بِسْمِ ٱللَّٰهِ ٱلرَّحْمَٰنِ ٱلرَّحِيمِ

King Fahd University of Petroleum & Minerals

Undergraduate Bulletin

2006–2009

Dhahran 31261, Saudi Arabia

638/10/2
2006
King Fahd University of Petroleum & Minerals
Dhahran, Saudi Arabia
Office of the Vice Rector for Academic Affairs
Undergraduate Bulletin 2006-09
500 p.; 16.5 × 23.5 cm
ISSN 1319 - 3430

Registered at
King Fahd National Library
under Legal Deposit No. 1058/15 on 19/5/1415H

Printed in the Kingdom of Saudi Arabia by
King Fahd University of Petroleum & Minerals Printing Press

About this Bulletin

The Undergraduate Bulletin of King Fahd University of Petroleum and Minerals (KFUPM) is an official publication issued by the Office of the Vice Rector for Academic Affairs.

This Bulletin was compiled during the 2005/2006 academic year from input by academic departments and administrative offices throughout the University and was printed in May 2006.

The Bulletin gives, at the time of printing, up-to-date information about all academic programs; some of which have been recently modified or introduced. It summarizes KFUPM policies, procedures, services and selected activities. It also gives information on admission criteria, academic regulations and requirements, the programs offered by academic departments and the services available to students. It is hoped that the Bulletin will help faculty, students and staff answer questions about academic matters such as University rules, curricula of programs, and courses and their prerequisites.

The Bulletin is distributed by the University Office of Public Relations, KFUPM, Dhahran 31261, Saudi Arabia. For further information, contact the KFUPM Public Relations Department or the specific department concerned. The Bulletin is also available on the website:
http://www.kfupm.edu.sa/kfupm/admissions/undergrad_bulletin.pdf

Dr. Ghassan A. Oweimreen
Professor, Chemistry Department
Editor, Undergraduate Bulletin
2006–2009

ACKNOWLEDGEMENTS

The editor expresses his gratitude for the support provided by the Vice Rector for Academic Affairs, Dr. Abdulaziz A. Al-Suwaiyan. Proof-reading of the bulletin and helpful comments from the Registrar, Mr. Ahmad A. Al-Dharrab, are gratefully acknowledged. Mr. M. Haseen Khan is thanked for providing the relevant University Council decisions. The dedication and hard work of many others throughout the University who provided the initial input is highly appreciated. The production of this Bulletin in its final form is the work of KFUPM Press. Particular thanks go to Engineer Ibrahim A. Al-Khaldi, Director General of Public Relations and Mr. Abdul Malik, the Director of KFUPM Press. Most of the photographs in the Bulletin were taken by Mr. Khalil Nasr of the KFUPM Public Relations Department.

FOREWORD

The revised Bulletin reflects the response of King Fahd University of Petroleum and Minerals (KFUPM) to the needs of the Kingdom of Saudi Arabia. It also reveals the adoption by KFUPM of what is suitable in recent trends in higher education and ensures that programs are equivalent to those accredited by international agencies such as the Accreditation Board of Engineering & Technology (ABET), and the Association to Advance Collegiate Schools of Business (AACSB). The Bulletin shows the extent to which KFUPM has accomplished its goals of attaining the highest international standards.

The periodic revision of the bulletin is also needed to update information on existing programs and on the addition of new programs or departments reflecting the dynamic growth of KFUPM in response to its aspirations to fulfill the country's needs. Examples include the introduction of the B.S. degree in Software Engineering by the Department of Information and Computer Science, the revision of the Preparatory Year Program and the establishing in 2002 of the Department of Aerospace Engineering. All newly added courses and changes in the descriptions and prerequisites of courses are also included.

I would like to conclude by thanking our faculty and dedicating this bulletin to them since, through their quest for excellence in education, they are the driving force for any success achieved by KFUPM.

Dr. Abdulaziz Abdulrahman Al-Suwaiyan

Vice Rector for Academic Affairs

20 May 2006

CONTENTS

GENERAL INFORMATION

HISTORY AND PHILOSOPHY OF THE UNIVERSITY

King Fahd University of Petroleum and Minerals (KFUPM) was officially established by Royal Decree on 5 Jumada 1, 1383 (23 September, 1963). The first students were admitted a year later, on 23 September, 1964, when 67 young men enrolled in what was then named the College of Petroleum and Minerals (CPM). Since that time, the University enrollment has grown to about 8,000 during the 2004–2005 academic year.

Two significant events have made the University's growth. The first of these was when the University conferred its first engineering degrees in 1971/72. In that year, four men received baccalaureate degrees. By the end of the 2004/2005 academic year 18,563 degrees were awarded including 1,821 Master's and 86 Ph.D. degrees. The second milestone was the official change in both name and status from a college to a university, which occurred in 1975, leading to the name University of Petroleum and Minerals, and later in 1986 to King Fahd University of Petroleum and Minerals.

The rapid growth of KFUPM is related to the rapid economic and technical development of Saudi Arabia. It also reflects the rising expectations of the people of Saudi Arabia, the expanding opportunities for the country's young men, and the increasing importance of Saudi Arabia as a major source of the world's energy.

The vast petroleum and mineral resources of Saudi Arabia pose a complex and exciting challenge for scientific, technical, and management education. To meet this challenge, the University has as its goals the advanced training of students in the field of science, engineering, and management for service and leadership in the Kingdom's petroleum and minerals industries and the promotion of research resulting in contributions to knowledge in these fields. In addition, because it derives a distinctive character from its being a technological university in the land of Islam, the University is unreservedly committed to deepening and broadening the faith of its Muslim students and to instilling in them an appreciation of the major contributions of their people to the world of mathematics and science. All areas of KFUPM — facilities, faculty, students, and programs — are directed to the attainment of these goals.

ORGANIZATION

King Fahd University of Petroleum & Minerals (KFUPM) is one of the eleven universities operated in the Kingdom by the Ministry of Higher Education, and regulated by the council of higher Education. It is an institution operating under a University Board, headed by the Minister of Higher Education. The Board has the responsibility for policy and control. It assigns to the chief executive officer — the Rector of the University — the principal responsibility for implementation of policy and the administration of the University. The

Rector is assisted by three Vice Rectors (for Graduate Studies and Scientific Research, for Academic Affairs, and for Applied Research), four supervisors (for Finance and Administration Affairs, for Technical Affairs, for Information and Community Technology Affairs, and for Public Relations and Information), and several advisory standing committees.

LOCATION

The University is located in Dhahran, near the headquarters of the Saudi Arabian Oil Company (SAUDI ARAMCO) in the Eastern Province of Saudi Arabia. The campus is situated near the Arabian Gulf at a distance of about 6 kilometers from the town of Al-Khobar, and 15 kilometers from the city of Dammam. The academic buildings are located on a hill (jebel) which is 35 meters above the surrounding desert. The University overlooks the Arabian Gulf, and is about 25 kilometers away from the island of Bahrain which can be seen from the roofs of academic buildings during clear weather.

The University is easily accessible by road or airline from any point in the Kingdom, or by international air, sea and road routes from Europe, Asia, Africa, or other Middle Eastern countries. The highway distance to Riyadh is about 400 kilometers and that to Jeddah is about 1,450 kilometers. A network of paved roads leads to various distant points, such as Najran, Abha, and Jaizan in the far south, to Burayadah and Hail northwest of Riyadh, to the lovely mountain resort of Taif near Makkah and Jeddah, and to Qaiysumah, Turaif, and Tabuk along the Northern frontier. King Fahd International Airport is about 40 kilometers from the University Campus, and regular airline service exists to all domestic and many international terminals.

FACILITIES

The campus of the University features a physical plan of exceptional beauty and size. Constructed on *Jebel* Dhahran, the buildings are both architecturally imaginative and educationally sound and viable. Their exterior design combines the stark color and raggedness of the landscape with the graceful lines of the Islamic arch, dome, and minaret. Interiors feature laboratories, lecture halls, classrooms, seminar rooms, offices and a variety of special facilities including computer terminals, closed circuit television outlets, and other amenities. All buildings are centrally air-conditioned.

The Academic Complex consists of 31 major buildings, all of them completed and in use. The facilities available include: faculty/staff offices; shops and laboratory buildings, which include the Heavy Equipment Laboratory building and the Energy Research Laboratory building; the Information Technology Center; classrooms; the Administration Building; the Library; the Faculty/Student Center, which includes the Faculty Dining Hall, the Post Office, and the Stationery Shop; the Auditorium, which seats 850 people and is equipped for simultaneous translation in three languages; the Gymnasium; a Mosque; the Research Institute; the Stadium, which seats 10,000 people; the Medical Center; the Conference Center; and multi-story parking garages. The facilities also include a natural exterior amphitheater, playing fields and indoor courts for intercollegiate and intramural sports, and the distinctive KFUPM water tower with circulatory water systems.

To the north of the *Jebel* there are: Student Housing, including the Student Reception Center, the Student Cafeteria, Mosques, Student Clubs and Services; a portion of the Faculty & Staff Housing;

the Projects & Maintenance Complex; the University Storehouse; the Security & Safety Department; the Transportation Center; the Garage for maintenance of University vehicles; and the Preparatory Year Campus, consisting of the Preparatory Year Faculty Office Building, two classroom buildings, and various laboratories and service buildings. A new Academic Complex is under construction, consisting of a classroom building, faculty office building, an auditorium for 1,200 people and a mosque. The buildings will be equipped with high-tech facilities.

To the south of the *Jebel,* there is faculty & Staff Housing, including the Community Center and the Coop Store. The Telephone Exchange, the University Press Building, the Bookstore, and the University Nursery and Kindergarten Schools are located on the southeast of the University campus.

The Conference Center

The Center is adjacent to the main University concourse and car park, has extensive modern facilities for hosting conferences of international level. In addition to the main auditorium, it has briefing and committee rooms and its own kitchen. Conference meetings are supported by the latest audio-visual equipment, Community Antenna Television (CATV), connecting with all parts of KFUPM campus, and its own typing facility.

The Medical Center

The KFUPM Medical Center provides the community with the following services:

- Primary health care.
- Laboratory & X-ray Facility in parallel to the available medical facilities.
- Referrals to the local governmental hospitals for hospitalization, further diagnosis and consultations.
- Multi-specialty clinics in Internal Medicine, Pediatrics, Gynecology & Obstetrics, Ophthalmology, Psychiatry, Dermatology, and Dentistry.
- Vaccinations, which include primary (essential) vaccinations for children, as well as participation in the national preventive campaigns.
- 24 hours first-aid service for management of emergency cases.
- 24 hours ambulance service to attend emergency cases.
- 24 hours nursing service which include giving injections, dressing and all possible nursing assistance, such as checking blood pressure and vision tests, etc.
- Few hours' observation inside the medical center, which ends up with either discharging the patients or referring them to hospitals.
- Issuing medical reports for residence permits (iqama), sick leaves, etc.
- Providing the majority of medicines according to the university policy.
- General dental clinics for dental care and oral hygiene.
- Check-up service for new employees including staff & faculty, laborers of KFUPM food services on a regular basis every three months, housemaids and drivers working for staff & faculty, and KFUPM school before registration and before frequent short activities.

Student Housing

The University provides student housing for the total student enrollment in keeping with its policy of being an entirely residential institution. The undergraduate student dormitories, which constitute the majority of student housing at this time, are in single-story, air-conditioned houses built of stone, containing furnished rooms, having two beds per room, showers and hygienic facilities. These units are located in the Student Compound *(AI-Falah District),* in the North Sector of the campus and have been modernized. As a part of the program of replacing these dormitories with newer facilities of modem design, consistent with the architecture of the University, some multi-story buildings have already been completed and being used. It is expected that a major portion of the Student Housing compound will be demolished and replaced with new dormitories, to be built in phases.

The University Cafeteria

A large spacious building — Student Cafeteria — is situated adjacent to the Student Dormitories. It can accommodate more than 1500 students at a time. Students are provided with subsidized meals, comprising of breakfast, lunch and dinner.

Preparation of food is handled by a well-qualified and professional team in the Central Kitchen, equipped with modern machinery and equipment. The Food Services Department makes sure that the food offered to students consists of a balanced diet, conforming to the Saudi Standards (SASO).

Apart from the Student Cafeteria, there are a number of Coffee Shops, located in different academic buildings and student dormitories, offering varied refreshments.

The University Bookstore

The Bookstore is located in Building #55, near KFUPM Press. Textbooks are issued to students and faculty free of charge.

As a large number of specialized textbooks are needed for different University programs, a comprehensive textbook acquisition system is followed to ensure that the latest editions of books are used, as far as possible.

Sports and Recreation Facilities

The University's major sports facility is the Stadium, located near the main entrance to the University. It is designed to seat 10,000 spectators. The Stadium is open and has facilities for VIP seating, press box, and TV booths. It is consistent with the style and construction of all other permanent buildings within the Academic Complex.

Other facilities available are: swimming pools, changing rooms, soccer fields, tennis courts, athletics track, basketball and volleyball courts, handball courts, squash courts, and athletic support facilities.

THE RESEARCH INSTITUTE

Research at the university can be classified into personal, sponsored, and client-funded. The first two categories involve faculty members who may follow their personal interest or participate in research sponsored by the university or other funding agencies. Client-funded research is administered by the Vice Rector for Applied Research and involves academic departments and Research Institute (RI). The RI is the focus of client-funded research at the university and its full time researchers together with faculty members with the appropriate expertise form teams to undertake research projects.

The mission of the RI is "to serve the nation by conducting client-driven research and development utilizing university resources." Among its objectives are: serve the nation as a professional problem solver; adapt imported technologies to the Saudi environment; serve the needs of government organizations, local industry, and businesses for research and development; develop local expertise and extend the Kingdom's knowledge base; support graduate and undergraduate programs at KFUPM, and contribute to the high quality education and training of students.

The first step in the process of client-funded research is often a technical memorandum submitted to prospective client(s) describing the university's applied research capabilities. In other cases, an organization may approach the RI to seek help in dealing with a problem it is facing. Alternatively, the RI may receive a request for proposal (RFP) to quote and undertake particular applied research work. The response in all cases will be a proposal describing the approach, scope, duration, and cost, with milestones and deliverables.

Clients normally contract for very specific studies. A project team is formed consisting of faculty members of appropriate background and experience together with selected RI full time researchers. This arrangement reflects the manpower pool for applied research consisting of RI professionals and faculty members.

The technical expertise for applied research available in the RI is focused in its seven centers with their sections/labs.

- Center for Applied Physical Sciences: The Metrology & Standards Section and the Central Analytical Laboratory.

- **Center for Communications & Computer Research:** Computer Technology, and Communications Technology Sections.
- **Center for Economics & Management Systems:** Business Incubators, Economic Studies, and Management & Quality Control Sections.
- **Center for Engineering Research:** Materials, Urban Areas Engineering, Engineering Analysis, Energy Systems Sections, and Material Characterization Laboratory.
- **Center for Environment & Water:** Water, Environment, and Marine Studies Sections.
- **Center for Petroleum & Minerals:** Petroleum & Gas Engineering, Petroleum Geology & Geophysics, Minerals Resources, and Remote Sensing Sections.
- **Center for Refining & Petrochemicals:** Refining, Petrochemicals, and Petrochemical Products Development Sections.
- Applied research support for the whole university is provided by the Research and Innovation Support Office, and the Support Services Office.

The activities encompassed by the RI include:

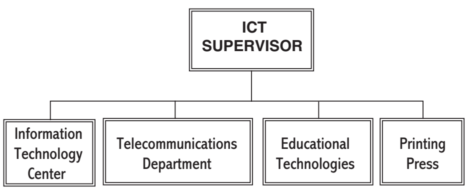
- Use of laser and nuclear techniques for applied research, measurement, and elemental analysis services;
- Studies in the areas of communications, computers, and information technology;
- Management organization, economic forecasting and database development;
- Studies related to mechanical, civil, and electrical engineering such as corrosion, traffic, pavement, electric power, simulation of engineering systems, and materials characterization;
- Atmospheric pollution monitoring, landfill waste disposal and groundwater quality, marine pollution, and water resources and irrigation system analysis and modeling;
- Optimization of production of oil and gas via appropriate drilling and extraction techniques, maximization of knowledge of oil and gas bearing stratigraphy, enhancement of oil exploration through remote sensing, and mineral resource studies;
- Development and improvement of catalysts, processes, and products. Improvement of polymer production processes, enhancement of use of polymers and plastics.

Typical some 50 client funded projects are active at any time, and about 100 project reports produced annually. Many hundreds of laboratory services are completed each year, and the number of clients served in a year is about 150. In addition, institute researchers produce over 100 publications in the open literature annually. Several patents have been generated and others are in process.

The manpower of the RI as of 01 January 2005 are 258 full-time employees, of with 53 held PhD degrees, 64 held MS degrees, 50 held BS degrees, and 91 held other credentials. Project teams are typically formed of 35% full time RI researchers, 25% faculty members, 10% students, and 30% support staff.

INFORMATION TECHNOLOGY CENTER

The Supervisor, Information & Communications Technology (SICT) position was established at KFUPM on January 29, 2005. The SICT acts as the Chief Information Officer (CIO) for KFUPM. He focuses on the development of information and communications technology at KFUPM. This development should be aligned with the University strategic IT plan along with the academic and administrative goals. The SICT reports to the Rector of KFUPM (CEO). Four departmental heads are reporting to SICT, namely, the Director of Information Technology Center (ITC), the Director General of Educational Technologies, the Administrator for Telecommunications, and the Director of Press.

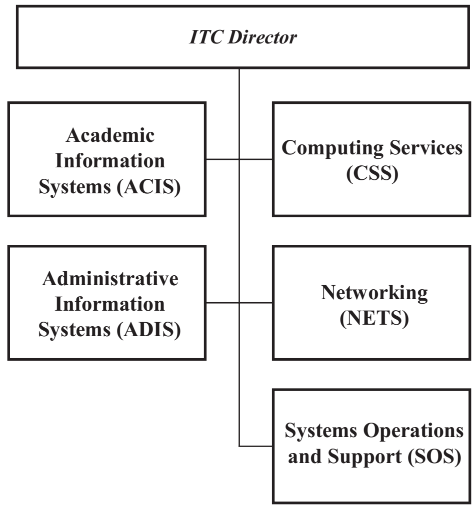


The Information Technology Center (ITC) is the primary computing facility at KFUPM. It provides computing support for education, research, and management at the University. It also provides services to various government and industrial agencies.

Organization of ITC

The ITC consists of the following departments as shown in the figure below:

Academic Information Systems (ACIS);
Administrative Information Systems (ADIS);
Computing Services Department (CSS);
Networking (NETS); and
Systems Operations and Support (SOS).



The CSS department serves the faculty, students, staff and the Research Institute with extensive IT consulting services and help desk support in addition to comprehensive examination generation and grading services and maintenance of hardware equipment. The department supports faculty, students and staff in the design and integration of technology into their teaching, learning and research work. In addition it provides faculty, staff and students with the computing skills they require. CSS also supports general purpose and teaching PC Labs in addition to smart classrooms. The ADIS department maintains the University's administrative applications such as payroll, personnel, financial accounting systems, material management, etc. In addition ADIS department has a software development section for developing new applications or reengineering of existing administrative systems. The NETS department is a service department for all the networking infrastructure, management and security in the University. The ACIS department is responsible for all applications related to student information. In addition, the ACIS department has sections that provide technical support to the University Libraries and their automation systems and services in addition to Web, portal, process workflow and document management support services. Finally, the SOS department provides systems and operational support to different operating system platforms (UNIX/AIX on RS/6000, z/OS on z/800, Win2K & Linux on Intel). Server administration of course management systems is also handled by SOS.

ITC Mission

ITC is committed to providing high-quality information services that foster a productive academic and research environment for students, faculty, staff, and management at KFUPM.

The Network

Networking facilities at KFUPM have seen exponential growth over the last five years. Networking facilities, which started with Novell based PC labs, now comprise a fiber optic Gigabit Ethernet backbone serving more than 7000 fast-Ethernet switched network points. All faculty offices, classrooms and PC labs are connected to the network. Faculty houses and multi-story student dorms buildings are also connected to network. The network is also enhanced to provide wireless LAN connectivity to selected buildings across the campus. Dial-in facilities are also available.

General-Purpose PC Laboratories

ITC operates several general-purpose PC labs throughout the campus. These labs provide PC's for accessing the network as well as printing facilities. The locations and operation hours for each of these labs are announced in the ITC web site.

Internet and E-mail

All faculty and students at KFUPM are provided with internet and e-mail services. A faculty member needs a login ID and password for these services, which can be obtained from the ITC. The use of these services is expected to be in compliance with the applicable rules and regulations, provided at the time of application. Faculty members can also post their course or personal web pages. Such services can be obtained by contacting the ITC.

Departmental Support

The CSS department of ITC provides technical support to all academic departments PC labs, which are operated by the departments themselves. It also provides support services to faculty using technology in their learning and teaching. Technology training is also provided. e-Learning facilities are also available.

Smart Classrooms Support

The ITC is also introducing technology into classrooms. Smart classrooms create new opportunities in teaching and learning by integrating networking, computers, and audio visual technologies. Currently there are more than 100 smart classrooms on the KFUPM campus available for faculty use. By the end of 2006, additional smart classrooms will be added, expanding its number to include all the university classrooms.

User Support

The CSS staff provides a wide range of support services to faculty members. A help-desk to answer queries is operated during daytime office hours. It also provides assistance to faculty members regarding hardware and software installation and support. In addition, ITC offers frequent short courses, tutorials, awareness seminars and workshops on PC applications as well as general user-orientation of university computing facilities.

Online storage administration and maintenance is provided by ITC (9.0 TB Storage Area Network, SAN) supporting Server e-mail Inboxes and enterprise storage backup solution for all platforms, AIX, Linux, W2K, and z/OS that is based on the IBM Enterprise Storage Server (ESS-800). Network Attached Storage (9.0 TB Storage, NAS) space is provided using the advanced F-825 filer from Network Appliance. Each faculty/staff can get a free space of 500MB on the filer storage and 200 MB quota per Student (for storing home directories as an additional disk space).

ITC also provides high speed 24/7 network connectivity to faculty housing using ADSL technology.

For additional information, please visit the following URL: www.kfupm.edu.sa/itc

LIBRARY

The University Main Library is centrally located in Building 8 within a walking distance of most classrooms and laboratories. It is an "open stack" library, allowing users free access to its resources. Reading areas are provided on the first, third, and fourth floors. Seven reading rooms are available on the third floor for serious reading, student–teacher meetings and discussions. To encourage and maximize utilization of its resources and services, the University Library operates with minimum regulations and restrictions.

The current collection of monographs and bound periodicals totals 394,955 volumes, of which 75% is in Science and Engineering, and the remaining 25% in Humanities and Social Sciences. In addition, there are 487,300 research reports on microfiche, 2,035 educational films and other media, subscriptions to about 904 periodical titles (of them many titles are available in both print and e-journal formats) and 37,530 reels of journal back issues on microfilm, in addition to 73,737 of materials available in multimedia format; audiovisual and films which constitute one of the main resources of our collections.

The Library additionally, has a fine collection of electronic resources, including 14 full-text databases on the Internet and 42 bibliographic databases (providing access to 32 multiple databases). Remote access to all the databases is available through the university-wide network. The Library also provides online access to more than 8,000 international e-journals.

The Library serves all the University community. In addition, it provides borrowing privileges and other services to local government agencies and private institutions.

Library services include:

a. Circulation of library materials,

b. Reference and Information Services,

c. Research assistance, including literature searches and on-line searching of bibliographic and full-text databases,

d. Audio Visual and Multimedia Services,

e. Interlibrary loan and photocopy services, and

f. Library instruction (orientation of new faculty and preparatory year students in effective use of the Library).

There are two separate Internet search labs for faculty and students with over 35 workstations providing access to electronic resources through Intranet and Internet.

Audio-Visual materials and services are provided through a well-equipped AV department. The Department's present collection consists principally of microforms, motion pictures, videotapes, multimedia materials (CD, DVD). The Library Auditorium is used by faculty and students for projection of AV materials, and also for seminars, lectures, short courses, theses defense, and other presentations.

The Library currently uses the Horizon library system, which has all the features of a modern system, including client/server architecture, GUI, Internet interface, etc. With these features, users are able to perform multiple tasks from a single workstation, including access to the Internet, KFUPM Intranet and the Horizon Information Portal (HIP), a web-based catalog.

DEANSHIP OF ACADEMIC DEVELOPMENT

The faculty, curricula, and facilities are the key components of the academic system of any University. The effectiveness of each of these components directly influences the effectiveness of student learning. King Fahd University of Petroleum and Minerals (KFUPM) realized from the very beginning the vital importance of continuous improvement and development of its faculty, academic programs and instructional technology which forms the corner stone in the quality of its graduates. Although the University has a rigorous academic system based on the regulations of the Ministry of Higher Education, on international standards and through various academic committees at all University levels, it has always been dynamic in exploring ways and means that lead to excellence in all academic activities. The Deanship of Academic Development (DAD) has therefore been established to help the university community, particularly the faculty members, to increase their effectiveness in teaching and learning, to insure the highest quality in academic programs, and to utilize the latest technologies in teaching.

DAD was originally established as the Academic Development Center (ADC) in the year 2000, which was later promoted to a Deanship in the year 2003. The DAD creates a focal point for the emphasis on academic matters such as teaching excellence, program development, quality assurance, and e-Learning at KFUPM. It deals directly with issues related to the development of academic excellence for all faculty members through a variety of means such as workshops, discussion forums, seminars, publications, and faculty peer consultation.

Objectives

The DAD mission will be accomplished by assisting the academic departments in their pursuit of the following objectives:

1. *Excellence in teaching:* Enhance the teaching effectiveness of faculty and teaching assistants that provide instruction consistent with the best systems on quality teaching and learning.
2. *Excellence in research:* Continuous improvement of faculty development to enable faculty members to reach their highest potential in research and to progress in academic rank in a timely fashion.
3. *Effective processes and methods:* Enhance the effectiveness of processes and methods that are critical to teaching and research.
4. *Quality assurance:* Assist the departments toward the quality assurance of their academic programs and academic advising.

Activities and Services

In order to achieve its objectives, the DAD identified specific fields of interest, which are reviewed periodically according to the University's evolving plans and polices. The main areas currently under the DAD focus include:

- Faculty development to enhance teaching, learning and research productivity;
- Quality assurance of academic programs;
- Assessment of student learning;
- Self-Assessment of Academic Programs;
- Development of administrative skills;
- Instructional technologies;

- Development and delivery of quality online courses;

The DAD offers most of its services to the University community through its four Centers. It provides a range of academic development workshops, discussion forums and seminars in which international, national and local experts participate. The Deanship, through its Centers, sponsors activities related to teaching, research, faculty evaluation, student learning and curriculum often with a specific audience in mind, such as new faculty, heads of departments, and college deans. The Deanship also conducts training programs on web-based education and develops its own expertise in this direction. In addition, personal consultation is available to any faculty member to enhance his teaching.

DAD also provides financial support/incentives through various grants to enable faculty to meet their objectives. The faculty members involved are expected to conduct studies in the various academic development areas such as faculty development; enhancement of the learning environment; technology-enhanced learning, etc. The Deanship is keen to collaborate with members of the University community on issues that lead to academic development at KFUPM. DAD also manages a resource center, offering a range of books, newsletters, journals and multimedia references such as videotapes, CD's, slides and other materials relating to its main areas of interest, especially teaching and learning and quality-assurance related issues. In addition, the Deanship publishes the proceedings of its workshops and discussion forums, as well as pamphlets on research and practices relating to teaching, learning, assessment and evaluation. These resources can be accessed by contacting the Deanship office.

Organization of the Deanship of Academic Development

The Deanship of Academic Development (DAD) has four centers under its patronage namely:

1. Teaching & Learning Center
2. Program Assessment Center
3. e-Learning Center
4. Testing & Evaluation Center.

Each center carries out various activities in its specific domain and is headed by a Director who reports to the Dean. The Dean reports directly to the Rector of the University. A standing Committee on Academic Development comprised of members from various academic departments of the university, also supports in carrying out the activities of the Deanship.

Teaching & Learning Center

Introduction

King Fahd University of petroleum & Minerals (KFUPM) believes that every individual at KFUPM has a right to experience personal growth and development through enriched academic opportunities. The purpose for establishing the Teaching & Learning Centre (TLC) at the year 2003, as one of the centers of the Deanship of Academic Development, is to provide such experience by promoting excellence in teaching at all ranks and excellence in student learning inside and outside the classroom. The TLC activities include workshops, mini-courses, seminars, consulting services and resources to the faculty and graduate teaching assistants to enhance teaching and learning. The TLC also administers several special programs including academic development grants.

Objectives

The primary objective is helping students to learn better. Other specific objectives include:

1. Fostering an environment of continuous academic development.
2. Assisting faculty members to attain their highest potential in teaching and research.
3. Providing instructional assistance to new faculty on campus.
4. Encouraging the use of new instructional technologies.

Activities, Services and Grants

To achieve its objectives TLC provides a variety of activities, services and grants. These include training, support, and professional development programs for faculty, academic professionals, and academic departments.

Activities

The activities offered by the TLC include:

- Workshops, Discussion Forums and Seminars.
- Microteaching: TLC organizes and facilitates microteaching workshops in which six to eight participants present brief lessons in their field, and then receive feedback from their peers.
- Department-Based Workshops: TLC encourages and support departmental-based workshops on topics related to teaching and learning.

Services

The services offered by TLC include:

- Class Videotaping and Consulting.
- Peer Consultation in Teaching: The main objective of Peer Consultation in Teaching (PCT) is to provide faculty members with formative feedback on their teaching.
- Teaching Consultation: Offers Discussions with Peer (senior) consultants who have been working with a number of faculty members and observed a good number of classes.
- Resource Room: DAD administers a room, which has a collection of publications on the subject of faculty development and the enhancement of teaching and learning.

Grants

TLC offers a number of academic development grants. Areas of the grants include:

- Enhancement of learning environment.
- Technology enhanced Learning.
- Faculty Development.

Program Assessment Center

Introduction

Continuous assessment is the key for quality assurance at the university. The aim of assessment is to understand how educational programs are working and to determine whether they are contributing to student growth and development. Program assessment focuses on programs rather than on individual students. It provides information on whether the curriculum as a whole provides students with the knowledge, skills and values that graduates should possess in accordance with its mission and set goals and learning objectives.

The new trends in accreditation criteria have brought outcome assessment to focus. Accrediting agencies such the Accreditation Board for Engineering and Technology (ABET), the Association to Advance

Collegiate Schools of Business (ACCSB), the Computer Science Accreditation Board (CSAB) and the National Architectural Accrediting Board (NAAB) require programs or colleges seeking accreditation to have self-assessment. Industry push and competitive job markets have also contributed to the need for continuous program quality improvement that focus on student learning and preparation for professional practice after graduation.

The Program Assessment Center (PAC) at KFUPM strives to achieve its mission towards developing quality education that meets local industry needs following reputable international standards. It provides the necessary services and support for the various academic programs and research units at the University. It also facilitates and coordinates their efforts to meet their objectives and institutional goals.

Objectives

1. Promote the culture of assessment university-wide;
2. Improve and maintain the highest academic standards at KFUPM;
3. Enhance students' learning outcomes;
4. Provide support for academic programs and research units to meet their objectives and institutional goals;
5. Provide feedback for quality assurance of academic programs and research units;
6. Prepare the academic programs for national/international accreditation.

Means and Activities

The Program Assessment Center strives to achieve its objectives through the following means and activities:

- Establish regulations and guidelines related to curricula and academic programs development;
- Establish regulations, guidelines and mechanisms for academic programs and research internal and external assessment and accreditation;
- Coordinate and facilitate activities for academic programs and research self-assessment and national/international accreditation;
- Organize lectures, workshops and short courses on the means of program assessment and curricula development;
- Develop and review campus-wide general education and major assessment plan;
- Review academic departments assessment plans, feedback processes and reporting strategies;
- Provide feedback to departments about their assessment reports;
- Facilitate the review and evaluation of students' learning outcomes;
- Assist in developing and updating assessment procedures and policies, monitor their effectiveness and suggest modifications as appropriate;
- Identify gaps in assessment information and recommend mechanisms for assessment activities and changes in the assessment process;
- Provide recommendations for improvements and new initiatives based on assessment findings.

The Program Assessment Center offers support, consultation and training for KFUPM faculty on assessment and accreditation issues. It keeps KFUPM faculty, academic and research departments updated on assessment and accreditation related issues through the invitation of reputable International speakers to conduct workshops and deliver seminars on the subject. The Center also keeps links with national and International assessment and accreditation organizations and invites International professionals to participate in the self-assessment teams of the various programs of the University.

e-Learning Center

Introduction

The e-Learning Center strives to achieve excellence in teaching and enhance the quality of teaching and learning through the effective use of web-based education which proves to be useful in enhancing education, reaching more students and enhancing self-paced learning.

Objectives

1. Raise KFUPM community awareness of the potential of e-learning in enhancing teaching and learning;
2. Promote the development and delivery of quality online courses;
3. Provide training and support consistent with the best information on quality online teaching;
4. Ensure educational quality and efficiency in e-learning activities;
5. Promote and conduct pedagogic research and development related to e-learning activities at KFUPM;
6. Establish quality distance education program at KFUPM.

The e-Learning Center also provides the following services to the university community:

Awareness Events

The Center regularly organizes public events on different issues related to e-Learning, like benefits and limitations of e-Learning, instructional design, online teaching, etc. Speakers of international repute in e-Learning are invited to conduct these events.

Software and Resources

The e-Learning Center provides all necessary software, like Course Management Systems (CMS), Authoring tools, Assessment tools, etc., to ensure successful delivery of e-Learning activities. Currently the e-Learning Center is providing WebCT for KFUPM community. In addition, the Center provides a range of books, journals, videotapes and other materials related to e-Learning available in the DAD Resource Center.

Training Workshops

Hands-on training programs are frequently conducted for KFUPM faculty to enable them to develop effective web-based instruction. These training programs cover a wide range of topics starting from instructional design of online courses where participants are introduced to various concepts and tools that help in designing pedagogically sound online courses to the development of web-based content using various web-based content development tools. In addition, the Center provides training on WebCT and its tools to enable faculty members to publish their courses online.

Grants

The e-Learning Center, through the DAD, awards grants for the development of some KFUPM courses as comprehensive online courses, which could be delivered completely through the web. In addition, DAD awards grants to encourage research and development in the area of technology-enhanced learning.

Online Instructional Material

The e-Learning Center provides support to develop online courses. Faculty members provide only the content of the online course and the support team in the e-Learning Center does the rest of the job. In addition, the e-Learning Center provides assistance to all KFUPM faculty members to develop quality online instructional material to enhance student learning.

e-Learning Quality Standards

To ensure quality in all e-Learning activities at KFUPM, the Center has started the development of guidelines and quality standards for e-Learning processes like copyrights, content development, course delivery, assessment and evaluation, online teaching, infrastructure, etc.

Testing & Evaluation Center

Introduction

The Testing & Evaluation Center is a specialized resource for support and training in methods of test construction and validation, meant to provide further stimulus for active learning and objectives-based instruction. A significant component of the work of the Center is student selection; the resolve is to target high standards of excellence, while abiding by the rules of fairness and equity. Placement exams as well as exit exams are other important components of the work of the Center. Study and evaluation of indicators of student and faculty performance indicators are another major concern for the Center.

Objectives

1. Examine existing proficiency exams, with particular reference to entrance examinations, and introduce new test construction techniques, based on sound statistical and research practice, with improved reliability, validity and economy;
2. Make the Center available to all departments and faculty members for consultation on test construction techniques, and methodology for improving item writing, and test reliability and validity, without jeopardy to other equally significant features of good testing, such as content and construct validity;
3. Organize workshops and seminars on test construction techniques, for the benefit of KFUPM community, and other institutions in the region, as well;
4. Follow modern trends in test adaptation and creation, and maintain ties with domestic and international organizations for a useful exchange of information on the quality and efficiency of assessment through joint research and experimental development;
5. Conduct research on issues relating to student performance.
6. Develop a career counseling mechanism.

Office of Planning and Quality

As the University moves forward to the next phase of its growth and evolution, it unerringly recognizes that it must improve its functional efficiencies with proactive policies and processes, and strategically align the University to seize the emerging opportunities and counteract the competitive threats. With this realism, the Office of Planning & Quality (OPQ) is committed to provide services to the University in three key areas: *Strategic Planning, Quality and Process Improvement, and Information and Data Management*.

Mission

The mission of the OPQ is to review, update, and, if necessary, redevelop University's strategic plan that aims to address the strategic directions of the University in Teaching and Learning, Research, and Community Service, to improve the quality of services and the processes, and to provide University decision-makers with data and information designed to improve the quality of planning and to make informed decisions.

Objectives

The objectives of the Office of Planning & Quality are:

a. to be proactively involved in all stages of strategic plan, including identification of strategic issues, review and updating of the strategic plan in place, and redevelopment of the plan as and when necessary;

b. to provide advice and support services for quality management plan through improvement in processes and controls;

c. to provide the decision-makers with data and information that are required for all aspects of planning, bench marking and quality assurance program.

Tasks

The specific tasks of the OPQ in the three main areas are stated in this section with brief introductory statements.

Strategic Plan

In a competitive world that constantly witnesses a changing landscape of opportunities and threats, a strategic plan is necessary for an institution to grow and expand. Strategic planning is a structured approach to anticipating the future and exploiting the inevitable, and it sets the major directions of the institution. The specific tasks of the OPQ in this area are listed as follows:

- Review, (Re-) development and Updating of Strategic Plan
- Coordination and Monitoring of the Implementation Plan
- Performing Gap Analysis
- Development of Communication and Awareness Campaign

Quality and Process Improvement

Efficient and effective processes contribute to responsive and productive organizations by eliminating inefficiencies, outdated and redundant activities, and burdensome rules and practices that hinder enterprise performance. The specific tasks of the OPQ in this area are listed as follows:

- Identify the problem areas that offer the greatest opportunities to improve and/ or require the most urgent attention through surveys of faculty, students and staff, analysis of key performance indicators or benchmarking data, and analysis of areas that are engulfed by high cost and low return;

- Prioritize the areas identified;
- Develop studies to identify quality improvement opportunities in selected areas;
- Develop implementation plans for the University units to execute;
- Follow-up with the units to assess the results of the quality improvement studies;
- Provide support to the units through advice and recommended actions for improved operational efficiencies of the processes in place;
- Establish a grant program through which teams from within the University can be invited to conduct process and quality improvements studies as and when needed. When warranted, consultants from the outside can be engaged to perform a specific task.

Information and Data Management

Accurate data and timely information are essential for planning and decision-making. As the sources of data and information are multiple, the OPQ can function as a custodian of data and information for the University, serving as a single-source that can be tapped to procure data and information needed for any planning or activity. The specific tasks of the OPQ in this area are listed in below

- Managing, Coordinating and Analyzing Data to support the University planning
- Development of the Key Performance Indicators
- Collection of Benchmarking Data and Indicators
- Document Management System
- Annual University Report and Statistical Analysis.

DEANSHIP OF STUDENT AFFAIRS

From the date of entry in the University until graduation, the Student Affairs provides an environment for students to participate in academic and nonacademic activities and offers all necessary services through the following departments:

Student Services Department

The Student Services Department offers important services to the students such as the issuance of university ID cards, student certification letters, final clearance letters, concession letters for travel, student monthly stipend, honors students allowance, contact with the student guardians/ parents, issuance of official and medical excuses, follow-up of sponsored students and ensuring the completion of student files. The student filing section is responsible for keeping a student's records.

Student Housing Department

KFUPM is much concerned to offer suitable accommodation to its students and no doubt suitable accommodation plays an excellent role in increasing academia achievements. The University has provided a separate area for the Student Housing on campus consisting of buildings which accommodate about 2000 students. This is in addition to the already existing 67 barracks which accommodate about 2,200 students thus bringing the total of students residing on campus to 4,200. Presently the construction of Phase-I housing buildings is in its final stage and will accommodate 1500 students. In addition Phase-II of students housing is under construction which will also accommodate about 1500 students.

Student Activities Department

The Student Activities Department provides an environment for the students to develop their personality by involving them in numerous extra-curricular activities. For this purpose, there are a large number of student clubs that give the student a chance to participate in scientific, cultural, social or sports activities.

Cooperative Program Department

The Cooperative Program (Coop) is a structured educational strategy, integrating the theoretical knowledge learned in the classrooms and laboratories with real world experiences. The Coop was first introduced at KFUPM in 1970. It is one of the graduation requirements and is considered as a graded nine (9) credit hours for students in some academic majors. The Coop majors extend for a period of twenty-eight (28) weeks. The objectives of the program are to enable the student to link theory and practice, provide guidance for future career opportunities, familiarize the student with the work environment after graduation, develop the student's work ethics, communication, management, and teamwork skills, and establish strong relationships between the university and industry. The Coop Department is responsible for coordinating with the employers to provide suitable training opportunities for the students.

Summer Training Department

The summer training program is similar to the cooperative program in its objectives except that it lasts for eight (8) weeks. It is one of the graduation requirements for some academic departments. The Summer Training Department is responsible for coordinating with the employers to provide suitable training opportunities for the students.

Alumni Department

The Alumni Department is responsible for facilitating career guidance, job search, and the relationship with students after graduation. It is also responsible for the distribution of the student's official certificates, alumni identification card, updating the addresses and contacts of the alumni and maintaining a computerized database for their information, preparing for the Career Day and Open Day activities that introduce the employers and students to each other, arranging orientation sessions for successful job searches, resume preparation and interviews, participating in the annual graduation ceremonies, and providing employers with requested information regarding the alumni for the purpose of recruitment.

Alumni Club

The KFUPM Alumni Club was established by the University Board in 1420 H/1999. The location of the club and its headquarter is at the University in Dhahran. Some of the major objectives of the club include:

- Enhancing the role of alumni in providing services to the country and the university.
- Strengthening relationship and communication between the university and its alumni.
- Providing moral and financial support for the university programs and activities.
- Strengthening relationship between the university and establishments where university alumni are working, for the benefit of society, country, and the alumni.
- Making awareness amongst university students about their future role after graduation, and advising them through former alumni colleagues about the benefits they may expect.
- Participating and cooperating with the university to achieve its educational, cultural, and social objectives of well aware generation of young graduates.
- Making use of educational and practical experience of alumni through their participation in the projects and programs designed by the university.

There are three types of the club membership, Active, Associate, and Honorary. Several services are provided to the members, such as, participation in the club activities & programs, using some university facilities, getting discounts on the fees of some services as applicable, receiving the publications of the club and any additional privileges and benefits offered by the club to its members.

Counseling and Advising Center (CAAC)

The main objective of the CAAC is to help equip KFUPM graduates with the right technical information and the proper personal skills. It aims at providing all students with academic and social counseling and advising. The CAAC has many objectives, among which are the following:

1. Assisting the students to achieve psychological, social and academic adjustment.
2. Psychological prevention of emotional and psychological disorder through primary and secondary prevention.
3. Assisting to modify unwanted behavior.
4. Psychological support to face psychological, social and academic stresses.

5. Holding lectures, workshop and discussions for educational and preventive goals.
6. Provide psychological, social and academic help, guidance and advice to all students.
7. Prepare new students for university life.
8. Activate/improve academic advising.
9. Strengthen academic performance and develop personal and career skills.
10. Looking after students with poor academic performance and providing the necessary guidance and follow ups.
11. Studying the behavior and common practices of student and the expected effects.
12. Catering for gifted and talented students.
13. Sharing the activities of academic development programs.

The services provided by the CAAC include counseling in one of the following forms:

1. *Individual Counseling:* A student meets with a counselor on a one-to-one basis to work through personal concerns.
2. *Group Counseling:* Counseling in groups offers a broad range of insight and support from peers and professional counselors.
3. *Student/Guardian Counseling:* Couples counseling works toward alleviating the strains in a close relationship. In such cases, one of the relatives, usually the father or a brother, are contacted and asked to visit the center.

Counseling is a collaborative process, which involves the development of a unique, confidential helping relationship. The CAAC treats all of its contacts with students in a highly confidential manner.

In addition, the CAAC arranges and conducts skill-building workshops and interactive seminars, which provide a structured presentation of information and skills practice appropriate to the students' personal development and career in the University. The CAAC is participating in the issuance of bulletins and brochures on different topics that relate to student life and skill development. The Center is in charge of the student part time employment program as well as the supervision of the student residential units program. In addition, it participates in planning and conducting the introductory (preparatory) program for new students. Furthermore, the Center takes care of student loan and financial aid requests and special housing requests and makes the appropriate recommendation. It also interviews students who are planning to withdraw from the University and provides them with appropriate alternatives.

Faculty members are encouraged to utilize the services of the CAAC by referring the student to the Center or by seeking advice on what might be done for a particular student or group of students.

RELIGIOUS AFFAIRS

Religion is an important part of student life, and both individual and group activities are available. Students are encouraged individually to go to the mosques on the campus for prayers and to utilize the large collection of books on Muslim thought available in the University Library. In addition the University provides special programs of group activities in the spirit of Islam. There is a full-time Religious Advisor available in the student housing area for advising and counseling individuals or groups, and also supervises or directs a variety of religion-oriented activities e.g.,

1. Religious seminars held throughout the week.
2. Meeting and study sessions after Al-Isha or Al-Fajr prayers and religious issues are discussed.
3. Religious symposia and open discussions are held periodically and often attended by faculty and staff members as well as students.
4. Lectures are delivered by reputable religious scholars. These are organized by the Islamic Studies committee.

GRADUATION

Upon satisfactory completion of all requirements for a degree from the University, students are invited to participate in the graduation ceremony. This colorful, time-honored university tradition, was instituted at KFUPM in 1972, and was the first such ceremony to be held at a university in the Kingdom of Saudi Arabia.

A unique feature of the graduation ceremony is the dress worn by graduates. Designed especially for KFUPM, the gown is the Arabian *meshlah*, featuring color of the specific college from which a particular student graduates. Instead of the usual "mortarboard" cap, the KFUPM graduate wears his traditional *ghutra* and *egal*.

The ceremony and the dresses are an impressive blending of academic and Arabian traditions.

ACADEMIC REGULATIONS

ACADEMIC REGULATIONS AND IMPLEMENTATIONS

The Undergraduate Study and Examinations Regulations and the KFUPM Rules for Their Implementation issued by the Deanship of Admissions and Registrations, First Edition 1417H/1996, is the basis of Articles (A1) to (A53) and their Implementations, provided herewith.

The Deanship of Admissions and Registrations will provide any further assistance in this matter.

DEFINITIONS OF TERMS (A1)

The Academic Year

The academic year is two regular semesters and a summer session, if any.

The Academic Semester

The academic semester is a term of no less than (15) weeks of instruction not including the registration and final examination periods.

The Summer Session

The summer session is a period of instruction not exceeding (8) weeks not including the registration and final examination periods. The weekly duration of each course in the summer sessions is twice its duration during the regular academic semester.

The Academic Level

The academic level indicates the study level. The levels required for graduation are eight or more, in accordance with the specifications of each approved degree program.

The Course

The course is a subject of study within a certain academic level of the approved degree plan in each major. Each course has a number, code, title and a detailed description of its contents which distinguishes it from the other courses. A special file of each course is kept in the corresponding department for follow up, evaluation and updating purposes. Some of the courses may have pre-requisite or co-requisite requirement(s).

The Credit Hour

The credit hour is each of the weekly lectures, with a duration not less than 50 minutes or a laboratory session or field study of not less than 100 minute duration.

Academic Probation

Academic probation is a notification given to a student with a cumulative GPA below the minimum acceptable limit as explained in these regulations.

Class Work Score

Class work score is the score which reflects the student's standing during a semester according to his performance in the examinations, research and other activities related to a particular course.

The Final Examination

The final examination is an examination in the course, given once at the end of every semester.

The Final Examination Score

The final examination score is the score attained by the student in each course on the final examination.

The Final Score

The final score is the total of the class work score plus the final examination score calculated for each course out of a total of grade of 100.

The Course Grade

The course grade is a percentage, or alphabetical letter, assigned to a student, indicating the final grade he received in a course.

Incomplete Grade

Incomplete grade is a provisional grade assigned to each course in which a student fails to complete the requirements by the required date. This is indicated in the academic record by the letter grade "IC".

In Progress Grade

In progress grade is a provisional grade assigned to each course which requires more than one semester to complete. The letter grade "IP" is assigned in this case.

Semester GPA

Semester GPA is the total quality points the student has achieved, divided by the credit-hours assigned for all the courses the student has taken in any semester. The quality points are calculated by multiplying the credit-hours by the grade earned in each course (see Table 1).

Cumulative GPA

Cumulative GPA is the total quality points the student has achieved in all courses he has taken since his enrollment at the University, divided by the total number of credit-hours assigned for these courses (see Table 1).

Graduation Ranking

Graduation ranking is the assessment of the student's scholastic achievement during his study at the University.

DEFINITIONS OF TERMS USED IN THE IMPLEMENTATION RULES

The Grading System applicable at KFUPM

Table 2 shows the grading system applicable at the University including the points assigned to each grade. The maximum GPA a student may attain is 4.00.

Major GPA

The major GPA is calculated on the basis of all the letter grades assigned in the courses taken in the student's major department, in addition to the other accredited courses. The major GPA is determined by the last grade assigned in each course.

The Credit-Hour for the Laboratory or Field Sessions

The duration of laboratory sessions or field study usually ranges between 150 to 200 minutes, but is not less than 100 minutes for any program.

The Admission & Academic Standing Committee

This is a consultative committee set up by the Rector of the University to study applications for transfer, readmission petitions, suspension, and dismissal, and to reach the appropriate recommendations, in accordance with the regulations.

Promotion Exams

These are examinations held at the University for students who achieve outstanding results in the admission exam or at the end of their first preparatory year semester, for exemption from the preparatory year courses.

The Cooperative Program

Some students are required to spend 28 weeks of cooperative work in their major field. These students should regularly consult their advisor about their work. Students must complete the cooperative program before the end of their last semester at the University.

Summer Training

Some students must spend an eight-week summer training period in their major field. These students must complete the summer training before the end of their last semester at the University.

ADMISSION OF NEW STUDENTS

Based upon the recommendation of the college councils and the other concerned bodies of the University, the University Council determines the number of new students to be admitted in the following academic year (A2).

The Deanship of Admissions & Registration prepares a draft recommendation to the University Council in coordination with the Deanship of Educational Services regarding the number of students to be admitted into the university during the following academic year.

The Deanship of Admissions & Registration and the colleges in the University coordinate with each other in the matter of determining the majors of the students who are expected to complete the preparatory year program. The major for these students will be determined according to their own choice.

Admission Requirements

Applicants having Saudi secondary school certificates must have majored in the natural, or technological sciences, or the administrative and social sciences. If the applicant earned his secondary school certificate from outside the Kingdom, equivalent requirements apply (A3).

An applicant for admission to the university must satisfy the following conditions.

a. he should have the secondary school certificate, or its equivalent from inside or outside the Kingdom of Saudi Arabia.

b. he should have obtained the secondary school certificate in a period of less than 5 years prior to the date of application. However, the University Council may waive this condition if the applicant has a satisfactory explanation.

c. he must have a record of good conduct.

d. he must successfully pass any examination or personal interviews as determined by the University Council.

e. he must be physically fit and healthy.

f. he must obtain the approval of his employer, if he is an employee of any government or private agency.

g. he must satisfy any other conditions the University Council may deem necessary at the time of application.

Admission is granted to applicants who satisfy all admission requirements, and is based on the applicant's grades in the secondary school examinations, the interviews and admission examinations, if any (A4).

THE PREPARATORY YEAR PROGRAM

All newly admitted students are required to complete the preparatory year program before starting their undergraduate study. Students may be exempted from part or all of this entire program according to the implementations rules of the promotion exam.

The majority of newly admitted students join the preparatory year program, which aims at preparing students for undergraduate study, in particular to achieving the following goals:

a. to improve the proficiency of students in English before they undertake undergraduate study;

b. to develop and improve the students' knowledge of mathematical and analytic techniques through the medium of English;

c. to introduce students to new subject areas and techniques such as workshop and graphics, thus improving their mental and manual skills;

d. to familiarize students with the various majors available at the University;

e. to improve students' physical health and stamina through the Physical Education program;

f. to familiarize students with the requirements of undergraduate study, including study skills and discipline in all its forms.

The duration of the Preparatory Year Program is one year, divided into two regular semesters and a summer session, if necessary. The preparatory year represents the first and second academic levels of all the undergraduate programs. The following courses are offered during the preparatory years:

1. English
2. Mathematics
3. Preparatory physical sciences
4. Preparatory computer sciences
5. Preparatory engineering technology
6. University study skills
7. Physical education.

The grades earned by the student in the preparatory year courses are recorded in his transcript together with the semester GPA and his cumulative GPA. However, these grades are not considered in the calculation of the cumulative GPA for the undergraduate program. The academic status assigned to the student at the end of his last regular semester in the preparatory year continues through his third academic level (i.e., first semester of the freshman year).

A student may be exempted from the Preparatory Year Program if he proves his proficiency in English and mathematics in the promotion examinations or by the credentials he has submitted.

If a student passes only the English part of the promotion examination, he will be partially promoted to the next academic level, but is required to fulfill any remaining preparatory year requirements during the same year.

Final Evaluation of the Preparatory Year Students

Student performance will be evaluated at the end of the preparatory year to determine those who have fulfilled the University preparatory year requirements. The performance of the student in all the courses he has taken shall be considered in addition to the results of all the exams taken at the end of the program. Levels of evaluation are classified below.

Fully Passing the Preparatory Year Program

Any student may register for the third academic level if he fulfills the following requirements:

a. successfully completes all the preparatory year courses with the grades indicated in *b* and *c* hereunder;

b. earns grade C or better in the first and second level courses of English in the preparatory year;

c. earns grade C or better in the first or the second level courses of mathematics in the preparatory year.

Promotion of a student to the third academic level, after completion of all preparatory year requirements, takes place at the beginning of the semester immediately following his completing these requirements. The student may select any of the majors offered by the University.

Partial Passing of the Preparatory Year Program

If a preparatory year student passes only the requirements of either English or mathematics, he will be eligible to study some of the third academic level courses, provided he simultaneously fulfills the remaining preparatory year requirements during a single semester; otherwise he will be obliged to dedicate his time exclusively to the preparatory year.

Dismissal from the Preparatory Year Program

A student will be dismissed from the Preparatory Year Program if either:

a. he earns the grade F or DN or WF twice consecutively in the same English or mathematics preparatory year courses, or,

b. he fails to complete all the preparatory year courses within a maximum of three regular semesters, as opposed to the two semesters normally required for completing the preparatory year.

ACADEMIC REGULATIONS

Undergraduate study at KFUPM follows the academic levels system, which comprises a minimum of eight academic levels. The duration of each academic level equals one regular semester, where the student gradually progresses from one academic level to another in accordance with the approved promotion rules (A5).

According to the rules and regulations established by the University Council, some colleges may formulate their programs on the basis of a full academic year. In this case the academic year is equivalent to two academic levels (A6).

Students are responsible for knowing and following the academic rules and regulations including the requirements for graduation. Academic advisors assist students in planning their academic programs, but their academic advising activities do not relieve students of this responsibility. Therefore every student should be thoroughly familiar with all the academic regulations and the degree conferral system and remain informed about them throughout his career at the University. A student may seek the assistance of his academic advisor or the department chairman in this respect.

The University assigns an academic advisor to each student to assist him in matters relating to his academic progress such as:

a. selecting a degree program consistent with the student's objectives and ability;

b. interpreting and understanding the academic regulations;

c. informing the student of the sequence of required and elective courses in his degree program and suggesting electives;

d. monitoring the student's progress and performance;

e. assisting in early registration and other registration activities;

f. assisting in course substitution, if necessary.

The academic advisor is a faculty member in the academic department or the college in which the student is enrolled. The advisor of the preparatory year students is the Director of the Preparatory Year Program or anyone he authorizes to act on his behalf.

REGISTRATION PROCEDURES

Early Registration

Early Registration is required for all college-level students (undergraduate as well as graduate) who intend to continue their studies at KFUPM during the following term(s). Early Registration is done through the Web on the pre-announced dates.

Since this activity provides a basis for finalizing courses to be offered, number of sections to be opened for each course, schedule of classes, manpower requirements, etc. for the term that follows, it is mandatory for every student to register early. Academic departments are therefore advised to ask their faculty members to stress the importance of Early Registration to the students enrolled in their classes.

The Early Registration activities are held according to the following schedule.

Event	Time Frame
Early Registration for spring semester	11th week of spring semester
Early Registration for summer session and the following fall semester	11th week of fall semester

Early Registration affects the academic future of the students; the activity must be performed by the student himself. The Office of the University Registrar does not entertain mail requests for Early Registration.

Formal Registration

Formal registration is held at the beginning of each semester or summer session as indicated in the academic calendar. Each student must personally register himself. Registration by proxy or mail is not permitted.

Late Registration

The students, who have not completed the formal registration process on the fixed date, may register late during the period specified in the academic calendar.

Adding and Dropping Courses

A student may change his registration by adding or dropping some courses during the registration period determined by Deanship of Admissions & Registration. A student may drop courses during the first two weeks of classes in a regular semester (the first week of classes in a summer session). Courses so dropped will not appear on the student's transcript. In addition, the following conditions apply for dropping/ adding courses.

Dropping Courses

a. The course load must remain at or above the minimum allowable limit (see The Academic Level System).

b. If the course dropped is a co-requisite for another registered course, the two courses should be dropped simultaneously.

Adding Courses

a. The course load should not exceed the maximum allowable limit (see The Academic Level System).

b. The courses added should not result in a conflict in the student's schedule.

Adding or Changing to Closed Sections

During the registration period, a student can change section directly through University Registrar's website if the section is available. For adding or change to a closed section, the student should fulfill the following conditions.

a. Select a section that meets at times which do not conflict with his current schedule;

b. Fill the section change form available in the respective departments and obtain the approval of the chairman of the department offering the course;

c. Submit the form to the Deanship of Admissions & Registration for processing.

The Deanship of Admissions & Registration will process the section change only if the form is complete and it does not cause conflict with the student's current schedule. Also, the requests will only be considered during registration period determined by Deanship of Admissions & Registration.

Auditing a Course

A student can change the status of a course for which he has already registered from regular to audit with the consent of the course instructor and subsequent approval of the Chairman of the concerned department, the academic advisor, and the Chairman of the student's major department. However, while making a request to audit a course, the student must bear in mind that:

a. he can audit a course only if he is expecting to graduate in the current semester;

b. he cannot audit a course that he needs in order to graduate;

c. the "audit" status for a course cannot be changed to "credit" status;

d. once a course has been audited, it cannot be repeated for credit in subsequent semester(s);

e. the deadline for receiving audit requests by the Deanship of Admissions & Registration is the last day for dropping course(s) with the grade 'W' in the respective term as indicated in the academic calendar.

Graduate students require the additional approval of the Dean of Graduate Studies to audit a course.

Equivalent Courses

A course in one department may be equivalent to another in a different department. Students can substitute a course with another course equivalent to it without having to make a petition.

Course Substitution in the Degree Plan

A student qualifies for graduation when he meets the requirements of the degree program in effect at the time he commences his studies. If certain courses are discontinued during a student's course of studies in a particular degree program, or changes are made to the contents of a course, or a new curriculum is adopted that does not include certain courses required by the student, alternative courses will be substituted which are consistent in level, subject area and credit hours with those in the program for which substitutions are required. The final decision regarding substitution of courses lies with the relevant Vice Rector of the University. All substitutions in a student's degree plan must be forwarded to the Deanship of Admissions & Registration.

Repeating a Course

A student who obtains a failing grade in a required course must repeat the course, and therefore should formally register for it in the following semester(s). Additionally, a student who wishes to improve his academic standing may repeat a course for which he previously obtained a D or a D+ grade. The last grade will reflect the student's performance in such a course.

Should a student repeat a required course in which he had previously earned a D grade, and fail, he must repeat the course again in a subsequent semester. All the student's grades are included in the GPA calculation in his transcript.

Assignment of Academic Status

A student's academic status will be determined at the end of each semester and will appear on the transcript that shows his achievements throughout his undergraduate study. However, the summer session has no effect on academic status. A student's academic status may be one of the following:

Good Standing

This status is assigned to all students at the beginning of their course of study. Students are expected to maintain this standing till their graduation. This involves a minimum GPA of 2.00 out of 4.00 in the student's cumulative and semester GPA.

Academic Warning

A student will be given this status after the final grades have been processed at the end of each regular semester if:

a. his cumulative GPA is less than 2.00 but more than 1.00, out of 4.00;

b. his semester GPA is less than 2.00 out of 4.00.

Academic Probation

A student is given this status after the final grades have been processed at the end of a regular semester, if his cumulative GPA is less than 1.00 out of 4.00.

Discontinued

A student is discontinued for at least one regular semester in either of the following two cases if:

a. he was previously on academic warning or probation in a regular semester and in the next term achieved a semester GPA of less than 1.50 out of 4.00;

b. the student receives three consecutive academic warnings. The Rector of the University may however give the student an opportunity to continue his studies following the recommendation of the relevant college council.

Ending of Academic Warning or Probation Status

The status of academic warning can be revoked after the lapse of one regular semester from the date of the warning if the student achieves a semester and cumulative GPA of 2.00 or above at the end of this semester. A student who has been discontinued may apply for readmission within a period not less than one month from the beginning of the next semester. The Admission and Academic Standing Committee, in coordination with the student's major college, consider applications for readmission of the student at the end of his discontinuation period. This period is not included in the period required to finish a degree program.

Enrollment in the Cooperative Program

Some students are required to work for a training period of 28 weeks in their major field as per their degree plan. In order to qualify for enrollment in this program the student should:

a. have completed not less than 85 credit hours of his degree plan and should complete the cooperative assignment before the end of his last semester at the University;

b. have completed all the required courses as identified by his major department;

c. have a major GPA of 2.00 or above (out of 4.00);

d. not have been discontinued.

Students are required to be in continuous contact with their academic advisors regarding their cooperative assignment.

Enrollment in Summer Training

Some students are required to spend a summer training period of 8 weeks in their major field. These students should complete the summer training period before the end of their last semester at the university. In order to qualify for this program, the student should:

a. have completed not less than 65 credit hours of his degree plan;

b. not have been discontinued.

Conferral of Two Undergraduate Degrees

Students are advised to study for one undergraduate degree. However, upon obtaining the approval of the two department councils and the two college councils concerned, a student may apply for two undergraduate degrees provided he has completed at least 32 credit hours and his cumulative GPA is not less than 3.00 (out of 4.00). The following conditions also apply.

a. The course and cumulative GPA requirements for each degree must be individually satisfied.

b. The total credit-hours completed should be at least 28 in excess of that which is required by whichever of the two degree programs carries the higher credit-hour requirement.

c. If both programs have cooperative assignments, the student may take one assignment and substitute the other by taking courses as determined by the councils of the two colleges concerned, in accordance with the study plan of the two degrees.

d. If both programs require summer training, the student may undertake one program as per the recommendation of the councils of the two colleges concerned.

If a student wishes to pursue a second undergraduate degree, he has to apply to the Admission and Academic Standing Committee.

Enrollment of KFUPM Employees

KFUPM employees may be admitted and registered for an undergraduate program on a part-time basis in accordance with the procedures approved by the Rector of the University.

THE ACADEMIC LEVELS SYSTEM

The academic levels system divides the academic year into two regular semesters. There may be a summer session, the duration of which is considered as half a regular semester. The degree requirements are divided into various levels in accordance with the degree plan approved by the University Council (A7).

The University Council sets up the detailed regulations which govern promotion from one academic level to another bearing in mind the following considerations (A8).

a. The courses of each major are spread over the academic levels. A number of credit hours is assigned for each level, as required by the approved degree plan.

b. Students who have not failed in the course of their studies are successively promoted from lower to higher academic levels, according to their approved degree plan.

c. Students who have failed some courses are registered in courses with the minimum allowed semester course load bearing in mind that:

- there should be no conflict in their study schedule;
- they should satisfy all pre-requisite requirements;
- they will not be allowed to take more courses from the next academic level other than the number required to complete their minimum course load.

Course Load

A course load is defined as the number of credit-hours for which a student is registered in a regular semester or a summer session. The restrictions on the course load are:

(a) The Minimum and Maximum Course Load Limit in a Regular Semester

The minimum course load limit is 12 credit hours during a regular semester, provided that the total number of credit hours registered by a student in any two consecutive semesters is not less than 28. This condition is relaxed in the last semester before graduation. The maximum course load is 19 credit hours.

However, a student is permitted to register for 21 credit hours with the approval of his department chairman, if the student has maintained a minimum cumulative GPA of 3.00 out of 4.00 in all work undertaken during the preceding terms in which he earned his last 28 credit hours.

(b) Minimum and Maximum Course Load in a Summer Session

The minimum course load in a summer session is 1 credit hour and the maximum is 8 credit hours.

(c) Minimum and Maximum Course Load for a Student on Academic Warning or Probation

The minimum course load in such cases is 12 credit hours; the maximum is 13 credit hours in each regular semester and 7 credit hours in a summer session.

(d) Minimum and Maximum Course Load for a Student in his Last Term before Graduation

The minimum course load at this level is 1 credit hour and the maximum is 20 credit hours during a regular semester and 9 in the summer session, provided the student's cumulative GPA of all work undertaken during the preceding terms in which he earned his last 28 credit hours is not less than 2.00 out of 4.00.

Degree Plan

The courses of each degree are spread over 10 academic levels. The required as well as elective courses and the number of credit hours that a student needs to successfully complete in order to receive a degree in his major field are clearly specified for each academic level. This distribution of courses and credit hours is called “the Degree Plan”. All degree plans are approved by the University Council. The academic departments regularly review and update the degree plans in order to provide students with continuously updated programs. The following rules apply to the degree plans.

a. A student’s degree plan is referred to by a specific code number, with effect from the first semester of his commencement of undergraduate study.

b. The academic departments develop subcategories of non-major electives as they deem fit. These may include technical, IAS, free and college electives. A list of the electives approved by the College Council concerned is provided to the Registrar and every effort will be made to make students aware of this list.

c. In special circumstances, some students may change from one degree plan to another, provided this does not affect their graduation requirements.

d. In introducing any changes to a degree plan, it is anticipated that some courses may not be offered, or be discontinued, or new courses may be included in the degree plan. Therefore, out-of-phase students should complete their graduation requirements in accordance with the time schedule of their original degree plan. If the new degree plan requires studying a course that has been canceled, and consequently it becomes impossible to register for such a course, the course could be substituted by an alternative course, consistent in level, subject area, and credit hours, with the approval of the academic advisor, the department council, and the college council. The Deanship of Admissions & Registration should be informed about the approval of this substitution.

e. A readmitted student will be subject to the degree plan assigned to him during his last semester at the University before receiving discontinued status. However, if this plan has been canceled, he will be placed in the most recent plan in his major.

Students are required to study within the framework of their approved degree plan and once they fulfill all the requirements they are nominated for graduation.

Student Transcript of Academic Record

The transcript comprises the complete academic record of the student from the date of admission to the issue date. No partial records are issued. An official transcript may be issued or sent to any outside agency upon receiving a written request from the student.

The accuracy of a student record is of the utmost importance and errors or suspected errors should be brought to the immediate attention of the Deanship of Admissions & Registration.

ATTENDANCE AND WITHDRAWAL FROM STUDY

1. A regular student should attend all classes and laboratory sessions. A student may be discontinued from a course and denied entrance to the final examination if his attendance is less than the limit determined by the University Council. This limit cannot be less than 75% of classes and lab sessions assigned to each course during the semester. A student who is denied entrance to the examination due to excessive absences will be considered as having failed that course (A9).

   Implementation Rules

   a. A regular student will not be allowed to continue in a course and take the final examination and will be given a DN grade if his unexcused absences are more than 20% of the lecture and laboratory sessions scheduled for the course.

   b. A regular student will not be allowed to continue in a course and to enter the final examination if his attendance is less than 66.7% of the lecture and lab sessions scheduled for the course. This applies to both excused and unexcused absences. The student will be given a W grade in that course provided his unexcused absences do not exceed 20% of the scheduled lecture and laboratory sessions. If the unexcused absences exceed 20%, the provisions of the previous paragraph will apply.

2. The college council — or whatever body it delegates its authority to — may exempt a student from the provisions of Attendance and allow him to attend the final examination if he provides an excuse acceptable to the council. For such an exemption provided by the University Council, the minimum attendance requirement is not less than 50% of the lecture and laboratory sessions scheduled for the course (A10).

   Implementation Rule

   The college council — or whatever bodies it delegates its authority to — may exempt a student from the provisions of Attendance and allow him to attend the final examination if he furnishes an excuse acceptable to the council, provided that his total attendance in the lecture and laboratory sessions is not less than 66.7% of the lecture and laboratory sessions scheduled for the course.

3. A student who fails to attend the final examination will be given zero in that examination. In this case, his course grade will be calculated on the basis of the class work score he earned in the course (A11).

4. If a student fails to attend the final examination of any of his scheduled courses due to circumstances beyond his control, the college council, in exceptional cases, may accept the excuse and arrange a make-up examination for the student within a period not exceeding the end of the next semester. In such cases the course grade will be given to the student after the make-up examination (A12).

   Implementation Rules

   a. The student must furnish the excuse to his instructor and request a make-up examination before the end of the next regular semester.

b. The course instructor submits his report to the department chairman for presentation to the departmental and, then, the college council. The dean of the college informs the student of the council's decision, i.e., as to whether his petition has been accepted or rejected. If the petition is accepted, the student will be informed of the date of the make-up examination.

c. Under exceptionally pressing circumstances, the college council may accept the student's excuse and give him a make-up examination before the end of the next semester. The final grade will be given to the student after that make-up examination.

5. A student may be allowed to withdraw from the University for a semester and not be considered as having failed if he furnishes an acceptable excuse to the authorized body as determined by the University Council, at least 5 weeks before the commencement of the final examinations (A13).

Implementation Rules

a. The Deanship of Admissions & Registration studies all applications for withdrawal for one semester, and submits its recommendations to the relevant Vice Rector of the University.

b. If a student has received any course grades before submitting an application to withdraw for a semester, all such grades are retained in his academic record and he will be given a W grade in the remaining courses.

c. A student may submit an application to discontinue study in a particular semester and withdraw from all courses during the stipulated period (after the 10th week and before end of the 14th week) provided he has an acceptable excuse and his grade in each course is determined as "Withdrawn with Pass" or "Withdrawn with Fail" according to his performance. The grade will be assigned by the instructor, with the approval of the department chairman, in the light of the student's performance before his application to discontinue his studies.

6. A student may submit an application for suspension of enrollment, for reasons acceptable to the college council, provided the suspension period does not exceed two consecutive semesters, or a maximum of three non-consecutive semesters, during his entire course of study at the University. Otherwise his enrollment status will be canceled. However, the University Council may, at its discretion, make exceptions to this rule (A14).

7. If a student interrupts his studies for one semester without submitting an application for suspension of enrollment, his enrollment status at the University will be canceled. The University Council however, may at its discretion, cancel a student's enrollment status if he discontinues his studies for a period of less than one semester (A15).

8. A student is not considered to have interrupted his studies during the terms he spends as a visiting student in other universities (A16).

RE-ENROLLMENT

A student, whose enrollment status has been canceled, may apply for re-enrollment with the same University ID number and academic record he had before his suspension (A17), provided:

1. he applies for re-enrollment within four regular semesters from the date of cancellation of his enrollment status;
2. he obtains the approval of the relevant college council and related departments for the re-enrollment;
3. that five or more semesters have lapsed since cancellation of his enrollment, in which case the student can apply to the University for admission as a new student without considering his old academic record, if he fulfills all the admission requirements for new students;
4. that he has not been re-enrolled previously;
5. that he was not on probation prior to the cancellation of his enrollment.

Implementation Rules

a. A suspended student should submit his re-enrollment application to the Deanship of Admissions & Registration at least one month before the beginning of the semester in which he intends to resume study.

b. The Deanship of Admissions & Registration coordinates with the relevant college council in order to arrive at a decision regarding the application.

c. A student who interrupts his studies for more than five semesters may apply for admission as a new student if he fulfills all admission requirements for new students. The student will be assigned a new University ID number and no credits will be transferred from his previous record, though such credits will appear in his new academic record.

d. Re-Enrollment does not apply to the dismissed students.

A student who has been dismissed from the University for academic or disciplinary reasons — or from other universities for disciplinary reasons — will not be re-enrolled at the University. If it becomes known later that a student has been dismissed for such reasons, his enrollment will automatically be considered null and void as of the re-enrollment date (A18).

GRADUATION

A student graduates after successfully completing the graduation requirements according to the degree plan, provided his cumulative GPA and major GPA are both not less than 2.00 out of 4.00. Following the recommendation of the department council, the college council may determine certain additional courses the student should take to improve his cumulative GPA if he has passed the required courses, but with a low GPA (A19).

Implementation Rules

a. The student is required to pursue his major degree plan and complete all requirements before graduation.

b. The Deanship of Admissions & Registration will provide the relevant departments with copies of the academic records of all candidates for graduation. The department will then review these records to ensure that the students have satisfied all graduation requirements and will provide the Deanship of Admissions & Registration with a list of the students who qualify for graduation.

c. The student must attain a cumulative GPA and major GPA of 2.00 or above (out of 4.00) to graduate.

d. If the cumulative GPA is lower than the required limit, it may be re-calculated at the student's request, provided he has successfully completed all the courses required for obtaining the degree. This will be based upon the recommendation of the department council in coordination with the Deanship of Admissions & Registration and the approval of the college council. However, at the time of graduation, the student's cumulative GPA should not be more than 2.00 (out of 4.00) after recalculation.

Cumulative GPA Re-calculation Rules

Following are the specific rules pertaining to GPA recalculation (applicable only at the time of graduation if the cumulative GPA is < 2.00):

- To exclude any previous grade of a course studied by a student, the student must have successfully repeated the course and obtained grade D or higher.
- The grades F, DN, WF and D may be excluded by subtracting the number of credit-hours of a certain course from the total credit-hours used in calculating the student's cumulative GPA, and subtracting the quality points assigned to these credit hours from the total quality points used for calculating the student's cumulative GPA.
- The total credit-hours of the courses to be excluded from the cumulative GPA calculation should not exceed 24.
- The academic record must include all the grades of the courses taken by the student, showing the grades earned on each occasion. A special mark should be introduced to identify the courses which have been excluded from the cumulative GPA calculation. The academic record should show the re-calculated cumulative GPA.
- No change is to be introduced to the academic record after the graduation document is issued.
- The rules of re-calculation of cumulative GPA will be applied to courses the student has repeated at KFUPM.
- Under no circumstances will the re-calculation of cumulative GPA raise the GPA above 2.00, which is the minimum required to satisfy graduation requirements.

e. To obtain any degree from KFUPM, the student must have studied a minimum of 36 credit-hours, at the University, including at least 18 credit hours in his major field.

f. The Deanship of Admissions & Registration thoroughly reviews all student records to ensure that all graduation requirements are satisfied.

g. The Deanship of Admissions & Registration submits a draft recommendation to the University Council listing the students nominated for graduation at the end of each semester.

h. The Deanship of Admissions & Registration submits a draft recommendation to the University Council listing the students who have satisfied all graduation requirements and actually graduated.

i. A graduating student is obliged to obtain a clearance form from the Deanship of Student Affairs and have it signed by the following departments:

j. The Central Library, Bookstore, Security, Medical Center, Student Housing, Academic Major Department, Student Fund, Deanship of Admissions & Registration, Accounting, and any other departments as determined by the Deanship of Student Affairs.

k. The Deanship of Admissions & Registration prepares and releases the official graduation certificates and degrees and maintains copies of these documents.

DISMISSAL

Dismissal from the University will occur in the following circumstances (A20).

1. A student will be dismissed if he obtains a maximum of three consecutive academic probations as the result of his cumulative GPA being less than 2.00 out of 5.00 or 1.00 out of 4.00. Following the recommendation of the college council the University Council may allow the student a fourth opportunity to improve his cumulative GPA by taking additional courses.
2. A student will be dismissed if he fails to complete the graduation requirements within a maximum additional period equal to one half of the period determined for his graduation in the original program period. The University Council, however, may exempt the student from this restriction and give him the opportunity to complete the graduation requirements within an additional period of maximum duration equal to that of the original program.

Implementation Rules

a. A student is dismissed if he receives three consecutive academic probations.

b. Following the recommendation of the college council, the University Council may allow the student a fourth opportunity to improve his cumulative GPA.

c. A student is dismissed if he fails to complete the graduation requirements within an additional period equal to one half of the original program's duration.

d. In exceptional cases, the University Council may allow the student to complete the graduation requirements within an additional period of a maximum duration equal to that of the original program.

e. The Deanship of Admissions & Registration informs the student of his dismissal and cancels his enrollment.

f. A dismissed student is obliged to obtain a clearance form from the Deanship of Student Affairs and have it signed by all the relevant departments as mentioned under Graduation previously.

STUDY BY AFFILIATION

Based upon the recommendation of the colleges, the University Council may adopt the principle of admission by affiliation in some colleges and specializations which allow this option. The University Council sets the rules and regulations for affiliation according to the following parameters (A21).

1. The credit-hours required for the graduation of an associate student should not be less than the credit-hours required of a regular student.
2. The associate student will be treated, with regard to admission, grading, transfer, dismissal and re-enrollment, in exactly the same manner as a regular student except the requirement regarding class attendance.
3. On the basis of the college council's recommendation, the University Council determines the rules required to evaluate the performance of associate students.
4. The student transcript, graduation certificate, and degree, must indicate that the student has studied "by affiliation".

EXAMINATIONS AND GRADES

1. On the basis of the recommendation of the department council offering the course, the college council determines the class work score as being not less than 30% of the course final grade (A22).
2. On the basis of the recommendation of the department council concerned, the college council may approve the inclusion of practical or oral tests in the final examination of any course. The scores to be assigned to such tests will be considered as part of the final examination scores (A23).
3. Upon the instructor's recommendation, the council of the department which teaches the course may allow the student to complete the requirements of any course during the next term. In such an event the grade IC will be recorded for the student in his academic record. IC grades are not included in the calculation of the semester and cumulative GPA until the student obtains his final grade in the course by completing all the requirements. If no change has been made in the IC grade after the lapse of one semester, the IC status will be changed to an F grade which will be included in the calculation of semester and cumulative GPA (A24).

Implementation Rules

a. The course instructor may allow the student to complete the course requirements during the following term if there are exceptional circumstances which are beyond the student's control.

b. The course instructor recommends assigning an IC grade after identifying the work and the time required to complete the course requirements.

c. The course instructor should submit a report to the department chairman indicating the reasons and justifications for assigning the IC grade and the work and time required to complete the course.

d. Based upon the instructor's recommendation, the department chairman may allow the student to complete the course requirements during the following semester.

e. The student must complete the course requirements by the end of the next regular semester. However, exceptions may be made in the following cases.

- Students registered in the coop program may, with the approval of the department chairman, delay completion of the course for an additional regular semester.
- Students with an IC grade before registering for the coop program may be allowed to complete incomplete courses within a maximum period of one regular semester after completion of the coop program.

f. When the student completes the course requirements within the specified period, the course instructor changes the student grade from IC to the new earned grade. This takes place within a maximum period of one semester after the end of the term during which the student earned the IC grade. The instructor also informs the Deanship of Admissions & Registration of the grade change.

g. The Deanship of Admissions & Registration changes the grade to F and informs the student and department chairman accordingly if the grade has not been changed by the instructor within the specified period.

h. If the student has registered for a course in the term following the semester in which he previously earned an IC grade and the said grade has not been changed, then the previous grade will be changed to F by the Deanship of Admissions & Registration.

i. If a student has an IC grade, this results in the suspension of the student's academic standing during that semester. This also includes the suspension of distinction status.

j. No student is allowed to register for a course in which he earned a grade of IC in the course pre-requisite.

4. The class work score is evaluated either by (A25):
   - oral and practical examinations, research, other class activities or some or part of all the above and at least one written examination; or,
   - at least two written examinations.
5. Courses involving symposia, research, field work, or of a practical nature, may be excluded from some or all the rules of 1, 2 & 4 following a decision by the college council and the recommendation of the department council teaching the course. The college council identifies alternate ways to evaluate the student's achievement in such courses (A26).
6. If any course of a research nature requires more than one semester for its completion, the student will be assigned an IP grade, and after the completion of the course, the student will be given the grade he has earned. However, if he fails to complete the course on time, the department council teaching the course may approve the assignation of an IC grade for this course in his record (A27).
7. The grades a student earns in each course are calculated as follows (A28):

Percentage	Grade	Grade Code	GPA (Out of 5.00)	GPA (Out of 4.00)
95 – 100	Exceptional	A+	5.00	4.00
90 – less than 95	Excellent	A	4.75	3.75
85 – less than 90	Superior	B+	4.50	3.50
80 – less than 85	Very Good	B	4.00	3.00
75 – less than 80	Above Average	C+	3.50	2.50
70 – less than 75	Good	C	3.00	2.00
65 – less than 70	High Pass	D+	2.50	1.50
60 – less than 65	Pass	D	2.00	1.00
Less than 60	Fail	F	1.00	0.00

Implementation Rules

a. The student's final course grade will be one of the above nine levels and his grades will be calculated in accordance with this table. The course instructor may consider both the grade average and the standard deviation in determining the student's end-of-course grade which reflects his achievement in the course. The Deanship of Admissions & Registration will be informed of the student's final grades in accordance with the forms prepared for this purpose.

b. The grade AU will be assigned to students who attend a course as auditors without being given any grades, regardless of their performance in the course. The effect of this assignment on the student's cumulative or semester grade is the same as the grade "no grade pass" or NP. The instructor informs the Deanship of Admissions & Registration in the event of such a student being absent for more than one third of the classes, in which case the course will be eliminated from his record.

c. The grades NP or F are assigned for courses offered on the basis of pass or fail, such as thesis and summer training.

d. The grade WP is given to a student who officially withdraws from all courses after the permitted withdrawal deadline. Such a grade will be given upon the instructor's confirmation that the student's performance was satisfactory and that his unexcused absences were less than 20% of the lecture and laboratory sessions scheduled for the course at the time of withdrawal. This grade does not affect the student's cumulative GPA.

e. The grade WF is assigned to a student who officially withdraws from all courses after the permitted withdrawal deadline, if his performance was unsatisfactory. A student who obtains such a grade is considered as having failed this course.

8. Based on the cumulative Grade Point Average achieved by a graduating student, his graduation rank is assigned to one of the following levels (A29).

	Level	Range of Cumulative GPA	
		Out of 5.00	Out of 4.00
1.	Excellent	4.50 – 5.00	3.50 – 4.00
2.	Very Good	3.75 – less than 4.50	2.75 – less than 3.50
3.	Good	2.75 – less than 3.75	1.75 – less than 2.75
4.	Pass	2.00 – less than 2.75	1.00 – less than 1.75

9. First honors will be granted to graduating students who achieve a cumulative GPA of 4.75 - 5.00 (out of 5.00) or 3.75 - 4.00 (out of 4.00). Second honors will be granted to graduating students who achieve a cumulative GPA of 4.25 - less than 4.75 (out of 5.00) or 3.25 - less than 3.75 (out of 4.00) (A30).

   In order to be eligible for the first or the second honors the student:

   - must not have failed in any course at the university he is currently attending or any other university;
   - must have completed all graduation requirements within a period of duration ranging between the maximum and minimum limits for completing the program of study in a college;
   - must have completed 60% or more of the graduation requirements at the university from which he graduates.

Implementation Rules

a. Third honors will be granted, at the time of graduation, to students who achieve a cumulative GPA of more than 3.00 (out of 4.00), and the conditions for offering first and second honors do not apply. However, they must fulfill the terms of the above paragraph (*b*) and paragraph (*c*).

b. At the end of each semester, the Deanship of Admissions & Registration records the names of distinguished students on the University distinction list, on the basis of their semester GPA and the quality points earned in this semester, as follows:

Distinction	Requirements		
	Semester GPA	&	Quality Points
First Distinction	3.75 – 4.00	&	60 or above
Second Distinction	3.50 – 3.74	&	56 or above
Third Distinction	3.00 – 3.49	&	48 or above

c. A student earns the rank of 'Excellent' for an academic year if he achieves one of the distinction ranks of paragraphs 2, in both the first and second semesters of that year.

d. A student receives one half of his distinction reward remuneration in the semester in which he achieves any of the above distinction ranks.

FINAL EXAMINATION PROCEDURES

1. The college council may set up a committee to coordinate with the departments in organizing the activities related to the final examination. This committee's charges should include reviewing of mark sheets and submitting them to the relevant committee within three days from the examination date of the course (A31).

   Implementation Rule

   All final grades must be submitted to the Deanship of Admissions & Registration by the deadline specified in the academic calendar.

2. The college council may apply the principle of strict confidentiality in the final examinations procedures (A32).

   Implementation Rule

   Course instructors should prepare examinations in strict secrecy and confidentiality. The instructor alone is responsible for having the exams printed at the Examination Center and for collecting them himself from there after they have been printed.

3. A course instructor prepares the examination questions. However, if the need arises, the college council may assign another teacher to do the same, based on the recommendation of the department chairman (A33).

4. A course instructor grades the final examination papers and if necessary the department chairman may assign one or more additional instructors to participate in the grading process. The college council may also assign the grading process to another instructor, when the need arises (A34).

   Implementation Rule

   In the case of common examinations for a multi-section course, the grading of the examination may be assigned to course instructors regardless of which sections they teach.

5. The instructor who corrects the final exam, and records the marks obtained by students on the designated grade list, signs his name on the grade sheet and has it countersigned by the department chairman (A35).

   Implementation Rules

   a. A course instructor enters the students' grades on the forms prepared by the Deanship of Admissions & Registration for this purpose and signs them.

   b. The course instructor submits the student grade forms to the department chairman for his approval.

   c. The course instructor must himself submit these forms to the Deanship of Admissions & Registration by the deadline fixed by the Deanship.

   d. No grade shall be reviewed or changed after the submission of the grade sheets to the Deanship of Admissions & Registration without a written request from the course instructor elaborating and explaining the occurrence of mistake(s). Such requests must be endorsed by the department chairman and the dean of the college. The Dean of Admissions & Registration should be informed of these changes no later than the beginning of the final examination period of the next term. The corrected grade will appear in the student's record.

6. No student is to be given more than two examinations in one day. The University Council may allow for exceptions to this rule (A36).

Implementation Rules

a. The Deanship of Admissions & Registration schedules the final examinations in such a way that no student is given more than two exams on the same day.

b. Every semester the Deanship of Admissions & Registration prepares the schedule of the final examinations listing the date, time and location of examinations. The following considerations are involved.

- The final examinations schedule must be maintained free from conflicts to the maximum extent possible.
- The classrooms and auditoria in which the examinations shall be held are reserved.
- The departments and students are informed by an announcement of the schedule of final examinations at least one week before the commencement of the final examinations period as specified in the University's academic calendar.

c. All course instructors and students should abide by the examination schedule prepared by the Deanship of Admissions & Registration.

d. In the event of a conflict in a student's final exams, the course instructors should provide make-up examinations for such courses with the approval of the Dean of Admissions & Registration and the chairmen of the departments concerned. The make-up exam is to be given during the final examination period.

e. The schedule of a final examination of a certain course may be changed for justifiable reasons upon the recommendation of the course instructor and the department chairman. The college council, in coordination with the Deanship of Admissions & Registration, decides on such cases. The recommended new date and time of the final exam of this course must fall within the final examination period.

f. An instructor of a course which does not require final examinations, as per its approved description, may give alternative examinations or homework assignments for the students instead of the final examination.

7. No student will be allowed to sit for a final examination after the lapse of 30 minutes from the beginning of the examination. Also, no student will be allowed to leave the examination venue less than 30 minutes after the beginning of the examination (A37).

8. Cheating, or attempting to cheat, or violating instructions and examination regulations shall render the offender subject to punishment in accordance with the Student Disciplinary Rules as issued by the University Council (A38).

Implementation Rules

a. Cheating is an act of dishonesty and faculty members and students must maintain trust and honesty to ensure and protect the integrity of grades.

b. All academic work or requirements assigned to a student must be carried out by him without any unauthorized aid of any kind.

c. Instructors must exercise due professional care in the supervision and verification of academic work so that honest effort on the part of the students will be positively encouraged.

d. If any instance of dishonesty by a student in homework assignments or any other requirements of the course is discovered by an instructor, it is his responsibility to take appropriate action. Based on his judgment of each particular case, he should, for instance, give a zero grade for that particular assignment or homework. The instructor will notify the department chairman about the incident in writing who, in turn, will submit the case to the attention of the dean of the college. After deliberating the case, the college council, may approve the instructor's decision(s), or else if further action is required refer it to the Academic Disciplinary Committee for review, and submit its recommendation to the Rector of the University based on the Student Disciplinary Rules. A student has the right to appeal to the Dean of Student Affairs within one week of notification of a disciplinary decision.

e. A course instructor or a supervisor of a course examination who discovers that a student is cheating or attempting to cheat in any of the written examinations must give the student a zero grade in that examination. He should also submit a report containing his recommendation to the chairman of the department offering the course. Based on his judgment of each particular case, the course instructor may additionally choose to take further action such as to give the student an F grade in that course. The department chairman should submit his report on the case to the dean of the college. After deliberating the case, the college council may approve the instructor's decision(s), or else if further action is required refer the case to the Academic Disciplinary Committee for review, and submit its recommendation to the Rector for appropriate action based on the Student Disciplinary Rules.

9. If the need arises, the council of the college which offers the course may agree to the re-grading of examination papers within a period not exceeding the beginning of the next term's examinations (A39).

Implementation Rule

A student who feels strongly that he has received a grade that is demonstrably inaccurate, or that the grading was unfair, must promptly discuss the matter with the instructor of the course. If the student and his instructor are unable to arrive at a mutually agreeable solution, the student may forward an official appeal to the chairman of the department offering the course, no later than the end of the fourth week of the next semester. The department chairman will investigate whether the appeal is justified by reviewing the instructor's evaluation of the student based on the student's class work and final examination scores. The department chairman will then take appropriate action, if he deems it necessary, by submitting the student's appeal to the college council.

10. Following the recommendation of the relevant department council, the college council determines the duration of the final written examinations which, in any case, should not be less than one hour and not more than three hours' duration (A40).

11. Consistent with the provisions of Final Examination Procedures of this document, the University Council establishes the regulations that govern the final examination procedures (A41).

TRANSFER

Transfer from one university to another

1. The transfer of a student from outside the University may be accepted under the following conditions (A42).
   a. The student should be enrolled at a recognized college or university.
   b. The student must not have been be dismissed from that university for disciplinary reasons.
   c. The student must satisfy the transfer provisions as determined by the University Council.

   Implementation Rules

   All transfer applications are submitted to the Admission & Academic Standing Committee which studies the application and ensures that the applicant fulfills the requirements in (1), in addition to any other provisions the Committee deems necessary, in coordination with the colleges concerned.

2. The college council shall review the courses taken by the student outside the University based on the recommendations of the departments which offer equivalent courses. The courses evaluated as equivalent will be transferred to the student's record but will not be included in the calculation of his cumulative GPA (A43).

   Implementation Rules

   In order to get transfer of credit for any course taken outside the University, the student should:
   a. have obtained grade of C or higher in that course;
   b. have taken the course at a recognized college or university;
   c. have taken a course equivalent in all respects to one of the courses which are included in the KFUPM degree requirements.
   d. The grade earned by the student in the course is not included in the student's cumulative GPA.

3. If, after his transfer, it is discovered that a student had been dismissed from his previous university for disciplinary reasons, his enrollment will be considered canceled as from the date of acceptance of his transfer to the University (A44).

4. The transfer of a student from one university to another during any semester takes place in accordance with the procedures and the dates announced by the university to which the student is transferring, under the general transfer rules (A45).

5. A student may be transferred from one college to another inside the university in accordance with University Council rules (A46).

   Implementation Rules

   a. A student may transfer from one college to another within the University before he completes the sixth academic level.

   b. The student should continue to study all the courses registered for at the level preceding the transfer, in compliance with the adding and dropping rules.

   c. The transfer from one college to another will be recorded in the academic record of the student the term following his transfer.

   d. A student is allowed a maximum of two transfers from one college to another.

   e. The academic record of a student transferred from one college to another includes all the courses he has studied together with the grades and the semester and cumulative GPA's obtained throughout his period of study at the University (A47).

Transfer from one major to another within the same college

1. With the approval of the dean of the relevant college, a student may transfer from one major to another within the same college according to the rules established by the University Council (A48).

   Implementation Rules

   a. A student may transfer from one major to another within his college at any time before he completes the sixth academic level. The college council may consider exceptional cases where students have already completed the sixth level.

   b. The transfer will be recorded in the academic record of the student at the beginning of the term following the transfer.

   c. A student is allowed a maximum of two transfers from one major to another within the same college. The college council may consider exceptional cases.

2. The academic record of a student transferring from one major to another will include all the courses the student has taken, including the grades and the semester and cumulative GPA's obtained throughout his period of study at the University (A49).

VISITING STUDENTS

A "visiting student" is a student who studies some courses at another university or in one branch of the university to which he belongs without transferring. Equivalency for such courses shall be granted according to the following rules (A50).

1. The student must obtain prior approval from the college at which he is studying.

2. The student should be enrolled at a recognized college or university.

3. The course the student is taking outside his university should be equivalent to one of the courses included in his degree requirements.

4. If the visiting student is studying in one of the branches of the university to which he belongs, the case should

be dealt with in accordance with (2) in "Transfer From One Major to Another within the Same College".

5. The University Council determines the maximum credit hours to be allocated to a visiting student from outside the University.

6. The course grades credited to the visiting student will not be considered in his cumulative GPA.

7. The University Council may establish other conditions regarding visiting students.

Implementation Rules

Case One: A student from KFUPM visiting another university

1. Study During a Regular Semester

a. The department council sets up a committee to study the outside courses which the student plans to take and determines the equivalent University (KFUPM) courses.

b. The student should submit to the chairman of the academic department a written application indicating the course(s) he intends to study at the other university. The student may also submit this application after completing the course(s) if he has been unable to get prior approval. The final decision whether or not to accept a course for transfer is made by the committee formed in (1).

c. The student will continue receiving KFUPM remuneration if he is studying at a university inside the Kingdom, provided that the credit-hours studied at that university are not less than 12 each semester. The student must present the necessary documents to substantiate his claim.

d. The remuneration will stop if the student is studying outside the Kingdom.

e. Notwithstanding the degree requirements, the maximum total credit hours that can be transferred from outside the University is 48 and the student's grade in each transferred course must not be lower than C. These grades are not included in the cumulative or major GPA.

f. The maximum number of semesters that can be taken outside the University is three consecutive or non-sequential semesters.

2. Study in Summer Sessions

Paragraphs *a*, *b*, and *e* above shall be applicable in this case. However, the student will continue to receive KFUPM remuneration.

Case Two: A student from another university visiting KFUPM

Study During a Regular Semester or Summer Session

a. The visiting student must satisfy all the requirements of the courses for which he is intending to register (whether co-requisite or pre-requisite requirements).

b. The courses for which the student wishes to register must be available and not fully enrolled.

c. All courses should be recorded in a unified academic record, including all courses studied at this University while a regular or visiting student.

d. The student will not receive any remuneration from KFUPM.

e. Textbooks may be provided to the visiting student in accordance with the applicable rules.

f. In the event of the student wishing to transfer to KFUPM, his acceptance or rejection is regulated by (1) in "Transfer from One University to Another" of this document.

GENERAL RULES

1. These regulations supersede all the preceding rules and regulations established for study and examinations at the undergraduate level (A51).
2. The University Council may set up implementation rules which will not contradict these regulations (A52).

   Implementation Rule

   The University Council reserves the right to interpret and amend the implementation rules accompanying these regulations.

3. The Higher Education Council reserves the right to interpret these regulations (A53).

ACADEMIC RECORDS AND GRADE CODES

Academic Record

The academic record is a statement which explains the student's academic progress. It includes the courses studied in each term with course numbers, codes, number of credit-hours, the grades attained and the codes and points of these grades. The record also shows the semester, cumulative GPA and the student's academic status in addition to the courses from which a transferred student is excused.

Grade Codes

Letter grades	Marks	Points		Grades in English
A+	95 – 100	4.00	5.00	Exceptional
A	90 – Less than 95	3.75	4.75	Excellent
B+	85 – Less than 90	3.50	4.50	Superior
B	80 – Less than 85	3.00	4.00	Very Good
C+	75 – Less than 80	2.50	3.50	Above Average
C	70 – Less than 75	2.20	3.00	Good
D+	65 – Less than 70	1.50	2.50	High-Pass
D	60 – Less than 65	1.00	2.00	Pass
F	Less than 60	0.00	1.00	Fail
IP	-	-	-	In-Progress
IC	-	-	-	Incomplete
DN	-	0.00	1.00	Denial
NP	60 or above	-	-	No grade-Pass
NF	Less than 60	-	-	No grade-Fail
W	-	-	-	Withdrawn

TABLE 1. EXAMPLE OF THE CALCULATION OF SEMESTER AND CUMULATIVE GPA

First Semester

Course	Cr Hrs	%	Code	GPA		Quality Points	
IAS 301	2	85	B+	4.50	3.50	9	7
CHEM 324	3	70	C	3.00	2.00	9	6
MATH 235	3	92	A	4.75	3.75	14.25	11.25
PHYS 312	4	80	B	4.00	3.00	16	12
Total	**12**					**48.25**	**36.25**

$$\text{First Semester GPA} = \frac{\text{Total Quality Points (48.25)}}{\text{Total Credits (12)}} = 4.02$$

or

$$\text{First Semester GPA} = \frac{\text{Total Quality Points (36.25)}}{\text{Total Credits (12)}} = 3.02$$

Second Semester

Course	Cr Hrs	%	Code	GPA		Quality Points	
IAS 104	2	96	A+	5.00	4.00	10	8
CHEM 327	3	83	B	4.00	3.00	12	9
MATH 314	4	71	C	3.00	2.00	12	8
PHYS 326	3	81	B	4.00	3.00	12	9
Total	**12**					**46**	**34**

$$\text{Second Semester GPA} = \frac{46}{12} = 3.83 \quad \text{or} \quad \frac{34}{12} = 2.83$$

$$\text{Cumulative GPA} = \frac{\text{Total Quality Points (48.25 + 46)}}{\text{Total Credits (12 + 12)}} = 3.93 \quad \text{or} \quad \frac{36.25 + 34}{12 + 12} = 2.93$$

TABLE 2. THE GRADING SYSTEM APPLICABLE AT KFUPM

Letter Grades	Marks	Points	Grades in English
A+	95 – 100	4.00	Exceptional
A	90 – Less than 95	3.75	Excellent
B+	85 – Less than 90	3.50	Superior
B	80 – Less than 85	3.00	Very Good
C+	75 – Less than 80	2.50	Above Average
C	70 – Less than 75	2.00	Good
D+	65 – Less than 70	1.50	High-Pass
D	60 – Less than 65	1.00	Pass
F	Less than 60	0.00	Fail
IP	-	-	In Progress
IC	-	-	Incomplete
DN	-	0.00	Denial
NP	60 or above	-	No grade-Pass
NF	Less than 60	-	No grade-Fail
W	-	-	Withdrawn
WP	-	-	Withdrawn with Pass
WF	-	0.00	Withdrawn with Fail
AU	-	-	Audit

ACADEMIC COLLEGES, DEPARTMENTS, AND PROGRAMS

ACADEMIC COLLEGES, DEPARTMENTS & PROGRAMS

College of Applied Engineering

- Applied Aerospace Engineering
- Applied Chemical Engineering
- Applied Civil Engineering
- Applied Electrical Engineering
- Applied Mechanical Engineering
- Applied Petroleum Engineering

College of Computer Sciences & Engineering

- Computer Engineering
- Information and Computer Science
  - Computer Science
  - Software Engineering
- Systems Engineering

College of Engineering Sciences

- Aerospace Engineering
- Chemical Engineering
- Civil Engineering
- Electrical Engineering
- Mechanical Engineering
- Petroleum Engineering

College of Environmental Design

- Architectural Engineering
- Architecture

College of Industrial Management

- Accounting and Management Information Systems
  - Accounting
  - Management Information Systems
- Finance and Economics
- Management and Marketing
  - Management
  - Marketing

College of Sciences

- Chemistry
  - Chemistry
  - Industrial Chemistry
- Earth Sciences
  - Geology
  - Geophysics
- Islamic and Arabic Studies
- Mathematical Sciences
  - Mathematics
  - Statistics
- Physics

Deanship of Educational Services

- Preparatory Year Program
- English Language Center
- Physical Education

COLLEGE OF APPLIED ENGINEERING

Dean:

DR. SAMIR A. AL-BAIYAT

Undergraduate Departments

APPLIED AEROSPACE ENGINEERING

APPLIED CHEMICAL ENGINEERING

APPLIED CIVIL ENGINEERING

APPLIED ELECTRICAL ENGINEERING

APPLIED MECHANICAL ENGINEERING

APPLIED PETROLEUM ENGINEERING

Vision

The vision of the *College of Applied Engineering* at KFUPM is to provide accessible and responsive applied engineering programs recognized internationally for their high quality and graduates with valuable education to the local industry.

Mission

The mission of the *College of Applied Engineering* at KFUPM is to graduate well-educated engineers who will contribute to the advancement of technical knowledge, provide innovative solutions to engineering problems and service to the nation at large.

Philosophy

The programs of the College of Applied Engineering are designed to meet the challenges of the 21st century by emphasizing both theory and practice that enhance students' preparation for professional careers, life-long learning, and responsible participation as members of society. Emphasis is placed on religious, general and sociological education to make today's engineer aware of environmental, sociological, and other "human concerns" in addition to safety, aesthetics, economics and cost of energy in their decision making. Clear and precise communication skills, oral and written, are required of the engineer who delivers judgments, plans and decisions. A sound knowledge of engineering and related disciplines is required so that the engineer can work effectively with other engineers, scientists and technicians, in fulfilling engineering assignments.

College Programs

The demand of engineering graduates who are more trained toward practice has been duly recognized by the College of Applied Engineering by developing an academic program which emphasizes both theory and practice. An elaborate on-job training program is an essential core of this broad base engineering education. Equipped with the knowledge of mathematics, physical sciences, tools of computational and statistical analysis data, and on-job training, the student is office ready to engage in creative design and construction of real-world engineering projects upon graduation. The College of Applied Engineering continue to provide flexibility in different programs through a spectrum of electives, which allows the College graduate to exercise a limited choice in tailoring his program to fit his personal career plans.

All programs of the College of Applied Engineering were evaluated for "Substantial Equivalency" recognition by the Accreditation Board for Engineering and Technology (ABET) in April 2001. They were found substantially equivalent to similar accredited programs in the United States.

CURRICULAR REQUIREMENTS

The general applied engineering curriculum includes the following features:

Virtually Common Freshman Year. In spite of the fact that students are required to declare their fields of major study at the Freshman level, the various specialty departments have a virtually common Freshman year.

Basic Science Courses. The curriculum of each major in Applied Engineering contains a number of specially designed courses in basic sciences to provide students with a firm background in the physical sciences and mathematics. Courses in general chemistry and physics, a three-semester sequence of mathematics courses, a course on differential equations and on computer programming are offered as a necessary foundation in science and computational skills.

General Education Courses. Several courses are designed within the framework of a curriculum to broaden the students' general education. Among the fields covered are Islamic history and culture, Arabic language and literature, English and economics.

Engineering Breadth. Several courses are required to give the student some breadth of study in science and technology. Courses in application of computers in engineering and statistical analysis of engineering data are clear features of the programs. In addition, under the heading of "Technical Electives", students are permitted to extend their study into further advanced courses in science, mathematics, computer technology, fields of engineering other than their major, or even from their own major.

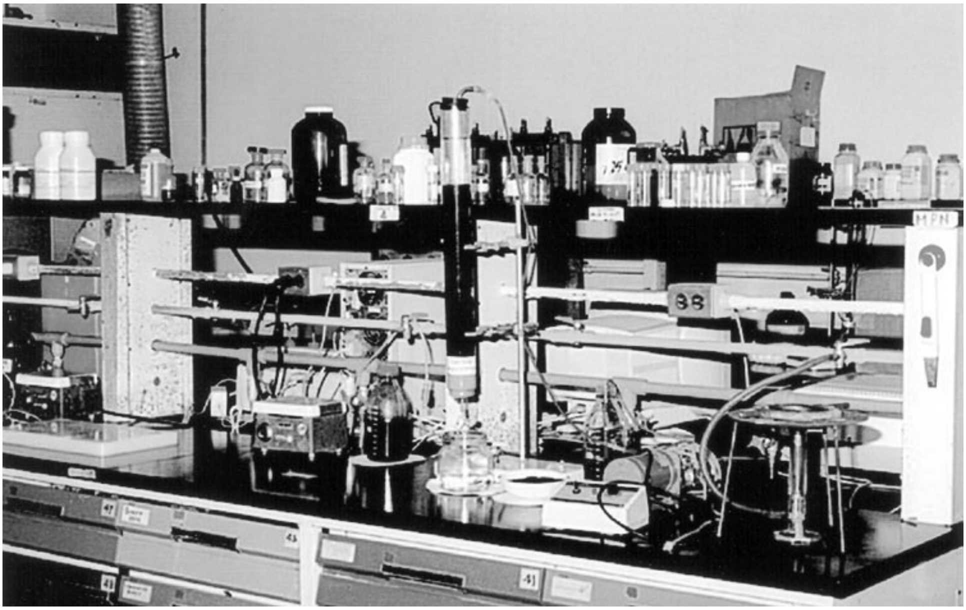
Engineering Depth. Most of the courses in this category are specified courses designed to give the student the essential subject materials in his major. However, two to four departmental electives are left open to the student so that he can do extend his knowledge in his own area of interest.

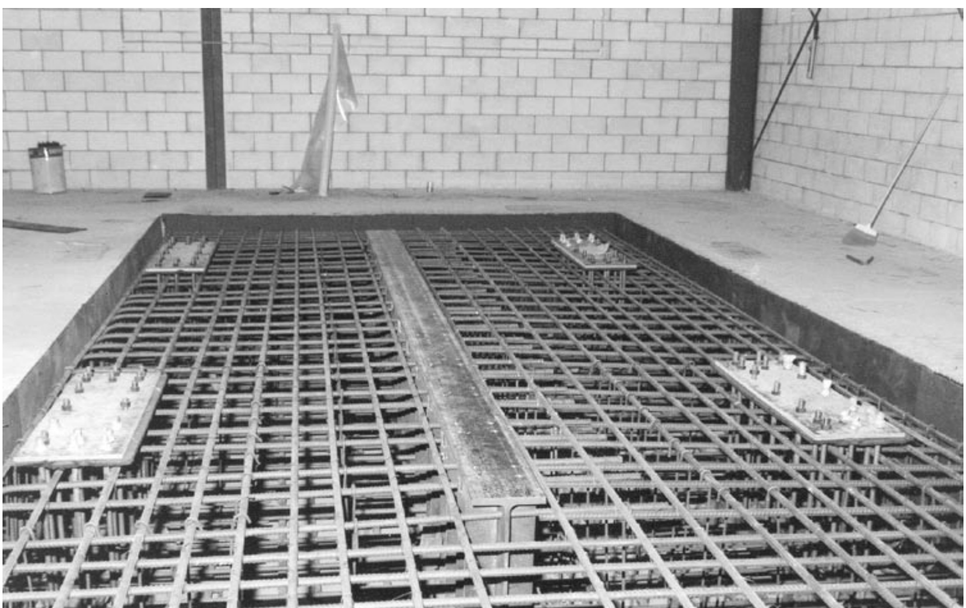
Engineering Training. A unique feature of the applied engineering program is its emphasis upon industrial experience in conjunction with academic training. Each student in the Applied Engineering College must spend one-half year working in industry under a supervised program known as "Cooperative Programs." In this training period, the students gain useful experience which broadens their engineering background.

Graduation Requirements

In order to qualify for graduation Applied Engineering students must:

1. complete all required and elective courses in the selected degree program (133 credit hours minimum) with a cumulative GPA of 2.00 or better;
2. achieve a major GPA of 2.00 or better;
3. complete successfully after the third year a 28-week cooperative program working in industry.





DEPARTMENT OF
APPLIED AEROSPACE ENGINEERING

Chairman:

DR. AHMED ZAFER AL-GARNI

Faculty

Al-Garni, A.M.

Al-Garni, A.Z.

Jamal

Kassem

Omar

Saeed

Tozan

Aerospace engineering is one of the most important strategic fields in the world at least from two aspects: first, its effect on the infrastructure of the country such as fast communication, air transportation, civil aviation, industry, and economy; second, its relevance to defense issues including Air Force and Air Defense.

Due to the importance of this field to the Kingdom of Saudi Arabia (KSA) and the region, an aerospace engineering program was established in 1419H (1998G) to serve two branches: Aeronautics Engineering and Astronautics Engineering. This program is the first and only program in KSA and the Arabian Gulf and Peninsula region that offers the two branches. It developed from the Aeronautical Engineering option which was offered in the Mechanical Engineering Department (ME) since 1406H (1986G). The current Aerospace Engineering Department was established in 1423H (2002G). Although, the Department has recently been established, it has to its credit the highest number of publications per faculty, among the Arabian countries, in leading aerospace journals (such as AIAA, Canadian, British and Japanese Aerospace Journals). Moreover, the AE Department faculty have received many awards such as King Abdul-Aziz Al-Saud Legion of Honor Medal in the first degree for a Scientific Patent, the Distinguished Engineering Scientist Award for Saudis and Non-Saudis, which is supervised by King Abdul-Aziz City for Science and Technology (KACST), the Distinguished Award in Teaching and Academic Advising by KFUPM, the Distinguished Research Award by KFUPM, and the American Romanian Academy of Arts and Sciences Book Award.

Curriculum

The Aerospace Engineering (AE) Program is designed to cover all fundamental aspects of aerospace engineering. The curriculum includes general education courses in Mathematics, Chemistry, Physics, Engineering, Computer Science, Islamic and Arabic Studies, English, and Physical Education. The program also provides the students with a strong base in the main areas of aerospace engineering: Aerodynamics and Gas Dynamics, Flight Dynamics and Control, Aerospace Structures, Flight Propulsion and other related fields such as Aerospace Systems Maintenance, Helicopter, Avionics, Flight Traffic Control, Flight Safety, Electronic Warfare and Radar, and Astronautics. Moreover, the curriculum is also augmented by a number of elective courses in various branches of aerospace engineering. A student has the opportunity to take the appropriate elective courses (three technical electives) in the area of aerospace engineering that he would like to specialize in. It balances theory with application and provides practical experience through appropriate laboratory sessions. In addition, the curriculum places additional emphasis on courses of practical importance such as AE 351 (Cooperative work), etc. The industrial experience gained from the Cooperative Program is of immense value since it provides the students with an important link between the theoretical and practical aspects of the Aerospace Engineering profession. The student must spend 28 weeks in an industrial setting. During this period of training, the student writes progress reports relevant to his work. After the prescribed time of training in the industry, the student presents a seminar and submits a comprehensive technical report.

Employment Opportunities

The employment opportunities for aerospace engineers in KSA, the Arabian Gulf and Peninsula region have been very good and will be brighter in this age of ever-changing technology. These opportunities exist because of the rapid pace of industrialization, technological development in aerospace engineering field, establishment of aviation departments in private organizations, and procurement of new aerospace related systems in defense and commercial aviation sectors. Moreover, the Kingdom's well established technological infrastructure has set the stage for the subsequent, very advanced and expanding phase of research and development, e.g., satellite development in the Space Institute of KACST (King Abdul-Aziz City of Science and Technology). In view of all these developments, well qualified aerospace engineers are in good demand.

Vision

The vision of the AE Department is to make KFUPM a *"leading and guiding"* institution in this field by developing a full range of aerospace degrees (undergraduate, graduate, and associate degrees) and conducting high quality research to meet the Kingdom's and region's needs for education, manpower, and technical expertise in aerospace engineering and related fields.

Mission

1. To provide high quality education in aerospace engineering at an international level and founded on the fundamental principles of engineering.
2. To promote and conduct research for the advancement of the aerospace industry, and to disseminate new knowledge through publications, conferences, seminars, and workshops.
3. To participate effectively in community services and provide professional expertise for KFUPM, the Kingdom, and the region through continuing education programs, short courses, and consulting services and establish close partnerships with industry, government, and other academic institutions in order to develop and support a strong economy.

Program Objectives

1. To provide students with a strong foundation in basic sciences, mathematics, and engineering fundamentals; in-depth knowledge of aerodynamics and gas dynamics, flight dynamics and control, aerospace structures, flight propulsion, and astrodynamics as well as aviation sciences and technologies.
2. To prepare students for professional careers in aerospace engineering or related fields by developing skills and abilities pertinent to: design and system integration, experiment, analysis, multidisciplinary teamwork and leadership, clear communication, and pursuit of advanced degrees.
3. To instill in students an understanding of the role and importance of life-long learning, professional responsibility, and engineering ethics with awareness of the impact of the engineering on societal and global issues.

Strategic Plan for the Achievement of Program Objectives

1. Provide first-class AE undergraduate education to students by developing a multi-disciplinary, systems-oriented aerospace engineering program founded on engineering fundamentals.
2. Provide the highest quality of AE graduate education which will equip the student with advanced knowledge in his chosen area of specialization, and the ability to apply this knowledge to new challenges, and to communicate the outcomes of these processes effectively to peers and the general public.
3. Establish centers of excellence by undertaking basic and applied research and multidisciplinary approaches to solve problems in aerospace, aviation, and other related areas.
4. Make the AE Department a leading and guiding institution for supporting and fostering the technological advancement and economic growth of the local, regional, and global industry.
5. Attract and retain qualified students, faculty and staff, help them to succeed, value their contributions, reward them for excellence and teamwork and offer them opportunities for professional development.
6. Integrating state-of-the-art technologies, advanced instrumentation, and high-tech multimedia tools into technologically advanced facilities that enhance the AE engineering environment for learning and research.
7. Periodically review the AE Program in view of the continually evolving needs of local, regional, and global industries and incorporate emerging aerospace related technologies into it.

Requirements for the B.S. Degree in Applied Aerospace Engineering

(a) General Education Requirements (78 Credit Hours)

		Credit Hours
Computer Programming	ICS 101	3
English	ENGL 101, 102, 214	9
General Studies	ECON 403	3
Engineering Courses	CE 201, 203; EE 204; SE 301	12
Islamic & Arabic Studies	IAS 101, 111, 201, 212, 301, 322, 4xx	14
Mathematics	MATH 101, 102, 201, 202, 301	17
Probability & Statistics for Engineers	STAT 319	3
Physical Education	PE 101, 102	2
Sciences	CHEM 101; PHYS 101, 102, 212	15
		78

(b) Core Requirements (43 Credit Hours)

ME Drawing & Graphics	ME 210	3
Dynamics & Control	ME 201, 413	6
Thermodynamics	ME 203	3
Materials Science	ME 215	4
Fluid Mechanics	ME 311	3
Introduction to Aerospace Engineering	AE 220	3
Gas Dynamics	AE 325	3
Flight Structures	AE 328	3
Aerodynamics	AE 333	3
Aerospace Engineering Labs	AE 420, 421	2
Flight Propulsion	AE 422	3
Flight Dynamics	AE 426	3
Aerospace System Design	AE 427	3
Computational Methods for AE	AE 450	1
		43

(c) Electives (3 Credit Hours)

Technical Electives	see the guidelines on page 69	3
		3

(d) Cooperative Work Requirements (9 credit hours)

Each student must participate in a 28- week program of industrial experience and submit a report: AE 350 & 351, "Applied Aerospace Engineering Cooperative Work".

Total Requirements (133 Credit Hours)

The B.S. degree in Applied Aerospace Engineering requires a total of 133 credit hours.

Applied Aerospace Engineering Curriculum

COURSE		TITLE	LT	LB	CR	COURSE		TITLE	LT	LB	CR
Preparatory Year											
ENGL	001	Preparatory English I	15	5	8	ENGL	002	Preparatory English II	15	5	8
MATH	001	Preparatory Math I	3	1	4	MATH	002	Preparatory Math II	3	1	4
PYP	001	Prep. Physical Sciences	2	0	2	PYP	002	Prep. Computer Sciences	0	2	1
PYP	003	University Study Skills	0	2	1	ME	003	Prep. Eng. Technology	0	2	1
PE	001	Prep. Physical Educ. I	0	2	1	PE	002	Prep. Physical Educ. II	0	2	1
			20	**10**	**16**				**18**	**12**	**15**
Total credit hours required in Preparatory Program: 31											
First Year (Freshman)											
CHEM	101	Chemistry I	3	4	4	ENGL	102	Intro. to Report Writing	3	0	3
ENGL	101	Intro. to Acad. Discourse	3	0	3	MATH	102	Calculus II	4	0	4
MATH	101	Calculus I	4	0	4	PHYS	102	Physics II	3	3	4
PHYS	101	Physics I	3	3	4	ICS	101	Computer Programming	2	3	3
IAS	111	Belief and its Consequences	2	0	2	IAS	101	Practical Grammar	2	0	2
PE	101	Physical Education I	0	2	1	PE	102	Physical Education II	0	2	1
			15	**9**	**18**				**14**	**8**	**17**
Second Year (Sophomore)											
ENLG	214	Acad. & Prof. Comm.	3	0	3	ME	201	Dynamics	3	0	3
MATH	201	Calculus	3	0	3	MATH	202	Elem. Diff. Equations	3	0	3
CE	201	Statics	3	0	3	CE	203	Structural Mechanics	3	0	3
ME	203	Thermodynamics I	3	0	3	ME	215	Mat. Sc. For ME	3	3	4
ME	210	Drawing & Graphics	2	3	3	AE	220	Introduction to AE	3	0	3
PHYS	212	Modern Physics	3	0	3	IAS	212	Professional Ethics	2	0	2
			17	**3**	**18**				**17**	**3**	**18**
Third Year (Junior)											
EE	204	Fund. of Elec. Circuits	2	3	3	AE	325	Gas Dynamics I	3	0	3
MATH	301	Methods of Appl. Math	3	0	3	AE	328	Flight Structure I	3	0	3
STAT	319	Prob. & Statistics for Engrs.	2	3	3	AE	333	Aerodynamics I	3	0	3
ME	311	Fluid Mechanics	3	0	3	AE	420	AE Lab I	0	3	1
SE	301	Numerical Method	3	0	3	IAS	301	Oral Communication Skills	2	0	2
IAS	201	Writing for Prof. Needs	2	0	2	IAS	322	Human Rights in Islam	2	0	2
						XX	xxx	T. Elective I*	3	0	3
			15	**6**	**17**				**16**	**3**	**17**
Summer Session						AE	350	Cooperative Work	0	0	0
Fourth Year (Senior)											
AE	351	Cont. of Coop Work	0	0	9	AE	422	Flight Propulsion I	3	0	3
						AE	421	AE Lab II	0	3	1
						AE	427	Aerospace Sysm. Design	3	0	3
						AE	450	Compl. Method for AE	0	3	1
						AE	426	Flight Dynamics I	3	0	3
						ME	413	System Dyn. & Control	2	3	3
						IAS	4xx	Islamic Elective	2	0	2
						ECON	403	Engineering Economics	3	0	3
			0	**0**	**9**				**16**	**9**	**19**
Total credit hours required in Degree Program: 133											

* The T. Electives will include AE Electives/Technical Electives from other departments with the approval of AE department.

Guidelines for Selection of Technical Electives for AE

The Technical Elective courses can be chosen from the following:

Any AE elective course in AE program

AE: 401, 402, 410, 414, 428, 429, 433, 442, 446, 499.

College of Engineering and Applied Engineering Courses

CE 305, 405

EE 203, 207, 306, 340, 370, 405, 418

ME 204, 206, 306, 307, 308, 309, 315, 424, 432, 434, 435, 468, 469, 476, 479, 481, 482, 484, 486, 487, 488, 489

College of Sciences Courses

MATH 280, 302, 311, 430, 465, 471

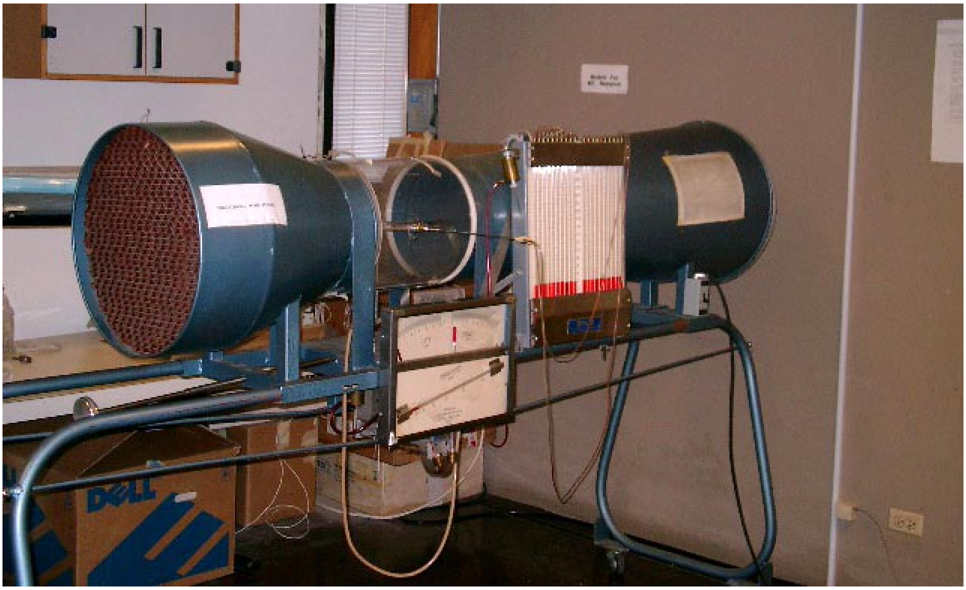
PHYS 201, 215, 315

College of Computer Sciences and Engineering

COE 353, 385

SE 303, 305, 402, 429, 443, 448

Note: Other courses can be considered by special permission from the AE Department and satisfaction of the prerequisite will be applied for each course.



DEPARTMENT OF APPLIED CHEMICAL ENGINEERING

Chairman:

DR. MOHAMED B. AMIN

Faculty

Abbas	Al-Mubaiyedh	Ma'adhah
Abul-Hamayel	Al-Naafa	Mahgoub
Abu-Sharkh	Al-Saleh	Redhwi
Al-Ali	Al-Shalabi	Saleem-ur-Rahman
Al-Amer	Amin	Shaikh
Al-Arfaj	Hussein	Tukur
Al-Baghli	Inui	Zaidi, S.M.J.
Al-Harbi	Kahraman	Zughbi
Al-Khattaf	Loughlin	

Faculty in Training

Abu-Ghandar	Al-Juhani	Al-Shammari
Abu Al-Saud	Al-Mutairi	Ba-Shammakh
Al-Harthi	Al-Sai	Malibari

Vision

The undergraduate program of the Department of Chemical Engineering will be recognized for excellence by its students, faculty, alumni, their employers, and other departments, both nationally and internationally.

Mission

The mission of the undergraduate programs in the Department of Chemical Engineering is to equip students with high quality education, fundamentals of chemical engineering, interdisciplinary knowledge, industrial experience, awareness of local industry needs, and skills in lifetime learning, communication and leadership.

Program Objectives

Graduates of KFUPM Applied Chemical Engineering Program will be able to:

1. Apply mathematical, scientific, and engineering principles in their professional practice.
2. Engage in adopting and developing new technology.
3. Provide technical leadership in a broad range of process industries.
4. Demonstrate high ethical and professional standards in their industrial practice.
5. Communicate effectively in both English and Arabic in industrial practice.

Outcomes

At the time of graduation, students of the Applied Chemical Engineering Program are expected to:

1. Apply knowledge of mathematics, science, and engineering principles in solving chemical engineering problems.
2. Have the ability to engage in life-long learning.
3. Design and evaluate chemical processes.
4. Conduct chemical engineering experiments and analyze and interpret plant data.
5. Function and work with others in multidisciplinary teams.
6. Communicate effectively both in English and Arabic.
7. Apply modern simulation software.
8. Be aware of professional and ethical responsibilities in the workplace.
9. Recognize environmental and societal impact of engineering decisions.
10. Apply safety rules in the work place.
11. Recognize contemporary issues related to the profession.
12. Understand the role of the chemical engineer in industry through a seven months industrial practice for the applied program.

Program Strategy

The strategy of the Department of Chemical Engineering to achieve our objectives is to:

1. Attract high quality students especially those with top university entrance scores to the chemical engineering program.
2. Continually improve and update the quality of the chemical engineering curriculum.
3. Adopt and apply advances in educational technologies to improve teaching and the learning environment.
4. Develop a strong senior capstone design project course. Annual awards are presented by the Saudi Arabian Section of the American Institution of Chemical Engineers and Saudi Arabia Basic Industries Corporation (SABIC) for the best presented projects.
5. Acquire modern computerized laboratory experiments to update our laboratory program in chemical engineering.
6. Promote a strong industrial cooperative program for a 28 week period to strengthen the industrial training of the students
7. Attract and retain high quality faculty and support staff.
8. Continually improve the program through advice of Industrial Advisory Committee.
9. Assess the program through surveys of graduating seniors, faculty, alumni, and their employers for improvement.

Program Description

Chemical Engineering may be defined as a profession, which uses the sciences of mathematics, physics and chemistry for the benefit of mankind. It employs chemical and physical principles for the design of processes and the conversion of raw materials into valuable products to improve life for the average individual. The chemical conversions involve the preparation of useful products in large quantities using basic thermodynamics and chemical kinetics, which govern reactions. Physical conversions utilize unit operations, fluid dynamics, heat transfer, and mass transfer to separate the reactant products into useful pure chemicals. All these subjects are used in the design of chemical plants and refineries.

The undergraduate curriculum has been systematically revised over the years to reflect the emergence of chemical engineering as a modern discipline and its changing role in society. The modern curriculum includes topics such as process control, reaction engineering, plant design and integrated plant design.

The applied chemical engineering program has been designed to educate individuals for industrial positions requiring a sophisticated but practically applied orientation. Graduates will be capable of solving design and applied chemical engineering problems as well as performing supervisory and sales functions. The department maintains excellent communication with industry through a seven-month cooperative work program, and encourages students to gain experience through industrial practice; for example, academic credit is granted for appropriate work experience.

The department has excellent laboratory facilities in the areas of fluid mechanics, heat transfer, mass transfer, process control, reactor analysis, pilot plant studies, and the like. The department has two custom built computer laboratories, equipped with state of the art PCs and essential software packages, which include powerful process simulators and computational fluid dynamics (CFD) packages.

Because of the wide scope of chemical engineering training and the industrial boom in Saudi Arabia, graduates can seek employment in many fields. Some may follow a career in government in various ministries. Still others find employment in petroleum, petrochemical, food, metallurgy, or chemical industries.

Requirements for the B.S. Degree in Applied Chemical Engineering

Each student majoring in Applied Chemical Engineering must complete the following courses:

(a) General Education Requirements (65 credit hours)

		Credit Hours
Chemistry	CHEM 101, 102	8
Communication Skills	ENGL 101, 102, 214, IAS 101, 201, 301	15
Engineering Skills	ICS 101, EE 204, SE 301	9
Islamic and Arabic Studies	IAS 111, 212, 322	6
Mathematics	MATH 101, 102, 201, 202, STAT 319	17
Physical Education	PE 101, 102	2
Physics	PHYS 101, 102	8
		65

(b) Advanced Chemical Sciences Requirements (18 credit hours)

Chemistry	CHEM 201, 202, 311, 323	15
Material Science	ME 205	3
		18

(c) Core Requirements (39 credit hours)

Introduction to Chemical Engineering	CHE 201	3
Thermodynamics	CHE 203, 303	6
Transport Processes	CHE 204, 300, 304	9
Separation Processes	CHE 306	3
Chemical Engineering Laboratories	CHE 309, 409	4
Chemical Engineering Computer Lab	CHE 325	2
Process Dynamics & Control	CHE 401	3
Kinetics & Reactor Design	CHE 402	3
Plant Design	CHE 425, 495	6
		39

(d) Electives (2 credits)

Islamic & Arabic Studies	1 IAS Elective	2
		2

(e) Cooperative Work Requirement (9 credit hours)

Each student must participate in a 28-week program of industrial experience and submit a report: CHE 351 Applied Chemical Engineering Cooperative Work.

(f) Total Requirements (133 credit hours)

The total requirements for the B.S. degree in Applied Chemical Engineering are 133 semester-credit-hours.

Applied Chemical Engineering Curriculum

COURSE		TITLE	LT	LB	CR	COURSE		TITLE	LT	LB	CR
Preparatory Year											
ENGL	001	Preparatory English I	15	5	8	ENGL	002	Preparatory English II	15	5	8
MATH	001	Preparatory Math I	3	1	4	MATH	002	Preparatory Math II	3	1	4
PYP	001	Prep. Physical Sciences	2	0	2	PYP	002	Prep. Computer Sciences	0	2	1
PYP	003	University Study Skills	0	2	1	ME	003	Prep. Eng. Technology	0	2	1
PE	001	Prep. Physical Educ. I	0	2	1	PE	002	Prep. Physical Educ. II	0	2	1
			20	**10**	**16**				**18**	**12**	**15**
Total credit hours required in Preparatory Program: 31											
First Year (Freshman)											
MATH	101	Calculus I	4	0	4	MATH	102	Calculus II	4	0	4
CHEM	101	General Chemistry I	3	4	4	CHEM	102	General Chemistry II	3	4	4
PHYS	101	General Physics I	3	3	4	PHYS	102	General Physics II	3	3	4
ENGL	101	Intro. to Acad. Discourse	3	0	3	ENGL	102	Intro. to Report Writing	3	0	3
IAS	111	Belief and its Consequences	2	0	2	ICS	101	Computer Programming	2	3	3
PE	101	Physical Education I	0	2	1						
			15	**9**	**18**				**15**	**10**	**18**
Second Year (Sophomore)											
CHE	201	Intro. to Chemical Engineering	3	0	3	CHE	203	Chem. Eng. Thermo. I	3	0	3
MATH	201	Calculus III	3	0	3	CHE	204	Transport Phenomena I	3	0	3
CHEM	201	Organic Chemistry I	3	4	4	MATH	202	Elem. Diff. Equations	3	0	3
ME	205	Materials Science	2	3	3	CHEM	202	Organic Chemistry II	3	4	4
EE	204	Fund Electric Circuits	2	3	3	ENGL	214	Acad. & Prof. Comm.	3	0	3
IAS	101	Practical Grammar	2	0	2	IAS	212	Professional Ethics	2	0	2
PE	102	Physical Education II	0	2	1						
			15	**12**	**19**				**17**	**4**	**18**
Third Year (Junior)											
CHE	300	Transport Phenomena II	3	0	3	CHE	306	Stagewise Operations	3	0	3
CHE	303	Chem. Eng. Thermo II	3	0	3	CHE	309	Chem. Engg. Laboratory I	0	6	2
CHE	304	Transport Phenomena III	3	0	3	CHE	325	Chem. Engg. Comp. Lab.	1	3	2
STAT	319	Statistics for Engineers	2	3	3	CHEM	323	Analytical Chemistry	2	4	3
CHEM	311	Physical Chemistry II	3	4	4	SE	301	Numerical Methods	3	0	3
IAS	201	Writing for Prof. Needs	2	0	2	IAS	322	Human Rights in Islam	2	0	2
			16	**7**	**18**				**11**	**13**	**15**
Summer Session						CHE	350	Coop Work Program	0	0	0
Fourth Year (Senior)											
CHE	351	Cont. of Coop Work	0	0	9	CHE	401	Process Dyn. & Control	3	0	3
						CHE	402	Kinetics & React. Design	3	0	3
						CHE	425	Eng. Econ. & Design	3	0	3
						CHE	409	Chem. Eng. Laboratory II	0	6	2
						CHE	495	Integrated Design Course	1	6	3
						IAS	4xx	IAS Elective	2	0	2
						IAS	301	Oral Communication Skills	2	0	2
			0	**0**	**9**				**14**	**12**	**18**
Total credit hours required in Degree Program: 133											

DEPARTMENT OF APPLIED CIVIL ENGINEERING

Chairman:

DR. HAMAD IBRAHIM AL-ABDUL WAHHAB

Faculty

Abduljauwad	Alghamdi, S.	Al-Sughaiyer	Baluch
Ahmad	Al-Ghamedy, H.	Al-Suwaiyan	Bouchama
Ahmadi	Al-Juruf	Al-Tayyib	Bukhari
Aiban	Al-Layla	Al-Yousef	Dakhil
Al-Abdul Wahhab	Al-Mana	Al-Zahrani, M.A.	Khathlan
Al-Amoudi	Al-Mandil	Al-Zahrani, M.M.	Malack
Al-Dulaijan	Almusallam	Azad	Ratrout
Al-Gadhib	Al-O	Bader, M.	Sharif
Al-Gahtani, A.	Al-Senan	Bader, T.	Vohra
Al-Gahtani, H.	Al-Shayea	Baig	

Introduction

Civil engineering major is multidisciplinary in nature. It covers aspects of studies that relate to the essential needs of mankind. It embodies planning, design, construction, maintenance, and operation of private and public facilities such as buildings and structures, transportation, water supply and wastewater systems.

The four-year undergraduate curriculum in applied civil engineering provides basic knowledge in sciences, mathematics, and engineering in the first two years. During the third year, the student is introduced to the traditional options in civil engineering with emphasis on applications and design. After the completion of his third year, the student undertakes a cooperative program in industry where the on-the-job training provided leads to an appreciation of the civil engineering practice. This is in contrast to the civil engineering student who enters the civil engineering practice after completing his four year study. Appropriate electives are also offered to further the student's knowledge in one or more of the areas of civil engineering. In addition, courses in humanities, social sciences and economics are integrated into the program to broaden the student's knowledge.

The Civil Engineering Department is equipped with modern laboratories for teaching and research in the areas of geotechnical engineering, civil engineering materials, strength of materials, structural analysis, design and modeling, highway and transportation, surveying and photogrammetry, hydraulics and hydrology, and environmental engineering. Effective use of the modern computer facilities at the University's Information Technology Center constitutes an essential part of the applied civil engineering undergraduate curriculum.

Vision

The Vision of the Department of Civil Engineering is to establish itself as a leading center of Civil Engineering education by supporting academic distinction and seeking excellence in teaching, learning, research and public services in partnership with the University.

Mission

The Mission of the Department of Civil Engineering is to maintain a preeminent role in teaching and research by pursuing a policy of rapid adaptation to new knowledge, discoveries, technological advances and emerging economics and to serve the public through the dissemination of knowledge and information. The department seeks to provide an environment of learning within which creative thinking, practical skills and self development are cultivated and sustained to produce qualified Civil Engineers who will challenge the present and enrich the future.

Strategic Goals

The strategic goals set by the department to achieve the Vision and Mission are:

- To seek continual improvement of the teaching environment and academic programs through an arduous self-evaluation as well as extramural evaluation by peers to provide an education reflective of the essential knowledge, professional competence and skills required of the graduates for successful careers in Civil Engineering profession.
- To readily adopt and apply advances in educational technologies to improve teaching and learning environment.
- To make the student community more motivated and responsive to learning and to instill a greater sense of responsibility and accomplishment among the students and to foster personal growth and lifelong learning.
- To focus in research the search for scholarship, discoveries, innovations and practical applications in all areas, including those which are emerging and rapidly developing and to maintain an effective link with local industries for productive engagements.
- To further promote University's standing and prestige within the society by upgrading and enlarging the public services provided by the department through continuing education, information dissemination, public lectures, seminars and consulting services.
- To build an efficient support and administration and to develop facilities that provide the infrastructure for enhanced education, research and services.

Requirements for the B.S. Degree in Applied Civil Engineering

Each student majoring in Applied Civil Engineering must complete the following courses:

(a) General Education Requirements (66 credits)

		Credit-Hours
Computer Programming	ICS 101	3
English	ENGL 101, 102, 214	9
General Studies	ECON 403	3
Interdisciplinary Basic Courses	ME 201, EE 204	6
Islamic and Arabic Studies	IAS 101, 111, 201, 212, 301, 322	12
Mathematics & Statistics	MATH 101, 102, 201, 202, STAT 319	17
Physical Education	PE 101, 102	2
Sciences	CHEM 101, 111, PHYS 101, 102	14
		66

(b) Core Requirements (47 credits)

Introduction to CE	CE 100	1
Engineering Drawing	CE 213	3
Surveying	CE 260	3
Structures	CE 201, 203, 305, 315	12
Materials	CE 303	4
Geotechnical	CE 353	4
Transportation	CE 341, 343	4
Water Resources and Environmental Engineering	CE 230, 331, 370	10
Computer Methods	CE 317	3
Construction Engineering	CE 420	3
Senior Design Project	CE 411	3
		50

(c) Electives (11 credits)

Applied Civil Engineering Elective	1 CE Elective	3
Technical Elective*	1 Technical Elective	3
Islamic and Arabic Studies	1 IAS Elective	2
		8

* Can also be taken from CE electives.

(d) Cooperative Work Requirement (9 credits)

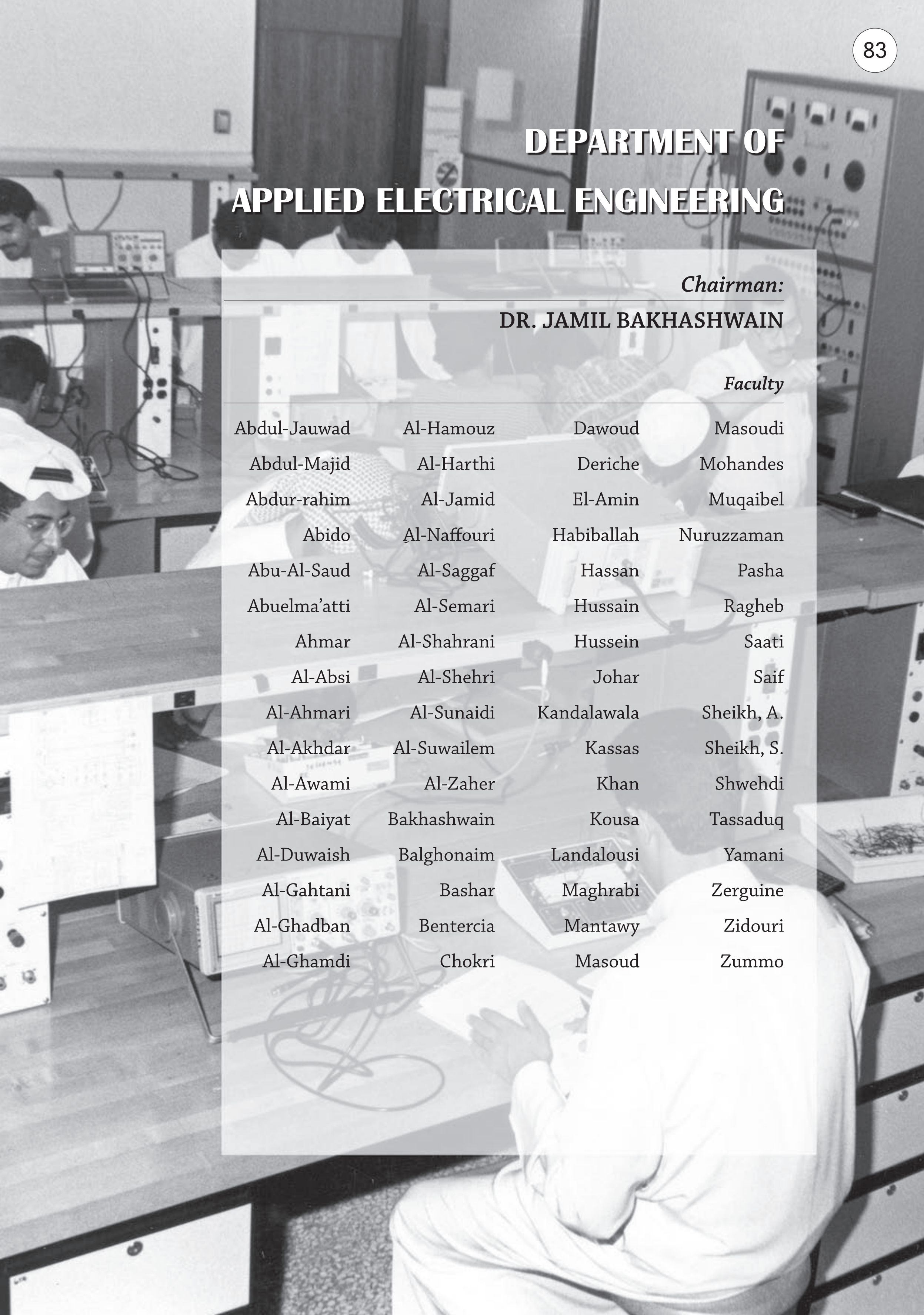
Each student must participate in a twenty-eight-week program in the industry to gain experience and subsequently submit and present a formal report: CE 350 and CE 351 (0, 9 credit hours respectively).

(e) Total Requirements (133 credits)

The total required credits for the B.S. degree in Civil Engineering Science is 133 semester-credit-hours including 9 credits for the cooperative work.

Applied Civil Engineering Curriculum

COURSE		TITLE	LT	LB	CR	COURSE		TITLE	LT	LB	CR
Preparatory Year											
ENGL	001	Preparatory English I	15	5	8	ENGL	002	Preparatory English II	15	5	8
MATH	001	Preparatory Math I	3	1	4	MATH	002	Preparatory Math II	3	1	4
PYP	001	Prep. Physical Sciences	2	0	2	PYP	002	Prep. Computer Sciences	0	2	1
PYP	003	University Study Skills	0	2	1	ME	003	Prep. Eng. Technology	0	2	1
PE	001	Prep. Physical Educ. I	0	2	1	PE	002	Prep. Physical Educ. II	0	2	1
			20	**10**	**16**				**18**	**12**	**15**
Total credit hours required in Preparatory Program: 31											
First Year (Freshman)											
CE	100	Introduction to CE	1	0	1	ICS	101	Computer Programming	2	3	3
CHEM	101	General Chemistry I	3	4	4	ENGL	102	Intro. to Report Writing	3	0	3
ENGL	101	Intro. to Acad. Discourse	3	0	3	MATH	102	Calculus II	4	0	4
MATH	101	Calculus I	4	0	4	PHYS	102	General Physics II	3	3	4
PHYS	101	General Physics I	3	3	4	PE	102	Physical Education	0	2	1
PE	101	Physical Education I	0	2	1	IAS	111	Belief and its consequences	2	0	2
			14	**9**	**17**				**14**	**8**	**17**
Second Year (Sophomore)											
ENGL	214	Acad. & Prof. Comm.	3	0	3	MATH	202	Elem. Diff. Equations	3	0	3
IAS	101	Practical Grammar	2	0	2	CE	203	Structural Mechanics I	3	0	3
CE	201	Statics	3	0	3	CE	230	Engg. Fluid Mechanics	3	0	3
MATH	201	Calculus III	3	0	3	CE	260	Surveying I	2	3	3
CE	213	Computer Graphics	1	6	3	IAS	212	Professional Ethics	2	0	2
EE	204	Fund. of Electric Circuits	2	3	3	CHEM	111	Basics of Env. Chemistry	2	0	2
						ME	201	Dynamics	3	0	3
			14	**9**	**17**				**18**	**3**	**19**
Third Year (Junior)											
CE	303	Structural Materials	3	3	4	CE	315	Reinforced Concrete I	2	3	3
CE	305	Structural Analysis I	3	0	3	CE	341	Transportation Engineering	3	0	3
CE	317	Comp. Methods in CE	2	3	3	CE	343	Transportation Engg. Lab.	0	3	1
STAT	319	Prob. & Stats for Engrs.	2	3	3	CE	353	Geotechnical Engg.	3	3	4
CE	331	Engg. Hydrology	2	3	3	CE	370	Water & Wastewater	3	3	4
IAS	301	Oral Communication Skills	2	0	3	IAS	201	Writing for Prof. Needs	2	0	2
			14	**12**	**18**				**13**	**12**	**17**
Summer Session						CE	350	Coop Field Work	0	0	0
Fourth Year (Senior)											
CE	351	Continue Coop Work	0	0	9	ECON	403	Engineering Economy	3	0	3
						CE	420	Construction Engineering	3	0	3
						CE	4xx	Applied CE Design Elect.	3	0	3
						CE	411	Senior Design Project	3	0	3
						XE	xxx	Technical Elective	3	0	3
						IAS	4xx	IAS Elective	2	0	2
						IAS	322	Human Rights in Islam	2	0	2
			0	**0**	**9**				**19**	**0**	**19**
Total credit hours required in Degree Program: 133											



DEPARTMENT OF APPLIED ELECTRICAL ENGINEERING

Chairman:

DR. JAMIL BAKHASHWAIN

Faculty

Abdul-Jauwad	Al-Hamouz	Dawoud	Masoudi
Abdul-Majid	Al-Harthi	Deriche	Mohandes
Abdur-rahim	Al-Jamid	El-Amin	Muqaibel
Abido	Al-Naffouri	Habiballah	Nuruzzaman
Abu-Al-Saud	Al-Saggaf	Hassan	Pasha
Abuelma'atti	Al-Semari	Hussain	Ragheb
Ahmar	Al-Shahrani	Hussein	Saati
Al-Absi	Al-Shehri	Johar	Saif
Al-Ahmari	Al-Sunaidi	Kandalawala	Sheikh, A.
Al-Akhdar	Al-Suwailem	Kassas	Sheikh, S.
Al-Awami	Al-Zaher	Khan	Shwehdi
Al-Baiyat	Bakhashwain	Kousa	Tassaduq
Al-Duwaish	Balghonaim	Landalousi	Yamani
Al-Gahtani	Bashar	Maghrabi	Zerguine
Al-Ghadban	Bentercia	Mantawy	Zidouri
Al-Ghamdi	Chokri	Masoud	Zummo

Introduction

The contribution of electrical engineering to modern society is a fact underlying a large number of products and services. Most modern appliances are electrically powered. Moreover, services such as global communications and large computing facilities are all electronically-based. At present, equipment used in medical diagnosis and treatment relying on electrical engineering principles is finding widening applications. In addition to these examples, electrical engineering concepts deriving from such disciplines as control theory and information theory have had applications in economics, management, physiology, energy, and biomedicine.

The applied electrical engineering program, while emphasizing applications of devices and circuits, has three aspects: first, classroom subjects in basic sciences such as chemistry, physics, and mathematics, as well as Islamic and Arabic studies; second, classroom subjects in the area of electrical engineering which cover major subjects while allowing the student to emphasize a certain area of electrical engineering such as control theory, electrical power, digital systems, and communications (which the student achieves through the list of electives offered to him); third, laboratory classes in which experimental work is done, utilizing a large number of instruments. A prominent characteristic of applied electrical engineering is the requirement that students spend one semester in industry. The requirement is satisfied through the cooperative work program.

After completing the undergraduate program in applied electrical engineering, the student is qualified to take up responsible employment. Numerous work opportunities for applied electrical engineers exist in the Kingdom and overseas, where graduates may work in the areas of communications, including telephony, telegraphy, radio and television, much of which incorporates the expanding field of microwaves. The areas of power engineering, electrical installation, broadcasting, and education also provide good career opportunities. A large number of graduates are also required by industry for work in information processing, computers, as well as systems analysis. Other opportunities exist in industrial electronics, instrumentation, manufacturing technology, and microwaves.

Vision

Aspires to be ranked first among all EE departments in the Middle East region.

Mission

To educate and train young men through transfer and integration of knowledge to become future Electrical Engineers and leaders.

Program Objectives

The objectives of the Applied Electrical Engineering Program are summarized below:

1. Students shall obtain a broad education necessary to understand the impact of Electrical Engineering solutions in a global, societal, and environmental context.
2. Students will attain an ability to analyze and solve Electrical Engineering problems in practice by applying fundamental knowledge of mathematics, science, and engineering sciences.
3. Students will be able to identify, formulate, and solve Electrical Engineering problems.
4. Students shall be able to design and conduct scientific and engineering experiments, and to analyze and interpret the results.
5. Students shall acquire the ability to function and communicate effectively.
6. Students will obtain a solid understanding of professional and ethical responsibility and recognition of the need for, and ability to engage in, perpetual learning.
7. Consistent with the breadth of Electrical Engineering, the Department offers a wide range of technical specialties.

Requirements for the B.S. Degree in Applied Electrical Engineering

(a) General Education Requirements (66 credit hours)

		Credit Hours
Communication Skills	ENGL 214, IAS 101, 201	7
English	ENGL 101, 102	6
Computer Programming in C	ICS 103	3
Interdisciplinary Engineering Courses	SE 301, ME 203	6
Mathematics	MATH 101, 102, 201, 202, 302	17
Physics	PHYS 101, 102	8
Chemistry	CHEM 101	4
Islamic Courses	IAS 111, 212, 301, 322, 4xx	10
Physical Education	PE 101, 102	2
General Studies	CIM xxx (Elective from CIM)	3
		66

(b) Core Requirements (45 credit hours)

Digital Logic Circuit Design	EE 200	4
Electric Circuits	EE 201, 205	7
Electronics	EE 203, 303	8
Signals and Systems	EE 207	3
Probabilistic Methods in EE	EE 315	3
Electromagnetics	EE 340	4
Electric Energy Engineering	EE 360	4
Communication Engineering	EE 370	4
Control Engineering	EE 380	4
Digital Systems Engineering	EE 390	4
Senior Design Project	EE 411	3
		48

(c) Electives (10 credit hours)

Electrical Engineering Electives	7
Technical Elective	3
	10

(d) Cooperative Work Requirements — 9

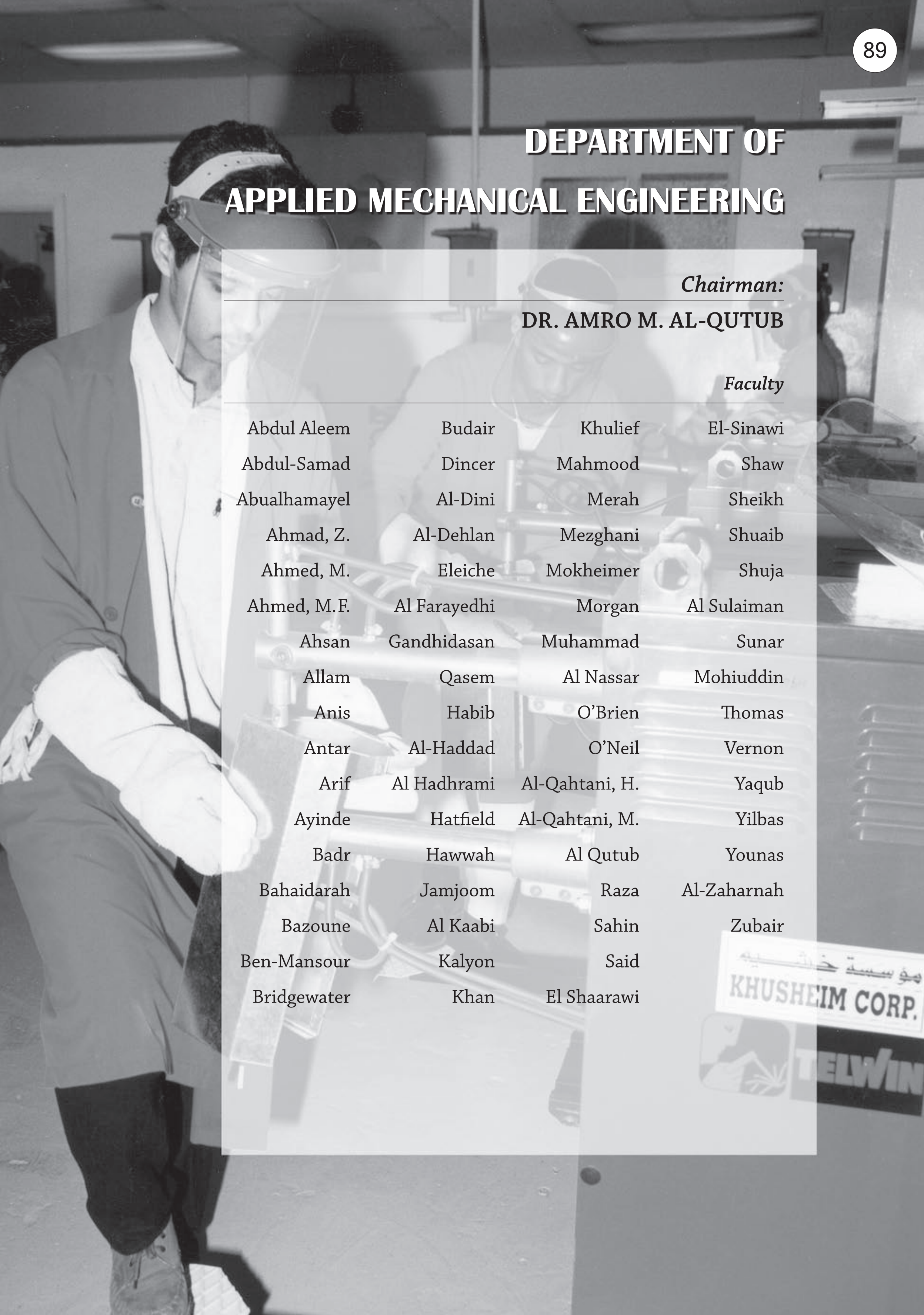
Each student must participate in a 28-week program of industrial experience after which a formal written report must be submitted.

(e) Total Requirements (133 credit hours)

The total requirements for the B.S. degree in Applied Electrical Engineering is 133 semester-credit-hours.

Applied Electrical Engineering Curriculum

COURSE	TITLE	LT	LB	CR	COURSE	TITLE	LT	LB	CR
Preparatory Year									
ENGL 001	Preparatory English I	15	5	8	ENGL 002	Preparatory English II	15	5	8
MATH 001	Preparatory Math I	3	1	4	MATH 002	Preparatory Math II	3	1	4
PYP 001	Prep. Physical Sciences	2	0	2	PYP 002	Prep. Computer Sciences	0	2	1
PYP 003	University Study Skills	0	2	1	ME 003	Prep. Eng. Technology	0	2	1
PE 001	Prep. Physical Educ. I	0	2	1	PE 002	Prep. Physical Educ. II	0	2	1
		20	**10**	**16**			**18**	**12**	**15**
Total credit hours required in Preparatory Program: 31									
First Year (Freshman)									
CHEM 101	General Chemistry	3	4	4	ENGL 102	Intro. to Report Writing	3	0	3
ENGL 101	Intro. to Acad. Discourse	3	0	3	IAS 101	Practical Grammar	2	0	2
IAS 111	Belief and its Consequences	2	0	2	ICS 103	Computer Programming in C	2	3	3
MATH 101	Calculus I	4	0	4	MATH 102	Calculus II	4	0	4
PE 101	Physical Education I	0	2	1	PE 102	Physical Education II	0	2	1
PHYS 101	General Physics I	3	3	4	PHYS 102	General Physics II	3	3	4
		15	**9**	**18**			**14**	**8**	**17**
Second Year (Sophomore)									
EE 200	Digital Logic Circuit Design	3	3	4	EE 203	Electronics I	3	3	4
EE 201	Electric circuits I	3	3	4	EE 205	Electric Circuits II	3	0	3
ENGL 214	Acad. & Prof. Comm.	3	0	3	EE 207	Signals & Systems	3	0	3
IAS 212	Professional Ethics	2	0	2	IAS 201	Writing for Prof. Needs	2	0	2
MATH 201	Calculus III	3	0	3	MATH 202	Elem. Diff. Equations	3	0	3
ME 203	Thermodynamics	3	0	3	SE 301	Numerical Methods	3	0	3
		15	**6**	**19**			**17**	**3**	**18**
Third Year (Junior)									
EE 303	Electronics II	3	3	4	EE 315	Probab. Methods in EE	3	0	3
EE 360	Elect. Energy Eng.	3	3	4	EE 340	Electromagnetics	3	3	4
EE 380	Control Eng.	3	3	4	EE 370	Communication Eng.	3	3	4
IAS 322	Human rights in Islam	2	0	2	EE 390	Digital Systems Eng.	3	3	4
MATH 302	Applied Math for Engnrs.	3	0	3	IAS 301	Oral Communication Skills	2	0	2
		14	**9**	**17**			**14**	**9**	**17**
Summer Session					EE 350	Cooperative Work	0	0	0
Fourth Year (Senior)									
EE 351	Cont. of Coop. Work	0	0	9	EE 4xx	Elective I	3	0	3
					EE 4xx	Elective II	3	3	4
					EE 411	Senior Design Project	3	0	3
					IAS 4xx	IAS Elective	2	0	2
					XE xxx	Technical Elective	3	0	3
					XX xxx	Elective from CIM	3	0	3
		0	**0**	**9**			**17**	**3**	**18**
Total credit hours required in Degree Program: 133									



DEPARTMENT OF APPLIED MECHANICAL ENGINEERING

Chairman:

DR. AMRO M. AL-QUTUB

Faculty

Abdul Aleem	Budair	Khulief	El-Sinawi
Abdul-Samad	Dincer	Mahmood	Shaw
Abualhamayel	Al-Dini	Merah	Sheikh
Ahmad, Z.	Al-Dehlan	Mezghani	Shuaib
Ahmed, M.	Eleiche	Mokheimer	Shuja
Ahmed, M.F.	Al Farayedhi	Morgan	Al Sulaiman
Ahsan	Gandhidasan	Muhammad	Sunar
Allam	Qasem	Al Nassar	Mohiuddin
Anis	Habib	O'Brien	Thomas
Antar	Al-Haddad	O'Neil	Vernon
Arif	Al Hadhrami	Al-Qahtani, H.	Yaqub
Ayinde	Hatfield	Al-Qahtani, M.	Yilbas
Badr	Hawwah	Al Qutub	Younas
Bahaidarah	Jamjoom	Raza	Al-Zaharnah
Bazoune	Al Kaabi	Sahin	Zubair
Ben-Mansour	Kalyon	Said	
Bridgewater	Khan	El Shaarawi	

Introduction

Applied mechanical engineers are employed in many fields. Whenever any item is produced, be it a transistor, a fabric, an aspirin tablet, or an automobile, it will be necessary to involve mechanical engineers to design and develop the machines and processes that make these products. In addition, applied mechanical engineers are involved in building and operating power plants, steel mills, transportation systems, refrigeration and air-conditioning systems, pumping machinery, and agricultural machinery. These are only a few examples.

The applied mechanical engineering curriculum is designed to provide the students with a strong base in the main areas of mechanical engineering for entering a challenging profession. In his junior year, the applied mechanical engineering student is required to go on a 28-week program of Co-op industrial experience. After completion of his Co-op work, each student is required to submit a comprehensive technical report. At the senior level, a Capstone Design Project enables each student to develop both his creativity and individual abilities. The possible topics cover a wide field of subjects such as the application of solar energy, vibration studies, refrigeration, air conditioning, control, fluid power engineering and manufacturing systems.

The role of, and opportunities for, applied mechanical engineers are enhanced by the rapid pace of industrialization in the Kingdom. The ambitious projects in the areas of petrochemical, oil, gas, domestic appliances, steel industries and other applications will demand an ever-increasing number of applied mechanical engineers. As a result, the choice of the field in which an applied mechanical engineer may work is virtually unlimited as he may work in the fields of research, development, production, operation, testing, maintenance, marketing and management.

Mission

The Department is committed to providing highest quality education in mechanical engineering, conducting world-class basic and applied research, addressing the evolving needs of industry and society, and supporting the development of more competitive and new industry in the Kingdom of Saudi Arabia.

Vision

The Mechanical Engineering Department at KFUPM will seek distinction as a leader in providing world-class mechanical engineering education to the Kingdom of Saudi Arabia and the Gulf region. The graduates of the Department will be at the forefront of establishing, advancing, and expanding an indigenous knowledge base, which can be solidly relied upon for accepting future challenges, providing proper directions for industrial growth, and furnishing reliable solutions to engineering problems.

Goals

1. Be preeminent in developing and providing the highest quality undergraduate learning environment in Mechanical Engineering education.
2. Be a world reputed Mechanical Engineering Department in graduate education, and basic and applied research.
3. Be preeminent on international level for academic, basic, and applied research.
4. Be a preeminent and leading institution for supporting the technological advancement and economic growth of the local, national, and Gulf area industry.
5. Be a leading university in human-resource development and effective and efficient infrastructure utilization.

Requirements for the B.S. Degree in Applied Mechanical Engineering

(a) General Education Requirements (75 credit hours)

		Credit-Hours
Computer Programming	ICS 101	3
English	ENGL 101, 102, 214	9
General Studies	ECON 403	3
Interdisciplinary Basic Courses	CE 201, 203, EE 204, 306	12
Islamic & Arabic Studies	IAS 101, 111, 201, 212, 301, 322, 4XX	14
Mathematics	MATH 101, 102, 201, 202, 301	17
Probability & Statistics for Engrs.	STAT 319	3
Physical Education	PE 101, 102	2
Sciences	CHEM 101, PHYS 101, 102	12
		75

(b) Core Requirements (46 credit hours)

ME Drawing & Graphics	ME 210	3
Dynamics and Control	ME 201, 309, 413	9
Thermodynamics	ME 203, 204	6
Materials Science	ME 215	4
Manufacturing Processes	ME 206, 306	7
Fluid Mechanics	ME 311	3
Heat Transfer	ME 315	3
Thermo-fluids Lab.	ME 316	1
Machine Design	ME 307, 308	7
Design Project	ME 415	3
		46

(c) Electives (3 credit hours)

Mechanical Engineering	ME 4XX	3
		3

(d) Co-operative Work Requirements (9 credit hours)

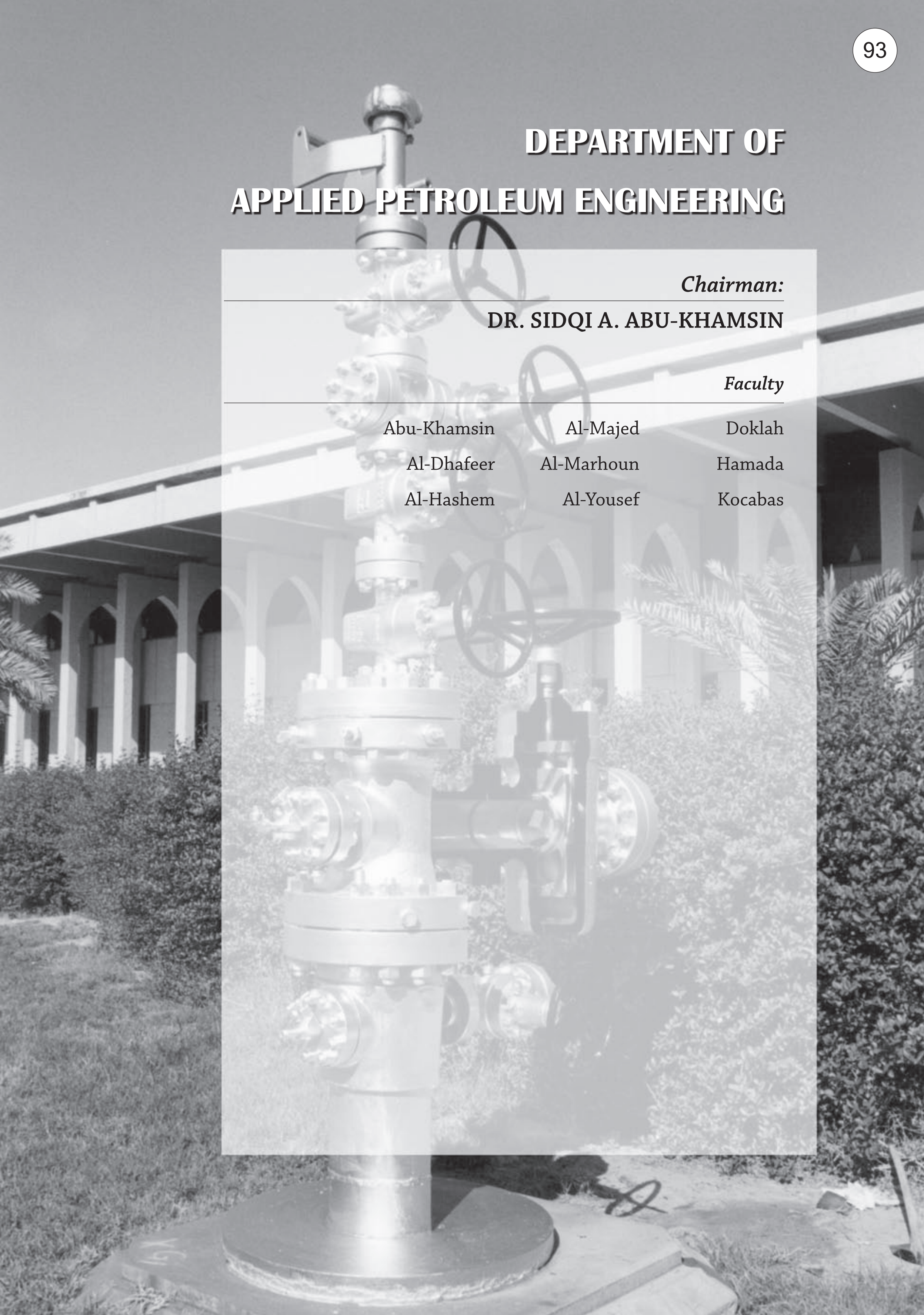
Each student must participate in a 28-week program of industrial experience and submit a report: ME 351, "Applied Mechanical Engineering Cooperative Work".

(e) Total Requirements (133 credit hours)

The total credit requirements for a B.S. degree in Applied Mechanical Engineering is 133 semester-credit-hours.

Applied Mechanical Engineering Curriculum

COURSE	TITLE	LT	LB	CR	COURSE	TITLE	LT	LB	CR
Preparatory Year									
ENGL 001	Preparatory English I	15	5	8	ENGL 002	Preparatory English II	15	5	8
MATH 001	Preparatory Math I	3	1	4	MATH 002	Preparatory Math II	3	1	4
PYP 001	Prep. Physical Sciences	2	0	2	PYP 002	Prep. Computer Sciences	0	2	1
PYP 003	University Study Skills	0	2	1	ME 003	Prep. Eng. Technology	0	2	1
PE 001	Prep. Physical Educ. I	0	2	1	PE 002	Prep. Physical Educ. II	0	2	1
		20	**10**	**16**			**18**	**12**	**15**
Total credit hours required in Preparatory Program: 31									
First Year (Freshman)									
CHEM 101	Chemistry I	3	4	4	ENGL 102	Intro. to Report Writing	3	0	3
ENGL 101	Intro. to Acad. Discourse	3	0	3	MATH 102	Calculus II	4	0	4
MATH 101	Calculus I	4	0	4	PHYS 102	Physics II	3	3	4
PHYS 101	Physics I	3	3	4	ICS 101	Computer Programming	2	3	3
IAS 111	Belief and its Consequences	2	0	2	IAS 101	Practical Grammar	2	0	2
PE 101	Physical Education I	0	2	1	PE 102	Physical Education II	0	2	1
		15	**9**	**18**			**14**	**8**	**17**
Second Year (Sophomore)									
MATH 201	Calculus III	3	0	3	ME 201	Dynamics	3	0	3
CE 201	Statics	3	0	3	MATH 202	Elem. Diff. Equations	3	0	3
ME 203	Thermodynamics I	3	0	3	CE 203	Structural Mechanics	3	0	3
ME 210	ME Drawing & Graphics	2	3	3	ME 204	Thermodynamics II	3	0	3
ME 215	Materials Science for ME	3	3	4	ME 206	Manufacturing Processes I	3	3	4
ENGL 214	Acad. & Prof. Comm.	3	0	3	IAS 212	Professional Ethics	2	0	2
		17	**6**	**19**			**17**	**3**	**18**
Third Year (Junior)									
EE 204	Fundamentals of Elec. Circuits	2	3	3	EE 306	Electromech. Devices	2	3	3
ME 307	Machine Design I	3	0	3	ME 308	Machine Design II	3	3	4
ME 306	Manufacturing Processes II	2	3	3	ME 309	Mechanics of Machines	3	0	3
ME 311	Fluid Mechanics	3	0	3	ME 315	Heat Transfer	3	0	3
IAS 201	Writing for Prof. Needs	2	0	2	ME 316	Thermo-fluids Lab.	0	3	1
STAT 319	Probability & Stats. for Engrs.	2	3	3	MATH 301	Methods of Applied Math	3	0	3
					IAS 322	Human rights in Islam	2	0	2
		14	**9**	**17**			**16**	**9**	**19**
Summer Session					ME 350	Cooperative Work	0	0	0
Fourth Year (Senior)									
ME 351	Continuation of Co-op Work	0	0	9	ME 413	Sys. Dynamics & Control	2	3	3
					ME 415	Senior Design Project	1	6	3
					ME 4XX	ME Elective	3	0	3
					IAS 301	Oral Communication Skills	2	0	2
					IAS 4XX	Islamic Elective	2	0	2
					ECON 403	Engineering Economics	3	0	3
		0	**0**	**9**			**13**	**9**	**16**
Total credit hours required in Degree Program: 133									



DEPARTMENT OF APPLIED PETROLEUM ENGINEERING

Chairman:

DR. SIDQI A. ABU-KHAMSIN

Faculty

Abu-Khamsin
Al-Dhafeer
Al-Hashem
Al-Majed
Al-Marhoun
Al-Yousef
Doklah
Hamada
Kocabas

Introduction

Petroleum engineering is the application of basic sciences to the development, recovery and field processing of oil and gas resources. Due to the complex nature of the development and extraction of petroleum reserves, various petroleum engineering specialties have emerged. Among these are drilling engineering, formation evaluation, completion and workover, surface processing, and reservoir engineering. It should be emphasized, however, that modern petroleum production operations involve a team effort in which all specialties of petroleum engineering as well as geologists, geophysicists, and computer technologists are involved.

Vision

The Department's vision is to be recognized as a leading center, worldwide, for petroleum engineering education and research.

Mission

The Department's mission is to provide high quality programs in petroleum engineering that stress innovation, integration, team work, high ethical standards and awareness of industry needs, in addition to advanced research capabilities.

Objectives

The Applied Petroleum Engineering Program is designed to provide sufficient training in the basic, social, and engineering sciences to enable the graduate to handle operational aspects of petroleum engineering. Furthermore, communication skills, design capabilities, and professional ethics are strongly emphasized and cultivated. Another objective of the program is to create sufficient awareness in the student regarding the special role and responsibility of the petroleum industry as the main energy supplier to the world. To achieve those objectives, the Department strides to attract faculty distinguished in teaching and research, admit talented students, and maintain state-of-the-art laboratories and support facilities.

In the Applied Petroleum Engineering program, the student is educated in the principles, procedures and practices of drilling, formation evaluation, reservoir studies, production, environmental protection, and economic analysis. The primary objective of the freshman and the sophomore years is to provide the student with the necessary background in science and engineering. The junior and senior years are concentrated on petroleum engineering courses. The prominent characteristic of this program is the requirement that the student spends 28 weeks during the junior year in industry through the cooperative work period, which exposes him to various practical aspects of the profession.

The Department's laboratories are fully equipped with state-of-the-art equipment for experiments in drilling fluids, oil-well cementing, rock and fluid properties, chemical analysis, thin sectioning & microscopy, formation evaluation, enhanced oil recovery, and production engineering. In addition, a multifunction lab., a drilling simulator, and a drilling fluid flow loop serve specialized research studies.

The Department is linked to the University's main computer facilities in addition to its own personal computer laboratory where licensed software packages are installed. The Department also maintains its own reference library, which has a collection of references and textbooks in all petroleum engineering specialties.

In addition to classroom instruction, laboratory work, and a brief industrial exposure, which constitutes the direct means of training, the student is exposed to other engineering and social dimensions of the discipline through field trips, seminars, gatherings, industry events, and informal student-faculty interaction.

Requirements for the B.S. Degree in Applied Petroleum Engineering

Each student majoring in Applied Petroleum Engineering must complete the following courses. He should also maintain a minimum major and cumulative GPA of 2.00 or above at the time of graduation:

(a) General Education Requirements (85 credit hours)		Credit Hours
COMMUNICATION		
Arabic	IAS 101, 201, 301	6
English	ENGL 101, 102, 214	9
ENGINEERING		
Chemical	CHE 204	3
Computer	ICS 101	3
Electrical	EE 204	3
Mechanical	ME 203, 205	6
Systems	SE 301	3
ISLAMIC STUDIES	IAS 111, 212, 322, 4xx	8
PHYSICAL EDUCATION	PE 101, 102	2
SCIENCE		
Chemistry	CHEM 101, 102	8
Geology	GEOL 201, 318	6
Mathematics	MATH 101, 102, 201, 202, STAT 319	17
Physics	PHYS 101, 102	8
SOCIAL SCIENCE	ECON 403	3
		85

(b) Major Requirements (39 credit hours)		
Drilling Engineering	PETE 203	4
Formation Evaluation	PETE 303, 306, 401	9
Production Engineering	PETE 302, 404	7
Reservoir Engineering	PETE 204, 205, 301, 402, 405, 410	17
Others	PETE 201, 408	2
		39

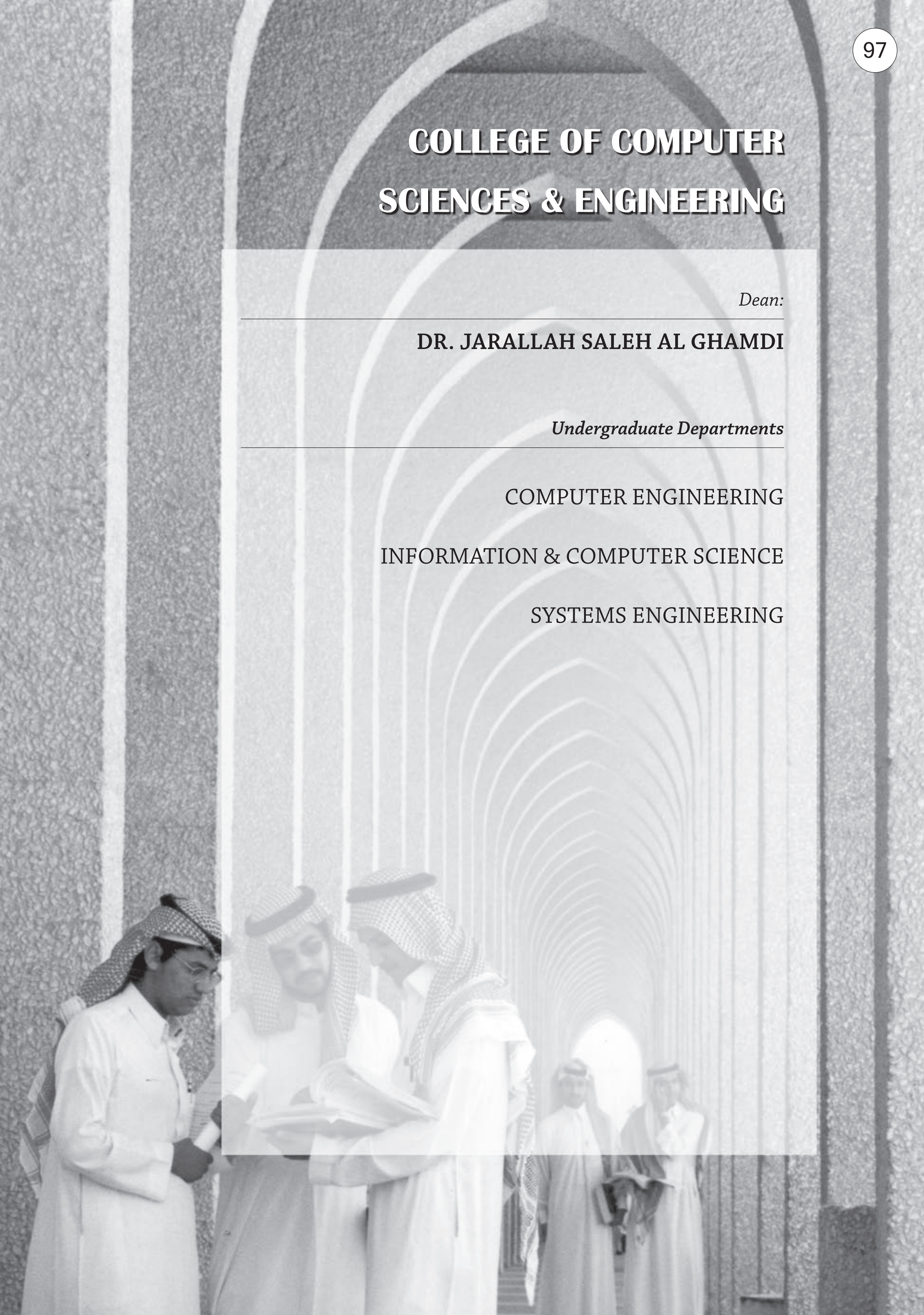
(c) Cooperative Work Requirements (PETE 350 & 351) 9

Each student must participate in a 28-week cooperative work program of industrial experience and submit a formal report.

Total Requirements (semester-credit-hours) 133

Applied Petroleum Engineering Curriculum

COURSE		TITLE	LT	LB	CR	COURSE		TITLE	LT	LB	CR
Preparatory Year											
ENGL	001	Preparatory English I	15	5	8	ENGL	002	Preparatory English II	15	5	8
MATH	001	Preparatory Math I	3	1	4	MATH	002	Preparatory Math II	3	1	4
PYP	001	Prep. Physical Sciences	2	0	2	PYP	002	Prep. Computer Sciences	0	2	1
PYP	003	University Study Skills	0	2	1	ME	003	Prep. Eng. Technology	0	2	1
PE	001	Prep. Physical Educ. I	0	2	1	PE	002	Prep. Physical Educ. II	0	2	1
			20	**10**	**16**				**18**	**12**	**15**
Total credit hours required in Preparatory Program: 31											
First Year (Freshman)											
CHEM	101	General Chemistry I	3	4	4	CHEM	102	General Chemistry II	3	4	4
ENGL	101	Intro. to Acad. Discourse	3	0	3	ENGL	102	Intro. to Report Writing	3	0	3
IAS	101	Practical Grammar	2	0	2	IAS	111	Belief and its Consequences	2	0	2
MATH	101	Calculus I	4	0	4	MATH	102	Calculus II	4	0	4
PE	101	Physical Education I	0	2	1	PE	102	Physical Education II	0	2	1
PHYS	101	General Physics I	3	3	4	PHYS	102	General Physics II	3	3	4
			15	**9**	**18**				**15**	**9**	**18**
Second Year (Sophomore)											
CHE	204	Transport Phenomena I	3	0	3	ENGL	214	Acad. & Prof. Comm.	3	0	3
GEOL	201	Physical Geology	2	3	3	IAS	212	Professional Ethics	2	0	2
IAS	201	Writing for Prof. Needs	2	0	2	ICS	101	Computer Programming	2	3	3
MATH	201	Calculus III	3	0	3	MATH	202	Elem. Diff. Equations	3	0	3
ME	203	Thermodynamics I	3	0	3	PETE	203	Drilling Engineering	3	3	4
PETE	201	Intro. to Pet. Engineering	1	0	1	PETE	205	Petroleum Fluid Properties	2	3	3
PETE	204	Reservoir Rock Properties	2	3	3						
			16	**6**	**18**				**15**	**9**	**18**
Third Year (Junior)											
ECON	403	Engineering Economics	3	0	3	EE	204	Circuits & Electronics	2	3	3
IAS	301	Oral Communication Skills	2	0	2	GEOL	318	Regional Geology	3	0	3
ME	205	Materials Science	2	3	3	IAS	322	Human Rights in Islam	2	0	2
PETE	301	Reservoir Engineering	3	0	3	PETE	303	Well Logging	3	3	4
PETE	302	Subsurface Production Eng.	3	0	3	PETE	306	Well Testing	2	0	2
SE	301	Numerical Methods	3	0	3	STAT	319	Prob. & Stat. for Eng. & Scientists	2	3	3
			16	**3**	**17**				**14**	**9**	**17**
Summer Session						PETE	350	Cooperative Work	0	0	0
Fourth Year (Senior)											
PETE	351	Cont. of Co-op Work	0	0	9	IAS	4xx	IAS Elective	2	0	2
						PETE	401	Reservoir Description	3	0	3
						PETE	402	Reservoir Simulation	2	3	3
						PETE	404	Production Facilities Design	3	3	4
						PETE	405	Water Flooding	2	0	2
						PETE	408	Seminar	0	2	1
						PETE	410	Natural Gas Engineering	3	0	3
			0	**0**	**9**				**15**	**8**	**18**
Total credit hours required in Degree Program: 133											



COLLEGE OF COMPUTER SCIENCES & ENGINEERING

Dean:

DR. JARALLAH SALEH AL GHAMDI

Undergraduate Departments

COMPUTER ENGINEERING

INFORMATION & COMPUTER SCIENCE

SYSTEMS ENGINEERING

The College of Computer Sciences & Engineering includes the following departments:

1. **Computer Engineering Department (COE)**

   This department offers a program in Computer Engineering. It grants B.S. and M.S. degrees in Computer Engineering. The department also grants an M.S. degree in Computer Network jointly with ICS Department. The department also grants a joint Ph.D. degree with the ICS Department in Computer Science and Engineering.

2. **Information & Computer Science Department (ICS)**

   This department offers two programs; one in Computer Science leading to a B.S. degree in Computer Science, and the other in Software Engineering leading to a B.S. degree in Software Engineering. The department also grants an M.S. degree in Computer Science as well as an M.S. degree in Computer Network jointly with COE Department. The department also grants a joint Ph.D. degree with the Computer Engineering Department in Computer Science & Engineering.

3. **Systems Engineering Department (SE)**

   This department offers two BS programs; one in Control and Instrumentation Systems Engineering and the other in Industrial and Systems Engineering. It also grants M.S. and Ph.D. degrees in Systems Engineering.

The above programs offered in these departments can be described as engineering programs that are not in the classical engineering domain. These programs prepare the students for challenging careers in the high technology areas of computers.

College Line of Business

The college of Computer Sciences and Engineering main lines of business are education, research and community service in the following areas:

- Computer Sciences
- Software Engineering
- Computer Engineering
- Network and Communication
- Automation, Control and Instrumentation.
- Industrial and Systems Engineering.

Vision

To be a Center of Excellence that is recognized worldwide in the education, research and professional development areas specified in the business line of the college.

Mission

- To prepare competent professionals in the areas specified in the college line of business who are competitive worldwide and will be the leaders in Saudi industry, academia and government.
- To conduct innovative basic and applied research that advances the frontiers of knowledge and address local problems.
- To provide high quality service to society in the areas of applied projects, consultation and training.

Strategic Objectives

1. Prepare competent qualified graduates in the areas in the college line of business that exceed customer requirements.
2. Provide up to date current academic programs that meet international standards and satisfy market needs.
3. Provide a student focused integrated educational experience.

4. Build a strong, motivated and highly committed faculty community.
5. Attract, maintain and develop a qualified pool of undergraduate and graduate students.
6. Conduct research at the frontiers of knowledge in the areas specified in the college line of business with emphasis on areas that serve and sustain the Kingdom economic development.
7. Create and encourage partnership with industry, government, local/ international institutions and alumni.
8. Continuously build and modernize college infrastructure including computing facilities, laboratories.

COLLEGE REQUIREMENTS

Common Freshmen Year

The programs in the COE, ICS, and SE departments have a common freshman curriculum which is similar to the freshman curriculum in the College of Engineering. This helps students to select their major area of study as late as the beginning of sophomore year.

Common Core Subjects

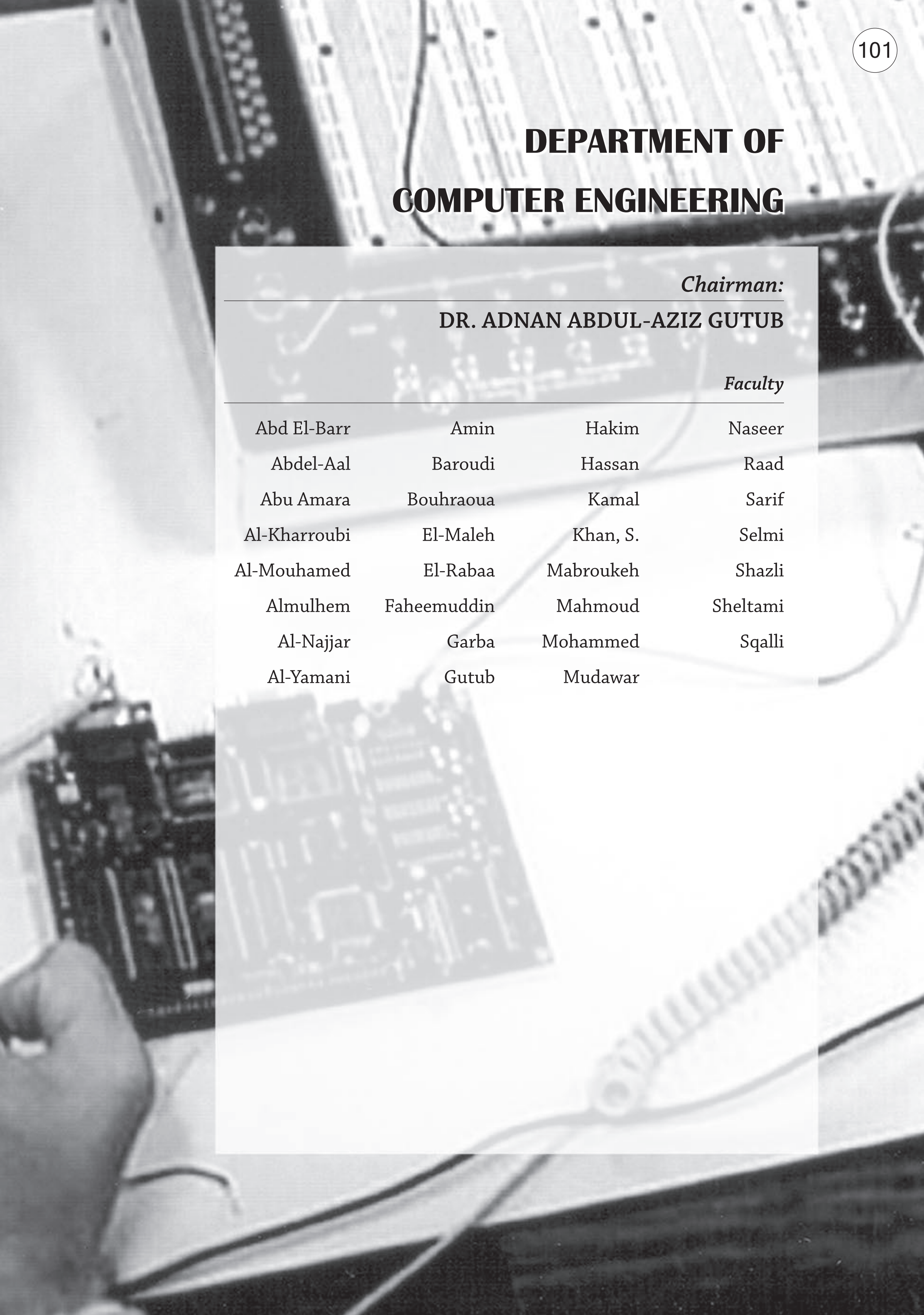
Common core subjects among all the programs in the three departments cover courses in basic sciences, Mathematics, English, Islamic History and Culture, Arabic Language and Literature, Physical Education, Social and Behavioral Sciences, and department core subjects.

The core subjects common to the programs in the COE and the ICS departments include Introduction to Computer Science, Digital Logic, Data Structures, Discrete Structures, Design and Analysis of Algorithms, Computer Organization and Programming, and Computer Networks. The total number of credit hours in the common core curriculum including freshman year is 64 out of 132 credit hours.

Requirements for Graduation

To qualify for graduation, students in the College of Computer Sciences & Engineering must:

1. complete all specified and elective courses in the selected degree program. Both cumulative and major GPAs should be 2.00 or better;
2. The college offers programs with two options; Summer Training and Coop.
   - For summer training option the student is required to spend eight consecutive weeks in one summer (after the third year) working in industry.
   - Student with coop option must complete successfully after the third year a 28-week cooperative program working in industry.



DEPARTMENT OF COMPUTER ENGINEERING

Chairman:

DR. ADNAN ABDUL-AZIZ GUTUB

Faculty

Abd El-Barr	Amin	Hakim	Naseer
Abdel-Aal	Baroudi	Hassan	Raad
Abu Amara	Bouhraoua	Kamal	Sarif
Al-Kharroubi	El-Maleh	Khan, S.	Selmi
Al-Mouhamed	El-Rabaa	Mabroukeh	Shazli
Almulhem	Faheemuddin	Mahmoud	Sheltami
Al-Najjar	Garba	Mohammed	Sqalli
Al-Yamani	Gutub	Mudawar	

Introduction

Computer engineering is a discipline for which a great demand exists both in Saudi Arabia and elsewhere. Currently, there is a critical shortage of computer professionals who can design and implement computer systems and networks. The Kingdom of Saudi Arabia has focused on the computer technology and its utilization as one of the fundamental tools to modernize its industry to cope up with advances in the technology. It is, therefore, mandatory to prepare highly qualified computer engineers who are capable of mastering the latest in such a rapidly growing technology.

The rapid evolution of computers and microprocessors is the consequence of the equally rapid development of semiconductor devices and the large scale integration of digital computer components. Computer devices are continuously improving and, at the same time, they are getting both cheaper and faster. The dramatic reduction in the cost of digital systems over the last decade has led to an enormous growth in the use of computers. Today, computer engineering is one of the fastest growing disciplines.

What is Computer Engineering?

Computer Engineering (COE) is the discipline concerned with the design, analysis, modeling and implementation of computers and networks systems. Both the software and the hardware aspects of these systems are studied in a balanced and coherent manner.

The COE program at KFUPM provides a comprehensive coverage of a wide range of COE subjects including hardware design, computer networks and data communications, computer architecture and operating systems, microprocessor-based systems, computer programming languages and software, as well as the computer underlying microelectronic VLSI technology.

Study in Computer Engineering

The Computer Engineering Department provides a program that develops the necessary skills and competence required to design and implement computer systems and networks. The computer engineering curriculum emphasizes the areas of digital system architecture and design, microprocessors, integrated circuit technology, computer communication, and computer networks. In addition, sufficient emphasis is given to the study of computer science to provide a coherent view of computer systems and an understanding of the interdependencies of hardware and software components and their interfaces and tradeoffs.

The Computer Engineering Department offers a program leading to a BS degree in computer engineering, a program leading to a MS degree in computer engineering, and recently a Ph.D. program has started jointly with the Information and Computer Science Department.

Vision

To become a recognized center of excellence in providing quality education and technical services, as well as in advancing computing technologies through innovative research.

Mission

- To prepare competent professionals in the area of Computer Engineering who are competitive worldwide and prepared to be the leaders in the Saudi industry, academia and government.
- To conduct original research that contributes to the advancement of computing technologies worldwide, solves local problems and leads to the transfer and dissemination of knowledge to the Saudi society at large.
- To provide the Saudi society with high quality technical services in areas related to Computer engineering in terms of consultation, training and applied projects.

Department Goals

- To provide the best possible quality undergraduate learning environment in Computer Engineering by providing:
  - A comprehensive broad-based undergraduate program
  - A conducive environment for developing ethics and technical and leadership skills
  - A strong hands-on-experience through laboratory experiments and projects
  - Strong design and analysis components in education
- To attract and retain high quality COE faculty members
- To produce world-class research in the different disciplines of computer engineering
- To establish strong, fruitful and continuous relationship with the Saudi industry and government agencies.

Strategies

- To attract highly motivated and intellectual students to COE department.
- To maintain a set of labs that support teaching and research which are second to none world-wide and employ latest technologies and expertise.
- To maintain an internal review/audit process that guarantees the continuous improvements of all aspect of the COE program (Courses, Labs, Textbooks, and faculty).
- To achieve a low students/faculty ratio.
- To attract top undergraduate students to join the graduate program.
- To participate actively in establishing interdisciplinary programs.
- To engage the local industries and governmental agencies in the all aspects of the department's activities such as curriculum development, program outcomes and objectives, research directions, etc.

Program Objectives and Outcomes

The main objective of the Computer Engineering Degree Program at KFUPM is to develop and train the human intellect needed for meeting the continued technological advances in the discipline of Computer Engineering. This includes graduating well-trained computer engineers to participate in the industrial development which is taking place in the Kingdom of Saudi Arabia. It is our responsibility to graduate students with a firm grasp of the fundamentals of mathematics, science, and engineering in sufficient breadth and depth. This accomplished through the following measures:

a. Performance in Mathematics: Students should be versed in the basic mathematical tools and should acquire specific skills that would help them tackle typical computer engineering problems.

b. Performance in Science: Students should be able to identify the involvement of science in the computer engineering discipline. They should be able to successfully apply both classical and modern scientific concepts to obtain solutions to relevant computer engineering problems.

c. Performance in Engineering: Students should be able to demonstrate skillful ability in integrating their knowledge in both mathematics and science in developing solutions to complex engineering problems.

As an outcome of our program, the students should be able to:

1. understand and apply fundamentals of mathematics, science, and engineering,
2. use engineering techniques, skills, and modern tools to design and conduct experiments,
3. identify, formulate, analyze, and solve engineering problems,
4. use specifications to design and realize components, processes, and systems,
5. communicate effectively,
6. function within multi-disciplinary teams,
7. understand professional and ethical responsibilities,
8. understand the impact of engineering solutions on society and the environment,
9. apply engineering skills and techniques in understanding contemporary issues, and
10. commit himself to life-long learning.

Requirements for the B.S. Degree in Computer Engineering

The COE Department offers two options for its students. These are:

(1) B.S. in Computer Engineering and (2) B.S. in Computer Engineering with coop.

The program requirements for each of these options are listed below:

Option I: B.S. in Computer Engineering with Summer Training:		**Credit Hours**
Basic Sciences	CHEM 101	4
	PHYS 101, 102	8
Mathematics	MATH 101, 102, 201, 260	14
	STAT 319	3
English	ENGL 101, 102, 214	9
Physical Education	PE 101, 102	2
Islamic Studies and Humanities	IAS 101, 111, 201, 212, 301, 322, 4xx	14
Information & Computer Science	ICS 102, 201, 202, 252, 431	18
Electrical Engineering	EE 201, 203	8
COE/ICS/SWE (IT Electives)	COE 4xx, ICS 353, ICS 342 or ICS 413	3
Electives	xxx, yyy, zzz	9
Computer Engineering	COE 202, 203, 205, 305, 308, 341, 344, 360, 390, 399, 400, 485, 4xx, 4xx	38
Total Credit Hours		**130**

Option II: B.S. in Computer Engineering with Coop:		**Credit Hours**
Basic Sciences	CHEM 101	4
	PHYS 101, 102	8
Mathematics	MATH 101, 102, 201, 260	14
	STAT 319	3
English	ENGL 101, 102, 214	9
Physical Education	PE 101, 102	2
Islamic Studies and Humanities	IAS 101, 111, 201, 212, 301, 322, 4xx	14
Information & Computer Science	ICS 102, 201, 202, 252, 431	18
Electrical Engineering	EE 201, 203	8
COE/ICS/SWE (IT Electives)	COE 4xx, ICS 353, ICS 342 or ICS 413	3
Electives	xxx, ICS 334	7
Computer Engineering	COE 202, 203, 205, 305, 308, 341, 342, 360, 390, 399, 400, 4xx	32
Coop	COE 350, COE 351	9
Total Credit Hours		**131**

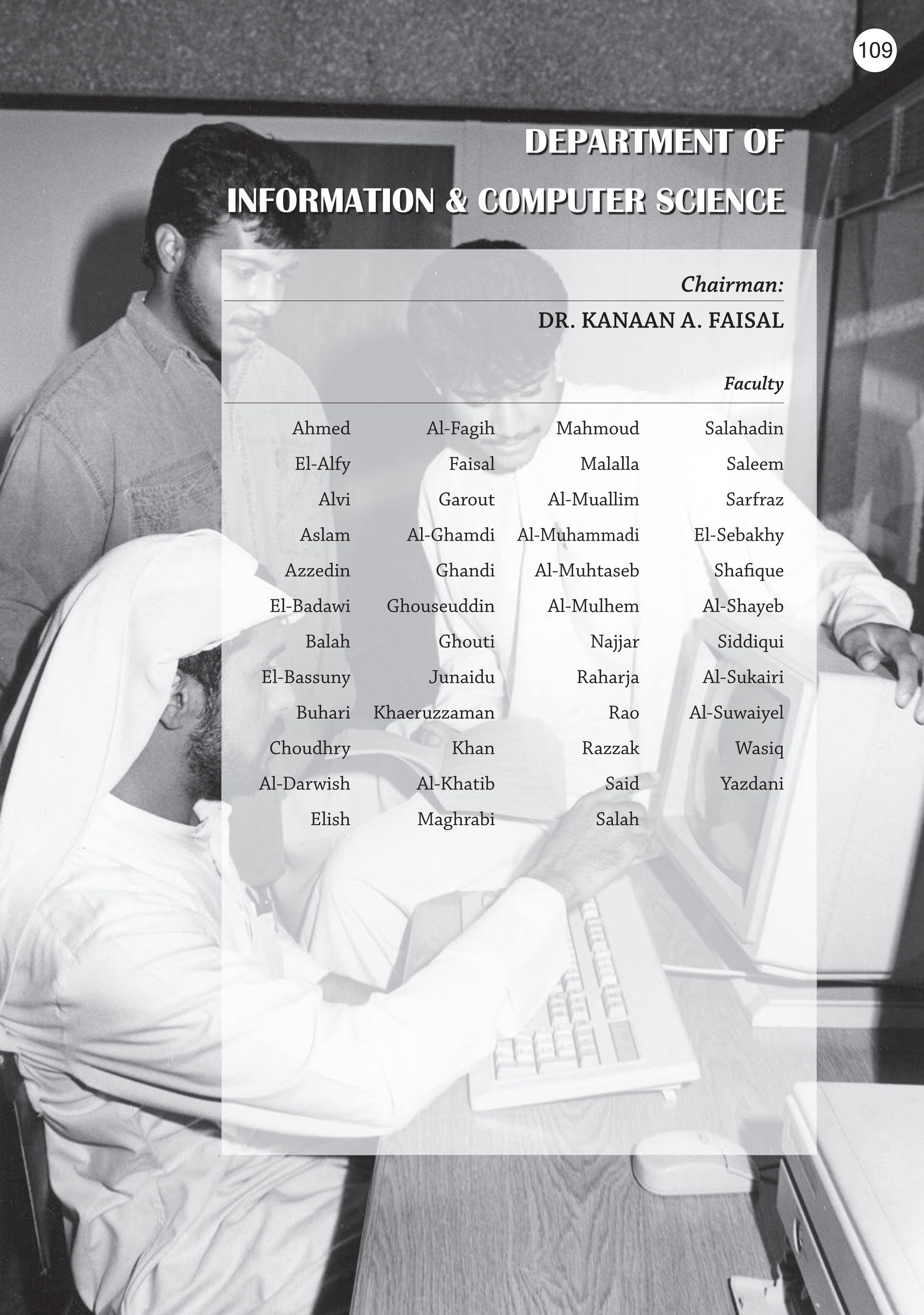
Computer Engineering Curriculum

COURSE	TITLE	LT	LB	CR	COURSE	TITLE	LT	LB	CR
Preparatory Year									
ENGL 001	Preparatory English I	15	5	8	ENGL 002	Preparatory English II	15	5	8
MATH 001	Preparatory Math I	3	1	4	MATH 002	Preparatory Math II	3	1	4
PYP 001	Prep. Physical Sciences	2	0	2	PYP 002	Prep. Computer Sciences	0	2	1
PYP 003	University Study Skills	0	2	1	ME 003	Prep. Eng. Technology	0	2	1
PE 001	Prep. Physical Educ. I	0	2	1	PE 002	Prep. Physical Educ. II	0	2	1
		20	**10**	**16**			**18**	**12**	**15**
Total credit hours required in Preparatory Program: 31									
First Year (Freshman)									
MATH 101	Calculus I	4	0	4	MATH 102	Calculus II	4	0	4
PHYS 101	General Physics I	3	3	4	PHYS 102	General Physics II	3	3	4
CHEM 101	General Chemistry I	3	3	4	ICS 102	Intro. to Computing	2	3	3
ENGL 101	Intro. to Acad. Discourse	3	0	3	ENGL 102	Intro. to Report Writing	3	0	3
IAS 111	Belief and its Conseq.	2	0	2	IAS 101	Practical Grammar	2	0	2
					PE 101	Physical Education I	0	2	1
		15	**6**	**17**			**14**	**8**	**17**
Second Year (Sophomore)									
COE 202	Digital Logic Design	3	0	3	COE 205	Comp. Org. & Ass. Lang.	3	3	4
EE 201	Electric Circuits I	3	3	4	COE 203	Digital Logic Laboratory	0	3	1
ICS 201	Introduction to CS	3	3	4	ICS 202	Data Structures	3	3	4
MATH 201	Calculus III	3	0	3	ICS 252	Discrete Structures	3	0	3
IAS 212	Professional Ethics	2	0	2	MATH 260	Linear Alg. & Diff. Equ.	3	0	3
PE 102	Physical Education II	0	2	1	ENGL 214	Acad. & Prof. Comm.	3	0	3
		14	**8**	**17**			**15**	**9**	**18**
Third Year (Junior)									
COE 305	Microcomp. Syst. Design	3	3	4	COE 308	Computer Architecture	3	0	3
STAT 319	Prob. & Stat. For Eng. & Sc.	2	3	3	COE 442	Computer Networks	3	3	4
COE 342	Data & Computer Comm.	3	0	3	COE 390	Seminar	1	0	1
COE/ICS/SWE xxx	IT Elective	3	0	3	EE 203	Electronics I	3	3	4
IAS 201	Writing for Prof. Needs	2	0	2	XXX xxx	Free Elective	3	0	3
					IAS 311	Islamic Shariah	2	0	2
		13	**6**	**15**			**15**	**6**	**17**
Summer Training					COE 399	Summer Training	0	0	0
Fourth Year (Senior)									
COE 485	Senior Design Project	1	6	3	COE 400	System Design Lab.	1	6	3
COE 4xx	COE Elective	3	0	3	COE 4xx	COE Elective	3	0	3
ICS 431	Operating Systems	3	3	4	XXX xxx	Free Elective	3	0	3
COE 360	Principles of VLSI Desig.	3	0	3	XXX xxx	General Elective	3	0	3
IAS 301	Oral Communication Skills	2	0	2	IAS 4xx	IAS Elective	2	0	2
		12	**9**	**15**			**12**	**6**	**14**
Total credit hours required in Degree Program: 130									

Computer Engineering Curriculum with Coop

COURSE	TITLE	LT	LB	CR	COURSE	TITLE	LT	LB	CR
Preparatory Year									
ENGL 001	Preparatory English I	15	5	8	ENGL 002	Preparatory English II	15	5	8
MATH 001	Preparatory Math I	3	1	4	MATH 002	Preparatory Math II	3	1	4
PYP 001	Prep. Physical Sciences	2	0	2	PYP 002	Prep. Computer Sciences	0	2	1
PYP 003	University Study Skills	0	2	1	ME 003	Prep. Eng. Technology	0	2	1
PE 001	Prep. Physical Educ. I	0	2	1	PE 002	Prep. Physical Educ. II	0	2	1
		20	**10**	**16**			**18**	**12**	**15**
Total credit hours required in Preparatory Program: 31									
First Year (Freshman)									
MATH 101	Calculus I	4	0	4	MATH 102	Calculus II	4	0	4
PHYS 101	General Physics I	3	3	4	PHYS 102	General Physics II	3	3	4
CHEM 101	General Chemistry I	3	3	4	ICS 102	Intro. to Computing	2	3	3
ENGL 101	Intro. to Acad. Discourse	3	0	3	ENGL 102	Intro. to Report Writing	3	0	3
IAS 111	Belief and its Conseq.	2	0	2	IAS 101	Practical Grammar	2	0	2
					PE 101	Physical Education I	0	2	1
		15	**6**	**17**			**14**	**8**	**17**
Second Year (Sophomore)									
COE 202	Digital Logic Design	3	0	3	COE 205	Comp. Org. & Ass. Lang.	3	3	4
EE 201	Electric Circuits I	3	3	4	COE 203	Digital Logic Laboratory	0	3	1
ICS 201	Introduction to CS	3	3	4	ICS 202	Data Structures	3	3	4
MATH 201	Calculus III	3	0	3	ICS 252	Discrete Structures	3	0	3
IAS 212	Professional Ethics	2	0	2	MATH 260	Linear Alg. & Diff. Equ.	3	0	3
PE 102	Physical Education II	0	2	1	ENGL 214	Acad. & Prof. Comm.	3	0	3
		14	**8**	**17**			**15**	**9**	**18**
Third Year (Junior)									
COE 305	Microcomp. Syst. Design	3	3	4	COE 308	Computer Architecture	3	0	3
STAT 319	Prob. & Stat. For Eng. & Sc.	2	3	3	COE 442	Computer Networks	3	3	4
COE 342	Data & Computer Comm.	3	0	3	COE 390	Seminar	1	0	1
COE/ICS/SWE xxx	IT Elective	3	0	3	COE 360	Principles of VLSI Desig.	3	0	3
EE 203	Electronics I	3	3	4	ICS 334	Database Systems	3	3	4
IAS 201	Writing for Prof. Needs	2	0	2	IAS 311	Islamic Shariah	2	0	2
		16	**9**	**19**			**15**	**6**	**17**
Summer Training					COE 350	Cooperative Work	0	0	0
Fourth Year (Senior)									
COE 351	Coop. Work (cont.)	0	0	9	COE 400	System Design Lab.	1	6	3
					COE 4xx	COE Elective	3	0	3
					ICS 431	Operating Systems	3	3	4
					XXX xxx	General Elective	3	0	3
					IAS 301	Oral Communication Skills	2	0	2
					IAS 4xx	IAS Elective	2	0	2
		0	**0**	**9**			**15**	**9**	**17**
Total credit hours required in Degree Program: 131									


SYSTEMS
ENGINEERING



DEPARTMENT OF INFORMATION & COMPUTER SCIENCE

Chairman:

DR. KANAAN A. FAISAL

Faculty

Ahmed	Al-Fagih	Mahmoud	Salahadin
El-Alfy	Faisal	Malalla	Saleem
Alvi	Garout	Al-Muallim	Sarfraz
Aslam	Al-Ghamdi	Al-Muhammadi	El-Sebakhy
Azzedin	Ghandi	Al-Muhtaseb	Shafique
El-Badawi	Ghouseuddin	Al-Mulhem	Al-Shayeb
Balah	Ghouti	Najjar	Siddiqui
El-Bassuny	Junaidu	Raharja	Al-Sukairi
Buhari	Khaeruzzaman	Rao	Al-Suwaiyel
Choudhry	Khan	Razzak	Wasiq
Al-Darwish	Al-Khatib	Said	Yazdani
Elish	Maghrabi	Salah	

Introduction

The Information & Computer Science department offers two programs leading to B.S. degrees in:

1. Computer Science
2. Software Engineering.

The two programs can broadly be defined as the study of the phenomena surrounding computing and computers. It involves the study of the theoretical principles, design and implementation of computer systems. As computers have become part of the day-to-day activities, the demand for specialized professionals in the area has increased astronomically.

To help meet these demands, KFUPM has established an undergraduate programs that relates directly to computer science and focus on theory, design, and applications. The programs have both academic and professional orientations. Thus, it enables graduates to meet the challenges in real life applications, research and advanced studies in computer science. The program is designed to provide several important features:

1. **Breadth and Depth.** The program has a set of core courses that provide breadth in the field. Additional specialized courses and electives are chosen to provide depth in the program.

2. **Balance.** Theoretical core courses and software/hardware are joined in theory and in practice through integrated lecture and laboratory sequences.

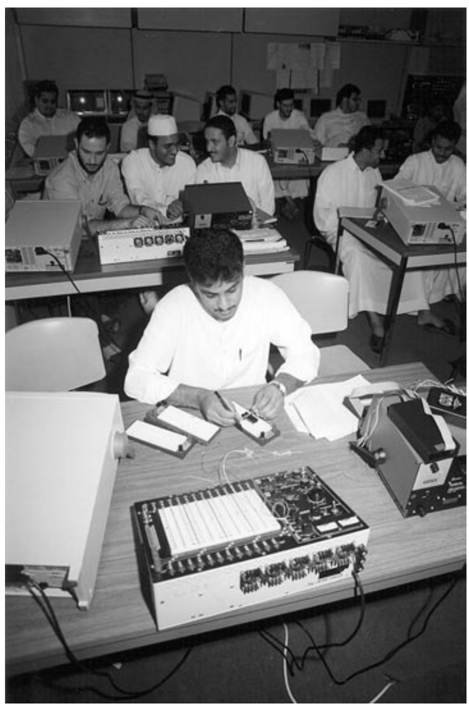
3. **Flexibility.** The curriculum is flexible and provides opportunities for students to emphasize specific areas of interest through their choice of appropriate technical and ICS electives.

Mission

- To provide high quality undergraduate and graduate educational programs in computer science and Software Engineering,
- To contribute significantly to the research and the discovery of new knowledge and methods in computing,
- To offer expertise, resources, and services to the community, and
- To keep its faculty members current by providing opportunities for professional development.

Vision

To be a regional leader that is recognized worldwide in education, research and professional development in the areas of Computer Science and Software Engineering.



B.S. IN COMPUTER SCIENCE PROGRAM

Introduction

The BS in Computer Science program has been revised and approved by the KFUPM University Board in October 1996. The program is mainly based on the ACM/IEEE-CS Joint Curriculum Task Force report titled "Computing Curricula 1991". General education requirements, core requirements, and elective courses have been carefully picked. They fulfill the Computing Curricula requirements and provide reasonable flexibility to the program by allowing the student to choose 15 credits (5 courses) as ICS electives and 12 credits (4 courses) as free electives.

Mission

To provide high quality education in computer science that prepares students for professional careers and lifelong learning in developing/managing computational processes and systems, with emphasis on net-centric computing, information management, and intelligent systems.

Objectives

Graduates of the Program should be able to:

- demonstrate a sound understanding of the main areas of the body of knowledge and the theories of computer science, with an ability to exercise critical judgment across a range of related issues.
- critically analyze and apply a range of concepts, principles, and practices in net-centric computing, information management, or intelligent systems; showing a range of problem solving skills and effective judgment in the selection and use of corresponding tools and techniques.
- demonstrate the ability to work as an individual with minimum guidance and as a leader/member of a team.
- follow appropriate practices within a professional, legal, and ethical framework.
- identify mechanisms for continuing professional development and life-long learning.

Outcomes

The department has identified the following outcomes for the graduating students:

Knowledge in major: Graduates will be able to demonstrate knowledge and understanding of essential facts, concepts, principles, and theories relating to computational processes and systems.

Modeling: Graduates will be able to use the acquired knowledge and understanding in the modeling and design of computational processes and systems in a way that demonstrates comprehension of the tradeoff involved in design choices.

Problem solving: Graduates will be able to identify and analyze criteria and specifications appropriate to specific problems, and plan and design strategies for their solution.

Critical evaluation and testing: Graduates will be able to use quality models in analyzing the extent to which a computational process or a computational system meets the criteria defined for its current use and future development

Methods and tools: Graduates will be able to employ appropriate methods and tools for the specification, design, implementation, and evaluation of computational processes and systems.

Professional responsibility: Graduates will be able to recognize and be guided by the social, professional, legal, and ethical issues involved in the use and development of computer technology.

Risk analysis: Graduates will be able to identify and assess different types of risk related to the development and management of computational processes and systems.

Communication: Graduates will be able to express ideas persuasively, in written and oral form.

Teamwork: Graduates will be able to work effectively as leader/member of a development team.

Self management: Graduates will be able to manage their own learning and development, including time management and organizational skills

Professional development: Graduates will be able to keep abreast of current developments in the discipline to continue their own professional development.

Computing and society: Graduates will be able to understand the impact of computing solutions in a global and societal context.

The Program

The department is offering the computer science program with two options:

Option I: B.S. in Computer Science with summer training.

Option II: B.S. in Computer Science with Coop.

Option I:
Requirements for the B.S. Degree in Computer Science with Summer Training

(a) General Education Requirements (52 credit hours)

		Credit Hours
Basic Science	CHEM 101, PHYS 101, PHYS 102	12
Mathematics & Statistics	MATH 101, MATH 102, MATH 201, MATH 260	14
Statistics	STAT 319	3
English	ENGL 101, ENGL 102, ENGL 214	9
Physical Education	PE 101, PE 102	2
Islamic & Arabic Studies	IAS 101, IAS 111, IAS 201, IAS 212, IAS 301, IAS 322	12
		52

(b) Core Requirements (53 credit hours)

ICS	ICS 102, ICS 201, ICS 202, ICS 232, ICS 251, ICS 252, ICS 313, ICS 334, ICS 353, ICS 411, ICS 413, ICS 431, ICS 432	46
COE	COE 202, COE 203, COE 308	7
		53

(c) Electives (27 credits hours)

ICS Electives	5 ICS xxx	15
Electives	4 XE xxx	12
		27

(d) Summer Training (Pass/Fail grade; No credits)

Every student is required to participate in a summer training program of real practical experience and submit a formal written report.

(e) Total Requirements

The total required credits for the BS degree in Computer Science are **132** semester-credit hours.

Information and Computer Science Curriculum
Computer Science Program with Summer Training

COURSE	TITLE	LT	LB	CR	COURSE	TITLE	LT	LB	CR
Preparatory Year									
ENGL 001	Preparatory English I	15	5	8	ENGL 002	Preparatory English II	15	5	8
MATH 001	Preparatory Math I	3	1	4	MATH 002	Preparatory Math II	3	1	4
PYP 001	Prep. Physical Sciences	2	0	2	PYP 002	Prep. Computer Sciences	0	2	1
PYP 003	University Study Skills	0	2	1	ME 003	Prep. Eng. Technology	0	2	1
PE 001	Prep. Physical Educ. I	0	2	1	PE 002	Prep. Physical Educ. II	0	2	1
		20	**10**	**16**			**18**	**12**	**15**
Total credit hours required in Preparatory Program: 31									
First Year (Freshman)									
MATH 101	Calculus I	4	0	4	MATH 102	Calculus II	4	0	4
PHYS 101	General Physics	3	3	4	PHYS 102	General Physics II	3	3	4
ENGL 101	Intro. to Acad. Discourse	3	0	3	ENGL 102	Intro. to Report Writing	3	0	3
CHEM 101	General Chemistry I	3	4	4	ICS 102	Intro. To Computing	2	3	3
PE 101	Physical Education I	0	2	1	IAS 111	Belief & its Consequences	2	0	2
		13	**9**	**16**			**14**	**6**	**16**
Second Year (Sophomore)									
ICS 201	Intro. to Comp. Science	3	3	4	ICS 202	Data Structure	3	3	4
ICS 251	Found. of Comp. Science	3	0	3	ICS 252	Discrete Structures	3	0	3
COE 202	Digital Logic Design	3	0	3	ICS 232	Comp. Org. & Assem.	3	3	4
MATH 201	Calculus III	3	0	3	MATH 260	Lin. Alg. & Diff. Equat.	3	0	3
IAS 101	Practical Writing	2	0	2	IAS 212	Professional Ethics	2	0	2
PE 102	Physical Education II	0	2	1	COE 203	Digital Logic Laboratory	0	3	1
		14	**5**	**16**			**14**	**9**	**17**
Third Year (Junior)									
ICS 313	Programming. Lang.	3	0	3	ICS 334	Database Systems	3	3	4
ICS 353	Design & Anal. of Algo.	3	0	3	ICS 3xx	(ICS Elective II)	3	0	3
ICS 3xx	(ICS Elective I)	3	0	3	COE 308	Computer Arch.	3	0	3
STAT 319	Prob. & Statistics for Engrs.	2	3	3	ENGL 214	Tech. Rep. Writing	3	0	3
IAS 201	Writing for Prof. Needs	2	0	2	IAS 322	Human Rights in Islam	2	0	2
XE xxx	(Elective I)	3	0	3	XE xxx	(Elective II)	3	0	3
		16	**3**	**17**			**17**	**3**	**18**
Summer Training					ICS 399	Summer Training	0	0	0
Fourth Year (Senior)									
ICS 413	Software Eng.	3	3	4	ICS 432	Computer Network Sys.	3	3	4
ICS 431	Operating Systems	3	3	4	ICS 4xx	(ICS Elective IV)	3	0	3
ICS 411	Senior Project	1	6	3	ICS 4xx	(ICS Elective V)	3	0	3
ICS 4xx	(ICS Elective III)	3	0	3	IAS 301	Oral Communication Skills	2	0	2
XE xxx	(Elective III)	3	0	3	XE xxx	(Elective IV)	3	0	3
		13	**12**	**17**			**14**	**3**	**15**
Total credit hours required in Degree Program: 132									

Option II:
Requirements for the B.S. Degree in Computer Science with Coop

(a) General Education Requirements (52 credit hours)		Credit Hours
Basic Science	CHEM 101, PHYS 101, PHYS 102	12
Mathematics & Statistics	MATH 101, MATH 102, MATH 201, MATH 260	14
Statistics	STAT 319	3
English	ENGL 101, ENGL 102, ENGL 214	9
Physical Education	PE 101, PE 102	2
Islamic & Arabic Studies	IAS 101, IAS 111, IAS 201, IAS 212, IAS 301, IAS 322	12
		52

(b) Core Requirements (50 credit hours)

ICS	ICS 102, ICS 201, ICS 202, ICS 232, ICS 251, ICS 252, ICS 313, ICS 334, ICS 353, ICS 413, ICS 431, ICS 432	43
COE	COE 202, COE 203, COE 308	7
		50

(c) Electives (21 credits hours)

ICS Electives	4 ICS xxx	12
Electives	3 XE xxx	9
		21

(d) ICS 351 Cooperative Work (9 credits)

Every student is required to work for 28 weeks in the industry for real practical experience and submit a formal written report.

(e) Total Requirements

The total required credits for the BS degree in Computer Science with coop are **132** semester-credit hours.

Information and Computer Science Curriculum
Computer Science Program with Coop

COURSE		TITLE	LT	LB	CR	COURSE		TITLE	LT	LB	CR
Preparatory Year											
ENGL	001	Preparatory English I	15	5	8	ENGL	002	Preparatory English II	15	5	8
MATH	001	Preparatory Math I	3	1	4	MATH	002	Preparatory Math II	3	1	4
PYP	001	Prep. Physical Sciences	2	0	2	PYP	002	Prep. Computer Sciences	0	2	1
PYP	003	University Study Skills	0	2	1	ME	003	Prep. Eng. Technology	0	2	1
PE	001	Prep. Physical Educ. I	0	2	1	PE	002	Prep. Physical Educ. II	0	2	1
			20	**10**	**16**				**18**	**12**	**15**
Total credit hours required in Preparatory Program: 31											
First Year (Freshman)											
MATH	101	Calculus I	4	0	4	MATH	102	Calculus II	4	0	4
PHYS	101	General Physics	3	3	4	PHYS	102	General Physics II	3	3	4
ENGL	101	Intro. to Acad. Discourse	3	0	3	ENGL	102	Intro. to Report Writing	3	0	3
CHEM	101	General Chemistry I	3	4	4	ICS	102	Intro. To Computing	2	3	3
PE	101	Physical Education I	0	2	1	IAS	111	Belief & its Consequences	2	0	2
						PE	102	Physical Education II	0	2	1
			13	**9**	**16**				**14**	**8**	**17**
Second Year (Sophomore)											
ICS	201	Intro. to Comp. Science	3	3	4	ICS	202	Data Structure	3	3	4
ICS	251	Found. of Comp. Science	3	0	3	ICS	252	Discrete Structures	3	0	3
COE	202	Digital Logic Design	3	0	3	ICS	232	Comp. Org. & Assem.	3	3	4
MATH	201	Calculus III	3	0	3	MATH	260	Lin. Alg. & Diff. Equat.	3	0	3
IAS	101	Practical Writing	2	0	2	IAS	212	Professional Ethics	2	0	2
ENGL	214	Acad. & Prof. Comm.	3	0	3	COE	203	Digital Logic Laboratory	0	3	1
			17	**3**	**18**				**14**	**9**	**17**
Third Year (Junior)											
ICS	313	Programming Lang.	3	0	3	ICS	334	Database Systems	3	3	4
ICS	353	Design & Anal. of Algo.	3	0	3	ICS	3xx	(ICS Elective II)	3	0	3
ICS	3xx	(ICS Elective I)	3	0	3	ICS	413	Software Engineering	3	3	4
STAT	319	Prob. & Statistics for Engrs.	2	3	3	COE	308	Computer Architecture	3	0	3
IAS	201	Writing for Prof. Needs	2	0	2	IAS	322	Human Rights in Islam	2	0	2
XE	xxx	(Elective I)	3	0	3	XE	xxx	(Elective II)	3	0	3
			16	**3**	**17**				**17**	**6**	**19**
Summer Session						ICS	350	Cooperative Work	0	0	0
Fourth Year (Senior)											
ICS	351	Cooperative Work (Cont.)	0	0	9	ICS	431	Operating Systems	3	3	4
						ICS	432	Computer Network Sys.	3	3	4
						ICS	4xx	(ICS Elective III)	3	0	3
						ICS	4xx	(ICS Elective IV)	3	0	3
						IAS	301	Style of Literature	2	0	2
						XE	xxx	(Elective III)	3	0	3
			0	**0**	**9**				**17**	**6**	**19**
Total credit hours required in Degree Program: 132											

B.S. IN SOFTWARE ENGINEERING PROGRAM

Introduction

Software Engineering focuses on creating high-quality software in a systematic, controlled, and efficient manner. Consequently, it has more emphasis on analysis, specification, design, evaluation and evolution of the software than its mere implementation. Other issues that play a vital role in software engineering include management and quality, novelty, creativity, standards, individual skills, teamwork and professional practice. The discipline of software engineering can be seen as an engineering field with a strong connection to its underlying computer science discipline. The Department of Information and Computer Science offers a BS in Software Engineering. The program was approved in 2001. The program is in full compliance with the latest IEEE-ACM Computing Curricula recommendations.

Mission

To bring forth software engineers who are capable of employing current and emerging engineering principles and methods to the cost-effective creation, operation, and maintenance of high-quality software, utilizing their acquired knowledge in computer science.

Objectives

Graduates of the Program will be able to:

1. Show mastery of the software engineering and relevant computer science knowledge and skills necessary to begin practice as a software engineer.
2. Demonstrate an understanding of the generic software engineering processes along with their variations, and the ability to exercise critical judgment with regard to their applicability.
3. Reconcile conflicting project objectives, and find acceptable compromises within limitations of cost, time, knowledge, existing systems, and organizations.
4. Employ current theories, models, and techniques that provide a basis for problem identification and analysis, software design, implementation, validation & verification, evolution, and documentation.
5. Learn new models, techniques, and technologies as they emerge.
6. Work in a professional manner as an individual as well as a member/leader of a team to create, present, and deliver quality software artifacts taking into consideration ethical, social, legal, and economic issues.

Goals

Our goal has been, and continues to be, a high quality degree program in Software Engineering that prepares students for lifelong learning as they undertake professional careers in computing. The program prepares students to work as software application developers, system programmers, database administrators, and Internet developers.

Requirements for the B.S. Degree in Software Engineering

(a) General Education Requirements (55 credit hours)

		Credit Hours
Basic Science	CHEM 101, PHYS 101, PHYS 102	12
Mathematics & Statistics	MATH 101, MATH 102, MATH 201, MATH 260	14
Statistics	STAT 319	3
English	ENGL 101, ENGL 102, ENGL 214	9
Physical Education	PE 101, PE 102	2
Islamic & Arabic Studies	IAS 101, IAS 111, IAS 201, IAS 212, IAS 301, IAS 322	12
Economics	SE 307	3
		55

(b) Core Requirements (61 credits hours)

SWE	SWE 214, SWE 312, SWE 316, SWE 344, SWE 415, SWE 417, SWE 418, SWE 444	25
ICS	ICS 102, ICS 201, COE 202, COE 203, ICS 202, ICS 232, ICS 252, ICS 313, ICS 334, ICS 353, ICS 431	36
		61

(c) Elective (16 credits)

SWE	SWE/ICS 3xx, SWE/ICS 4xx, SWE/ICS 4xx	9
Free	XX xxx, XX xxx	6
		15

(d) Summer Training (Pass/Fail grade; No credits)

The prerequisites for summer training:

1. Student is currently enrolled in the university.
2. Student has completed 65 credits or more (including current semester)
3. Students has completed or currently doing ENGL 214, ICS 334 and SWE 316.
4. Summer training is not in the last semester for the student at the university.

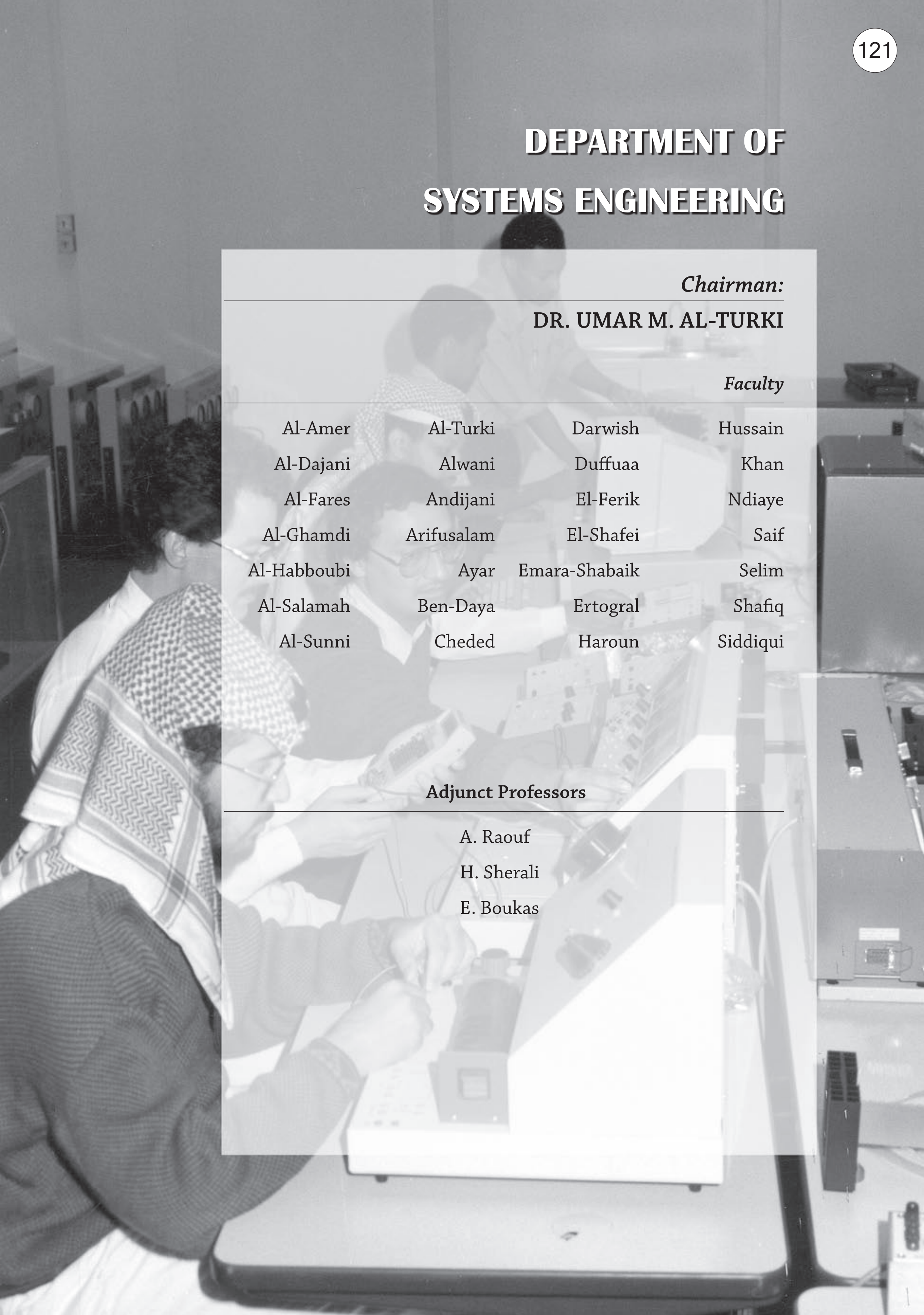
Every student is required to participate in a summer training program of real practical experience and submit a formal written report.

(e) Total Requirements

The total required credits for the BS degree in Software Engineering are **131** semester-credit-hours.

Software Engineering Curriculum

COURSE	TITLE	LT	LB	CR	COURSE	TITLE	LT	LB	CR
Preparatory Year									
ENGL 001	Preparatory English I	15	5	8	ENGL 002	Preparatory English II	15	5	8
MATH 001	Preparatory Math I	3	1	4	MATH 002	Preparatory Math II	3	1	4
PYP 001	Prep. Physical Sciences	2	0	2	PYP 002	Prep. Computer Sciences	0	2	1
PYP 003	University Study Skills	0	2	1	ME 003	Prep. Eng. Technology	0	2	1
PE 001	Prep. Physical Educ. I	0	2	1	PE 002	Prep. Physical Educ. II	0	2	1
		20	**10**	**16**			**18**	**12**	**15**
Total credit hours required in Preparatory Program: 31									
First Year (Freshman)									
MATH 101	Calculus I	4	0	4	MATH 102	Calculus II	4	0	4
PHYS 101	General Physics	3	3	4	PHYS 102	General Physics II	3	3	4
ENGL 101	Intro. to Acad. Discourse	3	0	3	ENGL 102	Intro. to Report Writing	3	0	3
CHEM 101	General Chemistry I	3	4	4	ICS 102	Intro. To Computing	2	3	3
PE 101	Physical Education I	0	2	1	IAS 111	Belief & It's Consequences	2	0	2
		13	**9**	**16**			**14**	**6**	**16**
Second Year (Sophomore)									
ICS 201	Intro. To Comp. Science	3	3	4	ICS 202	Data & Storage Structures	3	3	4
ICS 252	Discrete Structures I	3	0	3	SWE 214	Introduction to SW Eng.	3	3	4
COE 202	Digital Logic Design	3	0	3	ICS 232	Comp. Org. & Assem.	3	3	4
MATH 201	Calculus III	3	0	3	MATH 260	Lin. Alg. & Diff. Equation	3	0	3
IAS 101	Practical Grammar	2	0	2	IAS 212	Professional Ethics	2	0	2
PE 102	Physical Education II	0	2	1	COE 203	Digital Logic Laboratory	0	3	1
		14	**5**	**16**			**14**	**12**	**18**
Third Year (Junior)									
ICS 313	Programming. Lang.	3	0	3	SWE 312	User-Interface Design	3	0	3
ICS 353	Design & Anal. of Algo.	3	0	3	SWE 316	SW Arch. and Design	3	0	3
ICS 334	Database Systems	3	3	4	SWE 344	Internet Prot. & C-S Prg.	2	3	3
STAT 319	Prob. & Statistics for Engrs.	2	3	3	ENGL 214	Acad. & Prof. Comm.	3	0	3
IAS 201	Writing for Prof. Needs	2	0	2	IAS 301	Oral Communication Skills	2	0	2
SWE 3XX	(SWE Elective I)	3	0	3	XX xxx	(Elective I)	3	0	3
		16	**6**	**18**			**16**	**3**	**17**
Summer Training					ICS 399	Summer Training	0	0	0
Fourth Year (Senior)									
SWE 415	SW Testing & QA	3	0	3	SWE 418	SWE Project (II)	1	6	3
SWE 417	SWE Project (I)	2	3	3	ICS 431	Operating Systems	3	3	4
SWE 444	Internet & Web App. Dev.	3	0	3	IAS 322	Human Rights in Islam	2	0	2
SE 307	Eng. Economic Analysis	3	0	3	SWE 4xx	(SWE Elective III)	3	0	3
SWE 4xx	(SWE Elective II)	3	0	3	XX xxx	(Elective II)	3	0	3
		14	**3**	**15**			**12**	**9**	**15**
Total credit hours required in Degree Program: 131									



DEPARTMENT OF SYSTEMS ENGINEERING

Chairman:

DR. UMAR M. AL-TURKI

Faculty

Al-Amer	Al-Turki	Darwish	Hussain
Al-Dajani	Alwani	Duffuaa	Khan
Al-Fares	Andijani	El-Ferik	Ndiaye
Al-Ghamdi	Arifusalam	El-Shafei	Saif
Al-Habboubi	Ayar	Emara-Shabaik	Selim
Al-Salamah	Ben-Daya	Ertogral	Shafiq
Al-Sunni	Cheded	Haroun	Siddiqui

Adjunct Professors

A. Raouf

H. Sherali

E. Boukas

Introduction

Systems Engineering programs cover analysis, design, and control of engineering systems. The programs focus on the science and technology of industrial systems. They emphasize the analysis and design of systems to produce goods and services efficiently. Particular attention is devoted to both the physical processes involved and the environment.

The department offers two programs in systems engineering with and without Co-op. Co-op programs are implemented in most technical universities worldwide. The student usually leaves the school for one or more semesters and joins a relevant industry, where he is exposed to real life applications of what has been taught in the school. This exposure provides the student with a more mature outlook and has a significant effect on his understanding of his role as a practicing engineer. The two programs are: (1) Industrial and Systems Engineering (ISE) and (2) Control and Instrumentation Systems Engineering (CISE).

Industrial and Systems Engineering Program

This Program is concerned with the design, improvement, and installation of integrated systems of people, materials, and equipment; it draws upon specialized knowledge and skill in the mathematical, physical, and social sciences, together with the principles and methods of engineering analysis and design; its goals are specifying, predicting, and evaluating the results to be obtained from such systems.

The main study areas involved are:

1. **Manufacturing Systems Engineering.** This involves analysis and design of manufacturing methods, processes, and integrated systems including consideration of equipment, controls, services, managerial considerations, and new technologies such as computer-aided design/computer-aided manufacturing (CAD/CAM), automation, robotics, and computer control.
2. **Operations Research.** This entails the development and investigations of principles and techniques for quantitative evaluation, design, and representation of integrated physical and operations systems, using the theory and methods of statistics, stochastic processes, mathematical modeling, and numerical and optimization techniques.
3. **Production Systems and Quality Control.** This deals with planning, scheduling, allocation, facility layout and location, inventory and quality control for productivity improvement, and effective utilization of economic, human, and physical resources.
4. **Human Factors Engineering.** This is related to a systematic application of knowledge about human sensory, perceptual, mental, and psychomotor characteristics to the engineering design of equipment and facilities to enhance their operational use and improve the quality and safety of their working life.

Control and Instrumentation Systems Engineering

The primary thrust of this program is to graduate engineers who can carry out modern automation technology of industrial systems existing in all engineering disciplines such as the petrochemical industry, the steel industry, power systems, and the like, as well as non-industrial systems such as the automation of water supply systems and irrigation systems. This program emphasizes the analysis, design, synthesis, and optimization of control systems in order to provide the best means of controlling their dynamic behavior to produce favorable or specified outputs.

The main study areas involved in this program are:

1. **Computer Control Systems**. This deals with the design, control, and operation of large scale control systems. Sufficient details about electronics, hardware, instrumentation, and digital signal processing are given. Attention is also devoted to the use of microprocessors in automation systems, to computer-aided design/computer-aided manufacturing (CAD/CAM), and to robotics.
2. **Control Systems Analysis and Design**. This provides a thorough grasp of the analytical tools of dynamical systems coupled with the ability to apply such techniques to challenging problems facing today's control engineer. Classical and modern design approaches for both continuous and discrete control systems are studied.
3. **Modeling and Simulation of Dynamic Systems**. This involves mathematical modeling and digital simulation of deterministic as well as stochastic systems representing different practical engineering disciplines. The aim is to enable the systems engineer to generate and/or validate systems models that can be used to study and evaluate more complex dynamic systems.
4. **Signal, Speech and Image Processing**. Analysis, design and implementation of engineering systems require a deep knowledge in signal processing. Signal processing deals with the representation, transformation and manipulation of signals and the information they contain. All aspects of signal processing such as theoretical development, hardware, implementation and real-time applications are studied. Two important application areas of signal processing, i.e., speech and image processing are also covered.

Vision

Regional: To be the leader in the Arab region in the areas of Automation and Control, Industrial Engineering and Operations Research.

Global: To be recognized worldwide as a center of excellence in education and research in the areas of Automation and Control, Industrial Engineering and Operations Research.

Mission

The mission of the Systems Engineering Department is **to provide high quality education, research and community service** in the area of Control and Instrumentation, Industrial Engineering and Operations Research. Specific components of this mission are:

1. To provide high quality state of the art education in Automation and Control, Industrial Engineering and Operations Research that prepares professionals who can perform jobs in the domain of their fields of specialization at the highest quality level and who are competitive worldwide.
2. To conduct research that expands knowledge in the areas of Instrumentation and Control, Industrial Engineering and Operations Research and provide high quality graduate programs that prepare students properly in their areas of specialty.
3. To provide high quality professional training, applied projects and consultation in the area of Systems Engineering that are up-to-date and competitive worldwide.

Educational Objectives and Program Outcomes

1. Prepare students who can understand and formulate real world problems in the domain of Automation and Control, Industrial Engineering and Operations Research and who can apply problem-solving skills to obtain valid realistic solutions.
2. Develop students' abilities in critical thinking, problem solving and teamwork.
3. Prepare students to improve planning and utilization of resources and assist organizations to make optimal decisions.
4. Prepare students to conduct experiments, collect data, and perform analysis and interpretation to draw valid conclusions.
5. Provide students with the ability to identify, examine, analyze, stabilize, control and design organizations critical processes.
6. Prepare students to be proficient in applying information technology.
7. Prepare students to communicate effectively both orally and in writing
8. Provide students with the ability to engage in life long learning and growth in the filed of Systems Engineering and to understand professional and ethical responsibility.

Program Learning Outcomes

Program learning outcomes are the tasks students should carry out after going through the program. All Systems Engineering graduates should be able to:

1. Describe problems in the domain of Systems Engineering and understand their difficulties.
2. Formulate and use Models in the domain of Systems Engineering to analyze and optimize systems performance.
3. Design experiments, collect data, analyze and interpret results.
4. Plan activities and improve productivity, efficiency and utilization of resource.
5. Conduct process control and improvement.
6. Use computers and software effectively to solve problems in the domain of Systems Engineering.
7. Function well as a member of multidisciplinary team.
8. Communicate effectively orally and in writing.
9. Conduct their activities in a professional and ethical manner.
10. Pursue life-long learning and professional growth.

Additional Outcomes for the Control Instrumentation Program (CISE)

In addition to the above ten common outcomes students in the Control and Instrumentation program should be able to perform the following upon graduation:

1. Use computers and other digital devices to control and automate industrial systems.
2. Design and analyze instrumentation of control systems.
3. Design and analyze automation systems

Additional Outcomes for the ISE Program

In addition to the above ten common outcomes in section 4.2 students joining the ISE program should be able to perform the following upon graduation:

1. Develop performance measures and standards.
2. Evaluate reliability and quality performance and initiate improvements.
3. Design facilities, processes and operating procedures.

Employment Opportunities

In Saudi Arabia, there is an abundance of capital but limited human resources. Automation provides ways of reducing manpower requirements in industry, agriculture, and other services. In fact, the leading petrochemical and related industries, desalination plants, and power systems within the Kingdom are already using modern automation techniques. Furthermore, Industrial Engineering and Operations Research are essential to any country embarked on an ambitious industrialization plan. Indeed, the effectiveness of an enterprise is heavily influenced by the physical arrangement of people, equipment, and materials. The industrial engineer designs many types of systems, from material handling systems to the layout of factories and offices; he determines storage needs and space requirements for manufacturing systems, provides work measurement services, calculates labor requirements, estimates the performance of proposed systems, and measures and improves the effectiveness of existing systems.

Graduates of both options in the Systems Engineering Department are trained to use engineering principles in the solution of problems encountered in environments and situations where a quantitative basis for decision making is desirable.

Both options provide the preparation necessary for admission to graduate programs in highly respected universities.

B.S. Degree Requirements for the Systems Engineering Programs

(a) General Education Requirements (54 credit hours)

		Credit Hours
Arabic Studies	IAS 101, 201, 301	6
English Language	ENGL 101, 102, 214	9
Islamic Studies	IAS 111, 212, 322, 4xx	8
Mathematics	MATH 101, 102, 201, 260	14
Chemistry	CHEM 101	4
Numerical Methods	SE 301	3
Physics	PHYS 101, 102	8
Physical Education	PE 101, 102	2
		54

(b) Core Requirements: ISE (47 credit hours), or ICSE (46 credit hours)

General Engineering Fundamentals

Engineering Graphics	CE 101	2
Electrical Circuits	EE 201	4
Material Science (ISE) or, Thermodynamics (ICSE)	ME 215/ME 203	4/3
Computer Programming	ICS 103	3
		13/12

Systems Engineering Fundamentals

Introduction to Systems Engineering	SE 201	2
Probability and Statistics	SE 205	3
Modeling and Simulation	SE 207	3
Linear Control Systems	SE 302	4
Operations Research I	SE 303	4
Optimization Methods (Regular 3)	SE 305	3
Engineering Economic Analysis	SE 307	3
Computer Control Systems	SE 401	3
Production Systems	SE 402	3
Stochastic Systems Simulation	SE 405	3
Senior Project	SE 490	3
		34

(c) Areas of Specialization: ISE (19 credit hours), or CISE (20 credit hours)

Each student must select one of the following options:

(1) Industrial and Systems Engineering Program		**Credit Hours**
Quality Control & Ind. Stat.	SE 320	3
Manufacturing Technology	SE 322	4
Engineering Methods	SE 323	3
Engineering Statistics	SE 325	3
Operations Research II	SE 421	3
Facility Layout and Location	SE 422	3
		19

(2) Control and Instrumentation Systems Engineering Program

Digital Systems Design	SE 311	3
Instrumentation	SE 312	3
Microprocessors in Automation Systems	SE 417	4
Electronics I	EE 203	4
Signals and Systems	SE 315	3
Industrial Process Control	SE 418	3
		20

(d) Electives (12 credit hours)

Each student must take four elective courses based on his area of specialization, with the approval of his advisor and the curriculum committee. At least three of those courses must be selected from the following lists of courses:

ISE Electives

Maintenance Planning and Control	SE 429
Human Factors Engineering	SE 443
Decision Making	SE 447
Scheduling & Sequencing	SE 448
Special Topics in ISE	SE 449
Industrial Information Systems	SE 464
Industrial Safety	SE 465
Reliability and Maintainability	SE 480

Control and Instrumentation Systems Engineering Electives

Digital Signal Processing	SE 432
Control System Design	SE 435
Introduction to Robust Control	SE 436
Instrumentation and Process Control	SE 438
Special Topics in Automation	SE 439
Methodology of Large Scale Systems	SE 450
Computed-Aided Manufacturing and Robotics	SE 461
Theory of Stochastic Systems	SE 463
Digital Computing Techniques I	SE 470
Digital Computing Techniques II	SE 475

It must be noted that all the above elective courses are open to all students, regardless of their areas of concentration. Thus, the elective requirement is met as follows:

		Credit Hours
Departmental Electives	SE xxx, xxx, xxx	9
Free Technical Elective	XX xxx	3

(e) Summer Training Program (Pass/Fail Grade; Zero credit hours)

Each student must participate in a summer training program of industrial experience, submit a formal written report on his work during the program, and give an oral presentation (seminar). The period of training must be at least eight consecutive weeks. The student is eligible for summer training after completing a minimum of 95 credit hours.

(f) BS Degree requirements for the Programs with Co-op

The total required credits for the B.S. degree with Co-op is 132 semester credit hours. The course requirements for the BS program with Co-op are similar to the regular BS program described above, but differs as follows:

Three courses, with a total of 9 credit hours, are dropped from the requirements. The courses are SE 305, SE 490, and the free technical elective. These courses are replaced by SE 350, Co-op work program (9 credit hours), in which students join a 28-week program of industrial training approved by the department. Students are permitted to start the cooperative work after completing a minimum of 95 credit hours with a major and cumulative GPA's of 2.0 or more. Each student should submit a formal written report on his work experience and on a related design project.

(g) Total Requirements (132 credit hours)

The total required credits for both BS degrees in Systems Engineering is **132** credit hours.

INDUSTRIAL AND SYSTEMS ENGINEERING CURRICULUM

COURSE	TITLE	LT	LB	CR	COURSE	TITLE	LT	LB	CR
Preparatory Year									
ENGL 001	Preparatory English I	15	5	8	ENGL 002	Preparatory English II	15	5	8
MATH 001	Preparatory Math I	3	1	4	MATH 002	Preparatory Math II	3	1	4
PYP 001	Prep. Physical Sciences	2	0	2	PYP 002	Prep. Computer Sciences	0	2	1
PYP 003	University Study Skills	0	2	1	ME 003	Prep. Eng. Technology	0	2	1
PE 001	Prep. Physical Educ. I	0	2	1	PE 002	Prep. Physical Educ. II	0	2	1
		20	**10**	**16**			**18**	**12**	**15**
Total credit hours required in Preparatory Program: 31									
First Year (Freshman)									
CE 101	Engineering Graphics	1	3	2	ICS 103	Computer Programming	2	3	3
CHEM 101	General Chemistry I	3	4	4	ENGL 102	Intro. to Report Writing	3	0	3
ENGL 101	Intro. to Acad. Discourse	3	0	3	IAS 111	Belief & its Consequences	2	0	2
MATH 101	Calculus I	4	0	4	MATH 102	Calculus II	4	0	4
PHYS 101	General Physics I	3	3	4	PE 101	Physical Education I	0	2	1
					PHYS 102	General Physics II	3	3	4
		14	**10**	**17**			**14**	**8**	**17**
Second Year (Sophomore)									
EE 201	Electric Circuit	3	3	4	ENGL 214	Acad. & Prof. Comm.	3	0	3
IAS 212	Professional Ethics	2	0	2	IAS 101	Practical Grammar	2	0	2
MATH 201	Calculus III	3	0	3	SE 205	Engineering Prob. & Stats.	2	3	3
MATH 260	Introduction to DE and LA.	3	0	3	SE 207	Modeling & Simulation	2	3	3
SE 201	Intro.to Systems Eng.	2	0	2	ME 215	Materials Science	3	3	4
					PE 102	Physical Education II	0	2	1
		13	**3**	**14**			**12**	**11**	**16**
Third Year (Junior)									
IAS 201	Writing for Prof. Needs	2	0	2	IAS 322	Human Rights in Islam	2	0	2
SE 301	Numerical Methods	3	0	3	SE 302	Linear Systems	3	3	4
SE 303	Ops. Research I	3	3	4	SE 305	Optimization Methods	2	3	3
SE 320	Quality & Ind. Stat.	3	0	3	SE 322	Manufacturing Technology	3	3	4
SE 325	Engineering Statistics	3	0	3	SE 323	Methods Engineering	2	3	3
XX xxx	(Tech. Elective)	0	0	3					
		14	**3**	**18**			**12**	**12**	**16**
Summer Training					SE 399	Summer Training	0	0	0
Fourth Year (Senior)									
IAS 301	Oral Communication Skills	2	0	2	IAS 4xx	(IAS Elective)	2	0	2
SE 401	Comp. Control Systems	2	3	3	SE 405	Stochastic System Sim.	2	3	3
SE 402	Production Systems	3	0	3	SE 421	Operations Research II	3	0	3
SE 307	Eng. Economic Analysis	3	0	3	SE 422	Facility, Layout/Location	3	0	3
SE xxx	(Elective I)	0	0	3	SE 490	Senior Project	0	0	3
SE xxx	(Elective II)	0	0	3	SE xxx	(Elective III)	0	0	3
		10	**3**	**17**			**10**	**3**	**17**
Total credit hours required in Degree Program: 132									

INDUSTRIAL AND SYSTEMS ENGINEERING CURRICULUM (CO-OP)

COURSE	TITLE	LT	LB	CR	COURSE	TITLE	LT	LB	CR
Preparatory Year									
ENGL 001	Preparatory English I	15	5	8	ENGL 002	Preparatory English II	15	5	8
MATH 001	Preparatory Math I	3	1	4	MATH 002	Preparatory Math II	3	1	4
PYP 001	Prep. Physical Sciences	2	0	2	PYP 002	Prep. Computer Sciences	0	2	1
PYP 003	University Study Skills	0	2	1	ME 003	Prep. Eng. Technology	0	2	1
PE 001	Prep. Physical Educ. I	0	2	1	PE 002	Prep. Physical Educ. II	0	2	1
		20	**10**	**16**			**18**	**12**	**15**
Total credit hours required in Preparatory Program: 31									
First Year (Freshman)									
CE 101	Engineering Graphics	1	3	2	ICS 103	Computer Programming	2	3	3
CHEM 101	General Chemistry I	3	4	4	ENGL 102	Intro. to Report Writing	3	0	3
ENGL 101	Intro. to Acad. Discourse	3	0	3	IAS 111	Islamic Ideology	2	0	2
MATH 101	Calculus I	4	0	4	MATH 102	Calculus II	4	0	4
PHYS 101	General Physics I	3	3	4	PE 101	Physical Education I	0	2	1
					PHYS 102	General Physics II	3	3	4
		14	**10**	**17**			**14**	**8**	**17**
Second Year (Sophomore)									
EE 201	Electric Circuit	3	3	4	ENGL 214	Acad. & Prof. Comm.	3	0	3
IAS 212	Professional Ethics	2	0	2	IAS 101	Practical Grammar	2	0	2
MATH 201	Calculus III	3	0	3	SE 205	Engineering Prob. & Stats.	2	3	3
MATH 260	Introduction to DE and LA.	3	0	3	SE 207	Modeling & Simulation	2	3	3
SE 201	Intro. to Systems Eng.	2	0	2	ME 215	Materials Science	3	3	4
					PE 102	Physical Education II	0	2	1
		13	**3**	**14**			**12**	**11**	**16**
Summer Session					SE 301	Numerical Methods	3	0	3
					SE 307	Eng. Economic Analysis	3	0	3
							6	**0**	**6**
Third Year (Junior)									
IAS 201	Writing for Prof. Needs	2	0	2	SE 322	Manufacturing Technology	3	3	4
IAS 322	Human Rights in Islam	2	0	2	SE 323	Methods Engineering	2	3	3
SE 302	Linear Control System	3	3	4	IAS 301	Oral Communication Skills	2	0	2
SE 303	Operations Research-I.	3	3	4	SE 401	Computer Control Sys.	2	3	3
SE 320	Quality. Cont. & Ind. Stats.	3	0	3	SE 402	Prod. Sys./Invent. Control	3	0	3
SE 325	Engineering Statistics	3	0	3	SE xxx	(Elective I)	0	0	3
		16	**6**	**18**			**12**	**9**	**18**
Summer Session					SE 350	Coop Work Program	0	0	0
Fourth Year (Senior)									
SE 351	Cont. of Coop Work	0	0	9	IAS 4xx	(IAS Elective)	2	0	2
					SE 405	Stochastic System Sim.	2	3	3
					SE 421	Ops. Research II	3	0	3
					SE 422	Facility Planning	3	0	3
					SE xxx	(Elective II)	0	0	3
					SE xxx	(Elective III)	0	0	3
		0	**0**	**9**			**10**	**3**	**17**
Total credit hours required in Degree Program: 132									

CONTROL AND INSTRUMENTATION SYSTEMS ENGINEERING CURRICULUM

COURSE		TITLE	LT	LB	CR	COURSE		TITLE	LT	LB	CR
Preparatory Year											
ENGL	001	Preparatory English I	15	5	8	ENGL	002	Preparatory English II	15	5	8
MATH	001	Preparatory Math I	3	1	4	MATH	002	Preparatory Math II	3	1	4
PYP	001	Prep. Physical Sciences	2	0	2	PYP	002	Prep. Computer Sciences	0	2	1
PYP	003	University Study Skills	0	2	1	ME	003	Prep. Eng. Technology	0	2	1
PE	001	Prep. Physical Educ. I	0	2	1	PE	002	Prep. Physical Educ. II	0	2	1
			20	**10**	**16**				**18**	**12**	**15**
Total credit hours required in Preparatory Program: 31											
First Year (Freshman)											
CE	101	Engineering Graphics	1	3	2	ICS	103	Computer Programming	2	3	3
CHEM	101	General Chemistry I	3	4	4	ENGL	102	Intro. to Report Writing	3	0	3
ENGL	101	Intro. to Acad. Discourse	3	0	3	IAS	111	Belief & its Consequences	2	0	2
MATH	101	Calculus I	4	0	4	MATH	102	Calculus II	4	0	4
PHYS	101	General Physics I	3	3	4	PE	101	Physical Education I	0	2	1
						PHYS	102	General Physics II	3	3	4
			14	**10**	**17**				**14**	**8**	**17**
Second Year (Sophomore)											
EE	201	Electric Circuit	3	3	4	ENGL	214	Acad. & Prof. Comm.	3	0	3
IAS	212	Professional Ethics	2	0	2	IAS	101	Practical Grammar	2	0	2
MATH	201	Calculus III	3	0	3	SE	205	Engineering Prob. & Stats.	2	3	3
MATH	260	Introduction to DE and LA.	3	0	3	SE	207	Modeling & Simulation	2	3	3
SE	201	Intro.to Systems Eng.	2	0	2	EE	203	Electronics I	3	3	4
ME	203	Thermodynamics	3	0	3	PE	102	Physical Education II	0	2	1
			16	**3**	**17**				**12**	**11**	**16**
Third Year (Junior)											
IAS	201	Writing for Prof. Needs	2	0	2	IAS	322	Human Rights in Islam	2	0	2
SE	301	Numerical Methods	3	0	3	SE	302	Linear Systems	3	3	4
SE	303	Ops. Research I	3	3	4	SE	305	Optimization Methods	3	0	3
SE	311	Digital Systems Design	2	3	3	SE	312	Instrumentation	2	3	3
SE	315	Signals and Systems	3	0	3	XX	xxx	(Technical Elective)	0	0	3
			13	**6**	**15**				**10**	**6**	**15**
Summer Training						SE	399	Summer Training	0	0	0
Fourth Year (Senior)											
IAS	301	Oral Communication Skills	2	0	2	IAS	4xx	(IAS Elective)	2	0	2
SE	401	Comp. Control Systems	2	3	3	SE	405	Stochastic System Sim.	2	3	3
SE	402	Production Systems	3	0	3	SE	417	Microprocessor in Auto.	3	3	4
SE	307	Eng. Economic Analysis	3	0	3	SE	418	Industrial Process Cont.	3	0	3
SE	xxx	(Elective I)	0	0	3	SE	490	Senior Project	0	9	3
SE	xxx	(Elective II)	0	0	3	SE	xxx	(Elective III)	0	0	3
			10	**3**	**17**				**10**	**15**	**18**
Total credit hours required in Degree Program: 132											

CONTROL AND INSTRUMENTATION SYSTEMS ENGINEERING CURRICULUM (CO-OP)

COURSE	TITLE	LT	LB	CR	COURSE	TITLE	LT	LB	CR
Preparatory Year									
ENGL 001	Preparatory English I	15	5	8	ENGL 002	Preparatory English II	15	5	8
MATH 001	Preparatory Math I	3	1	4	MATH 002	Preparatory Math II	3	1	4
PYP 001	Prep. Physical Sciences	2	0	2	PYP 002	Prep. Computer Sciences	0	2	1
PYP 003	University Study Skills	0	2	1	ME 003	Prep. Eng. Technology	0	2	1
PE 001	Prep. Physical Educ. I	0	2	1	PE 002	Prep. Physical Educ. II	0	2	1
		20	**10**	**16**			**18**	**12**	**15**
Total credit hours required in Preparatory Program: 31									
First Year (Freshman)									
CE 101	Engineering Graphics	1	3	2	ICS 103	Computer Programming	2	3	3
CHEM 101	General Chemistry I	3	4	4	ENGL 102	Intro. to Report Writing	3	0	3
ENGL 101	Intro. to Acad. Discourse	3	0	3	IAS 111	Islamic Ideology	2	0	2
MATH 101	Calculus I	4	0	4	MATH 102	Calculus II	4	0	4
PHYS 101	General Physics I	3	3	4	PE 101	Physical Education I	0	2	1
					PHYS 102	General Physics II	3	3	4
		14	**10**	**17**			**14**	**8**	**17**
Second Year (Sophomore)									
EE 201	Electric Circuit	3	3	4	ENGL 214	Acad. & Prof. Comm.	3	0	3
IAS 212	Professional Ethics	2	0	2	IAS 101	Practical Grammar	2	0	2
MATH 201	Calculus III	3	0	3	SE 205	Engineering Prob. & Stats.	2	3	3
MATH 260	Introduction to DE and LA.	3	0	3	SE 207	Modeling & Simulation	2	3	3
SE 201	Intro. to Systems Eng.	2	0	2	EE 203	Electronics I	3	3	4
ME 203	Thermodynamics	3	0	3	PE 102	Physical Education II	0	2	1
		16	**3**	**17**			**12**	**11**	**16**
Summer Session					SE 301	Numerical Methods	3	0	3
					SE 307	Eng. Economic Analysis	3	0	3
							6	**0**	**6**
Third Year (Junior)									
IAS 201	Writing for Prof. Needs	2	0	2	IAS 301	Oral Communication Skills	2	0	2
SE 302	Linear Control System	3	3	4	IAS 322	Human Rights in Islam	2	0	2
SE 303	Operations Research I	3	3	4	SE 312	Instrumentation	2	3	3
SE 311	Digital System Design	2	3	3	SE 401	Computer Control System	2	3	3
SE 315	Signals & System	3	0	3	SE xxx	(Elective I)	0	0	3
					SE xxx	(Elective II)	0	0	3
		13	**9**	**16**			**8**	**6**	**16**
Summer Session					SE 350	Coop Work Program	0	0	0
Fourth Year (Senior)									
SE 351	Cont. of Coop Work	0	0	9	IAS 4xx	(IAS Elective)	2	0	2
					SE 402	Prod. Systems/Inv. Cont.	3	0	3
					SE 405	Stochastic Sys. Simulation	2	3	3
					SE 417	Microprocessor System	3	3	4
					SE 418	Industrial Process Cont.	3	0	3
					SE xxx	(Elective III)	0	0	3
		0	**0**	**9**			**13**	**6**	**18**
Total credit hours required in Degree Program: 132									

COLLEGE OF ENGINEERING SCIENCES

Dean:

DR. SAMIR A. AL-BAIYAT

Undergraduate Departments

AEROSPACE ENGINEERING

CHEMICAL ENGINEERING

CIVIL ENGINEERING

ELECTRICAL ENGINEERING

MECHANICAL ENGINEERING

PETROLEUM ENGINEERING

Vision

The vision for the *College of Engineering Sciences* at KFUPM is to be recognized as a world-class college that provides excellence and leadership in Engineering Education and Research.

Mission

The mission of the *College of Engineering Sciences* at KFUPM is to graduate well-educated engineers capable of leading and managing change through integration, application and transfer of engineering knowledge.

Philosophy

The programs of the College of Engineering Sciences are designed to meet the challenges of the 21^{st} century through enhancement of students' preparation for professional careers, life-long learning, and responsible participation as member of society. Emphasis is placed on religious, general and sociological education to make today's engineer aware of environmental, sociological, and other "human concerns" in addition to safety, aesthetics, economics and cost of energy in their decision making. Clear and precise communication skills, oral and written, are required of the engineer who delivers judgments, plans and decisions. A sound knowledge of engineering and related disciplines is required so that the engineer can work effectively with other engineers, scientists and technicians, in fulfilling engineering assignments.

College Programs

The undergraduate programs of the College of Engineering Sciences provide students with a range of educational opportunities by which they may achieve competence in major branches of engineering. Equipped with the knowledge of mathematics, physical sciences, computational techniques, and statistical analysis of data, the engineer can engage in creative design and construction, synthesis of system, and in research and development. Thus the engineer serves as a bridge between meeting human needs and the storehouse of theoretical knowledge. The College of Engineering Sciences continues to provide flexibility in different programs through a spectrum of electives, which allows the College graduate to exercise a limited choice in tailoring his program to fit his personal goals, whether for immediate employment or for graduate work.

All programs of the College of Engineering Sciences have been evaluated by the Accreditation Board for Engineering and Technology (ABET), and deemed substantially equivalent to similar accredited programs offered in the United States.

Curricular Requirements

The general engineering sciences curriculum includes the following features:

Virtually Common Freshman Year. In spite of the fact that students are required to declare their fields of major study at the Freshman level, the various specialty departments have a virtually common Freshman year.

Basic Sciences. The curriculum of each major in Applied Engineering contains a number of specially designed courses in basic sciences to provide students with a firm background in the physical sciences and mathematics. Courses in general chemistry and physics, a three-semester sequence of mathematics courses, a course on differential equations and on computer programming are offered as a necessary foundation in science and computational skills.

General Education Courses. Several courses are designed within the framework of a curriculum to broaden the students' general education. Among the fields covered are Islamic history and culture, Arabic language and literature, English and economics.

Engineering Breadth. Several courses are required to give the student some breadth of study in science and technology. Courses in application of computers in engineering and statistical analysis of engineering data are clear features of the programs. In addition, under the heading of "Technical Electives", students are permitted to extend their study into further advanced courses in science, mathematics, computer technology, fields of engineering other than their major, or even from their own major.

Engineering Depth. About one full year of study is devoted to the student's major field of engineering. Most of the courses in this category are specified courses designed to give the student the essential subject materials in his major. However, two to four departmental electives are left open to the student so that he can do extend his knowledge in his own area of interest. Finally every student takes a course leading to an integrated design project where the student uses his engineering and design skills in planning and designing a real world engineering project. The design should take into consideration appropriate constraints such as economic factors, safety, reliability, ethics, and environmental and social impact.

Graduation Requirements

In order to qualify for graduation Applied Engineering students must:

1. complete all required and elective courses in the selected degree program (133 credit hours minimum) with a cumulative GPA of 2.00 or better;
2. achieve a major GPA of 2.00 or better.
3. complete successfully after the third year a 28-week cooperative program working in industry.

DEPARTMENT OF AEROSPACE ENGINEERING

Chairman:

DR. AHMED ZAFER AL-GARNI

Faculty

Al-Garni, A.M.

Al-Garni, A.Z.

Jamal

Kassem

Omar

Saeed

Tozan

Aerospace engineering is one of the most important strategic fields in the world at least from two aspects: first, its effect on the infrastructure of the country such as fast communication, air transportation, civil aviation, industry, and economy; second, its relevance to defense issues including Air Force and Air Defense.

Due to the importance of this field to the Kingdom of Saudi Arabia (KSA) and the region, an aerospace engineering program was established in 1419H (1998G) to serve two branches: Aeronautics Engineering and Astronautics Engineering. This program is the first and only program in KSA and the Arabian Gulf and Peninsula region that offers the two branches. It developed from the Aeronautical Engineering option which was offered in the Mechanical Engineering Department (ME) since 1406H (1986G). The current Aerospace Engineering Department was established in 1423H (2002G). Although, the Department has recently been established, it has to its credit the highest number of publications per faculty, among the Arabian countries, in leading aerospace journals (such as AIAA, Canadian, British and Japanese Aerospace Journals). Moreover, the AE Department faculty have received many awards such as King Abdul-Aziz Al-Saud Legion of Honor Medal in the first degree for a Scientific Patent, the Distinguished Engineering Scientist Award for Saudis and Non-Saudis, which is supervised by King Abdul-Aziz City for Science and Technology (KACST), the Distinguished Award in Teaching and Academic Advising by KFUPM, the Distinguished Research Award by KFUPM, and the American Romanian Academy of Arts and Sciences Book Award.

Curriculum

The Aerospace Engineering (AE) Program is designed to cover all fundamental aspects of aerospace engineering. The curriculum includes general education courses in Mathematics, Chemistry, Physics, Engineering, Computer Science, Islamic and Arabic Studies, English, and Physical Education. The program also provides the students with a strong base in the main areas of aerospace engineering: Aerodynamics and Gas Dynamics, Flight Dynamics and Control, Aerospace Structures, Flight Propulsion and other related fields such as Aerospace Systems Maintenance, Helicopter, Avionics, Flight Traffic Control, Flight Safety, Electronic Warfare and Radar, and Astronautics. Moreover, the curriculum is also augmented by a number of elective courses in various branches of aerospace engineering. A student has the opportunity to take one elective course in the area of aerospace engineering that he would like to specialize in. It balances theory with application and provides practical experience through appropriate laboratory sessions.

The program includes a senior project, a capstone design course, which provides the student with an opportunity to work with a design team that exposes him to unstructured problem solving situations. Every aerospace engineering science student is required to spend 8 weeks in summer training to make use of his knowledge and to acquire valuable experience in an industrial environment.

Employment Opportunities

The employment opportunities for aerospace engineers in KSA, the Arabian Gulf and Peninsula region have been very good and will be brighter in this age of ever-changing technology. These opportunities exist because of the rapid pace of industrialization, technological development in aerospace engineering field, establishment of aviation departments in private organizations, and procurement of new aerospace related systems in defense and commercial aviation sectors. Moreover, the Kingdom's well established technological infrastructure has set the stage for the subsequent, very advanced and expanding phase of research and development, e.g., satellite development in the Space Institute of KACST (King Abdul-Aziz City of Science and Technology). In view of all these developments, well qualified aerospace engineers are in good demand.

Vision

The vision of the AE Department is to make KFUPM a *"leading and guiding"* institution in this field by developing a full range of aerospace degrees (undergraduate, graduate, and associate degrees) and conducting high quality research to meet the Kingdom's and region's needs for education, manpower, and technical expertise in aerospace engineering and related fields.

Mission

1. To provide high quality education in aerospace engineering at an international level and founded on the fundamental principles of engineering.
2. To promote and conduct research for the advancement of the aerospace industry, and to disseminate new knowledge through publications, conferences, seminars, and workshops.
3. To participate effectively in community services and provide professional expertise for KFUPM, the Kingdom, and the region through continuing education programs, short courses, and consulting services and establish close partnerships with industry, government, and other academic institutions in order to develop and support a strong economy.

Program Objectives

1. To provide students with a strong foundation in basic sciences, mathematics, and engineering fundamentals; in-depth knowledge of aerodynamics and gas dynamics, flight dynamics and control, aerospace structures, flight propulsion, and astrodynamics as well as aviation sciences and technologies.
2. To prepare students for professional careers in aerospace engineering or related fields by developing skills and abilities pertinent to: design and system integration, experiment, analysis, multidisciplinary teamwork and leadership, clear communication, and pursuit of advanced degrees.
3. To instill in students an understanding of the role and importance of life-long learning, professional responsibility, and engineering ethics with awareness of the impact of the engineering on societal and global issues.

Strategic Plan for the Achievement of Program Objectives

1. Provide first-class AE undergraduate education to students by developing a multi-disciplinary, systems-oriented aerospace engineering program founded on engineering fundamentals.

2. Provide the highest quality of AE graduate education which will equip the student with advanced knowledge in his chosen area of specialization, and the ability to apply this knowledge to new challenges, and to communicate the outcomes of these processes effectively to peers and the general public.

3. Establish centers of excellence by undertaking basic and Science research and multidisciplinary approaches to solve problems in aerospace, aviation, and other related areas.

4. Make the AE Department a leading and guiding institution for supporting and fostering the technological advancement and economic growth of the local, regional, and global industry.

5. Attract and retain qualified students, faculty and staff, help them to succeed, value their contributions, reward them for excellence and teamwork and offer them opportunities for professional development.

6. Integrating state-of-the-art technologies, advanced instrumentation, and high-tech multimedia tools into technologically advanced facilities that enhance the AE engineering environment for learning and research.

7. Periodically review the AE Program in view of the continually evolving needs of local, regional, and global industries and incorporate emerging aerospace related technologies into it.

Requirements for the B.S. Degree in Aerospace Engineering

(a) General Education Requirements (78 Credit Hours)

		Credit Hours
Computer Programming	ICS 101	3
English	ENGL 101, 102, 214	9
General Studies	ECON 403	3
Engineering Courses	CE 201, 203; EE 204; SE 301	12
Islamic & Arabic Studies	IAS 101, 111, 201, 212, 301, 322, 4xx	14
Mathematics	MATH 101, 102, 201, 202, 301	17
Probability & Statistics for Engineers	STAT 319	3
Physical Education	PE 101, 102	2
Sciences	CHEM 101; PHYS 101, 102, 212	15
		78

(b) Core Requirements (46 Credit Hours)

ME Drawing & Graphics	ME 210	3
Dynamics & Control	ME 201, 413	6
Thermodynamics	ME 203	3
Materials Science	ME 215	4
Fluid Mechanics	ME 311	3
Introduction to Aerospace Engineering	AE 220	3
Gas Dynamics	AE 325	3
Flight Structures	AE 328	3
Aerodynamics	AE 333	3
Aerospace Engineering Labs	AE 420, 421	2
Flight Propulsion	AE 422	3
Flight Dynamics	AE 426	3
Aerospace System Design	AE 427	3
Computational Methods for AE	AE 450	1
Senior Design Project	AE 411, AE 412	3
		46

(c) Electives (9 Credit Hours)

Technical Electives	see the guidelines on page 145	9
		9

(d) Summer Training (Pass/Fail grade; zero credit hours)

Each student must participate in an eight-week program of industry experience and submit a formal report at the end of the training period.

Total Requirements (133 Credit Hours)

The B.S. degree in Aerospace Engineering requires a total of 133 credit hours.

Aerosapce Engineering Curriculum

COURSE	TITLE	LT	LB	CR	COURSE	TITLE	LT	LB	CR
Preparatory Year									
ENGL 001	Preparatory English I	15	5	8	ENGL 002	Preparatory English II	15	5	8
MATH 001	Preparatory Math I	3	1	4	MATH 002	Preparatory Math II	3	1	4
PYP 001	Prep. Physical Sciences	2	0	2	PYP 002	Prep. Computer Sciences	0	2	1
PYP 003	University Study Skills	0	2	1	ME 003	Prep. Eng. Technology	0	2	1
PE 001	Prep. Physical Educ. I	0	2	1	PE 002	Prep. Physical Educ. II	0	2	1
		20	**10**	**16**			**18**	**12**	**15**
Total credit hours required in Preparatory Program: 31									
First Year (Freshman)									
CHEM 101	Chemistry I	3	4	4	ENGL 102	Intro. to Report Writing	3	0	3
ENGL 101	Intro. to Acad. Discourse	3	0	3	MATH 102	Calculus II	4	0	4
MATH 101	Calculus I	4	0	4	PHYS 102	Physics II	3	3	4
PHYS 101	Physics I	3	3	4	ICS 101	Computer Programming	2	3	3
IAS 111	Belief and its Consequences	2	0	2	IAS 101	Practical Grammar	2	0	2
PE 101	Physical Education I	0	2	1	PE 102	Physical Education II	0	2	1
		15	**9**	**18**			**14**	**8**	**17**
Second Year (Sophomore)									
ENLG 214	Acad. & Prof. Comm.	3	0	3	ME 201	Dynamics	3	0	3
MATH 201	Calculus	3	0	3	MATH 202	Elem. Diff. Equations	3	0	3
CE 201	Statics	3	0	3	CE 203	Structural Mechanics	3	0	3
ME 203	Thermodynamics I	3	0	3	ME 215	Mat. Sc. For ME	3	3	4
ME 210	Drawing & Graphics	2	3	3	AE 220	Introduction to AE	3	0	3
PHYS 212	Modern Physics	3	0	3	IAS 212	Professional Ethics	2	0	2
		17	**3**	**18**			**17**	**3**	**18**
Third Year (Junior)									
EE 204	Fund. of Elec. Circuits	2	3	3	AE 325	Gas Dynamics I	3	0	3
MATH 301	Methods of Appl. Math	3	0	3	AE 328	Flight Structure I	3	0	3
STAT 319	Prob. & Statistics for Engrs.	2	3	3	AE 333	Aerodynamics I	3	0	3
ME 311	Fluid Mechanics	3	0	3	IAS 322	Human Rights in Islam	2	0	2
SE 301	Numerical Method	3	0	3	XX xxx	T. Elective I*	3	0	3
IAS 201	Writing for Prof. Needs	2	0	2					
		15	**6**	**17**			**14**	**0**	**14**
Summer Session					AE 399	Summer Training	0	0	0
Fourth Year (Senior)									
ME 413	System Dyn. & Control	2	3	3	AE 412	Sr. Design Project II	2	0	2
AE 411	Sr. Design Project I	1	0	1	AE 421	AE Lab II	0	3	1
AE 420	AE Lab I	0	3	1	AE 427	Aerospace Sysm. Design	3	0	3
AE 422	Flight Propulsion I	3	0	3	AE 450	Compl. Method for AE	0	3	1
AE 426	Flight Dynamics I	3	0	3	XX xxx	T. Elective II*	3	0	3
ECON 403	Engineering Economics	3	0	3	XX xxx	T. Elective III*	3	0	3
IAS 301	Oral Communication Skills	2	0	2	IAS 4xx	Islamic Elective	2	0	2
		14	**6**	**16**			**13**	**6**	**15**
Total credit hours required in Degree Program: 133									

* The T. Electives will include AE Electives/Technical Electives from other departments with the approval of AE department.

Guidelines for Selection of Technical Electives for AE

The Technical Elective courses can be chosen from the following:

Any AE elective course in AE program

AE: 401, 402, 410, 414, 428, 429, 433, 442, 446, 499.

College of Engineering and Applied Engineering Courses

CE 305, 405

EE 203, 207, 306, 340, 370, 405, 418

ME 204, 206, 306, 307, 308, 309, 315, 424, 432, 434, 435, 468, 469, 476, 479, 481, 482, 484, 486, 487, 488, 489

College of Sciences Courses

MATH 280, 302, 311, 430, 465, 471

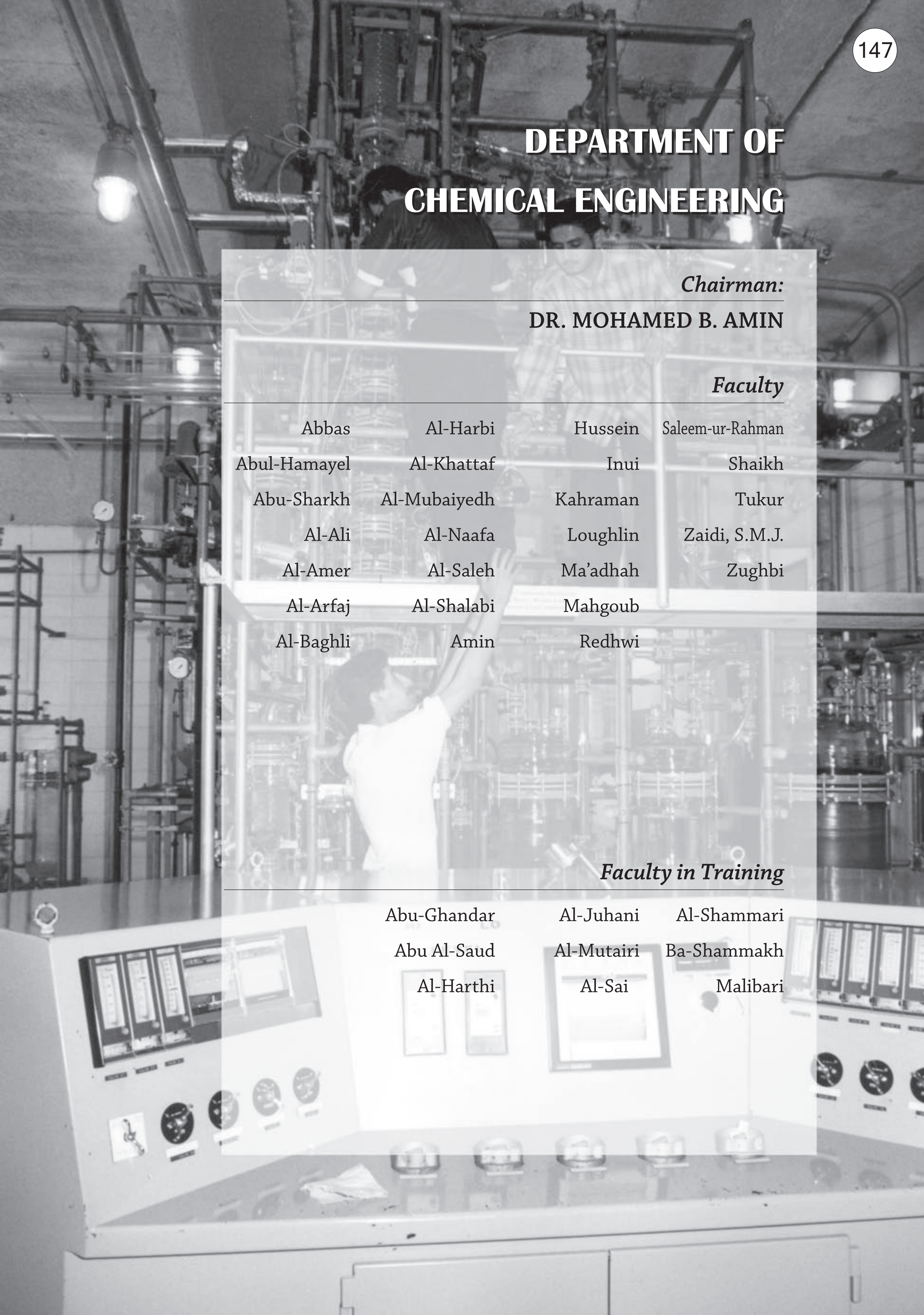
PHYS 201, 215, 315

College of Computer Sciences and Engineering

COE 353, 385

SE 303, 305, 402, 429, 443, 448

Note: Other courses can be considered by special permission from the AE Department and satisfaction of the prerequisite will be applied for each course.



DEPARTMENT OF CHEMICAL ENGINEERING

Chairman:

DR. MOHAMED B. AMIN

Faculty

Abbas	Al-Harbi	Hussein	Saleem-ur-Rahman
Abul-Hamayel	Al-Khattaf	Inui	Shaikh
Abu-Sharkh	Al-Mubaiyedh	Kahraman	Tukur
Al-Ali	Al-Naafa	Loughlin	Zaidi, S.M.J.
Al-Amer	Al-Saleh	Ma'adhah	Zughbi
Al-Arfaj	Al-Shalabi	Mahgoub	
Al-Baghli	Amin	Redhwi	

Faculty in Training

Abu-Ghandar	Al-Juhani	Al-Shammari
Abu Al-Saud	Al-Mutairi	Ba-Shammakh
Al-Harthi	Al-Sai	Malibari

Introduction

Chemical Engineering may be defined as a profession, which uses the sciences of mathematics, physics and chemistry for the benefit of mankind. It employs chemical and physical principles for the design of processes and the conversion of raw materials into valuable products to improve life for the average person. The chemical conversions involve the preparation of useful products in large quantities using basic thermodynamics and chemical kinetics, which govern reactions. Physical conversions utilize unit operations, fluid dynamics, heat transfer, and mass transfer to separate the reactant products into useful pure chemicals. All these subjects are used in the design of chemical plants and refineries.

The undergraduate curriculum has been systematically revised over the years to reflect the emergence of chemical engineering as a modern discipline and its changing role in society. The modern curriculum includes such diverse topics as process control, use of simulation packages, chemical plant design, with electives in diverse areas such as biochemical engineering, environmental engineering, desalination, and petroleum and petrochemicals.

The chemical engineering department offers a four-year program, which is sufficiently general to prepare the graduate for all phases of the chemical industry, whether in process engineering or development and research. The aim of the first two years is to provide the necessary background of physics, chemistry, mathematics, and engineering subjects such as electrical engineering, fluid mechanics, materials science, and chemical engineering. The third and fourth years are taken almost entirely within the department; the curriculum is designed around the core topics of mass, heat and momentum transfer, thermodynamics, reaction kinetics, separation processes, and process control.

The department has excellent laboratory facilities in the areas of fluid mechanics, heat transfer, mass transfer, process control, reactor analysis, pilot plant studies, and the like. The department has two custom built computer laboratories, equipped with state of art PCs and essential software packages, which include powerful process simulators and computational fluid dynamics (CFD) packages.

Because of the wide scope of chemical engineering training and the industrial boom in Saudi Arabia, graduates can seek employment in many fields. Some may follow a career in university teaching and research. Others find employment in petroleum, petrochemical, food, metals and chemical industries, or in government ministries.

The electives in the department include topics such as Reactor Design and Catalysis, Mathematical Analysis and Control, Petroleum and Petrochemical Industries, Environment, and General Topics. These areas are of particular interest to the present industrial development of the Kingdom. Students can thus advance their knowledge to any one of these fields by choosing appropriate courses for the two chemical engineering electives shown in the present chemical engineering curriculum guide.

Vision

The undergraduate program of the Department of Chemical Engineering will be recognized for excellence by its students, faculty, alumni, their employers, and other departments, both nationally and internationally.

Mission

The mission of the undergraduate programs in the Department of Chemical Engineering is to equip students with high quality education, fundamentals of chemical engineering, interdisciplinary knowledge, industrial experience, awareness of local industry needs, and skills in lifetime learning, communication and leadership.

Program Objectives

Graduates of KFUPM Chemical Engineering Science Program will be able to:

1. Apply mathematical, scientific, and engineering principles in their professional practice.
2. Engage in adopting and developing new technology.
3. Provide technical leadership in a broad range of process industries.
4. Demonstrate high ethical and professional standards in their industrial practice.
5. Communicate effectively in both English and Arabic in industrial practice.

Outcomes

At the time of graduation, students of the Chemical Engineering Science Program are expected to:

1. Apply knowledge of mathematics, science, and engineering principles in solving chemical engineering problems.
2. Have the ability to engage in life-long learning.
3. Design and evaluate chemical processes.
4. Conduct chemical engineering experiments and analyze and interpret plant data.
5. Function and work with others in multidisciplinary teams.
6. Communicate effectively both in English and Arabic.
7. Apply modern simulation software.
8. Be aware of professional and ethical responsibilities in the workplace.
9. Recognize environmental and societal impact of engineering decisions.
10. Apply safety rules in the work place.
11. Recognize contemporary issues related to the profession.
12. Understand the role of the chemical engineer in industry through a two months industrial practice for the science program.

Program Strategy

The strategy of the Department of Chemical Engineering to achieve our objectives is to

1. Attract high quality students especially those with top university entrance scores to the chemical engineering program.
2. Continually improve and update the quality of the chemical engineering curriculum.
3. Adopt and apply advances in educational technologies to improve teaching and the learning environment.
4. Develop a strong senior capstone design project course. Annual awards are presented by the Saudi Arabian Section of the American Institution of Chemical Engineers and Saudi Arabia Basic Industries Corporation (SABIC) for the best presented projects.
5. Acquire modern computerized laboratory experiments to update our laboratory program in chemical engineering.
6. Attract and retain high quality faculty and support staff.
7. Continually improve the program through advice of Industrial Advisory Committee.
8. Promote a strong environmental engineering elective program as per the request of our Industrial Advisory Committee.
9. Promote study in Petroleum Refining and Petrochemicals through our Saudi Aramco funded chair professorship.
10. Promote Study of Corrosion in Industry through our SABIC funded chair professorship.
11. Assess the program through surveys of graduating seniors, faculty, alumni, and their employers for improvement.

Requirements for the B.S. Degree in Chemical Engineering

Each student majoring in chemical engineering science must complete the following courses:

(a) General Education Requirements (68 credit hours)		Credit Hours
Chemistry	CHEM 101, 102	8
Communication Skills	ENGL 101, 102, 214, IAS 101, 201, 301	15
Engineering Skills	CE 201, ICS 101, EE 204, SE 301	12
Islamic and Arabic Studies	IAS 111, 212, 322	6
Mathematics	MATH 101, 102, 201, 202, STAT 319	17
Physical Education	PE 101, 102	2
Physics	PHYS 101, 102	8
		68

(b) Advanced Chemical Sciences Requirements (18 credit hours)

Chemistry	CHEM 201, 202, 311, 323	15
Material Science	ME 205	3
		18

(c) Core Requirements (39 credit hours)

Introduction to Chemical Engineering	CHE 201	3
Thermodynamics	CHE 203, 303	6
Transport Processes	CHE 204, 300, 304	9
Separation Processes	CHE 306	3
Chemical Engineering Laboratories	CHE 309, 409	4
Chemical Engineering Computer Lab	CHE 325	2
Process Dynamics & Control	CHE 401	3
Kinetics & Reactor Design	CHE 402	3
Engg. Economics & Design Principles	CHE 425	3
Integrated Design Course	CHE 495	3
		39

(d) Electives (8 credits)

Chemical Engineering	2 CHE Electives	6
Islamic & Arabic Studies	1 IAS Elective	2
		8

(e) Summer Training (Pass/Fail grade)

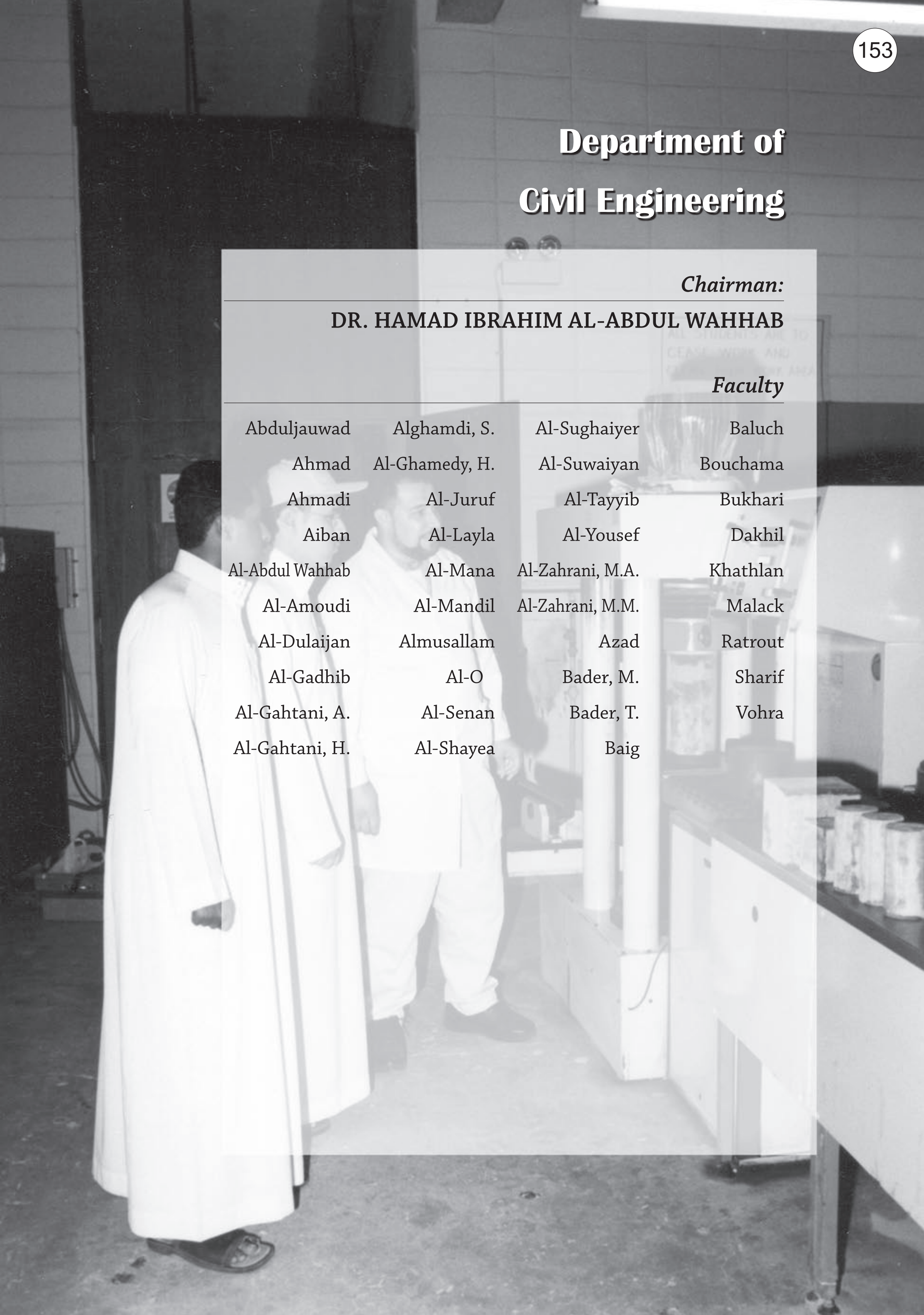
Each student must participate in an eight-week program of industrial experience and submit a formal report.

(f) Total Requirements (133 credit hours)

The total requirements for the B.S. degree in Chemical Engineering are 133 semester- credit-hours.

Chemical Engineering Curriculum

COURSE	TITLE	LT	LB	CR	COURSE	TITLE	LT	LB	CR
Preparatory Year									
ENGL 001	Preparatory English I	15	5	8	ENGL 002	Preparatory English II	15	5	8
MATH 001	Preparatory Math I	3	1	4	MATH 002	Preparatory Math II	3	1	4
PYP 001	Prep. Physical Sciences	2	0	2	PYP 002	Prep. Computer Sciences	0	2	1
PYP 003	University Study Skills	0	2	1	ME 003	Prep. Eng. Technology	0	2	1
PE 001	Prep. Physical Educ. I	0	2	1	PE 002	Prep. Physical Educ. II	0	2	1
		20	**10**	**16**			**18**	**12**	**15**
Total credit hours required in Preparatory Program: 31									
First Year (Freshman)									
MATH 101	Calculus I	4	0	4	MATH 102	Calculus II	4	0	4
CHEM 101	General Chemistry I	3	4	4	CHEM 102	General Chemistry II	3	4	4
PHYS 101	General Physics I	3	3	4	PHYS 102	General Physics II	3	3	4
ENGL 101	Intro. to Acad. Discourse	3	0	3	ENGL 102	Intro. to Report Writing	3	0	3
IAS 111	Belief and its Consequences	2	0	2	ICS 101	Computer Programming	2	3	3
PE 101	Physical Education I	0	2	1					
		15	**9**	**18**			**15**	**10**	**18**
Second Year (Sophomore)									
CHE 201	Intro. to Chemical Engg.	3	0	3	CHE 203	Chem. Eng. Thermo. I	3	0	3
CHEM 201	Organic Chemistry I	3	4	4	CHE 204	Transport Phenomena I	3	0	3
MATH 201	Calculus III	3	0	3	CHEM 202	Organic Chemistry II	3	4	4
EE 204	Fund Electric Circuits	2	3	3	MATH 202	Elem. Diff. Equations	3	0	3
CE 201	Statics	3	0	3	ME 205	Materials Science	2	3	3
IAS 101	Practical Grammar	2	0	2	IAS 212	Professional Ethics	2	0	2
PE 102	Physical Education II	0	2	1					
		16	**9**	**19**			**16**	**7**	**18**
Third Year (Junior)									
CHE 300	Transport Phenomena II	3	0	3	CHE 306	Stagewise Separations	3	0	3
CHE 303	Chem. Eng. Thermo. II	3	0	3	CHE 309	Chem. Eng. Lab I	0	6	2
CHE 304	Transport Phenomena III	3	0	3	CHE 325	Chem. Eng. Comp. Lab	1	3	2
STAT 319	Statistics for Engineers	2	3	3	CHEM 311	Physical Chemistry II	3	4	4
ENGL 214	Acad. & Prof. Comm.	3	0	3	SE 301	Numerical Methods	3	0	3
IAS 201	Writing for Prof. Needs	2	0	2	IAS 322	Human Rights in Islam	2	0	2
		16	**3**	**17**			**12**	**13**	**16**
Summer Session					CHE 399	Summer Ind. Training	0	0	0
Fourth Year (Senior)									
CHE 401	Process Dynamics & Control	3	0	3	CHE 495	Integrated Design Course	1	6	3
CHE 402	Kinetics & Reactor Design	3	0	3	CHE 409	Chem. Eng. Lab II	0	6	2
CHE 425	Eng. Econ. & Design Prin.	3	0	3	CHE 4xx	Chem. Eng. Elective I	3	0	3
CHEM 323	Analytical Chemistry	2	4	3	CHE 4xx	Chem. Eng. Elective II	3	0	3
IAS 301	Oral Communication Skills	2	0	2	IAS 4xx	IAS Elective	2	0	2
		13	**4**	**14**			**9**	**12**	**13**
Total credit hours required in Degree Program: 133									



Department of Civil Engineering

Chairman:

DR. HAMAD IBRAHIM AL-ABDUL WAHHAB

Faculty

Abduljauwad	Alghamdi, S.	Al-Sughaiyer	Baluch
Ahmad	Al-Ghamedy, H.	Al-Suwaiyan	Bouchama
Ahmadi	Al-Juruf	Al-Tayyib	Bukhari
Aiban	Al-Layla	Al-Yousef	Dakhil
Al-Abdul Wahhab	Al-Mana	Al-Zahrani, M.A.	Khathlan
Al-Amoudi	Al-Mandil	Al-Zahrani, M.M.	Malack
Al-Dulaijan	Almusallam	Azad	Ratrout
Al-Gadhib	Al-O	Bader, M.	Sharif
Al-Gahtani, A.	Al-Senan	Bader, T.	Vohra
Al-Gahtani, H.	Al-Shayea	Baig	

Introduction

Civil Engineering major is multidisciplinary in nature. It covers aspects of studies that relate to the essential needs of mankind. It embodies planning, design, construction, maintenance, and operation of private and public facilities such as buildings and structures, transportation, water supply and wastewater systems. The four-year undergraduate curriculum leading to the B.S. degree in Civil Engineering provides basic knowledge in sciences, mathematics, and engineering in the first two years. During the third year, the student is introduced to the traditional areas of civil engineering. In the fourth year, the student can take elective courses that are consistent with his interest and future plans. Electives covering most civil engineering options permit the student to strengthen his background in one or more of these options. In addition, courses in Islamic and Arabic Studies, Social Sciences, and Economics are integrated into the program to broaden the student's perspective. Additionally, a summer training program is incorporated into the students' curriculum to expose the student to the civil engineering practice.

The Civil Engineering Department is equipped with the modern laboratories for teaching and research in the areas of geotechnical engineering, civil engineering materials, strength of materials, structural analysis, design and modeling, highway and transportation, surveying and photogrammetry, hydraulics and hydrology, and environmental engineering. Effective use of the modern computer facilities at the University's Information Technology Center constitutes an essential part of the Civil Engineering undergraduate curriculum.

Vision

The *Vision* of the Department of Civil Engineering is to establish itself as a leading center of Civil Engineering education by supporting academic distinction and seeking excellence in teaching, learning, research and public services in partnership with the University.

Mission

The *Mission* of the Department of Civil Engineering is to maintain a preeminent role in teaching and research by pursuing a policy of rapid adaptation to new knowledge, discoveries, technological advances and emerging economics and to serve the public through the dissemination of knowledge and information. The department seeks to provide an environment of learning within which creative thinking, practical skills and self development are cultivated and sustained to produce qualified Civil Engineers who will challenge the present and enrich the future.

Strategic Goals

The strategic goals set by the department to achieve the *Vision* and *Mission* are:

- To seek continual improvement of the teaching environment and academic programs through an arduous self-evaluation as well as extramural evaluation by peers to provide an education reflective of the essential knowledge, professional competence and skills required of the graduates for successful careers in Civil Engineering profession.
- To readily adopt and apply advances in educational technologies to improve teaching and learning environment.
- To make the student community more motivated and responsive to learning and to instill a greater sense of responsibility and accomplishment among the students and to foster personal growth and lifelong learning.
- To focus in research the search for scholarship, discoveries, innovations and practical applications in all areas, including those which are emerging and rapidly developing and to maintain an effective link with local industries for productive engagements.
- To further promote University's standing and prestige within the society by upgrading and enlarging the public services provided by the department through continuing education, information dissemination, public lectures, seminars and consulting services.
- To build an efficient support and administration and to develop facilities which provide the infrastructure for enhanced education, research and services.

Requirements for the B.S. Degree in Civil Engineering

Each student majoring in Civil Engineering Sciences must complete the following courses:

(a) General Education Requirements (69 credits)

		Credit-Hours
Computer Programming	ICS 101	3
English	ENGL 101, 102, 214	9
General Studies	ECON 403	3
Interdisciplinary Basic Courses	ME 201, 203, EE 204	9
Islamic and Arabic Studies	IAS 101, 111, 201, 212, 301, 322	12
Mathematics & Statistics	MATH 101, 102, 201, 202, STAT 319	17
Physical Education	PE 101, 102	2
Sciences	CHEM 101, 111, PHYS 101, 102	14
		69

(b) Core Requirements (50 credits)

Introduction to CE	CE 100	1
Engineering Drawing	CE 213	3
Surveying	CE 260	3
Structures	CE 201, 203, 305, 315	12
Materials	CE 303	4
Geotechnical	CE 353	4
Transportation	CE 341, 343	4
Water Resources and Environmental Engineering	CE 230, 331, 370	10
Computer Methods	CE 317	3
Construction Engineering	CE 420	3
Senior Design Project	CE 411	3
		50

(c) Electives (14 credits)

Civil Engineering Elective	3 CE Electives	9
Technical Elective*	1 Technical Elective	3
Islamic and Arabic Studies	1 IAS Elective	2
		14

* Can also be taken from CE electives.

(d) Summer Training (Pass/Fail grade; 0-credits)

Each student must participate in an eight-week program selected to gain industrial experience and submit a formal report: CE 399 (Summer work).

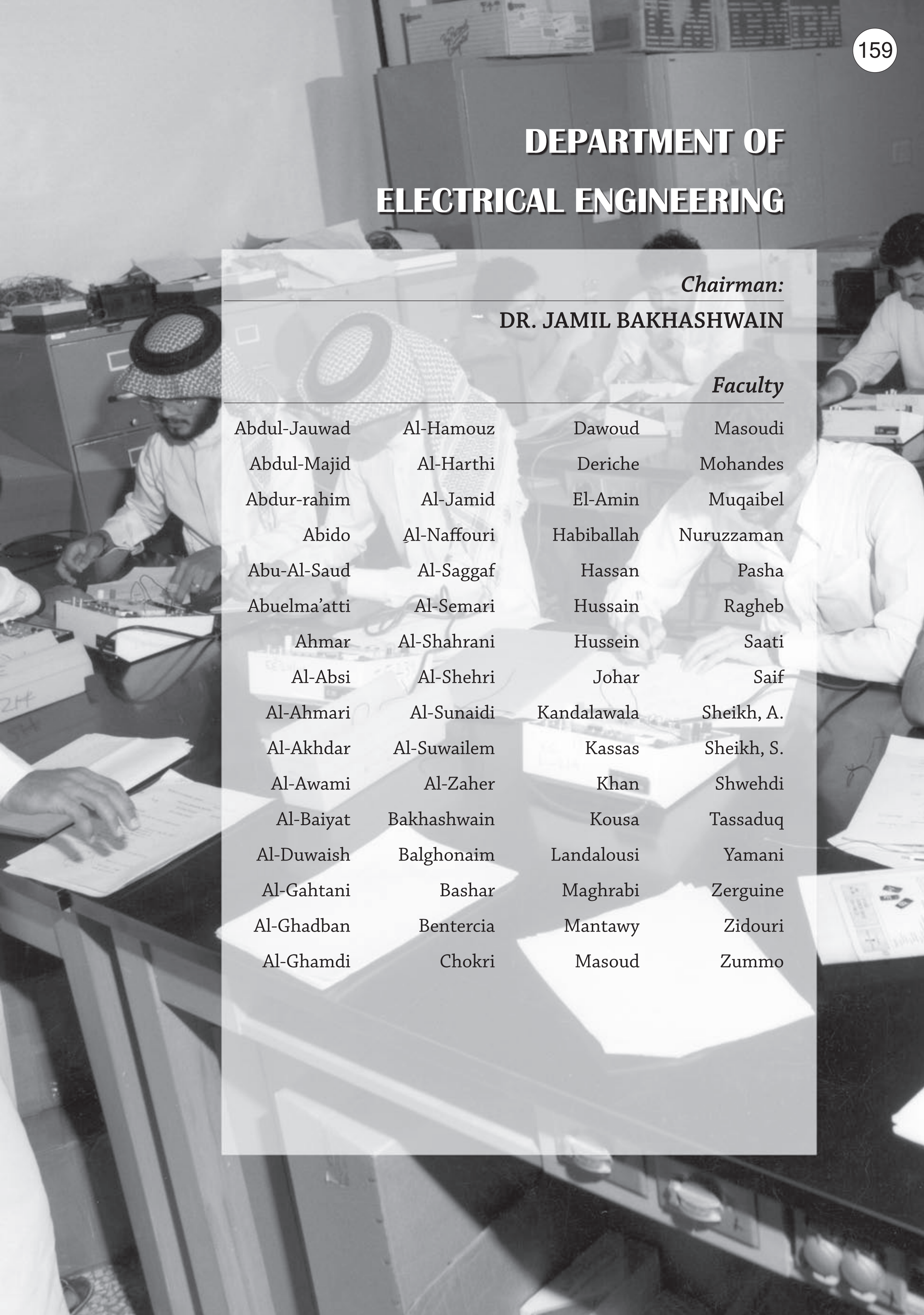
(e) Total Requirements (133 credits)

The total required credits for the B.S. degree in Civil Engineering Sciences is 133 semester-credit-hours.

Civil Engineering Curriculum

COURSE		TITLE	LT	LB	CR	COURSE		TITLE	LT	LB	CR
Preparatory Year											
ENGL	001	Preparatory English I	15	5	8	ENGL	002	Preparatory English II	15	5	8
MATH	001	Preparatory Math I	3	1	4	MATH	002	Preparatory Math II	3	1	4
PYP	001	Prep. Physical Sciences	2	0	2	PYP	002	Prep. Computer Sciences	0	2	1
PYP	003	University Study Skills	0	2	1	ME	003	Prep. Eng. Technology	0	2	1
PE	001	Prep. Physical Educ. I	0	2	1	PE	002	Prep. Physical Educ. II	0	2	1
			20	**10**	**16**				**18**	**12**	**15**
Total credit hours required in Preparatory Program: 31											
First Year (Freshman)											
CE	100	Introduction to CE	1	0	1	ICS	101	Computer Programming	2	3	3
CHEM	101	General Chemistry I	3	4	4	ENGL	102	Intro. to Report Writing	3	0	3
ENGL	101	Intro. to Acad. Discourse	3	0	3	MATH	102	Calculus II	4	0	4
MATH	101	Calculus I	4	0	4	PHYS	102	General Physics II	3	3	4
PHYS	101	General Physics I	3	3	4	PE	102	Physical Education	0	2	1
PE	101	Physical Education I	0	2	1	IAS	111	Belief and its Consequences	2	0	2
			14	**9**	**17**				**14**	**8**	**17**
Second Year (Sophomore)											
IAS	101	Practical Grammar	2	0	2	CHEM	111	Basics for Env. Chemistry	2	0	2
CE	201	Statics	3	0	3	ME	201	Dynamics	3	0	3
MATH	201	Calculus II	3	0	3	MATH	202	Elem. Diff. Equations	3	0	3
ME	203	Thermodynamics I	3	0	3	CE	203	Structural Mechanics I	3	0	3
CE	260	Surveying I	2	3	3	IAS	212	Professional Ethics	2	0	2
EE	204	Fund. of Electric Circuits	2	3	3	CE	213	Computer Graphics	1	6	3
						CE	230	Engg. Fluid Mechanics	3	0	3
			15	**6**	**17**				**17**	**6**	**19**
Third Year (Junior)											
ENGL	214	Acad. & Prof. Comm.	3	0	3	CE	353	Geotechnical Engg. I	3	3	4
CE	305	Structural Analysis I	3	0	3	CE	343	Transportation Engg. Lab.	0	3	1
CE	303	Structural Materials	3	3	4	CE	315	Reinforced Concrete I	2	3	3
CE	317	Comp. Methods in CE	2	3	3	IAS	201	Writing for Prof. Needs	2	0	2
STAT	319	Prob. & Stats for Engrs.	2	3	3	CE	341	Transportation Engg.	3	0	3
CE	331	Engg. Hydrology I	2	3	3	CE	370	Water & Wastewater Engg.	3	3	4
			15	**12**	**19**				**13**	**12**	**17**
Summer Session						CE	399	Summer Work	0	0	0
Fourth Year (Senior)											
IAS	301	Oral Communication Skills	2	0	2	CE	420	Construction Engg.	3	0	3
IAS	322	Human Rights in Islam	2	0	2	CE	4xx	Elective II	3	0	3
CE	411	CE Senior Design Project	0	9	3	CE	4xx	Elective III	3	0	3
CE	4xx	Elective I	3	0	3	XE	xxx	Technical Elective	3	0	3
ECON	403	Engineering Economy	3	0	3	IAS	4xx	IAS Elective	2	0	2
			10	**9**	**13**				**14**	**0**	**14**
Total credit hours required in Degree Program: 133											


٣ العلوم والهندسة ٣



DEPARTMENT OF ELECTRICAL ENGINEERING

Chairman:

DR. JAMIL BAKHASHWAIN

Faculty

Abdul-Jauwad
Abdul-Majid
Abdur-rahim
Abido
Abu-Al-Saud
Abuelma'atti
Ahmar
Al-Absi
Al-Ahmari
Al-Akhdar
Al-Awami
Al-Baiyat
Al-Duwaish
Al-Gahtani
Al-Ghadban
Al-Ghamdi
Al-Hamouz
Al-Harthi
Al-Jamid
Al-Naffouri
Al-Saggaf
Al-Semari
Al-Shahrani
Al-Shehri
Al-Sunaidi
Al-Suwailem
Al-Zaher
Bakhashwain
Balghonaim
Bashar
Bentercia
Chokri
Dawoud
Deriche
El-Amin
Habiballah
Hassan
Hussain
Hussein
Johar
Kandalawala
Kassas
Khan
Kousa
Landalousi
Maghrabi
Mantawy
Masoud
Masoudi
Mohandes
Muqaibel
Nuruzzaman
Pasha
Ragheb
Saati
Saif
Sheikh, A.
Sheikh, S.
Shwehdi
Tassaduq
Yamani
Zerguine
Zidouri
Zummo

Introduction:

Many of the products and services utilized all over the world are based on the work of electrical engineers. The availability of electric power for domestic and industrial use, the extensive, fast and reliable communications between countries, and the large computational capacity achieved with modern computers are only some examples of the contributions of electrical engineers to human advancement. In addition to this, contributions by electrical engineers to the development of concepts in communications, simulation, analysis and control are applied in areas such as economics, management, psychology, and physiology.

In training students, the electrical engineering program emphasizes three aspects. First, classroom subjects in science such as mathematics, physics, and chemistry enable the student to develop the necessary analytical ability and the underlying scientific principles. This aspect is complemented by subjects in the humanities. Second, classroom subjects in electrical engineering cover common material and allow the student to emphasize certain electrical engineering disciplines through the choice of Department electives. Third, laboratory classes expose the students to the instrumentation, design, and construction of electrical and electronic devices and circuits. This aspect is complemented by a summer employment program in which the student undergoes industrial training.

After completing the undergraduate program in electrical engineering, the student is qualified to take up responsible employment or engage in higher studies by enrolling in a graduate program. Numerous work opportunities for electrical engineers exist in the Kingdom, where graduates may work in the areas of communications – including telephony, telegraphy, and point-to-point radio and television, as well as the areas of power engineering, electrical installation, broadcasting, microwave, satellite, and mobile communications. Graduates are also employed by industry for work in information processing, computers, and in systems analysis. Other opportunities exist in industrial electronics, instrumentation, manufacturing technology, and microwaves.

Vision

The department aspires to be ranked first among all EE departments in the Middle East region.

Mission

To educate and train young men through transfer and integration of knowledge to become future Electrical Engineers and leaders.

Goals

The objectives of the Electrical Engineering Department Program are summarized below:

1. Students shall obtain a broad education necessary to understand the impact of Electrical Engineering solutions in a global, societal, and environmental context.
2. Students will attain an ability to analyze and solve Electrical Engineering problems in practice by applying fundamental knowledge of mathematics, science, and engineering sciences.
3. Students will be able to identify, formulate, and solve Electrical Engineering problems.
4. Students shall be able to design and conduct scientific and engineering experiments, and to analyze and interpret the results.
5. Students shall have the ability to function and communicate effectively.
6. Students will obtain a solid understanding of professional and ethical responsibility and recognition of the need for, and ability to engage in, perpetual learning.
7. Consistent with the breadth of Electrical Engineering, the Department offers a wide range of technical specialties.

Requirements for the B.S. Degree in Electrical Engineering

(a) General Education Requirements (69 credit hours)		Credit Hours
Communication Skills	ENGL 214, IAS 101, 201	7
English	ENGL 101, 102	6
Computer Programming in C	ICS 103	3
Interdisciplinary Engineering Courses	SE 301, ME 203	6
Mathematics	MATH 101, 102, 201, 202, 302	17
Physics	PHYS 101, 102, 103	11
Chemistry	CHEM 101	4
Islamic Courses	IAS 111, 212, 301, 322, 4xx	10
Physical Education	PE 101, 102	2
General Studies	CIM xxx (Elective from CIM)	3
		69

(b) Core Requirements (48 credit hours)

Digital Logic Circuit Design	EE 200	4
Electric Circuits	EE 201, 205	7
Electronics	EE 203, 303	8
Signals and Systems	EE 207	3
Probabilistic Methods in EE	EE 315	3
Electromagnetics	EE 340	4
Electric Energy Engineering	EE 360	4
Communication Engineering	EE 370	4
Control Engineering	EE 380	4
Digital Systems Engineering	EE 390	4
Senior Design Project	EE 411	3
		48

(c) Electives (16 credit hours)

Electrical Engineering Electives	13
Technical Elective	3
	16

(d) Summer Training (Pass/Fail; nil credit hours)

Each student must participate in eight weeks summer training program after which a formal written report must be submitted.

(e) Total Requirements (133 credit hours)

The total requirements for the B.S. degree in Electrical Engineering is 133 semester-credit-hours.

Electrical Engineering Curriculum

COURSE	TITLE	LT	LB	CR	COURSE	TITLE	LT	LB	CR
Preparatory Year									
ENGL 001	Preparatory English I	15	5	8	ENGL 002	Preparatory English II	15	5	8
MATH 001	Preparatory Math I	3	1	4	MATH 002	Preparatory Math II	3	1	4
PYP 001	Prep. Physical Sciences	2	0	2	PYP 002	Prep. Computer Sciences	0	2	1
PYP 003	University Study Skills	0	2	1	ME 003	Prep. Eng. Technology	0	2	1
PE 001	Prep. Physical Educ. I	0	2	1	PE 002	Prep. Physical Educ. II	0	2	1
		20	**10**	**16**			**18**	**12**	**15**
Total credit hours required in Preparatory Program: 31									
First Year (Freshman)									
CHEM 101	General Chemistry	3	4	4	ENGL 102	Intro. to Report Writing	3	0	3
ENGL 101	Intro. to Acad. Discourse	3	0	3	IAS 101	Practical Grammar	2	0	2
IAS 111	Belief and its Consequences	2	0	2	ICS 103	Computer Programming in C	2	3	3
MATH 101	Calculus I	4	0	4	MATH 102	Calculus II	4	0	4
PE 101	Physical Education I	0	2	1	PE 102	Physical Education II	0	2	1
PHYS 101	General Physics I	3	3	4	PHYS 102	General Physics II	3	3	4
		15	**9**	**18**			**14**	**8**	**17**
Second Year (Sophomore)									
EE 200	Digital Logic Circuit Design	3	3	4	EE 203	Electronics I	3	3	4
EE 201	Electric Circuits I	3	3	4	EE 205	Electric Circuits II	3	0	3
MATH 201	Calculus III	3	0	3	EE 207	Signals & Systems	3	0	3
ME 203	Thermodynamics	3	0	3	ENGL 214	Acad. & Prof. Comm.	3	0	3
PHYS 203	E&M Props. of Materials	3	0	3	IAS 212	Professional Ethics	2	0	2
					MATH 202	Elem.Diff.Equations	3	0	3
		15	**6**	**17**			**17**	**3**	**18**
Third Year (Junior)									
EE 303	Electronics II	3	3	4	EE 315	Probabilistic Methods in EE	3	0	3
EE 360	Elect. Energy Eng.	3	3	4	EE 340	Electromagnetics	3	3	4
EE 380	Control Eng.	3	3	4	EE 370	Communication Eng.	3	3	4
IAS 201	Writing for Prof. Needs	2	0	2	EE 390	Digital Systems Eng.	3	3	4
MATH 302	App. Math. for Engnrs.	3	0	3	IAS 322	Human Rights in Islam	2	0	2
		14	**9**	**17**			**14**	**9**	**17**
Summer Session					EE 399	Summer Training	0	0	0
Fourth Year (Senior)									
EE 411	Senior Design Project	1	6	3	EE 4xx	Elective III	3	0	3
EE 4xx	EE Elective I	3	0	3	EE 4xx	Elective IV	3	3	4
EE 4xx	EE Elective II	3	0	3	IAS 4xx	IAS Elective	2	0	2
IAS 301	Oral Communication Skills	2	0	2	XE xxx	Technical Elective	3	0	3
SE 301	Numerical Methods	3	0	3	XX xxx	Elective from CIM	3	0	3
		12	**6**	**14**			**14**	**3**	**15**
Total credit hours required in Degree Program: 133									

Note: One summer after either the third or fourth year must be spent in industry, after which a formal written report must be submitted.

DEPARTMENT OF MECHANICAL ENGINEERING

Chairman:

DR. AMRO M. AL-QUTUB

Faculty

Abdul Aleem	Budair	Khulief	El-Sinawi
Abdul-Samad	Dincer	Mahmood	Shaw
Abualhamayel	Al-Dini	Merah	Sheikh
Ahmad, Z.	Al-Dehlan	Mezghani	Shuaib
Ahmed, M.	Eleiche	Mokheimer	Shuja
Ahmed, M.F.	Al Farayedhi	Morgan	Al Sulaiman
Ahsan	Gandhidasan	Muhammad	Sunar
Allam	Qasem	Al Nassar	Mohiuddin
Anis	Habib	O'Brien	Thomas
Antar	Al-Haddad	O'Neil	Vernon
Arif	Al Hadhrami	Al-Qahtani, H.	Yaqub
Ayinde	Hatfield	Al-Qahtani, M.	Yilbas
Badr	Hawwah	Al Qutub	Younas
Bahaidarah	Jamjoom	Raza	Al-Zaharnah
Bazoune	Al Kaabi	Sahin	Zubair
Ben-Mansour	Kalyon	Said	
Bridgewater	Khan	El Shaarawi	

Introduction

Mechanical engineering is involved in every area of modern technology which makes it interesting and versatile. For over a century, mechanical engineers have been building engines to develop power, applying power for useful purposes by means of machines, using machines in transportation of people and things, and controlling environments and industrial processes. In addition to these traditional functions, today's mechanical engineers develop new products, new manufacturing processes, which may include sophisticated machinery, and new materials to develop better and cheaper products; improve energy conversion processes to make power plants more efficient; control environmental living conditions by means of refrigeration and air-conditioning; develop alternative forms of energy; and devise new transportation systems and other systems beneficial to society. To accomplish these goals, appreciable effort must be put into research, the area where theoretical work and laboratory experiments are used to seek an understanding of various physical phenomena or to investigate new engineering concepts.

Because of rapidly changing technology, the education of an engineer must provide him with a sound base for working in fields which perhaps may not exist at the time of his graduation. For this reason, an undergraduate curriculum in mechanical engineering combines a broad training in basic disciplines with both theoretical and experimental project-oriented work.

The mechanical engineering curriculum at KFUPM is designed to provide a comprehensive background in the main areas of mechanical engineering during the first three years of study. In the senior year, the students devote a portion of their time to one of the options in energy, dynamics and control, or materials and manufacturing. At the same time, however, students take various courses both in technical subjects and in humanities; thereby ensuring that they receive a well-balanced education. A senior Capstone Design project enables each student to develop both his creativity and individual abilities. The possible topics cover a wide field of subjects such as the application of solar energy, vibration studies, aerodynamics, propulsion, refrigeration, air conditioning, control, fluid power engineering and manufacturing systems. These topics prepare students both for entering industrial establishments directly after graduation or for enrollment in graduate studies. The mechanical engineering program is evaluated by ABET every five years and the ME curriculum is revised according to ABET recommendations.

The employment opportunities for mechanical engineers have been very good and will remain so in this age of fast-changing technology. In Saudi Arabia, these opportunities will further grow because of the rapid pace of industrialization taking place in the Kingdom. Many ambitious projects in petrochemical industry, chemical process industry are being undertaken and considered to be of the largest in the world. These projects will significantly increase the demand for mechanical engineering graduates in the short- and long-term future.

Mission

The Department is committed to providing highest quality education in mechanical engineering, conducting world-class basic and applied research, addressing the evolving needs of industry and society, and supporting the development of more competitive and new industry in the Kingdom of Saudi Arabia.

Vision

The Mechanical Engineering Department at KFUPM will seek distinction as a leader in providing world-class mechanical engineering education to the Kingdom of Saudi Arabia and the Gulf region. The graduates of the Department will be at the forefront of establishing, advancing, and expanding an indigenous knowledge base, which can be solidly relied upon for accepting future challenges, providing proper directions for industrial growth, and furnishing reliable solutions to engineering problems.

Goals

1. Be preeminent in developing and providing the highest quality undergraduate learning environment in Mechanical Engineering education.
2. Be a world reputed Mechanical Engineering Department in graduate education, and basic and applied research.
3. Be preeminent on international level for academic, basic, and applied research.
4. Be a preeminent and leading institution for supporting the technological advancement and economic growth of the local, national, and Gulf area industry.
5. Be a leading university in human-resource development and effective and efficient infrastructure utilization.

Program

In Mechanical Engineering program there are three options, namely, energy, dynamics and control, and materials and manufacturing. Students can specialize in any option by taking 4 elective courses in that option. However, a free (none specialized) option is also available in which a student can select any four elective courses.

Requirements for the B.S. Degree in Mechanical Engineering

(a) General Education Requirements (78 credit hours)

		Credit-Hours
Computer Programming	ICS 101	3
English	ENGL 101, 102, 214	9
General Studies	ECON 403	3
Interdisciplinary Engineering Courses	CE 201, 203, EE 204, 306, SE 301	15
Islamic & Arabic Studies	IAS 101, 111, 201, 212, 301, 322, 4XX	14
Mathematics	MATH 101, 102, 201, 202, 301	17
Probability & Statistics for Engineers	STAT 319	3
Physical Education	PE 101, 102	2
Sciences	CHEM 101, PHYS 101, 102	12
		78

(b) Core Requirements (43 credit hours)

ME Drawing & Graphics	ME 210	3
Dynamics and Control	ME 201, 309, 413	9
Thermodynamics	ME 203, 204	6
Materials Science	ME 215	4
Manufacturing Processes	ME 206	4
Fluid Mechanics	ME 311	3
Heat Transfer	ME 315	3
Machine Design	ME 307, 308	7
Thermo-fluids Laboratory	ME 316	1
Senior Design Project	ME 411, 412	3
		43

(c) Electives (12 credit hours)

Mechanical Engineering	ME 4XX, 4XX, 4XX, 4XX	12
		12

(d) Summer Training (Pass/Fail grade; zero credit hours)

Each student must participate in an eight-week program of industrial experience and submit a formal report at the end of the training period.

(e) Total Requirements (133 credit hours)

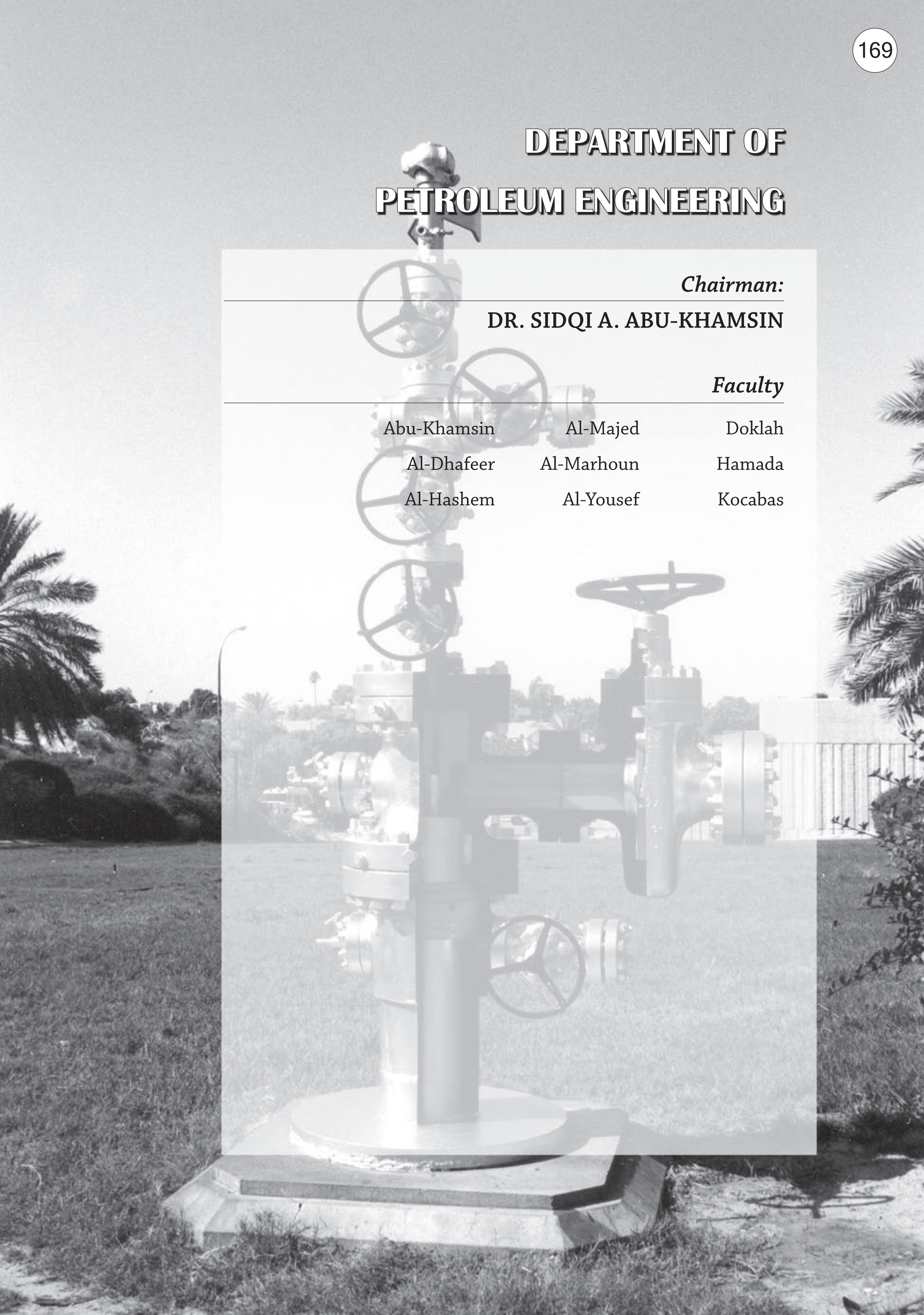
The total credit requirements for a B.S. degree in Mechanical Engineering Science is 133 semester-credit-hours.

Mechanical Engineering Curriculum

COURSE		TITLE	LT	LB	CR	COURSE		TITLE	LT	LB	CR
Preparatory Year											
ENGL	001	Preparatory English I	15	5	8	ENGL	002	Preparatory English II	15	5	8
MATH	001	Preparatory Math I	3	1	4	MATH	002	Preparatory Math II	3	1	4
PYP	001	Prep. Physical Sciences	2	0	2	PYP	002	Prep. Computer Sciences	0	2	1
PYP	003	University Study Skills	0	2	1	ME	003	Prep. Eng. Technology	0	2	1
PE	001	Prep. Physical Educ. I	0	2	1	PE	002	Prep. Physical Educ. II	0	2	1
			20	**10**	**16**				**18**	**12**	**15**
Total credit hours required in Preparatory Program: 31											
First Year (Freshman)											
CHEM	101	Chemistry I	3	4	4	ENGL	102	Intro. to Report Writing	3	0	3
ENGL	101	Intro. to Acad. Discourse	3	0	3	MATH	102	Calculus II	4	0	4
MATH	101	Calculus I	4	0	4	PHYS	102	Physics II	3	3	4
PHYS	101	Physics I	3	3	4	ICS	101	Computer Programming	2	3	3
IAS	111	Belief and its Consequences	2	0	2	IAS	101	Practical Grammar	2	0	2
PE	101	Physical Education I	0	2	1	PE	102	Physical Education II	0	2	1
			15	**9**	**18**				**14**	**8**	**17**
Second Year (Sophomore)											
MATH	201	Calculus III	3	0	3	ME	201	Dynamics	3	0	3
CE	201	Statics	3	0	3	MATH	202	Elem. Diff. Equations	3	0	3
ME	203	Thermodynamics I	3	0	3	CE	203	Structural Mechanics	3	0	3
ME	210	ME Drawing & Graphics	2	3	3	ME	204	Thermodynamics II	3	0	3
ME	215	Materials Science for ME	3	3	4	ME	206	Manufacturing Processes I	3	3	4
ENGL	214	Acad. & Prof. Comm.	3	0	3	IAS	212	Professional Ethics	2	0	2
			17	**6**	**19**				**17**	**3**	**18**
Third Year (Junior)											
EE	204	Fundamentals of Elec. Circuits	2	3	3	EE	306	Electromech. Devices	2	3	3
MATH	301	Methods of Applied Math.	3	0	3	SE	301	Numerical Methods	3	0	3
ME	307	Machine Design I	3	0	3	ME	308	Machine Design II	3	3	4
ME	311	Fluid Mechanics	3	0	3	ME	309	Mechanics of Machines	3	0	3
IAS	201	Writing for Prof. Needs	2	0	2	ME	315	Heat Transfer	3	0	3
STAT	319	Prob. & Stats. for Engrs.	2	3	3	ME	316	Thermo-fluids Lab.	0	3	1
			15	**6**	**17**				**14**	**9**	**17**
Summer Session						ME	399	Summer Training	0	0	0
Fourth Year (Senior)											
ME	413	Sys. Dynamics & Control	2	3	3	ME	4XX	ME Elective II	3	0	3
ECON	403	Engineering Economics	3	0	3	ME	4XX	ME Elective III	3	0	3
ME	411	Senior Design Project I	1	0	1	ME	4XX	ME Elective IV	3	0	3
ME	4XX	ME Elective I	3	0	3	ME	412	Senior Design Project II	2	0	2
IAS	322	Human Rights in Islam	2	0	2	IAS	4XX	Islamic Elective	2	0	2
IAS	301	Oral Communication Skills	2	0	2						
			13	**3**	**14**				**13**	**0**	**13**
Total credit hours required in Degree Program: 133											

Note: One summer must be spent in industry after either the Sophomore or the Junior year.


IBM



DEPARTMENT OF PETROLEUM ENGINEERING

Chairman:

DR. SIDQI A. ABU-KHAMSIN

Faculty

Abu-Khamsin	Al-Majed	Doklah
Al-Dhafeer	Al-Marhoun	Hamada
Al-Hashem	Al-Yousef	Kocabas

Introduction

Petroleum engineering is the application of basic sciences to the development, recovery and field processing of oil and gas resources. Due to the complex nature of the development and extraction of petroleum reserves, various petroleum engineering specialties have emerged. Among these are drilling engineering, formation evaluation, completion and workover, surface processing, and reservoir engineering. It should be emphasized, however, that modern petroleum production operations involve a team effort in which all specialties of petroleum engineering as well as geologists, geophysicists, and computer technologists are involved.

Vision

The Department's vision is to be recognized as a leading center, worldwide, for petroleum engineering education and research.

Mission

The Department's mission is to provide high quality programs in petroleum engineering that stress innovation, integration, team work, high ethical standards and awareness of industry needs, in addition to advanced research capabilities.

Program Objectives

The Petroleum Engineering Program is designed to provide sufficient training in the basic, social, and engineering sciences to enable the graduate to handle routine aspects of petroleum engineering. Furthermore, communication skills, design capabilities, and professional ethics are strongly emphasized and cultivated. Another objective of the program is to create sufficient awareness in the student regarding the special role and responsibility of the petroleum industry as the main energy supplier to the world. To achieve those objectives, the Department strides to attract faculty distinguished in teaching and research, admit talented students, and maintain state-of-the-art laboratories and support facilities.

In the Petroleum Engineering program, the student is educated in the principles, procedures and practices of drilling, formation evaluation, reservoir studies, production, environmental protection, and economic analysis. The primary objective of the freshman and the sophomore years is to provide the student with the necessary background in science and engineering. The junior and senior years are concentrated on petroleum engineering courses.

The Department's laboratories are fully equipped with state-of-the-art equipment for experiments in drilling fluids, oil-well cementing, rock and fluid properties, chemical analysis, thin sectioning & microscopy, formation evaluation, enhanced oil recovery, and production engineering. In addition, a multifunction lab., a drilling simulator, and a drilling fluid flow loop serve specialized research studies.

The Department is linked to the University's main computer facilities in addition to its own personal computer laboratory where licensed software packages are installed. The Department also maintains its own reference library, which has a collection of references and textbooks in all petroleum engineering specialties.

In addition to classroom instruction, laboratory work, and a brief industrial exposure, which constitutes the direct means of training, the student is exposed to other engineering and social dimensions of the discipline through field trips, seminars, gatherings, industry events, and informal student-faculty interaction.

Requirements for the B.S. Degree in Petroleum Engineering

Each student majoring in Petroleum Engineering must complete the following courses. He should also maintain a minimum major and cumulative GPA of 2.00 or above at the time of graduation:

(a) General Education Requirements (85 credit hours)		Credit Hours
COMMUNICATION SKILLS		
Arabic	IAS 101, 201, 301	6
English	ENGL 101, 102, 214	9
ENGINEERING		
Chemical	CHE 204	3
Computer	ICS 101	3
Electrical	EE 204	3
Mechanical	ME 203, 205	6
Systems	SE 301	3
ISLAMIC STUDIES	IAS 111, 212, 322, 4xx	8
PHYSICAL EDUCATION	PE 101, 102	2
SCIENCE		
Chemistry	CHEM 101, 102	8
Geology	GEOL 201, 318	6
Mathematics	MATH 101, 102, 201, 202, STAT 319	17
Physics	PHYS 101, 102	8
SOCIAL SCIENCE	ECON 403	3
		85

(b) Major Requirements (45 credit hours)		
Drilling Engineering	PETE 203	4
Formation Evaluation	PETE 303, 306, 401	9
Production Engineering	PETE 302, 404	7
Reservoir Engineering	PETE 204, 205, 301, 402, 405, 410	17
Others	PETE 201, 408, 411	5
PETE Elective	PETE 4xx	3
		45

(c) Technical Elective (3 credit hours) XE xxx **3**

The Department's policy on approving a non-petroleum engineering technical elective course is that it should be consistent with the career objective of the student. A technical elective course should either be a 300 or 400 level course subject to the approval of the Student Advisor and the Department Chairman.

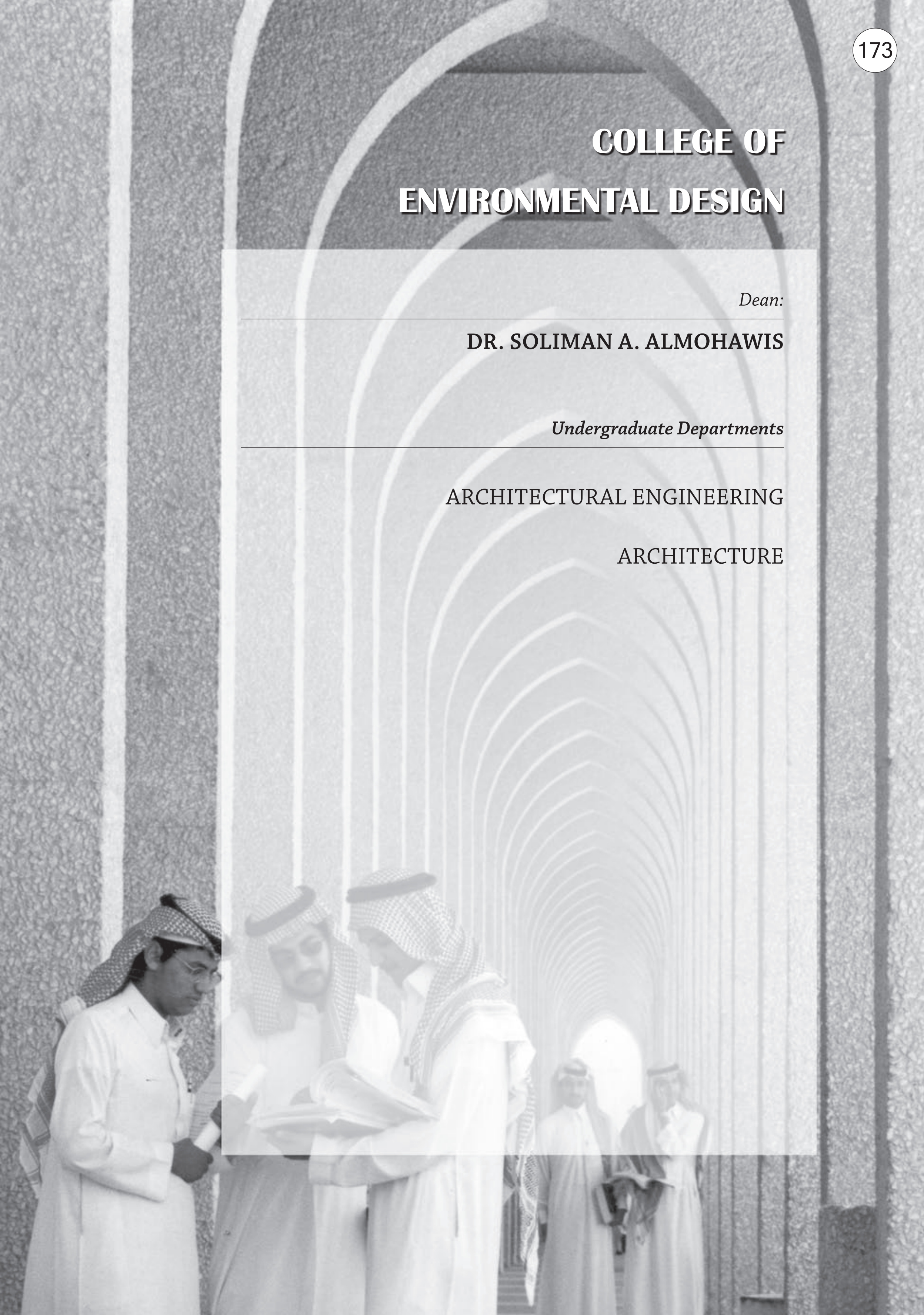
(d) Summer Training (PETE 399; Pass/Fail grade; no credit)

Each student must participate in an eight-week program of industrial experience and submit a formal report.

Total Requirements (semester-credit-hours) **133**

Petroleum Engineering Curriculum

COURSE		TITLE	LT	LB	CR	COURSE		TITLE	LT	LB	CR
Preparatory Year											
ENGL	001	Preparatory English I	15	5	8	ENGL	002	Preparatory English II	15	5	8
MATH	001	Preparatory Math I	3	1	4	MATH	002	Preparatory Math II	3	1	4
PYP	001	Prep. Physical Sciences	2	0	2	PYP	002	Prep. Computer Sciences	0	2	1
PYP	003	University Study Skills	0	2	1	ME	003	Prep. Eng. Technology	0	2	1
PE	001	Prep. Physical Educ. I	0	2	1	PE	002	Prep. Physical Educ. II	0	2	1
			20	**10**	**16**				**18**	**12**	**15**
Total credit hours required in Preparatory Program: 31											
First Year (Freshman)											
CHEM	101	General Chemistry I	3	4	4	CHEM	102	General Chemistry II	3	4	4
ENGL	101	Intro. to Acad. Discourse	3	0	3	ENGL	102	Intro. to Report Writing	3	0	3
MATH	101	Calculus I	4	0	4	IAS	101	Practical Grammar	2	0	2
PE	101	Physical Education I	0	2	1	MATH	102	Calculus II	4	0	4
PHYS	101	General Physics I	3	3	4	PE	102	Physical Education II	0	2	1
						PHYS	102	General Physics II	3	3	4
			13	**9**	**16**				**15**	**9**	**18**
Second Year (Sophomore)											
CHE	204	Transport Phenomena I	3	0	3	ENGL	214	Acad. & Prof. Comm.	3	0	3
GEOL	201	Physical Geology	2	3	3	IAS	201	Writing for Prof. Needs	2	0	2
IAS	111	Belief and its Consequences	2	0	2	ICS	101	Computer Programming	2	3	3
MATH	201	Calculus III	3	0	3	MATH	202	Elem. Diff. Equations	3	0	3
ME	203	Thermodynamics I	3	0	3	PETE	203	Drilling Engineering	3	3	4
PETE	201	Intro. to Petroleum Engg.	1	0	1	PETE	205	Petroleum Fluid Properties	2	3	3
PETE	204	Reservoir Rock Properties	2	3	3						
			16	**6**	**18**				**15**	**9**	**18**
Third Year (Junior)											
ECON	403	Engineering Economics	3	0	3	EE	204	Circuits & Electronics	2	3	3
IAS	212	Professional Ethics	2	0	2	GEOL	318	Regional Geology	3	0	3
ME	205	Materials Science	2	3	3	IAS	301	Oral Communication Skills	2	0	2
PETE	301	Reservoir Engineering	3	0	3	PETE	303	Well Logging	3	3	4
PETE	302	Subsurface Prod. Engg.	3	0	3	PETE	306	Well Testing	2	0	2
SE	301	Numerical Methods	3	0	3	STAT	319	Prob. & Stat. for Engrs. & Scien.	2	3	3
			16	**3**	**17**				**14**	**9**	**17**
Summer Session						PETE	399	Summer Training	0	0	0
Fourth Year (Senior)											
IAS	322	Human Rights in Islam	2	0	2	IAS	4xx	IAS Elective	2	0	2
PETE	405	Water Flooding	2	0	2	PETE	401	Reservoir Description	3	0	3
PETE	408	Seminar	0	2	1	PETE	402	Reservoir Simulation	2	3	3
PETE	411	Senior Design Project	0	9	3	PETE	404	Production Facilities Design	3	3	4
PETE	4xx	PETE Elective	3	0	3	PETE	410	Natural Gas Engineering	3	0	3
XE	xxx	Technical Elective	3	0	3						
			10	**11**	**14**				**13**	**6**	**15**
Total credit hours required in Degree Program: 133											



COLLEGE OF ENVIRONMENTAL DESIGN

Dean:

DR. SOLIMAN A. ALMOHAWIS

Undergraduate Departments

ARCHITECTURAL ENGINEERING

ARCHITECTURE

The College of Environmental Design was established during the 1400–1401 (1980–1981) academic year to meet the large demand for professionals in the construction industry, resulting from the extensive ongoing construction program throughout the Kingdom of Saudi Arabia. The College was established to bring together the academic programs that are mainly concerned with the built environment, both natural and man-made and to prepare students for professional practice in Architecture, Architectural Engineering, Construction Engineering and Management and City Planning. The College has four departments: Architectural Engineering, Architecture, Construction Engineering & Management, and City & Regional Planning, and offers Bachelor's degrees in Architectural Engineering and Architecture, and Master's degrees in Architectural Engineering, Construction Engineering and Management, and City and Regional Planning.

The Architectural Engineering Department was established in 1975 as a part of the College of Engineering Sciences. In 1980, the program formed the nucleus of the newly established College of Environmental Design. The Architectural Engineering undergraduate program emphasizes the importance of structural, mechanical and environmental systems in the design of buildings. Additionally, it emphasizes building construction, operation, and maintenance.

The Architecture Department was established in 1981. It offers a Bachelor's degree in Architecture with emphasis on Architectural Design. Apart from design, however, students also have the option of a minor in one of the areas of Computer Aided Architectural Design, Urban Design, and Regional Architecture. The Architecture Department has evolved into a leading school of architecture in the region.

The City and Regional Planning Department was established in 1987. The program began by offering a Bachelor's degree in City and Regional Planning, but now offers only a Master's program in City and Regional Planning. The Department seeks to meet the Kingdom's demand for professional city planners to guide and manage the Kingdom's growing cities. The department is recognized for its expertise in the area of Geographical Information Systems.

The Construction Engineering and Management Department was established in 1984. It offers a graduate program in Construction Engineering and Management with the aim of providing professional managers for the construction industry or for further study at the doctoral level leading to careers in teaching and research.

Mission and Philosophy

The mission of the College of Environmental Design is to be the leading institution in the region that prepares students for leadership roles in the professions that plan, design, construct and manage the built environment. Consistent with the above mission, the educational philosophy of the College of Environmental Design, as its name suggests, is to develop interdisciplinary relations between professionals who share a common concern for the design of the built environment. In recognition of this commonality, the college has been organized as one unit with shared common facilities and resources. The realization of this philosophy comes by allowing students, whatever their chosen specialty is, to share knowledge and classroom experience received from highly qualified instructors. Each undergraduate program requires five years of study, with the first year providing preparatory English and Mathematics. The College requires all students to attend a summer session or a coop program as an introduction to professional practice.

In harmony with the nature of KFUPM as a technological university and in consideration of the present and future needs of Saudi Arabia, all the programs in the College introduce basic science courses and are heavily oriented towards the teaching of physical design principles and the application of advanced technology.

Features

The College is housed in building 19, adjacent to both the KFUPM Conference Center and the Information Technology Center. An important feature of the design of the facilities is the inclusion of studios as well as offices, laboratories, and support areas.

Graduation Requirements

To qualify for the B.S. degree from one of the programs in the College of Environmental Design, the candidate must:

(1) complete all curricular requirements for the degree as outlined in this bulletin;

(2) achieve a cumulative GPA of 2.00 or more in all courses taken in or offered by Major department;

(3) achieve a cumulative GPA of 2.00 or more in all credit courses taken at KFUPM as an undergraduate; and

(4) complete a summer internship/coop program.

DEPARTMENT OF ARCHITECTURAL ENGINEERING

Chairman:

DR. BAQER AL-RAMADAN

Faculty

Abdou	Hassanain
Al-Hammad	Khaiyat
Al-Homoud	Konash
Budaiwi	Sabeer

Introduction

Overview

The KFUPM Architectural Engineering Department was established in 1975 under the College of Engineering Sciences. In 1980, the program formed the nucleus of the newly established College of Environmental Design. As the name implies, Architectural Engineering is related to both architecture as well as engineering. However, Architectural Engineering as a discipline is distinguished from Architecture by its emphasis on the technology and engineering aspects related to Building Design, Construction and Operation. Since its establishment, the Department has successfully supplied both government and private sectors with many high-quality Architectural Engineers. In order to maintain world-class education, the program has been reviewed by the Accreditation Board of Engineering and Technology (ABET). This organization, which evaluates engineering schools in the US, has declared that the KFUPM Architectural Engineering Program is substantially equivalent to similar Architectural Engineering Programs in the USA.

Vision

The vision of the Architectural Engineering Department is to be a model department focused on the enhancement and nourishment of an academic environment conducive to excellence in teaching, research and community services. Therefore, the department will seek distinction as a leader in providing outstanding architectural engineering education in Saudi Arabia and the Gulf region that is responsive to the local needs of the building industry within the socio-economic and environmental context.

Mission

The department is devoted to: (1) providing outstanding education in Architectural Engineering, (2) conducting outstanding technical, basic and applied research, and (3) providing professional development opportunities to practicing engineers. It is also dedicated to addressing the existing and evolving needs of the building industry in the Kingdom in view of the local, social values and global needs, and developments in the technical and professional practice.

Objectives

The broad educational objectives of the undergraduate program in Architectural Engineering are to provide solid foundation of mathematical, scientific, engineering and management principles and to provide comprehensive but in-depth knowledge necessary for developing the basic engineering skills that will serve graduates to proficiently perform throughout their careers in the building industry.

Objective 1 (Foundation):

To provide students with a strong foundation (base) in Architectural Engineering sciences and design methodologies that emphasizes the application of the fundamental mathematical, scientific, and engineering and management principles in the areas of Architectural Engineering.

Objective 2 (Skills & Tools):

To provide students with skills and capabilities that would allow them to smoothly join and adapt to the workplace (governmental, private sector, and academia) well-prepared and competent in integrative building design, construction, operation, modeling, problem-solving, experimentation, data analysis, technical communication, and capable of working in inter-disciplinary teams and able to utilize contemporary computing systems, information technology and resources.

Objective 3 (Awareness & Professional Ethics):

To provide students with knowledge and skills relevant to Architectural Engineering practice, ethical responsibilities and professional practice, social and global awareness of contemporary issues (such as safety, health and environmental issues), the impact of Architectural Engineering and the building industry on society, as well as the importance of Continuing Education and lifelong learning for professional development.

Program Emphasis

The curriculum places strong emphasis on studies related to each of the building technology and engineering areas such as: Building Structural and Environmental Control Systems. The curriculum also requires courses in building materials, construction systems and architectural design, construction management, building economics and computer applications in building design. Within the above general framework, the student can orient his study in the senior year to concentrate on one of the following specific areas:

1. Building Structural Systems
2. Building Environmental Control Systems
3. Construction and Maintenance Management
4. Computer-Aided Building Design.

The emphasis is selected by the student and is made at the beginning of the senior year by which time he would have completed most of the fundamental courses in all the above areas.

The plan of study in Architectural Engineering consists of 132 credit hours of course work, which include essentially the same basic requirements as other engineering programs in the areas of physics, chemistry, mathematics, engineering science and social science and humanities. The program is composed of 54 credit hours as general education requirements, 69 credit hours as core requirements and 9 credit hours as electives. The student is offered two opportunities to gain practical experience during his study. He can spend 8 weeks during summer (Summer Training option) or he may choose to spend 28 weeks in a more intensive Coop program in the building industry (Coop option). The student is expected to finish the B.S. degree in 4 years in addition to one year spent in the Orientation Program.

Requirements for the B.S. Degree in Architectural Engineering

Summer Training Option

Each student majoring in Architectural Engineering must complete the following courses:

(a) General Education Requirements (54 credit hours)

		Credit Hours
Communication Skills	ENGL. 214, IAS 101, 201, 301	9
English	ENGL. 101, 102	6
Introduction to ARE	ARE 100	1
History of Architecture	ARC 110	2
Islamic and Arabic Studies	IAS 111, 212, 322, 4xx	8
Mathematics	MATH 101, 102, 201, 202	14
Natural Sciences	PHYS 101, 102, CHEM 101	12
Physical Education	PE 101, 102	2
		54

(b) Core Requirements (69 credit hours)

Building Materials & Construction	ARE 211, 212, 303	9
Computer Sciences	ICS 102, ARE 221	6
Construction Management	ARE 413, 431	6
Building Environmental Systems	ARE 320, 322, 325, 342, EE 208	12
General Engineering	CE 230, 260, 353, ME 203	13
Graphics & Architectural Design	ARE 201, 202, 301	8
Senior Project	ARE 400	3
Structural Engineering	CE 201, 203, 305, 315	12
		69

(c) Electives (9 credit hours)

Each student must select **one 3** credit hours technical elective course and **two** ARE **3** credit hours elective courses from any of the following list:

Computer-Aided Building Design	ARE 443, 444	
Building Construction & Maintenance Management	ARE 457, 458, 459	
Building Environmental Control Systems	ARE 440, 442, 450, 452, 455, 456	
Building Structural Engineering	ARE 445, 446, CE 415, 408	
Special Topics in Architectural Engineering	ARE 490	
		9

(d) Summer Training ARE 399 (Pass-Fail grade; nil credit hours)

In addition to the course work as listed above, each student must undergo an eight week training in a consulting office or construction office/site during the summer after the junior year.

(e) Total Requirements (132 credit hours)

The total requirements for the B.S. degree in Architectural Engineering is **132** semester-credit-hours.

Architectural Engineering Curriculum

Summer Training Option

COURSE	TITLE	LT	LB	CR	COURSE	TITLE	LT	LB	CR
Preparatory Year									
ENGL 001	Preparatory English I	15	5	8	ENGL 002	Preparatory English II	15	5	8
MATH 001	Preparatory Math I	3	1	4	MATH 002	Preparatory Math II	3	1	4
PYP 001	Prep. Physical Sciences	2	0	2	PYP 002	Prep. Computer Sciences	0	2	1
PYP 003	University Study Skills	0	2	1	ME 003	Prep. Eng. Technology	0	2	1
PE 001	Prep. Physical Educ. I	0	2	1	PE 002	Prep. Physical Educ. II	0	2	1
		20	**10**	**16**			**18**	**12**	**15**
Total credit hours required in Preparatory Program: 31									
First Year (Freshman)									
ARE 100	Introduction to ARE	1	0	1	IAS 111	Belief and its Consequences	2	0	2
CHEM 101	General Chemistry I	3	4	4	ICS 102	Intro. to Computing	2	3	3
ENGL 101	Intro. to Acad. Discourse	3	0	3	ENGL 102	Intro. to Report Writing	3	0	3
MATH 101	Calculus I	4	0	4	MATH 102	Calculus II	4	0	4
PE 101	Physical Education I	0	2	1	PE 102	Physical Education II	0	2	1
PHYS 101	General Physics I	3	3	4	PHYS 102	General Physics II	3	3	4
		14	**9**	**17**			**14**	**8**	**17**
Second Year (Sophomore)									
ARE 201	Architectural Graphics	0	6	2					
ARE 211	Building Materials	2	3	3	ARE 202	Architectural Design I	0	9	3
ARC 110	History of Architecture	2	0	2	ARE 212	Construction Systems	3	0	3
CE 201	Statics	3	0	3	ARE 221	Computer Appl Bldg Des.	2	3	3
IAS 101	Practical Grammar	2	0	2	CE 203	Structural Mechanics I	3	0	3
MATH 201	Calculus III	3	0	3	CE 230	Eng. Fluid Mechanics	3	0	3
ME 203	Thermodynamics	3	0	3	MATH 202	Elem. Diff. Equations	3	0	3
		15	**9**	**18**			**14**	**12**	**18**
Third Year (Junior)									
ARE 301	Architectural Design II	0	9	3	ARE 303	Working Drawings	0	9	3
ARE 322	Building Mechanical Sys.	2	3	3	ARE 325	Building Illumination	1	3	2
CE 305	Structural Analysis I	3	0	3	ARE 342	Principles of HVAC	2	0	2
CE 260	Surveying I	2	3	3	CE 315	Reinforced Concrete I	2	3	3
ENGL 214	Acad. & Prof. Comm.	3	0	3	IAS 201	Writing for Prof. Needs	2	0	2
IAS 212	Professional Ethics	2	0	2	EE 208	Electrical Systems	2	3	3
		12	**15**	**17**			**9**	**18**	**15**
Summer Session					ARE 399	Summer Training	0	0	0
Fourth Year (Senior)									
ARE 320	Architectural Acoustics	1	3	2	ARE 413	Construction Mgt.	3	0	3
ARE 400	Senior Design Project	0	9	3	ARE 431	Building Economy	3	0	3
ARE 4xx	(ARE Elective I)	3	0	3	ARE 4xx	(ARE Elective II)	3	0	3
IAS 322	Human Rights in Islam	2	0	2	CE 353	Geotechnical Engineering I	3	3	4
IAS 301	Language Communication Skills	2	0	2	IAS 4xx	(IAS Elective)	2	0	2
XE xxx	(Technical Elective)	3	0	3					
		11	**12**	**15**			**14**	**3**	**15**
Total credit hours required in Degree Program: 132									

Requirements for the B.S. Degree in Architectural Engineering

Coop Option

Each student majoring in Architectural Engineering with Coop option must complete the following courses:

(a) General Education Requirements (54 credit hours) **Credit Hours**

Communication Skills	ENGL 214, IAS 101, 201, 301	9
English	ENGL 101, 102	6
Introduction to ARE	ARE 100	1
History of Architecture	ARC 110	2
Islamic and Arabic Studies	IAS 111, 212, 322, 4xx	8
Mathematics	MATH 101, 102, 201, 202	14
Natural Sciences	PHYS 101, 102, CHEM 101	12
Physical Education	PE 101, 102	2
		54

(b) Core Requirements (66 credit hours)

Building Materials & Construction	ARE 211, 212, 303	9
Computer Sciences	ICS 102, ARE 221	6
Construction Management	ARE 413, 431	6
Building Environmental Systems	ARE 320, 322, 325, 342, EE 208	12
General Engineering	CE 230, 260, 353, ME 203	13
Graphics & Architectural Design	ARE 201, 202, 301	8
Structural Engineering	CE 201, 203, 305, 315	12
		66

(c) Electives (3 credit hours) **3**

(d) Coop Work Program, ARE 350-51 (9 credit hours) **9**

In addition to the course work as listed above, each student must participate in a 28-week program of industrial training approved by the department and must submit a comprehensive report on his work during that period.

(e) Total Requirements (132 credit hours)

The total requirements for the B.S. degree in Architectural Engineering with Coop is **132** semester-credit-hours.

Architectural Engineering Curriculum

Coop Option

COURSE		TITLE	LT	LB	CR	COURSE		TITLE	LT	LB	CR
Preparatory Year											
ENGL	001	Preparatory English I	15	5	8	ENGL	002	Preparatory English II	15	5	8
MATH	001	Preparatory Math I	3	1	4	MATH	002	Preparatory Math II	3	1	4
PYP	001	Prep. Physical Sciences	2	0	2	PYP	002	Prep. Computer Sciences	0	2	1
PYP	003	University Study Skills	0	2	1	ME	003	Prep. Eng. Technology	0	2	1
PE	001	Prep. Physical Educ. I	0	2	1	PE	002	Prep. Physical Educ. II	0	2	1
			20	**10**	**16**				**18**	**12**	**15**
Total credit hours required in Preparatory Program: 31											
First Year (Freshman)											
ARE	100	Introduction to ARE	1	0	1	IAS	111	Belief and its Consequences	2	0	2
CHEM	101	General Chemistry I	3	4	4	ICS	102	Intro. to Computing	2	3	3
ENGL	101	Intro. to Acad. Discourse	3	0	3	ENGL	102	Intro. to Report Writing	3	0	3
MATH	101	Calculus I	4	0	4	MATH	102	Calculus II	4	0	4
PE	101	Physical Education I	0	2	1	PE	102	Physical Education II	0	2	1
PHYS	101	General Physics I	3	3	4	PHYS	102	General Physics II	3	3	4
			14	**9**	**17**				**14**	**8**	**17**
Second Year (Sophomore)											
ARE	201	Architectural Graphics	0	6	2	ARE	202	Architectural Design I	0	9	3
ARE	211	Building Materials	2	3	3	ARE	212	Construction Systems	3	0	3
CE	201	Statics	3	0	3	ARE	221	Computer Appl.Bldg. Desg,	2	3	3
IAS	101	Practical Grammar	2	0	2	CE	203	Structural Mechanics I	3	0	3
MATH	201	Calculus III	3	0	3	CE	230	Eng. Fluid Mechanics.	3	0	3
ARC	110	History of Architecture	2	0	2	MATH	202	Elem. Diff. Equations	3	0	3
ME	203	Thermodynamics	3	0	3						
			15	**9**	**18**				**14**	**12**	**18**
Third Year (Junior)											
ARE	301	Architectural Design II	0	9	3	ARE	303	Working Drawings	0	9	3
ARE	320	Architectural Acoustics	1	3	2	ARE	325	Building Illumination	1	3	2
ARE	322	Building Mechanical Sys.	2	3	3	ARE	342	Principle of HVAC	2	0	2
CE	305	Structural Analysis I	3	0	3	CE	315	Reinforced Concrete I	2	3	3
CE	260	Surveying I	2	3	3	IAS	201	Writing for Prof. Needs	2	0	2
ENGL	214	Acad. & Prof. Comm.	3	0	3	EE	208	Electrical Systems	2	3	3
IAS	212	Professional Ethics	2	0	2	IAS	322	Human Rights in Islam	2	0	2
			13	**18**	**19**				**11**	**18**	**17**
Summer Session						ARE	350	Coop Work Program	0	0	0
Fourth Year (Senior)											
ARE	351	Cont. of Coop Work	0	0	9	ARE	413	Construction Mgt.	3	0	3
						ARE	431	Building Economy	3	0	3
						CE	353	Geotechnical Engineering I	3	3	4
						IAS	301	Language Communication Skills	2	0	2
						IAS	4xx	(IAS Elective)	2	0	2
						XE	xxx	(Technical Elective)	3	0	3
			0	**0**	**9**				**16**	**3**	**17**
Total credit hours required in Degree Program: 132											

DEPARTMENT OF ARCHITECTURE

Chairman:

DR. ADEL S. ALDOSARY

Faculty

Al-Dosary	Garba
Al-Najjar	Ishteeaque
Al-Nazhah	Reffat
Al-Qawasmi	Salama
Al-Rugaib	Sharbini
Al-Said	

Introduction

Vision

The vision of the Department of Architecture is to become a center of excellence with a well established educational facility that graduates highly qualified professionals capable of life long learning and participation in national development.

Mission

To become a leading school of architecture in the region that graduates architects well-versed in programming, design and project management as well as in the application of information technology and knowledge systems to the field of architecture.

Goals

To graduate architects with highly developed skills in the areas of programming, planning and design of buildings. Additionally, the program seeks to familiarize students with the information technology, needed for planning and managing complex processes and information systems needed for managing the built environment. It is also part of the goal of the program to graduate architects who contribute to the preservation of the architectural heritage of Saudi Arabia and to the development of an architectural identity for the country.

Strategies for achieving the program goals

The goals of the architecture program are achieved through regular review and assessment of the program and associated educational processes to improve and ensure quality, the introduction of courses and minor areas of concentration in the curriculum to ensure the acquisition of specific skills, expanding the program of information technology investment and renewal to ensure availability of state of the art systems for information technology instruction; focus in design exercises on heritage and local issues, and regular educational field trips and heritage exhibitions.

Curriculum Emphasis

The emphasis of the architecture program is on architectural design and the application of information technology in design. This emphasis is reflected in the curriculum which includes eight sequential semesters of Design Studios backed by lectures in the following essential subject groups:

- Theory and History of Architecture
- Structures and Building Systems
- Construction Materials, Methods, and Systems
- Mechanical and Environmental Support Systems
- Computer Aided Design
- Professional Practice
- Electives.

The program also offers the opportunity for minor specialization in the areas of Computer Aided Design, Urban Design and Regional Architecture through the selection of elective courses and the choice of studio projects. The senior project selection must also reflect the choice of minor.

Requirements for the B.S. Degree in Architecture

General Education Requirements (32 credits)

Communication Skills	ENGL 214, IAS 101, IAS 201, IAS 301	9
English	ENGL 101, ENGL 102	6
Architectural Graphics	ARC 315	2
Islamic & Arabic Studies	IAS 111, IAS 212, IAS 322	6
Natural Sciences	PHYS 133	4
Mathematics	MATH 130	3
Physical Education	PE 101, PE 102	2
		32

Core Requirements (71 credits)

Des. Studios & Const. Documents	ARC 100, 101, 202, 203, 304, 305, 400, 406, 407, 408	50
History and Theory of Arch.	ARC 110, 112, 210, 313, 314	10
Urban Design & Analysis	ARC 251	2
Arch. of Saudi Arabia	ARC 281	2
Design Determinants for Arid Regions	ARC 435	2
Man and Built Environment	ARC 132	2
Professional Practice	ARC 426	3
		71

Cognate Studies (35 credits)

Building Materials and Construction	ARE 211, 212	6
Env. Control systems	ARE 322, 328	6
Computer Studies	ARC 124, 225,	6
Structures and Surveying	ARC 221, 222, 323, CE 260	12
Housing Design	ARC 353	2
Building Economy	ARE 431	3
		35

Electives (9 credits)

Option Electives	ARC xxx, ARC xxx	4
Architecture Elective	ARC xxx	2
Free Electives	XX xxx	3
		9

Summer Internship	**ARC 399 (1 Credit)**	**1**
Total Degree Requirement		**148**

Architecture Curriculum

COURSE	TITLE	LT	LB	CR	COURSE	TITLE	LT	LB	CR
Preparatory Year									
ENGL 001	Preparatory English I	15	5	8	ENGL 002	Preparatory English II	15	5	8
MATH 001	Preparatory Math I	3	1	4	MATH 002	Preparatory Math II	3	1	4
PYP 001	Prep. Physical Sciences	2	0	2	PYP 002	Prep. Computer Sciences	0	2	1
PYP 003	University Study Skills	0	2	1	ME 003	Prep. Eng. Technology	0	2	1
PE 001	Prep. Physical Educ. I	0	2	1	PE 002	Prep. Physical Educ. II	0	2	1
		20	**10**	**16**			**18**	**12**	**15**
Total credit hours required in Preparatory Program: 31									
First Year (Freshman)									
ARC 100	Architectural Graphics	0	10	5	ARC 101	Design Studio I	0	10	5
ARC 110	History of Arch. I	2	0	2	ARC 112	History of Arch. II	2	0	2
ARC 132	Man & Built Env.	2	0	2	ARC 124	Comp. Aided Arch. Design	2	3	3
ENGL 101	Intro. to Acad. Discourse	3	0	3	ENGL 102	Intro. to Report Writing	3	0	3
MATH 130	Math for Architects	3	0	3	PHYS 133	Principles of Physics	3	3	4
IAS 111	Belief & its Conseq.	2	0	2	PE 102	Physical Ed. II	0	2	1
PE 101	Physical Ed. I	0	2	1					
		12	**12**	**18**			**10**	**18**	**18**
Summer Session					IAS 101	Practical Grammar	**2**	**0**	**2**
Second Year (Sophomore)									
ARC 202	Design Studio II	0	10	5	ARC 203	Design Studio III	0	10	5
ARC 210	History of Islam. Arch.	2	0	2	ARC 222	Structure in Arch. II	3	0	3
ARC 221	Structure in Arch. I	3	0	3	ARC 251	Intro. Urban Design	2	0	2
ARC 225	Virtual Reality in Arch.	2	3	3	ARC 281	Arch. of S. Arabia	2	0	2
ARE 211	Building Materials	2	3	3	ARE 212	Construction Systems	3	0	3
IAS 212	Professional Ethics	2	0	2	ARE 328	Acoustics & illumination	3	0	3
		11	**16**	**18**			**13**	**10**	**18**
Summer Session					ENGL 214	Acad. & Prof. Comm.	3	0	3
					CE 260	Surveying I	2	3	3
							5	**3**	**6**
Third Year (Junior)									
ARC 304	Design Studio IV	0	12	6	ARC 305	Design Studio V	0	12	6
ARC 313	Theories of Arch. I	2	0	2	ARC 314	Theories of Arch. II	2	0	2
ARC 315	Percep. Geom. & Col.	2	0	2	ARC 353	Housing Design	2	0	2
ARC 323	Structure in Arch. III	3	0	3	ARC xxx	ARC Opt Elective I	2	0	2
ARE 322	Mechanical Systems	2	3	3	ARE 431	Building Economy	3	0	3
IAS 201	Writing for Prof. Needs	2	0	2	XX xxx	Free Elective I	3	0	3
		11	**15**	**18**			**12**	**12**	**18**
Summer Session					ARC 399	Summer Internship	**0**	**0**	**1**
Fourth Year (Senior)									
ARC 400	Senior Proj. Prep.	2	0	2	ARC 408	Senior Project	0	14	7
ARC 406	Design Studio VI	0	12	6	ARC 426	Professional Practice	3	0	3
ARC 407	Construction Documents	0	6	3	ARC xxx	ARC Free Elective	2	0	2
ARC 435	Des. Det. in Arid Reg.	2	0	2	IAS 322	Human Rights in Islam	2	0	2
ARC xxx	ARC Opt Elective II	2	0	2					
IAS 301	Oral Communication Skills	2	0	2					
		8	**18**	**17**			**7**	**14**	**14**
Total credit hours required in Degree Program: 148									

COLLEGE OF
INDUSTRIAL MANAGEMENT

Dean:

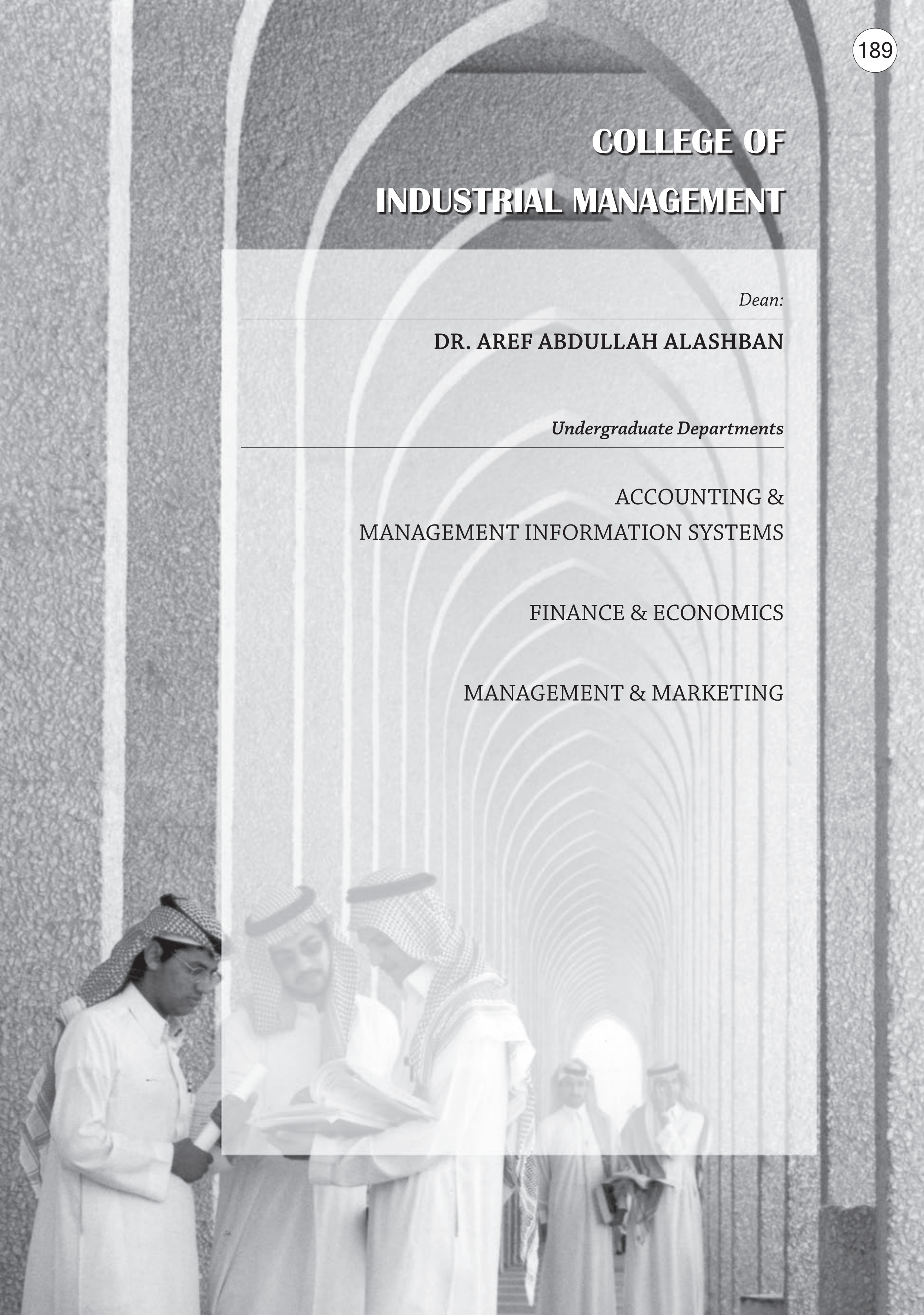
DR. AREF ABDULLAH ALASHBAN

Undergraduate Departments

ACCOUNTING &
MANAGEMENT INFORMATION SYSTEMS

FINANCE & ECONOMICS

MANAGEMENT & MARKETING



Established in 1975 the College of Industrial Management (CIM) offers undergraduate degree programs in Accounting, Management Information Systems, Finance, Marketing, and Management. Coordinated by the College Dean and an Assistant Dean for Graduate Programs, CIM programs are administered by three academic departments: Accounting & MIS, Finance & Economics, and Management & Marketing. All programs are accredited by AACSB International. They are periodically reviewed and benchmarked against leading business programs in the United States, and revised to remain topical and current with evolving business trends and conform to AACSB standards.

An outstanding faculty committed to continuous improvement through adoption of new technologies, emphasis on global perspectives and attention to ethical issues, places the CIM business programs on par with leading international institutions.

Vision

To be among the best in the world as a center for excellence in management education, research and community service that actively addresses the needs of stakeholders.

Mission

To be a prominent provider of management education through high-quality teaching reinforced by experiential learning for students who will play significant and productive roles in the development of the Saudi economy within the global business environment.

To actively contribute to Saudi business, industry, and community through relevant high quality research, professional services, and dissemination of knowledge responsive to the evolving stakeholders' needs.

Guiding Values

In the pursuit of its mission, the College is guided by the following values.

- Leadership
- Curricula relevance
- Islamic ethics
- Community involvement
- Faculty professional growth.

CIM will continue to lead the way for business education in the Kingdom, ensure that its curricula remain current and relevant to the needs of stakeholders, incorporate ethics based on the tenets of Islam into its curricula, forge links with the business community, and foster intellectual development of its faculty.

CIM Educational Objectives

The learning objectives of the University's general education requirements and those of CIM's core undergraduate curriculum include developing knowledge, competencies and attributes in the following areas:

- ability to communicate effectively both orally and in writing;
- ability to apply effectively interpersonal skills as a member or a leader of a team in performing group tasks in business and professional organizations;
- ability to apply logic and to exercise sound judgment in making decisions;
- ability to effectively use quantitative and analytical skills in solving business problems;
- ability to incorporate ethical and social dimensions into making business and professional decisions;
- ability to use information technology as a business enabler and to assess

the impact of technology on business strategy and operations;

- ability to take initiative, show confidence and exercise leadership in business and professional organizations.

Features

Among the distinguishing features of CIM's undergraduate curricula are the following:

Methods of Instruction: A dedicated and real effort is made during lectures and workshops to emphasize business and industrial applications in the commercial world. The methods stress using practical examples and cases from the Saudi Arabian business and industrial community as well as from other Asian countries, America and Europe. Therefore, understanding of the theories and approaches of business is reinforced by practical examples and cases.

Faculty: The CIM faculty is a highly qualified group of scholars and professionals, with a diversity that brings a rich background of international experience in management issues and practices to the program.

Cooperative Program: A unique feature of the industrial management programs is its emphasis on industrial and business experience in conjunction with academic training. As part of his academic program, each student is required to undertake a 28-week cooperative training program in business and industry. This training prepares the students for careers in business and management by exposing them to a practical work environment. As an invaluable prelude to their final year of academic specialization, students write and defend a comprehensive technical report based on their cooperative training experience under the supervision of a faculty member.

Information Technology: Almost all courses at the CIM integrate the use of computing and information technology. Four computer laboratories equipped with dedicated business software and access to the Internet enable students to use information technology as a vital everyday tool.

Research: Educating the business leaders of tomorrow requires faculty to remain at the cutting edge of knowledge through scholarly research. The college encourages faculty to conduct basic, applied, and instructional development research, and provides the necessary resources and incentives to enhance research productivity.

Links with Industry: Recognizing the business community as a vital stakeholder, CIM maintains strong links with business and industry through a variety of channels. An Advisory Committee, comprising leading Saudi businessmen and entrepreneurs provide valuable feedback on a regular basis. These inputs are used in the internal processes of continuous renewal and improvement. A very active CIM student club hosts seminars and talks featuring professionals and business leaders. The CIM club also organizes field trips and company visits for the student body.

Public Service: The College of Industrial Management is committed to providing leading-edge solutions to the business community in Saudi Arabia. Faculty members extend consulting and advisory services to business, industry, and government. The CIM faculty are also actively involved in the design and delivery of a variety of educational and training programs to these stakeholders.

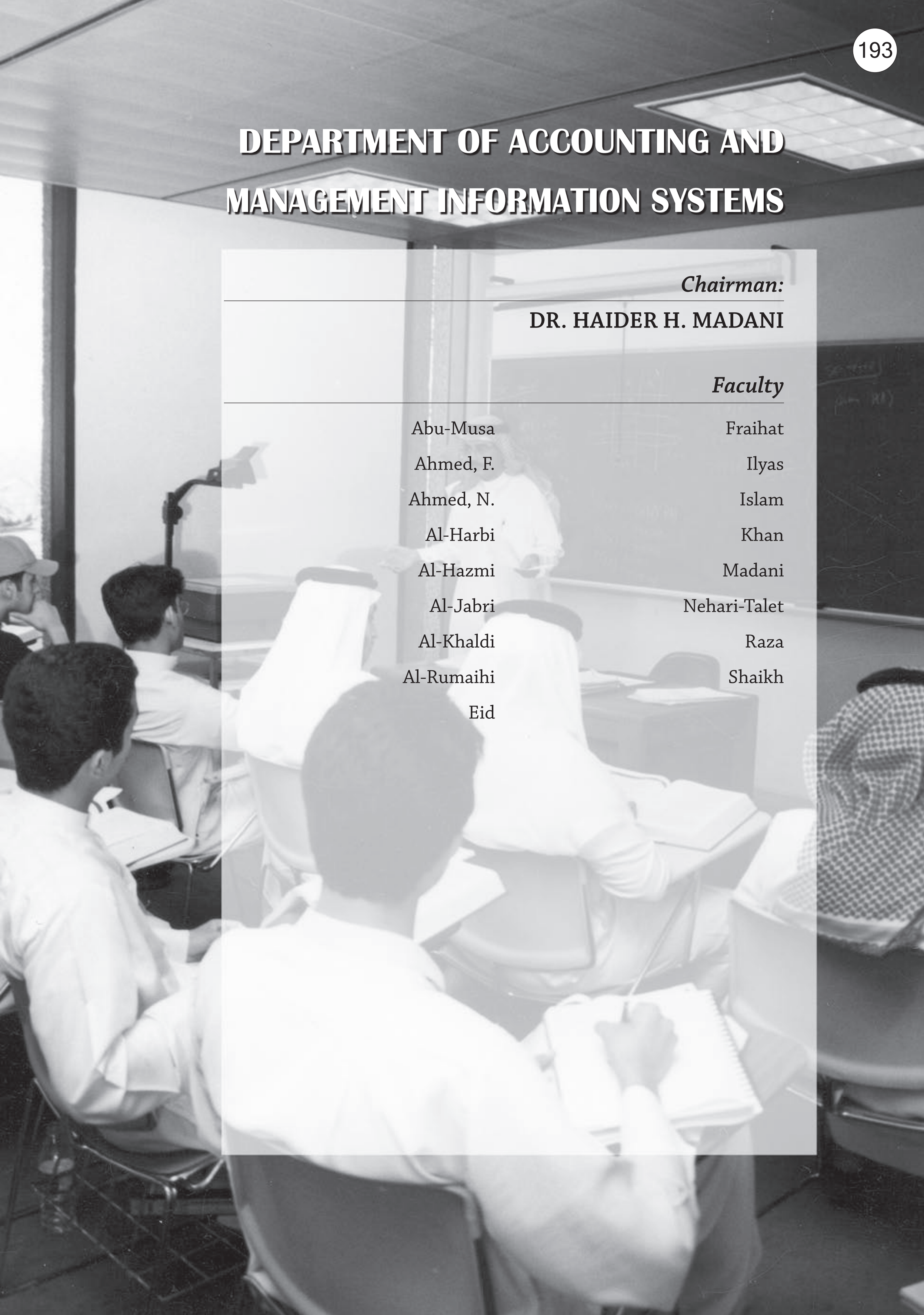
Business Development Unit (BDU): Interfacing with business and industry, the BDU plays a multifaceted role. It provides human resource development services, coordinates consulting activities, and promotes entrepreneurship in the Kingdom. A speaker series hosted by the BDU provides a forum for faculty, students and business executives to discuss current business issues throughout the year.

Career Placement Office: The career placement office supports CIM students in their individual career planning efforts and in developing job search strategies.

Graduation Requirements:

To graduate with a B.S. degree, a candidate must have:

1. completed a minimum of 128 credit hours;
2. completed all required and elective courses and cooperative work in the selected major degree program as described in this bulletin;
3. achieved a cumulative GPA of 2.00 or better for all courses taken in the selected major;
4. achieved a cumulative GPA of 2.00 or better for all courses taken for credit at KFUPM as an undergraduate;
5. earned at least 50% of the total business credit hours at KFUPM in compliance with the undergraduate study and examinations regulations and the KFUPM rules for their implementation.



DEPARTMENT OF ACCOUNTING AND MANAGEMENT INFORMATION SYSTEMS

Chairman:

DR. HAIDER H. MADANI

Faculty

Abu-Musa
Ahmed, F.
Ahmed, N.
Al-Harbi
Al-Hazmi
Al-Jabri
Al-Khaldi
Al-Rumaihi
Eid
Fraihat
Ilyas
Islam
Khan
Madani
Nehari-Talet
Raza
Shaikh

Objectives

Our objective is to be a department of highly qualified instructors dedicated to preparing our students for entry-level opportunities and long-term career success in accounting and management information systems, providing a fulfilling experience for members of our faculty, and making meaningful contributions to the professional and academic communities at the national, regional and international levels.

Educational Goals

(*a*) To provide students with sufficient academic, technical and professional base from which to pursue a career in accounting and management information systems or from which to advance to further study and a potential academic career in accounting and management information systems.

(*b*) To provide students with the skills necessary to apply their knowledge in the organizations and business in which they are employed.

(*c*) To provide students with a solid basis on which they can adapt to changing techniques and practices in the professional world.

(*d*) To attract and retain qualified students with the talents necessary to successfully complete their chosen programs.

Research Goals

To conduct research that contributes directly to the Department's role in providing education to our students, encourages the intellectual development of faculty, and meets the needs of the local and international business and academic communities.

Community Service

To participate in public service activities, and to provide accounting, MIS consulting, and professional services to businesses.

Bachelor of Science in Accounting

Vision

To be among the best in the world as a center for excellence in accounting education, research and community service, by actively addressing the needs of our stakeholders.

Mission

To educate students to function effectively in a wide range of accounting and management careers in all types of economic organizations at the national, regional and international levels.

Goals

To provide students with a strong base in accounting education that will equip them with the necessary skills and knowledge for professional career development or further academic studies in line with the goals of the college and university. The program stresses basic conceptual knowledge in all fields of business administration as an essential foundation for an effective accounting career. It integrates practical business applications into the curriculum and keeps up with the most recent developments in the field of accounting. Heavy emphasis is placed on computer applications in all areas of accounting.

Specific Goals

At a minimum, graduates with a Bachelor of Science degree in Accounting should have accounting knowledge and understanding that enable them to:

- prepare, analyze, and interpret financial statements competently;
- audit financial statements and the underlying accounting systems, controls and records, and express an independent professional opinion about them;
- identify, measure, gather, analyze, interpret and communicate cost and other types of information to management for planning, control, performance measurement, and decision making related to pricing, operating, investing, and financing activities;
- identify and anticipate control risks both in manual and computerized accounting systems, and to suggest and establish better controls to safeguard business resources from risk exposures of illegal acts;
- analyze and design accounting information systems, and use computer applications in business transaction cycles.

Strategy

The goals of the program will be achieved through:

- the recruitment and retention of adequately qualified faculty from all parts of the world in line with University policy;
- the regular revision of all curricula to reflect modern accounting trends;
- dedicated effort to emphasize business and industrial applications of accounting through the use of Saudi Arabian and international business examples;
- continuous updating and improvement of instructional resources;
- programs for best students' recruitment, retention, advising, career development, etc., in line with the University Mission and policies;
- emphasizing industrial and business experience in conjunction with academic training through the requirements of the student cooperative work program;
- integration of courses within the program with different computer applications;
- encouraging and supporting research and intellectual contributions through the provision of resources needed to enhance the research productivity of faculty and students.

Career Opportunities

The accounting program is designed for students who wish to pursue careers as certified public accountants, managerial accountants, financial accountants, internal auditors, or accounting directors in governmental and non-profit entities. A student graduating with a major in accounting will have the necessary training to move up in the organizational hierarchy to the level of a chief executive officer.

Requirements for the B.S. Degree in Accounting

a) General Education Requirements (40 credit hours)

		Credit Hours
Communication Skills	ENGL 214, IAS 101, 201, 301, 4xx MGT 210, 448	17
English	ENGL 101, 102	6
Islamic & Arabic Studies	IAS 111, 212, 322	6
Mathematics	MATH 131, 132	6
Physical Education	PE 101, 102	2
Technology	SE 100	3
		40

b) Core Requirements (42 credit hours)

Accounting	ACCT 201, 202	6
Economics	ECON 101, 202	6
Finance	FIN 301	3
Management Information Systems	MIS 105, 215	6
Management	MGT 301, 311, 449	9
Marketing	MKT 301	3
Operations Management	STAT 211, STAT 212, OM 210	9
		42

c) Accounting Major Requirements (36 credit hours)

In addition to the core, accounting majors must complete the following courses:

A. Required courses (30 credit hours)

ACCT 300, 301, 302, 303, 401, 402, 403, 404,
FIN 302, MGT 410

B. Required Electives (6 credit hours)

Each student majoring in accounting is required to take two of the following elective courses:

ACCT 304, 305, 306, 307, 405, 406
FIN 420
MGT 440
MIS 345, 401, 420, 425
OM 310

d) Accounting Cooperative Work Requirements (9 credit hours)

Each student majoring in Accounting must participate in a structured 28-week cooperative work program of accounting practical training in the Accounting Section or a section related to it in a selected economic organization. The student's progress during the co-op training will be monitored by the Department of Accounting and Management Information Systems. Under the supervision of an accounting faculty member or a faculty member in a related discipline, the student must write an analytical report about his co-op work experience under the label: ACCT 351 (Accounting Cooperative Work).

e) Total Requirements (127 credit hours)

The B.S. degree in Accounting requires a total of 127 credit hours.

Accounting Major Curriculum

COURSE	TITLE	LT	LB	CR	COURSE	TITLE	LT	LB	CR
Preparatory Year									
ENGL 001	Preparatory English I	15	5	8	ENGL 002	Preparatory English II	15	5	8
MATH 001	Preparatory Math I	3	1	4	MATH 002	Preparatory Math II	3	1	4
PYP 001	Prep. Physical Sciences	2	0	2	PYP 002	Prep. Computer Sciences	0	2	1
PYP 003	University Study Skills	0	2	1	ME 003	Prep. Eng. Technology	0	2	1
PE 001	Prep. Physical Educ. I	0	2	1	PE 002	Prep. Physical Educ. II	0	2	1
		20	**10**	**16**			**18**	**12**	**15**
Total credit hours required in Preparatory Program: 31									
First Year (Freshman)									
SE 100	Intro. to Technology	2	2	3	ECON 101	Principles of Economics I	3	0	3
ENGL 101	Intro. to Acad. Discourse	3	0	3	ENGL 102	Intro. to Report Writing	3	0	3
IAS 111	Belief and its Conseq.	2	0	2	MIS 215	Principles of MIS	2	2	3
MIS 105	Intro. to Comp. Appl.	2	2	3	MATH 132	Mathematics for Mgt. II	3	0	3
MATH 131	Mathematics for Mgt. I	3	0	3	IAS 101	Practical Grammar	2	0	2
PE 101	Physical Education I	0	2	1	ACCT 201	Principles of Acct. I	2	3	3
					PE 102	Physical Education II	0	2	1
		12	**6**	**15**			**15**	**7**	**18**
Second Year (Sophomore)									
ACCT 202	Principles of Acct. II	2	3	3	ACCT 301	Intermediate Acct. I	3	0	3
ECON 202	Principles of Economics II	3	0	3	MGT 210	Business Communications	3	0	3
IAS 201	Writing for Prof. Needs	2	0	2	STAT 212	Statistics for Business-II	3	0	3
ENGL 214	Acad. & Prof. Comm.	3	0	3	OM 210	Production Management	3	0	3
IAS 212	Professional Ethics	2	0	2	FIN 301	Financial Mgt. I	3	0	3
STAT 211	Statistics for Business-I	3	0	3	ACCT 300	Acct. Info. Systems	2	3	3
		15	**3**	**16**			**17**	**3**	**18**
Third Year (Junior)									
ACCT 303	Computer Control & Audit	3	0	3	ACCT 401	Cost Accounting	3	0	3
ACCT 302	Intermediate Acct. II	3	0	3	ACCT 403	Advanced Accounting	3	0	3
MGT 301	Principles of Mgt.	3	0	3	ACCT 404	Auditing	3	0	3
FIN 302	Financial Management II	3	0	3	MGT 311	Legal Environment	3	0	3
IAS 322	Human Rights in Islam	2	0	2	IAS 301	Oral Communication Skills	2	0	2
MKT 301	Principles of Marketing	3	0	3	XX xxx	Elective I	3	0	3
		17	**0**	**17**			**17**	**0**	**17**
Summer Session					ACCT 350	Accounting Coop Work	0	0	0
Fourth Year (Senior)									
ACCT 351	Acct. Coop Work (Continued)	0	0	9	ACCT 402	Managerial Accounting	3	0	3
					IAS 4xx	IAS Elective	2	0	2
					MGT 410	Organization Behavior	3	0	3
					MGT 448	Proj. Feasibility Study	3	0	3
					MGT 449	Business Policy	3	0	3
					XX xxx	Elective II	3	0	3
		0	**0**	**9**			**17**	**0**	**17**
Total credit hours required in Degree Program: 127									

Bachelor of Science in Management Information Systems (MIS)

Vision

The vision of the MIS Program is to be among the best MIS programs in the world in terms of graduates quality, research, and industry service.

Mission

To furnish to the Saudi and regional IT labor market the best of graduates who are equipped with leading-edge technological knowledge, superb managerial skills, and outstanding ability to deploy technology to reinforce managerial and organizational productivity needed for modern corporations.

Goals and Objectives

The MIS Program emphasizes the study of Information Systems (IS) for providing the types of relevant information in support of operational, tactical, and strategic process in business organizations. The MIS curriculum is designed to equip students with the conceptual framework, broad business knowledge, technical and communication skills necessary for qualifying them for positions as business systems specialists, business application developers, IS systems analysts, IS designers, database administrators, or managers of information services.

Program Outcomes

After completing the MIS degree successfully, graduates will have the necessary conceptual, technical, interpersonal, communication, collaborative work, and coordination skills to:

- apply modern tools, techniques, and technology in a functional and productive manner in their professional activities;
- analyze, design, construct, implement and maintain, usable, reliable, and cost-effective IS that support operational, managerial, and strategic activities of organizations;
- analyze, design, manipulate, and implement relational databases on which most IS are built upon;
- plan, coordinate, monitor, and control IS development projects;
- study and evaluate existing manual and automated business processes, and identify opportunities for re-engineering and/or automation;
- coordinate confidently and competently with the use community in IS requirements analysis/design activities, and provide guidance and technical support to end user computing activities;
- support Information System Managers in their management activities particularly in database administration, information system development project management, selection/adoption of latest tools and techniques;
- be equipped with technical skills necessary to build and operate e-commerce and e-business endeavors.
- appreciate the use of IS for effective management; and
- pursue graduate studies in MIS or equivalent area.

Strategy

Under the auspices of the MIS Curriculum and Academic Affairs Committee, the MIS program is set to achieve its objectives by continuously developing and enhancing all the resources used in executing the program. Accordingly the strategy is demonstrated through the following avenues:

- Maintaining top quality faculty members via encouragement of self enhancement, conference attendance, provision of unlimited access to best research journals in the MIS field; as well as recruiting new faculty members who have established records in the MIS field
- Maintaining computer and e-commerce laboratories and providing students with broadband linkage to the Internet, the KFUPM's Intranet, as well as many other IT educational resources and Extranets.
- Encouraging the use of Instructional resources as means of enhancing faculty-student interaction and peer interaction.
- Maintaining close relationships with international accrediting agencies including the AACSB and other international organizations.
- Establishing a high research profile through encouraging and motivating faculty members to publish their research work in renowned research journals.

Career Opportunities

The MIS program is designed for students who wish to pursue careers as an:

- Information systems analyst
- Information systems designer
- Information systems manager
- Information center specialist
- Manager of information services
- Business computer consultant
- Website administrator
- Database administrator.

Requirements for the B.S. Degree in Management Information Systems

(a) General Education Requirements (40 credit hours)

		Credit Hours
Communication Skills	ENGL 214	
	IAS 101, 201, 301	
	MGT 210, 448	15
English	ENGL 101, 102	6
Islamic & Arabic Studies	IAS 111, 212, 311, 4xx	8
Mathematics	MATH 131, 132	6
Physical Education	PE 101, 102	2
Technology	SE 100	3
		40

(b) Core Requirements (42 credit hours)

Accounting	ACCT 201, 202	6
Economics	ECON 101, 202	6
Finance	FIN 301	3
Management Information Systems	MIS 105, 215	6
Management	MGT 301, 311, 449	9
Marketing	MKT 301	3
Statistics	STAT 211, STAT 212	6
Operations Management	OM 210	3
		42

(c) MIS Major Requirements (37 credit hours)

In addition to the core, MIS majors must complete the following courses:

A. Required courses (28 credit hours)

MIS 301, 311, 401, 410, 490	15
ICS 102, 201	7
COE 353	3
MGT 410	3
	28

B. Required Electives (9 credit hours)

Each student majoring in MIS is required to take three of the following elective courses:

MIS 302, 345, 363, 411, 415,
MIS 420, 425, 499
ACCT 300, 401, FIN 420
MKT 345, 375
MGT 401, 415, 420, 425
ECON 401
OM 310, 405, 407, 420
SE 429, 443
COE 307, 385, 442
ICS 435

(d) MIS Cooperative Work Requirements (9 credit hours)

Each student majoring in MIS must participate in a structured 28-week cooperative work program of MIS practical training in the MIS Section or a section related to it in a selected economic organization. The student's progress during the co-op training will be monitored by the Department of Accounting and Management Information Systems. Under the supervision of an MIS faculty member or a faculty member in a related discipline, the student must write an analytical report about his Coop work experience under the label: MIS 351 (MIS Cooperative Work).

(e) Total Requirements (128 credit hours)

The B.S. degree in Management Information Systems requires a total of 128 credit hours.

MIS MAJOR REQUIREMENTS

In addition to the core courses, MIS majors must complete the following courses:

COURSE	TITLE	PRE-REQUISITES
MIS 301	Business Systems Analysis & Design I	MIS 215, or Departmental approval
MIS 311	Business Data Management	ICS 201
MIS 401	Business Systems Analysis & Design II	MIS 301
MIS 410	Intelligent Support Systems in Business	MIS 301 & MIS 311
MIS 490	Information Resources Management	MIS 401, COE 353, & Senior Standing
ICS 102	Introduction to Computing	Co-Req: MATH 101 or MATH 132
ICS 201	Introduction to Computer Science	ICS 102
COE 353	Introduction to Data Communications	Junior standing in Business
MGT 410	Organizational Behavior & Design	MGT 301

Management Information Systems Curriculum

COURSE		TITLE	LT	LB	CR	COURSE		TITLE	LT	LB	CR
Preparatory Year											
ENGL	001	Preparatory English I	15	5	8	ENGL	002	Preparatory English II	15	5	8
MATH	001	Preparatory Math I	3	1	4	MATH	002	Preparatory Math II	3	1	4
PYP	001	Prep. Physical Sciences	2	0	2	PYP	002	Prep. Computer Sciences	0	2	1
PYP	003	University Study Skills	0	2	1	ME	003	Prep. Eng. Technology	0	2	1
PE	001	Prep. Physical Educ. I	0	2	1	PE	002	Prep. Physical Educ. II	0	2	1
			20	**10**	**16**				**18**	**12**	**15**
Total credit hours required in Preparatory Program: 31											
First Year (Freshman)											
SE	100	Intro. to Technology	2	2	3	ECON	101	Principles of Economics I	3	0	3
ENGL	101	Intro. to Acad. Discourse	3	0	3	ENGL	102	Intro. to Report Writing	3	0	3
IAS	111	Belief and its Conseq.	2	0	2	IAS	101	Practical Grammar	2	0	2
MIS	105	Intro. to Comp. Appl.	2	2	3	ACCT	201	Principles of Acct. I	2	3	3
MATH	131	Mathematics for Mgt. I	3	0	3	ICS	102	Introduction to Computing	2	3	3
MATH	132	Mathematics for Mgt. II	3	0	3	STAT	211	Statistics for Business I	3	0	3
PE	101	Physical Education I	0	2	1	ACCT	201	Principles of Acct. I	2	3	3
						PE	102	Physical Education II	0	2	1
			15	**6**	**18**				**15**	**8**	**18**
MIS	215	Principles of MIS	3	0	3	MIS	301	Bus. Sys. Anal. & Design I	3	0	3
ACCT	202	Principles of Acct. II	2	3	3	ECON	202	Principles of Economics II	3	0	3
ICS	201	Intro. to Comp. Science	3	3	4	MGT	311	Legal Environment	3	0	3
Stat	212	Statistics for Business II	3	0	3	OM	210	Production Management	3	0	3
ENGL	214	Acad. & Prof. Comm.	3	0	3	MGT	210	Business Communication	3	0	3
IAS	212	Professional Ethics	3	0	3	IAS	201	Writing for Prof. Needs	2	0	2
			16	**6**	**18**				**17**	**0**	**17**
Third Year (Junior)											
MIS	311	Business Data Management	3	0	3	MIS	401	Bus. Sys. Anal. & Des. II	3	0	3
COE	353	Fundl. Comp. Communication	3	0	3	MIS	410	Intell. Sup. Sys. In Bus.	2	2	3
FIN	301	Financial Management I	3	0	3	MGT	410	Org. Behavior & Design	3	0	3
MGT	301	Principles of Management	3	0	3	MKT	301	Principles of Marketing	3	0	3
IAS	322	Human Rights in Islam	2	0	2	IAS	301	Oral Communication Skills	2	0	2
XX	xxx	Elective I	3	0	3	XX	xxx	Elective II	3	0	3
			17	**0**	**17**				**16**	**2**	**17**
Summer Session						MIS	350	MIS Coop Work	0	0	0
Fourth Year (Senior)											
MIS	351	MIS Coop Work (Cont.)	0	0	9	MGT	448	Proj. Feasibility Study	3	0	3
						MGT	449	Business Policy	3	0	3
						MIS	490	Info. Resources Mgt.	3	0	3
						IAS	4xx	IAS Elective	2	0	2
						MIS	xxx	Elective II	3	0	3
			0	**0**	**9**				**14**	**0**	**14**
Total credit hours required in Degree Program: 128											

DEPARTMENT OF FINANCE AND ECONOMICS

Chairman:

DR. IBRAHIM M. AL-GAHTANI

Faculty

Abraham	Al-Sahlawi	Masih
Abunayyan	Al-Sakran	Merdad
Al-Abandi	Al-Subaie	Musa
Al-Binali	Al-Titi	Ramady
Al-Elg	Al-Zahrani	Seyyed
Algahtani	DeMello	Umar
Al-Ghamdi, M.	Essayyad	Uthman
Al-Ghamdi, Z.	Hamdan	Yamani
Al-Hajji	Hoque	Younes
Almansur	Jabir	

The field of Finance deals with the acquisition and efficient allocation of financial resources by business firms, governments, and individuals. The Bachelor of Science in Finance is designed to develop an understanding of financial markets and institutions, and provide students with both the theoretical background in finance and the analytical tools required to make intelligent financial decisions. The finance curriculum prepares students for careers in corporate financial management, commercial and investment banking, investments, capital markets, and financial services.

Graduates with a B.S. Degree in Finance should demonstrate the following competencies, skills, and knowledge:

1. Understanding of fundamental economic concepts and familiarity with the role and working of financial markets and institutions including exposure to the Saudi economy and its institutional arrangements.
2. The ability to evaluate financial performance of a firm, perform discounted cash flow analysis, use spreadsheet programs, retrieve financial information from the different sources, and communicate the results of analysis effectively.
3. Understanding of the various sources of capital ability to determine cost of capital and analyze the effect of capital structure and dividend policy on firm valuation.
4. Understanding and ability to apply basic capital budgeting techniques, estimate project cash flows for evaluation of investment alternatives, and knowledge of short-term financial planning and management of working capital.
5. Understanding of risk and return concepts within the context of modern portfolio theory and an ability to use these concepts in valuation of risky assets within the framework of efficient markets.
6. Familiarity with various aspects of international finance and economic issues including understanding of global perspectives in making financial decisions.
7. Ability to integrate financial and economic concepts and techniques to diagnose business problems and propose solutions, and show appreciation for ethical and Islamic values in making decisions.

The Bachelor of Science in Finance offers a program designed for students who aim to work in corporation treasury operations, long-range planning, capital investment analysis, cash management; in government finance or banking agencies; in bank management; in managing other forms of financial firm, such as stock brokerage or currency exchange; and in analyzing and designing new financial products or innovations in financial services.

The Bachelor of Science in Finance focuses on making sound decisions based on economic principles and management information. The degree program emphasizes the use of computers as tolls for analysis and decision-making. A key objective of the program is to ensure that graduates have a high level of expertise in computers. This enables students to use computers naturally for analyzing complex problems to reach correct decisions.

Graduates of the Bachelor of Science in Finance will know how to analyze capital investment proposals, manage foreign exchange risks, negotiate letters of credit, prepare cash budgets and cash forecasts, analyze financial performances of enterprise, manage investment portfolios of securities to balance risk and return, manage the enterprise's cash and receivables, and prepare financial forecasts.

Requirements for the B.S. Degree in Finance

(a) General Education Requirements (38 credit hours)		Credit Hours
Communication	ENGL 214, IAS 101, 201 MGT 210, 448	13
English	ENGL 101, 102	6
Islamic & Arabic Studies	IAS 111, 212, 322	6
Mathematics	MATH 131, 132	6
Physical Education	PE 101, 102, 201, 202	4
Introduction to Technology	SE 100	3
		38

(b) Core Requirements (42 credit hours)

Accounting	ACCT 201, 202	6
Economics	ECON 101, 202	6
Finance	FIN 301	3
Information Systems	MIS 105, 215	6
Management	MGT 301, 311, 449	9
Marketing	MKT 301	3
Operations Management	OM 210	3
Quantitative Business Analysis	STAT 211, STAT 212	6
		42

(c) Finance Major Requirements (39 credit hours)

1. **Required Courses (30 credit hours)**

   ECON 305, 306, 410
   FIN 302, 410, 415, 420, 425, 430, 450

2. **Elective Courses (9 credit hours)**

   Students majoring in Finance must select three of the following courses as electives:

   ACCT 300, 301, 302, 304, 401, 402
   ECON 301, 401, 415
   FIN 421, 435
   MGT 401, 410, 415, 420, 425, 430, 440
   MKT 320, 330, 345, 375, 400, 410, 420, 450
   MIS 301, 305, 340, 401, 410, 420, 490
   OM 310, 405, 407, 420

(d) Cooperative Work Requirements (9 credit hours)

Each student must participate in a 28-week program of industrial experience in Finance and/ or related business areas and submit a formal written report. Students will be encouraged to spend their coop training in a multinational business organization. FIN 351.

(e) Total Requirements (128 credit hours)

Total requirements for B. S. degree in Finance is 128 semester-credit-hours.

Finance Curriculum

COURSE		TITLE	LT	LB	CR	COURSE		TITLE	LT	LB	CR
Preparatory Year											
ENGL	001	Preparatory English I	15	5	8	ENGL	002	Preparatory English II	15	5	8
MATH	001	Preparatory Math I	3	1	4	MATH	002	Preparatory Math II	3	1	4
PYP	001	Prep. Physical Sciences	2	0	2	PYP	002	Prep. Computer Sciences	0	2	1
PYP	003	University Study Skills	0	2	1	ME	003	Prep. Eng. Technology	0	2	1
PE	001	Prep. Physical Educ. I	0	2	1	PE	002	Prep. Physical Educ. II	0	2	1
			20	**10**	**16**				**18**	**12**	**15**
Total credit hours required in Preparatory Program: 31											
First Year (Freshman)											
SE	100	Intro. to Technology	3	0	3	ECON	101	Principles of Economics I	3	0	3
ENGL	101	Intro. to Acad. Discourse	3	0	3	ENGL	102	Intro. to Report Writing	3	0	3
IAS	111	Belief and its Consequences	2	0	2	MIS	215	Principles of MIS	3	0	3
MIS	105	Intro. to Computer Appl.	3	0	3	MATH	132	Applied Calculus	3	0	3
MATH	131	Finite Mathematics	3	0	3	IAS	101	Practical Grammar	2	0	2
PE	101	Physical Education I	0	2	1	PE	102	Physical Education II	0	2	1
			14	**2**	**15**				**14**	**2**	**15**
Second Year (Sophomore)											
ACCT	201	Principles of Accounting I	2	2	3	ACCT	202	Principles of Accounting II	2	2	3
ECON	202	Principles of Economics II	3	0	3	MGT	210	Business Communication	3	0	3
ENGL	214	Acad. & Prof. Comm.	3	0	3	MGT	311	Legal Environment	3	0	3
IAS	212	Professional Ethics	2	0	2	STAT	212	Stat Methods for Mgt II	3	0	3
STAT	211	Stat Methods for Mgt I	3	0	3	OM	210	Production Management	3	0	3
PE	201	Physical Education III	0	2	1	PE	202	Physical Education IV	0	2	1
			13	**4**	**15**				**14**	**4**	**16**
Summer Session						IAS	201	Writing for Prof. Needs	2	0	2
						MGT	301	Principles of Management	3	0	3
						MKT	301	Principles of Marketing	3	0	3
									8	**0**	**8**
Third Year (Junior)											
ECON	305	Money and Banking	3	0	3	FIN	302	Financial Management II	3	0	3
ECON	306	Economy of Saudi Arabia	3	0	3	FIN	410	Inter'l Financial Mgmt.	3	0	3
ECON	410	International Economics	3	0	3	FIN	415	Mgt. of Financial Institution	3	0	3
FIN	301	Financial Management I	3	0	3	FIN	420	Investments	3	0	3
XX	xxx	Finance Major Elective I	3	0	3	XX	xxx	Finance Major Elective II	3	0	3
IAS	322	Human Rights in Islam	2	0	2	MGT	448	Project Feasibility Analysis	3	0	3
			17	**0**	**17**				**18**	**0**	**18**
Summer Session						FIN	351	Finance Cooperative Work	**0**	**0**	**9**
Fourth Year (Senior)											
Continuation of Cooperative Work						FIN	425	Computer Appl. in Fin	3	0	3
						FIN	430	Risk Mgmt. & Insurance	3	0	3
						FIN	450	Financial Policy	3	0	3
						XX	xxx	Finance Major Elective III	3	0	3
						MGT	449	Business Policy	3	0	3
									15	**0**	**15**
Total credit hours required in Degree Program: 128											

DEPARTMENT OF MANAGEMENT AND MARKETING

Chairman:

DR. EID SENDI AL-SHAMMARI

Faculty

Abdul-Muhmin
Achoui
Al-Abdali
Al-Ashban
Al-Buraey
Al-Faraj
Al-Ghamdi, M.
Al-Ghamdi, S.
Al-Kahtani
Al-Meer
Al-Shammari
Al-Shuridah
Al-Twaijri
Al-Zamel
Al-Zayer
Bubshait
Calcich
Cooper
El-Omari
Eltayeb
Hammad
Kayal
Maghrabi
Mansour
Mat-zin
Murteza
Oukil
Refaat
Sadi
Sohail
Yousef

Part-time Faculty

Alkadi
Al-Humaidan
Al-Owaid
Al-Suhaimi

Adjunct Professors

Khumawala

Introduction

The Department of Management and Marketing offers two Bachelor of Science Degrees in Management, and Marketing. The curricula of the two degrees are designed to provide a professional background for further careers or advanced work in academic, government, and industrial organizations.

Mission of the Department of Management and Marketing

To contribute to the mission of the College of Industrial Management at KFUPM by being a prominent provider of education in the areas of Management and Marketing through high quality curricula and high quality teaching and to support the other programs in the College by contributing to the College general educational requirements, and to graduate students with current and relevant knowledge, skills, and experiences that allows them to play a significant and productive roles in the Development of the Saudi economy within the global business environment; and to actively contribute with high quality research in the areas of Management, Marketing, and related fields, professional services, and dissemination of knowledge in a manner responsive to the evolving stakeholders' needs.

1. Management Program

Bachelor of Science in Management

The Management program prepares students to assume leadership roles in business and other types of institutions. The program is designed to develop the student's ability to think objectively and make sound decisions. This program will teach the student how to become effective as a person and as a managerial leader.

The Management program includes Management of Human Resources, Materials Management, International Business, Cost Accounting, Financial Management, Management of Organizational Changes and Development, Management Information Systems, and courses in Quantitative Methods and Research, as well as 28 weeks of practical experience in a managerial post. The program keeps up with the most recent developments in the field of management. It places heavy emphasis on computer applications and quantitative methods.

Mission

To provide students with education in the Management field that meets high international standards of quality, that is relevant to the Saudi business environment, and that provides knowledge, skills, and experiences that are current and relevant to equip the students for careers in business and public sectors. The content and pedagogy of the MGT curriculum will be balanced in terms of breadth and depth and will provide students with the proper perspective, relevant skills, and style of thinking that will enhance their professional and personal development to be productive and effective organizational members.

Educational Objectives of Management Program

Graduates with B.S. in Management should have the following:

- Knowledge and Skills in oral and written communication
- Knowledge and Skills in information technology
- Knowledge and Skills in mathematical and quantitative techniques
- Broad knowledge in Arabic and Islamic Studies
- Broad knowledge in all business functions
- Deep knowledge in the field of Management to include:
  - Compensation management
  - Human Resources Management
  - Organizational Behavior
  - Operations Management
  - Supply Chain
  - Business Strategy
  - International and global Business
- Actual work experience.

Requirements for the B.S. Degree in Management

(a) General Education Requirements (38 credit hours)

		Credit Hours
Communication Skills	ENGL 214, IAS 101, 201 MGT 210,448	13
English	ENGL 101, 102	6
Islamic & Arabic Studies	IAS 111, 212, 322	6
Mathematics	MATH 131, 132	6
Physical Education	PE 101, 102, 201, 202	4
Introduction to Technology	SE 100	3
		38

(b) Core Requirements (42 credit hours)

Accounting	ACCT 201, 202	6
Economics	ECON 101, 202	6
Finance	FIN 301	3
Management Information Systems	MIS 105, 215	6
Management	MGT 301, 311, 449	9
Marketing	MKT 301	3
Operations Management	OM 210	3
Statistics for Business	STAT 211, 212	6
		42

(c) Management Major Requirements (39 credit hours)

In addition to the general and core requirements, Management majors must complete the following courses:

1. **Required Courses (33 credit hours)**

    MGT 401, 405, 410, 415, 420, 425, 440
    FIN 302
    ACCT 401
    MKT 345
    OM 310

2. **Required Elective (6 credit hours)**

    Management majors are required to take two of the following electives:

MGT	3xx or 4xx	OM	3xx or 4xx
ACCT	3xx or 4xx	MKT	3xx or 4xx
ECON	3xx or 4xx	MIS	3xx or 4xx
FIN	3xx or 4xx	OM	3xx or 4xx

(d) Cooperative Work Requirement (9 credit hours)

Each student must participate in a 28-week program of industrial experience in his major area and submit a formal written report: MGT 351: Cooperative Work.

(e) Total Requirements (128 credit hours)

The total requirements for a B.S. Degree in Management are 128 semester-credit-hours.

Management Major Curriculum

COURSE	TITLE	LT	LB	CR	COURSE	TITLE	LT	LB	CR
Preparatory Year									
ENGL 001	Preparatory English I	15	5	8	ENGL 002	Preparatory English II	15	5	8
MATH 001	Preparatory Math I	3	1	4	MATH 002	Preparatory Math II	3	1	4
PYP 001	Prep. Physical Sciences	2	0	2	PYP 002	Prep. Computer Sciences	0	2	1
PYP 003	University Study Skills	0	2	1	ME 003	Prep. Eng. Technology	0	2	1
PE 001	Prep. Physical Educ. I	0	2	1	PE 002	Prep. Physical Educ. II	0	2	1
		20	**10**	**16**			**18**	**12**	**15**
Total credit hours required in Preparatory Program: 31									
First Year (Freshman)									
SE 100	Intro. to Technology	3	0	3	ECON 101	Principles of Economics I	3	0	3
ENGL 101	Intro. to Acad. Discourse	3	0	3	ENGL 102	Intro. to Report Writing	3	0	3
IAS 111	Belief and its Consequences	2	0	2	IAS 101	Practical Grammar	2	0	2
MIS 105	Intro. to Comp. Applications	3	0	3	MIS 215	Prin. of Mgt. Info. Sys.	3	0	3
MATH 131	Finite Mathematics	3	0	3	MATH 132	Applied Calculus	3	0	3
PE 101	Physical Education I	0	2	1	PE 102	Physical Education II	0	2	1
		14	**2**	**15**			**14**	**2**	**15**
Second Year (Sophomore)									
ACCT 201	Principles of Acct. I	2	2	3	ACCT 202	Principles of Acct. II	2	2	3
ECON 202	Principles of Economics II	3	0	3	MGT 210	Business Communication	3	0	3
ENGL 214	Acad. & Prof. Comm.	3	0	3	MGT 311	Legal Environment	3	0	3
IAS 212	Professional Ethics	2	0	2	OM 210	Operations Management	3	0	3
STAT 211	Statistics for Business I	3	0	3	STAT 212	Statistics for Business II	3	0	3
PE 201	Physical Education III	0	2	1	PE 202	Physical Education IV	0	2	1
		13	**4**	**15**			**14**	**4**	**16**
Summer Session					IAS 201	Writing for Prof. Needs	2	0	2
					MGT 301	Principles of Management	3	0	3
					MKT 301	Principles of Marketing	3	0	3
							8	**0**	**8**
Third Year (Junior)									
MGT 401	Human Resources Mgt.	3	0	3	MGT 405	Compen. & Benefits Mgt.	3	0	3
MGT 410	Org. Behavior & Design	3	0	3	MGT 420	Materials Management	3	0	3
ACCT 401	Cost Accounting	3	0	3	MKT 345	Marketing Research	3	0	3
FIN 301	Financial Management I	3	0	3	FIN 302	Financial Management II	3	0	3
IAS 322	Human Rights in Islam	2	0	2	OM 310	Quant. Methods for Mgt.	3	0	3
XX xxx	Elective I	3	0	3	MGT 440	International Business	3	0	3
		17	**0**	**17**			**18**	**0**	**18**
Summer Session					MGT 351	Cooperative Work	**0**	**0**	**9**
Fourth Year (Senior)									
Continuation of Cooperative Work					MGT 415	Industrial Psychology	3	0	3
					MGT 425	Orgl. Changes & Dev.	3	0	3
					MGT 448	Project Feasibility Analysis	3	0	3
					MGT 449	Business Policy	3	0	3
					XX xxx	Elective II	3	0	3
							15	**0**	**15**
Total credit hours required in Degree Program: 128									

2. Marketing Program

Marketing is a fundamental human activity. Businesses and noncommercial institutions attempt to anticipate, manage and satisfy demands for goods and services. To do this, marketers must adequately conceive, promote, price, and distribute such goods and services. Marketing is an appropriate field of study for individuals who are interested in discovering consumer needs, satisfying these needs, and/or communicating benefits to a target group of customers.

The broad objective of the B.S. in marketing program is to equip students with relevant knowledge and skills to enable them to function effectively in marketing-related positions in a variety of contexts. This program stresses basic conceptual knowledge in all fields of industrial management as an essential foundation for an effective Marketing career.

The Marketing program is designed for students who wish to pursue careers as marketing managers or directors, sales managers, marketing research coordinators, advertising directors, product development specialists, distribution managers, sales executives, market analysts, retail merchandising specialists, brand or product managers, or export directors.

The Marketing program includes courses in sales management, promotion management, retail management, marketing research, services marketing, industrial marketing, consumer behavior, international marketing and strategic marketing, as well as 28 weeks of practical experience in marketing. The program focuses on the principles, concepts, and procedures needed for measuring and analyzing marketing information for effective decision-making, and for implementing and controlling marketing plans for efficient market penetration. Even though the program is designed to meet the local marketing environment requirements, it also keeps up with the most recent developments in the field of marketing.

Mission

To provide students with education in the Marketing field that meets high international standards of quality, that is relevant to the Saudi business environment, and that provides knowledge, skills, and experiences that are current and relevant to equip the students for careers in business and public sectors. The content and pedagogy of the MKT curriculum will be balanced in terms of breadth and depth and will provide students with the proper perspective, relevant skills, and style of thinking that will enhance their professional and personal development to be productive and effective organizational members.

Educational Objectives of Marketing Program

Graduates with B.S. in Marketing should have the following:

- Knowledge and Skills in oral and written communication
- Knowledge and Skills in information technology
- Knowledge and Skills in mathematical and quantitative techniques
- Broad knowledge in Arabic and Islamic Studies
- Broad knowledge in all business functions
- Skills and Deep knowledge in the field of Marketing to include:
  - Marketing Research
  - Retailing
  - Business Marketing
  - Service Marketing
  - Sales Management
  - Advertising and Promotion
  - Consumer Behavior
  - International Marketing
  - Marketing Strategies
- Actual work experience.

Requirements for the B.S. Degree in Marketing

(a) General Education Requirements (38 credit hours)

		Credit Hours
Communication Skills	ENGL 214,	3
	IAS 101, 201	4
	MGT 210, 448	6
English	ENGL 101, 102	6
Islamic & Arabic Studies	IAS 111, 212, 322	6
Mathematics	MATH 131, 132	6
Physical Education	PE 101, 102, 201, 202	4
Technology	SE 100	3
		38

(b) Core Requirements (42 credit hours)

Accounting	ACCT 201, 202	6
Economics	ECON 101, 202	6
Finance	FIN 301	3
Management Information Systems	MIS 105, 215	6
Management	MGT 301, 311, 449	9
Marketing	MKT 301	3
Operations Management	OM 210	3
Statistics for Business	STAT 211, 212	6
		42

(c) Marketing Major Requirements (33 credit hours)

In addition to the General Education Requirements and Core Requirements, Marketing majors must complete the following courses:

MKT 320, 330, 340, 345, 375, 400, 410, 420, 450
OM 310
MGT 410

(d) Required Electives (6 credits)

MGT 3xx or 4xx
ACCT 3xx or 4xx
ECON 3xx or 4xx
OM 3xx or 4xx
FIN 3xx or 4xx
OM 3xx or 4xx
MIS x33 or 4xx

(e) Marketing Cooperative Work Requirement (9 credit hours)

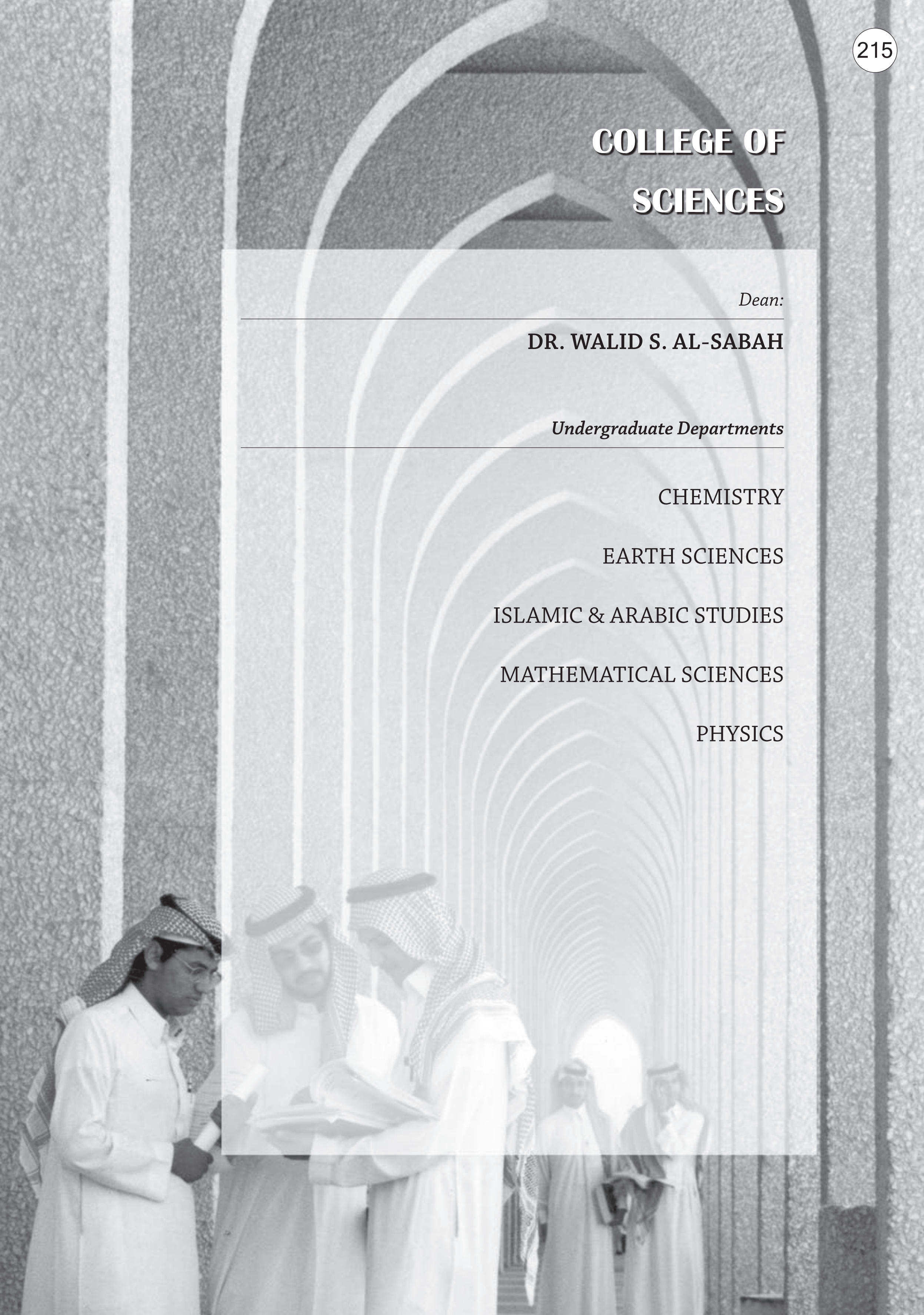
Each student majoring in Marketing must participate in a structured 28-week program of marketing practical training in the Marketing Department, or a section related to it, or in a selected industrial organization. The student's progress during the Coop training will be monitored by the Department of Management & Marketing. Under the supervision of a Marketing faculty member or a faculty member in a related discipline, the student must write an analytical report about his Coop work experience under the label: MKT 351 (Marketing Cooperative Work).

(f) Total Requirements (128 credit hours)

The total requirements for a B.S. degree in Marketing are 128 semester-credit-hours.

Marketing Major Curriculum

COURSE	TITLE	LT	LB	CR	COURSE	TITLE	LT	LB	CR
Preparatory Year									
ENGL 001	Preparatory English I	15	5	8	ENGL 002	Preparatory English II	15	5	8
MATH 001	Preparatory Math I	3	1	4	MATH 002	Preparatory Math II	3	1	4
PYP 001	Prep. Physical Sciences	2	0	2	PYP 002	Prep. Computer Sciences	0	2	1
PYP 003	University Study Skills	0	2	1	ME 003	Prep. Eng. Technology	0	2	1
PE 001	Prep. Physical Educ. I	0	2	1	PE 002	Prep. Physical Educ. II	0	2	1
		20	**10**	**16**			**18**	**12**	**15**
Total credit hours required in Preparatory Program: 31									
First Year (Freshman)									
SE 100	Intro. to Technology	3	0	3	ECON 101	Principles of Economics I	3	0	3
ENGL 101	Intro. to Acad. Discourse	3	0	3	ENGL 102	Intro. to Report Writing	3	0	3
IAS 111	Belief and its Consequences	2	0	2	IAS 101	Practical Grammar	2	0	2
MIS 105	Intro. to Comp. Applications	3	0	3	MIS 215	Principles of Mgt Info. Sys.	3	0	3
MATH 131	Finite Mathematics	3	0	3	MATH 132	Applied Calculus	3	0	3
PE 101	Physical Education I	0	2	1	PE 102	Physical Education II	0	2	1
		14	**2**	**15**			**14**	**2**	**15**
Second Year (Sophomore)									
ACCT 201	Principles of Acct. I	2	2	3	ACCT 202	Principles of Acct. II	2	2	3
ECON 202	Principles of Economics II	3	0	3	MGT 210	Business Communication	3	0	3
ENGL 214	Acad. & Prof. Comm.	3	0	3	MGT 311	Legal Environment	3	0	3
STAT 211	Statistics for Business I	3	0	3	STAT 212	Statistics for Business II	3	0	3
IAS 212	Professional Ethics	2	0	2	OM 210	Operations Management	3	0	3
PE 201	Physical Education III	0	2	1	PE 202	Physical Education IV	0	2	1
		13	**4**	**15**			**14**	**4**	**16**
Summer Session					IAS 201	Writing for Prof. Needs	2	0	2
					MGT 301	Principles of Management	3	0	3
					MKT 301	Principles of Marketing	3	0	3
							8	**0**	**8**
Third Year (Junior)									
MKT 320	Sales Management	3	0	3	MKT 330	Adv. & Sales Promotion	3	0	3
MKT 345	Marketing Research	3	0	3	MKT 340	Retail Management	3	0	3
MKT 375	Services Marketing	3	0	3	MKT 400	Industrial Marketing	3	0	3
IAS 322	Human Rights in Islam	2	0	2	MKT 410	Consumer Behavior	3	0	3
FIN 301	Financial Management I	3	0	3	MGT 410	Org. Behavior & Design	3	0	3
XX xxx	Elective I	3	0	3	OM 310	Quant. Methods for Mgt.	3	0	3
		17	**0**	**17**			**18**	**0**	**18**
Summer Session					MKT 351	Cooperative Work	**0**	**0**	**9**
Fourth Year (Senior)									
Continuation of Cooperative Work					MKT 420	International Marketing	3	0	3
					MKT 450	Marketing Management	3	0	3
					MGT 448	Project Feasibility Analysis	3	0	3
					MGT 449	Business Policy	3	0	3
					XX xxx	Elective II	3	0	3
							15	**0**	**15**
Total credit hours required in Degree Program: 128									



COLLEGE OF SCIENCES

Dean:

DR. WALID S. AL-SABAH

Undergraduate Departments

CHEMISTRY

EARTH SCIENCES

ISLAMIC & ARABIC STUDIES

MATHEMATICAL SCIENCES

PHYSICS

The time gap between a scientific idea and its application for man's benefit in the fields of engineering and technology (i.e. in the production of goods and services) spanned many generations a century ago. During the past four decades, this gap has been reduced to merely several years. Nuclear energy, transistors, lasers, and integrated circuits are but a few examples of how short this gap has become.

In the past, science provided the leadership and the direction to engineering and technology. Nowadays we see the boundaries of these three areas being pushed into what are best described as cross-disciplines, and with the unprecedented growth in all three major areas we are experiencing cases where engineering and technology are also driving science. One view of these three fields, then, is that they are synergistic and should together form the basis for the technological development of a developing country such as the Kingdom. The role of the College of Sciences in the technological development of the Kingdom stems from this view.

PHILOSOPHY

The curriculums of the various departments of the College of Sciences are formulated to provide the Kingdom with the manpower for this technological development and to provide the student with a sound basis either for an immediate career in the technological development of the Kingdom or for graduate study and further advancement in his chosen field. The College of Sciences curriculums provide the student with an extensive grounding in mathematics and other allied fields of science, a strengthening of basic communications skills, general contact with Islamic and Arabic studies, and a comprehensive specialized major in one of the fields offered by the departments of the college: chemistry, geology, geophysics, industrial chemistry, mathematics, statistics and physics.

The goals of this curriculum and its philosophy are as follows:

1. to develop in each student a disciplined approach to problems whereby analysis, investigation, and formulation of conclusions are all guided by reason and scientific objectivity;
2. to acquaint the student with a broad area of scientific knowledge such that he will understand both the possibilities and the limitations of his knowledge;
3. to produce in each student a respect for and a deeper understanding of his cultural heritage as an Arab and as a Muslim;
4. to instill in each student a sincere desire for excellence.

GRADUATION REQUIREMENTS

To qualify for the B.S. degree, a candidate must:

- complete all departmental requirements (which vary from 121 to 125 credit hours) with a grade of D or better. These include 2 credit hours for summer training in industry as outlined in this bulletin.
- attain a cumulative GPA of 2.00 or better in all courses taken at KFUPM as an undergraduate,
- attain a cumulative GPA of 2.00 or better in all courses taken in his major department.

DEPARTMENT OF CHEMISTRY

Chairman:

DR. ZAKI. S. SEDDIGI

Faculty

Abulkibash
Al-Arfaj
Al-Daous
Ali, S.A.
Al-Muallem
Al-Suwaiyan
Al-Thag
Al-Thukair
Badawi
El Ali
Fettouhi
Forner
Forristal
Hamdan
Isab
Jaber
Khaled
Maung
Morsy
Oweimreen
Perzanowski
Seddigi
Siddiqui
Sultan
Wazeer

Introduction

The Chemistry Department is one of the earliest departments established at KFUPM and one of the leading chemistry departments in the Middle East. There are over 30 faculty members with a wide range of research interests. These are reflected in the content of our advanced courses, where topics at the forefront of research are taught. The Chemistry Department offers the degree of Bachelor of Science with two options: (1) Chemistry and (2) Industrial Chemistry.

The chemist is a professional scientist who specializes in some specific area of chemistry. He can either be involved in research or in the utilization of our natural resources. As a research chemist, he studies the ways in which matter changes and how to develop new materials to improve our living conditions. The chemist may be an analytical chemist who performs a variety of tasks such as analyze water, air, or petroleum samples, determine the composition of a newly discovered substance, or identify the materials in a crime investigation. An inorganic chemist synthesizes and characterizes materials like alloys, semiconductors, superconductors, glasses, catalysts, and inorganic pharmaceuticals. An organic chemist is concerned with the syntheses of new materials such as plastics, pharmaceutical products, or other commercial chemicals from various other chemicals or from natural resources and he studies the chemical properties of various carbon compounds. A physical chemist applies physics principles to the structure of matter and the process of chemical changes. An environmental chemist can investigate the conditions of pollution, monitor pollutants and assess hazardous effects. There are many other branches of chemistry, such as petroleum chemistry, biochemistry, nanochemistry and electrochemistry.

An industrial chemist undertakes optimization of complex processes, but unlike engineers, he examines and modifies the chemistry of the process itself. The industrial chemist is involved in all the production stages of a wide range of important chemicals and materials. These include the design and modification of the actual chemical process, the analysis of raw materials, the application of advanced computers to the simulation and control of the chemical plant, verification of the quality of the product and giving technical advice to both management and customers.

Chemistry graduates are expected to contribute to the academic, civil service and industrial development of the Kingdom by working in educational institutions, in government and in private institutions responsible for public health and safety of the environment, or in one of the many industries whose products or processes involve chemical technology. These areas include: schools and technical colleges; water authorities; desalination plants; agencies for environment protection; standards and specifications bureau; the vast petroleum, petrochemical and mining industries scattered all over the Kingdom; as well as the many smaller industries whose products or processes involve chemical technology. Chemistry graduates are also expected to form the backbone of the various research centers that are emerging in the Kingdom whether related to government organizations such as agriculture, health, petroleum, commerce (standards and quality control) or to private organizations. Industrial research centers, in particular, are envisaged to supplement huge industrial complexes to utilize manpower trained under the above programs of studies.

Vision

To be a leading department in chemical education, research and community services.

Mission

The chemistry department is committed to excellence in the discovery and transmission of knowledge in the field of chemistry. It will honor this commitment by a continuous modernization of its programs to achieve international recognition and satisfy the Saudi industrial need of skilled manpower. It will support research that has impact on the Kingdom economy and provide distinguished services to the national community. It will provide a nurturing and conducive environment for quality teaching, learning and research in basic and applied chemistry relying on teamwork and successful organizational practices.

Goals

I. Teaching

- To offer quality programs in chemistry and industrial chemistry.
- To integrate modern teaching/learning methods into the curriculum.
- To avail for faculty the latest instructional technology tools.
- To hire and develop distinguished faculty.
- To develop new interdisciplinary programs.
- To incorporate Saudi industry feedback into the curriculum.

II. Research

- To respond to current technological needs of Saudi industry.
- To conduct internationally recognized research.
- To consolidate and add to the present areas of concentration.
- To support multidisciplinary research.
- To acquire and maintain state of the art instrumentation.
- To attract and recruit high quality graduate students.
- To promote undergraduate research.
- To endorse collaborative research with national and international institutions.

III. Services

- To disseminate chemical awareness in the community.
- To carry out analysis of environmental contaminants and fuel oils.
- To offer specialized training on instrumentation and methodologies.
- To update high school teachers skills through tailored programs.

- To act as a consultation hub for industrial, governmental and academic institutions.

To achieve these goals the chemistry and industrial chemistry curricula are designed to provide the necessary professional background for pursuing careers in academic, governmental and industrial establishments. The courses offered are those recommended by international chemical organizations and provide a fundamental knowledge in the major areas of chemistry. Both programs include independent study and research where the student learns to apply different techniques and principles to the solution of scientific problems under the direction of a member of the faculty. The duration of this activity is one semester for industrial chemist and two semesters for a chemist. Summer training is required from chemistry and industrial chemistry students. For Industrial Chemists, the training must be done in industry.

Guidelines on Electives

Chemistry electives may be chosen by students majoring in chemistry from any 300 or 400 level chemistry courses and include: Environmental chemistry and environmental analysis, Chemistry of petroleum processes, polymer chemistry, homogeneous catalysis in industrial processes, industrial organic chemistry, industrial inorganic chemistry, spectroscopic identification of organic compounds, synthetic organic chemistry, computer applications in chemistry, photochemistry and others.

Free Electives can be from courses at the 200 level or above in the University except those offered by Chemistry Department or Department of Islamic and Arabic Studies. Engineering electives can be from courses at the 200 level or above in the Colleges of Engineering Sciences or Applied Engineering.

Biology Courses

Five Biology courses are offered by the Chemistry Department. All students at KFUPM can take these courses as requirements, where appropriate, or as electives.

Requirements for the B.S. Degree in Chemistry

Every student majoring in Chemistry must complete the following curriculum:

(a) General Education Requirement (52 credit hours)

		Credit Hours
Communication Skills	ENGL 214, IAS 101, 201, 301	9
Computer Programming	ICS 101	3
English	ENGL 101, 102	6
Islamic and Arabic Studies	IAS 111, 212, 322	6
Mathematics	MATH 101, 102, 201, 202	14
Physical Education	PE 101, 102	2
Physics	PHYS 101, 102, 201	12
		52

(b) Core Requirements (50 credit hours)

Analytical Chemistry	CHEM 223, 323, 324	8
General Chemistry	CHEM 101, 102	8
Inorganic Chemistry	CHEM 331, 332	7
Organic Chemistry	CHEM 201, 202, 303	11
Physical Chemistry	CHEM 212, 311, 312	11
Professional Skills	CHEM 471, 472, 479	5
		50

(c) Electives (20 credits hours)

Chemistry Electives	Two CHEM xxx courses	6
Islamic and Arabic Studies	IAS 4xx	2
Free Electives (not from Chemistry or IAS)	Four courses	12
		20

(d) Summer Training (CHEM 399, 2 credit hours)

Each student must spend two months in a chemical laboratory (analytical laboratory, hospital, clinic, etc.) or in a chemical industry firm, after which he must submit a report and present a seminar before receiving a grade for this course.

(e) Total Requirement (124 credit hours)

The total requirements for the B.S. degree in Chemistry is 124 semester credit hours.

Chemistry Curriculum

COURSE		TITLE	LT	LB	CR	COURSE		TITLE	LT	LB	CR
Preparatory Year											
ENGL	001	Preparatory English I	15	5	8	ENGL	002	Preparatory English II	15	5	8
MATH	001	Preparatory Math I	3	1	4	MATH	002	Preparatory Math II	3	1	4
PYP	001	Prep. Physical Sciences	2	0	2	PYP	002	Prep. Computer Sciences	0	2	1
PYP	003	University Study Skills	0	2	1	ME	003	Prep. Eng. Technology	0	2	1
PE	001	Prep. Physical Educ. I	0	2	1	PE	002	Prep. Physical Educ. II	0	2	1
			20	**10**	**16**				**18**	**12**	**15**
Total credit hours required in Preparatory Program: 31											
First Year (Freshman)											
CHEM	101	General Chemistry I	3	4	4	CHEM	102	General Chemistry II	3	4	4
IAS	111	Belief and its Consequences	2	0	2	ENGL	102	Intro. to Report Writing	3	0	3
ENGL	101	Intro. to Acad. Discourse	3	0	3	ICS	101	Comp. Programming	2	3	3
MATH	101	Calculus I	4	0	4	MATH	102	Calculus II	4	0	4
PE	101	Physical Education I	0	2	1	PHYS	102	General Physics II	3	3	4
PHYS	101	General Physics I	3	3	4						
			15	**9**	**18**				**15**	**10**	**18**
Second Year (Sophomore)											
CHEM	201	Organic Chemistry I	3	4	4	CHEM	202	Organic Chemistry II	3	4	4
ENGL	214	Acad. & Prof. Comm.	3	0	3	CHEM	212	Physical Chemistry I	3	4	4
IAS	212	Professional Ethics	2	0	2	CHEM	323	Instrumental Chem. Analysis	2	4	3
MATH	201	Calculus III	3	0	3	IAS	101	Practical Grammar	2	0	2
CHEM	223	Quant. Meth. of Chem. Anal.	1	4	2	MATH	202	Elem. Diff. Equations	3	0	3
PE	102	Physical Education II	0	2	1						
			12	**10**	**15**				**13**	**12**	**16**
Third Year (Junior)											
CHEM	331	Inorganic Chemistry	3	4	4	CHEM	303	Spect.& Qual. Org. Chem.	2	4	3
CHEM	311	Physical Chemistry II	3	4	4	CHEM	332	Adv. Inorganic Chemistry	3	0	3
IAS	322	Human Rights in Islam	2	0	2	CHEM	324	Adv. Instr. Chem. Analysis	2	4	3
PHYS	201	General Physics III	3	3	4	CHEM	312	Physical Chemistry III	3	0	3
						IAS	201	Writing for Prof. Needs	2	0	2
			11	**11**	**14**				**12**	**8**	**14**
Summer Session						CHEM	399	Summer Training	**0**	**0**	**2**
Fourth Year (Senior)											
CHEM	471	Chem. Senior Project I	0	8	2	CHEM	472	Chemistry Sr. Project II	0	8	2
CHEM	479	Chemistry Seminar	1	0	1	XXX	xxx	(Free Elective II)	3	0	3
CHEM	xxx	(Chemistry Elective I)	3	0	3	XXX	xxx	(Free elective III)	3	0	3
CHEM	xxx	(Chemistry Elective II)	3	0	3	IAS	4xx	(IAS Elective)	2	0	2
IAS	301	Oral Communication Skills	2	0	2	XXX	xxx	(Free Elective IV)	3	0	3
XXX	xxx	(Free elective I)	3	0	3						
			12	**8**	**14**				**11**	**8**	**13**
Total credit hours required in Degree Program: 124											

Requirements for the B.S. Degree in Industrial Chemistry

Every student majoring in Industrial Chemistry must complete the following curriculum:

(a) General Education Requirement (55 credit hours)		Credit Hours
Communication Skills	ENGL 214, IAS 101, 201, 301	9
Computer Programming	ICS 101	3
English	ENGL 101, 102	6
Islamic and Arabic Studies	IAS 111, 212, 322	6
Management	MGT 301	3
Mathematics	MATH 101, 102, 201, 202	14
Physical Education	PE 101, 102	2
Physics	PHYS 101, 102, 201	12
		55

(b) Core Requirements
Industrial Chemistry (19 credit hours)

Introduction to Chemical Engineering	CHE 201	3
Industrial Catalysis	CHEM 355	3
Polymer Chemistry	CHEM 450	4
Chemistry of Petroleum Processing	CHEM 453	3
Industrial Inorganic Chemistry	CHEM 455	3
Industrial Organic Chemistry	CHEM 456	3
		19

Pure Chemistry (40 credit hours)

Analytical Chemistry	CHEM 323, 324	6
General Chemistry	CHEM 101, 102	8
Inorganic Chemistry	CHEM 331	4
Organic Chemistry	CHEM 201, 202, 303	11
Physical Chemistry	CHEM 212, 311	8
Professional Skills	CHEM 471, 479	3
		40

(c) Elective (8 credit hours)

Islamic and Arabic Studies	IAS 4xx	2
Free Elective (not from Chemistry or IAS)	XXX xxx	3
Engineering Elective	XXX xxx	3
		8

(d) Summer Training (CHEM 399, 2 credit hours)

Each student must spend two months in a chemical laboratory (analytical laboratory, hospital, clinic, etc.) or in a chemical industry firm, after which he must submit a report and present a seminar before receiving a grade for this course.

(e) Total Requirement (124 credit hours)

The total requirements for the B.S. degree in Industrial Chemistry is 124 semester credit hours.

Industrial Chemistry Curriculum

COURSE	TITLE	LT	LB	CR	COURSE	TITLE	LT	LB	CR
Preparatory Year									
ENGL 001	Preparatory English I	15	5	8	ENGL 002	Preparatory English II	15	5	8
MATH 001	Preparatory Math I	3	1	4	MATH 002	Preparatory Math II	3	1	4
PYP 001	Prep. Physical Sciences	2	0	2	PYP 002	Prep. Computer Sciences	0	2	1
PYP 003	University Study Skills	0	2	1	ME 003	Prep. Eng. Technology	0	2	1
PE 001	Prep. Physical Educ. I	0	2	1	PE 002	Prep. Physical Educ. II	0	2	1
		20	**10**	**16**			**18**	**12**	**15**
Total credit hours required in Preparatory Program: 31									
First Year (Freshman)									
CHEM 101	General Chemistry I	3	4	4	CHEM 102	General Chemistry II	3	4	4
IAS 111	Belief and its Consequences	2	0	2	ENGL 102	Intro. to Report Writing	3	0	3
ENGL 101	Intro. to Acad. Discourse	3	0	3	MATH 102	Calculus II	4	0	4
MATH 101	Calculus I	4	0	4	ICS 101	Comp. Programming	2	3	3
PE 101	Physical Education I	0	2	1	PHYS 102	General Physics II	3	3	4
PHYS 101	General Physics I	3	3	4					
		15	**9**	**18**			**15**	**10**	**18**
Second Year (Sophomore)									
CHEM 201	Organic Chemistry I	3	4	4	CHEM 202	Organic Chemistry II	3	4	4
ENGL 214	Acad. & Prof. Comm.	3	0	3	CHEM 212	Physical Chemistry I	3	4	4
IAS 212	Professional Ethics	2	0	2	IAS 101	Practical Grammar	2	0	2
MATH 201	Calculus III	3	0	3	MATH 202	Elem. Diff. Equations	3	0	3
PE 102	Physical Educ II	0	2	1	CHEM 323	Inst. Chemical Analysis	2	4	3
		11	**6**	**13**			**13**	**12**	**16**
Third Year (Junior)									
PHYS 201	General Physics III	3	3	4	CHEM 303	Spect. & Qual. Org. Chem.	2	4	3
CHEM 331	Inorganic Chemistry	3	4	4	CHEM 355	Industrial Catalysis	3	0	3
CHEM 311	Physical Chemistry II	3	4	4	IAS 201	Writing for Prof. Needs	2	0	2
CHE 201	Intro. to Chem. Eng.	3	0	3	CHEM 324	Adv. Inst. Chem. Analysis	2	4	3
IAS 322	Human Rights in Islam	2	0	2	CHEM 456	Industrial Org. Chem.	3	0	3
		14	**11**	**17**			**12**	**8**	**14**
Summer Session					CHEM 399	Summer Training	**0**	**0**	**2**
Fourth Year (Senior)									
CHEM 453	Chem. of Pet. Processing	2	4	3	CHEM 479	Chemistry Seminar	1	0	1
CHEM 455	Industrial Inorg. Chem	3	0	3	CHEM 450	Polymer chemistry	3	4	4
IAS 301	Oral Communication Skills	2	0	2	CHEM 471	Chemistry Sr. Project I	0	8	2
MGT 301	Principles of Mgt.	3	0	3	IAS 4xx	(IAS Elective)	2	0	2
XXX xxx	(Free Elective)	3	0	3	XXX xxx	(Engineering Elective)	3	0	3
		13	**4**	**14**			**9**	**12**	**12**
Total credit hours required in Degree Program: 124									

DEPARTMENT OF EARTH SCIENCES

Chairman:

DR. ABDULAZIZ M. AL-SHAIBANI

Faculty

Abdulghani
Abdullatif
Abokhodair
Ahmed
Al-Dajjani
Al-Hinai
Al-Shaibani
Al-Shuhail
Franks
Ghaleb
Hariri
Hughes (Adjunct)
Hussain
Jarad
Korvin
Makkawi
Oncel
Qahwash
Saafeen

Introduction

Earth Sciences, which include both Geology and Geophysics, are an integral part of the basic science education in most universities and college worldwide. Realizing their importance in the development and advancement of Saudi Arabia, KFUPM established the Department of Geology in 1963. By the addition of a geophysics option in 1976, the name was changed to the Department of Earth Sciences.

Scope

The scope of Earth Sciences is quite broad and diverse, beginning with the ground we walk on, extending inward to the center of the earth, and outward to the other planets in the solar system. While the scope of Geology and Geophysics is closely related, there are some major differences. Geologists study the composition, structure and history of the earth's crust. Geophysicists use the principles of physics and mathematics to study not only the earth's surface but its interior as well as its magnetic, electrical, and gravitational fields. Both, however, commonly apply their skills to solve environmental problems and to search for natural resources, such as oil, natural gas, minerals, and groundwater.

Vision

To continue as the leading Geosciences department in the region through a balanced approach between education and research.

Mission

1. To prepare students who are competent in theory and applications of Geosciences. Our graduates will be prepared equally for industrial and post-graduate careers.
2. To provide solutions to problems resulting from natural hazards and human activities in arid regions through focused research.
3. To serve the community by providing expertise in the fields of Petroleum Geology, Groundwater, Environment, and Exploration Geophysics.

Goals

The main goals of Earth Sciences programs are: (1) to reflect in our teaching, research, and service the breadth and importance of Earth Sciences to society, (2) to provide students with the technical expertise and skills needed to gather and interpret Earth Sciences data in a scientific manner, (3) to provide students with the necessary tools to effectively communicate the results of geological/geophysical investigations to other professional and public, and (4) to maintain and enhance distinction in the areas of natural resources, including oil and gas, groundwater, mineral resources, and environment.

To achieve such goals, the department adopts the following strategies to provide: (1) Up-to-date lecture and laboratory-based courses. (2) Laboratory and field study experiences that provide exposure to modern equipment and technologies that will enhance career opportunities of our students. (3) State-of-the art-computer technology and software for data acquisition, analysis, and modeling applications within Earth Sciences. (4) Research opportunities and support for undergraduate students (senior projects, field trips, field courses, and summer training) and graduate students (theses).

The Program and Facilities

The Department of Earth Sciences offers major in both Geology and Geophysics, covering a broad-base program in both options. In addition to the B.S. programs in both Geology and Geophysics, the department offers an M.S. program in geology. The M.S. program is tailored for various interests such as Petroleum Geology, Hydrogeology, Stratigraphy and Sedimentation, Paleontology, Economic Geology, Geostatistics, Geochemistry, Engineering Geology, Exploration Geophysics and others. The undergraduate programs in the Department are sufficiently flexible to accommodate transfer students from other departments in the university.

Facilities currently available in the department include several well-equipped lecture, seminar, audio-visual and resource rooms. The resource room contains a wide selection of professional journals, memoirs, reference textbooks and other publications. The Earth Sciences museum has an impressive inventory of geological specimens (rocks, minerals, fossils, fossil fuels) collected from different areas in the Kingdom and worldwide. The department owns several 4-wheel drives and a dune buggy for field trips. These vehicles are used both for local course-related field trips as well as geological itineraries during the Summer Field camp.

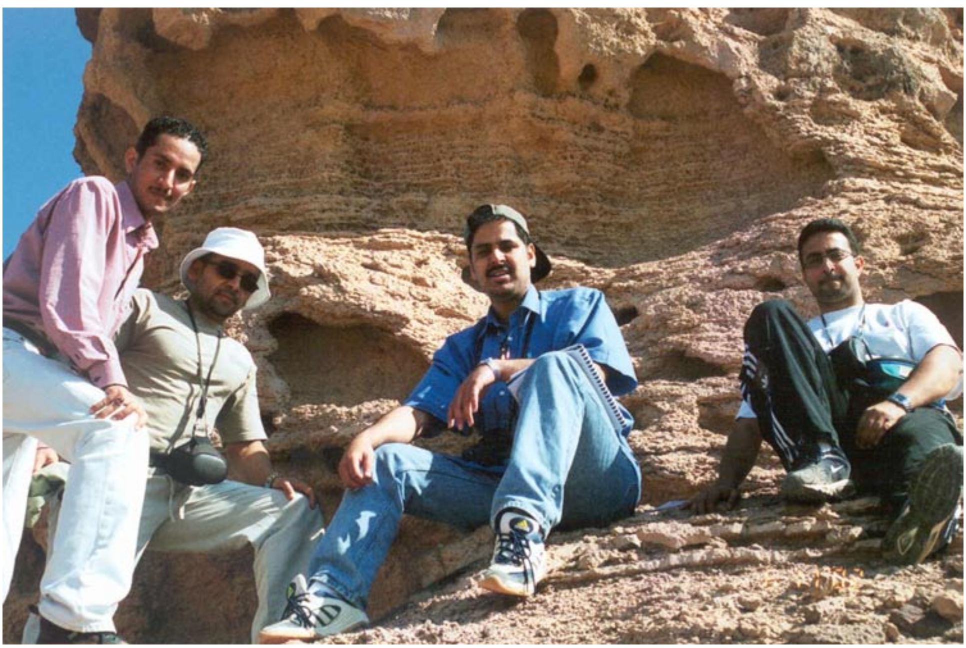
Laboratory facilities and equipment available in the department include thin-section, and reflection microscopy, scanning electron microscopy (SEM), X-ray diffractometry (XRD), ground penetrating radar (GPR), equipment for paleomagnetic studies, remote sensing, aerial photographs, gravimeter, resistivity and seismic, and various analytical instruments for field as well as laboratory hydrologic investigations. A modern seismic monitoring station is also located in the department. In addition, the department enjoys unrestricted access to the highly developed and equipped research facilities in the Central Analytical Laboratories and Remote Sensing units of the university Research Institute (RI). Facilities available at RI include XRF, SEM, TEM, ICP, AA, and GC-MS, X-ray emission (PIXE).

The PC laboratory of the department is equipped with state-of-the art computing facilities. The department has recently acquired several SUN workstations for training students in different geological and geophysical application software packages including IESX 2D/3D, GeoViz, Stratlog II, GeoFrame, and GPS-3. In addition, the department is connected to the UNIX server of the university Information Technology Center (ITC), a major data processing center in the region.

Employment Opportunities

Most Earth Scientists are employed by government agencies and industries related to oil and gas, mining and minerals, environmental consulting, and water resources. In recent years, depleting energy, mineral, and water resources along with increasing concerns about environment and natural hazards have created added opportunities and challenges for the Earth Scientists. In addition, demand for geologists for faculty positions both in school and university levels has been steadily increasing for the last few decades.

In Saudi Arabia, a majority of the Earth Sciences graduates finds employment in Saudi ARAMCO, different service companies and government agencies including Geological Survey of Saudi Arabia, Ministry of Agriculture and Water, Ministry of Petroleum and Mineral Resources, Ministry of Defense, Ministry of Higher Education, King Abdulaziz City for Science and Technology (KACST), Schlumberger, Western Geophysical, Geophysical Services International, Arabian Geophysical and Surveying (ARGAS) and others. In a fast-developing country like Saudi Arabia, expanded exploration and exploitation efforts for hydrocarbons, economic minerals deposits, and ground water resources, city and highway planning, environmental pollution control and mitigation will require the service of a growing number of Earth Scientists in the future.



Requirements for the B.S. Degree in Geology

(a) General Education Courses (61 credit hours)		Credit Hours
Chemistry	CHEM 101, 102	8
Information and Computer Science	ICS 103	3
English	ENGL 101, 102, 214	9
Islamic and Arabic Studies	IAS 101, 111, 201, 212, 301, 322, 4xx	14
Mathematics	MATH 101, 102, 201, STAT 201	14
Physical Education	PE 101, PE 102	2
Physics	PHYS 101, 102	8
Social Sciences	One approved course	3
		61

(b) Core Courses (46 Credit hours)		
Physical Geology	GEOL 201	3
Historical Geology	GEOL 203	3
Paleontology and Biostratigraphy	GEOL 214	3
Mineralogy and Optics	GEOL 216	4
Structural Geology	GEOL 305	3
Sedimentation and Stratigraphy	GEOL 307	4
Regional Geology	GEOL 318	3
Petrology	GEOL 320	4
Geology Seminar	GEOL 409	1
Petroleum Geology	GEOL 415	3
Hydrogeology	GEOL 423	3
Field Geology	GEOL 430	6
Environmental Geology	GEOL 446	3
Introduction to Geophysics	GEOP 202	3
		46

(c) Geology Elective Courses (6 Credit Hours)

Each student must take two additional geology courses to a total of six credit hours from the following:

Remote Sensing and GIS Applications in Geology	GEOL 312	3
Geological Mapping Techniques	GEOL 328	3
Engineering Geology	GEOL 341	3
Geochemistry	GEOL 355	3
Geotectonics	GEOL 420	3
Geomorphology	GEOL 431	3
Marine Geology	GEOL 434	3
Petroleum Geochemistry	GEOL 435	3
Oceanography	GEOL 436	3
Sedimentology	GEOL 440	3
Techniques in Sediment Analysis	GEOL 441	3
Computational Methods in Geology	GEOL 454	3
Economic Geology	GEOL 456	3
Mining Geology	GEOL 460	3
Mineral Economics	GEOL 461	3
Carbonate Geology	GEOL 464	3
Special Topics	GEOL 480	3

(d) Free Elective Courses (9 credit hours)

Each student must take three free electives to a total of nine credit hours, after consultation with his advisor. The free elective courses should be 200-level or higher.

(e) Summer Training (GEOL 399, 2 credit hours)

Each student must work as a trainee geologist for a period of a total of eight weeks in an organization/company that conducts geological activities, after which he must submit a written report and make an oral presentation, based on his training in the organization.

(f) Total Requirements (124 credits)

The total required credits for the B.S. degree in Geology is 124 semester-credit-hours.

Geology Curriculum

COURSE	TITLE	LT	LB	CR	COURSE	TITLE	LT	LB	CR
Preparatory Year									
ENGL 001	Preparatory English I	15	5	8	ENGL 002	Preparatory English II	15	5	8
MATH 001	Preparatory Math I	3	1	4	MATH 002	Preparatory Math II	3	1	4
PYP 001	Prep. Physical Sciences	2	0	2	PYP 002	Prep. Computer Sciences	0	2	1
PYP 003	University Study Skills	0	2	1	ME 003	Prep. Eng. Technology	0	2	1
PE 001	Prep. Physical Educ. I	0	2	1	PE 002	Prep. Physical Educ. II	0	2	1
		20	**10**	**16**			**18**	**12**	**15**
Total credit hours required in Preparatory Program: 31									
First Year (Freshman)									
CHEM 101	General Chemistry I	3	4	4	CHEM 102	General Chemistry II	3	4	4
ENGL 101	Intro. to Acad. Discourse	3	0	3	ENGL 102	Intro. to Report Writing	3	0	3
IAS 111	Belief & its Consequences	2	0	2	MATH 102	Calculus II	4	0	4
MATH 101	Calculus I	4	0	4	PE 102	Physical Education II	0	2	1
PE 101	Physical Education I	0	2	1	PHYS 102	General Physics II	3	3	4
PHYS 101	General Physics I	3	3	4					
		15	**9**	**18**			**13**	**9**	**16**
Second Year (Sophomore)									
GEOL 201	Physical Geology	2	3	3	GEOL 214	Paleontology & Biostratigrphy	2	3	3
GEOL 203	Historical Geology	2	3	3	ENGL 214	Acad. & Prof. Comm.	3	0	3
IAS 101	Practical Grammar	2	0	2	GEOL 216	Mineralogy and Optics	3	3	4
ICS 103	Programming in C	2	3	3	IAS 212	Professional Ethics	2	0	2
MATH 201	Calculus III	3	0	3	STAT 201	Introduction to statistics	2	2	3
		11	**9**	**14**			**12**	**8**	**15**
Summer Session					GEOL 399	Summer Training	**0**	**0**	**2**
Third Year (Junior)									
GEOL 305	Structural Geology	2	3	3	GEOL 318	Regional Geology	3	0	3
GEOL 307	Sediment. and Stratigraphy	3	3	4	GEOL 320	Petrology	3	3	4
IAS 201	Writing for Prof. Needs	2	0	2	IAS 322	Human Rights in Islam	2	0	2
XXX xxx	Free Elective I	3	0	3	XXX xxx	Free Elective II	3	0	3
GEOP 202	Intro. to Geophysics	3	0	3					
		13	**6**	**15**			**11**	**3**	**12**
Summer Session					GEOL 430	Field Geology	**0**	**18**	**6**
Fourth Year (Senior)									
GEOL 415	Petroleum Geology	3	0	3	GEOL 423	Hydrogeology	3	0	3
GEOL 446	Environmental Geology	3	0	3	GEOL xxx	Geology Elective II	3	0	3
GEOL xxx	Geology Elective I	3	0	3	GEOL 409	Geology Seminar	1	0	1
XXX xxx	Free Elective III	3	0	3	IAS 4xx	(IAS Elective I)	2	0	2
IAS 301	Styles of literature	2	0	2	GS xxx	(Social or Behav. Science)	3	0	3
		14	**0**	**14**			**12**	**0**	**12**
Total credit hours required in Degree Program: 124									

Requirements for the B.S. Degree in Geophysics

(a) General Education Courses (65 credit hours) Credit Hours

Chemistry	CHEM 101, 102	8
Information and Computer Science	ICS 103	3
English	ENGL 101, 102, 214	9
Islamic and Arabic Studies	IAS 101, 111, 201, 212, 301, 311, 4xx	14
Mathematics	MATH 101, 102, 201, 202	14
Physical Education	PE 101, 102	2
Physics	PHYS 101, 102, 201	12
Social Sciences	GS xxx	3
		65

(b) Core Courses (40 Credit hours)

Introduction to Geophysics	GEOP 202	3
Introduction to Seismology	GEOP 204	3
Computational Geophysics	GEOP 205	3
Seismic Exploration I	GEOP 315	3
Seismic Data Processing	GEOP 320	3
Senior Project	GEOP 402	3
Gravity and Magnetic Exploration	GEOP 404	3
Seminar	GEOP 405	1
Electrical Exploration	GEOP 450	3
Physical Geology	GEOL 201	3
Structural Geology	GEOL 305	3
Regional Geology	GEOL 318	3
Classical Mechanics I	PHYS 301	3
Electricity and Magnetism I	PHYS 305	3
		40

(c) Geophysics Elective Courses (6 Credit Hours)

Each student must take two additional geophysics courses to a total of six credit hours from the following:

Seismic Exploration II	GEOP 415	3
Geophysical Well Logging	GEOP 430	3
Geodynamics	GEOP 455	3
Paleomagnetism	GEOP 465	3
Geophysical Engineering	GEOP 470	3
Meteorology and Climatology	GEOP 472	3
Environmental Geophysics	GEOP 475	3
Data Inversion in Geophysics	GEOP 478	3
Special Topics	GEOP 480	3

(d) Mathematics Elective Courses (3 credit hours)

Each student must take at least three credit hours numbered 200 or above in Mathematics after consultation with the advisor.

(e) Geology Elective Courses (3 Credit Hours)

Each student must take at least three credit hours numbered 200 or above in Geology after consultation with the advisor.

(f) Free Elective Courses (6 credit hours)

Students are required to complete at least six credit hours of courses numbered 200 or above from the Engineering and/or Sciences and that are approved by the advisor.

(g) Summer Training (GEOP 399, 2 credit hours)

Each student must spend eight weeks in a firm or institution that conducts geophysical activities, after which he must submit a formal written report and give an oral presentation.

(h) Total Requirements (125 credits)

The total required credits for the B.S. degree in geophysics is 125 semester-credit-hours.

Geophysics Curriculum

COURSE	TITLE	LT	LB	CR	COURSE	TITLE	LT	LB	CR
Preparatory Year									
ENGL 001	Preparatory English I	15	5	8	ENGL 002	Preparatory English II	15	5	8
MATH 001	Preparatory Math I	3	1	4	MATH 002	Preparatory Math II	3	1	4
PYP 001	Prep. Physical Sciences	2	0	2	PYP 002	Prep. Computer Sciences	0	2	1
PYP 003	University Study Skills	0	2	1	ME 003	Prep. Eng. Technology	0	2	1
PE 001	Prep. Physical Educ. I	0	2	1	PE 002	Prep. Physical Educ. II	0	2	1
		20	**10**	**16**			**18**	**12**	**15**
Total credit hours required in Preparatory Program: 31									
First Year (Freshman)									
CHEM 101	General Chemistry I	3	4	4	CHEM 102	General Chemistry II	3	4	4
ENGL 101	Intro. to Acad. Discourse	3	0	3	ICS 103	Programming in C	2	3	3
IAS 111	Belief & its Consequences	2	0	2	ENGL 102	Intro. to Report Writing	3	0	3
MATH 101	Calculus I	4	0	4	MATH 102	Calculus II	4	0	4
PHYS 101	General Physics I	3	3	4	PHYS 102	General Physics II	3	3	4
PE 101	Physical Education I	0	2	1	PE 102	Physical Education II	0	2	1
		15	**9**	**18**			**15**	**12**	**19**
Second Year (Sophomore)									
GEOP 202	Intro. to Geophysics	3	0	3	GEOP 204	Introduction to Seismology	3	0	3
GEOL 201	Physical Geology	2	3	3	GEOP 205	Computational Geophysics	3	0	3
IAS 101	Practical Grammar	2	0	2	ENGL 214	Acad. & Prof. Comm.	3	0	3
MATH 201	Calculus III	3	0	3	IAS 212	Professional Ethics	2	0	2
PHYS 201	General Physics III	3	3	4	MATH 202	Elem. of Diff. Equations	3	0	3
		13	**6**	**15**			**14**	**0**	**14**
Third Year (Junior)									
GEOP 315	Seismic Exploration I	2	3	3	GEOP 320	Seismic Data Processing	2	3	3
GEOL 305	Structural Geology	2	3	3	GEOL 318	Regional Geology	3	0	3
IAS 201	Writing for Prof. Needs	2	0	2	GEOL xxx	(Geology Elective)	3	0	3
PHYS 301	Classical Mechanics I	3	0	3	IAS 322	Human Rights in Islam	2	0	2
MATH xxx	(Math Elective)	3	0	3	XXX xxx	(Free Elective I)	3	0	3
		12	**6**	**14**			**13**	**3**	**14**
Summer Session					GEOP 399	Summer Training	**0**	**0**	**2**
Fourth Year (Senior)									
GEOP 402	Senior Project	1	6	3	GEOP 404	Gravity and Magnetic Expl.	3	0	3
GEOP xxx	Geophysics Elective I	3	0	3	GEOP 405	Seminar	1	0	1
GEOP 450	Electrical Exploration	3	0	3	GS xxx	(Social or Behav. Science)	3	0	3
PHYS 305	Elec. & Magnetism I	3	0	3	IAS 4xx	IAS Elective	2	0	2
IAS 301	Styles of Literature	2	0	2	XXX xxx	Free Elective II	3	0	3
					GEOP xxx	Geophysics Elective II	3	0	3
		12	**6**	**14**			**15**	**0**	**15**
Total credit hours required in Degree Program: 125									

DEPARTMENT OF ISLAMIC AND ARABIC STUDIES

Chairman:

DR. MESFER ALI AL-GAHTANI

Faculty

Abu Amsha	Al-Ghahtani S.	Al-Muzaini	Hethlen
Abu Sagar	Al-Humaidan	Al-Nemari	Howsawi
Afzal	Al-Khulai	Al-Osail	Hussien
Al-Abri	Al-Mashooqi	Al-Shalhoob	Kadi
Al-Assaf	Al-Matoug	Al-Twaigri	Khedair
Al-Baridi	Al-Mubarak A.	Al-Zahrani	Moftah
Al-Damer	Al-Mubarak A.M.	Al-Zamil	Sendi
Al-Dukayyil	Al-Mulla	Ashoor	
Al-Ghahtani M.	Al-Mutrif	Hajj Ibrahim	

The Islamic and Arabic studies department is a service department. Its responsibilities include the broadening of students' knowledge and general education in history, social behaviors and other disciplines within the context of the Islamic culture in which KFUPM graduates are expected to practice their professions. A second major objective of the courses offered by the Department is to enrich the students' knowledge and utilization of the Arabic language in effective written and spoken communication. Furthermore, an attempt is made to develop in the students an appreciation of Arabic not only as a language of poetry, literature and religion, but also as one of science and technology. Above all, the foremost objective of these courses is to revitalize the Islamic and Arabic foundations of the students as they embark on their future life with an Islamic perspective.

With respect to the students the department aims to achieve the following goals:

- Impart a moderate perspective of Islam
- Safeguard their thought and belief from harmful influences
- Impart knowledge about rulings of Shariah that are relevant for everyday life
- Mould the character of the student according to Islamic morals and ethics
- Improve communication skills to enable the students to excel in their respective fields
- Provide background about international relations, politics and economics
- Provide them with the ability to collect relevant information from diverse and varied resources.

In order to achieve these goals, all students at KFUPM, are required to take a total of 14 semester credit hours in Islamic and Arabic Studies before they are considered for graduation. It is not permitted to register two subjects in one semester except for those who are nearing graduation, after getting approval from the department.

Furthermore the department serves the general community through consulting services in matters related to the Arabic language, religion, ethics and culture and also offers symposia and short courses. It also provides cultural enlightenment through continued contribution to mass communication media such as television, radio and newspapers.

The University wide-requirements for students are outlined in the following table.

1. Required Islamic Culture Courses (8 Credit Hours)

Each undergraduate student must successfully complete eight semester credit hours in Islamic Culture in the following manner. Each of the requirements will be offered in English for non-Arabic speaking student; in all other cases, Arabic will be the language of instruction:

(a) Required Courses (6 credit hours)		**Credit Hours**
Freshman year		
Belief and its Consequences	IAS 111	2
Sophomore year		
Professional Ethics	IAS 212	2
Junior year		
Human Right in Islam	IAS 322	2
		6

(b) Elective Courses (2 Credit Hours)

In addition to the courses required in (a) above, each senior year student, except for students of Industrial Management, must select one of the following courses:

		Credit Hours
Contemporary Islamic World	IAS 411	2
As-Sirah An-Nabawiyyah	IAS 416	2
Contemporary Financial Transactions in Islam	IAS 418	2
Inimitability of Al-Qur'an	IAS 419	2

The above courses are elective courses for graduating students according to the requirements of the graduation plan for every academic department in KFUPM.

Option for Non-Muslims

After consultation with and approved by their advisors, non-Muslim students may choose from the courses mentioned in section 3 below substitute elective courses for the 'Requirements in Islamic Culture Courses' as specified above.

2. Required Arabic Language Courses (6 Credit Hours)

(a) Required courses for Arabic-Speaking Students (6 credit hours)

Each Arabic-speaking undergraduate student must successfully complete all of the following two-credit-hour courses at the indicated class level:

		Credit Hours
Freshman year		
Practical Grammar	IAS 101	2
Sophomore year		
Writing for Professional Needs	IAS 201	2
Junior year		
Language Communication Skills	IAS 301	2
		6

(b) Required courses for Non-Arabic-Speaking Students

Each non-Arabic-speaking student is normally required to take a sequence of three two-credit-hour courses (IAS 131, 231, 331) in Arabic as a Second Language in lieu of IAS 101, 201, and 301 as follows. Students who are not interested in taking all or part of the above sequence may make appropriate substitution with the approval of the IAS Department.

		Credit Hours
Freshman year:		
(Arabic as a Second Language I) Reading & Writing	IAS 131	2
Sophomore year:		
(Arabic as a Second Language II) Grammar & Composition	IAS 231	2
Junior year:		
(Arabic as a Second Language III) Literature & Text	IAS 331	2
		6

3. Elective Courses in Social and Behavioral Sciences (6 Credit Hours)

A student can select any two courses from the following:

Information Searching Skills	GS 220	2
Industrial Sociology and Production	GS 221	3
Principles of Human Behavior	GS 321	3
International Relations	GS 423	3
Planning and Social Development	GS 424	3
Man and Environment	GS 427	3

DEPARTMENT OF MATHEMATICAL SCIENCES

Chairman:

DR. SULIMAN S. AL-HOMIDAN

Faculty

Abu-Dieh	Al-Sawi	Demir	Muttlak
Abuihlail	Al-Shakhs	El-Gebeily	Omar, M.
Abujiya	Al-Shallali	Fairag	Omar, S.
Abu-Sbeih	Al-Shammari	Fiagbedzi	Qadir (Adjunct)
Ahmed	Al-Shawish	Furati	Raburu
Ahsan (Adjunct)	Al-Shuaibi	Hogendijk (Adj.)	Rahimov
Al-Absi	Al-Smail	Ibrahim	Saifullah
Alaimia	Al-Zoubi	Iqbal	Saleh
Al-Assaf	Anabosi	Jibril	Samman
Alassar	Ansari	Joarder	Sarhan
Al-Attas	Arafeh	Kabbaj	Sharqawi
Al-Bar	Azad	Khan, A.	Shehadeh
Al-Daffa' (Adjunct)	Beg	Khan, S.	Siddiqi
Al-Furaidan	Bokhari, A.	Kharab	Tatar
Al-Garni	Bokhari, M.	Laradji	Tawfiq
Al-Homidan	Boucherif	Latif	Umar
Al-Humaidi	Chanane	Lyaghfouri	Yushau
Al-Labadi	Chaudhry, An	Malik	Zaman
Al-Momani	Chaudhry, As	Messaoudi	
Al-Rasasi	Cherid	Mimouni	
Al-Sabah	Dehwah	Mustafa	

Introduction

The Department of Mathematical Sciences offers four major programs: a four-year BS program in Mathematical Sciences, a four-year BS program in Statistics, a graduate program leading to an MS degree in Mathematical Sciences, and a Ph.D. program in Mathematical Sciences.

The Department is also responsible for teaching of mathematics courses at both the undergraduate and graduate levels in the Colleges of Science, Computer Sciences and Engineering, Engineering, Environment Design, and Industrial Management.

Vision

To be recognized internationally for excellence in research and teaching, and nationally for high-quality service.

Mission

The Department of Mathematical Sciences is committed to:

- provide effective and innovative graduate and undergraduate education to both math and non-math major students in order to prepare them to succeed in their further studies and careers;
- contribute high-quality basic and applied research, and utilize mathematical talent for the understanding and modeling of real-life problems;
- deepen the community appreciation of mathematical sciences and their role.

Goals

The objective of the BS program in mathematics is to prepare the students for career opportunities in educational institutions, industry, government organizations and other areas involving applications of mathematics. The program also prepares the students for graduate studies in mathematics and other research organizations using mathematical tools.

The program is broad-based and covers main streams of mathematics, namely; pure mathematics, applied mathematics, numerical analysis, and statistics. The curriculum is designed to strengthen both conceptual and computational talent of the students and as such the graduates will have a solid background to pursue higher educational programs as well as take up assignments in industry and other related practical fields.

Requirements for the B.S. Degree in Mathematics

(a) General Education Requirements (61 credit hours)

		(Credit Hours)
English	ENGL 101, 102	6
Communication Skills	ENGL 214	3
	IAS 101, 201, 301	6
Computing	ICS 101	3
Mathematics	MATH 101, 102, 201, 202	14
Natural Sciences	CHEM 101, 102	8
	PHYS 101, 102	8
Islamic & Arabic Studies	IAS 111, 212, 322, 4xx	8
Social & Behavioral Sciences	One GS Course	3
Physical Education	PE 101, 102	2
		61

(b) Mathematics Core Requirements (30 credit hours)

Introduction to Sets and Structures	MATH 232	3
Introduction to Linear Algebra	MATH 280	3
Methods of Applied Mathematics	MATH 301	3
Advanced Calculus I	MATH 311	3
Introduction to Numerical Computing	MATH 321	3
Modern Algebra I	MATH 345	3
Summer Training	MATH 399	2
Advanced Calculus II	MATH 411	3
Introduction to Complex Variables	MATH 430	3
Seminar in Mathematics	MATH 490	1
Introduction to Statistics	STAT 201	3
		30

(c) Electives

(i) Math Electives (15 credit hours)

Besides the core requirement, a student must satisfactorily complete at least 15 credit-hours of mathematics courses in consultation with his advisor. The selection of these courses should be made with a definite goal in mind with at least 9 credits from one of the following groups:

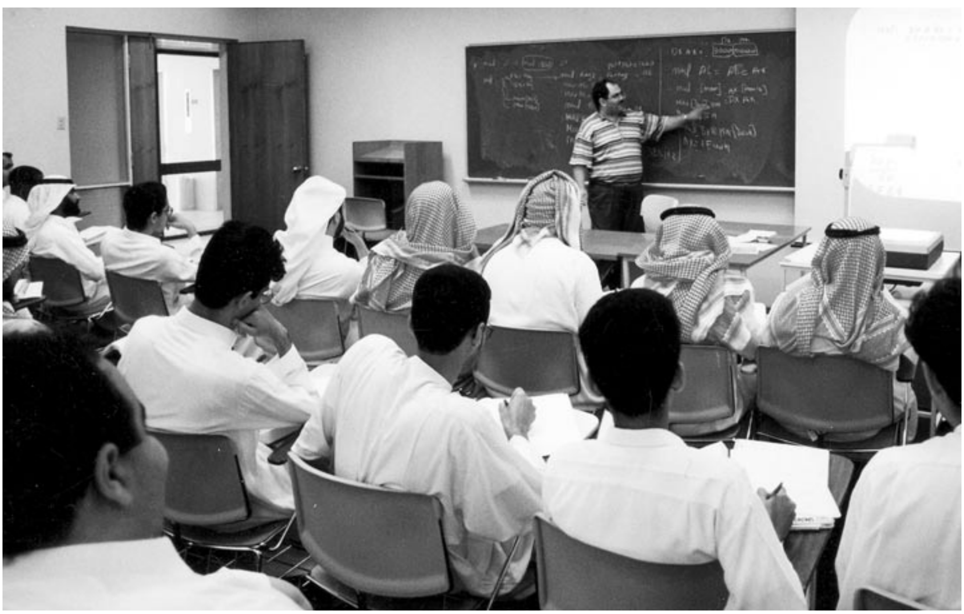
Pure Mathematics	MATH 330, 355, 412, 421, 425, 431, 440, 450, 452, 455, 460, 465, 470
Applied Mathematics and Numerical Analysis	MATH 401, 431, 442, 460, 465, 470, 471, 472, 480, 485, 495
Statistics	STAT 301, 302, 310, 325, 365, 415, 430, 435, 440

(ii) Free Electives (15 credit hours)

In addition, the students are also required to complete at least 15 credit hours of free elective courses which must include at least 9 credit hours of non-math courses. At least two of these elective courses must be numbered 300 or above. These courses should not be chosen at random but rather with a definite objective in mind and so as to form an integrated part of the degree program.

(d) Total Requirements (121 credit hours)

The total requirements for the B.S. degree in Mathematics is 121 semester-credit-hours.



Mathematics Curriculum

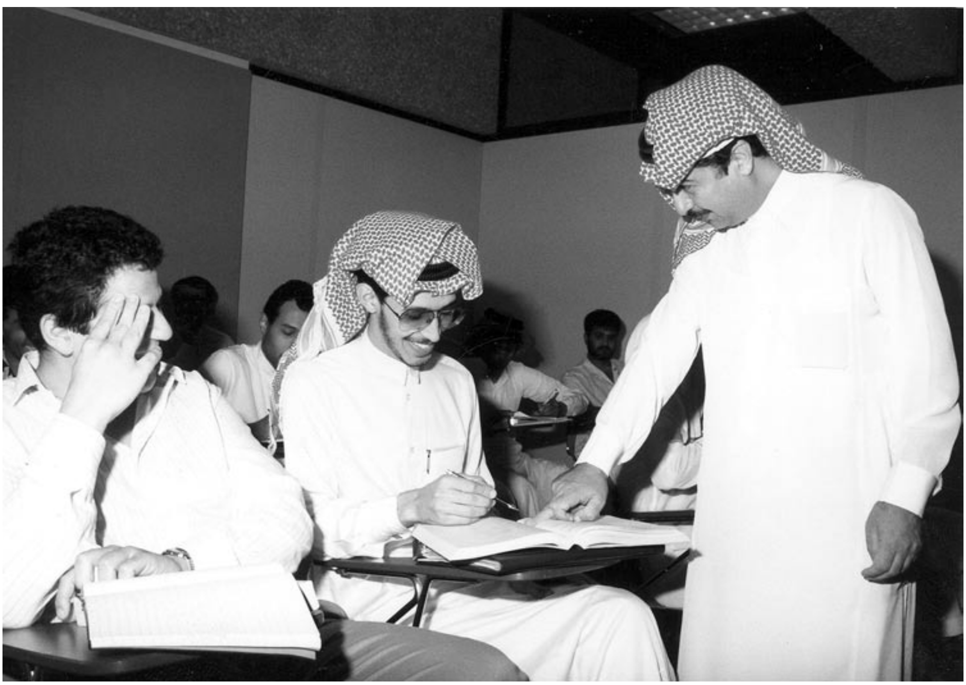
COURSE	TITLE	LT	LB	CR	COURSE	TITLE	LT	LB	CR
Preparatory Year									
ENGL 001	Preparatory English I	15	5	8	ENGL 002	Preparatory English II	15	5	8
MATH 001	Preparatory Math I	3	1	4	MATH 002	Preparatory Math II	3	1	4
PYP 001	Prep. Physical Sciences	2	0	2	PYP 002	Prep. Computer Sciences	0	2	1
PYP 003	University Study Skills	0	2	1	ME 003	Prep. Eng. Technology	0	2	1
PE 001	Prep. Physical Educ. I	0	2	1	PE 002	Prep. Physical Educ. II	0	2	1
		20	**10**	**16**			**18**	**12**	**15**
Total credit hours required in Preparatory Program: 31									
First Year (Freshman)									
CHEM 101	General Chemistry I	3	4	4	CHEM 102	General Chemistry II	3	4	4
ENGL 101	Intro. to Acad. Discourse	3	0	3	ENGL 102	Intro. to Report Writing	3	0	3
ICS 101	Computer Programming	2	3	3	IAS 111	Belief and its Consequences	2	0	2
MATH 101	Calculus I	4	0	4	MATH 102	Calculus II	4	0	4
PE 101	Physical Education I	0	2	1	PE 102	Physical Education II	0	2	1
PHYS 101	General Physics I	3	3	4	PHYS 102	General Physics II	3	3	4
		15	**12**	**19**			**15**	**9**	**18**
Second Year (Sophomore)									
ENGL 214	Acad. & Prof. Comm.	3	0	3	GS xxx	General Studies Elective	3	0	3
IAS 212	Professional Ethics	2	0	2	IAS 101	Practical Grammar	2	0	2
MATH 201	Calculus III	3	0	3	MATH 202	Elem Diff Equations	3	0	3
MATH 232	Intro. Sets & Structures	3	0	3	MATH 280	Intro. Linear Algebra	3	0	3
STAT 201	Intro. to Statistics	2	2	3	MATH 345	Modern Algebra I	3	0	3
		13	**2**	**14**			**14**	**0**	**14**
Third Year (Junior)									
IAS 322	Human rights in Islam	2	0	2	IAS 201	Writing for Prof. Needs	2	0	2
MATH 301	Methods of Applied Math	3	0	3	MATH 411	Advanced Calculus II	3	0	3
MATH 311	Advanced Calculus I	3	0	3	MATH xxx	MATH Elective I	3	0	3
MATH 321	Intro. to Numerical Comp.	3	0	3	MATH xxx	MATH Elective II	3	0	3
XXX xxx	Free Elective I	3	0	3	XXX xxx	Free Elective II	3	0	3
		14	**0**	**14**			**14**	**0**	**14**
Summer Session					MATH 399	Summer Training	**0**	**0**	**2**
Fourth Year (Senior)									
IAS 301	Oral Communication Skills	2	0	2	IAS 4xx	IAS Elective	2	0	2
MATH xxx	MATH Elective III	3	0	3	MATH 430	Intro. Complex Variables	3	0	3
MATH xxx	MATH Elective IV	3	0	3	MATH 490	Seminar in Math	1	0	1
XXX xxx	Free Elective III	3	0	3	MATH xxx	MATH Elective V	3	0	3
XXX xxx	Free Elective IV	3	0	3	XXX xxx	Free Elective V	3	0	3
		14	**0**	**14**			**12**	**0**	**12**
Total credit hours required in Degree Program: 121									

B.S. Degree in Statistics

Objectives of the Program

Statistics is the science that deals with collecting data, analyzing it and making decisions from it. A statistician is a value asset in every industry from the design stage, through the data collection stage to the analysis. The input of the statistician is essential for the success of every endeavor.

The objective of the BS program in Statistics is to prepare students for career opportunities in industry and government, as well as the private sector in such fields as business, banking, insurance, health, and for further graduate studies. The program has a good balance of theory, applications and data analysis, as well as carefully selected sequences of courses from computer science, management information systems, accounting and finance, and management and marketing. This interdisciplinary approach is meant to make the program flexible, and give the students a broad base of education, improving their chances of employment. Graduates of the program are well-qualified statisticians with good knowledge in computing, information systems, management and marketing.



Requirements for the B.S. Degree in Statistics

General Education Requirements (67 credit hours)

		(Credit Hours)
English	ENGL 101, 102	6
Communication Skills	ENGL 214	3
	IAS 101, 201, 301	6
Computer Programming	ICS 103	3
Islamic & Arabic Studies	IAS 111, 212, 322, 4xx	8
Mathematics	MATH 101, 102, 201, 202	14
Natural Sciences	CHEM 101, 102	8
	PHYS 101, 102	8
Physical Education	PE 101, 102	2
Social and Behavioral Sciences	ECON 101	3
	MIS 105	3
	One GS course	3
		67

Core Requirements (26 credit hours)

Introduction to Linear Algebra	MATH 280	3
Introduction to Numerical Computing	MATH 321	3
Introduction to Statistics	STAT 201	3
Introduction to Probability Theory	STAT 301	3
Statistical Inference	STAT 302	3
Regression Analysis	STAT 310	3
Data Collection and Sampling Methods	STAT 365	3
Experimental Design	STAT 430	3
Senior project in Statistics	STAT 470	2
		26

Statistics Electives (12 credit hours)

Students must take four (4) out of the following courses:

STAT 320	Statistical Quality Control
STAT 325	Nonparametric Statistical Methods
STAT 355	Demographic Methods
STAT 361	Operations Research I
STAT 375	Categorical Data Analysis
STAT 415	Stochastic Processes
STAT 435	Linear Models
STAT 440	Multivariate Analysis
STAT 460	Time Series
STAT 461	Operations Research II
STAT 475	Statistical Models for Lifetime Data
STAT 499	Topic in Statistics.

Other Electives (15 credit hours)

- Students should choose four (4) courses from one of the following groups:

  Group I: ICS 201, 202, 252, 334
  MIS 301, 340, 401, 410, 425.

  Group II: ACCT 201, 202
  ECON 202
  FIN 301, 302
  MGT 210, 301
  MKT 301, 345.

  Group III: Courses from any department with the approval of the adviser.

- In addition, students must take one technical elective course.

(d) Summer Training (2 credit hours)

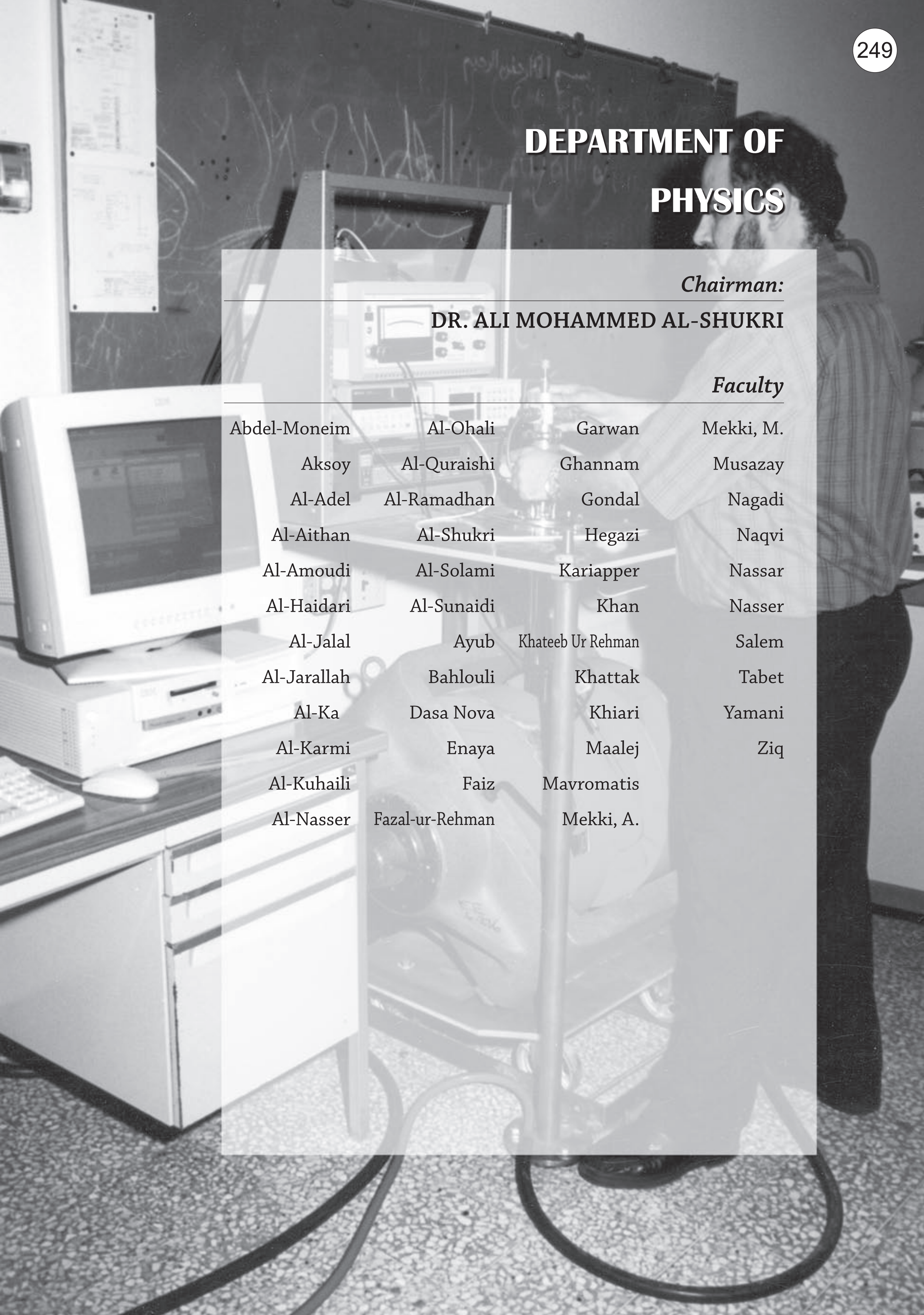
Students are required to spend eight weeks working in industry prior to the term in which they expect to graduate.

(e) Total Requirements (122 credit hours)

The total requirements for the B.S. degree in Statistics are 122 semester-credit-hours.

Statistics Curriculum

COURSE	TITLE	LT	LB	CR	COURSE	TITLE	LT	LB	CR
Preparatory Year									
ENGL 001	Preparatory English I	15	5	8	ENGL 002	Preparatory English II	15	5	8
MATH 001	Preparatory Math I	3	1	4	MATH 002	Preparatory Math II	3	1	4
PYP 001	Prep. Physical Sciences	2	0	2	PYP 002	Prep. Computer Sciences	0	2	1
PYP 003	University Study Skills	0	2	1	ME 003	Prep. Eng. Technology	0	2	1
PE 001	Prep. Physical Educ. I	0	2	1	PE 002	Prep. Physical Educ. II	0	2	1
		20	**10**	**16**			**18**	**12**	**15**
Total credit hours required in Preparatory Program: 31									
First Year (Freshman)									
CHEM 101	General Chemistry I	3	4	4	CHEM 102	General Chemistry II	3	4	4
ENGL 101	Intro. to Acad. Discourse	3	0	3	ENGL 102	Intro. to Report Writing	3	0	3
IAS 111	Belief and Its Consequences	2	0	2	ICS 103	Computer Programming	2	3	3
MATH 101	Calculus I	4	0	4	MATH 102	Calculus II	4	0	4
PE 101	Physical Education I	0	2	1	PE 102	Physical Education II	0	2	1
PHYS 101	General Physics	3	3	4	PHYS 102	General Physics II	3	3	4
		15	**9**	**18**			**15**	**12**	**19**
Second Year (Sophomore)									
ECON 101	Principles of Economics	3	0	3	IAS 101	Practical Grammar	2	0	2
ENGL 214	Acad. & Prof. Comm.	3	0	3	MATH 202	Elem. Diff. Equations	3	0	3
IAS 212	Professional Ethics	2	0	2	MATH 280	Intro. to Linear Algebra	3	0	3
MATH 201	Calculus III	3	0	3	MIS 105	Intro. to Comp. Concepts	2	2	3
STAT 201	Introduction to Statistics	2	2	3	XXX xxx	Technical Elective I	3	0	3
		13	**2**	**14**			**13**	**2**	**14**
Third Year (Junior)									
GS xxx	GS Elective	3	0	3	IAS 201	Writing for Prof. Needs	2	0	2
IAS 322	Human Rights in Islam	2	0	2	STAT 302	Statistical Inference	3	0	3
MATH 321	Intro. to Numerical Computing	3	0	3	STAT 365	Data Collection and Sampling Methods	3	0	3
STAT 301	Intro. to Prob. Theory	3	0	3	STAT xxx	STAT Elective I	3	0	3
STAT 310	Regression Analysis	3	0	3	XXX xxx	Technical Elective II	3	0	3
		14	**0**	**14**			**14**	**0**	**14**
Summer Session					STAT 399	Summer Training	**0**	**0**	**2**
Fourth Year (Senior)									
IAS 301	Oral Communication Skills	2	0	2	IAS 4xx	IAS Elective	2	0	2
STAT 430	Experimental Design	3	0	3	STAT 470	Senior Project in Stat	1	3	2
STAT xxx	STAT Elective II	3	0	3	STAT xxx	STAT Elective IV	3	0	3
STAT xxx	STAT Elective III	3	0	3	XXX xxx	Technical Elective IV	3	0	3
XXX xxx	Technical Elective III	3	0	3	XXX xxx	Technical Elective V	3	0	3
		14	**0**	**14**			**12**	**3**	**13**
Total credit hours required in Degree Program: 122									



DEPARTMENT OF PHYSICS

Chairman:

DR. ALI MOHAMMED AL-SHUKRI

Faculty

Abdel-Moneim	Al-Ohali	Garwan	Mekki, M.
Aksoy	Al-Quraishi	Ghannam	Musazay
Al-Adel	Al-Ramadhan	Gondal	Nagadi
Al-Aithan	Al-Shukri	Hegazi	Naqvi
Al-Amoudi	Al-Solami	Kariapper	Nassar
Al-Haidari	Al-Sunaidi	Khan	Nasser
Al-Jalal	Ayub	Khateeb Ur Rehman	Salem
Al-Jarallah	Bahlouli	Khattak	Tabet
Al-Ka	Dasa Nova	Khiari	Yamani
Al-Karmi	Enaya	Maalej	Ziq
Al-Kuhaili	Faiz	Mavromatis	
Al-Nasser	Fazal-ur-Rehman	Mekki, A.	

Introduction

Physics deals with the study of natural phenomena originating from matter, motion, and energy. It therefore represents the foundation of all scientific, technological and engineering disciplines. The main purpose of physics is to understand and describe the apparent complexities of nature with as few unifying concepts as possible.

The teaching efforts of the Physics Department at the undergraduate level have two main objectives:

- to provide science and engineering students with the basic knowledge of physics principles necessary for their respective studies;
- to provide advanced and specialized training for students who seek a deeper understanding of the physical world.

The first objective is met by the Department's offering of a series of introductory physics courses, and the second by providing an advanced program leading to a bachelor's degree.

A student pursuing the bachelor degree program will not only become familiar with basic physics principles and applications, but will also study the underlying fundamental concepts of the structure of matter and the nature of the universe. In addition, a Physics graduate is well prepared for a career in any one of the Kingdom's rapidly expanding technological sectors and for possible advanced study either at home or abroad.

Vision

The physics department aspires to be one of the leading departments in teaching, research, and community services.

Mission

The Physics Department is committed to providing the best education possible in basic and applied physics. It strives to insure high quality teaching and research, valuable services to the community, and effective contribution to the development of the country.

Goals

- Provide solid general physics course instruction
- Provide high quality education and training to undergraduate and graduate physics majors to prepare them for their future careers
- Conduct basic and applied physics research
- Provide consulting, short courses, training, outreach activities and community services.

Strategy

- Excels in teaching by maintaining rigorous course curricula, using sound teaching methods, continuously assessing the program and making necessary improvements
- Prepare physics students for successful careers by instilling in them the required physics knowledge, skills and work ethics through close interaction with the faculty and involvement in physics projects
- Provide resources and opportunities for faculty to enhance their skills, teaching and research abilities to maintain a high level of performance
- Support and promote collaboration between faculty members, with other departments, and the industry in interdisciplinary research
- Identify and provide relevant services to the community.

Requirements for the B.S. Degree in Physics

The Department expects every student majoring in Physics to acquire a basic knowledge of:

Classical mechanics
Electromagnetism, wave and optical phenomena
Quantum mechanics and its applications to simple physical systems
Kinetic theory, thermodynamics, and statistical mechanics
Experimental physics.

The required courses are designed in such a way to ensure that every student graduating in physics has proficiency in all of the above five areas of physics.

The introductory course sequence of general Physics 101, 102, 211 and 212 covers the entire subject matter of physics at an elementary level. Mechanics is dealt with in Physics 301 at the intermediate level. Physics 305 and Physics 306 give the required knowledge and competency in classical electrodynamics. The wave components of Physics 211, and Physics 306 will provide an appreciation of waves in physics. Quantum mechanics and its applications will be dealt with in Physics 401 and Physics 402. Physics 430 will examine the statistical and thermal description of many particle systems. Students will have ample opportunity to learn experimental techniques in Physics 211, 212, 303, 304 and 403.

To qualify for graduation with a B.S. in Physics, a student must fulfill the following:

Each student majoring in physics must complete a total of 123 credit hours according to the following distribution:

General Education Courses (61 credit hours)		Credit Hours
Chemistry	CHEM 101, 102	8
Computer Programming	ICS 101	3
English	ENGL 101, 102, 214	9
Islamic & Arabic Studies	IAS 101, 111, 201, 212, 301, 322, 4xx	14
Mathematics	MATH 101, 102, 201, 202	14
Physics	PHYS 101, 102	8
Physical Education	PE101, PE 102	2
Social or Behavioral Sciences	GS xxx	3
		61

Core Courses (33 credit hours)		
Optics &Modern Physics	PHYS 211 & 212	7
Classical Mechanics I	PHYS 301	3
Experimental Physics	PHYS 303, 304, & 403	7
Electricity & Magnetism	PHYS 305 & 306	6
Quantum Mechanics	PHYS 401 & 402	6
Physics Seminar	PHYS 409	1
Thermal & Statistical Physics	PHYS 430	3
		33

Physics Elective Courses (12 credit hours)

Each student must take a total of 12 credit hours from the following Physics elective courses:

Classical Mechanics II	PHYS 302	3
Laser Molecular Spectroscopy	PHYS 307	3
Astrophysics	PHYS 315	3
Physics of Nuclear Reactors	PHYS 323	3
Radiation & Health Physics	PHYS 353	4
Introduction to Medical Physics	PHYS 365	3
Methods of Theoretical Physics	PHYS 371	3
Intro. to Computational Physics	PHYS 373	3
Selected Experiments in Physics	PHYS 404	2
Advanced Optics	PHYS 411	3
Physics of Lasers	PHYS 412	3
Cosmology and the Early Universe	PHYS 416	3
Nuclear & Particle Physics	PHYS 422	3
Introduction to Solid State Physics	PHYS 432	3
Intro. to the Physics of Surface	PHYS 434	3
Superconductivity	PHYS 435	3
Particle Physics	PHYS 441	3
Relativistic Quantum Mechanics	PHYS 442	3
Introduction to Plasma Physics	PHYS 461	3
Selected Topics in Physics	PHYS 493	3
Guided Studies	PHYS 495	1

Mathematics Electives (6 credit hours)

Free Electives (9 credit hours)

Each student is expected to take 9 credit hours of free electives where at least 6 credit hours should be from outside his program.

Summer Training (2 credit hours)

Summer Training	PHYS 399	2

Students are required to spend one summer working in industry prior to the term in which they expect to graduate. They will be required to write a report and present it in a seminar at the Department.

Total Requirements (123 credit hours)

The total requirements for the B.Sc. degree in Physics is 123 semester-credit-hours.

Physics Curriculum

COURSE	TITLE	LT	LB	CR	COURSE	TITLE	LT	LB	CR
Preparatory Year									
ENGL 001	Preparatory English I	15	5	8	ENGL 002	Preparatory English II	15	5	8
MATH 001	Preparatory Math I	3	1	4	MATH 002	Preparatory Math II	3	1	4
PYP 001	Prep. Physical Sciences	2	0	2	PYP 002	Prep. Computer Sciences	0	2	1
PYP 003	University Study Skills	0	2	1	ME 003	Prep. Eng. Technology	0	2	1
PE 001	Prep. Physical Educ. I	0	2	1	PE 002	Prep. Physical Educ. II	0	2	1
		20	**10**	**16**			**18**	**12**	**15**
Total credit hours required in Preparatory Program: 31									
First Year (Freshman)									
CHEM 101	General Chemistry I	3	4	4	CHEM 102	General Chemistry II	3	4	4
ENGL 101	Intro. to Acad. Discourse	3	0	3	ENGL 102	Intro. to Report Writing	3	0	3
IAS 111	Belief and its Consequences	2	0	2	MATH 102	Calculus II	4	0	4
MATH 101	Calculus I	4	0	4	PE 102	Physical Education II	0	2	1
PE 101	Physical Education I	0	2	1	PHYS 102	General Physics II	3	3	4
PHYS 101	General Physics I	3	3	4					
		15	**9**	**18**			**13**	**9**	**16**
Second Year (Sophomore)									
ENGL 214	Tech. Rep. Writing	3	0	3	IAS 212	Professional Ethics	2	0	2
IAS 101	Practical Grammar	2	0	2	MATH 202	Elementary Diff. Equations	3	0	3
MATH 201	Calculus III	3	0	3	MATH xxx	(Math Elective I)	3	0	3
PHYS 211	Optics	2	3	3	PHYS 212	Modern Physics	3	3	4
ICS 101	Computer Program	2	3	3	XXX xxx	(Free Elec. I)	3	0	3
		12	**6**	**14**			**13**	**3**	**15**
Third Year (Junior)									
IAS 201	Writing for Prof. Needs	2	0	2	IAS 322	Human Rights in Islam	2	0	2
GS xxx	Social & Behavioral Sciences	3	0	3	PHYS 304	Experimental Physics II	1	3	2
PHYS 301	Classical Mechanics I	3	0	3	PHYS 306	Electricity & Magnetism II	3	0	3
PHYS 303	Experimental Physics I	2	3	3	XXX xxx	(Free Elective II)	3	0	3
MATH xxx	(Math Elective II)	3	0	3	PHYS 401	Quantum Mech. & Appl. I	3	0	3
PHYS 305	Electricity & Magnetism I	3	0	3					
		16	**3**	**17**			**12**	**3**	**13**
Summer Session					PHYS 399	Summer Training	**0**	**0**	**2**
Fourth Year (Senior)									
IAS 301	Oral Communication Skills	2	0	2	IAS 4xx	(Islamic Studies Elective)	2	0	2
PHYS 402	Quantum Mech. & Appl. II	3	0	3	PHYS xxx	(Physics Elective II)	3	0	3
PHYS 403	Senior Physics Lab	0	6	2	PHYS 4xx	(Physics Elective III)	3	0	3
PHYS xxx	(Physics Elective I)	3	0	3	PHYS 4xx	(Physics Elective IV)	3	0	3
PHYS 409	Physics Seminar	1	0	1	XXX xxx	(Free Elective III)	3	0	3
PHYS 430	Thermal & Stat. Physics	3	0	3					
		12	**6**	**14**			**14**	**0**	**14**
Total credit hours required in Degree Program: 123									

DEANSHIP OF EDUCATIONAL SERVICES

Dean:

DR. MUHAMMAD SALEH AL-MULHEM

Asst. Dean, Prep-Year Affairs:

DR. HATTAN ZAINULABIDEEN TAWFIQ

Asst. Dean, Continuing Education Programs:

DR. MOHAMMAD ABDULAZIZ AL-SUNAIDI

Programs & Centers

PREPARATORY YEAR PROGRAM

ENGLISH LANGUAGE CENTER

PHYSICAL EDUCATION DEPARTMENT

Preparatory Year Program

The preparatory Year program at King Fahd University of Petroleum & Minerals is a separate academic division and is an essential element in the University curriculum.

The Preparatory Year Program at KFUPM aims at preparing newly admitted students for their undergraduate studies at the University. The specific objectives of the program are :

This program has six major objectives:

1) to improve students English language proficiency, with some emphasis on scientific, technical and business applications in preparation for the University courses;

2) to review and reinforce the students' knowledge of mathematical and analytical techniques through the medium of English;

3) to consolidate the students' knowledge of basic science, and computer science through the medium of English;

4) to provide students with the study skills needed for effective learning, and the necessary career guidance for informed choice of academic majors;

5) to provide students with experience in innovation, design, manufacturing and diagnostics through the medium of technical studies;

6) to develop fitness techniques and health strategies relevant to students' physical well-being.

In addition, the University also provides teachers and personnel for courses in math, mechanical and systems engineering, Physical sciences, and physical education from the College of Sciences, the College of Engineering Sciences, College of computer Sciences and Engineering, and the Physical Education Department. The advantage of having teachers who are directly familiar with the requirements of university-level work is felt in the preparation and assistance they are able to give students in the Preparatory Year Program.

Throughout the Preparatory Year, special meetings are arranged between students and the chairmen of the academic departments or deans of the colleges in order to clarify the requirements and expectations a student must meet in those fields of study. These meetings culminate in activities where students have a chance not only to see presentations both by the University's academic departments and by large industrial or commercial concerns in which they may some day seek employment, but also to try their hand at many practical demonstrations which are designed to give them a better idea of the kinds of experiences and activities involved in different types of work and study.

Regular tutorial sessions are also held in locations close to classrooms and throughout the academic day in order to render additional instructional assistance to students. Faculty form the various Preparatory Year departments are available during scheduled tutorial office hours.

A testing program for placement purposes is conducted during the first week of each academic year. Some of the Preparatory Year requirements may be waived for students with exceptional scores on the placement tests. Grades earned in the Preparatory Year courses and standardized examinations are used at the end of the Preparatory Year to determine students' readiness for freshman year undergraduate studies.

CALENDAR OF STUDY

First Semester

			Credit Hours
Engl-001	Preparatory English-I	(15-5-8)	8
Math-001	Preparatory Math-I	(3-1-4)	4
PYP-001	Preparatory Physical Sciences	(2-0-2)	2
PYP-003	University Study Skills	(0-2-1)	1
PE-001	Preparatory Physical Education-I	(0-2-1)	1
			16

Second Semester

			Credit Hours
Engl-002	Preparatory English-II	(15-5-8)	8
Math-002	Preparatory Math-II	(3-1-4)	4
PYP-002	Preparatory Computer Sciences	(0-2-1)	1
ME-003	Preparatory Engineering Technology	(0-2-1)	1
PE-002	Preparatory Physical Education-II	(0-2-1)	1
			15

Total credit hours required in the Preparatory Year Programs : 31

(These credit hours are not carried forward to count towards students' undergraduate degrees.)

Continuing Education Programs

The Department of Continuing Education Programs offers short courses. These courses are designed for engineers, managers, and practitioners who are interested in pursuing further studies in their fields of specialization. The courses are open to all applicants who have the desire and the background to participate.

In addition, KFUPM offers specific "closed" short courses for any organization that needs to develop its personnel in specific areas.

Testing Center

Various international academic and professional examinations are administered through the Testing Center. These examinations include the TOEFL, the GMAT, the GRE, the CACA (Certificate of the Association of Chartered Accountants) and the SAT/ACH. It is expected that the number and range of examinations offered by the Testing Center will increase in the years to come.

The Center also conducts examinations to check the English proficiency of non-KFUPM graduate students who apply for post-graduate studies. Based on these results, recommendations are sent to the Dean of the College of Graduate Studies about their proficiency in English and their ability to pursue graduate studies at the university.

ENGLISH LANGUAGE CENTER

Dean:

DR. MUHAMMAD SALEH AL-MULHEM

Asst. Dean, Prep-Year Affairs:

DR. HATTAN ZAINULABIDEEN TAWFIQ

University English Program:

Director: **Anthony Gibson**

Faculty

Bianchi	Gibson	McLaren	Nee
Congreve	Horn	Moore, K.	Nicholas
Dale	Ismail	Morris, C.	Pryor
Davies	Jameson	Murray	Uprichard
Donovan	McGee	Nagy	Williams, J.
Fredericks			

Orientation English Program:

Director: **Daniel Bowles**

Faculty

Ablorh	Deacon	Hennessey	Portman
Armstrong	Debenham	Johnston	Powell
Baas	Doman	Kirk	Richards
Bankson	Dowling	Knight	Ross
Birkett	Ferguson	Lynn	Sienkiewicz
Bliss	Fitzsimmons	MacLeod	Sliwa
Bowles	Fletcher	Man-Cheung	Smith
Brigham	Flint	McCord	Snyman
Britton	Fogarty	McKey	Surran
Burdett	Foster	Miller	Sweeney
Burridge	Fry	Moloney	Telfer
Butterworth	Gaylard	Moore, D.	Thomas
Callaghan	Gibbons	Morris, A.	Unwin
Cannella	Golding	Nelson	Whittaker
Caraher	Gray	O'Heron	Williams, K.
Chapman	Hands	Paddock	Winters
Combes	Hanrahan	Pearson	

ENGLISH LANGUAGE CENTER

The English Language Center (ELC) is responsible for developing the English proficiency required in a university where English is the language of instruction. The ELC has two programs:

- the Orientation English Program (OEP)
- the University English Program (UEP).

The Orientation English Program

This intensive two-semester course, to which all new students are initially admitted, is designed to consolidate and develop the basic knowledge of English that the student has acquired in school. Four hours of English instruction per day are given. The course is specifically designed to help students develop all four language skills — reading, listening, writing and speaking - that they will need in order to succeed in their academic studies. Grammar and vocabulary instruction support these skills, as do projects and computer-based exercises. Alongside the development of language, the OEP courses also aim to help students develop the study skills and self-discipline necessary for success in their academic careers.

Through the integrated Orientation English Program the students' ability to cope with university-level work in a technical environment is improved. A particularly advantageous aspect of the English Language Center's program is that the course materials are designed, written, produced at the Center by its own staff for the specific needs of KFUPM students.

The student who successfully completes the course is equipped with a solid basis of English, on the strength of which he is able to commence his freshman studies. However, those students who can demonstrate that their use of English is already at a high-enough level on entering the Preparatory Year, either by their performance in internationally-recognized examinations or by passing the O.E.P. promotion exams, can bypass one or both of the OEP courses, a few proceeding directly to freshman studies.

The University English Program

The UEP offers three university-level writing courses: Composition I (An Introduction to Academic Discourse), Composition II (Introduction to Report Writing), and Academic & Professional Communication. The first of these offers broad introduction to academic discourse emphasizing writing on scientific and technical subjects from sources such as textbooks, encyclopedias, and specialist periodicals; there is also a strong reading element. The second course strengthens the skill of writing from sources and takes students up to the production of a term paper based on the resources of the university library; library skills figure prominently in this course. The third course, usually taken in sophomore or junior year, focuses on the writing of a technical report on a subject in the student's own major field of interest; other topics covered include abstracts, academic proposals and business communication. All these courses, along with exposure to English in the classroom, have the central objective of providing students with the linguistic competencies they need in their chosen field of specialization.

Other Features of the ELC

The Center moved to new premises in 2005 and is well-equipped with modern educational aids. Facilities exist for recording and playing both audio and video material.

English language instruction also takes place in the Computer Assisted Language Learning (CALL) Labs. There are nine labs, with a total of 238 work-stations connected to a server on a Local Area Network (LAN). Students have access to a range of material prepared by faculty members as well as commercial software and the facility to produce printed copies of written assignments.

The center serves both the KFUPM community and the community at large in a program of continuing education. Evening courses in English are offered each semester, and other, specialized courses are produced to meet the needs of local industry.

The English Language Center also provides professional editing services through the University Editing Board. Papers, theses and other documents prepared by professors and lecturers at KFUPM, which are to be published in academic journals and elsewhere, are edited by experienced ELC faculty members.

The Center also conducts examinations to check the English proficiency of non-KFUPM graduate students who apply for post-graduate studies. Based on these results, recommendations are sent to the Dean of Graduate Studies about their proficiency in English and their ability to pursue graduate studies at the University.

The English Language Center does not grant a degree but, for all Preparatory-Year students, success in the Orientation English Program (a grade C in both courses) is a requirement for promotion to the freshman year. University English Program courses, however, are credit-bearing courses in the degree programs of the various academic colleges.


THE MUSCULAR SYSTEM
LifeFitness

DEPARTMENT OF PHYSICAL EDUCATION

Chairman:

DR. ALI M. ABU-SALEH

Faculty

Abu Hilal	Al Swi	Hyoung
Abu Saleh	Basyuoni	Ibeid
Adejumo	De roo	Nour Eldeen
Al Ameer	Evans	Nuttal
Al Moslem	Gassor	Said, A.
Al Namory	Hamdan	Suter
Al Saif	Hasanain	Toal

The physical Education Program at KFUPM provides the opportunity for each student to benefit physically, mentally, and socially from a variety of sports activities. Its aims are:

- to develop the skills, knowledge, and attitudes essential to enjoyable participation in sports and recreation at all levels throughout university and professional life;
- to progressively develop socially acceptable and satisfying attitudes towards others, both in sports and work; and
- to stimulate and enhance physical, mental, and emotional health through the interrelationship of one person to another in sports.

Students are introduced to the program in a 2 semester Preparatory Year (PE 001, PE 002) and normally continue through the freshman and sophomore years. The successful completion of two semesters (PE 101, 102, 201, 202) at the university level is a requirement for the majority of B.S. degrees unless valid medical reasons for exemption are presented.

Physical Education activities during the Preparatory Year consist of a basic introduction to the majority of the courses taught at KFUPM. Included are

Athletics (Track & Field)	Swimming
Basketball	Fitness
Squash	Table Tennis.

Each introduction lasts for five weeks.

In subsequent years, students enroll for semester-long courses and study one sport in each semester. Activities are chosen prior to the commencement of the semester and choice may be made from sports covered during the Preparatory Year or from the following courses:

Fencing	Basketball
Judo	Volleyball
Karate	Football
Tae kwon do	Handball
Weight training	Badminton
Weight control	Squash
Physical Fitness	Swimming
Tennis	Table Tennis.

Sport Teams

Students may train and compete at a higher level by joining the team squads from which a representative selection is made. Students represent KFUPM at inter-club, Inter-university, provincial, national, and international levels. Team members frequently represent Saudi Arabia in International competition up to and including the level of the World Student Games.

Entry to a KFUPM team training squad is made on the assessment of a student's practical ability. Standards are high, the programs are rigorous and challenging, and the activities are designed to satisfy the serious competitor.

Students are actively encouraged to make use of the Department's many facilities for active leisure. Equipment and facilities ranging from table tennis paddles to floodlit football pitches are available on request.

Students requiring further information are requested to visit the Department offices located in the field house of the Track & Field Stadium.

PE Department Facilities

Sports and Recreation Facilities are in three large areas ideally situated on the main campus.

The mid-campus areas has

- a 25 meter indoor swimming pool,
- student shower and changing facilities,
- two soccer pitches (one with an artificial grass "superturf" surface),
- a handball/six-a-side court,
- five tennis courts, athletic track, four basketball, volleyball courts,
- four squash courts, a weight training room,
- two rooms equipped with television and video facilities to aid the teaching and coaching of all sports.

There is also an environmental chamber for use in Physical Education research plus administrative offices for the department.

The Sports Hall area located on the Jebel contains the latest in modern indoor physical education facilities. Included are areas for basketball, volleyball, gymnastics handball, squash, table tennis, judo, tae kwon do, karate, weight training, and many other sports activities. Shower and changing rooms plus seating areas for spectators are also provided. Adjacent to the gymnasium is Olympic-size swimming and diving pool with its own shower and changing rooms.

The third main area of sports facilities is a floodlit soccer and athletics stadium with seating for 10,000 people, an excellent field house and spectator facilities. The playing area is a "super turf" artificial grass field. A weight training room and physical therapy unit is also available in the stadium.

Sports and Recreation Activities

KFUPM has both intercollegiate athletic teams and intramural teams. University teams have traveled across Saudi Arabia to Riyadh and Jeddah and outside the Kingdom for athletic competitions. The intercollegiate sports in which University teams participate include basketball, football, volleyball, handball, swimming, table tennis, tennis, track and field, judo, karate, squash, badminton and tae kwon do.

At the intramural level, the teams from student housing area compete against each other in basketball, swimming, football, volleyball, track and field, and tennis.

ACADEMIC COURSES

KFUPM Course Abbreviations

Note:

- The parenthesized numerals, e.g. (3-3-4) in the following course descriptions indicate the weekly lecture hours, the weekly laboratory hours, and the credit hours for each course, respectively.
- Additional remarks and prerequisites, if any, are indicated at the end of the course description.

ACCOUNTING

ACCT 201 Principles of Accounting I (2-2-3)

Accounting principles and techniques underlying the preparation of the income statement and balance sheet of a business enterprise. An overview of generally accepted accounting principles as they relate to the recognition of revenues and expenses, and the valuation of assets and liabilities. Study of ethics in accounting. Utilization of basic accounting software packages.

Prerequisites: Sophomore Standing, MIS 105, MATH 132

ACCT 202 Principles of Accounting II (2-2-3)

Accounting principles and techniques underlying the financial statements of partnerships and corporations. Accounting for stocks and dividends. Accounting for bond issues. Statement of cash flows. Analysis of financial statements. Cost accounting systems for manufacturing concerns. Cost-volume-profit analysis, responsibility accounting, and budgeting. Cost-revenue analysis for decision making. Study of ethics in accounting. Utilization of basic accounting software packages.

Prerequisite: ACCT 201

ACCT 300 Accounting Information Systems (2-3-3)

Principles and concepts of providing information support for managerial activities in the functional areas of logistics, manufacturing, marketing, human resources, and finance. Internal control in manual and computerized accounting systems. Analysis, design, and implementation of accounting systems with emphasis on decision support systems, expert systems, and networked systems. Utilization of computerized general ledger packages. Exposure to ERP systems.

Prerequisites: ACCT 202, MIS 215

ACCT 301 Intermediate Accounting I (3-0-3)

Objectives of financial statements, and their preparation. In-depth study of generally accepted accounting principles with concentration on the valuation techniques and procedures underlying the financial statements. Accounting for current assets and current liabilities. Accounting for acquisition and disposition of plant assets including depreciation and depletion. Accounting for intangible assets. Study of ethics in accounting. Computer applications in financial accounting.

Prerequisite: ACCT 202

ACCT 302 Intermediate Accounting II (3-0-3)

Study of stockholders' equity including issuance and reacquisition of capital stock, dividends and retained earnings. Accounting for short-term and long-term investments in securities. Study of cash flows, price level adjustments, capital leases, and interpretation and analysis of financial statements. Study of ethics in accounting. Computer applications in financial accounting.

Prerequisite: ACCT 301

ACCT 303 Computer Control and Audit (3-0-3)

Auditing of computer-based information systems. Audit environment and information systems controls. Theory of internal control and the application of audit procedures in a computerized environment. Techniques for evaluating applications, data integrity, general operations, security, systems software and maintenance.

Prerequisite: ACCT 300

ACCT 304 International Accounting (3-0-3)

Objectives of international accounting. International accounting standards and organizations. Transnational financial reporting and disclosure problems. Accounting information systems and control for multinational operations. Financial planning for multinational operations. Accounting for foreign currency translation and inflation. Multinational taxation and transfer pricing. Consolidated financial statements for multinational operations. Accounting and Economic Development. Accounting for multinational corporate responsibility.

Prerequisite: ACCT 301 or Departmental Approval.

ACCT 305 Accounting for Governmental & Non-Profit Entities (3-0-3)

Accounting concepts and techniques for governmental operations including fund accounting. Financial reporting and disclosure problems of governmental and non-profit organizations. Budgetary control procedures for governmental and non-profit entities such as universities, hospitals, and charities. Computer applications in governmental and non-profit accounting.

Prerequisite: ACCT 301

ACCT 306 Zakat and Income Tax Accounting (3-0-3)

Fundamentals, rules, and objectives of taxation, Saudi Arabian tax and zakat regulations, assessment of income tax and zakat base, income tax and zakat rates, Department of Zakat and Income Tax procedures and rules, case studies.

Prerequisite: ACCT 202

ACCT 307 Islamic Financial Jurisprudence (3-0-3)

Commercial law in Islam, property rights, contracts, capital, types of ownership, sale contracts, bankruptcy, commercial paper, secured transactions and suretyship, agency estate and trust.

Prerequisite: ACCT 202

ACCT 351 Accounting Cooperative Work (0-0-9)

Twenty-eight (28) weeks of accounting practical training in a selected economic organization. The Department of Accounting and Management Information Systems approves the training program and monitors the student's progress during his Co-op period. Under the supervision of an accounting faculty member or a faculty member in a related discipline, the student writes an analytical report about his Co-op experience.

Prerequisites: Senior Standing, ACCT 402, 403, 404, & FIN 302

ACCT 401 Cost Accounting (3-0-3)

Cost terms and concepts. Cost behavior patterns and cost estimation. Cost-volume-profit analysis. Budgetary planning and control systems. Product costing systems including job order costing, process costing, joint products costing, operational costing, and backflush costing in manufacturing and service organizations. Activity-based-costing systems. Standard costing systems including flexible budgets and disposition of cost variances; cost variance reports and investigation of cost variances. Service departments costs allocation methodologies for product costing and cost control purposes. Cost information for short-term managerial decision making. Study of ethics in accounting. Computer applications in cost accounting.

Prerequisite: ACCT 202

ACCT 402 Managerial Accounting (3-0-3)

Behavioral and organizational foundations of managerial accounting. Probabilistic cost-volume-profit analysis. Cost information for short-term and long-term pricing decisions. Comprehensive revenue variance analysis. Balanced scorecard and strategic profitability analysis. Cost of quality and theory of constraints. Responsibility accounting and performance evaluation. Transfer pricing systems. Performance evaluation systems and multinational considerations. Study of ethics in accounting. Computer applications in managerial accounting.

Prerequisite: ACCT 401

ACCT 403 Advanced Accounting (3-0-3)

Study of accounting principles and procedures related to business combinations. Methods and techniques for preparing consolidated financial statements. Receiverships and statement of affairs. Accounting for formation, operation, and liquidation of partnerships. Accounting for branches, consignments, and joint-ventures. Study of ethics in accounting.

Prerequisite: ACCT 302

ACCT 404 Auditing (3-0-3)

Generally accepted auditing standards and procedures used by the external auditor. Professional ethics, professional responsibility, and legal liability of the external auditor. Audit concepts such as auditor's independence, fair presentation, and due professional care. Internal control evaluation and design of audit programs; collection of audit evidence including statistical sampling and analytical review; evaluation of audit evidence; arriving at audit conclusions. Development of working papers and audit reports. Assurance services. Uses of the computer as an audit tool. Utilization of generalized audit software packages. Information Technology and the audit process.

Prerequisites: ACCT 302, ACCT 303

ACCT 405 Accounting Theory & Research (3-0-3)

The development and structure of accounting theory, principles, and practices applicable to business organizations. Objectives of financial reporting and disclosure. Models of income determination and balance sheet valuations including historical cost, replacement cost, exit values, and discounted cash flows. The pronouncements of professional accounting bodies. Study of contemporary issues in financial accounting.

Prerequisite: ACCT 300, ACCT 302

ACCT 406 Internal Auditing (3-0-3)

Scope and objectives of internal auditing. Internal auditing and internal control. Internal auditor's independence. Ethics in internal auditing. Standards of internal auditing. The internal audit process. Financial audits; operational, efficiency, and management audits; compliance audits. Computer applications in internal auditing.

Prerequisite: ACCT 404 or Departmental Approval.

AEROSPACE ENGINEERING

AE 220 Introduction to Aerospace Engineering (3-0-3)

Introduction to overview of aerospace engineering, airplane, and the atmosphere. Basic aerodynamics and gas dynamics of incompressible flows, airfoils and wings, lift, drag, moments, circulation, boundary layers, and skin friction. Performance of aircraft, level flight, climb, range, endurance, and take-off and landing. Introduction to stability and control; structures and materials; propulsion of flight vehicles; and space flight (astronautics).

Prerequisite: PHYS 102

AE 325 Gas Dynamics I (3-0-3)

Fundamentals of compressible fluid flow (gas dynamics) in relation to effects of area change (nozzles and diffusers), friction and heat interaction (Fanno, Rayleight line, and isothermal flow), combustion waves (deflagration, explosion, and detonation waves), normal and oblique shock waves and their effects on flow properties (extended diffusers and supersonic airfoils). Applications to flow through pipelines, subsonic, sonic, and supersonic flights, turbo machinery and combustion.

Note: AE 325 and ME 425 are equivalent; only one can be taken for credit.

Prerequisite: AE 220

AE 328 Flight Structures I (3-0-3)

Statistically determinate and indeterminate structures; aerodynamics and inertia loads, load factors, stresses in beams, shear flow in thin webs, closed section box beams; deflection analysis of structural systems; introduction to buckling; application to wing and fuselage stress analysis; Rayleight-Ritz and introduction to the finite element method; elasticity of structures stress-strain relationships; vehicle materials; fatigue; strength-weight comparisons of materials; and sandwich construction including composite materials.

Note: AE 328 and ME 428 are equivalent; only one can be taken for credit.

Prerequisites: CE 203 and AE 220

AE 333 Aerodynamics I (3-0-3)

General fluid flow equation, potential parallel flow theory with some applications of aerodynamics, thin airfoil theory and finite wing in incompressible inviscid flow. Introduction to viscous flow and boundary layers.

Prerequisite: AE 220

AE 351 Aerospace Engineering Cooperative Work (0-0-9)

A period of 28 weeks of industrial employment for Aerospace Engineering students to work in appropriate industries or firms. Students are evaluated on their performance on the job and are required to submit an extensive formal report on their experience.

Prerequisites: ENGL 214, AE 220 and Approval of the Department.

AE 399 Summer Training (0-0-0)

A continuous period of 8 weeks of summer training spent in the industry working in any of the fields of Aerospace Engineering. The training should be carried out in an organization with an interest in one or more of these field. On completion of the program, the student is required to submit a formal written report of his work.

Prerequisites: ENGL 214 and Approval of the Department.

AE 401 Aerospace System Maintenance (2-3-3)

Aviation maintenance regulation, records, and documents; servicing procedures and ground operation, aviation material. Hydraulic, electrical, avionic, ignition, environmental, and fuel systems, engine overhaul. Installation and repair; heat exchangers; inspection, testing; weight and balance computation. Aerospace maintenance and its management with economical considerations; including visits to the field.

Prerequisite: ME 215 or equivalent.

AE 402 Aerospace Avionics (2-3-3)

Theory of operation and utilization of various types of avionic equipment. Radio wave propagation, VHF communication, and VOR navigation system; instrument landing systems; automatic direction finder; distance measuring equipment; transponders. Weather radar and area navigation systems. Avionic system integration and flight control. Avionics equipment troubleshooting and repair; including visits to the field.

Prerequisite: EE 204 or equivalent.

AE 410 Astronautics (3-0-3)

Solar system; rocket propulsion and staging of power trajectories; dynamics and control of spacecraft; satellite altitude control; astrodynamics; lunar and interplanetary trajectories; re-entry and heating consideration; aerospace plane.

Prerequisite: PHYS 102

AE 411 Senior Design Project I (1-0-1)

A course that integrates various components of the curriculum in comprehensive engineering experience so that the basic sciences, mathematics, and engineering sciences which the student has learned in his freshman-to-senior years of study can be applied. It considers design of a complete project or system including establishment of objectives and criteria, formulation of the problem statements, preparation of specifications, consideration of alternative solutions, feasibility considerations, and detailed engineering designs. The design should take into consideration appropriate constraints such as economic factors, safety, reliability, ethics and environmental and social impact. Submission of a written report is an essential requirement for completion of the course. Team design projects, where appropriate, are highly encouraged.

Prerequisites: Senior Standing and Approval of the Department.

AE 412 Senior Design Project II (2-0-2)

Continuation and completion of project started in AE 411. Public oral presentation and submission of final written report of the design project are essential requirements for the completion of the course.

Prerequisite: AE 411

AE 414 Flight Traffic Control and Safety (3-0-3)

Air traffic control system, the inter-relationships between enroute, terminal, tower, flight service functions. Interface between man and machine which affect the safety of flight and human factors. Accident prevention and investigation; including visits to the field.

Prerequisite: EE 204 or equivalent.

AE 420 Aerospace Engineering Lab I (0-3-1)

Laboratory experiments related to aerospace fields including wind tunnel and other equipment testing to demonstrate various phenomena, such as pressure distribution, lift and drag measurement on different bodies. The course will include three parts, i.e., Fluid Dynamics, Aerodynamics and Gas Dynamics, and Propulsion.

Prerequisite: AE 220.

AE 421 Aerospace Engineering Lab II (0-3-1)

Laboratory experiments related to two parts of aerospace flight: flight structures and materials; and flight dynamics and control, including demonstration and familiarization with basic components of the airframe construction (e.g., landing gear mechanism, aircraft wing, part of fuselage), and flight simulator model performance stability (e.g., lift and drag measurement and neutral point location and trim curves). The course includes films and visits to the industries in aerospace fields.

Prerequisites: Senior Standing and AE 220

AE 422 Flight Propulsion I (3-0-3)

Introduction to Joule-Brayton cycle. Aerodynamics of aerospace vehicle engines, combustion, thrust and efficiency. Gas turbine engines: Turbojet, turbofan, turboprop; ramjet and scramjet, typical engine performance. Aerothermodynamics of inlets, combustors and nozzles. Introduction to propellers, turbo-compressors and turbines. Introduction to rockets and performance of rocket vehicle engines. Chemical and electrical drive rocket engines.

Note: AE 422 and ME 422 are equivalent; only one can be taken for credit.

Prerequisite: AE 220

AE 426 Flight Dynamics I (3-0-3)

Flight performance, statics and dynamics of flight vehicles, stability and control of flight vehicles, rocket trajectories and satellite orbits.

Prerequisite: AE 220

AE 427 Aerospace System Design (3-0-3)

This is an integrated aerospace design course which include theory, background, and methods of aerospace system (e.g. aircraft, rockets, and spacecraft) design; including requirements and specifications of design, integration of aerodynamics, structure, propulsion, and flight dynamics and control; performance analysis and prediction; and complete project of aerospace system.

Prerequisites: Senior Standing and AE 220

AE 428 Flight Structures II (3-0-3)

Theory and analysis of structures of flight vehicles, plate theory, thermal stresses, buckling and failure, introduction to structural dynamics; analysis of aero-elastic phenomena and flutter; composite materials; crack-growth calculation and wear out models.

Prerequisite: AE 328 or equivalent.

AE 429 Gas Dynamics II (3-0-3)

Linearized flow; method of characteristics, conical flow. Experimental methods in gas dynamics.

Prerequisite: AE 325 or equivalent.

AE 433 Aerodynamics II (3-0-3)

Viscous flow and Navier-stokes equations; laminar and turbulent boundary layer; transition flow; unsteady flow; flow instabilities. High speed aerodynamics and aerodynamic heating. Introduction to hypersonic flow. Experimental methods in aerodynamics.

Prerequisite: AE 333 or equivalent.

AE 442 Flight Propulsion II (3-0-3)

Rocket and power plants performance, dynamics, and control of turbo-engines. RAM/ SCRAM jets engines. Blades element theory for propellers; turbo-compressors, turbines; chemical, nuclear, and electrical propulsion rockets. Introduction to space propulsion system.

Prerequisite: AE 422 or equivalent.

AE 446 Flight Dynamics II (3-0-3)

Fundamentals of atmospheric flight; stability and control analysis; matrix approach to the general motion and transfer function; elastic flight vehicle; automatic flight control. Introduction to space flight dynamics; application to missile, space-craft, and satellite attitude controls.

Prerequisite: AE 426 or equivalent.

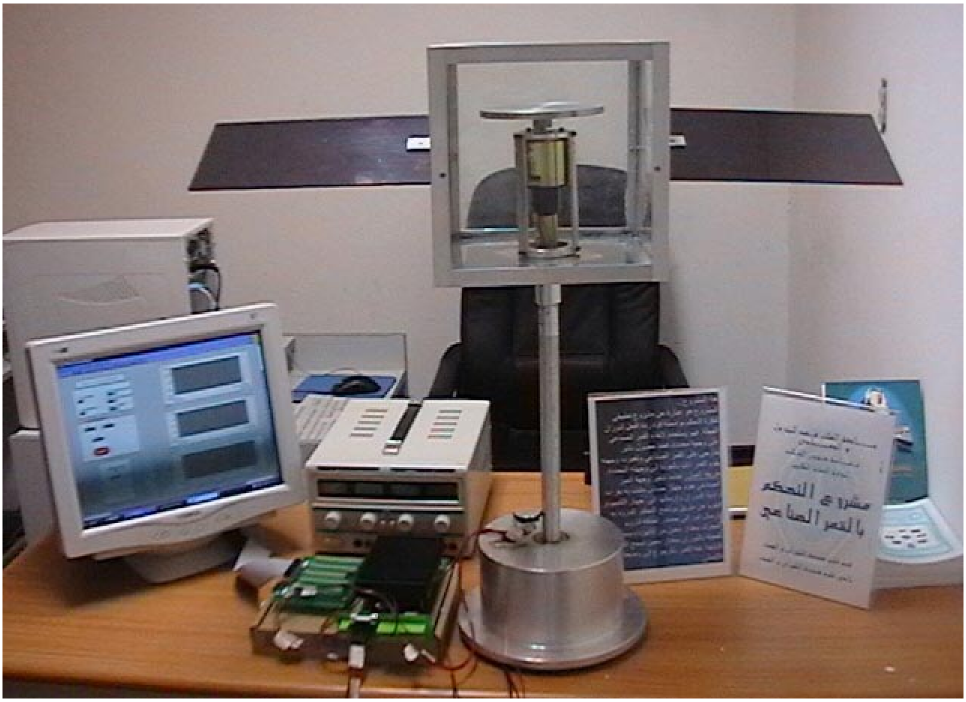
AE 450 Computational Methods for Aerospace Engineering (0-3-1)

Solution of systems of algebraic equations; numerical solution of ordinary differential equations, computer aided aerospace design and analysis. Introduction to finite difference methods and computational fluid dynamics.

Prerequisites: AE 328 or equivalent, AE 333 or equivalent, and SE 301 or equivalent.

AE 499 Special Topics in Aerospace Engineering (3-0-3)

Prerequisites: To be set by the Department.



ARCHITECTURE

ARC 100 Architectural Graphics (0-10-5)

This is a foundation course introducing the processes and techniques of graphic thinking. The course develops basic skills, ideas and the presentation methods of simple architectural exercises through a sequence of project types emphasizing 2D and 3D thinking. The importance of sketching in architecture is emphasized. The course bridges the gap between having no graphic communication skills and having the first level of skills required for the succeeding design studio.

Prerequisite: None

ARC 101 Design Studio-I: Design Principles (0-10-5)

The objectives of this course are those of improving graphic communication and initiation into design. Elementary projects are carried out which explore spatial thinking in basic structural forms and shapes. This course introduces the architectural design process, including issues of concept making, and design development.

Prerequisite: ARC 100

ARC 110 History of Architecture-I (2-0-2)

This course is an introduction to the chronological development of architecture from pre-history, to Egyptian, Greek, and Byzantine, highlighting the development of structural systems, materials, construction and other building systems. Emphasis is on the Middle and Near East. The eastern Architectures of the Indian, Chinese and Japanese civilizations are also covered. The focus of this course are those of developing an understanding for material use, and of creating an appreciation as to the factors that contribute to the development of the unique architecture of the various cultures.

Prerequisite: None

ARC 112 History of Architecture-II (2-0-2)

The first part of this course covers a chronological development of architecture from the Early Christian period through the Gothic, to the Renaissance and Baroque periods. The second part studies architectural development from the Baroque period though the Industrial Revolution to the Modern movements.

Prerequisite: ARC 110

ARC 124 Computer Aided Architectural Design (2-3-3)

Introduction to the techniques and applications of computer aided design in the context of architectural design. Emphases in the use of computer to seek, produce, manage, and exchange graphical information in the design process. Topics include introduction to personal computing in an office environment, two-dimensional editing and modifying techniques, standard layering system, associative dimensioning, blocks and external referencing system, layout management, CAD and the Internet. Introduction to computer programming using AutoLisp to automate drafting functions.

Note: ARC 124 and ARE 221 are equivalent; only one can be taken for credit.

Prerequisite: None

ARC 132 Man and Built Environment (2-0-2)

This course constitutes an investigation into the design factors necessary for human living. It looks at the design of the built environment with emphasis on human needs and how the social sciences can contribute to architectural design and practice. The influence of other factors such as climate, materials, technology, and physical context are considered, and design principles are formulated from cross-cultural examples of world architecture.

Prerequisite: None

ARC 202 Design Studio-II Space & Order (0-10-5)

This course continues the study of the development of design principles from Design Studio 1 (ARC 101). Space definition is supplemented with human, cultural and localized contextual needs. Small and minimally complex projects explore functional, aesthetic and structural issues.

Prerequisite: ARC 101

ARC 203 Design Studio-III Site, Context & Form (0-10-5)

Intermediate design scale is explored in this course, utilizing analytical approaches to problem solving, sketching and 3-D modeling. Emphasis is on site design, programming, materials and technology.

Prerequisite: ARC 202

ARC 210 History of Architecture-III (2-0-2)

The course covers the chronological development of Islamic civilization and architecture from Umayyad in Syria and Iraq, through the classical and late classical periods in Spain, North Africa, the Middle East, including Mesopotamia, the Ottoman empire, Persia and the Mughal Empire. The influences of Islamic architecture on other architectural styles of the same periods and vice versa are studied. The course covers the importance of Islamic art, geometry, calligraphy and variations in cultural attitudes in architectural styles. The development and evaluation of contemporary Islamic architecture is introduced.

Prerequisite: ARC 110

ARC 221 Structures in Architecture-I (3-0-3)

This course studies the history of shelters and the development and philosophy of structural systems. It is an introduction to different structural systems and their advantages; including load transfer mechanisms; their equilibrium and their application. The quantitative analysis of simple determinate systems, such as trusses, frames and beams; and the computation of axial and bending stress in simple members are covered.

Prerequisites: PHYS 101 or PHYS 132 or PHYS 133, Instructor Approval for Non-ARC Students.

ARC 222 Structures in Architecture-II (3-0-3)

This course provides a continuation in the study of structural systems. Emphasis is on analysis and design. Analysis and design of in-determinate structural systems in wood and steel, along with an introduction to concrete and masonry structural systems are covered. Computers are introduced as a tool in structural analysis and design at this level.

Prerequisite: ARC 221 or ARE 221

ARC 225 Virtual Reality in Architecture (2-3-3)

Computer visualization process that includes: three dimensional modeling, analytical rendering, and animation, focusing on the description of architectural design. Digital video; capturing editing video audio clips. Virtual Reality in architecture; terminology, characteristics, environment, and applications. Virtual Reality Modeling Language. Students will apply the above tools to a design studio project. This course includes exposure to a broad spectrum of modeling, and presentation software such as; AutoCAD, 3D max Viz, Ulead Media Studio.

Prerequisite: ARC 124 or ARE 221 or Instructor Approval.

ARC 251 Introduction to Urban Design Concepts (2-0-2)

This course is an introduction to the history and theories of urban spatial design. Approaches to the development of urban spaces throughout history are discussed, including Greek, Roman, Renaissance, Islamic, Baroque, Utopian, and Modern post-industrial concepts. Influential urban design theories and trends in modern times, their implications and feasibility, are studied. Urban social behavior and the psychological effects of urban space on its users are also studied.

Prerequisite: None

ARC 281 Architecture of Saudi Arabia (2-0-2)

Emphasis in this course is on developing a good understanding of the traditional architecture of all the regions of Saudi Arabia. Focus is on the need to learn important aspects about the fast-vanishing traditional architecture of the region. Historic preservation is discussed.

Prerequisite: None

ARC 300 Workshop/Summer Internship (2-0-2)

This workshop provides experience in the practical application of core subjects in a new or on-going research project. It provides 'in house' training with instruction in the students' intended professional major. Opportunities are offered for experimentation with innovative materials, construction and structural elements.

The workshop is an acceptable substitute for the summer internship.

Prerequisite: Junior Standing

ARC 304 Design Studio-IV Analysis & Synthesis (0-12-6)

This studio focuses on building types that exhibit complexity and challenge. Project designs must show clear understanding of structural, mechanical and construction systems, along with space planning. Architectural programming is introduced.

Prerequisite: ARC 203

ARC 305 Design Studio-V: Virtual Design Studio (0-12-6)

The building types explored in this studio have greater complexity of function. In addition, emphasis is placed on building envelope in terms of form, massing, articulation and fenestration. Use of computer-aided design is a part of the design exploration.

Prerequisites: ARC 304, ARC 225

ARC 313 Theory of Architecture-I (2-0-2)

This course explores the path of the principal architectural thoughts and events which led to the development of major architectural and town planning theories; starting with Vitruvius' "ten Books of Architecture", to the European Art Nouveau movement (1890-1910) and the early influence of reinforced concrete. Concepts of architectural space, form and vocabulary, as well as major town planning concepts and theories from these periods are discussed and critically analyzed.

Prerequisite: ARC 210

ARC 314 Theory of Architecture-II (2-0-2)

The course outlines the theoretical foundations of 20th Century trends in architecture, in the light of worldwide historical developments and their social and technological influences. The focus of the course is on the Modern Movement and recent developments leading to the Post-Modern aspects of architectural aesthetics.

Prerequisite: ARC 313

ARC 315 Perception, Geometry and Color in Architecture (2-0-2)

This course offers an understanding of perception and its application in transforming ideas into design and 3-D form. It is an introduction to the evolution of geometry in architecture and to primary elements such as line, plane, form, size direction and other ordering principles. The theories of color, and the interaction of color with its physical, visual and psychological aspects are included.

Prerequisite: Instructors Approval for Non-ARC Students

ARC 323 Structures in Architecture-III (3-0-3)

This course is an introduction to the characteristics of reinforced concrete and to its analysis and design using codes, tables and charts. Aspects of material deterioration and design for durability are covered in the course. Emphasis is placed on the use of computer applications in both analysis and design.

Prerequisite: ARC 222

ARC 341 Freehand Drawings (1-3-2)

In this course students are taught how to see and how to quickly draw what they see thus improving their abilities to draw in three dimensions. The techniques of drawing are taught using various mediums, such as pencil, ink, and charcoal. The subject matter includes still-life and landscape drawing in the field, as well as "gesture drawing" drawing.

Prerequisite: None

ARC 342 Computer Presentation Techniques (2-0-2)

Expanding the use of mixed media into the translation of ideas, this course brings practical presentation principles, layout and comprehensive media techniques to the field of graphic design. Computer software, using industry standard illustration, paint, and page layout, new technologies and traditional composition are addressed.

Prerequisite: ARC 124

ARC 343 Creative Design Workshop (1-3-2)

This is an advanced-level workshop covering creative thinking in design, using various media and methods of expression. The students are encouraged to develop innovative ideas and topics.

Prerequisite: None

ARC 344 Architectural Photography (1-3-2)

This course covers fundamental information about the use of photographic materials in the environmental design professions. Subjects discussed include photographic films and papers, camera types, lighting and darkroom techniques. Included in the course program are architectural documentation, presentation and promotional use of photography. Reproduction techniques using Diazo material, offset printing, model photography and line printing are also discussed.

Prerequisite: None

ARC 351 Specific Urban Design Workshop (1-3-2)

Application of traditional and modern urban design theories and methods constitutes the backbone of the course. Focus is on the solution of urban spatial problems and urban rehabilitation. Examination of case studies is undertaken at the scale of a district within the city. Action area projects are chosen from adjacent urban areas to allow easy accessibility for data collection and actual site analysis.

Prerequisite: ARC 251

ARC 353 Housing Policy and Design (2-0-2)

This course provides an introduction to housing theory, socio-economic aspects related to housing, alternative approaches to housing policy and housing problems in developing countries, with particular attention to traditional housing settlements in Saudi Arabia.

Exploration of current issues in the formulation and implementation of housing programs is carried out. This covers an analysis of Housing Design, classification of housing types, data gathering on housing, neighborhood theory as a housing concept, design procedure of a housing community, structure of housing areas as a criteria for the design of housing, construction technologies, materials, costs, climatic conditions and code issues.

Prerequisite: None

ARC 361 Introduction to Landscape Plants (1-3-2)

This course introduces basic principles of landscape architecture. Both landscape design processes and design methods are taught. This includes field study, and site analysis for the use of plants. Identification is made of native plants, factors of aridity, soil and types of irrigation systems suitable for Saudi Arabia. Emphasis is placed on the use of local plant materials.

Prerequisite: None

ARC 362 Introduction to Landscape Design (1-3-2)

This course is an introduction to basic principles of landscape architectural design and techniques. Projects at the scale of site design, such as open spaces and building surrounds, are dealt with. This reinforces understanding of the optimum and correct use of land development, local plant materials and irrigation systems.

Prerequisite: None

ARC 363 Introduction to Ecological Analysis (1-3-2)

This course covers the analysis of environmental factors, ecosystem functions, and ecosystem dynamics as they relate to decision-making for planning design. Environmental phenomena of Saudi Arabia, need controls, and counter measures are discussed.

Prerequisite: None

ARC 364 Specific Open Spaces Design Workshop (1-3-2)

This workshop provides a focus on how landscape design and green spaces add vitality to community and city life. The workshop introduces students to the creative design of urban open spaces. Such open spaces are analyzed, where their potentials are explored with the intent of creating parks, out door recreation, toddler lots, picnic areas, ponds, walks and natural trails.

Prerequisite: None

ARC 371 Introduction to Interior Architecture (2-0-2)

This course is an introduction to concepts of interior space, color and material selection, contract interiors and space planning methods. Course content covers discussion of marketing interior design services and methods. Sociological and psychological aspects of interior architecture are also presented.

Prerequisite: None

ARC 372 Furnishing Design (1-3-2)

This is a survey course concerning materials, methods and manufacturing processes that are applied to interior furniture and fixture design. The course covers the analysis of custom and mass production costs and considers the benefits of durability, safety and human comfort. These factors are discussed with respect to various interior furnishings.

Prerequisite: None

ARC 373 Commercial Interiors (1-3-2)

This course addresses commercial and institutional interiors. Space planning methodologies, life cycle costing, modular office systems and, materials selection are discussed. Office comfort, artificial illumination and day lighting are also considered.

Prerequisite: None

ARC 374 History of Interior Architecture (2-0-2)

This course presents a survey of interior architecture throughout history. Emphasis is placed on the way historical periods are reflected through the use of interior colors, materials and finishes.

Prerequisite: None

ARC 399 Summer Internship (0-0-1)

This is a continuous period of 8 weeks of summer work in building design and construction industry, for gaining exposure and appreciation of the architectural profession. The writing of a field experience report is required. The report should emphasize duties assigned and completed during the period.

Prerequisite: Junior Standing

ARC 400 Senior Project Preparation and Programming (2-0-2)

In addition to teaching the basic techniques of architectural programming, this course is designed to help the senior student to prepare his proposal for the final project in ARC 408. Topics include: Client objectives, Functional relationships, Facility space requirement development, Site development requirements, Site analysis, Prioritizing functions, Spatial restrictions and budget constraints. The student carries out research on his chosen building type and location, acquires the necessary approval based on the need for where it is planned for his project, visit the site and government offices to obtain the necessary maps, contour information, street locations and photographs. The student then writes a program for his project.

Co requisite: ARC 406

ARC 406 Design Studio-VI: Comprehensive Design Project (0-12-6)

This studio emphasizes the comprehensive nature of architectural design. Assigned project programs relate to an urban context and a visit-able site. Experimenting with different solutions using knowledge of architectural theories and contemporary concepts of design, formulate concepts to a high level of practicality. This course is available to students of senior standing only.

Prerequisite: ARC 305

ARC 407 Construction Documents (0-6-3)

This course is setup to introduce concepts and methods of preparing construction documents for buildings. It provides a hands-on experience in preparing such documents. The course will emphasize the use of computer integrated database management systems, Intranet and Intranet methods for accessing, distributing and coordinating construction documents. Topics to be covered include; the graphic component: a coordinated set of drawings, plans, sections, elevations, graphic symbols, and details, required to graphically describe the project. The alphanumeric component: dimensions and annotations, tables, and schedules (doors, windows, and room finishes). Specifications, mostly text but sometimes supplemented with graphics, including bills of quantity or materials.

Prerequisites: ARC 124 or ARE 221; ARE 212

ARC 408 Senior Project (0-14-7)

This studio begins with a presentation of the ARC-400 program document with clear indication of the intent and direction of emphasis. Having been reviewed and approved by a senior project committee, This project design is undertaken to its completion. The project must exhibit a comprehensive mastery of architectural design, reflecting the knowledge and skills acquired during four years of study in architecture.

Prerequisites: ARC 400, ARC 406, Senior Standing

ARC 416 Specific Topics on Islamic Architecture (2-0-2)

In this course, the major developments in Islamic architecture are studied. The course concentrates either on a given period, a specific case study, or both in the rich and diversified traditions of Islamic architecture. At the discretion of the instructor, themes such as Al-Hamra Palace or Andalusian Islamic Architecture, form the focus and essence for the entire course.

Prerequisite: ARC 210

ARC 426 Professional Practice (3-0-3)

The course introduces knowledge required for a success career in architectural practice or employment. The course is divided into three parts. The first part discusses the training and role in society of architects. This covers academic and professional training; career choices, lives as professionals and professional ethics. The second part discusses the organization and management of architectural firms and covers firm formation and organization, marketing of services, management and dynamics. The last part deals with Project administration. It covers project conception and acquisition; project management; design services, parameters and documentation; and contract administration. The course highlights practices in Saudi Arabia and compares them with international practices.

Prerequisite: Junior Standing

ARC 435 Design Determinants for Arid Regions (2-0-2)

This course offers insights into design for arid regions. It covers analysis of natural conditions, climate, topography and water. Analytical criticism of existing buildings in arid regions is used to develop an understanding of the culture, construction technology, and materials of such regions. This also develops an appreciation for cultural, site and climatic conditions that prevail and determine the building-form.

Prerequisite: None

ARC 442 Knowledge-Based Systems in Architecture (2-0-2)

This course presents an overview of the knowledge-Based Systems and their application in the field of architecture and environmental design. Fundamental concepts, as well as types of knowledge-Based systems are discussed. Case studies in the architectural application of these systems, issues of linking these systems to other information technologies such as CADD, Multimedia, Hypermedia and ontologies, are undertaken.

Prerequisite: ARC 124

ARC 449 Special Topics in Computer Aided Design (2-0-2)

The objective of this course is one of exploring emerging ideas in Computer Graphics and Information Technology Applications in the fields of architecture and design. It provides a forum for faculty and IT experts to share their research findings or professional experience in computer graphics with students. It also provides an opportunity for students to explore topics in Information Technology Applications that are of special interest to them individually. The specific content and format of the course varies with the topic and research interest of the faculty teaching it.

Prerequisite: ARC-124

ARC 453 Urban Design Theory (2-0-2)

This course is a critical analysis of the theories and current issues of urban spatial design. It examines city forms and patterns, and reviews utopian models. The emphasis is on the understanding of the physical, socio-cultural, economic and technological forces, and their role in shaping the urban environment.

Prerequisite: ARC 251

ARC 454 Methods of Urban Design Analysis (2-0-2)

This course is concerned with 'Researching and analyzing urban form' to understand its elements and its underlying organizing principles. The purpose is to expose the students to the range of approaches available for urban form analysis and for understanding what makes a "good" city or urban area. Computer based analytical techniques and computer visualization and simulation technology will be emphasized.

Prerequisite: ARC 251

ARC 459 Special Topics in Urban Design (2-0-2)

The objective of this course is one of exploring emerging ideas, concepts and policy intervention methods in urban design. The course provides a forum for faculty to share their research findings or professional experience in the field of urban design or to explore a new theory, method or techniques of urban design. Students with particular urban design interest may also explore them in this course. The specific content and format of the course varies with topic and research interest of the faculty teaching it.

Prerequisite: ARC 251

ARC 482 Socio-Cultural Factors in Design (2-0-2)

This course is a study of behavioral concepts and socio-cultural aspects affecting the way man shapes his environment, and in turn is shaped by it. The course builds an understanding of human culture, attitudes, psychology, and the behavior of both individuals and groups. Selected social planning and design issues, technology and related research techniques are studied.

Prerequisite: None

ARC 483 Architectural Conservation and Preservation (2-0-2)

This course is an introduction to construction principles and materials employed in Saudi Architecture. Observation and examination of existing architectural examples in the form of their physical, historical, and cultural context, and their anatomy, both physical and conceptual make up the majority of the study. Development of skills in architectural design principles required for the conservation and preservation of "what is there" in architecture is also important.

Prerequisite: None

ARC 489 Special Topics in Regional Architecture (2-0-2)

The flexible content and format of the course offers opportunity to the student to explore much deeper into chosen areas and types of regional architecture. This exploration, however, should allow for the development of understanding in creating a link between the past, present and the future of regional architecture.

Prerequisite: None

ARCHITECTURAL ENGINEERING

ARE 100 Introduction to Architectural Engineering (1-0-1)

The course introduces a simple understanding of building as an integration of various systems and components to perform a certain function. The discipline of Architectural Engineering and the role of Architectural Engineers in the process of building design, construction and operation are explained. The need for Architectural Engineers in Saudi Arabia. An overview of building technology and systems developments from the point view of building materials and environmental sciences.

Prerequisite: None

ARE 201 Architectural Graphics (0-6-2)

This course introduces architectural engineering and the role of the architectural engineer in the building profession. Graphics techniques and methods in architectural design and presentation. These include: drawing tools and materials; architectural drafting conventions; orthographic projections, types and use in building presentation. Use of contextual elements. Topics such as rendition of value and context; shades and shadows techniques in various types of drawings; perspectives, major characteristics, elements, and types; graphic diagrams; freehand sketching and model-making techniques are also covered.

Prerequisite: None

ARE 202 Architectural Design I (0-9-3)

This course introduces the design process in the form of phases, activities, and parties involved. Topics covered include: Description of each phase, activities and objectives; models for problem-solving process in design utilizing graphic thinking. Problem definition, developments of alternatives, evaluation, selection of solution and communication of a design project are introduced, explored and exercised through both abstract sketches and definitive concrete designs to solve simple design problems. Design problems of complete but simple buildings are introduced. Considerations of building function, construction materials and systems, cultural, environmental constraints, and climatic influences are emphasized. Individual design thinking is encouraged throughout the studio work.

Prerequisite: ARE 201

ARE 211 Building Materials (2-3-3)

Properties, behavior, and selection of building materials including wood, laminates, cements, aggregates, concrete, masonry mortar, steel, and finishing materials. Structural and architectural use of traditional and modern building materials. Introduction to basic methods of construction; excavation, foundations, building systems, and construction equipment and general techniques in wood, masonry, and concrete construction. New building materials. Visits to building sites and manufacturers.

Prerequisite: None

ARE 212 Construction Systems (3-0-3)

Construction systems including foundation, superstructure, enclosure (walls and roofs), interior finishes, partitions, and ceilings. Construction and detailing of site-built and prefabricated systems. Selection methods and criteria for appropriate design as a function of climate and energy use, labor and material availability, maintenance and replacement patterns, safety, functionality, and cultural context. Course material comprehension is ensured through submission of sketches, to-scale detail drawings and model-development of the introduced systems.

Prerequisite: ARE 211

ARE 221 Computer Applications in Building Design (2-3-3)

Introduction to personal computing, computer components and their functions, operating systems such as DOS, Windows, MAC platforms, hard disk management. Computer facilities at KFUPM. Introduction to general computer applications in architectural offices such as, spreadsheets and Database. Introduction to Computer-Aided Drafting and Design which includes: 2D drawings, 3D modeling, rendering, and Image processing. Major CAD drafting, and presentation packages will be used for the production, management, and presentation of project information.

Note: ARE 221 and ARC 124 are equivalent; only one can be taken for credit.

Prerequisite: ARE 201

ARE 301 Architectural Design II (0-9-3)

This course is a continuation of a two-semester sequence of design studios. Introduction and appreciation of the design process through dealing with more complex buildings and lager project sites. The concept of building design as a multi-disciplinary approach is introduced. Integration of structural, mechanical and environmental control systems with the building function, form and spaces' organization is emphasized. Basic elements of architectural form and space and how they can be manipulated, organized in the development of a design concept and their visual implications are explored.

Prerequisite: ARE 202

ARE 303 Working Drawings (0-9-3)

An introduction to the production of construction documents used in the building industry. A preliminary building design is developed to include detailed materials, and construction information. A set of drawings is completed including floor plans and elevations, site, foundation, framing and roof plans and details, wall and roof sections and details, interior finish elevations and details, and door and window schedules and details. Drawing skills are developed, office management issues are discussed.

Prerequisites: ARE 202, ARE 212

ARE 320 Architectural Acoustics (1-3-2)

Introduction to architectural acoustics. Room acoustics and noise sources, measurements, and control. Acoustical properties of materials and room shapes. Sound absorption and transmission. Computer applications in room acoustics simulation.

Prerequisite: PHYS 102 or PHYS 132

ARE 322 Building Mechanical Systems (2-3-3)

Introduction to basic concepts, terminology and design methods for building mechanical systems. Thermal comfort, building thermal performance, and heating & cooling load calculation procedures. Fire protection systems and smoke control. Water supply and distribution systems; Waste and drainage systems. Vertical transportation systems. Computer applications.

Prerequisite: PHYS 102 or PHYS 132

ARE 325 Building Illumination (1-3-2)

Concept of light, vision, and color. Luminaries and lamps. Lighting system design procedures; calculation and measurement techniques, evaluation of interior lighting quality, and daylighting. Computer applications in artificial and daylighting analysis and design.

Prerequisite: PHYS 102 or PHYS 132

ARE 328 Architectural Acoustics and Illumination (3-0-3)

Introduction to basic phenomena, and concepts of Architectural lighting and acoustics. Electrical light sources, lighting system, and design methods, quantity and quality of illumination. Daylighting, lighting measurements, instruments and methods. Acoustical properties of materials and constructions. Room acoustics and noise control. Measuring method and equipment. Acoustic design of auditoria. Impact of acoustical and lighting system on Architectural design. Computer applications.

Prerequisite: PHYS 133 (not open to ARE students)

ARE 342 Principles of Heating, Ventilating, and Air-conditioning (2-0-2)

Fundamental principles and engineering procedures for the design of heating, ventilating, and air conditioning systems; HVAC system characteristics; system and equipment selection; duct design and layout. Energy conservation techniques. Computer applications.

Prerequisites: ARE 322 and ME 203

ARE 350 Coop Work Program (0-0-0)

ARE 351 Continue Coop Work (0-0-9)

A continuous period of 28 weeks is spent in the industry to acquire practical experience in the Architectural Engineering under the supervision and guidance of the employer and the academic advisor. During this period the student gains an in-depth exposure and appreciation of the Architectural Engineering profession. The student is required to write a detailed report about his training period under the regulation of the ARE department.

Prerequisites: ENGL 214, Junior Standing

ARE 399 Summer Training (0-0-0)

A continuous period of 8 weeks of summer working in the industry to gain exposure and appreciation of the Architectural Engineering profession. On-the-job training can be acquired in one of the area related to architectural engineering. The student is required to write a brief report about his industrial experience. The report should emphasize duties assigned and completed by the student.

Prerequisites: ENGL 214, Junior Standing

ARE 400 Senior Design Project (0-9-3)

A comprehensive course that integrates various components of the curriculum in a comprehensive engineering design experience. The project should include development of system design and analysis techniques such as integrated design of structure, mechanical, electrical and environmental systems. The design should take place with consideration to appropriate constraints such as economic, safety, reliability, ethics, environmental, social, and cultural factors. Public oral presentations and written reports of the final design are essential requirements for completion of the course. Computer applications and team design projects, where appropriate, are greatly encouraged.

Prerequisite: Senior Standing

ARE 413 Construction Management (3-0-3)

A survey of Construction Management: Basic concepts, preparing the bid package, issues during construction phase, construction contracts, legal structure, time planning/control. Project cash flow; project funding, equipment ownership, equipment productivity, construction operations, construction labor, materials management and safety. Types of specifications, technical division, changes, bonds, liens, general conditions, special conditions and contract documents.

Prerequisite: Junior Standing

ARE 431 Building Economy (3-0-3)

Basic concepts of building economics: initial cost, life cost in use, cost and benefit ratio analysis, and control of cost and depreciation. Cost estimating, including determination of materials, labor, equipment, overhead, profit, and other construction costs.

Prerequisite: Senior Standing or Consent of the Instructor.

ARE 440 Solar Energy in Buildings (3-0-3)

Principles of solar energy collection, conversion, storage and distribution. Solar water heating, space heating and cooling applications, components and systems. Passive solar strategies. Computer applications.

Prerequisite: Senior Standing or Consent of the Instructor.

ARE 442 Building Energy Analysis (3-0-3)

Application of thermal sciences to the evaluation of building energy systems; energy estimating methods; computer models for estimating building energy consumption; applications of various energy analysis computer programs; design methods for reducing energy consumption in buildings.

Prerequisite: ARE 322 or Consent of the Instructor.

ARE 443 Computer-Aided Building Design (2-3-3)

Introduction to Computer-Aided Building Design (CABD) software packages, their potentials, and limitations. Production of building systems design using computers. Use of computers in space planning, cost analysis, structural design, building services layout, mechanical systems, energy analysis, lighting analysis and design, and room acoustics evaluation. Choice of a software upon given conditions. Use and application of selected package(s) for various building applications.

Prerequisite: ARE 221 or Consent of the Instructor.

ARE 444 Knowledge-Based Systems in Buildings (2-3-3)

Computer-based decision making problem solving, database and integrated approaches. Introduction to the theory of artificial intelligence and knowledge-based systems in architectural engineering. Conceptual design of CAD systems involving knowledge base approach. Overview of available Expert Systems shells, their potential and limitations. Applications of selected packages in building design problems.

Prerequisites: ICS 102, ARE 221 or Consent of the Instructor.

ARE 445 Structural Masonry (3-0-3)

Masonry materials and their characteristics, non-load bearing wall construction, load bearing wall design, basics of design for vertical loading and lateral forces, stability and types of load bearing walls, structural elements and forms. Design of single-story structures, reinforced and post tension masonry. Masonry architecture, vault and dome design. Complete design project, site visits and practical applications. Computer applications.

Prerequisite: CE 305 or ARC 222

ARE 446 Planning and Design of Structural Systems (3-0-3)

Fundamental concepts in planning, design, and construction of complete structures. Design philosophies and criteria. The nature of loads and probabilistic determination of design loads.

Selection of structural systems for buildings. Approximate analysis for preliminary design. Utilization of computers in structural engineering. Special problems in tall building.

Prerequisite: CE 305 or ARC 222

ARE 450 Artificial Lighting Systems (3-0-3)

Introduction to different lighting systems. Lighting requirements under different working conditions. Detailed understanding of artificial lighting sources. Quantity and quality of light for various architectural spaces. Polar curves for various artificial lighting sources. Design of artificial lighting systems for avoiding glare. Artificial lighting design of outdoor spaces.

Prerequisite: ARE 325 or Consent of the Instructor.

ARE 452 Daylighting Analysis and Design (3-0-3)

Introduction to daylighting. Sources of daylighting. Solar spectrum and its relationship to daylight availability. Weather phenomenon and daylighting. Concept of cloudiness and design sky: Performance of building materials with respect to daylighting such as reflectivity and absorption. Decomposition and decoloring of materials under daylight. Detailed study of daylight transmission through openings with shading devices. Solar geometry and design of sun-shading devices. Computer and lab methods for the study of daylight in buildings. Design of openings in desert areas with respect to glare and overheating.

Prerequisite: ARE 325 or Consent of the Instructor.

ARE 455 Room Acoustics (3-0-3)

Acoustical phenomena in enclosed spaces. Sound absorbing materials and constructions. Acoustical requirements for the design of enclosures for speech and music (e.g. studios, auditoriums, and multipurpose halls). Techniques for evaluating room acoustics performance. Sound reinforcement systems; principal uses, basic elements, and loudspeaker systems. Computer applications in sound behavior modeling and evaluation.

Prerequisite: ARE 320 or Consent of the Instructor.

ARE 456 Noise Control in Buildings (3-0-3)

Noise sources and their effect. Transmission of noise in buildings; air-borne and structure-borne noise. Sound isolation and sound insulating construction. Mechanical systems noise and vibration. Noise control techniques. Computer applications.

Prerequisite: ARE 320 or Consent of the Instructor.

ARE 457 Introduction to Building Maintenance Management (3-0-3)

Basic concepts of building maintenance management. Classification of maintenance types, work orders types, planning and scheduling of maintenance works, maintenance contract types. Organizing preventive maintenance activities. Maintenance contract documents.

Prerequisite: Junior Standing

ARE 458 Quantitative Methods in Construction Management (3-0-3)

An introduction to the application of modeling techniques to problems in construction management. Topics include the application of linear programming, transportation and assignment techniques, materials management, queuing and simulation.

Prerequisite: Junior Standing

ARE 459 Contracts and Specifications (3-0-3)

Contract documents, divisions of specifications, types of specifications, technical divisions options and alternatives, contracts, time and money, changes bonds liens, government contracts, general conditions, special conditions, proposal form, instruction to bidders, invitations to bid, checking, interpretation of specifications, and computerized specifications. Saudi standard public works contract.

Prerequisite: Junior Standing

ARE 490 Special Topics in Architectural Engineering (3-0-3)

Variable contents. State-of-the-art advanced topics in the field of Architectural Engineering.

Prerequisites: Junior Standing

BIOLOGY

BIOL 101 Introduction to Biology (3-3-4)

Structural organization of cells and metabolic activities of some of the cellular components, basic principles of genetics, biological diversity and the major kingdoms of life.

Prerequisite: None

BIOL 102 Ecology and Environment (3-0-3)

Population and community ecology, with emphasis on growth and distributions of populations, interaction between species, structure, dynamics, and functions of communities and ecosystems; structure and systems analysis of the earth from a biological perspective, with emphasis on biogeochemical cycles and global change. At least one field trip required.

Prerequisite: BIOL 101 or Consent of the Instructor.

BIOL 201 Microbiology (3-3-4)

The course covers structures, functions, and diversity of microbes with respect to basic views related to microorganisms. It highlights different metabolic diversities, advances in molecular phylogeny, diversification and biogeochemical cycling of elements in different environments. It studies interaction among viruses, bacteria and macro organisms with objective views of beneficial vs. harmful effects of microorganisms on environment, human health and society.

Prerequisite: BIOL 102

BIOL 202 Physiology (3-3-4)

An introductory human physiology. The course will concentrate on basic mechanisms underlying human life processes including cells and membranes; nervous and muscle function cardiovascular, respiratory, and renal and gastrointestinal physiology; metabolism, endocrinology and reproduction.

Prerequisite: BIOL 101

BIOL 301 Biochemistry (3-0-3)

Studies of biomolecules such as sugars, polysaccharides, hemoglobin and amino acids and on the structural studies of proteins. Enzymes in biological tissues with emphasis on mechanism and catalytic reactions. Metabolism and transport in biological systems. Study of structure of nucleic acids as well as the DNA molecule.

Prerequisites: CHEM 201, BIOL 101

CIVIL ENGINEERING

CE 100 Introduction to Civil Engineering (1-0-1)

Introduction to CE profession; description of various areas of specialization with a focus on nature of work and duties; orientation of the CE program and choice of electives for concentration in each discipline; field trips to ongoing projects; professional ethics and conduct, responsibilities and role of a civil engineer in the society.

Prerequisite: None

CE 101 Engineering Graphics (1-3-2)

An introductory course on the "language of engineering" and the use of drafting instruments and machines. Topics include freehand sketching, graphic geometry, orthographic projection, sectional and auxiliary views, dimensioning, intersections, developments, and introduction to working drawings and an overview of computer graphics.

Prerequisite: None

CE 201 Statics (3-0-3)

Basic concepts and principles of mechanics; vector algebra; equilibrium of particles in two and three dimensions; definition of moment and couple; reduction of systems forces; equilibrium of rigid bodies; statically determinate structures including beams, trusses, frames, and machines; internal forces, shear force and bending moment diagrams in beams; friction and its applications, centroid and center of gravity of lines, areas, and volumes; moment of inertia and radius of gyration.

Prerequisite: PHYS 101 or PHYS 131

CE 203 Structural Mechanics I (3-0-3)

Concepts of stress, strain, and constitutive relations; stress and deformation of axially loaded members; thermal stresses; pressure vessels; energy concepts; torsion of circular and thin-walled sections; shear and bending moment diagrams in beams; elastic bending; shear stress in beams; compound stresses; stress transformation; deflection of beams and introduction to the concept of singularity functions.

Prerequisite: CE 201

CE 213 Computer Graphics (1-6-3)

Introduction to Computer Aided Design and Drafting.

Introduction to computer graphics; graphics laboratory assignments to develop a skill in using the CAD system and to produce a quality engineering drawings; fundamentals of engineering graphics in 2D and 3D drawings, solid modeling, applications to Mining and Civil engineering problems, through length and sloping lines, cut and fill, strike and dip; the forms of graphical communication for designers; example problems to develop student's perception and visualization ability.

Prerequisite: ICS 101 or ICS 102 or ICS 103

CE 230 Engineering Fluid Mechanics (3-0-3)

Properties of fluids, hydrostatics with applications to manometers, forces on plane and curved surfaces, buoyancy, equations of continuity, energy and linear momentum with applications, dimensional analysis, dynamic similarity, open channel flow, conduit flow.

Prerequisites: CE 201, MATH 102

CE 260 Surveying I (2-3-3)

Introduction; measuring units, significant figures, direct distance measurement with tapes, tape corrections; electronic distance measurement; levels and leveling; longitudinal profiles and cross sections; contouring; area and volume computations; the theodolite and angular measurements; optical distance measurements; rectangular coordinates; traverse surveys and computations; mapping.

Prerequisite: None

CE 303 Structural Materials (3-3-4)

Composition and properties of hydraulic cements; characteristics of local aggregates and water mix; properties of fresh concrete; production, handling and placement of cement and fresh concrete; properties of hardened concrete; mix design; durability in the Gulf environment; problems of hot weather concreting; introduction to repair materials and techniques; types, engineering properties, and usage of structural steel, aluminum, timber, glass and plastics. Laboratory sessions will concentrate on various tests of concrete constituents, fresh and hardened concrete, aggregate gradation and mix design; flexure behavior of reinforced concrete beams; hardness test, tensile and compressive tests on metals, measurement of Poisson's ratio and stress concentration and bending tests on steel beams.

Prerequisite: CE 203

CE 305 Structural Analysis I (3-0-3)

Shear force and bending moment diagrams for frames; influence lines for beams, frames and 2D trusses; displacement of beams by moment area, and conjugate beam methods; displacements of beams, frames and trusses by virtual work; analysis of statically indeterminate structures; method of consistent deformation, energy methods, slope-deflection and moment distribution; introduction to the flexibility and stiffness matrix methods and computer applications.

Prerequisite: CE 203

CE 315 Reinforced Concrete I (2-3-3)

Review of properties of structural concrete and reinforcing steel; behavior and design of reinforced rectangular and T-section in flexure; Use of computers in beam design for flexure; behavior and design of beams for shear, bond, and development length including splices and cut-off points; design of one-way slab, design of continuous beams with computer application for analysis; control of deflection and cracking; design of short columns; design of single footing; design project of a simple multistory building with one-way flooring system which integrates the design of the different structural components.

Prerequisite: CE 305

CE 317 Computer Methods in Civil Engineering (2-3-3)

Introduction to numerical methods; matrix algebra; solution of nonlinear equations; solution of system of linear and nonlinear equations; numerical solutions of differential equations by finite differences; error analysis; introduction to the finite element method (FEM); modular programming using finite elements and finite differences; application of developed finite difference and finite element software problems in civil engineering; introduction to linear programming.

Prerequisites: ICS 101 & MATH 202

CE 331 Engineering Hydrology I (2-3-3)

The hydrologic cycle, precipitation, evaporation and transpiration, infiltration streamflow, hydrograph analysis including unit hydrograph, occurrence of groundwater, fundamentals of groundwater flow including Darcy's Law and its applications, steady and unsteady flow to wells, laboratory sessions include experiments in fluid mechanics, surface and subsurface hydrology.

Prerequisite: CE 230 or equivalent.

CE 341 Transportation Engineering (3-0-3)

Planning and evaluation of transportation systems; transportation in Saudi Arabia; characteristics of transportation systems and vehicles; introduction to design principles and transportation facilities including roadways and airports; flexible pavement design; application of computer software(s) related to transportation.

Prerequisites: PHYS 101 and Junior Standing.

CE 343 Transportation Engineering Laboratory (0-3-1)

Field studies for speed, traffic volume counts and delays; introduction and practice in capacity analysis, traffic signal design, pavement material testing and design; intersection, channelization and highway geometric design; introduction to transportation related softwares.

Prerequisite: CE 303
Co requisite: CE 341

CE 350 Coop Field Work (0-0-0)

CE 351 Continue Coop Work (0-0-9)

A continuous period of 28 weeks is spent in the industry to acquire practical experience in Civil Engineering under the supervision and guidance of the employer and the academic advisor. During this period the student gains an in-depth exposure and appreciation of the Civil Engineering profession. The student is required to write a detailed report about his training period under the regulation of the CE department.

Prerequisites: CE 317 and ENGL 214

CE 353 Geotechnical Engineering I (3-3-4)

Soil formation and identification; index and classification properties of soils; clay minerals; soil compaction; capillarity, swelling, shrinkage and effective stresses; flow of water in soils; compressibility and consolidation; stress in soils; shear strength of cohesive and cohesionless soils; introduction to lateral earth pressure and shallow foundation.

Prerequisite: CE 203
Co requisite: CE 230

CE 370 Water and Wastewater Engineering (3-3-4)

Analysis of water distribution and wastewater collection systems, computer modeling of network systems; water treatment including coagulation, flocculation, softening, sedimentation, filtration, desalination and disinfection; water treatment, principles of biological treatment systems including activated sludge, extended aeration, aerated lagoons, and stabilization ponds.

Prerequisites: CE 230, CHEM 111

CE 399 Summer Work (0-0-0)

A continuous period of eight weeks of summer working in the industry to gain exposure and appreciation of the civil engineering profession. On-the-job training can be acquired in one of the four specialties of civil engineering. The student is required to write a brief report about his industrial experience. The report should emphasize duties assigned and completed by the student.

Prerequisites: ENGL 214, Junior Standing and Approval of the Department.

CE 401 Concrete Technology (2-3-3)

In-depth study of composition, characteristics and hydration of cements; structure and properties of hardened cement paste; local aggregates; workability, strength, volume changes and permeability of concrete; failure mechanisms of plain concrete; production, handling and quality control of concrete; mix design; special concretes such as fiber reinforced concrete, ferrocement and polymer impregnated; durability problems of concrete in the Gulf environment; preventive measures, specifications and construction techniques for local conditions.

Prerequisite: CE 303

CE 402 Durability, Evaluation and Repair of Concrete Structures (3-0-3)

Durability problems of concrete in the Gulf environment; factors causing deterioration in the local conditions; manifestations and mechanisms of sulfate attack, corrosion of reinforcement, salt weathering, environmental cracking and cement-aggregate reaction; deterioration of concrete in sea water; preventive measures; diagnosis and evaluation of deterioration, repair materials and techniques.

Prerequisite: CE 303

CE 405 Structural Analysis II (3-0-3)

Review of matrix algebra and solution of simultaneous equations; flexibility (force) method analysis; stiffness (displacement) method of analysis; 2-D trusses, beams and frames; development of computer programs using the stiffness method; use of available computer packages for applications in structural analysis; introduction to the Finite Element Method; introduction to Structural Stability.

Prerequisite: CE 305

CE 406 Structural Mechanics II (3-0-3)

Bending of beams of non-symmetrical sections; shear center; energy concepts including Rayleigh-Ritz method; use of classical and energy methods in the analysis of curved beams; torsion of prismatic members; beams on elastic foundations; introduction to finite difference and finite element methods; beam-columns; failure theories and members with cracks.

Prerequisite: CE 203

CE 408 Steel Design I (2-3-3)

Properties of structural steel; steel sections and introduction to load resistance factor design (LFRD), design of tension members, compression members and capacity calculations; laced columns width-thickness ratios; design of beams with and without lateral supports; design of members under combined axial and bending loads; design and details of simple bolted and welded connections, and an introduction to common building connections; use of softwares for design of elements and overall design of frames.

Prerequisite: CE 305

CE 411 Senior Design Project (0-9-3)

Students undertake a civil engineering project under the supervision of a faculty member with the aim of achieving a comprehensive design experience through a coherent study of all applicable principles, strategies and methodologies of design, including construction operation, and maintenance as and when applicable. The project should also take into consideration other appropriate factors such as alternative designs, economic feasibility and social and environmental impacts. The student is required to make an oral and written presentation of the design project to an examining committee.

Prerequisites: ENGL 214 and CE 317, Senior Standing or Approval of the Advisor.

CE 412 Drawing and Detailing (2-3-3)

Topics include: drawing conventions; design process; comprehension of tender, contract, working and detail drawings; mapping; technical illustration and presentation; study of drawing office, its equipment, management, automated drawing devices and computer graphics applications.

Prerequisite: CE 213 or Instructor's Permission.

CE 415 Reinforced Concrete II (2-3-3)

Behavior and design of columns under axial load and bending including slenderness effects; design of wall footings; design of combined footings; ACI Code provisions for serviceability requirements; deflection of flexural members; design of two-way slabs on beams using the ACI Direct Design Method; analysis and design of frames and continuous beams; design of one-way joist floor system; design of beam column joints; design of stairs behavior and design of retaining walls; introduction to prestressed concrete; design project of multistory building with two-way flooring system which integrates the design of different structural components; computer application in interactive design.

Prerequisite: CE 315

CE 417 Reinforced Concrete III (3-0-3)

Analysis of multi-storeyed building frames for one-way and two-way flooring systems using approximate and "exact" methods; preliminary and final design of multi-storeyed building frames; mat foundations; water tanks; introduction to reinforced concrete bridges; problem of durability in reinforced concrete buildings; computer application in interactive design.

Prerequisite: CE 415

CE 418 Steel Design II (3-0-3)

Introduction to elastic-plastic material behavior; plastic analysis and design of continuous beams and simple frames using load resistance factor design (LRFD); design of built-up beams and plate girders; optimum proportioning of I-beam; design of composite section analysis; design for torsion; design of semi-rigid and rigid connections; computer application and usage in design of rigid frames and steel buildings.

Prerequisite: CE 408

CE 420 Construction Engineering (3-0-3)

Construction engineering environment and practices, contract documents, types of contract, bidding strategies and professional liabilities; construction equipment and methods, CPM, network analysis, scheduling and resource leveling; cost control and project management with computer applications. Introduction to PERT.

Prerequisite: Senior Standing

CE 430 Engineering Hydrology II (3-0-3)

Review of fundamentals of hydrology and advanced treatment for estimation of elements of the hydrologic cycle; hydrologic flood routing; probability concepts in hydrology, flood frequency analysis; hydrologic principles in engineering design; computer applications in hydrology and introduction to minor structure design.

Prerequisite: CE 230 or equivalent.

CE 432 Hydraulic Engineering (3-0-3)

Open channel concepts leading to the development of gradually varied flow computation, computer-aided profile computation, hydraulic factors for the design of reservoirs, dams, spillways and stilling basins. Hydraulic models and similitudes; fundamentals of pumps and turbines; selection of pumps.

Prerequisite: CE 230 or equivalent.

CE 433 Ground Water Engineering (3-0-3)

Introduction and definitions, ground water storage and supply, Darcy's Law and its limitation, Dupuit approximation, steady and unsteady flows in confined and unconfined aquifers, radial flow towards wells, storage coefficient and safe yield in a water-table aquifer, design of wells, methods of drilling and construction, development of maintenance of wells.

Prerequisite: CE 230 or equivalent.

CE 434 Irrigation Engineering (3-0-3)

Irrigation in Saudi Arabia; sources and quality of water for irrigation; design of low diversion dams in wadies; irrigation wells; and soil-water-plant relations, consumptive use; layout of gravity irrigation systems, irrigation methods, furrow, borderstrip, sprinkler and drip systems, computer-aided design of sprinkler system; waterlogging and salinity problems, and drainage in irrigated lands.

Prerequisite: CE 230 or equivalent.

CE 435 Theory and Design of Water Wells (3-0-3)

Aquifers and wells of Saudi Arabia; trends in recent groundwater developments; exploration methods and location of wells; well hydraulics-steady and unsteady flow, yield vs. well size and yield vs. drawdown; non-equilibrium well formula; design of wells; well screens, well drilling methods, well logging and installing of well screens; design and layout of well point system; well development; disinfecting of wells; encrustation and corrosion of well screens, remedial measures and maintenance; water-well specifications; pumps for wells.

Prerequisite: CE 230 or equivalent.

CE 440 Highway and Airport Materials (3-0-3)

Materials types: asphalts, cement, aggregates and local materials; specifications: material selection and design; tests of asphalts and aggregates, mix design procedures for hot and cold mixes of flexible pavements and concrete mixes for rigid pavements; characterization techniques; modulus of resilience, fatigue, rutting and field control tests.

Prerequisites: CE 303, CE 341, CE 343

CE 441 Design of Pavement (3-0-3)

Pavement types and loading, behavior of pavements under dynamic loads, stresses in flexible and rigid pavements, pavement components, pavement design factors, flexible highway and airport pavement design, rigid highway and airport pavement design; overlay design and computer applications; practical pavement design project of a road and airport.

Prerequisite: CE 303

CE 442 Construction and Maintenance of Highways and Airports (3-0-3)

Course on the fundamentals of highway and airport construction and maintenance; topics include asphalt plants, material placement and compaction methods, quality control, earthwork, highway drainage and roadside requirements; construction standards, pavement performance and evaluation, pavement distress identification, surface treatments, types, application and design; overlay; pavement recycling techniques; computer applications.

Prerequisites: CE 341, CE 343

CE 443 Highway Planning and Design (3-0-3)

Highway planning in rural and urban areas; highway location studies; engineering and aesthetic considerations; geometric design, structural design, highway materials; drainage, highway construction, highway safety engineering; discussion of AASHTO and Saudi highway design manuals; complete geometric design of a two-lane highway; introduction to computer softwares for geometric design.

Prerequisite: CE 341

CE 444 Traffic Engineering and Roadway Safety (3-0-3)

Vehicle, roadway and driver characteristics; traffic engineering and safety studies; traffic flow theory and highway capacity analysis, and computer applications; traffic control methods and devices; operational considerations for safety; roadway lighting and highway traffic noise.

Prerequisites: CE 341, CE 343

CE 453 Geotechnical Engineering II (3-0-3)

Fundamental relations of elasticity and plasticity in soil masses; unsaturated soils behavior; deformation properties of cohesionless and cohesive soils; advanced strength concepts in soils and stress path; slope stability analysis; introduction to soil dynamics.

Prerequisite: CE 353

CE 454 Soil Stabilization and Site Improvement (3-0-3)

General survey of soil types and their behavior and the available techniques for improvement; shallow and deep mechanical modifications; modifications by admixtures and grouting; modifications by inclusions; the use of geosynthetic material in filtration, seepage control, separation, reinforcement and water retention; hydraulic modifications; and treatment of marginal soils.

Prerequisite: CE 353

CE 455 Foundation and Earth Structure Design (3-0-3)

Site investigation, including determination of soil properties for design; bearing capacity theory of shallow foundation; settlement of building foundations; design and analysis of retaining walls, sheet piles and braced excavations; design of pile and pier foundations.

Prerequisite: CE 353

CE 456 Seepage Analysis & Its Control (3-0-3)

Principles that govern the flow of water into soils; equation of continuity and potential theory; flow nets; confined flow; unconfined flow; seepage forces and critical gradient; applications of seepage principles to earth structures; seepage from canals and ditches; seepage into wells; filters and drains; review of selected case histories.

Prerequisite: CE 353

CE 460 Remote Sensing Technology (3-0-3)

The physical and spectral basis of remote sensing; sensor systems; photographic censors; multispectral scanners; sidelooking airborne radar; passive microwave sensors and remote sensing programs; mission planing consideration; LANDSAT system; image interpretation of remote sensing data; numerical analysis of remote sensing data; pattern recognition in remote sensing; typical steps in numerical analysis; applications of remote sensing.

Prerequisites: PHYS 102 and Junior Standing

CE 461 Geodesy (3-0-3)

The earth and its gravity field, scope of geodetic positioning techniques, the figure of the earth, geodetic datum, terrestrial coordinate systems and associated transformations, geodetic position computation on earth as sphere, as ellipsoid, field astronomy, mapping, and projection coordinates of the ellipsoid.

Prerequisite: CE 260

CE 462 Photogrammetry I (2-3-3)

Metric camera, optical principles, mathematical principles, terrestrial photogrammetry, aerial photogrammetry, stereoscopic plotters, analytical photogrammetry, orthophotomaps, holography, flight planning.

Prerequisite: CE 260

CE 463 Theory of Errors and Adjustment Computations (3-0-3)

Definition of errors, sources of errors, types of errors, Gauss probability distribution of random errors, uni-variate and multi-variate errors propagation, parametric least squares adjustment, single and multiconditional least squares adjustment, least squares solution of mathematical model, statistical testing of observations and mathematical structures.

Prerequisite: CE 260

CE 464 Project Surveying (3-0-3)

Laser systems and alignment, electronic distance measurement with high precision, land subdivision and legal aspects; route surveying, hydrographic surveying, mine surveying, construction surveying, ruin surveying, industrial surveying, plane table surveying, structure deformation measurement and monitoring, earth crustal deformation measurement.

Prerequisite: CE 260

CE 472 Environmental Engineering (3-0-3)

Analyses of stream and estuary water quality; composition and disposal of solid wastes; types of hazardous waste generated, and their management; sources, characteristics, and effects of air pollution; meteorology of inversions and dispersion of pollutants; health effects of noise pollution and its control; application of computer models in analysis of environmental data.

Prerequisite: Senior Standing.

CE 473 Design and Operation of Water and Wastewater Treatment Plants (3-0-3)

Theory and practice in sanitary engineering including the concepts of processing, design, economic evaluation and computer analysis; class projects incorporating practical considerations in the design and operation of treatment units and the combining of unit processing in water and wastewater treatment plants; field trips will be organized to visit various types of treatment plants in operation.

Prerequisite: CE 370

CE 475 Water Distribution and Wastewater Collection System (3-0-3)

Design of pumping stations employing both constant speed and variable speed pumps; design of water distribution systems with computer analysis incorporating storage reservoirs, booster pumping, and control valves; design of wastewater collection systems including gravity flow sewers, force mains, and lift stations; and operation of utilities employing telemetry and data processing; site visits will be arranged to see various operational and maintenance practices.

Prerequisite: CE 230

CHEMICAL ENGINEERING

CHE 201 Introduction to Chemical Engineering (3-0-3)

The basic principles and techniques used for calculations of material balances in chemical engineering processes are introduced. The material covered involves fundamental engineering concepts, formulation and solution of increasingly complex chemical engineering process problems and familiarization with physical properties and behavior of ideal and real gases. Problem solving sessions.

Prerequisites: CHEM 102, PHYS 102

CHE 203 Chemical Engineering Thermodynamics I (3-0-3)

The first and second laws of thermodynamics are studied in detail. Material covered includes concepts of energy, enthalpy, heat effects, conservation of energy, interaction between heat transfer, mechanical work, and chemical energy liberation, equations of state, behavior of gases and liquids, standard heats of reaction, formation and combustion and entropy. Study of combined mass and energy balances.

Prerequisites: CHE 201, MATH 201, ICS 101 or ICS 102 or ICS 103

CHE 204 Transport Phenomena I (3-0-3)

An introductory treatment of practical fluid dynamics covering both laminar and turbulent flow is given. Mass, energy, and momentum balances are derived, and the techniques of dimensional analysis are introduced. The principles and operation of fluid meters are developed and their characteristics are described, together with flow analysis of typical piping systems. Flow of particulates is also covered.

Prerequisites: ICS 101 or ICS 102 or ICS 103
Co requisites: MATH 202, CHE 203 or ME 203

CHE 300 Transport Phenomena II (3-0-3)

Modes of heat transfer. Differential equations of energy transport. Steady and transient heat conduction. Free and forced convection in laminar and turbulent flows. Momentum and heat transfer analogies. Boiling and condensation. Radiation heat transfer. Application to the design of process heat transfer equipment.

Prerequisite: CHE 204

CHE 303 Chemical Engineering Thermodynamics II (3-0-3)

Review of 1st and 2nd laws. Thermodynamic relations. PVT properties. Thermodynamic diagrams. Properties of mixtures. Ideal and real mixtures. Phase equilibria, calculation concepts. The concept of fugacity and activity in liquid phase models. Chemical reaction equilibria concepts and criteria. The steam power plant.

Prerequisites: MATH 202, CHE 203

CHE 304 Transport Phenomena III (3-0-3)

Fundamentals of mass transfer. Differential equations of mass transfer. Steady-state and unsteady-state molecular diffusion. Convective mass transfer. Interface mass transfer. Mass transfer theories. Mass transfer equipment. Absorption and humidification operations.

Prerequisite: CHE 204
Co requisite: CHE 300

CHE 306 Stagewise Operations (3-0-3)

Review of vapor-liquid equilibria. Differential and flash distillation. Binary distillation. McCabe-Thiele and Ponchon-Savarit methods. Introduction to multicomponent distillation. Liquid-liquid and solid-liquid extraction.

Prerequisites: CHE 303, CHE 304

CHE 309 Chemical Engineering Laboratory I (0-6-2)

This laboratory emphasizes concepts presented in the transport phenomena courses. A safety session is given at the commencement of the course. Safe practices are strictly adhered to throughout the course. Students carry out selected experiments in fluid mechanics, heat transfer, thermodynamics and diffusional mass transfer. Data collected are analyzed and compared to applicable theories.

Prerequisites: CHE 300, ENGL 214
Co requisite: CHE 304

CHE 311 Chemical Process Industries (3-0-3)

Flow sheets and process calculations are described for major chemical industries now operating in Saudi Arabia or likely to be developed in the future. Examples are industrial gases, cement, aluminum, glass, fertilizers, detergents, sulfur industry, petrochemicals, petroleum refining, pulp and paper industry etc.

Prerequisites: CHEM 201, CHE 203

CHE 312 Surface Petroleum Operations (3-0-3)

Processing of crude oil and the associated natural gas of the wellhead into stabilized crude oil, pipeline quality natural gas, natural gas liquids and sulfur. Gas-oil separation, crude oil desalting, gas sweetening and dehydration, recovery and fractionation of natural gas liquids, sulfur production and crude oil stabilization. Computer simulation of major oil field processes. Thermodynamics and phase equilibria of multi-component hydrocarbon mixtures. Gas compression, refrigeration and two-phase flow.

Co requisite: CHE 306

CHE 325 Chemical Engineering Computing Laboratory (1-3-2)

Programming chemical engineering calculations and problem solving. Data acquisition and processing, computer assisted design and simulation of chemical engineering problems using appropriate commercial software packages.

Co requisite: CHE 306

CHE 351 Applied Chemical Engineering Cooperative Work (0-0-9)

In this course the student will spend a period of 28 weeks of industrial employment in industry. Students are required to write a detailed formal report on their experience. Evaluation by the employer will be counted towards the grade given for this course.

Prerequisites: CHE 309, ENGL 214, Approval of the Department (85 credit hours).

(Registration in this course is limited to students in the College of Applied Engineering)

CHE 399 Summer Industrial Training (0-0-0)

A period of 12 weeks of industrial employment in appropriate industries or firms. Students are evaluated on their performance, and are required to submit a formal written report about their experience before receiving a grade of Pass or Fail for the course.

Prerequisite: Junior Standing

CHE 401 Process Dynamics and Control (3-0-3)

Dynamics and simulation of linear systems. Transfer functions for 1st and 2nd order. General Transfer functions. Linearization. Modes of control; Block diagram representation, open and closed loop transfer functions, stability studies, parameter tuning, frequency response analysis, Nyquist and Bode diagrams. Case studies.

Prerequisites: CHE 306, SE 301

CHE 402 Kinetics and Reactor Design (3-0-3)

Theory of chemical kinetic mechanisms and derivation of overall rate expressions. Interpretation of constant volume, variable volume batch reactor data and its application to the design of ideal backmix and plug flow reactors. Comparison of reactor performance including series, parallel, and multiple reactions. Nonisothermal reactor operation. Basic heterogeneous reactions and nonideal reactors performance.

Prerequisites: CHE 303, CHEM 311, Senior Standing

CHE 409 Chemical Engineering Laboratory II (0-6-2)

A laboratory to complement the theoretical derivations in stagewise operations, process dynamics and control, and kinetics and reactor design. A safety session is given at the commencement of the course. Safe practices are strictly adhered to throughout the course. Two environmental engineering reaction experiments are included. Students carry out selected experiments, analyze data collected referring to applicable theories and present their findings in formal reports.

Prerequisites: CHE 306, CHE 309
Co requisites: CHE 401, CHE 402

CHE 422 Properties of Fluids (3-0-3)

Study on several methods for the estimation of physical, thermodynamic and transport properties of fluids commonly used in industry. Study of literature sources where property information is available. Application of these properties to process design is emphasized to give the students a complete picture of the use and importance of good property estimation.

Prerequisite: CHE 303

CHE 425 Engineering Economics and Design Principles (3-0-3)

Process economic analysis of chemical plants with particular emphasis on cost estimation, interest calculations, depreciation, profitability, methods for decision-making among alternatives and capital budgeting.

Process flow diagram analysis, design of flow systems, design and integration of process equipment such as chemical reactors, separators, pumps, compressors, heat exchangers, absorbers, etc., into a chemical process. Development of the general principles of process design including materials selection, transfer and handling, plant location, plant layout, waste disposal, safety considerations, etc. Application of software packages such as Aspen Plus or HYSYS.

Prerequisite: CHE 306
Co requisite: CHE 402

CHE 430 Separation Processes (3-0-3)

Separation techniques of interest in the chemical industry, primarily diffusional, are covered. Emphasis will be on the unit operations of multicomponent gas absorption, humidification, adsorption and ion exchange, reverse osmosis, permeation, dialysis, electrophoresis, foam fractionation, chromatographic separations, sublimation and electrodialysis.

Prerequisite: CHE 306

CHE 432 Principles of Heat Exchanger Design (3-0-3)

Description and applications of different heat exchangers in process industries. Design of double pipe heat exchanger (including extended surfaces). Detailed design procedures for shell and tube heat exchanger for single phase flow. Detailed design procedures for air coolers. Selection criteria for heat exchangers. Descriptive discussion of condensers, evaporators and reboilers, novel heat exchangers and other types of heat exchangers.

Prerequisite: CHE 300

CHE 440 Catalysis & Catalytic Processes (3-0-3)

Basic definition and classification of catalysts, nature and mechanism of catalytic reactions, adsorption processes, catalyst preparation and catalyst characterization. Mass and heat transport effects in catalysis. Catalyst deactivation. Basic design principles of heterogeneous catalytic reactors such as fixed bed and fluidized bed reactors. Industrial catalytic processes with emphasis on existing processes in Saudi Arabia.

Co requisite: CHE 402

CHE 449 Biochemical Engineering (3-0-3)

Descriptive treatment of key concepts on biochemistry. The kinetics of enzyme-catalyzed reactions and its applications. Kinetics of substrate utilization, transport phenomena in microbial systems. Design and analysis of biological reactors. Analysis of multiple interacting microbial populations in applications.

Prerequisite: CHE 304
Co requisite: CHE 402

CHE 453 Mathematical Methods in Chemical Engineering (3-0-3)

The selection, construction, solution, and interpretation of mathematical models applicable to the study of chemical engineering. Analytical, numerical, and approximate methods for solving algebraic, ordinary, and partial differential equations arising in chemical engineering systems. Relationships of lumped and distributed parameter systems are also developed.

Prerequisite: Senior Standing

CHE 455 Chemical Process Simulation (3-0-3)

Systems analysis as applied to the mathematical modeling and computer aided simulation of chemical processes. Students will learn how to simulate various process units, process areas, and what is in the black box of a simulator program. Each student will be assigned an individual process to simulate in the latter half of the course.

Prerequisite: CHE 306

CHE 461 Petroleum Refining (3-0-3)

General review of refining processes of crude oil. Shortcut methods for practical design calculations. Design of atmospheric, vacuum, and pressure columns for petroleum fractionation, including auxiliary furnaces and condensers. Recent developments in heavy oil processing.

Prerequisite: CHE 306

CHE 462 Petrochemical Industries (3-0-3)

Process technologies used in petrochemical industries, such as thermal and catalytic cracking will be introduced. Basic, intermediate and final petrochemicals are studied. These include synthesis gas and derivatives, ethylene, propylene, butene, BTX, and their derivatives. Competing technologies will be assessed from the chemical engineering point of view.

Prerequisite: CHE 306

CHE 463 Polymer Technology (3-0-3)

Structure and physical properties of polymers. Homogeneous and heterogeneous polymerization processes. The chemical, mechanical, and engineering properties of polymers as well as polymer processing and rheology are emphasized in this course.

Prerequisite: CHEM 311

CHE 470 Process Air Pollution Control (3-0-3)

Sources and effects of air pollution; air quality, atmospheric reactions and scavenging processes. Meteorological setting for dispersion of air pollutants. Theory of atmospheric dispersion modeling. Air pollution control concepts, selection, evaluation and application of control devices for emission and control from chemical and petrochemical industries.

Prerequisite: Senior Standing or Departmental Approval.

CHE 471 Process Water Pollution Control (3-0-3)

Water quality and pollution, industrial wastewater characterization, classification of wastewater processes. Modeling and design of biological waste treatment processes. Analyses of chemical and physical processes for wastewater treatment in process industries.

Prerequisite: CHE 304

CHE 472 Corrosion (3-0-3)

Study of corrosion mechanisms and techniques used in prevention and control. Electrochemistry and its application to corrosion. Material selection for different environments.

Prerequisite: CHEM 311

CHE 473 Desalination (3-0-3)

Description of methods of water analysis and treatment. Study of properties of water and aqueous solutions. Detailed discussion and analysis of design, maintenance, energy requirements and economics of the major processes of desalination such as distillation, reverse osmosis, and electrodialysis.

Prerequisites: CHE 300, CHE 303

CHE 480 Energy Technology (3-0-3)

Statistics on global energy use, supply and demand of energy, energy generation from fossil and non-fossil fuels. Energy transportation and storage, energy from low-calorific value fuels, energy conservation and economics, and energy management.

Prerequisites: CHE 300, CHE 303

CHE 491 Materials Evaluation and Selection (3-0-3)

This course is designed to acquaint students with the theoretical reasoning and experimental methods used in evaluating both crystalline and non-crystalline materials covering metallic, polymeric and ceramic materials. The principles involved in their selection based on mechanical properties, resistance to degradation, and wear, and special properties are illustrated in the practical examples from process industries.

Prerequisite: ME 205

CHE 495 Integrated Design Course (1-6-3)

Development of general engineering skills and judgment needed in the solution of open-ended problems from a technical-economic viewpoint are the major goals of this course. The design of a project from conception to implementation including preliminary feasibility study, preparation of process, flow diagram, process design, pre-construction cost estimate, equipment sizing (design), selection of materials of construction, and analysis of project.

Applications will be in areas such as petroleum, petrochemicals, emerging chemical industries and water desalination. Design topics will be assigned to teams of students.

Co requisite: CHE 425

CHE 498 Special Topics in Chemical Engineering I (3-0-3)

Selected topics from the broad area of chemical engineering. The specific contents of the course is published one semester in advance.

Prerequisite: Approval of the Department.

CHE 499 Special Topics in Chemical Engineering II (3-0-3)

Selected topics from the broad area of chemical engineering. The specific contents of the course is published one semester in advance.

Prerequisite: Approval of the Department.

CHEMISTRY

CHEM 101 General Chemistry I (3-4-4)

Matter, atomic structure and the periodic table, chemical bonding, stoichiometry of pure substances, reaction in aqueous solutions, states of matter (gases, liquids, and solids), mixtures (with emphasis on some physical aspects of solutions), thermochemistry.

Laboratory: Qualitative and quantitative aspects of general chemistry.

CHEM 102 General Chemistry II (3-4-4)

Chemical equilibria (gases, acids and bases, and solubility equilibria), chemical kinetics, spontaneity of reactions, coordination chemistry, nuclear chemistry, electrochemistry, chemistry of selected representative elements, organic structure and reactions, chemistry of materials.

Laboratory: Qualitative and quantitative aspects of general chemistry.

Prerequisite: CHEM 101

CHEM 111 Basics of Environmental Chemistry (2-0-2)

Elements, compounds, chemical equations, and gas laws, spontaneity of reactions, chemical kinetics, chemical equilibria (gases, acids and bases, redox and complexation reactions), organic structures and reactions, carbohydrates, proteins and fats, pesticides and organic pollutants, colloids.

Prerequisite: CHEM 101 (Not open for Chemistry and Industrial Chemistry Majors).

CHEM 201 Organic Chemistry I (3-4-4)

Structure, stereochemistry and the properties of organic compounds, synthesis and reactions of alkanes, alkenes, alkynes, dienes, alicyclic, alcohols, ethers, mechanism of radical substitution, radical, electrophilic addition and electrophilic aromatic substitution.

Laboratory: Laboratory techniques of organic chemicals and laboratory synthesis of organic chemicals.

Prerequisite: CHEM 102

CHEM 202 Organic Chemistry II (3-4-4)

Identification of organic compounds by spectroscopic methods. Synthesis and properties of carboxylic acids and derivatives, aldehydes, ketones, amines, polycyclic and hetereocyclic aromatics, carbohydrates, amino acids and nucleic acids.

Laboratory: Basic spectroscopic techniques, laboratory synthesis of organic chemicals and multistep synthesis.

Prerequisite: CHEM 201

CHEM 212 Physical Chemistry I (3-4-4)

Basic gas laws, laws of thermodynamics, chemical equilibria, phases, solutions, and phase equilibria.

Laboratory: Techniques of physical measurements, error analysis and statistics with experiments on gas laws, calorimetry, equilibria and phase diagrams.

Prerequisites: CHEM 102, MATH 102, PHYS 102

CHEM 223 Quantitative Methods of Chemical Analysis (1-4-2)

Sampling and sample preparation. Gravimetric methods of analysis (formation, washing, filtration and drying). Acid-base equilibria (theories of acids and bases). Monoprotic and diprotic acids. Buffers. Precipitation titrations. Complex formation titration (EDTA titrations). Oxidation-reduction equilibria, (redox reactions and electrochemical cells).

Laboratory: Experiments on basic analytical methods, including gravimetric, and titrimetric techniques.

Prerequisite: CHEM 102

CHEM 303 Spectroscopic and Qualitative Organic Chemistry (2-4-3)

A course in which spectroscopy and classical methods are combined to identify unknown organic compounds. Separation of mixtures of unknowns is carried out using chromatographic methods and other classical chemical methods. Spectroscopic and NMR methods for the identification of compounds are emphasized.

Laboratory: Spectroscopic and wet chemical techniques are used to determine structures of unknown organic compounds.

Prerequisite: CHEM 202

CHEM 311 Physical Chemistry II (3-4-4)

The application of thermodynamics to electrochemical cells, chemical kinetics; the kinetics of reactions in the gaseous and liquid states, transport properties, surface chemistry and colloids and surface dynamics.

Laboratory: Experiments involving conductivity, electrochemistry, chemical kinetics, and transport properties of gases and liquids.

Prerequisite: CHEM 212 or CHE 203 or ME 203

CHEM 312 Physical Chemistry III (3-0-3)

Electromagnetic Radiation and the Old Quantum Theory, Bohr's Atomic Theory, The Foundations of Quantum Mechanics, Schrödinger's Wave Mechanics, Quantum-Mechanical Postulates, Quantum Mechanics of Some Simple Systems, Quantum Mechanics of Hydrogen like Atoms, Angular Momentum and Magnetic Moment, The Rigid Linear Rotor, Spin Quantum Numbers, Many-Electron Atoms, Approximate Methods in Quantum Mechanics.

Prerequisite: CHEM 311

CHEM 314 Computer Applications in Chemistry (3-0-3)

Application of available PC-software to solve chemical and numerical problems in the various areas of chemistry and to treat laboratory data. Molecular modeling and its application to interpret spectroscopic results. Emphasis will be placed on literature review and implementation of ready-to-use PC-programs in chemistry.

Prerequisites: ICS 101, CHEM 212

CHEM 323 Instrumental Chemical Analysis (2-4-3)

Instrumental analysis techniques such as molecular and atomic spectrophotometry: absorption and emission spectroscopy, electroanalytical techniques of analysis with emphasis on potentiometry and voltammetry, chromatography, and thermal analysis.

Laboratory: Experiments related to qualitative and quantitative analysis using various instrumental techniques.

Prerequisite: CHEM 102

CHEM 324 Advanced Instrumental Chemical Analysis (2-4-3)

Advanced instrumentation and application of modern instrumental techniques to include: spectroscopy, mass spectrometry, electrochemical methods, chromatography and flow injection analysis.

Laboratory: Experiments related to qualitative and quantitative analysis using advanced instrumental techniques.

Prerequisite: CHEM 323

CHEM 331 Inorganic Chemistry (3-4-4)

Introduction to modern inorganic chemistry, facets of atomic structure and properties of elements, periodic table and periodic properties, molecular bonding, solid state chemistry, acids and bases, oxidation and reduction, molecular shape and symmetry, coordination chemistry.

Laboratory: Experiments in inorganic chemistry

Prerequisite: CHEM 102

CHEM 332 Advanced Inorganic Chemistry (3-0-3)

Transition metal chemistry, structural and bonding interpretation of magnetic and spectral properties of transition metal compounds (ligand field theory), stabilities of transition metal complexes, reaction mechanisms of complexes, polynuclear complexes, coordination compounds as industrial homogeneous catalysts, naturally occurring transition metal complexes, importance of complexes in environment, importance of complexes in biological systems, chemistry of organometallic compounds.

Prerequisite: CHEM 331

CHEM 355 Industrial Catalysis (3-0-3)

A study of transition metal chemistry and organometallic reaction mechanism. A study of important catalytic processes including alkylation, carbonylation, Oxidation-Oxygenation, Hydrogenation, Methatesis and others. Study of the mechanisms, the catalytic cycles and the active intermediates involved in these processes. Discussion of the most important industrial catalytic processes now operating in Saudi Arabia and worldwide.

Prerequisite: CHEM 202

CHEM 399 Summer Training in Industry (0-0-2)

A period of two months of industrial employment in appropriate industries or firms. Students are evaluated on their performance, and are required to submit a report and present a seminar about their experience before receiving a grade for this course.

Prerequisites: ENGL 214, Junior Standing, Approval of the Department.

CHEM 401 Special Topics (3-0-3)

A discussion of the recent advances in selected fields of chemistry

Prerequisite: Permission of the Instructor.

CHEM 402 Structure and Mechanisms in Organic Chemistry (3-0-3)

Chemical bonding and structure, stereochemical principles, conformational and steric effects, methods of mechanistic study, nucleophilic substitution, polar addition and elimination, carbanions, carbonyl compounds, aromatic substitution, concerted reactions, other interesting reaction types.

Prerequisite: CHEM 202

CHEM 403 Synthetic Organic Chemistry (3-0-3)

Organic reaction types, less common functional groups, reaction mechanisms, basic synthetic methods, retrosynthesis and selected total synthesis of natural products.

Prerequisite: CHEM 202

CHEM 406 Spectroscopic Identification of Organic Compounds (3-0-3)

Identification and structural analysis of organic compounds by nuclear magnetic resonance, infrared and ultraviolet spectroscopy, and mass spectrometry. Introduction to instrumentation, sample handling and basic theory of each technique with emphasis on their practical applications for structure determination

Prerequisite: CHEM 202

CHEM 415 Molecular Spectroscopy (3-0-3)

General review of wave mechanics in relation to molecular systems, vibrational and rotational energies of molecules, absorption and emission of radiation, molecular symmetry and group theory, electronic spectra of diatomic and polyatomic molecules.

Prerequisite: CHEM 312

CHEM 416 Photochemistry (3-0-3)

A study of the fundamental photochemical and photophysical processes which follow absorption of radiation by molecules and the techniques used to study these processes.

Prerequisite: CHEM 312

CHEM 417 Introduction To Statistical Thermodynamics (3-0-3)

Principles of Statistical Thermodynamics, Probability, Ensembles, Partition Functions, Independent Molecules and the Ideal Gas. Einstein and Debye Models of Solids, Statistical Theory of Black Body Radiation. Debye-Hückel Theory of Electrolyte Solutions.

Prerequisite: CHEM 312

CHEM 418 Quantum Chemistry (3-0-3)

Classical mechanics versus quantum mechanics, postulates of quantum mechanics, Schrödinger equation, particle in a box, atomic wave functions, Russell-Saunders coupling and perturbation theory, molecular wave functions.

Prerequisite: CHEM 312

CHEM 424 Environmental Analysis (3-0-3)

Pollution, pollutant dispersion, preconcentration and final degradation, transport of pollutants in the environment. The role of analytical chemistry. How to set up an analytical monitoring scheme. Techniques for water quality measurements. Trace Pollutants. Analysis of Solids. Atmospheric Analysis. Gases and Particulates. Ultra-trace analysis.

Prerequisite: CHEM 324

CHEM 425 Trace Analysis (3-0-3)

Sampling, the working environment, laboratory materials, storage, reagents, ordinary techniques e.g. spectrophotometry, electroanalytical methods and separation techniques, atomic absorption and atomic emission, fluorescence and phosphorescence, inductively coupled plasma, coupled techniques such as ICP-MS, HPLC-MS and HPLC-ICP-MS.

Prerequisite: CHEM 324

CHEM 431 Chemistry of The Environment (3-0-3)

Chemical processes important in the environment from naturally occurring to man-induced systems, thermodynamics and chemical consideration of fuels, the thermodynamics of the atmosphere, atmospheric photochemistry, chemistry of natural water systems, chemistry of pesticides, fertilizers and other important environmental contaminants, aspects of the carbon, nitrogen and sulfur cycles.

Prerequisite: CHEM 331 or Permission of the Instructor.

CHEM 436 Chemical Applications of Group Theory (3-0-3)

Introduction, symmetry elements and symmetry operations, introduction to groups, symmetry point groups, class structure, representations and character tables, chemical applications of symmetry, bonding and spectral interpretation from group theory.

Prerequisite: CHEM 331 or Permission of the Instructor.

CHEM 450 Polymer Chemistry (3-4-4)

Basic concepts of polymer chemistry, condensation, polymerization, addition polymerization, copolymerization, polymer structure and properties, molecular weight measurements of polymers, analysis and testing of polymers, industrially important polymers and copolymers and plastic technology.

Laboratory: The laboratory classes are organized to provide practical experience in the field of polymer chemistry, polymer synthesis, mechanism and kinetics of polymerization, properties and characterization of polymers.

Prerequisite: CHEM 202

CHEM 453 Chemistry of Petroleum Processes (2-4-3)

A study of the science of petroleum beginning with its formation in the ground, the physical and chemical properties of petroleum and petroleum products, the chemistry of major refining processes, and eventually leading to analysis of the production of a wide variety of petrochemical intermediates as well as the more conventional fuel products.

Laboratory: The laboratory experiments provide practical experience in the field of petroleum chemistry, catalyst preparation, catalytic reaction, and hydrocarbon analysis.

Prerequisite: CHEM 202

CHEM 455 Industrial Inorganic Chemistry (3-0-3)

A study of inorganic chemicals and products with emphasis on industrial processes. The focus is on sulfur and sulfuric acid, ammonia and its derivatives, cement, glasses, ceramics, electrolytic processes, chlor-alkali industries, phosphorous industries, fertilizer chemicals and metallurgical processes.

Prerequisite: CHEM 331 or (CHEM 305 and CHEM 306)

CHEM 456 Industrial Organic Chemistry (3-0-3)

A study of the organic chemicals and products derived mainly from sources other than petroleum. Special emphasis is on oils and fats, pharmaceuticals, agrochemical, fermentation products, surface coatings, explosives, detergents, and pollution and waste management.

Prerequisite: CHEM 202

CHEM 457 Homogeneous Catalysis in Industrial Processes (3-0-3)

Introduction to homogeneous catalysis in chemical industries using inorganic compounds, comparison of homogeneous and heterogeneous catalysis, basic concepts of organometallic chemistry, metal chelates as catalysts, metallocenes as polymerization catalysts, synthesis of specialty compounds using coordination compounds as catalysts.

Prerequisite: Permission of the Instructor.

CHEM 471 Chemistry Senior Project I (0-8-2)

Students are introduced to research under the direction of a member of faculty. Reasonably simple but challenging projects are chosen which give students the opportunity to use different techniques and principles of chemistry. After their research, students will submit a final project report.

Prerequisite: Senior Standing

CHEM 472 Chemistry Senior Project II (0-8-2)

The requirements for this course are the same as CHEM 471.

Prerequisite: CHEM 471

CHEM 479 Chemistry Seminar (1-0-1)

Students will participate with faculty members in giving and attending seminars of general chemical interest. Topics cover both reviews of current literature and discussion of research in progress. The course includes also a guide to the use of traditional and automated methods for storage and retrieval of chemical information.

Prerequisite: Permission of the Instructor.

COMPUTER ENGINEERING

COE 202 Digital Logic Design (3-0-3)

Introduction to information representation and number systems. Boolean algebra and switching theory. Manipulation and minimization of completely and incompletely specified Boolean functions. Physical properties of gates: fan-in, fan-out, propagation delay, timing diagrams and tri-state drivers. Combinational circuits design using multiplexers, decoders, comparators and adders. Sequential circuit analysis and design, basic flip-flops, clocking and timing diagrams. Registers, counters, RAMs, ROMs, PLAs, PLDs, and FPGA's.

Note: COE 202 and COE 203 together are equivalent to EE 200.
Students who take EE 200 cannot take COE 202 or COE 203 for credit.

Prerequisite: PHYS 102

COE 203 Digital Logic Laboratory (0-3-1)

The course consists of a set of laboratory experiments for students to gain hands-on experience in digital logic. Use of state-of-the-art CAD tools and boards for the design, simulation, and implementation of digital logic. Combinational and sequential digital systems as well as data and control path design experiments will be conducted.

Note: COE 202 and COE 203 together are equivalent to EE 200.
Students who take EE 200 cannot take COE 203 for credit.

Prerequisite: COE 202

COE 205 Computer Organization and Assembly Language (3-3-4)

Introduction to computer organization. Octal and hexadecimal number systems, ASCII codes. Assembly language programming, instruction formats and types, memory and I/O instructions, arithmetic instructions, addressing modes, stack operations, and interrupts. ALU design. RTL, microprogramming, and hardwired control design. Practice of assembly language programming.

Prerequisites: COE 202, ICS 102

COE 305 Microcomputer System Design (3-3-4)

Microprocessor architecture and organization. Bus types, architecture, and buffering techniques. Memory and I/O subsystems, organization, timing and interfacing. Peripheral controllers and programming. Practice on the design of a microprocessor system, testing, debugging, and reporting.

Prerequisite: COE 203, COE 205

COE 307 Computer Hardware (3-0-3)

Digital computers and digital systems, binary systems, number systems, base conversion and binary codes. Basic logic elements, Boolean algebra, and manipulation of Boolean functions. Flip-flops, clocking, and registers. Computer organization, CPU, ALU, main memory, and I/O devices.

Prerequisite: Junior Standing.

Note: This course is NOT open for COE students.
It cannot be taken for credit with COE 202 and COE 203.

COE 308 Computer Architecture (3-0-3)

Memory hierarchy and cache memory. Integer and floating point arithmetic. Instruction and arithmetic pipelining, superscalar architecture. Reduced Instruction Set Computers. Parallel architectures and interconnection networks.

Prerequisite: COE 203, COE 205

COE 341 Data and Computer Communications (3-0-3)

Introduction to data communication. Overview of the OSI model. Frequency response, bandwidth, filtering, and noise. Fourier series and Fourier transform. Information theory concepts: Nyquist's theorem, Shannon theorem, and Sampling theorem. Analog and digital modulation techniques. Pulse Code Modulation (PCM). Communication systems circuits and devices. Data encoding. Physical layer protocols. Data Link Control (point to point communication, design issues, link management, error control, and flow control). Multiplexing.

Prerequisite: MATH 102

COE 344 Computer Networks (3-3-4)

This course will be taught using TCP/IP top-down approach. Topics covered include introduction to computer networks. Application layer design issues and protocols are discussed. Then, Transport layer design issues, protocols as well as congestion control mechanisms are presented. Socket programming is explained. An in-depth analysis is presented of the Network layer design issues, and internetworking. MAC layer design issues and protocols are presented. Finally, multimedia network applications are explored.

Prerequisite: COE 341 and STAT 319. This course cannot be taken for credit with ICS-342.

COE 350 Cooperative Work (0-0-0)

The starting of the cooperative work in the summer just preceding the senior year. Description as given in COE 351.

Prerequisites: ENGL 214, Completion of 90 credit-hours and Departmental Approval.

COE 351 Cooperative Work (Continued) (0-0-9)

A continuous period of 28 weeks spent in industry with the purpose of acquiring practical experience in different areas of Computer Engineering. During this period, a student is exposed to the profession of Computer Engineering by working in the field. Students are required to submit a final report and give a presentation about their experience and the knowledge they gained during their cooperative work.

Prerequisite: COE 350

COE 352 Cooperative Work (Continued) (0-0-9)

This course is the same as COE 351. The only difference is that COE 352 is for students who choose to start their coop program during the second term of the academic year.

Prerequisites: ENGL 214, Completion of 90 credit-hours.

COE 353 Fundamentals of Computer Communications (3-0-3)

Digital communications fundamentals. Voice and data transmission equipment. Communications channels. Data coding and modulation. Multiplexing. Modems. Transmission media. Data transmission codes and protocols. Software packages. Data networks. Planning and design of communication networks.

Prerequisite: Junior Standing

Note: This course is NOT open for COE students.
It cannot be taken for credit with COE 341.

COE 360 Principles of VLSI Design (3-0-3)

MOS transistor operation and limitations. MOS digital logic circuits (NMOS and CMOS), static, dynamic and sequential MOS logic. IC fabrication and processing. Layout and mask generation. IC design and verification tools. Applications and case studies.

Prerequisite: EE 203

COE 385 Personal Computers (2-3-3)

Overview of system features and components. Microprocessor types and specifications. Motherboards, bus slots and I/O cards, memory, power supply, input devices, video display hardware, and audio hardware. Floppy disk, hard disk, and CD-ROM drives and controllers. Network cards. Preventive maintenance, backups, and warranties. Software and hardware diagnostic tools. Software and hardware troubleshooting. Applications.

Prerequisite: Junior Standing

COE 390 Seminar (1-0-1)

The purpose of this course is to help improve students' ability for presenting their technical work. In addition, the course emphasizes the various social and ethical responsibilities of the computing professional. It teaches students about the nature of engineering as a profession, codes of professional conduct, ethics & responsibility, and the role of professional societies. Case studies of conflict between engineering professional ethical values and external demands. The course features students participation in discussions held by faculty members and invited guests.

Prerequisite: Junior Standing

COE 399 Summer Training (0-0-0)

The aim of the summer training is to provide students with direct on-the-job experience working with professionals in the field. This training provides an opportunity to expose students to the reality of professional practice. Students are required to submit a report and make a presentation on their summer training experience and the knowledge gained.

Prerequisites: ENGL 214, Junior Standing, Approval of the Department.

COE 400 System Design Laboratory (1-6-3)

The purpose of this course is to integrate student's knowledge of hardware and software in the design, implementation, debugging, and documentation of one major system. The twin learning experience of making hardware versus software decisions, and participating in a structured design are integrated into the same design exercise. Contrary to COE 485, this is a structured course whereby students are trained by the course instructor to work in teams in implementing a number of mini projects in addition to one major common project at the end of the course.

Prerequisites: COE 305, Senior Standing

COE 402 Computer System Performance Evaluation (3-0-3)

Introduction to computer system performance analysis and evaluation. Review of basic probability distributions and basic concepts of statistics. Performance measures and measurement techniques. Performance analysis, performance prediction, asymptotic bounds on performance. Simulation and modeling of computer systems. Experimental and analytical approaches. Introduction to queuing network modeling. Case studies.

Prerequisite: STAT 319 or Consent of the Instructor.

COE 403 Advanced Microprocessor Architecture (3-0-3)

Introduction to advanced microprocessor architectures. Classification, data types, memory allocation in high level languages, addressing modes, and instructions. Register organization, floating point arithmetic, and interrupts. Memory management: virtual and physical memories, hierarchy, segmentation, and paging. Study of advanced microprocessor architectures. Multi-microprocessors: single and shared buses and arbiters.

Prerequisite: COE 305

COE 405 Design and Modeling of Digital Systems (3-0-3)

Design methodology. Hardware modeling basics. Modeling concurrency and timing aspects. Behavioral, structural, and data flow level modeling using hardware description languages (HDLs). System level modeling and design of practical processors, controllers, arithmetic units, etc. Translation of instruction sets to hardware models for software emulation. Case studies.

Prerequisite: COE 308 or Consent of the Instructor.

COE 406 RISC Architectures (3-0-3)

Principles of RISC design methodologies. Designing an instruction set from a RISC perspective. Optimized register usage. RISC compilers. RISC assessment. A general purpose RISC processor example. An application oriented RISC processor example. Future directions.

Prerequisite: COE 308

COE 409 Special Topics in Computer Architecture & Digital System Design (3-0-3)

Special topics in issues related to computer architecture and digital systems design. Topics and specifics will be announced well before the course starting date.

Prerequisite: COE 308

COE 410 Design of Sequential Systems (3-0-3)

Finite state machines, state minimization and assignment, extended state tables. ASM charts, RT level modeling. Use of programmable logic devices in digital design and synthesis (PLAs, PLDs, FPGAs). Design and analysis of asynchronous logic: level mode sequential circuits, analysis and design of fundamental mode circuits, reduction of state and flow tables, races, cycles, race-free assignment, and hazards.

Prerequisite: COE 202, COE 203

COE 420 Parallel Computing (3-0-3)

Introduction to parallel computing. Parallel architectures, MIMD, SIMD, interconnection topologies. Performance measures, speedup, efficiency, limitations of parallel processing. Parallel programming paradigms, shared memory, message passing, data parallel, data flow. Parallelizing compiler techniques, code and data partitioning, vectorization. Parallel programming environments and tools. Parallel algorithms examples.

Prerequisite: COE 308

COE 421 Fault-Tolerant Computing (3-0-3)

Introduction to fault-tolerant computing (FTC). Goals of fault tolerance (FT). Design techniques to achieve FT. Evaluation of FT systems. Reliability modeling and analysis of FT systems. Availability modeling. Design of practical FT systems. Design of FT VLSI circuits. Introduction to testing.

Prerequisite: COE 308

COE 422 Real Time Systems (3-0-3)

Fundamentals of real time systems design; scheduling, interrupts, process communication and synchronization. Design of real time systems. Decomposition of real time systems. Applications of real time systems. Instrumentation for real time applications. Real time operating systems. Case studies.

Prerequisite: COE 305

COE 423 Distributed Systems (3-0-3)

Characterization of distributed systems, interprocess communication, client-server, remote procedure calls, logical and physical time, distributed coordination. File services, naming and directory services, distributed concurrency control, transactions and atomic commit problem. Case studies.

Prerequisite: Senior Standing

COE 429 Special Topics in Parallel and Distributed Systems (3-0-3)

Special topics in issues related to parallel and distributed systems. Topics and specifics will be announced well before the course starting date.

Prerequisite: Senior Standing

COE 441 Local Area Networks (3-0-3)

Introduction to Local Area Networks (LANs). Classes of LANs. LAN design issues. LAN topologies. LAN transmission media. LAN protocols: Medium Access Control (MAC) and Logic Link Control (LLC). LAN standards. Network software: Network operating systems. LAN performance modeling and analysis. Internetworking: Bridges, Routers, and Gateways. Reliability, availability, survivability, and security.

Prerequisite: COE 341 or Consent of the Instructor.

COE 443 High Speed Networks (3-0-3)

Introduction to computer communication networks. Introduction to high speed networking. Impact of high speed on communication protocols. Design and performance issues of high speed networks. Standard high speed protocols and networks. Examples of high speed networks. Case studies. Future directions.

Prerequisite: COE 341 or Consent of the Instructor.

COE 444 Internetwork Design and Management (3-0-3)

Types of computer networks. Principles of internetworking. The network development life cycle. Network analysis and design methodology. Internetworking hardware. Connectionless internetworking. Connection-oriented internetworking. Routing strategies. Structured wiring and backbone design. OSI internetworking. Network management (SNMP). Network security and firewalls. Network administration. Case studies.

Prerequisite: COE 341

COE 445 Internet Information Services (3-0-3)

Electronic mail and file transfer. Information retrieval services and tools. Multimedia applications: Computer Supported Cooperative Work (CSCW); audio-video conferencing; networked hypertext and hypermedia; visual cyberspace; networking requirements of multimedia applications. World Wide Web (WWW) page and program development. The HyperText Markup Languages and the HyperText Transfer Protocols. Common Gateway Interfaces, Java and Java Script language. Web page style and design.

Prerequisite: Senior Standing or Consent of the Instructor.

COE 446 Mobile Computing (3-0-3)

Introduction to mobile computing. Designing computer networks to support user mobility. Models for indoor and outdoor mobile networks. System issues such as performance, quality of service, reliability, and security in mobile computing environment. Hardware, and access protocols, for mobile networks. Adapting existing protocols to support mobility.

Prerequisite: Senior Standing and Consent of the Instructor.

COE 447 Fundamentals of Optical Networking (3-0-3)

Passive and Active Optical Components. Optical Modulation and Demodulation. Transmission System Design. SONET/SDH and other Client Layers. WDM Networks. Control and Management. Survivability and Resiliency. Access Technologies. Photonic Packet Switching.

Prerequisite: COE 344 or Consent of the Instructor.

COE 449 Special Topics in Computer Communications and Networking (3-0-3)

Special topics in issues related to computer communication networks. Topics and specifics will be announced well before the course starting date.

Prerequisite: COE 341

COE 460 Advanced Digital Electronics (3-0-3)

Sub-micron CMOS technology. BiCMOS process technology, device design considerations, device modeling, BiCMOS digital integrated circuits, BiCMOS digital circuit applications. GaAs process technology, device design, and digital logic design. Comparison between CMOS, BiCMOS, and GaAs performance. Future trends.

Prerequisite: COE 360

COE 462 Design Automation of VLSI Circuits (3-0-3)

Introduction to computer-aided design of integrated circuits. Design approaches, design steps and corresponding design automation problems and tools. Logical and physical partitioning. Solution techniques for floorplanning, placement, global routing and detailed routing. Strategies for grid and channel routing. Layout generation problem and solutions. Symbolic layout, layout editors and compaction. Silicon compilation.

Co requisite: COE 360 or Consent of the Instructor.

COE 464 Testing of Digital Circuits (3-0-3)

Introduction to the testing problem, fault modeling, e.g., stuck-at, bridging, transistor-open and transistor-short faults. Fault simulation, gate-level testing, automatic test pattern generation (ATPG) algorithms. Testing of regular structures. Testing of sequential circuits. Signature analysis. Design-for-testability (DFT).

Prerequisite: Senior Standing

COE 465 VLSI System Design Methodology (3-0-3)

VLSI MOS system design. Layout and design rules, layout graphic editors, design rule checking, layout extraction and verification (LVS). Full custom versus semicustom design styles. Design entry tools, schematic capture and HDLs. Logic and switch level simulation. Static timing analysis concepts and tools. Concepts and tools in floorplanning, placement and routing, layout generation and design synthesis. The course stresses hands-on experience of VLSI design using CAD tools.

Prerequisite: COE 360

COE 469 Special Topics in VLSI and Design Automation (3-0-3)

Special topics in issues related to the VLSI technology. Topics and specifics will be announced well before the course starting date.

Prerequisite: COE 360

COE 484 Introduction to Robotics (3-0-3)

Introduction to Robotics. Motion coordination, configuration space and task space. Mathematical operators, direct and inverse geometric method, direct and inverse variational method. Robot programming, effector-level and object-level, and applications. Practice of robot programming. Introduction to sensors systems and robotics vision. Architectural aspects of robotics systems.

Prerequisite: Senior Standing

COE 485 Senior Design Project (1-6-3)

This course is designed to give students the experience of tackling a realistic engineering problem. The intent is to show how to put theoretical knowledge gained into practical use by starting from a word description of a problem and proceeding through various design phases to end up with a practical engineering solution. Various projects are offered by COE faculty in their respective specialization areas. The project advisor guides the student in conducting feasibility study, preparation of specifications, and the methodology for the design. Detailed design and implementation of the project are carried out followed by testing, debugging, and documentation. An oral presentation and a final report are given at the end of the semester.

Prerequisite: Senior Standing

COE 487 Computer Vision Processing (3-0-3)

Introduction to vision processing. Illumination and imaging techniques. Planar and stereo-vision, pixel representation, preprocessing, smoothing, enhancement, and equalization. Edge detection, gradient, Laplacian, and thresholding. Segmentation, linear, polygonal, and Fourier descriptors. Introduction to 3D structures. Shape matching, search approaches, interpretation, and recognition.

Prerequisite: Senior Standing

COE 488 Data Acquisition Interfacing (3-0-3)

Data acquisition systems, basic sampling concepts, data collection fundamentals. Interfaces. Special instruments. IEEE 488 standard. RS 232C data acquisition software technique. I/O operation queuing. Hardware for data acquisition systems. Multibus. VME bus. Examples and designs.

Prerequisite: COE 305

COE 499 Special Topics in Computer Engineering (3-0-3)

Special topics in issues related to computer engineering. Topics and specifics will be announced well before the course starting date.

Prerequisite: COE 341

ECONOMICS

ECON 101 Principles of Economics I (MICRO) (3-0-3)

The definition of the economic problems and market systems. Demand and consumer behavior, supply, production and costs. Price determination and equilibrium of the firm under different market structures. Pricing factors of production. Public goods and externalities.

ECON 202 Principles of Economics II (MACROECONOMICS) (3-0-3)

An introduction to macroeconomic analysis. National income accounting and determination. Business cycles, inflation and unemployment, fiscal policy, money, banking, and monetary policy, economic growth and development, international trade and finance.

Prerequisite: ECON 101

ECON 301 Intermediate Microeconomic Theory (3-0-3)

A survey of methods of decision-making at the microeconomic level. It covers consumer theory, production theory, business firms, cost and optimal production decisions under different market structures. In general, this course provides a review of price theory and resource allocation in a market economy in much more detailed analysis than does ECON 101.

Prerequisite: ECON 202

ECON 305 Money and Banking (3-0-3)

This course extends the introduction provided in ECON 202. The roles played by money are amplified. The history of money is outlined. The demand and supply are developed. Special emphasis is placed on the role of money in the macroeconomy. This involves a development of the theory of income determination and of the mechanism by which money affects the equilibrium income level.

The role played by the central bank as the executor of monetary policy is emphasized. The policy tools that are available to a central bank are introduced and analyzed. Issues which pertain to the effectiveness of monetary policy are developed. Banking and monetary systems of Saudi Arabia will be discussed.

Prerequisite: ECON 202

ECON 306 Economy of Saudi Arabia (3-0-3)

This course provides a comprehensive study of the Saudi Arabia economy. Special emphasis is placed on the national income accounting, aggregate demand and its components, the economic structural changes, national economic problems and issues. It analyzes the demographic structure and manpower. It provides a detailed analysis of the major topics and sectors: oil, agriculture, manufacturing, international trade, public finance, price level and fiscal policy, money, banking and monetary policy, and economic planning.

Prerequisite: ECON 202

ECON 401 Managerial Economics (3-0-3)

Application of economic theory and methodology to decision process of the firm. Topics include demand theory and estimation, production theory, cost analysis, optimization, market structure, pricing practices, marginal analysis, and business investment decisions.

Prerequisites: ECON 202 and (OM 202 or STAT 212)

ECON 403 Engineering Economics (3-0-3)

Application of fundamental concepts and techniques of economic analysis to project evaluation in engineering practice. Emphasis on interest and money relationships, methods for decision-making among alternatives, depreciation, break-even analysis, minimum cost formula, and capital budgeting.

Not open to College of Industrial Management majors.

ECON 410 International Economics (3-0-3)

The classical and modern theories of international trade and finance, balance of payments, exchange rates, terms of trade, tariffs and other trade barriers, international economics organizations, the new world economic order, economic integration and application to current problems.

Prerequisite: ECON 202

ECON 415 Public Finance (3-0-3)

This course is designed to help students develop an understanding of the economic principles useful in analysis of tax and expenditure policies. The emphasis is theoretical, but is also supported with factual and institutional material about the Saudi economy. The course covers the different types of market failures, principles of expenditure analysis, government programs such as social security and income transfer programs, tax incidence, and the magnitude and importance of the welfare cost of taxation.

Prerequisite: ECON 202

ELECTRICAL ENGINEERING

EE 200 Digital Logic Circuit Design (3-3-4)

Number systems & codes. Logic gates. Boolean algebra. Karnaugh maps. Analysis and synthesis of combinational systems, decoders, multiplexers, adders and subtractors, PLAs. Types of flip-flops. Memory concept. Counters. Registers. Introduction to sequential circuit design.

Note: EE 200 is equivalent to COE 202 with its lab COE 203.
Only one of them, EE 200 or (COE 202 + COE 203) can be taken for credit.

Prerequisites: MATH 101, PHYS 101

EE 201 Electric Circuits I (3-3-4)

Basic laws: Ohm's law, KVL, KCL. Resistive networks. Circuit analysis techniques: node-voltage and mesh-current. Network theorems: Thevenin's, Norton's, source transformations, superposition, maximum power transfer. Operational amplifiers. Energy storage elements. Phasor technique for steady-state sinusoidal response. Important power concepts of AC circuits. Transient analysis of first-order circuits.

Prerequisites: MATH 102, PHYS 102

EE 203 Electronics I (3-3-4)

Semiconductor Physics. PN junction. Diode applications. BJT and FET physics and I-V characteristics. Digital Electronics (TTL, ECL, CMOS, BiCMOS). Analog electronics. Small signal amplifiers.

Prerequisite: EE 201
Co requisite: EE 200 or COE 200

EE 204 Fundamentals of Electrical Circuits (Non-EE students) (2-3-3)

Basic laws: Ohm's law, KVL, KCL. Resistive networks. Circuit analysis techniques: node-voltage and mesh-current. Network theorems. Inductance and capacitance. Sinusoidal analysis and phasor methods. Power concepts of AC circuits. Polyphase circuits.

Prerequisites: MATH 102, PHYS 102

EE 205 Electric Circuits II (3-0-3)

Analysis of three-phase networks. Time-domain solutions of second-order circuits. State equations for linear circuits. Computer-aided circuit analysis. Frequency-domain analysis and bode plots. Network analysis in the S-domain. Mutual inductance and transformers. Two-port networks.

Prerequisite: EE 201

EE 207 Signals and Systems (3-0-3)

Fourier series. Fourier transform. Laplace transform. Linear circuits and systems concepts. Impulse response. Convolution. Transfer function. Frequency response. State-space representation. Introduction to sampling of analog signals. Introduction to difference equations and z-transform.

Prerequisite: EE 201 (Not to be taken for credit with SE 315)

EE 208 Electrical Systems (Architectural Engineering students) (2-3-3)

Basic electrical concepts: Ohm's law, Kirchoff's laws, DC and AC, resistance, inductance, capacitance, three phase systems. Electrical symbols. Outlets. Conductor sizes. Types and determination of number of circuits required. Wiring plans for single and multiple family dwellings. Commercial and institutional structures.

Prerequisites: MATHS 102, PHYS 102

EE 303 Electronics II (3-3-4)

Amplifier frequency response. Linear and nonlinear operational amplifier applications. Nonideal characteristics of operational amplifiers. Multistage amplifiers. Active filters. Feedback: circuit topologies and analysis. Oscillators.

Prerequisite: EE 203

EE 306 Electromechanical Deices (Non-EE students) (2-3-3)

Magnetic circuits. Transformers. Concepts of electric machines. DC generators and motors operation. Three-phase Induction motors. Motor starting. Synchronous machines. Parallel operation. Fractional Horsepower Motors.

Prerequisite: EE 201 or EE 204

EE 315 Probabilistic Methods in Electrical Engineering (3-0-3)

Fundamentals of probability theory. Single and multiple discrete and continuous random variables. Probability density function. Gaussian and other distributions. Functions of random variables. Joint and conditional probabilities. Moments and statistical averages. Central limit theorem. Random processes. Stationarity and ergodicity. Correlation function. Power spectrum density. Gaussian and Poisson random processes. Response of linear systems to random signals.

Prerequisite: EE 207 (Not to be taken for credit with STAT 319)

EE 340 Electromagnetics (3-3-4)

Coulomb's law. Gauss's law. Electric potential. Electric boundary conditions. Electric dipoles. Resistance. Capacitance. Laplace's equation. Biot-Savart law. Ampere's law. Scalar and vector potentials. Magnetic boundary conditions. Inductance. Time varying fields. Maxwell's equations. Plane wave propagation. Reflection and refraction. Poynting vector. Introduction to transmission line theory. Concept of radiation.

Prerequisites: EE 201, MATH 302

EE 351 Electrical Engineering Cooperative Work (AEE students only) (0-0-9)

A continuous period of 28 weeks spent in the industry working in any of the fields of electrical engineering. During this training period, the student is exposed to the profession of electrical engineering through working in many of its fields. The student is required to submit, and present, a formal written report of his work.

Prerequisites: ENGL 214,
Completion of 90 credit-hours including all 300-level EE courses.

EE 360 Electric Energy Engineering (3-3-4)

Magnetic circuits. Transformers. Concepts of electric machines, DC machines: motor and generator operation, speed control of motors, motor starting. Induction Machines: motor starting. Synchronous machines. Parallel operation. Per-unit systems. Transmission lines: parameters, current and voltage relations for short, medium, and long lines, performance characteristics. Cables.

Prerequisite: EE 205

EE 370 Communications Engineering I (3-3-4)

Transmission of signals through linear systems. Hilbert transform. Representation of band-pass signals and systems. Amplitude modulation (AM, DSBSC, SSB, VSB). Signal spectrum. Angle modulation (PM, FM). Review of sampling theory. Pulse analog modulation. Pulse code modulation. Introduction to digital modulation schemes.

Prerequisites: EE 203, EE 207

EE 380 Control Engineering I (3-3-4)

Introduction to feedback control systems. Block diagram and signal flow graph representation. Mathematical modeling of physical systems. Stability of linear control systems. Time-domain and frequency-domain analysis tools and performance assessment. Lead and lag compensatory design. Proportional, integral, and derivative control.

Note: EE 380 and SE 302 are equivalent; only one can be taken for credit.

Prerequisite: EE 207

EE 390 Digital Systems Engineering (3-3-4)

Microprocessor hardware models. Instruction sets. Assembly language programming and debugging. Memory and input/output mapping. Input and output instructions. Input/output interfacing. Introduction to interrupts.

Prerequisites: ICS 101, EE 200

EE 399 Summer Training (EE students only) (0-0-0)

A continuous period of 8 weeks of summer training spent in the industry working in any of the fields of electrical engineering. The training should be carried out in an organization with an interest in one or more of these fields. On completion of the program, the student is required to submit a formal written report of his work.

Prerequisites: ENGL 214, Junior Standing, Approval of the Department.

EE 400 Telecommunication Networks (3-3-4)

Survey of design and implementation of communication networks. Transmission media. Network topologies. Routing. Switching. Network protocols and architectures. Internetworking. Network performance. Broadband access.

Prerequisites: EE 315, ICS 103 (Not to be taken for credit with COE 442)

EE 402 Control Engineering II (3-0-3)

Review of stability criteria and techniques. Linear feedback system design and compensation methods. Introduction to nonlinear control systems: the describing function and phase plane analysis. Stability criteria for nonlinear systems. On-off control systems and optimum switching. Introduction to optimal control theory. Simulations.

Prerequisite: EE 380

EE 403 Semiconductor Devices (3-0-3)

Characteristics of semiconductors. Classification of the various junctions. Characterization of bipolar devices. MOS devices. Charge-transfer devices. Integrated devices. Opto-electric devices. Impatt photovoltaic effect. Solar cells.

Prerequisites: PHYS 203, EE 203

EE 405 Microwave Transmission (3-3-4)

Characteristics of high–frequency transmission lines. Lossless and lossy transmission lines. Microstrip transmission lines. Smith chart. Impedance techniques. Theory of waveguides (rectangular and circular). Microwave components and cavity resonators. Introduction to radio wave propagation.

Prerequisite: EE 340

EE 406 Digital Signal Processing (3-0-3)

Classification of signals and their mathematical representation. Discrete-time systems classification. Linear shift-invariant system response, difference equations, convolution sum, and frequency response. Discrete Fourier transform. Z-transform and its application to system analysis. Realization forms. Sampling and aliasing. Finite impulse response (FIR). Design windowing technique. Introduction to infinite impulse response (IIR). Filter design techniques.

Note: EE 406 and SE 432 are equivalent; only one can be taken for credit.

Prerequisite: EE 370

EE 407 Microwave Engineering (3-3-4)

Introduction to rectangular waveguides. Limitations of low-frequency components. Microwave materials (semiconductors, ferrites, etc). Microwave tubes and solid-state devices: klystrons, magnetron, Gum, Impatt, etc. Microwave circuit design. Directional couplers. Power dividers, equalizers, phase shifters. Microwave integrated circuit design: filters and amplifiers. Applications of microwaves.

Prerequisite: EE 340

EE 410 Digital Image Processing (3-0-3)

Fundamentals of digital image processing. Image acquisition. Image display. Image transforms. Image enhancement. Image segmentation. Basics of image filtering and encoding. Industrial applications.

Prerequisite: Senior Standing or
Consent of the Instructor (Not to be taken for credit with COE 487).

EE 411 Senior Design Project (1-6-3)

A course that integrates various components of the curriculum in a comprehensive engineering design experience. Design of a complete project including establishment of objectives and criteria, formulation of design problem statements, preparation of engineering designs. The design may involve experimentation, realization and/or computer project. Team design projects, where appropriate, are highly encouraged.

Prerequisite: Senior Standing

EE 415 Analog Integrated Circuits Analysis and Design (3-0-3)

Integrated circuit devices and concepts. Review of single stage BJT and FET amplifiers. Biasing circuits, current mirrors and sources. Design of input stages, differential pairs, active loads, gain stages, and level shifting. Output stages, power dissipation, and current protection. Design of low power amplifiers. Analysis of typical operational amplifier circuits and audio amplifiers. Non-linear operational amplifier applications. Design of compactors, A/D and D/A converters.

Prerequisite: EE 303

EE 416 Analog Filter Design (3-0-3)

Properties of network functions. Design of lossless two-port networks. Filter characteristic approximation: Butterworth, Chebyshev, Elliptic, and Bessel approximations. Frequency transformation. Design of active RC filters using operational amplifiers. Nonideal effects. Design using OTA's and MOSFET-C circuits. Introduction to switched capacitor filters.

Prerequisites: EE 207, EE 303

EE 417 Communication Engineering II (3-0-3)

Noise in telecommunication systems. Representation of white and narrow-band noise. Transmission of noise through linear filters. Performance of continuous wave modulation (full-AM, DSBSC, SSB, and FM) in the presence of additive white Gaussian noise. Digital waveform coding (DM, PCM, DPCM and ADPCM). Digital communication systems. Noise effects and probability of error in digital communication systems. Matched filters.

Prerequisites: EE 315, EE 370

EE 418 Introduction to Satellite Communications (3-0-3)

Overview of satellite systems. Orbits and launching methods. Communication satellite subsystems. Modulation schemes and satellite multiple access (FDMA, TDMA, and CDMA). Space link analysis. Satellite antennas. Applications of satellites.

Prerequisites: EE 340, EE 370

EE 420 Optical Fiber Communications (3-3-4)

Optical fiber waveguides: ray and mode theories. Step-index and graded-index fibers. Transmission characteristics of optical fibers: losses and dispersion. Methods of manufacturing optical fibers and cables. Connections of optical fibers. Measurements of attenuation, dispersion, refractive index profile, numerical aperture, diameter and field. Optical sources: semiconductor lasers and light emitting diodes. Optical detectors. Optical fiber systems. Digital and analog systems. Design of a simple optical fiber communication link.

Prerequisites: EE 340, EE 370

EE 422 Antenna Theory (3-3-4)

Types of antennas. Antenna fundamental parameters. Transmission formula and radar range equation. Radiation integrals. Linear wire antennas. Antenna arrays. Synthesis of far field patterns by array factors. Design of Dolph-Chebyshev arrays. Broadband antennas and matching techniques. Methods of antenna measurements.

Prerequisite: EE 340

EE 429 Microcomputer Organization (3-3-4)

Microprocessor architectures. Design of ALU. Overview of 32- and 64-bit processors. Advanced assembly language programming. Memory mapping. Advanced input/output interfacing. Programmable timers. Analog-to-digital and digital-to-analog interfacing. BIOS and DOS interrupts. High-level language interface. Data acquisition. Design projects.

Prerequisite: EE 390

EE 430 Information Theory and Coding (3-0-3)

Concept of information and its measurement. Entropy source coding theorem. Huffman codes, LZW, arithmetic codes. Introduction to rate distortion theory. Channel coding theorem, channel capacity. Block codes: detection and correction. Linear codes, cyclic codes, hamming codes, BCH codes, encoding, and decoding algorithms. Introduction to convolutional codes.

Prerequisites: EE 315, EE 370

EE 432 Digital Control Systems (3-3-4)

Transducer fundamentals. Basic sampling concepts. Sample and hold circuits and analog multiplexes. Data conversion systems. Data loggers and acquisition systems. Application of microcomputers to closed-loop industrial systems.

Prerequisite: EE 380

EE 433 Applied Control Engineering (2-3-3)

Introduction to process control. Feedback and feed-forward control configuration. Modeling of dynamic systems: time delays, high order systems, multivariable systems. Process identification. Analysis and controller design performances. PID controller tuning. Intelligent controller tuning. Advanced control techniques. Process interaction and decoupling control. Introduction to distributed computer control systems and digital control issues.

Prerequisite: EE 380

EE 434 Industrial Instrumentation (2-3-3)

Instrumentation and control. Signal and data acquisition and processing. Interfacing techniques. Physio-chemical principles of instrumentation. Force, torque, and pressure measurements. Temperature, flow, moisture, and humidity sensors. Digital transducers. Calibration techniques. Errors in measurements. Introduction to actuators. Norms and standardization. Introduction to intelligent instrumentation.

Prerequisites: EE 200, EE 303, EE 380

EE 437 Electrical Installation (2-3-3)

Distribution system. Load characteristics. Conductors and cables. Installation methods. Design of electrical systems for residential, commercial, and industrial constructions. Electrical safety. Grounding. Protection equipment. Voltage drop calculations. Electrical drawings.

Prerequisite: EE 360

EE 445 Industrial Electronics (3-3-4)

The 555 timers. Optoelectronic sensors. Microswitches. Ultrasonic transducers. Thermal sensors. Strain gauges and instrumentation amplifiers. UJT, PUT, multilayer diodes. SCRS and TRIACS. Triggering and power control techniques. Solid state relays. Practical applications.

Prerequisite: EE 303

EE 446 Programmable Logic Controllers (2-3-3)

Basic concepts of microcontrollers. The structure of programmable logic controllers: I/O, relays, counters and timers. Ladder diagram concept. PLC's intermediate and advanced functions. PLC's instruction sets and data manipulations. PLC's industrial applications in process control.

Prerequisite: Senior Standing

EE 455 Analog Communication Electronics (3-3-4)

Functional blocks of analog communication systems. Design of mixers, converters, RF and IF amplifiers, AM detectors, and FM discriminators. Functional blocks of monochrome TV receivers. Design of video IF amplifiers, video amplifiers, sync. separators, horizontal and vertical oscillators and AFC. Functional blocks of color TV receivers. Color signal representation and processing.

Prerequisites: EE 303, EE 370

EE 456 Digital Communication Electronics (3-3-4)

Functional blocks of digital communication systems: PAM, PWM, PPM and PCM. Design of S/H circuits, A/D and D/A converters, and timing (clock generator) circuits. Circuit design using PLL, VCO, and multipliers. Design of PAM, PPM, PWM and PCM transmitters and detectors. Special circuits for phase shift keying.

Prerequisites: EE 303, EE 370

EE 460 Power Electronics (3-3-4)

Review of power semiconductor devices: diodes, thyristors, BJTS and MOSFETS transistors. Diode characteristics. Diode circuit rectifiers. Thyristor characteristics. Principles of thyristor controlled rectifiers. AC voltage controllers. Thyristor commutation techniques. Power transistor characteristics. DC choppers. Pulse-width modulation techniques for inverters. Resonant pulse inverters. (All design and analysis concepts are supported by computer aided design analysis).

Prerequisite: EE 360

EE 462 Electrical Machines (3-3-4)

Electromechanical energy conversion principles. Generalized machine concepts. Steady state operation of DC, synchronous, and induction machines. DC machine dynamics. Fractional horse-power AC motors. Special types of machines.

Prerequisites: EE 360, EE 380

EE 463 Power System Analysis (3-0-3)

Basic concepts of power systems. Per-unit systems. System modeling. Network calculations. Load flow analysis. Economic operation of power systems. Symmetrical three-phase faults. Symmetrical components. Unsymmetrical faults. Introduction to power system stability.

Prerequisite: EE 360

EE 464 High Voltage Engineering (2-3-3)

Ionization and decay processes. Photo-ionization, thermal ionization. Townsend ionization coefficient. Electric breakdown in gases. Surge breakdown voltage-time lag. Corona discharges under switching surges. Breakdown in solids and dielectrics. Generation of high voltage. Attenuation voltage. Transient voltage. Direct voltage.

Prerequisite: EE 360

EE 465 Power Transmission & Distribution (3-0-3)

Fundamental concepts for transmission lines. Transmission line parameters and constants. Underground cables. Construction of overhead lines. Sag and tension analysis and mechanical design. Transient overvoltage on transmission lines. Reactive compensation and natural loading.

Prerequisite: EE 360

EE 466 Power System Protection (3-0-3)

Introduction to protective relaying. Relay operating principles. Current and potential transformers. Overcurrent differential, distance, and pilot protection. Protection of generators, motors, transformers, busbars, and transmission lines. Protection aspects of power system phenomena.

Prerequisite: EE 360

EE 470 Introduction to Optical Electronics (3-0-3)

Spontaneous and induced transitions. Absorption and amplification of radiation. Atomic susceptibility. Rate equations. Gain saturation. Fabry–Perot lasers. Mode locking. Q-switching. Waveguide modes. Semiconductor physics review. Gain and absorption in semiconductors laser media. Heterostructures. Modulation and bandwidth. Semiconductor photodiods. Avalanche diodes. Detection. Noise in optical detection. Traveling wave amplification. Design of optical digital data transmission systems.

Prerequisites: PHYS 203, EE 340

EE 499 Special Topics in Electrical Engineering (3-0-3)

The contents of this course will be in the areas of interest in electrical engineering. The specific contents of the course will be given in detail at least one semester in advance of that in which it is offered.

Prerequisite: Senior Standing or Consent of the Instructor.

ENGLISH

ENGL 001 Preparatory English I (15-5-8)

ENGL 002 Preparatory English II (15-5-8)

Students follow a two-semester (600 hour) intensive English-as-a-foreign-language program from an elementary level to an intermediate level. Emphasis is on building the skills of reading, listening, writing and speaking for application to academic studies in science and technology. Instruction in vocabulary and grammar supports development of these skills. At the same time, word-processing skills are introduced and practiced, study skills are developed and attitudes to study and work are reshaped.

Instruction is facilitated through classroom instruction, assignments, project work and computer-based programs.

ENGL 101 An Introduction to Academic Discourse (3-0-3)

This course is designed to enable students to recognise and interpret the various modes of spoken and written academic discourse and to produce written documents related to what they have read. The main writing skills component of the course teaches students to make use of the principal modes of exposition and various types of academic correspondence common in English to write well-organized texts The course's reading skills element focuses on ways to improve students' reading of scientifically-oriented college-level textbooks and specialist articles and to familiarize them with the organizational and typographical features (glossaries, indices, headings, boldface, italics, etc.) of such texts. The course's oral skills element introduces students to academic oral communication in classroom and tutorial interaction. The electronic skills taught are intended to complement the written and oral skills by enabling students to use state-of-the-art internet and database search techniques to locate the information they require for expository composition writing and class-related tasks. Students will also be required to maintain a portfolio (including a reflective journal) exhibiting their efforts, progress, and achievement throughout the course.

Prerequisite: ENGL 002

ENGL 102 Introduction to Report Writing (3-0-3)

This course sets out to develop students' spoken and written communication skills in English, particularly with regard to the production of a researched academic/professional type report. The writing skills component includes paraphrasing and synthesis of ideas from several different sources for expository composition and term report writing; training in composing various types of formal correspondence to enable students to function well in the university setting; the researching (library and internet), organizing, and writing of an academic term report in which students must be especially sensitive to their particular audience. The course's oral skills component further develops students' intercommunicative skills, introducing them to oral presentations in which they must communicate information to an audience using a variety of presentational media. Electronic skills are taught to complement the written and oral skills by enabling students to use state-of-the-art internet and database search techniques to locate the information they require in order to produce written reports or presentations. Students will also be required to maintain a portfolio (including a reflective journal) exhibiting their efforts, progress, and achievement throughout the course.

Prerequisite: ENGL 101

ENGL 214 Academic & Professional Communication (3-0-3)

The purpose of this course is to further develop students' spoken and written communication skills in English in order to prepare them for future academic and professional life. The writing skills component includes training in composing various types of business correspondence to enable students to function well in the world of work. It also deals with the researching, organizing, and writing of technical reports in which students must be especially sensitive to their particular audience. The course's oral skills component enhances students' oral presentation skills as they will practice communicating a technical subject to a lay audience using a variety of presentational media. The electronic skills taught are intended to complement the written and oral skills by enabling students to use state-of-the-art internet and database search techniques to locate the information they require in order to produce written reports or presentations. Students will also be required to maintain a portfolio (including a reflective journal) exhibiting their efforts, progress, and achievement throughout the course.

Prerequisite: ENGL 102

FINANCE

FIN 301 Financial Management I (3-0-3)

An introductory course which presents basic theories, concepts, and analytical techniques in financial management. Topics covered in the course include evaluation of financial goals and objectives. Overview of financial markets and institutions; financial statements and cash flows; time value of money; ratio analysis; working capital management; short-term financing operating and financial leverages, financial forecasting and planning, capital budgeting techniques.

Prerequisites: ACCT 202, ECON 202

FIN 302 Financial Management II (3-0-3)

A second course in Finance which focuses on capital investments and financing decisions. Capital investments are evaluated under conditions of uncertainty. Financing decisions are examined through capital structure theory, cost of capital, and dividend policy. Valuation of securities integrates the impact of both investment and financing decisions. Other topics covered in the course instruments of long-term financing; leasing; mergers and acquisitions; corporate restructuring and reorganizations; international finance.

Prerequisite: FIN 301

FIN 351 Cooperative Work (0-0-9)

Each student must participate in a 28-week program of industrial experience in Finance and/or related business areas. The academic advisor approves the student's training program and makes sure that the student submits a formal written report based on his practical experience during the training period.

Prerequisite: Senior level

FIN 410 International Financial Management (3-0-3)

Analysis of the key financial decisions made by multinational companies. The course provides an international perspective to financial problems facing multinationals. Topics examined in the course include international financial environment; international money and capital markets; analysis of foreign exchange risk exposure and risk management; capital budgeting and working capital management; direct foreign investment decisions, political risk assessment, international banking and taxation.

Prerequisite: FIN 301

FIN 415 Management of Financial Institutions (3-0-3)

The course presents both theoretical and practical aspects of decision making in financial institutions. The primary focus is on commercial bank management. Major topics include asset/liability and capital management; credit evaluation, lending policies and practices, liquidity management; bank performance evaluation; investment banking; investment portfolio management; international banking. Cases and computer game methods are used to simulate decisions made by bank managers.

Prerequisites: FIN 301, ECON 305

FIN 420 Investments (3-0-3)

An introductory course in investment theory and principles. The course provides an overview of security markets, alternative investment securities, sources of investment information, and factors influencing security prices. Major topics include selection and management of financial assets; valuation techniques for stocks and bonds; fundamental and technical analysis; theory of efficient financial markets; risk-return analysis; introduction to portfolio theory.

Prerequisite: FIN 301

FIN 421 Security Analysis and Portfolio Management (3-0-3)

Security analysis theory and practice. The primary focus of the course is on selection and management of security portfolios, applying tools and techniques developed within the modern portfolio theory framework. Other topics include management of fixed income security portfolios, capital asset pricing model; investment in stock options and futures; portfolio performance evaluation and monitoring; examination of institutional investment policies; computer applications in portfolio management.

Prerequisite: FIN 420

FIN 425 Computer Applications in Finance (3-0-3)

Application of computer software in formulating and analyzing problems in Finance. The course is specifically designed to encourage use of sensitivity analysis and "what if" projections, in financial modeling, financial statement analysis; capital budgeting, cash flow projections, and risk analysis; working capital management; capital structure and financing decision; leasing; foreign exchange forecasting; valuation of securities; investment analysis and portfolio management; application of quantitative methods in finance.

Prerequisite: FIN 302

FIN 430 Risk and Management Insurance (3-0-3)

Theory of risk and risk management; identification; measurement, and arrangements to deal with risk in personal and business situations. Types of insurance coverages; basic features of selected insurance contracts, implementation of risk management strategies using insurance, risk retention, and risk reduction devices.

Prerequisite: FIN 301

FIN 435 Real Estate Management (3-0-3)

Overview of real estate markets; analysis of residential and commercial real estate development, mortgage financing and investment decisions. Fundamentals of property valuation, economic factors influencing property values, property management, and appraising principles for residential and income property are examined.

Prerequisite: FIN 301

FIN 450 Financial Policy (3-0-3)

A capstone case-oriented course which examines various practical problems in financial policy. The course emphasizes the application of financial theories and analytical techniques to solve business problems in both domestic and international environments. Topics covered in the course include financial analysis and planning; working capital management; capital budgeting and cash flow analysis; lease financing; long term financing and capital structure decisions; corporate restructuring, mergers, and acquisitions.

Prerequisite: FIN 302

GEOLOGY

GEOL 201 Physical Geology (2-3-3)

Introduction to the fundamentals of physical geology. Composition and structure of the Earth, mineral and rock identification, plate tectonics, mountain building, geological structures, earthquakes, volcanism, erosion and sedimentation processes. Laboratory exercises concentrate on mineral and rock identification and the interpretation of topographic and geologic maps. At least one field trip to a nearby locality is required.

Prerequisite: None

GEOL 202 Applied Geosciences for Scientists and Engineers (2-3-3)

Introduction; geologic processes; rocks and minerals; natural resources: hydrocarbons, minerals and, ground water; aspects of environmental and engineering geology; geophysics principles and practices; case histories. The Earth Sciences majors for credit cannot take this course.

Prerequisite: None

GEOL 203 Historical Geology (2-3-3)

Introduction to principles useful in studying the Earth's history, and to examine the physical and biological evolution of the Earth from the viewpoint of global tectonics. Laboratory exercises include examination of stratigraphic rock samples, index fossils and their identification, lithostratigraphic correlation, paleoenvironments, interpretation of paleogeographic and geological maps and cross-sections. At least one field trip to a nearby locality is required.

Co requisite: GEOL 201

GEOL 214 Paleontology and Biostratigraphy (2-3-3)

Introduction to macrofossils and microfossils, including basic aspects of taxonomic theory, classification and principles of nomenclature; a review of the major palynomorphs, such as pollen, spores, chitinozoans and acritarchs; particular emphasis will be placed on the industrial application of these forms to aid paleoenvironmental and biostratigraphic determinations as applied primarily to oil and gas exploration and production.

Prerequisite: GEOL 203

GEOL 216 Mineralogy and Optics (3-3-4)

Systematic mineralogy including detail study of major rock-forming minerals with emphasis on their physical and optical properties, chemical composition, occurrences, and associations. Principles of crystallography, crystal systems, symmetry classes and crystal forms. Crystal chemistry. Structures of minerals. Optical mineralogy. Laboratory exercises include studies of common rock forming minerals using polarizing microscope, morphological crystallography using crystal models, and determination of mineral specimens by physical properties and using hand lens, and recalculations of chemical analysis.

Prerequisite: GEOL 201

GEOL 305 Structural Geology (2-3-3)

Principles of structural geology. Concepts of true and apparent dip of strata, folds, structural contours for homoclinal and complex surfaces, geological cross-sections, block diagrams, isopachs, faults, intrusive and extrusive igneous structures, impact structures, landslides and sinkholes. Laboratory exercises focus on the interpretation of geological maps and cross-sections and stereographic projection using Schmidt net. Computer software will be used in directional data interpretation, manipulation, and diagram and graph construction. At least one field trip to a nearby locality is required.

Prerequisite: GEOL 201

GEOL 307 Sedimentation and Stratigraphy (3-3-4)

Sediments and their properties, processes of sedimentation; depositional environments; facies and facies analyses; provenance; principles and fundamentals of stratigraphic units, Walther's law; correlation; overview of seismic and sequence stratigraphy. Laboratory exercises on types, texture and composition of common sedimentary rocks; core description; lithofacies map; facies analyses; correlation. Computer software will be used in stratigraphic column construction and data interpretation. One field trip to nearby area is required.

Prerequisites: GEOL 201 and GEOL 203

GEOL 312 Remote Sensing and GIS Applications in Geology (2-3-3)

Introduction and principles of remote sensing; aerial photography and other remote sensing techniques; principles of photogrammetry and image interpretation for geological information; introduction to the GIS (Geographic Information Systems) and its application in geosciences. Computer software will be used in data processing and interpretation.

Prerequisite: GEOL 305

GEOL 318 Regional Geology (3-0-3)

Major tectonic elements of the Arabian Peninsula. Rocks and the sedimentary cover in Arabia. Geological, structural and geomorphological evolution of Arabia with emphasis on hydrocarbon potentials, mineral wealth and underground water resources. At least one field trip is required.

Prerequisites: Geology 201 and Junior Standing

GEOL 320 Petrology (3-3-4)

Nature, origin, differentiation and crystallization of magma; Phase relations in silicate melts. Mode of occurrence, textures, petrography and minerals of igneous rocks. Texture, structure, composition, provenance, digenesis and classification of sedimentary rocks. Distribution and origin of sedimentary rocks in relation of plate tectonics and basin developments. Processes and types of metamorphism. Facies, textures, mineralogy of metamorphic rocks. P-T paths. Relations of rocks to plate tectonics.

Laboratory studies of igneous, sedimentary and metamorphic rocks in hand specimens and under microscope. At least one field trip is required.

Prerequisite: GEOL 216

GEOL 328 Geological Mapping Techniques (2-3-3)

Elementary methods of field observation and geological mapping as applied to various geological terrains. Principles of remote sensing and aerial photography. Emphasis will be on those aspects of rocks, geological structures and stratigraphic principles that are demonstrated in their natural setting in the Eastern Province of Saudi Arabia. Several laboratory exercises will be conducted in the field. Two weekend field trips to nearby localities are required. Computer software will be used in data processing and interpretation.

Prerequisite: GEOL 305

GEOL 341 Engineering Geology (3-0-3)

Modern concepts of engineering geology. Impact of geology on siting and structures design of engineering projects. Geological and mechanical fundamentals as related to engineering practices, emphasis on parameters of rock mass classification systems and on techniques relevant to site investigation programs. Case histories.

Prerequisite: GEOL 201 or Consent of the Instructor (for non Earth Sciences Majors)

GEOL 355 Geochemistry (2-3-3)

Composition of the Earth and nature of geochemical data. Geochemical classification of elements. Crystal-chemical controls of element distribution. Thermodynamics, partial pressure and Eh-*p*H diagrams. Geochemical cycle and isotope geochemistry.

Prerequisites: CHEM 102 and GEOL 216

GEOL 399 Summer Training (0-0-2)

A total period of eight weeks of internship in the industry to gain practical experience in the field of geology. The student is required to submit a written report and make an oral presentation at the department based on the experience of the training program.

Prerequisites: ENGL 214 and Approval of the Department.

GEOL 409 Geology Seminar (1-0-1)

Preparation and presentation of selected geological topics. Each student is expected to submit a written report on his topic and make an oral presentation at the class.

Prerequisite: Geology Senior Standing

GEOL 415 Petroleum Geology (3-0-3)

Definition and properties of petroleum and natural gas. The origin, migration and accumulation of hydrocarbons as related to source, reservoir and seal rocks and reservoir properties. Structural, stratigraphic and combination traps. Survey of exploration methods. Concept of petroleum province and basin analysis. Computer software will be introduced for basin analysis and data interpretation. At least one field trip is required to investigate the outcrop section of a major reservoir in Saudi Arabia.

Prerequisites: GEOL 318 and Consent of the instructor.

GEOL 420 Geotectonics (3-0-3)

Characteristics and origin of the oceanic and continental crust. Major structural elements of lithosphere. Plate tectonic theory. Mountain building and magmatic activities. Tectonic provinces of the continental crust. Transpression and transtension. Basin subsidence mechanisms. Global tectonics and Earth's resources, with special emphasis on the Middle East region.

Prerequisite: GEOL 305

GEOL 423 Hydrogeology (3-0-3)

Theory and geology of groundwater occurrence and flow. Introduction to the hydrology of surface and groundwater supplies; water bearing properties of rocks; hydrodynamics of flow through porous materials; flow nets, well hydraulics, analysis and evaluation of pumping test data. Groundwater quality, occurrence of groundwater in various rock types and sediments; field techniques used in groundwater exploration and survey. Computer software will be used in data interpretation, simulation, manipulation, and graphs construction. At least one field trip to a nearby locality is required.

Prerequisite: GEOL 201 or Consent of the instructor (for non Earth Sciences Majors).

GEOL 430 Field Geology (0-18-6)

Six weeks of systematic fieldwork for training in geological techniques. After a brief introduction and rehearsal of basic field procedures and mapping techniques including applications of remote sensing and aerial photography, a specific area will be mapped in detail. The course requires each student to prepare a complete field notebook, geological map, stratigraphic successions, cross-sections, and a comprehensive geological report. The participants of the course are also required to make an oral presentation based on the field report.

Prerequisites: GEOL 305, GEOL 307 and GEOL 320

GEOL 431 Geomorphology (3-0-3)

Introduction to internal and external earth processes, and resulting landforms on the earth's surface. Classification, description, and evolution of landforms. The fluvial and Aeolian domain. Analysis of geomorphic features using maps and aerial photographs. At least one field trip to a nearby locality is required.

Prerequisites: GEOL 201 and Junior Standing

GEOL 434 Marine Geology (3-0-3)

Introduction to the continental margin geological processes and features: continental shelf, barrier island, reef, atoll, slope, rise, and abyssal plains, submarine canyons and plate-tectonic activity. Worldwide sea level changes through time, oxygen isotope stratigraphy, and paleoceanic circulation. Marine sedimentary rocks of the Arabian Peninsula. At least one field trip to a nearby locality is required.

Prerequisites: GEOL 201 and Junior Standing

GEOL 435 Petroleum Geochemistry (3-0-3)

Overview of the origin of petroleum, its chemical composition, and the methods used in petroleum geochemistry; carbon cycle; composition of biomass; kerogen and coal formation; maturity assessments; biomarkers and molecular geochemistry; geochemical correlation techniques; geochemical prospecting.

Prerequisites: GEOL 203 and GEOL 415

GEOL 436 Oceanography (3-0-3)

Fundamental oceanographic principles. Distribution of terrigenous and biogenic ocean sediments. Historical overview of seawater formation. Tidal influence, geostrophic force, storms, surface and deep ocean water circulation, photic and aphotic zones, total dissolved solids and formation of manganese nodules. Concept of CCD, lysocline, thermocline, oxygen-minimum layer, pycnocline, nepheloid concentration layer, salinity and temperature gradient, Pleistocene glaciations and worldwide carbon dioxide budget. At least one field trip to a nearby locality is required.

Prerequisites: GEOL 201 and Junior Standing

GEOL 440 Sedimentology (2-3-3)

Elements of sedimentary basin formation, style of sedimentation, provenance, associated facies, and subsequent physicochemical changes through time. Plate-tectonic, climatic, allo- and auto-cyclic constraints on sedimentary rocks. Emphasis on convergent and rifted margin sedimentary record. Usage of several macroscopical and microanalytical tools for detailed sedimentary basin analysis. Computer software will be introduced for basin analysis and data interpretation. At least one field trip is required.

Prerequisite: GEOL 307

GEOL 441 Techniques in Sediment Analysis (2-3-3)

Macro- and micro- analysis of geological materials. Fundamental principles and sample preparation techniques for detailed geochemical studies. Determination of bulk and trace element composition, fluid inclusion study, homogenization, pressure-temperature, and *Eh-pH* of the mineralizing solution. Laboratory exercises include: grain-size analysis, heavy mineral and magnetic separation, petrographic slide preparation, staining techniques, vacuum impregnation, peels and slices, scanning electron microscope, X-ray diffraction, X-ray florescence, electron probe microanalyzer (EPMA), ICP, and gas chromatography. Individual research project report is required. At least one field trip to a nearby locality is required.

Prerequisite: GEOL 216

GEOL 446 Environmental Geology (3-0-3)

Environmental problems, hazards and their mitigation. Critical evaluation of geological processes: volcanic activity, earthquakes, slope failures and landslides, flooding, groundwater movement, solution cavities and sinkholes. Environmental problems associated with human interaction: groundwater pollution, groundwater withdrawal, acid rain, solid waste disposal, land development and urbanization, agricultural activity, soil erosion, and desertification. Current environmental issues. Selected case studies. Computer software related to the subject will be introduced At least one field trip to a nearby locality is required.

Prerequisites: GEOL 201 and Junior Standing.

GEOL 454 Computational Methods in Geology (2-3-3)

Introduction to the modern concepts of quantifying geologic variables. Integration, analysis, and interpretation of geologic data. Application of statistical, spatial, and numerical techniques to characterize oil reservoirs, groundwater aquifers, mineral resources and environmentally contaminated sites. Computer packages are introduced for modeling purposes.

Prerequisites: Junior Standing and
Consent of the instructor (for non Earth Sciences Major).

GEOL 456 Economic Geology (2-3-3)

Introduction, historical development of economic geology. Origin, classification, occurrences and association of mineral deposits. Metallogenic provinces and epochs. Study of important economic mineral deposits. Laboratory exercise includes ore microscopy and hand specimens' identification of common ore minerals and gemstones. Computer software will be introduced for data processing and interpretation. At least one field trip is required.

Prerequisite: GEOL 216

GEOL 460 Mining Geology (3-0-3)

Basic concepts and historical developments. Geological principles of ore exploration and appraisal. Methods of ore body sampling, estimation and classification of reserves. Methods of mining and mineral processing. Computer software related to data processing ore reserve estimation, and interpretation will be used.

Prerequisite: GEOL 216

GEOL 461 Mineral Economics (3-0-3)

Basic concepts. Significance of the mineral industries in the economy. Examination and valuation of mineral properties, mine organization and administration, and mine management.

Prerequisite: GEOL 216

GEOL 464 Carbonate Geology (2-3-3)

Carbonate rocks, their characteristics, classification, and distribution. Environments of deposition, associations, and economic importance. Relationship to petroleum deposits with special emphasis on shoals and reefs. Study of outcrops, hand specimens and thin sections. At least one field trip is required.

Prerequisite: GEOL 307

GEOL 480 Special Topics (3-0-3)

Contents to be arranged.

Prerequisite: To be set by the Earth Sciences Department.

GEOPHYSICS

GEOP 202 Introduction to Geophysics (3-0-3)

Introduction to applied and solid-earth geophysics; the gravitational, seismic, magnetic, thermal, and radioactive properties of rocks and earth materials; methods of measurement and their applications to the exploration of the Earth's interior. Physical properties of the earth's interior. Some field trips are required.

Prerequisites: MATH 102 and PHYS 102

GEOP 204 Introduction to Seismology (3-0-3)

Body and surface forces, stress, strain, elastic moduli, equation of motion, yield strength. Types of elastic waves, their propagation, reflection/refraction, travel-time curves and their application to the study of the Earth's interior. Causes and effects of earthquakes; methods of locating and determining magnitudes of earthquakes; interpretation of seismograms; occurrence frequency of earthquakes and risk analysis, earthquake prediction, earthquakes related to human activity, seismometry.

Prerequisite: GEOP 202

GEOP 205 Computational Geophysics (3-0-3)

Topics covered include: Fourier transform; partial differential equations of geophysics; linear operators; convolution; correlation techniques; digital filters; the FFT algorithm; analytic continuation; probability distributions; trend surface analysis; with emphasis on computer applications of these tools to geophysical data; MATLAB would be used to illustrate the techniques numerically.

Prerequisites: MATH 201, ICS 103 and GEOP 202

GEOP 315 Seismic Exploration I (2-3-3)

Principles of the seismic method; exploration objectives and requirements of seismic data acquisition; the seismic pulse - its generation and transmission; partition of seismic energy at an interface; seismic energy reflection, refraction, attenuation, and travel time - distance functions; reflection time corrections; field testing and procedures with emphasis on multiple coverage and design of source and receiver arrays for signal enhancement; well velocity survey; the synthetic seismogram and the convolution model. The laboratory work includes seismic field demonstrations, computational exercises using software packages. A field trip to a seismic crew is required.

Prerequisite: GEOP 202

GEOP 320 Seismic Data Processing (2-3-3)

Objectives of processing; basic data processing sequence; the digital tape format; demultiplex, trace editing and gain removal; design of digital filters; deconvolution; residual static correction; seismic velocity analysis; migration including Kirchoff, finite difference, and frequency domain methods; computer lab sessions on the use of common seismic software packages.

Prerequisites: GEOP 205 and GEOP 315

GEOP 399 Summer Training (0-0-2)

A continuous period of eight weeks of summer working in the industry to gain practical experience in the fields of geophysics. The student is required to submit a written report and give an oral presentation in a seminar at the department about his experience and the knowledge he gained during his summer work.

Prerequisites: ENGL 214, Junior Standing and Approval of the Department.

GEOP 402 Senior Project (1-6-3)

Topics will depend on student and instructor's interest. They may vary from acquisition and interpretation of geophysical data from the field or the laboratory to computer models and simulation of theoretical problems of interest in geophysics, or a mixture of both. Weekly consultations with the instructor as well as a written report are required.

Prerequisite: Senior Standing

GEOP 404 Gravity and Magnetic Exploration (3-0-3)

The course is devoted to the gravity and magnetic exploration methods, starting with a survey of the theory of potential, the coverage will include field instruments and procedures, methods for the acquisition, reduction and processing of data. Special emphasis is placed on data analysis and computer modeling.

Prerequisite: GEOP 205

GEOP 405 Seminar (1-0-1)

Weekly discussion and presentation of research topics of geophysical interest. The theme of the seminar varies from year to year depending on the interest of the coordinator of the seminar. Participants are expected to make presentations and lead discussions on the subject of interest.

Prerequisite: Senior Standing

GEOP 415 Seismic Exploration II (3-0-3)

Topics covered include: seismic resolution; types of events on seismic sections; characteristics of events; vertical seismic profiling; geologic aspects of velocity; seismic response of various stratigraphic and structural features; direct hydrocarbon indicators; 2-D and 3-D seismic exploration technique; introduction to seismic stratigraphy.

Prerequisites: GEOP 315

GEOP 430 Geophysical Well Logging (2-3-3)

General aspects of well logging; drilling mud and casing; compositional properties of rocks, porosity, permeability, and fluids content. Logging techniques - resistivity, self-potential, gamma ray, neutron, density, sonic, calipers, dipmeters, etc. Determination of formation factor, water saturation, shaliness, estimation of permeability. Well log patterns of known rock units and the geological interpretation of well logs. Differentiation of oil and gas zones. Correlation between logs and tying wells to seismic sections.

Not to be taken for credit with PETE 303.
Students can take either GEOP 430 or PETE 303 for credits.

Prerequisite: GEOP 202

GEOP 450 Electrical Exploration (3-0-3)

Electrical properties of minerals and rocks. Principles of resistivity, self-potential, induced polarization, and electromagnetic methods. Emphasis on physical bases, instrumentation, field procedures, and interpretation using electrical software packages.

Prerequisite: GEOP 202

GEOP 455 Geodynamics (3-0-3)

Basic physical principles applied to the study of earth material properties and earth dynamical processes; discussions of a variety of geological phenomena such as heat and fluid flow, rock rheology and deformation, lithospheric flexure and isostatic equilibrium, mechanics of plate tectonics.

Prerequisites: GEOP 202 and PHYS 301

GEOP 465 Paleomagnetism (3-0-3)

Methods and techniques of paleomagnetism and their application to a variety of geological problems in regional and global tectonics, geochronology, paleogeography, rock fabric analysis, etc. Students conduct a small-scale study as a term project.

Prerequisite: GEOP 202

GEOP 470 Geophysical Engineering (3-0-3)

Practical and theoretical aspects of seismic refraction and electrical resistivity methods as applied for siting and control of engineering projects, such as dams, tunnels, highway cuts and water supply. Correlation between parameters of field data and rock mechanics, such as joint frequency, rock quality designation, strength and solution cavities. Interpretation techniques and fieldwork constitute the main part of the course.

Prerequisite: GEOP 202

GEOP 472 Meteorology and Climatology (3-0-3)

An introductory course on the atmosphere, weather, and climate. Discussion topics cover: an overview of the Earth's atmosphere, energy in the atmosphere, general atmospheric circulation, atmospheric physics and dynamics, clouds and precipitation, storms, air masses and fronts, weather analysis and forecasting, remote sensing in meteorology, general climatology, climatic classification, climatic change, climate dominated by different air masses, climate and water resources, applied climatology, and weather modification and climate.

Prerequisite: Junior Standing

GEOP 475 Environmental Geophysics (3-0-3)

Application of geophysical methods to environmental problems such as impact-assessment, clean-up, city planning, and siting of civic, industrial, and military critical facilities. Techniques include seismic, electrical and electromagnetic sounding, ground - penetrating radar, magnetic, gravity, and borehole geophysics.

Prerequisites: GEOP 202 and Senior Standing

GEOP 478 Data Inversion in Geophysics (3-0-3)

Basic concepts and techniques of inverse theory and application to geophysical problems; focus on linear inverse problems in gravity, magnetic, seismic, and electrical data modeling and interpretation.

Prerequisites: GEOP 202 and MATH 202

GEOP 480 Special Topics (3-0-3)

Contents to be arranged.

Prerequisites: Senior Standing and Permission of the Department.

GENERAL STUDIES

GS 220 Information Searching Skills (2-0-2)

Acquaintance to printed and electronic information resources, methods of searching for information, searching in the indexes and the abridgements, seeking by subject and word, using electronic information bases and the Internet, practical exercises through searching for information.

Prerequisite: None

GS 221 Industrial Sociology and Production (3-0-3)

Industrialization and sociological cultural exchange, Saudi Arabia and development of human resources, industrialization and environment, industrial technology and human relations, production and ideal spirit.

Prerequisite: None

GS 321 Principles of Human Behavior (3-0-3)

Personality and individual differentials, human behavior in industrial technical application, spiritual work problems.

Prerequisite: None

GS 423 International Relations (3-0-3)

Nature of international society and interaction between nations. Theories of international relations. Strength balance meaning. Struggle in the international relations. Globalization. Study of some modern international and contemporary lawsuits.

Prerequisite: None

GS 424 Planning and Social Development (3-0-3)

Mechanics of changing, backwardness and advancement, social and economical expansion, and exchange influence between them, expansion and planning, planning in the growing countries, planning in the Kingdom of Saudi Arabia.

Prerequisite: None

GS 427 Man and Environment (3-0-3)

Environment through the human look, nature, health, workmen, benefits, manners, economy, international and local environmental problems.

Prerequisite: None

ISLAMIC & ARABIC STUDIES

IAS 101 Practical Grammar (2-0-2)

Selection of aspects of Arabic grammar essential for written and spoken communication in everyday life with emphasis on correct grammar usage.

Prerequisite: None

IAS 111 Belief and its Consequences (2-0-2)

The roots of the true faith. Special characteristics of Islamic faith. The Islamic view of the universe, mankind and life. Means for enrichment of life and beliefs.

Prerequisite: None

IAS 131 Reading and Writing (1-3-2)

Alphabetization, correct pronunciation and handwriting. Step by step explanation of the principles of the Arabic language using everyday illustrations (excluding grammar and morphology).

(Open to non-Arabic speakers only)

Prerequisite: None

IAS 201 Writing for Professional Needs (2-0-2)

Characteristics and types of formal writing: reports; scientific research; summaries; forms; résumé; evaluations and minutes of meetings.

Prerequisite: IAS 101

IAS 212 Professional Ethics (2-0-2)

Importance of ethics in Islam and the integration of worship and aspects of professional life. Suitability criteria for employment in Islam. Standards for professional behavior. Employee interaction with others. Application of Islam to professional violations. Saudi Laws and professional behavior.

Prerequisite: IAS 111

IAS 231 Grammar and Composition (1-3-2)

A simplified systematic study of selected important topics of Arabic grammar.

(Open to non-Arabic speakers only)

Prerequisite: IAS 131

IAS 301 Oral Communication Skills (2-0-2)

Promoting interactive skills and techniques for social, academic and professional life: dialogue; presentations; persuasion and developing a positive approach.

Prerequisite: IAS 201

IAS 322 Human Rights in Islam (2-0-2)

The dignity of mankind and basic human rights. The Islamic viewpoint of human rights, its distinguishing characteristics, and debates related to this issue.

Prerequisite: IAS 212

IAS 331 Literature and Text (1-3-2)

Reading, understanding and discussion of the meaning of some Quranic *Ayas* and *hadiths*. Selected Islamic stories and Arabic verse.

(Open to non-Arabic speakers only)

Prerequisite: IAS 231

IAS 411 Contemporary Islamic World (2-0-2)

An introduction to the Islamic world. Internal challenges relating to the lagging behind in educational and scientific pursuits, differences in opinions, and differing contemporary schools of thought. External forces opposed to Islam. Current Islamic issues and means for solving them. The role played by Islamic organizations.

Prerequisite: Junior Standing

IAS 416 As-Sirah An-Nabawiyyah (2-0-2)

The biography and lifestyle of the Holy Prophet Mohammad (Peace Be Upon Him) portraying an exemplary model for students in their practical life.

Prerequisite: Junior Standing

IAS 418 Contemporary Financial Transactions in Islam (2-0-2)

Contemporary business transactions: corporative structures; Islamic banking; contracts; borrowing and lending; investments (stocks and shares and bonds).

Prerequisite: Junior Standing

IAS 419 Inimitability of Al-Quran (2-0-2)

Different aspects of inimitability of Al-Quran: rhetorical, metaphysical, Legislative; and, scientific inimitabilities.

Prerequisite: Junior Standing

INFORMATION & COMPUTER SCIENCE

ICS 101 Computer Programming (2-3-3)

Overview of computer hardware and software. Programming in FORTRAN with emphasis on modular and structured programming technique. Problem solving and algorithm development. Simple engineering and scientific problems.

Suggested Lab work (Closed Lab)

Programming assignments to solve simple engineering and scientific problems using various features of FORTRAN language. These include Data types, arithmetic and logical expressions, functions and subroutines, Selection and repetition constructs, Arrays, IO format and file processing.

Co requisite: MATH 101

ICS 102 Introduction to Computing (2-3-3)

Overview of computers and computing. Introduction to a typical programming language, such as Java. Basic data types and operators. Basic object-oriented concepts. Wrapper classes. Console input/output. Logical expressions and control structures. Memory models and methods. Arrays and strings. More object-oriented concepts.

Suggested Lab work (Closed Lab)

Programming assignments to exercise the use of the various features of the object oriented programming language taught in the course. This may include the implementation of basic applets, numerical algorithms such as finding the average, standard deviation etc., as well as non-numerical algorithms such as basic recursive methods used in sorting and searching techniques.

Co requisite: MATH 101 or MATH 132

ICS 103 Computer Programming in C (2-3-3)

Overview of computer hardware and software. Programming in "C" with emphasis on modular and structured programming technique. Problem solving and algorithm development. Simple engineering and scientific problems.

Suggested Lab work (Closed Lab)

Programming assignments to solve simple engineering and scientific problems using various features of C language. These include Data types and arithmetic expressions, IO operations, Selection and repetition constructs, Functions, Arrays, Strings and Structures.

Co requisite: MATH 101

ICS 201 Introduction to Computer Science (3-3-4)

Advanced programming concepts. Simple graphical user interfaces. Basic data structures. Searching and sorting techniques. Survey of computer science areas. Case studies and practice in developing small scale programs.

Suggested Lab work (Closed Lab)

Programming assignments to practice different problem solving strategies, with emphasis on sound object-oriented basis. Solving basic problems using static and dynamic data structures. Solving various searching and sorting algorithms using iterative and recursive approaches.

Prerequisite: ICS 102

ICS 202 Data Structures (3-3-4)

Analysis of basic data structures. Specification and design of advanced abstract data types (ADTs) and garbage collection. Secondary storage structures and file processing. Introduction to design patterns. Case studies and practice in developing medium scale programs. Software development using inheritance, frameworks and component architectures.

Suggested Lab work (Closed Lab)

Programming assignments and projects for software applications that make use of the data structures introduced in class. Emphasis on design and implementation of object-oriented abstract data types. Stress on software development of medium scale applications using the developed ADTs.

Prerequisite: ICS 201

ICS 232 Computer Organization and Assembly Programming (3-3-4)

Computer organization. Data and instruction representation. ASCII code. Binary and Hexadecimal number systems. Assembler directives versus machine instructions. Keyboard input and screen output. Instruction formats and types. Conversion between ASCII strings and binary numbers. Stack operations. Debugging. Interrupts. Macros. Video output. Disk I/O.

Suggested Lab work (Closed Lab)

Programming assignments to practice MS-DOS batch programming, Assembly Process, Debugging, Procedures, Keyboard input, Video Output, File and Disk I/O and Data Structure.

Prerequisites: ICS 201 and COE 202

Note: ICS 232 is equivalent to COE 205. Students can take credit for only one of them.

ICS 251 Foundation of Computer Science (3-0-3)

Mathematical logic: derivations, proofs, prepositional logic, first order logic, interpretations, validity and inconsistency. Sets, relations, functions. Basic number theory. Abstract algebra.

Note: ICS 251 and MATH 232 are equivalent; only one can be taken for credit.

Prerequisites: MATH 101, ICS 102

ICS 252 Discrete Structures I (3-0-3)

Basics of propositional and predicate logic. Set theory. Mathematical reasoning: methods of proof, mathematical induction, and recursive definitions. Combinatorics: permutations, combinations, pigeon-hole principle, counting techniques. Relations.

Prerequisite: MATH 101, ICS 201

ICS 313 Fundamentals of Programming Languages. (3-0-3)

Concepts of Programming languages: Syntax and semantics. Data types. Control structures. Sub-Programs. Exception handling. Run-time Storage Management. Programming Paradigms: Imperative, functional, logic, object-oriented, and concurrent.

Prerequisite: ICS 202

ICS 314 Object-Oriented Programming (3-0-3)

Concepts of Object-oriented Programming. Programming in an object-oriented language such as Java. Tools and class libraries. Object-oriented Software Development.

Prerequisite: ICS 202

ICS 331 Systems Software (3-0-3)

Systems software and its relationship to machine architecture. Design of Assemblers, Loaders, Linkers and Macroprocessors. Device drivers. Editors. Debuggers. Brief introduction to operating systems and compilers.

Prerequisites: ICS 202, ICS 232 or COE 205

ICS 333 File Processing (3-0-3)

External storage devices. Sequential, Indexed Sequential and Direct file organizations. Tree-structured, multilist, inverted, cellular multilist, and hybrid file organizations. File systems. External sorting and merging. The Protection problem. Introduction to Database systems. The course includes implementation of a number of file systems using the COBOL language.

Prerequisite: ICS 202

ICS 334 Database Systems (3-3-4)

Basic database concepts. Conceptual modeling. Relational data model. Relational theory and languages. Database Design. Database security and integrity. Introduction to query processing and optimization. Introduction to concurrency and recovery.

Suggested Lab work

Programming assignments to learn database design using CASE tools. Introduction to back-end/Server-based Relational DataBase Management System (RDBMS). Learning Standard SQL (interactive/embedded). Introduction and programming assignments on Front-End tools. Programming team projects to design and develop real life database systems using the learned tools.

Prerequisite: ICS 202

ICS 350 Cooperative work (0-0-0)

Beginning of coop in summer. Description as given in ICS 351.

Prerequisites: ENGL 214 & Department Approval

ICS 351 Cooperative work (0-0-9)

A continuous period of 28 weeks spent in the industry to acquire practical experience in different fields of computer science.

Prerequisites: ENGL 214 & Department Approval

ICS 352 Cooperative work (0-0-0)

A continuous period of 28 weeks spent in the industry to acquire practical experience in different fields of computer science.

Prerequisites: ENGL 214 & Department Approval

ICS 353 Design and Analysis of Algorithms (3-0-3)

Introduction to algorithms and review of data structure; Time and space analysis; Algorithm design techniques: divide-and-conquer, greedy algorithms, dynamic programming, search techniques; NP-complete problems and approximation algorithms.

Prerequisite: ICS 202

ICS 354 Automata and Language Translation Systems (3-0-3)

Introduction to languages, machines, grammars and translating systems. Chomsky hierarchy. Properties of regular, context-free and context-sensitive languages. Pumping lemma. Finite state, pushdown, linear-bounded automata and Turing machines. Linear, context-free, context-sensitive grammars. Introduction to parsing techniques and computational complexity.

Prerequisite: ICS 252

ICS 381 Introduction to Artificial Intelligence (3-0-3)

Introduction to the types of problems and techniques in Artificial Intelligence. Problem-Solving methods. Major structures used in Artificial Intelligence programs. Study of knowledge representation techniques such as predicate logic, non-monotonic logic, and probabilistic reasoning. Examples of expert systems. Introduction to natural language understanding and various syntactic and semantic structures. Expert systems. Introduction to computer image recognition.

Prerequisite: ICS 202

ICS 399 Summer Training (0-0-0)

The aim of the summer training is to provide students with direct on-the-job experience working with professionals in the field. This training provides an opportunity to expose students to the reality of professional practice. Students are required to submit a report and make a presentation on their summer training experience and the knowledge gained.

Prerequisites: ENGL 214, Junior Standing, and Approval of the Department.

ICS 411 Senior Project (1-6-3)

The student will work on an applied project designed to develop his interest in some application of computer technology to a real life problem. Student is expected to submit a written report at the end of the project.

Prerequisite: As required by the project.

ICS 412 Compiler Construction (3-0-3)

Compiler techniques and methodology. Organization of compilers. Lexical and syntax analysis. Parsing techniques. Object code generation and optimization, detection and recovery from errors. Contrast between compilers and interpreters.

Prerequisite: ICS 313

ICS 413 Software Engineering (3-3-4)

The software development process; Software requirements and specification; Software design; Software verification and validation; Software management; Software tools.

Suggested Lab work (Open Lab)

A team project in which students of the class are divided into teams of 3 or 4 students each. Each team is given the requirements for a small size software to be delivered by the end of the semester by applying the waterfall model. Team work concepts should be stressed. The leader position is rotated among members of the same team at different phases of the project.

Prerequisite: ICS 202

ICS 431 Operating Systems (3-3-4)

History and evolution of operating systems. Types of operating systems. Case histories of significant operating systems. Processes, inter-process communication, process coordination and synchronization. Process scheduling. Memory management. File systems. Security and protection. Case operating systems.

Suggested Lab work (Open Lab)

Implementation of user-defined utilities/commands for UNIX by writing system programs using different types of system calls including those for file/directory management, process management, signal management, and client/server management. Also involve practice on various aspects of shell environment and shell programming.

Prerequisite: ICS 232 or COE 205

ICS 432 Computer Network Systems (3-3-4)

The ISO model. Basic data communication concepts. Physical layer. RS-232 interface. Data link layer. Sliding window techniques. LAN medium access protocols: CSMA/CD and token passing. LAN hardware and standards: Ethernet and Token Ring. Network and transport protocols. TCP/IP. Internetworking devices: bridges and routers. Network programming.

Suggested Lab work (Open Lab)

Low level programming of the RS-232 interface. High level programming using NetBIOS or Sockets. Use of LAN analysis tools.

Prerequisite: ICS 232 or COE 205

ICS 434 Advanced Database Systems (3-0-3)

Advanced data models. Conceptual Database design. Concurrency control techniques. Recovery techniques. Query processing and optimization. Integrity and security. Client-server architecture. Distributed database systems. Current trends in database systems.

Prerequisite: ICS 334

ICS 435 Computer Graphics (3-0-3)

Applications of Computer Graphics. Graphics systems and devices. Output Primitives. Attributes of Output Primitives. Two-Dimensional Transformations. Windows to Viewport Mapping and Clipping. Graphical User Interfaces and Interactive Input Methods. Two-Dimensional Object Representations. Three-Dimensional Object Representations. Three-Dimensional Graphics.

Prerequisite: ICS 202

ICS 452 Theory of Computing (3-0-3)

Review of Chomsky hierarchy. Various models of effective computability—Turing machines, recursive functions. Church's thesis. Godel numbering. The Halting problem and Post correspondence problem. Decidability. Complexity theory—Time and space hierarchies.

Prerequisite: ICS 252

ICS 471 Parallel & Distributed Processing (3-0-3)

Distributed systems (multiprocessors, multicomputers, computer networks). Distributed processing (concurrency, synchronization, and cooperation). Parallel processing. Vectorization. Systolic processing. Parallel programming languages. Distributed operating systems. Case studies.

Co requisite: ICS 431

ICS 481 Neural Networks (3-0-3)

Neuron. Perceptrons. Back propagation. Counter propagation networks. Hopfield model. Kohonen model. Statistical methods. Associative memory. Adaptive resonance theory. Cognitron and recognition. Applications of Neural Networks.

Prerequisite: Senior Standing

ICS 482 Natural Language Understanding (3-0-3)

Basic Linguistics. Morphological analysis, syntax, semantics. Parsing techniques: Transformational Grammars. Transition Networks. Semantic Networks. Representation of knowledge. Sentence generation. Design of Natural Language Systems.

Prerequisite: Senior Standing

ICS 483 Computer Vision (3-0-3)

Vision perception and visual illusion. Edge detection. Primal sketch. Line-drawing interpretation. Shape from shading. Stereopsis. Shape from contour. Texture. Motion perception and optical flow. 2.5D and 3D maps. Object representation. Object recognition.

Prerequisite: ICS 381

ICS 484 Arabization of Computers (3-0-3)

Introduction. Arabic Language Characteristics. Arabic Character Sets. Standardization. Arabic Characters for Screens and printers. Arabization Systems. Arabic Software tools, and programming languages. Introduction to Arabic Computations. Projects in specific discipline using available tools.

Prerequisite: Senior Standing

ICS 485 Knowledge Based Systems (3-0-3)

Overview of Artificial Intelligence. Architecture of expert systems: including the structure of knowledge bases and the various knowledge representations methods, inference engines and reasoning techniques, search and exploitation of domain specific knowledge through heuristics, knowledge acquisition. Discussion of examples of expert systems shells, their capabilities and limitations. Projects in specific discipline using available shells.

Prerequisite: Senior Standing

ICS 490 Special Topics I (3-0-3)

State-of-the-art topics in Computer Science and Information Systems.

Prerequisite: Senior Standing

ICS 491 Special Topics II (3-0-3)

State-of-the-art topics in Computer Science and Information Systems.

Prerequisite: Senior Standing

MATHEMATICS

MATH 001 Preparatory Mathematics I (3-1-4)

MATH 002 Preparatory Mathematics II (3-1-4)

Concepts and manipulations in algebra. Trigonometry. Elementary analytic geometry and Linear Algebra. Introduction to concepts of calculus. Preparation for rigorous study of mathematics.

MATH 101 Calculus I (4-0-4)

Limits and continuity of functions of a single variable. Differentiability. Techniques of differentiation. Implicit differentiation. Local extrema, first and second derivative tests for local extrema. Concavity and inflection points. Curve sketching. Applied extrema problems. The Mean Value Theorem and applications.

Prerequisite: One year preparatory mathematics or its equivalent.

MATH 102 Calculus II (4-0-4)

Definite and indefinite integrals of functions of a single variable. Fundamental Theorem of Calculus. Techniques of integration. Hyperbolic functions. Applications of the definite integral to area, volume, arc length and surface of revolution. Improper integrals. Sequences and series: convergence tests, integral, comparison, ratio and root tests. Alternating series. Absolute and conditional convergence. Power series. Taylor and Maclaurin series.

Prerequisite: MATH 101

MATH 131 Finite Mathematics (3-0-3)

Linear equations and inequalities. Systems of linear equations. Basic material on matrices. Elementary introduction to linear programming. Counting techniques. Permutations and combinations. Probability for finite sample space. Basic concepts in statistics. Topics in the mathematics of finance.

Prerequisite: One year preparatory mathematics or its equivalent.

MATH 132 Applied Calculus (3-0-3)

The derivative. Rules for differentiation. Derivative of logarithmic, exponential, and trigonometric functions. Differentials. Growth and decay models. Definite and indefinite integrals. Techniques of integration. Integrals involving logarithmic, exponential and trigonometric functions. Integration by tables. Area under a curve and between curves.

Functions of several variables. Partial derivatives and their applications to optimization.

Prerequisite: One year preparatory mathematics or its equivalent.

MATH 201 Calculus III (3-0-3)

Polar coordinates, polar curves, area in polar coordinates. Vectors, lines, planes and surfaces. Cylindrical and spherical coordinates. Functions of two and three variables, limits and continuity. Partial derivatives, directional derivatives. Extrema of functions of two variables. Double integrals, double integrals in polar coordinates. Triple integrals, triple integrals in cylindrical and spherical coordinates.

Prerequisite: MATH 102

MATH 202 Elements of Differential Equations (3-0-3)

First order and first degree equations. The homogeneous differential equations with constant coefficients. The methods of undetermined coefficients, reduction of order, and variation of parameters. The Cauchy-Euler equation. Series solutions. Systems of linear differential equations. Applications.

Prerequisite: MATH 201

MATH 232 Introduction to Sets and Structures (3-0-3)

Elementary logic. Methods of proof. Set theory. Relations and functions. Finite and infinite sets. Equivalence relations and congruence. Divisibility and the fundamental theorem of arithmetic. Well-ordering and axiom of choice. Groups, subgroups, symmetric groups, cyclic groups and order of an element, isomorphisms, cosets and Lagrange's Theorem.

Note: MATH 232 and ICS 251 are equivalent; only one can be taken for credit.

Prerequisite: MATH 102

MATH 260 Introduction to Differential Equations & Linear Algebra (3-0-3)

Systems of linear equations. Rank of matrices. Eigenvalues and eigenvectors. Vector spaces, subspaces, bases, dimensions. Invertible matrices. Similar matrices. Diagonalizable matrices. Block diagonal and Jordan forms. First order differential equations: separable and exact. The homogeneous differential equations with constant coefficients. Wronskian. Non-homogeneous differential equations. Methods of undetermined coefficients and variation of parameters. Systems of differential equations. Non-homogeneous systems.

Not to be taken for credit with MATH 202 or MATH 280.

Prerequisite: MATH 102

MATH 280 Introduction to Linear Algebra (3-0-3)

Matrices and systems of linear equations. Vector spaces and subspaces. Linear independence. Basis and dimension. Inner product spaces. The Gram-Schmidt process. Linear transformations. Determinants. Diagonalization. Real quadratic forms.

Co requisite: MATH 201

MATH 301 Methods of Applied Mathematics (3-0-3)

Special functions. Bessel's functions and Legendre polynomials. Vector analysis including vector fields, divergence, curl, line and surface integrals, Green's, Gauss' and Stokes' theorems. Systems of differential equations. Sturm-Liouville theory. Fourier series and transforms. Introduction to partial differential equations and boundary value problems.

Prerequisite: MATH 202 or MATH 260

MATH 302 Engineering Mathematics (3-0-3)

Vector analysis including vector fields, gradient, divergence, curl, line and surface integrals, Gauss' and Stokes' theorems. Introduction to complex variables. Vector spaces and subspaces. Linear independence, basis and dimension. Solution of linear equations. Orthogonality. Eigenvalues and eigenvectors. Applications to systems of differential equations.

Not to be taken for credit with MATH 280 or MATH 301.

Prerequisite: MATH 201

MATH 305 Development of Mathematics (3-0-3)

History of numeration: Egyptian, Babylonian, Hindi and Arabic contributions. Algebra: including the contributions of Al-Khwarizmi and Ibn Kura. Geometry: areas, approximation of π, the work of Al-Toussi on Euclid's axioms. Analysis: The calculus: Newton, Leibniz, Gauss. The concept of limit: Cauchy, Laplace. An introduction to some famous old open problems.

Prerequisite: MATH 102 or MATH 132

MATH 311 Advanced Calculus I (3-0-3)

The real number system. Continuity and limits. Uniform continuity. Differentiability of functions of one variable. Definition, existence and properties of the Riemann integral. The fundamental theorem of calculus. Sequences and series of real numbers.

Prerequisite: MATH 232

MATH 321 Introduction to Numerical Computing (3-0-3)

Floating-point arithmetic and error analysis. Solution of non-linear equations. Polynomial interpolation. Numerical integration and differentiation. Data fitting. Solution of linear algebraic systems. Initial and boundary value problems of ordinary differential equations.

Note: MATH 321 and SE 301 are equivalent; only one can be taken for credit.

Prerequisites: MATH 201, ICS 101, ICS 102 or ICS 103

MATH 330 Euclidean and Non-Euclidean Geometry (3-0-3)

Axiomatic approach to Euclidean geometry. Use of logic in mathematical reasoning. Hilbert's formulation. Removal of the parallel axiom. The discovery of non-Euclidean geometries. Independence of the parallel postulate. The question of the geometry of physical space.

Geometric transformations and invariance under groups of transformations. Hyperbolic geometry.

Prerequisite: MATH 232

MATH 345 Modern Algebra I (3-0-3)

Review of basic group theory including Lagrange's Theorem. Normal subgroups, factor groups, homomorphisms, fundamental theorem of finite Abelian groups. Examples and basic properties, integral domains and fields, ideal and factor rings, homomorphisms. Polynomials, factorization of polynomials over a field, factor rings of polynomials over a field. Irreducibles and unique factorization, principal ideal domains.

Prerequisite: MATH 232

MATH 355 Linear Algebra (3-0-3)

Theory of vector spaces and linear transformations. Direct sums. Inner product spaces. The dual space. Bilinear forms. Polynomials and matrices. Triangulation of matrices and linear transformations. Hamilton-Cayley theorem.

Prerequisite: MATH 280

MATH 399 Summer Training (0-0-2)

Students are required to spend one summer working in industry prior to the term in which they expect to graduate. Students are required to submit a report and make a presentation on their summer training experience and the knowledge gained.

Prerequisites: ENGL 214, Junior Standing and Approval of the Department.

MATH 401 Methods of Applied Mathematics II (3-0-3)

Introduction to linear spaces and Hilbert spaces. Strong and weak convergence. Orthogonal and orthonormal systems. Integral Equations: Fredholm and Volterra equations. Green's Function: Idea of distributions, properties of Green's function and construction. Any one of the following topics: Asymptotic Methods: Laplace method, Steepest descent method, Perturbation Theory: regular and singular perturbations, Integral Transforms: Fourier, Laplace, Mellin and Hankel transforms.

Prerequisite: MATH 301

MATH 411 Advanced Calculus II (3-0-3)

Theory of sequences and series of functions. Continuity and differentiability of functions of several variables. Partial derivatives. The Chain rule. Taylor's theorem. Maxima and minima. Integration of functions of several variables. Convergence and divergence of improper integrals. Derivative of functions defined by improper integrals.

Prerequisite: MATH 311

MATH 412 Advanced Calculus III (3-0-3)

Functions of bounded variation. The Riemann-Stieltjes integral. Implicit and inverse function theorems. Lagrange multipliers. Change of variables in multiple integrals. Vector functions and fields on R^n. Line and surface integrals. Green's theorem. Divergence theorem. Stokes' theorem.

Prerequisite: MATH 411

MATH 421 Introduction to Topology (3-0-3)

Topological Spaces: Basis for a topology, The order topology. The subspace topology. Closed sets and limit points. Continuous functions. The product topology, The metric topology. Connected spaces. Compact spaces. Limit point compactness. The countability axioms. The separation axioms. The Urysohn lemma. The Urysohn metrization theorem. Complete metric spaces.

Prerequisite: MATH 311

MATH 425 Graph Theory (3-0-3)

Graphs and digraphs. Degree sequences, paths, cycles, cut-vertices, and blocks. Eulerian graphs and digraphs. Trees, incidence matrix, cut-matrix, circuit matrix and adjacency matrix. Orthogonality relation. Decomposition, Euler formula, planar and nonplanar graphs. Menger's theorem. Hamiltonian graphs.

Prerequisite: MATH 260 or MATH 280 or MATH 302

MATH 430 Introduction to Complex Variables (3-0-3)

Complex numbers and the complex plane. Arguments and roots, roots of unity. De Moivre's theorem. Basic topological definitions. Analytic functions. Limits. Continuity. Differentiability. Cauchy-Riemann conditions. Elementary functions. Branch cuts. Convergence of complex series. Complex integration. Cauchy's theorem. Cauchy's integral formula. Morera's and Liouville's theorems. Taylor's and Laurent's series. Residues and poles. Rouche's theorem. Fundamental theorem of algebra. Evaluation of improper integrals. Meromorphic functions. Basic concepts of conformal mapping.

Prerequisite: MATH 201

MATH 431 Introduction to Measure Theory and Functional Analysis (3-0-3)

Lebesgue integrable functions. Fatou's lemma. Dominated convergence theorem. Measurable functions. Measurable sets, non-measurable sets. Egoroff's theorem. Convergence in measure. L_p-spaces, Riesz-Fischer theorem, geometry of Hilbert spaces. Orthonormal sequences. Fourier series. Bounded linear functionals. Hahn-Banach theorem. Linear functionals on Hilbert and L_p-spaces.

Prerequisite: MATH 311

MATH 440 Differential Geometry (3-0-3)

Manifolds in R^n and their orientability. Tensor fields. Curves in 3-dimensional Euclidean space: the Frenet frame and formulae, curvature and torsion, natural equations. Surfaces in 3-dimensional Euclidean space: the first and second fundamental forms, the classification of surfaces, the fundamental theorem.

Prerequisite: MATH 260 or MATH 280 or MATH 302

MATH 442 Calculus of Variations and Optimal Control (3-0-3)

Introduction to the calculus of variations. Euler-Lagrange, Weierstrass, Legendre and Jacobi necessary conditions. Formulation of optimal control problems. Bolza, Mayer and Lagrange formulations. Variational approach to optimal control. Pontryagin maximum principle.

Prerequisite: MATH 202

MATH 450 Modern Algebra II (3-0-3)

Finite and finitely generated Abelian groups. Solvable groups. Nilpotent groups. Sylow theorems. Factorization in integral domains. Principal ideal domains. Fields. Field extensions. Finite fields. An introduction to Galois theory.

Prerequisite: MATH 345

MATH 452 Applied Algebra (3-0-3)

Boolean algebras. Symmetry groups in three dimensions. Polya-Burnside method of enumeration. Monoids and machines. Introduction to automata theory. Error correcting codes.

Prerequisite: MATH 345

MATH 455 Number Theory (3-0-3)

Divisibility and primes. Congruences. Primitive roots. Quadratic reciprocity. Arithmetic functions. Diophantine equations. Applications (e.g. cryptography or rational approximation).

Prerequisite: MATH 232 or Senior Standing

MATH 460 Applied Matrix Theory (3-0-3)

Review of the theory of linear systems. Eigenvalues and eigenvectors. The Jordan canonical form. Bilinear and quadratic forms. Matrix analysis of differential equations. Variational principles and perturbation theory: the Courant minimax theorem, Weyl's inequalities, Gershgorin's theorem, perturbations of the spectrum, vector norms and related matrix norms, the condition number of a matrix.

Prerequisite: MATH 260 or MATH 280 or MATH 302

MATH 465 Ordinary Differential Equations (3-0-3)

Existence, uniqueness and continuation of solutions to initial value problems: scalar, 1st order systems and linear systems. Linear systems: solution matrix, fundamental solution matrix. Variation of constants method. Phase space analysis. Autonomous systems. Definitions of Stability. Stability for linear and almost linear systems. Basic concepts of Liapunov's method.

Prerequisites: MATH 202, MATH 280

MATH 470 Partial Differential Equations (3-0-3)

First order quasilinear equations. Lagrange method and Characteristics. Classification of linear second order PDEs. Brief review of separation of variables. The one dimensional wave equation: its solution and characteristics. Cauchy problem for the wave equation. Laplace's equation: The maximum principle, uniqueness theorems. Green's function. Neumann's function. The heat equation in one dimension.

Prerequisite: MATH 301

MATH 471 Numerical Analysis I (3-0-3)

Floating-point, round-off analysis. Solution of linear algebraic systems: Gaussian elimination and LU decomposition, condition of a linear system, error analysis of Gaussian elimination, iterative improvement. Least squares and singular value decomposition. Matrix eigenvalue problems.

Prerequisite: MATH 321 or SE 301

MATH 472 Numerical Analysis II (3-0-3)

Approximation of functions: Polynomial interpolation, spline interpolation, least squares theory, adaptive approximation. Differentiation. Integration: basic and composite rules, Gaussian quadrature, Romberg integration, adaptive quadrature. Solution of ODEs: Euler, Taylor series and Runge-Kutta methods for IVPs, multistep methods for IVPs, systems of higher-order ODEs. Shooting, finite difference and collocation methods for BVPs. Stiff equations.

Prerequisite: MATH 321 or SE 301

MATH 480 Linear & Nonlinear Programming (3-0-3)

Formulation of linear programs. Basic properties of linear programs. The simplex method. Duality. Necessary and sufficient conditions for unconstrained problems. Minimization of convex functions. A method of solving unconstrained problems. Equality and inequality constrained optimization. The Lagrange multipliers theorem. The Kuhn-Tucker conditions. A method of solving constrained problems.

Prerequisite: Junior Standing

MATH 485 Wavelets and Applications (3-0-3)

Wavelets. Wavelet transforms. Multiresolution analysis. Discrete wavelet transform. Fast wavelet transform. Wavelet decomposition and reconstruction. Applications such as boundary value problems, data compression, etc.

Prerequisite: MATH 301 or EE 207 or SE 315

MATH 490 Seminar in Mathematics (1-0-1)

This course provides a forum for the exchange of mathematical ideas between faculty and students under the guidance of the course instructor. The instructor arranges weekly presentations by himself, other faculty members and/or students, of lectures or discussions on topics or problems of general interest. The course culminates in the presentation by each student of at least one written report on a selected topic or problem, reflecting some independent work and evidence of familiarity with the mathematical literature. With the permission of the instructor, students may work with other faculty members in the preparation of written reports.

Prerequisites: Any two of MATH 301, MATH 311, MATH 321, MATH 345

MATH 495 Industrial Mathematics (3-0-3)

Industrial and environmental problems. Theoretical foundations and computational methods involving ordinary and partial differential equations.

Prerequisites: MATH 301 (or EE 207) and MATH 321 (or SE 301)

MATH 499 Topics in Mathematics (Variable Credit Hours 1-3)

Variable contents. Open for Senior students interested in studying an advanced topic in mathematics with a departmental faculty member.

May be repeated for a maximum of three credit hours total.

Prerequisites: Senior Standing,
Permission of the Department Chairman upon recommendation of the instructor.

MECHANICAL ENGINEERING

ME 001 Preparatory Graphics (0-2-1)

Graphics is a universal language for transmission of accurate information for the purpose of manufacturing or maintenance of items. Thus the course is introduced to enable students to meaningfully read a technical drawing. Students will sketch pictorially a series of objects, convey ideas by means of sketches and later convert such sketches into orthographic drawing.

Prerequisite: None.

ME 002 Preparatory Shop (0-2-1)

Students will be introduced to methods of using machines and hand-tools and develop practical survival skills. Later in the course, they will be required to complete two projects from the following: (*a*) manufacturing a toolbox from sheet metal; (*b*) manufacturing a desk light from wood; (*c*) manufacturing of a pen holder from wood; (*d*) manufacturing of a book stand from wood; (*e*) manufacturing a bookshelf from wood; (*f*) manufacturing a small table from wood; (*g*) automobile servicing; (*h*) electric appliances servicing.

Prerequisite: None.

ME 201 Dynamics (3-0-3)

Kinematics of rectilinear and curvilinear motion of particles. Dynamics of particles and systems of particles. Kinematics of rotation and plane motion of rigid bodies. Work and energy relations. Impulse and momentum principles. Dynamics of rigid bodies in plane motion.

Prerequisite: CE 201

ME 203 Thermodynamics I (3-0-3)

System and control volume concepts. Properties of a pure substance. Work and heat. The first law of thermodynamics as applied to a system and a control volume, internal energy, enthalpy. The second law of thermodynamics. Carnot cycle, entropy, reversible and irreversible processes. Applications of steady-state, steady-flow, uniform-state, uniform-flow, and other processes.

Prerequisites: MATH 102, PHYS 102

ME 204 Thermodynamics II (3-0-3)

Vapor power cycles, Rankine, reheat, and regenerative cycles. Maxwell relations, ideal and real gases, equations of state, generalized charts. Gas-vapor mixtures, psychrometric charts, ideal solutions. Chemical reactions. Fuels and combustion processes.

Prerequisite: ME 203

ME 205 Materials Science (for non-ME students) (2-3-3)

Introduction to the properties of engineering materials: mechanical, electrical, and chemical. Fundamentals of crystallography. Impurities and imperfections in solids. Atomic vibrations and diffusion. Single phase metals and alloys; elastic and plastic deformation, recrystallization, fracture, fatigue, and creep. Multiphase materials; phase diagrams with emphasis on iron-iron carbide system. Heat treatment processes such as annealing, normalizing, and quenching. Studies of widely used engineering materials; steels, plastics, ceramics, concrete, and wood.

Prerequisites: CHEM 102, MATH 102

ME 206 Manufacturing Processes I (3-3-4)

Manufacturing methods of metals and plastics including: metal casting, forming, machining, welding, and plastic processing. Laboratory experiments and demonstrations in material behavior, forming, casting, welding and machining operations, metrology and dimensional control.

Prerequisites: CE 101 or ME 210, ME 215

ME 210 Mechanical Engineering Drawing & Graphics (2-3-3)

Graphical Interpretation of machine components and assemblies through the study of orthographic projection to include auxiliary views; section drawings and full dimensioning; translation of design instruction into detailed and assembly drawings; drawing conventions including weldments, piping, referencing and surface finish notation; selection of tolerances based on design requirements.

Prerequisite: None

ME 215 Materials Science for ME (3-3-4)

Atomic bonding in solids, bonding forces and energies, primary and secondary bonds. The structure of crystalline solids, lattice, unit cell, and crystal systems, density computation, crystal directions and planes, linear and planar atomic densities. Impurities and imperfections in solids: point, line and interfacial defects. Atomic vibration and diffusion. Mechanical properties of materials. Elastic and plastic deformation, and recrystallization. Phase diagrams of single phase & multiphase materials with emphasis on iron-iron carbide system (steel & cast iron). Thermal processing of metals & alloys: annealing, normalizing, quenching and tempering, composite materials, polymers. Impact, fracture, fatigue and creep properties and introduction to fracture mechanics.

Prerequisites: CHEM 101, MATH 102, PHYS 102

ME 306 Manufacturing Processes II (2-3-3)

Principles applied to metal working, casting, welding, and machine processes. Design and process considerations. Non-traditional metal removal and welding processes. Powder metal processing. Automation. Numerical Control machining. Introduction to statistical manufacturing process control. Laboratory demonstrations and experiments on these principles and processes.

Prerequisites: ICS 101, ME 206 or SE 322

ME 307 Machine Design I (3-0-3)

Design process, review of stress, strain and deformation analysis as applied to mechanical design; properties of materials; review of static failure theories; designing against fatigue failures; element design; shafts, keys, couplings, power screws; bolted, riveted and welded joints.

Prerequisites: ME 210, ME 206, CE 203

ME 308 Machine Design II (3-3-4)

Design of elements: bearings (journal and anti-friction), springs, spur, helical, bevel and worm gears; flexible drives (belts and chains); clutches and brakes; design optimization. Laboratory sessions to supplement and to apply the material covered in the lectures. Consideration of manufacturing aspects of the design (limits and fits). Study of projects considering the different stages of their design, manufacturing and assembly.

Prerequisite: ME 307

ME 309 Mechanics of Machines (3-0-3)

Kinematics of mechanisms, vector method of analysis of plane mechanisms. Static and dynamic analysis of machines, inertia forces, gyroscopic forces. Static and dynamic balancing, balancing machines. Dynamics and balancing of reciprocating engines. Flywheels, kinematic and dynamic analysis of cam mechanisms. Elements of mechanical vibrations, critical speeds and torsional vibrations.

Prerequisite: ME 201

ME 311 Fluid Mechanics (3-0-3)

Definition and properties of fluids. Fluid statics with applications. Basic fluid dynamic equations of continuity, energy and momentum with applications to different flow situations and flow measurement. Viscous effects, boundary-layer concepts, laminar and turbulent flow in pipes, open channel flow, fluid dynamics forces on immersed bodies. Modeling and dimensional similarity. Introduction to turbomachinery.

Prerequisites: MATH 201, ME 201, ME 203

ME 315 Heat Transfer (3-0-3)

An introduction to heat transfer by conduction, radiation, and convection. Steady-state solution for heat conduction applied to wall and pipe insulation, heat sources, and extended surfaces (fins). Unsteady heat transfer to plates, cylinders and spheres (Heisler charts). Black and gray body radiation systems and electric network analogy. Practical hydraulic and thermal analysis of forced and natural convection system with application to heat exchangers.

Prerequisite: ME 311

ME 316 Thermofluids Lab (0-3-1)

This lab course will deal with equal emphasis on fluid mechanics and heat transfer. All experiments conducted in this lab combine elements of theory and practice. Many of the concepts and basic theories which the student learns in the lectures of ME 311 and ME 315 are demonstrated and confirmed in the lab through different experiments.

Prerequisite: ME 311
Co requisite: ME 315

ME 351 Applied Mechanical Engineering Cooperative Work (0-0-9)

A period of 28 weeks of industrial employment for Applied Mechanical Engineering students to work in appropriate industries or firms. Students are evaluated on their performance on the job and are required to submit an extensive formal report on their experience.

(Limited to AME Students).

Prerequisites: ENGL 214, ME 307, ME 309, ME 315

ME 399 Summer Training (0-0-0)

A continuous period of 8 weeks of summer training spent in the industry working in any of the fields of mechanical engineering. The training should be carried out in an organization with an interest in one or more of these fields. On completion of the program, the student is required to submit a formal written report of his work.

Prerequisites: ENGL 214, Junior Standing and Approval of the Department.

ME 411 Senior Design Project I (1-0-1)

A course that integrates various components of the curriculum in comprehensive engineering experience so that the basic sciences, mathematics, and engineering sciences which the student has learned in his freshman-to-senior years of study can be applied. It considers design of a complete project or system including establishment of objectives and criteria, formulation of the problem statements, preparation of specifications, consideration of alternative solutions, feasibility considerations, and detailed engineering designs. The design should take into consideration appropriate constraints such as economic factors, safety, reliability, ethics and environmental and social impact. Submission of a written report is an essential requirement for completion of the course. Team design projects, where appropriate, are highly encouraged.

Prerequisite: Senior Standing

ME 412 Senior Design Project II (2-0-2)

Continuation and completion of project started in ME 411. Oral presentation and submission of final written report of the design project are essential requirements for the completion of the course.

Prerequisite: ME 411

ME 413 Systems Dynamics and Control (2-3-3)

Dynamics of mechanical, fluid, electrical and thermal systems. Equations of motion. Dynamic response to elementary systems. Transfer functions and pole-zero diagrams. Simulation of dynamics of complex systems. Dynamic stability of systems. Open and closed-loop systems. Basic control actions. Laboratory sessions involve use of computers for simulation of dynamic systems and analysis of control systems.

Prerequisite: MATH 301 and ME 201

ME 415 Design Project (1-6-3)

This course, designed for Applied Mechanical Engineering students, integrates various components of ME curriculum in a comprehensive engineering experience so that basic sciences, mathematics and engineering sciences introduced in freshmen-to-senior years can be applied. It considers design of a complete project or system including establishment of objectives and criteria, formulation of the problem statements, preparation of specifications, considerations of alternative solutions, feasibility considerations and detailed engineering designs. The design should take into consideration appropriate constraints such as: economic factors, safety, reliability, ethics, environmental and social impact. Submission of a written report and oral presentation are essential requirements for completion of the course.

Team design projects are highly encouraged.

Prerequisite: Senior Standing.

ME 422 Propulsion Systems (3-0-3)

Aerothermodynamics of aerospace vehicle engines, combustion, thrust and efficiency. Gas turbine engines: turbojet, turbofan, turboprop; ramjet and scramjet, typical engine performance. Aerothermodynamics of inlets, combustors and nozzles. Introduction to propellers, turbocompressors and turbines. Introduction to rockets and performances of rocket vehicle engines. Chemical and electrical driven rocket engines.

Note: ME 422 and AE 422 are equivalent; only one can be taken for credit.

Prerequisites: ME 204, ME 311

ME 423 Energy Conversion (3-0-3)

Energy sources and their classification. Conventional energy conversion; power plant and vapor cycles. Renewable energy; solar energy with emphasis on solar cells, wind energy, OTEC systems, geothermal energy. Nuclear fission and types of fission reactors.

Prerequisites: ME 204, ME 315

ME 424 Maintenance Engineering (3-0-3)

Introduction to maintenance engineering; Condition monitoring of machines, plants & structures, various methods of condition monitoring: vibration acoustic emission, temperature, etc. and their practical applications. Interpreting the results of condition monitoring. Economics of Maintenance, Optimal maintenance strategies: Inspection intervals planning for maintenance crew, forecasting the spare parts and determining optimal stocking policy.

Co requisite: STAT 319

ME 425 Compressible Fluid Flow (3-0-3)

Fundamentals of compressible fluid flow (gas dynamics) in relation to effects of area change (nozzles and diffusers), friction and heat interaction (Fanno and Rayleigh lines and isothermal flow), combustion waves (deflagration, explosion and detonation waves), normal and oblique shock waves and their effects on flow properties (extended diffusers and supersonic airfoils). Applications to flow through pipelines, subsonic, sonic and supersonic flights, turbomachinery and combustion.

Note: ME 425 and AE 325 are equivalent; only one can be taken for credit.

Prerequisite: ME 311

ME 427 Turbomachinery (3-0-3)

Thermo-fluid dynamics aspects of fluid flow, kinematic relations and efficiencies of turbomachines. Two dimensional cascades; Turbine and Compressor cascade correlations and performance. Axial Turbines (two dimensional analysis), Axial Flow Compressors and Fans (two dimensional analysis), Centrifugal Compressors and Fans, Radial Flow Turbines, and preliminary design fundamentals of turbomachines and three dimensional considerations.

Prerequisites: ME 204, ME 311

ME 428 Structure of Flight Vehicles (3-0-3)

Statically determinate and indeterminate structures; aerodynamic and inertia loads, load factors; elasticity of structures, stress-strain relationships; mechanical properties of vehicle materials; fatigue; strength-weight comparisons of materials; sandwich constructions; stresses in beams, shear flow in thin webs, closed-section box beams; deflection analysis of structural systems; Castigliano's theorems, Rayleigh-Ritz method, finite difference method; redundancy in structures.

Note: ME 428 and AE 328 are equivalent; only one can be taken for credit.

Prerequisite: CE 203

ME 430 Air Conditioning **(2-3-3)**

Thermodynamics of moist air; construction of the psychrometric chart; psychrometric processes; psychrometric systems; Industrial processes; air conditioning systems; duct design and air distribution methods; cooling towers. Experiments utilizing air conditioning equipment will be conducted in the laboratory and design calculations for air-conditioning systems will be practiced through a practical project in tutorial sessions.

Prerequisites: ME 204, ME 315

ME 431 Refrigeration **(2-3-3)**

Mechanical vapor compression refrigeration cycles (single-stage and multi-stage); refrigerant compressors; refrigerants; absorption refrigeration systems; thermoelectric cooling; flash cooling; gas cycle refrigeration; ultra-low-temperature refrigeration (cryogenics); food refrigeration; transport refrigeration. Laboratory hours will be utilized to carry out experiments on refrigeration equipment and in problem solving sessions.

Prerequisites: ME 204, ME 315

ME 432 Internal Combustion Engines **(2-3-3)**

Analysis of spark ignition, compression ignition, and gas turbine engines. Combustion processes in an actual system. Performance characteristics. Combustion abnormalities. Analysis of intake, fuel, and exhaust systems. Laboratory experiments will illustrate the topics discussed.

Prerequisite: ME 204

ME 434 Wind Engineering **(3-0-3)**

Wind characteristics, boundary layer, turbulence, surface roughness, measurements. Loads on static structures, wind tunnel modeling, wind induced vibrations, flutter, buffeting. Additional selected topics such as airborne pollution, sand motion, vehicle aerodynamics.

Prerequisite: ME 311

ME 435 Thermal Power Plants **(2-3-3)**

Forms of energy, oil, gas and coal. Combustion processes, energy cycles. Steam generators and their component design, turbines, load curves. Field trips to power plants and other energy installations during laboratory hours.

Prerequisites: ME 204, ME 315

ME 436 Fluid Power Systems **(3-0-3)**

Study of fluid power systems as used in industrial applications to transmit power by the flow of hydraulic fluids. Fluid power circuit diagrams including components such as valves, pumps, motors, filters, reservoirs and accumulators. Analysis of fluid leakage, hydrostatic transmissions, hydraulic stiffness, and performance of positive displacement pumps and motors.

Prerequisite: ME 311

ME 437 Design and Rating of Heat Exchangers (3-0-3)

Heat transfer mechanism leading to basic heat exchanger equations; classification and analyses of heat exchangers including geometry; heat transfer and flow friction characteristics; compact and shell and tube heat exchanger application and design procedures; fouling and its effect on life cycle analysis; maintenance methodology; flow induced vibration and noise in heat exchangers.

Prerequisite: ME 315

ME 438 Pumping Machinery (2-3-3)

Terminology and description of typical pump machinery. Momentum and energy transfer between fluid and rotor. Performance characteristics of centrifugal and axial flow fans, compressors and pumps. Various types of losses. Positive displacement pumps. Cavitation and water-hammer problems in pump systems. Special problems in pump design and applications. Laboratory experiments will include performance evaluation of various types of pumps and problem-solving sessions.

Prerequisite: ME 311

ME 439 Solar Energy Conversion (3-0-3)

Thermal aspects of solar energy conversion. Solar radiation measurement and prediction. Selected topics in heat transfer. Flat plate and focusing collector analysis. Solar energy storage. Solar systems including hot water, space heating and cooling, distillation and thermal power conversion.

Prerequisite: ME 315

ME 440 Convective Heat and Mass Transfer (3-0-3)

Boundary layers; laminar boundary layer heat transfer; turbulent boundary layer heat transfer; free convection boundary layers; enclosures; convection mass transfer; boiling and condensation; pool boiling; two-phase flow; laminar and turbulent film condensation.

Prerequisite: ME 315

ME 441 Energy and the Environment (3-0-3)

General introduction. Engineering and environment. Overview of environmental issues. Case studies in design for the environment. Automobiles and the environment. Batteries and the environment. Power plants and the environment. Refrigeration and the environment. Environmental life cycle assessments. Pollution control technologies and instrumentation. Thermodynamic assessment of environmental impacts. Case studies in mechanical engineering for environmental modeling. Smog control. CFCs and ozone layer. Acid rain. Global warming and climate change. Toxic metals. Environmental policy. Economic analysis. Environmental risk and decision.

Prerequisite: ME 203 or equivalent.

ME 462 Reliability for Mechanical Engineers (3-0-3)

Fundamentals of probability theory. Probabilistic models of load (stress) and resistance (strength) variables. Stress-strength interference models. Monte Carlo simulation. Hazard functions and reliability models for random and wear-out failures. Hazard plotting and reliability estimation. System reliability. Failure rate endurance testing and failure data analysis. Accelerated life testing.

Prerequisite: ME 307

ME 463 Production Engineering I (3-0-3)

Limits, fits, tolerance charts. Part analysis, process selection and operations sequence planning. Integrating and combining operations. Workpiece control, cutting tools, dies, and work holding devices. Mechanized assembly and functional gaging. Metal cutting economics and process selection.

Prerequisite: ME 307

ME 464 Production Engineering II (3-0-3)

Principles of dimensional metrology and geometrical accuracy. Concepts of attaining and maintaining manufacturing accuracy. Principles of precision measuring instruments and machines. Process capability evaluation and quality control.

Prerequisite: ME 206

ME 466 Fundamentals of Heat Treatment (2-3-3)

Principles of phase transformations, heat treatment, mechanical properties as applied to ferrous and non-ferrous metals and alloys. Heat treatment processes including: normalizing, hardening, tempering, annealing, surface hardening. Applications of heat treatment and surface hardening techniques.

Prerequisite: ME 206

ME 468 Casting and Welding Engineering (2-3-3)

Metallurgical and engineering principles applied to melting, casting and solidification. Testing and evaluation of castings. Foundry processes. Introduction to the metallurgy of welding. Material and process selection, codes and specifications, weldment design and testing. Welding defects. Analysis of industrial welding processes. Laboratory experience in foundry, production and evaluation of weldments.

Prerequisite: ME 206

ME 469 Computer-Aided Manufacturing (2-3-3)

High volume discrete parts production systems. CAD/CAM fundamentals. Numerical Control (NC) manufacturing systems. Part Programming. NC justification, advances in NC (CNC, DNC, adaptive control). Tooling for NC and CNC. Overview of group technology, flexible manufacturing systems (FMS), and robotics in manufacturing. Related laboratory experiments.

Prerequisite: ME 306

ME 471 Mechanical Metallurgy (3-0-3)

Review of mechanical properties of metals and alloys. Introduction to theory of elasticity. Elements of theory of plasticity; flow curve, yield criteria, plastic stress-strain relationship, introduction to slipline fields. Metallurgical aspects of plastic deformation. Metalworking processes: Forging, rolling, extrusion, and drawing.

Prerequisite: ME 215

ME 472 Corrosion Engineering I (3-0-3)

Technical and economical aspects of corrosion problems. Types of corrosion; pitting, crevice, intergranular, galvanic and stress corrosion cracking. Mechanisms and prevention of corrosion failures. Cathodic protection of pipelines and submerged structures. Principles of inhibition of corrosion in process industries. Behavior of iron, copper, aluminum and their alloys in corrosive environments. Metallurgical aspects of corrosion. Design considerations in prevention of corrosion failures.

Prerequisite: ME 215

ME 473 Corrosion Engineering II (2-3-3)

Review of important principles of corrosion protection. Effect of atmospheric composition, climatic condition and industrial pollution on metallic corrosion. Erosion and cavitation. High pressure and high temperature corrosion. Corrosion in steam generation plants, pressure vessels and its mitigation. Reinforced concrete corrosion. Design of cathodic protection systems for various structures. Surface preparation, applications and designing of coating systems. Sea water induced corrosion and scaling in major desalination plant components. Laboratory studies related to inspection and testing of coating, evaluation of inhibitors, cathodic protection measurements and corrosion resistance of materials.

Prerequisite: ME 472

ME 474 Physical Metallurgy (3-0-3)

Review of crystal structures, dislocation and slip phenomena, plastic deformation. Metals and alloy systems. Diffusion in solids Strengthening mechanisms. Heat treatment of metals, phase transformations. Metallurgical aspects of failure.

Prerequisite: ME 215

ME 475 Mechanical Behavior of Materials (2-3-3)

Testing of materials under static and dynamic loading. Introduction to fracture mechanics. Fatigue, creep, and wear mechanisms. Evaluation and presentation of materials testing and failure data.

Prerequisite: ME 307

ME 476 Non-Metallic Materials (3-0-3)

Structure of nonmetallic materials. Ceramic materials, glass and vitreous products, concrete and related materials of construction, refractory materials, composite materials, polymers.

Prerequisite: ME 215

ME 477 Non-Ferrous Extractive Metallurgy (3-0-3)

Physical and chemical principles involved in the extraction of non-ferrous metals. Principles of hydrometallurgical and pyrometallurgical processes. Extraction of aluminum, copper, nickel, silver and gold. Refining processes for non-ferrous metals.

Prerequisites: ME 204, ME 215

ME 478 Iron and Steel Making (3-0-3)

Introduction to extractive metallurgy and iron ore dressing including the following topics: iron ores, mining, and ore dressing. Production of pig iron. The blast furnace. Production of steel. Bessemer process, basic oxygen process, open-hearth process, direct reduction process, and electric-furnace process. Continuous casting.

Prerequisite: ME 215

ME 479 Modern Materials (3-0-3)

Electrical, magnetic, optical and thermal properties of materials. Advanced ceramics, composites. Advanced engineering plastics. High temperature materials. Advanced coatings. Advanced material processing such as rapid solidification and powder metallurgy; selection of modern materials.

Prerequisite: ME 215

ME 480 Plastics Materials and Processing (3-0-3)

Thermoplastic and thermosetting polymers, their properties and engineering applications. Plastic manufacturing processes, equipment and mold design. Plastic materials and process selection.

Prerequisite: ME 206

ME 481 Advanced Dynamics (3-0-3)

The foundation of dynamics leading to Lagrange's equations and Hamilton's principle. Variation problems in mechanics. General three-dimensional kinematics and dynamics. Stability of motion. Self-excited vibrations, and non-linear vibrations.

Prerequisite: ME 201

ME 482 Mechanical Vibrations (2-3-3)

Free and forced vibrations. Applications to systems with one, two and multi-degree of freedom. Viscous, hysteretic and Coulomb damping. Response to general periodic excitation. Transient vibration and the phase plane method. Principal and coupled coordinates. Dynamic vibration absorbers. Energy methods and Rayleigh's principle. Laboratory sessions are devoted to applications and experiments to illustrate various phenomena studied. Vibration measuring instruments and measuring techniques are emphasized.

Prerequisite: ME 309

ME 483 Mechanisms (2-3-3)

Kinematic pairs, kinematic chain, mobility of planar and space mechanisms, inversion. Vector and complex algebra methods of analysis of plane mechanisms. Centros and mechanical advantage. Hartmann's construction and Euler-Salvary equation. Kinematics of gears and simple, compound, reverted and epicyclic gear trains. Synthesis and analysis of cam mechanisms. Universal joints. Synthesis of function, path and motion generating mechanisms. Laboratory sessions to include graphical and computer methods of analysis and synthesis of mechanisms.

Prerequisite: ME 309

ME 484 Acoustics (3-0-3)

Fundamentals of vibrations. Plane and spherical acoustic waves. Radiation, transmission and filters. Loudspeakers and microphones. Speech, hearing, noise and intelligibility. Architectural acoustics. Acoustic measurements and demonstration of measurement apparatus. Case studies.

Prerequisite: ME 309

ME 485 Mechanical System Design (2-3-3)

Systematic approach to design problems, morphology of design, feasibility study, preliminary design phase, detailed design phase, searching for ideas, evaluation of design, use of computer techniques, designing for production, designing for ease of maintenance, organizing for design, assembly and detail drawings, retrieval systems for future use coding. Laboratory sessions involving selected projects.

Prerequisite: ME 308

ME 486 Optimization of Mechanical Systems (2-3-3)

Formulation and simulation of mechanical engineering systems involving dynamics, kinematics, machine design and thermo-fluid systems. The concept of optimization. Analytical and numerical methods such as unconstrained and constrained optimization, Lagrange multipliers, linear programming for optimum design of mechanical systems. Laboratory sessions involve formulation and solution of problems using microcomputers and the use of computer graphics and existing software packages during the design process.

Prerequisites: ME 307, ME 315

ME 487 Mechanics of Materials (3-0-3)

Analysis of stress and strain in two and three dimensions. Equilibrium, compatibility and stress-strain relations. Analysis of torsion; non-circular sections. Saint-Venant's theory, membrane analogy, hollow sections. Thick walled cylinders. Membrane stresses in thin shells. Bending of flat plates. Energy theorems.

Prerequisite: CE 203

ME 488 Systems Control (2-3-3)

Classical control techniques: Basic control actions. Design of systems by means of rootlocus method, and Bode plots. Control system synthesis. Modern control techniques: state variable representation. State variable feedback. Linear quadratic controller. Laboratory sessions involve utilization of control software for analysis and design of control systems.

Prerequisite: ME 413

ME 489 Finite Element Analysis in Mechanical Design (3-0-3)

Introduction to Finite Element Method and its application in different mechanical problems including: static loading of beam and beam structure, free vibration of beam and beam structures, 2-D plane stress and plane strain, elasticity, and 2-D steady state heat conduction. Using a commercial FE software, in solving various design problems.

Prerequisites: ME 307

ME 491 Mechanical Engineering Experimentation (2-3-3)

Functional description of measuring instruments. Performance characteristics of instruments. Planning of experiments. Analysis of experimental data. Data acquisition and processing. Measuring devices for Mechanical Engineering applications and selected experiments.

Prerequisites: EE 204, ME 309, ME 311

ME 496 Special Topics in Energy Engineering (3-0-3)

Prerequisites: To be set by the ME Department.

ME 497 Special Topics in Dynamics & Control **(3-0-3)**

Prerequisites: To be set by the ME Department.

ME 498 Special Topics in Materials & Manufacturing **(3-0-3)**

Prerequisites: To be set by the ME Department.

MANAGEMENT

MGT 210 Business Communication (3-0-3)

Forms and styles of communication in and among business organizations, business letter and report writing; library research projects and use of business periodicals.

Prerequisite: ENGL 214

MGT 301 Principles of Management (3-0-3)

The basic principles and practices of management in all kinds of enterprise. Such functions as planning, organizing, directing, and controlling are given particular attention. The problems of developing countries including Saudi Arabia are given emphasis.

Prerequisite: Junior Standing

MGT 311 Legal Environment (3-0-3)

Basic legal concepts and laws of Saudi Arabia covering business transactions. Special emphasis on legal proceedings of actual cases. The nature of the external legal system and how it relates to Saudi Arabia.

Prerequisite: Sophomore Standing

MGT 351 Industrial Management Cooperative Work (3-0-3)

Twenty-eight weeks of managerial and industrial experience. Faculty advisor approves assignment and serves as supervisor for a comprehensive study.

Prerequisites: Senior Standing,
MGT 401, 405, 410, 420, 440, ACCT 401, FIN 302, MKT 345

MGT 401 Human Resources Management (3-0-3)

Principles of human resource management. The roles of, and techniques employed by, personnel management and line management in staffing, organizing, motivating, and developing the work-force, labor markets, wages, and salary systems.

Prerequisite: MGT 301

MGT 405 Compensation and Benefits Management (3-0-3)

The development and administration of compensation and benefits programs for both Saudi and expatriate employees. Great emphasis is placed on the role of compensation in attracting, retaining and motivating Saudi and expatriate employees. Topics investigated include motivation theory, factors influencing compensation levels, job evaluation, forms of compensation including incentive plans and fringe benefits.

Prerequisite: MGT 401

MGT 410 Organization Behavior and Design (3-0-3)

Study of structure, process, and behavior of groups and individuals within an organization. Learning techniques include case studies, experimental method, and group problem-solving.

Prerequisite: MGT 301

MGT 411 Saudi & International Commercial Arbitration (3-0-3)

Role played by arbitration in the judicial process, especially in business, both local and international. How arbitration participates in developing and promoting new principles and trends of 'International Mercantile Law common to all nations. Emphasis is given to arbitration courts and how they operate, also to actual cases shown and decided by arbitration courts.

Prerequisite: MGT 311

MGT 415 Industrial Psychology (3-0-3)

This course is designed to enable the student to understand the fundamentals of human relations, the forces involved in group dynamics, the importance of psychological testing, counseling and guidance, interviewing techniques, and an understanding of the use and interpretation of Statistical analysis.

Prerequisite: MGT 301

MGT 420 Materials Management (3-0-3)

Traditionally a business firm is looked at from a vertical, i.e. functional, point of view separating finance from manufacturing, which in turn is separated from marketing. Instead, this course is concerned with the materials throughout the entire operating system, i.e., it takes a horizontal look at input, throughput and output. Topics that are discussed include purchasing and supply (procurement), monetary management, physical distribution, and logistics.

Prerequisites: MGT 301, OM 210

MGT 425 Organizational Changes & Development (3-0-3)

This course is intended to provide students with the knowledge, skills, and techniques they will need as chance agents to facilitate and manage change in organization. Topics include team building, sensitivity training, survey feedback, system four organization, managerial grids, etc.

Prerequisite: MGT 301

MGT 430 International Management (3-0-3)

The study and analysis of management in different environments. Emphasis is placed on comparative management (differences in managing in selected countries).

Prerequisite: MGT 301

MGT 440 International Business (3-0-3)

Analysis of problems encountered in the management of multinational corporations. Examination of business opportunities in the international forum and influences of the foreign environment on the firm's strategy, structure, and management style.

Prerequisites: MGT 301, MKT 301, FIN 301

MGT 448 Project Feasibility Analysis (in Arabic) (3-0-3)

The utility of business management principles and techniques in Arabic. Includes preparation of a critical project feasibility study from the Kingdom, and discussion of contemporary issues in business and economics.

Prerequisites: FIN 301, MGT 301, MKT 301

MGT 449 Business Policy (3-0-3)

Case study policy-making from a general management point of view. Emphasis is on problem analysis, the decision-making process, administration and control, and continuous reappraisal of policies and objectives. Saudi business cases and computer simulations are used.

Prerequisites: Last Semester, Senior Standing

MANAGEMENT INFORMATION SYSTEMS

MIS 105 Introduction To Computer Applications (2-2-3)

Introduction to computer components. Hands-on exposure to PC-based applications including word processing, spreadsheet, statistics, database, electronic mail, business graphics, and introduction to internet.

Suggested lab work (Closed Lab)

Programming assignments to exercise the use of various tools taught in the course. This may include solving business problems and/or implementing mini-projects. These include spreadsheet, data base, and statistical tools. Mainly, students will use MS Office software.

Prerequisite: None

MIS 215 Principles of Management Information Systems (3-0-3)

A survey of MIS concepts. Information systems for operational, tactical and strategic management in the various functions of an organization. Overview of end-user computing.

Prerequisite: MIS 105

MIS 300 Fundamentals of Electronic Commerce (2-2-3)

E-Commerce fundamentals, E-Commerce business models; infrastructure; electronic payment systems and E-commerce security; Development, implementation, marketing and managing E-Commerce applications. Benefits and limitations, legal, ethical and global issues.

Prerequisite: MIS 215

MIS 301 Business Systems Analysis & Design I (3-0-3)

Fundamentals of systems development life cycle. Basic systems analysis and design tools: data dictionary, data flow diagrams, process specifications, entity-relationship diagrams, and CASE tools. Emphasis on front-end phases of SDLC. Practice of analysis and design through case studies.

Prerequisite: MIS 215 or Departmental Approval.

MIS 302 Business Applications Development (3-0-3)

Introduction to COBOL language fundamentals, designing structured programs using basic structured and modular programming techniques. Developing high level programs: control break processing, data validation techniques, interactive processing, array processing & table handling, and file maintenance. The course will also provide exposure to program test planning and test data design.

Prerequisite: ICS 102

MIS 311 Business Data Management (3-0-3)

Database versus file processing environments. Data resource management. Database support for various levels of management. Relational Database model. Conceptual data modeling. Logical database design. Integrity and security. Database languages including SQL and QBE. Data and Database administration.

Prerequisite: ICS 201

MIS 345 Information Technology in Society (3-0-3)

Information Technology (IT) in today's world. Evaluation of the impact on individuals, organizations, society, and quality of life. Social and ethical considerations including privacy, piracy, accuracy, accessibility, and dysfunctional behavior. Legislative responsibilities, computer crimes, copyrights, patents, and other legal issues.

Prerequisites: MIS 215, Junior Standing

MIS 351 Cooperative Work (0-0-9)

A period of 28 weeks of business employment for MIS students to get practical training in the area of management information systems with reputable business organizations and as approved by the Department. Each student is evaluated on his performance on the job and is required to submit progress reports and a formal report about his coop work experience. The final report will be evaluated by a team of three faculty members, including the advisor.

Prerequisites: Senior Standing, ENGL 214, MIS 301, MIS 311

MIS 401 Business Systems Analysis & Design II (3-0-3)

Development of computerized business systems using CASE tools, DBMS, 4GL and/or application generators. Project management techniques. Emphasis on back-end phases of SDLC. Team projects to develop real business systems.

Prerequisite: MIS 301

MIS 410 Management Support Systems (2-2-3)

Introduction to Management Support systems (MSS): Decision Support Systems, Group Decision Support Systems, and Executive Information Systems. Expert Systems and Neural Networks. Tools and Techniques for developing and using these systems. Integration of MSS. Team projects to develop MSS.

Suggested Laboratory Work (Closed Lab)

Work on different tools used in developing management support systems. Use of tools such as Access, Excel, Expert Choice, IFPS, VP Expert, Exsys, EIS Commander, and Flagship. By using one or more of these tools, students will develop prototypes systems in one or more of the following areas: decision support system, expert system, executive support system, and natural language processing system.

Prerequisites: MIS 301, MIS 311

MIS 411 Database Applications Development (3-0-3)

Business programming in a database environment. Client/server concepts and applications. Multi-user system considerations including concurrency control and security. Program efficiency, program test planning and test data design, program maintenance, and online documentation.

Prerequisites: MIS 311

MIS 415 Group Decision Support Systems (2-2-3)

Concepts and supporting technologies for group decision making activities. Topics include conceptual foundations of group decision process and techniques, structure of GDSS, level of GDSS support, technologies of GDSS, organizational and individual impact of decision making in groups. Team work approach will be applied to projects and class assignments.

Suggested Laboratory Work (Closed Lab)

Work on different tools used in developing and using group decision support systems. Student will practice group decision processes in actual specialized lab. Students will also develop prototypes for an actual GDSS using a specialized lab software, such as Lotus Notes.

Prerequisite: MIS 410

MIS 420 Computer Control and Audit (3-0-3)

Auditing of computer-based information systems. Audit environment and information systems controls. Theory of internal control and application of audit procedures in a computerized environment. Techniques for evaluating applications, data integrity, general operations, security, systems software and maintenance.

Prerequisites: ACCT 300, Senior Standing

MIS 425 End-User Computing (3-0-3)

Fundamentals of managing End User Computing (EUC) activities and resources. Technological, organizational, and behavioral issues related to EUC. Potential benefits, growth, problems and risks. Use of information center to promote, support, control, and manage EUC.

Prerequisites: MIS 215, MGT 301

MIS 490 Information Resources Management (3-0-3)

Theories and practices in the management of organizational information systems resources. Frameworks for introduction, evolution, and assimilation of information systems into an organization. Roles of IT and roles of people using, developing, and managing systems. Global concepts of IT. Societal and ethical issues related to IS design and use.

Prerequisites: MIS 401, COE 353, Senior Standing

MIS 499 Topics in MIS (3-0-3)

Coverage of contemporary and advanced MIS topics, such as data management, information processing, decision making, and social implications of information technology.

Prerequisites: Senior Standing, Departmental Approval.

MARKETING

MKT 301 Principles of Marketing (3-0-3)

The basic principles of marketing are introduced. Material covered includes marketing's role in society and the firm, marketing concept, market segmentation and target marketing, market measurement, and the elements of the marketing mix, including product planning, physical distribution, promotion, personal selling, mass selling, and price setting.

Prerequisite: ECON 202

MKT 320 Sales Management (3-0-3)

Fundamentals of personal-selling and sales management are introduced. Formulating sales program objectives, establishing a sales organization, assigning sales territories and sales quotas, and its implementation through personnel selection, training, motivation, and compensation are extensively covered. Understanding buying behavior and selling role in marketing strategy. Computerized models of evaluation and control for the sales program are introduced.

Prerequisite: MKT 301

MKT 330 Advertising and Sales Promotion (3-0-3)

The role of advertising and sales promotion in the marketing program is thoroughly examined. Discussions center on the communication process and consumer decision-making. Other topics covered include organization of advertising activities, determination of objectives and budgets, creation of the message, selection of media, and evaluation and control of the advertising and sales promotion efforts.

Prerequisite: MKT 301

MKT 340 Retail Management (3-0-3)

A comprehensive examination of retail operations planning, buyer behavior, and Facilities planning. The course covers store location, store design and layout, staffing, merchandise planning and control, pricing and promotion, credit and other services, and financial management of the retail enterprises.

Prerequisite: MKT 301

MKT 345 Marketing Research (3-0-3)

An introduction to the principles and applications of marketing research. The role of marketing research, types of research, and the research process are thoroughly examined. Types of data, research designs, sampling methods, questionnaire design, field work, basic data analysis, and effective presentation of findings are extensively discussed. Computer assisted interviewing, sampling and analysis are emphasized. It includes an empirical market research project.

Prerequisites: MKT 301, STAT 212

MKT 351 Marketing Cooperative Work (0-0-9)

Twenty-eight weeks of practical training in marketing or in a related area in a selected organization. The training program must be approved and the student's progress during his coop period must be monitored. The student is expected to write a coop report under the supervision of a faculty member in accordance with university regulations.

Prerequisite: Senior Standing

MKT 375 Services Marketing (3-0-3)

It focuses on the process of planning, organizing, and implementing the marketing effort in service organizations. It includes a detailed discussion of the distinctive aspects of services marketing, the development of a framework for understanding and positioning service organization in the marketplace, and the management of demand and customer mix of service organizations.

Prerequisite: MKT 301

MKT 400 Industrial Marketing (3-0-3)

A systematic discussion of the strategic factors to be considered in the marketing of trial and technical goods and services. In-depth examinations of industrial markets, complex nature of industrial buying behavior, methods of industrial market research, and developing industrial marketing strategy are provided. In addition, roles of product strategy, personal selling, promotion, distribution, and pricing strategies in industrial marketing are examined.

Prerequisite: MKT 301

MKT 410 Consumer Behavior (3-0-3)

An introduction to the principal concepts in consumer behavior and consumer decision-making. A thorough examination is made of such conventional areas and topics in consumer behavior as needs and motivation, personality, consumer psychographics, perception, learning, attitudes, and values. The consumer's decision-making process is covered. Other factors which influence consumer behavior such as reference groups, family, social class, and culture are discussed.

Prerequisite: MKT 301

MKT 420 International Marketing (3-0-3)

The process of identifying consumer needs and preferences across international boundaries and matching the abilities of the enterprise to serve these needs through adaptation strategies. A systematic study of the cultural, societal, political, legal, and economic environments of planned target markets. Marketing strategy planning for an effective program in international marketing for product, price, promotion, and distribution decisions are rigorously covered.

Prerequisite: MKT 301

MKT 450 Marketing Management (3-0-3)

Analytical integration of tools, factors, and concepts used by marketing management in analyzing, planning, establishing strategies and policies, and solving marketing problems. Other material covered includes strategies and approaches necessary for sound marketing management decisions in the price, promotion, demand management, distribution channels, and product development activities of profit and non-profit organizations.

Prerequisite: MKT 301

OPERATION MANAGEMENT

OM 210 Operations Management (3-0-3)

Production systems; capacity and facility location problems; layout planning; forecasting; production scheduling and control; inventory and quality control.

Prerequisite: STAT 211

OM 310 Quantitative Methods for Management (3-0-3)

Decisions theory, linear programming, simplex method and duality. Inventory control under certain and uncertain demand. Network models including traveling salesman problem, maximal flow problem, and PERT/CPM networks

Prerequisite: OM 210

OM 405 Production Planning and Control (3-0-3)

Facilities location and design. Job design, line balancing, aggregate planning, project planning, project management, operations, scheduling, inventory management.

Prerequisite: OM 310

OM 407 Quality Control and Reliability (3-0-3)

Analysis and design of quality control systems and procedures. Topics to include inspection policies, sampling, reliability engineering, and product testing.

Prerequisite: STAT 211

OM 420 Operation Research (3-0-3)

Integer programming, dynamic programming, simulation, queuing theory, Markov process.

Prerequisite: OM 310

PHYSICAL EDUCATION

PE 001 Preparatory Physical Education I (0-2-1)

PE 002 Preparatory Physical Education II (0-2-1)

A sequence of courses, introducing at a basic level the majority of sports courses taught at KFUPM: athletics, badminton, basketball, fencing, football, handball, squash, swimming, table tennis, tennis, volleyball, tae kwon do, karate, judo, weight training, weight control and physical fitness.

Each introduction lasts for five weeks.

PE 101 Physical Education I (0-2-1)

PE 102 Physical Education II (0-2-1)

PE 201 Physical Education III (0-2-1)

PE 202 Physical Education IV (0-2-1)

A required course sequence commencing in the freshman year and completed with no more than one semester for each course.

Students take semester-long courses and study one sport or two each semester and choices may be made from sports offered in the Preparatory Year Program including fencing, judo, karate, tae kwon do, weight training, weight control and physical fitness.

Students may train and compete at a higher level by joining the team squads from which representative selection is made.

PETROLEUM ENGINEERING

PETE 201 Introduction to Petroleum Engineering (1-0-1)

An overview of the petroleum industry. A brief introduction to modern exploration, production, and processing operations. Highlights of the petroleum industry: its history, its technical achievements, its role in the global-economy, and its future prospects.

Prerequisite: None

PETE 203 Drilling Engineering (3-3-4)

Description of rotary drilling systems and operations. Casing design, landing and cementing practices. Optimization of drilling parameters, well control and drilling hydraulics. Directional drilling, horizontal drilling, deviation control, offshore drilling and equipment, drilling problems and economics. Laboratory sessions cover drilling fluids and cement formulation and testing. Simulation of drilling operations and control.

Prerequisite: PETE 201

PETE 204 Reservoir Rock Properties (2-3-3)

Basic petrophysical properties of reservoir rocks including porosity, permeability, fluid saturation, electrical conductivity, capillary pressure, and relative permeability. Laboratory measurement of the reservoir rocks characteristics mentioned above.

Co requisite: PETE 201

PETE 205 Petroleum Fluid Properties (2-3-3)

Study of the phase behavior of hydrocarbon systems as related to petroleum recovery. Ideal and real gas behavior, single and multicomponent two-phase systems, properties of reservoir fluids under various conditions of pressure and temperature. Laboratory tests on reservoir fluids.

Prerequisite: ME 203

PETE 301 Reservoir Engineering (3-0-3)

Derivation of the general material balance equation. Estimation of water influx using steady and unsteady-state models for radial and bottom water drive reservoirs. Application of the general material balance equation for determining initial oil in place, gas cap size and water influx constant under different drive mechanisms. Decline curve analysis.

Prerequisite: PETE 204, PETE 205

PETE 302 Subsurface Production Engineering (3-0-3)

Study of the fundamentals and applications of completion and workover operations including various completion designs, reservoir and mechanical considerations, basic tubing design, subsurface equipment, completion and workover fluids, perforating, stimulation, sand control and remedial cementing. Horizontal well completion technology. Laboratory sessions involve actual completion and workover problem solving and demonstration of the design and operation of basic completion and control equipment.

Prerequisite: PETE 203

PETE 303 Well Logging (3-3-4)

Comprehensive study of modern well logging methods, open hole and cased hole log interpretation methods. Production logging. Design of logging programs and examples of applications.

Prerequisite: PETE 204

PETE 306 Well Testing (2-0-2)

Derivation of the diffusivity equation for slightly compressible fluid. Solution of the diffusivity equation using Boltzman transformation. Pressure drawdown and buildup tests. Injection and fall-off tests. Average reservoir pressure. Reservoir limit tests. Type curve matching. Pulse and drill stem tests. Test design and instrumentation.

Prerequisite: PETE 301

PETE 350 & 351 Cooperative Work (0-0-9)

A continuous period of 28 weeks to be spent in the industry to acquire practical experience in different areas of petroleum engineering. During this training period, the student gains in-depth exposure and appreciation of the petroleum engineering profession. The student is required to write a concise report, summarizing his experience and discussing the engineering work he was engaged in and give a presentation of his work.

Prerequisites: ENGL 214, PETE 302
A minimum of 85 credit hours should be completed.

PETE 399 Summer Training (0-0-0)

A student of junior standing spends a period of eight weeks in the summer working in the industry to gain exposure to and appreciation of the petroleum engineering profession. On-the-job training can be acquired in any field of petroleum engineering. On completion of the training, the student is required to write a brief report on his work.

Prerequisites: ENGL 214, PETE 302
A minimum of 85 credit hours should be completed.

PETE 400 Special Topics (3-0-3)

The course will cover a special topic in one of the areas of the petroleum engineering discipline. Topics will be selected according to the faculty expertise, the students' interests and enrollment.

Prerequisite: Consent of the Department.

PETE 401 Reservoir Description (3-0-3)

Principles and techniques of petroleum reservoir descriptions. Subsurface data from geological and engineering sources. Univariate and bivariate description. Estimation techniques. Reserve estimation methods.

Prerequisites: PETE 303, STAT 319

PETE 402 Reservoir Simulation (2-3-3)

Basic theory and practices in reservoir simulation. Formulation of equations governing single phase and multi-phase flow in porous media. Introduction to finite difference methods and solution techniques. Solutions of systems of linear equations. Applications using a black oil simulator. Laboratory sessions covering examples of applications using simulation packages.

Prerequisites: PETE 301, SE 301

PETE 404 Production Facilities Design (3-3-4)

Overview of petroleum surface operations including types, applications, and design of two-and three-phase separators; oil treatment equipment; vapor recovery processes; gas treatment processes and equipment; produced-water treatment and disposal; flowlines; gathering lines and transportation; oil, water and gas metering. Laboratory sessions cover design principles of production facilities leading to the complete design of one basic production unit.

Prerequisite: CHE 204

PETE 405 Water Flooding (2-0-2)

Basic theoretical and design aspects of waterflooding processes. Review of capillary phenomena and relative permeability characteristics of reservoir rocks. Theory of immiscible displacement including piston-like and frontal advance mechanisms. Injectivity analysis and performance prediction of linear and pattern flooding. Heterogeneous reservoirs. Problems encountered in water flooding projects.

Prerequisite: PETE 301

PETE 406 Improved Oil Recovery (3-0-3)

Introduction to current techniques of improved oil recovery. Principles of thermal recovery, chemical flooding, and miscible gas displacement methods, performance prediction. Advantages and drawbacks of each displacement method. Selection criteria for target reservoirs.

Prerequisite: PETE 301

PETE 407 Petroleum Economics (3-0-3)

Introduction to the standards and practices of economic analysis in the petroleum industry. Brief review of the principles of economic evaluation, typical decision making situations including risk analysis, alternative reservoir depletion schemes utilizing decline curve analysis, secondary stage development options, and various improved oil recovery methods. Analysis involves reserve estimation and forecasting of capital investment, operating cost, and manpower requirement.

Prerequisite: Senior Standing for PETE and Earth Sciences Students

PETE 408 Seminar (0-2-1)

Lectures are presented on subjects related to preparation of technical presentations, use of visual aids, and platform and vocal techniques. Each student is then required, as a practice, to prepare and deliver a presentation on selected subjects. Each presentation is discussed and methods for improvements are highlighted. Finally, students are evaluated on their final presentations.

Prerequisite: Junior Standing

PETE 409 Artificial Lift (3-0-3)

Equipment and techniques of modern production operations. Analysis of inflow performance, multiphase flow and well performance. Artificial lift methods and applications including gas-lift, electric submersible pumping, and sucker rod pumping. Overview of off-shore production operations.

Prerequisite: PETE 302

PETE 410 Natural Gas Engineering (3-0-3)

Estimation of gas reserves using different forms of the general material balance equation for gas reservoir. Prediction of gas reservoir performance subject to water drive. Decline curve analysis. Derivation of the basic flow equations for real gas and their solutions and applications for analyzing gas well testing. Analysis of hydraulically fractured gas well tests. Gas field development. Storage of natural gas.

Prerequisites: PETE 301, PETE 306

PETE 411 Senior Design Project (0-9-3)

Experimental and/or theoretical approaches with possible application of computer techniques to integrate various components of the curriculum in a comprehensive engineering design experience. Design of a complete project including identification of a problem, formulation of design, preparation of specifications, and consideration of alternative feasible solutions. The work will be supervised by a faculty member. The student has to submit a detailed final project report and present his work.

Prerequisites: Senior Standing, ENGL 214 and approval of the advisor.

PHYSICS

PHYS 101 General Physics I (3-3-4)

First course of calculus-based, general physics sequence. Topics covered include: particle kinematics and dynamics; conservation of energy and linear momentum; rotational kinematics; rigid body dynamics; conservation of angular momentum; simple harmonic motion; gravitation; the static and dynamics of fluids.

Co requisite: MATH 101

PHYS 102 General Physics II (3-3-4)

A continuation of PHYS 101. Topics covered include: wave motion and sound; temperature, first and second law of thermodynamics; kinetic theory of gases; Coulomb's law; the electric field; Gauss' law; electric potential; capacitors and dielectrics; D.C. circuits; the magnetic field; Ampere's and Faraday's laws.

Prerequisite: PHYS 101
Co requisite: MATH 102

PHYS 133 Principles of Physics (3-3-4)

This is a non-calculus based physics course. Topics include: Particle kinematics and dynamics, work, energy, and power. Kinetic theory of gases. Temperature, first and second laws of thermodynamics. Heat transfer. Wave motion and sound. Electricity and magnetism. Light and optics.

Prerequisite: None

PHYS 201 General Physics III (3-3-4)

A continuation of PHYS 101 and 102. Topics covered include: inductance; magnetic properties of matter, electromagnetic oscillations and waves; geometrical and physical optics. Relativity, introduction to quantum physics, atomic and molecular physics, nuclear physics, particle physics and cosmology.

(For non-Physics Majors)

Prerequisites: PHYS 102, MATH 102

PHYS 203 Electrical and Magnetic Properties of Materials (3-0-3)

The course material includes the following topics: Concepts of Modern Physics: photons, electronic structure of isolated atoms; atoms bonding, crystal structure, energy bands in solids, insulators, semiconductors and conductors; electrons and holes in semiconductors, drift and diffusion, mobility, recombination and lifetime, conductivity; PN junctions, I(V) characteristic, applications; photo detectors, Light emitting diodes, Solar-cell, Bipolar transistor, MOSFET and JFET, Lasers, Magnetic Properties, Use of computer to simulate the effect of various physical properties of semiconductors on the I(V) characteristics of devices.

Prerequisite: PHYS 102

PHYS 211 Optics (2-3-3)

An introductory course in Geometrical and Physical Optics. Topics covered include: nature and propagation of light; image formation-paraxial approximation; optical instruments; superposition of waves; standing waves beats; Fourier analysis of harmonic periodic waves and wavepackets; two-beam and multiple-beam interference; polarization; Fraunhofer and Fresnel diffraction; holography; lasers.

Prerequisite: PHYS 102

PHYS 212 Modern Physics (3-3-4)

Special relativity; quantum mechanics: the particle and wave aspects of matter; quantum mechanics in one and three dimensions, quantum theory of the hydrogen atom; atomic physics; statistical physics; selected topics in solid state physics; nuclear physics.

(Not open for credit to students who have taken PHYS 201).

Prerequisite: PHYS 102

PHYS 215 Introduction to Astronomy (3-0-3)

An elementary introduction to astronomy. Topics covered include: Celestial mechanics; the solar system; stellar measurement; stellar magnitudes and spectra; galaxies; cosmology.

Prerequisite: PHYS 102

PHYS 234 The Physics of How Things Work (3-0-3)

A sophomore level course, free elective for scientists and engineers. It emphasizes on developing physical intuition. The chosen topics are related to a variety of fields that may include: materials engineering, nuclear physics, aerodynamics, energy, electronics, communications, biological systems, terrestrial and celestial natural systems.

Prerequisite: PHYS 102

PHYS 261 Energy (3-0-3)

A survey of energy sources and resources; a quantitative evaluation of energy technologies; the production, transportation, and consumption of energy. Topics covered include: Nuclear energy; fossil fuels; solar energy; wind energy; hydropower; geothermal energy; MHD; energy storage and distribution; automotive transportation.

Prerequisite: PHYS 102

PHYS 271 Introduction to Special Relativity (3-0-3)

Topics covered include: Properties of space-time; the Lorentz transformation; paradoxes; four vector formulations of mechanics and electromagnetism.

Prerequisite: PHYS 102

PHYS 301 Classical Mechanics I (3-0-3)

Topics covered include: Newton's laws of motion and conservation theorems, oscillations; non-linear oscillations and chaos; Computational study of forced oscillatory motion and nonlinear motion gravitation; Hamilton's variational principle – Lagrangian and Hamiltonian Dynamics; Central force; Motion in a non-inertial reference frame.

Prerequisites: MATH 202, PHYS 101

PHYS 302 Classical Mechanics II (3-0-3)

Topics covered include: Planetary motion; dynamics of a system of particles; motion in a non-inertial reference frames; dynamics of rigid bodies; coupled oscillations; continuous systems; special theory of relativity; computational study of coupled oscillatory motion and Euler's equations.

Prerequisite: PHYS 301

PHYS 303 Experimental Physics I (2-3-3)

An introductory course in electronic and the methods of experimental physics. The physics of semi-conductors; junction transistor; amplifiers; feedback circuits; oscillators; nonlinear devices; digital electronics; digital logic; counters and registers; analog-to-digital converters.

Prerequisite: PHYS 302

PHYS 304 Experimental Physics II (1-3-2)

Method of experimental physics. Analysis of experimental data. Relationship between theory and experiment. Curve fitting processes; fundamental of the theory of statistics; evaluation of experimental data; estimation of errors. Selected experiments in physics will be performed in conjunction with lecture material.

Prerequisite: PHYS 303

PHYS 305 Electricity and Magnetism I (3-0-3)

Introduction to classical electromagnetic theory based on vector calculus. Electrostatics; Laplace and Poisson's equations; Dielectric media and magnetostatics fields in matter; Computer will be used to solve electromagnetic problems.

Prerequisites: PHYS 102, MATH 202

PHYS 306 Electricity and Magnetism II (3-0-3)

A continuation of Physics 305. Topics covered include electrodynamics; electromagnetic waves; electromagnetic radiation and relativity.

Prerequisite: PHYS 305

PHYS 307 Laser Molecular Spectroscopy (3-0-3)

Introduction to lasers; laser in time-resolved and in frequency-resolved spectroscopy; basic elements of spectroscopy; rotational, vibrational, and electronic spectroscopy.

Prerequisite: PHYS 212 or PHYS 201

PHYS 315 Astrophysics (3-0-3)

Basic methods of obtaining information about stars: stellar positions, size, luminosity, spectra. Methods of deducing stellar parameters from those observations. Newtonian gravitation, spectral analysis, Doppler shift, interaction of matter and radiation. Modeling the structure of stars. Pulsating stars, novae and supernovae. Collapsed stars (white dwarfs, neutron stars, and black holes). Stellar systems and clusters, Galaxies, systems of galaxies, filament and voids.

Prerequisite: PHYS 212 or PHYS 201

PHYS 323 Physics of Nuclear Reactors (3-0-3)

Nuclear reactions and fission; the multiplication factor and nuclear reactor criticality; homogeneous and heterogeneous reactors; the one-speed diffusion theory; reactor kinetics; multi group diffusion theory; Computer will be used in simple criticality calculations and reactor kinetics.

Prerequisites: PHYS 212 or PHYS 201; MATH 202

PHYS 353 Radiation and Health Physics (3-3-4)

A survey course in safety from ionizing radiation. Topics covered include: properties of ionizing radiation; interaction of radiation with matter, detection methods, dosimetry, biological effects of radiation, external and internal radiation protection.

Prerequisite: PHYS 212 or PHYS 201

PHYS 365 Introduction to Medical Physics (3-0-3)

Topics: biomechanics, sound and hearing, pressure and motion of fluids, heat and temperature, electricity and magnetism in the body, optics and the eye, biological effects of light, use of ionizing radiation in diagnosis and therapy, radiation safety, medical instrumentation.

Prerequisite: PHYS 201 or PHYS 212

PHYS 371 Methods of Theoretical Physics (3-0-3)

A one-semester course of mathematical topics chosen because of their importance and usefulness to physics. Topics covered may include functions of a complex variable; contour integration; partial differential equations; special functions; numerical techniques.

(Not open for credit to students who have taken MATH 301)

Prerequisite: MATH 202

PHYS 373 Introduction to Computational Physics (2-3-3)

Computer simulation of physical systems. Topics covered include: simulation techniques; programming methods; comparison of ideal and realistic systems; limitations of physical theory; behavior of physical systems.

(Not open for credit to students who have taken MATH 321 or SE 301).

Prerequisites: PHYS 212, ICS 101 or ICS 102 or ICS 103

PHYS 399 Summer Training (0-0-2)

Students are required to spend one summer working in industry prior to the term in which they expect to graduate. They will be required to write a report and present it in a seminar at the Department.

PHYS 401 Quantum Mechanics and Applications I (3-0-3)

This course deals with the fundamentals of non-relativistic quantum mechanics. Failures of classical physics in describing microscopic phenomena. Mathematical tools and basic postulates of Quantum Mechanics. Matrix formulation of Quantum Mechanics. The Schrödinger equation and its application to various one-dimensional systems. Orbital angular momentum. Applications of Quantum Mechanics to the study of three-dimensional systems. Wavefunctions for some of the above systems and related expectation values obtained via computer packages.

Prerequisite: PHYS 301

PHYS 402 Quantum Mechanics and Application II (3-0-3)

This course is continuation of Physics 401. Addition of angular momenta. Time-independent perturbation theory. The variational method and its applications. Schrödinger, Heisenberg and Interaction pictures. Time-dependent perturbation theory. Scattering Theory. Identical particles systems. Approximate solutions of several Schrödinger equations obtained via computer packages.

Prerequisite: PHYS 401

PHYS 403 Senior Physics Laboratory (0-6-2)

A number of experiments selected both for their importance in the historical development physics and their educational value in presenting the techniques used in experimental physics correlation of the experimental work with theory are stressed.

Prerequisite: PHYS 304

PHYS 404 Physics Project Laboratory (0-6-2)

A laboratory course, which offers an opportunity for student to carry out experimental projects, based on their special interests and ideas to study physical phenomena. Faculty help students to determine the feasibility of proposed projects.

Prerequisite: Senior Standing

PHYS 409 Physics Seminar (1-0-1)

Students are given the opportunity to present and attend lectures on topics of current research interest.

Prerequisite: Senior Standing

PHYS 411 Advanced Optics (3-0-3)

An advanced study of Physical Optics. Topics covered are: Fourier transforms and applications, theory of coherence, interference spectroscopy, auto correlation function, fluctuations, optical transfer functions, diffraction and Gaussian beams, Kirchhoff diffraction theory, theory of image formation, spatial filtering, aberrations in optical images, interaction of light with matter, crystal optics, nonlinear optics, lasers.

Prerequisite: PHYS 211 and PHYS 306

PHYS 412 Physics of Lasers (3-0-3)

Topics covered are: Stimulated emission and coherence; population inversion; Gaussian beam propagation; optical resonators and cavity modes; stability criteria; unstable resonators; phase conjugate resonators; oscillation threshold and gain; line broadening; gain saturation; density matrix formulation and semi-classical theory of laser; lasers without inversion; Q-switching, mode-locking and pulse compression.

Prerequisite: PHYS 211 and PHYS 212

PHYS 416 Cosmology and the Early Universe (3-0-3)

Distance scale of the universe. Hubble expansion and modeling by non-Euclidean spaces. The steady state models: Einstein, De Sitter, Lemaitre. Continuous creation models: Bondi, Hoyle-Harlikar. The relativistic evolution equation and Friedmann's expanding models. Cosmology and nucleosynthesis. Gamow's big bang model. Phase transitions and the thermal history of the universe. Problems of the standard model of cosmology: horizons and structure formation. Solution by inflationary models using grand unified field theories, their problems and the revised inflationary scenarios.

Prerequisites: PHYS 212 or PHYS 201, Math 202

PHYS 422 Nuclear and Particle Physics (3-0-3)

Study of Nuclear and Particle Physics with the help of Quantum Mechanics. Topics covered include: nuclear properties, forces between nucleons, nuclear models, radioactive decays and detectors, nuclear reactions, accelerators. Fundamental particles, forces, the subnuclear zoo. Two-body bound and scattering problems, nuclear forces, models, etc. studied both analytically and via computer packages.

Prerequisite: PHYS 401

PHYS 430 Thermal and Statistical Physics (4-0-4)

Statistical physics, developing both thermodynamics and statistical mechanics simultaneously. Concepts of temperature, laws of thermodynamics, entropy, thermodynamic relations, free energy. Applications to phase equilibrium, multicomponent systems, chemical reactions, and thermodynamic cycles. Application of statistical mechanics to physical systems; introduction to treatment of Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac statistics with applications. Computational aspects of free-energy entropy magnetization for various classical and quantum distributions.

Co requisite: PHYS 401

PHYS 432 Introduction to Solid State Physics (3-0-3)

Introductory concepts in crystal diffraction and the reciprocal lattice. Crystal bonding; lattice vibrations; thermal properties of insulators; free electron theory of metals; band theory; semiconductors, introduction to superconductivity. Simple band structure calculations using computer software packages.

Prerequisite: PHYS 401

PHYS 434 Introduction to the Physics of Surface (3-0-3)

A course may be offered in conjunction with current research at the Surface Science Laboratory. Topics covered include: preparation of clean surfaces; experimental methods such as XPS, UPS, Auger, and LEED; thin films; surface states; temperature effects.

Co requisite: PHYS 432

PHYS 435 Superconductivity (3-0-3)

Experiment and phenomenology, the two fluid model. Perfect conductance and electrodynamics of superconductors. Thermodynamics of the phase transition, type I and type II superconductors. Ginzburg Landau phenomenological theory of type II superconductors: coherence length, vortices, Abrikosov vortex lattice, critical fields and vortex flow dynamics. The microscopic theory of BCS and the concept of electron pairing. High T_c superconductivity.

Prerequisite: PHYS 432

PHYS 441 Particle Physics (3-0-3)

Topics covered include: accelerators and detectors; the subnuclear zoo; symmetries and conservation laws; the quark model; the gauge principle.

Prerequisite: PHYS 401

PHYS 442 Relativistic Quantum Mechanics (3-0-3)

Topics covered include: relativistic spin zero particle; the Klein-Gordon equation; relativistic spin one-half particles; the Dirac equation; propagation theory.

Prerequisite: PHYS 402

PHYS 461 Introduction to Plasma Physics (3-0-3)

An introduction to plasmas. Topics covered include: single-particle motions; plasmas as fluids; waves in plasmas; diffusion and resistivity; equilibrium and stability; a simple introduction to kinetic theory; nonlinear effects; controlled fusion.

Prerequisite: PHYS 306

PHYS 493 Selected Topics in Physics (1-3 credits)

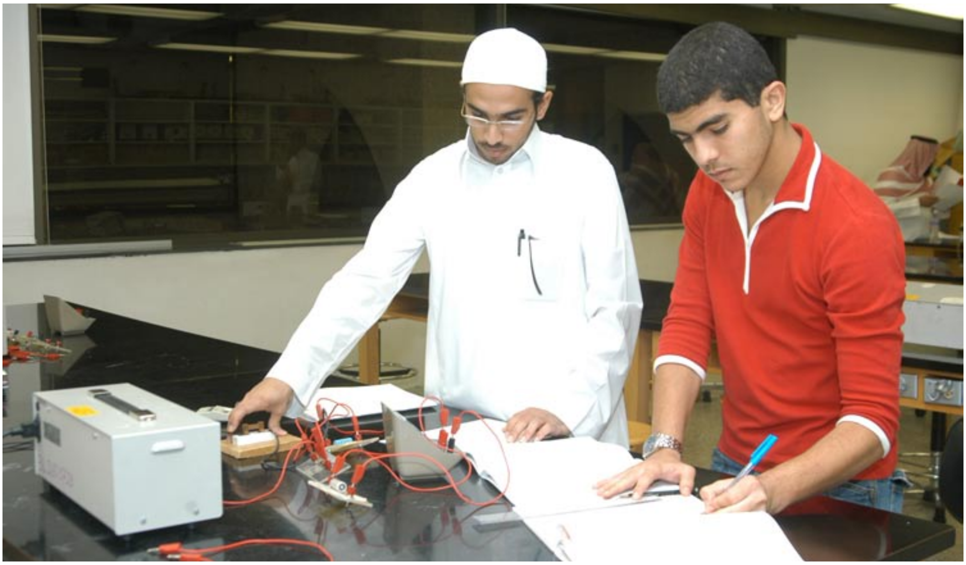
Selected topics of special interest to students. This course may be repeated for credit as an investigation in depth of a single topic or as a survey of several topics.

Prerequisite: Consent of the Instructor.

PHYS 495 Guided Studies (1-0-1)

Guided reading and reporting on special topics by individual students under the guidance of faculty members.

Prerequisite: Consent of the Instructor.



PREPARATORY YEAR PROGRAM

PYP 001 Preparatory Physical Science (2-0-2)

Introduction to Physical Science, measurements, motion, Newton's Laws, momentum and energy, wave motion, the atom, elements and compounds, states of matter, the Periodic Table.

PYP 002 Preparatory Computer Science (0-2-1)

Introduction to compute systems components. Windows operating systems and its utilities. Hands-on exposure to applications software. Introduction to Internet tools and technologies.

PYP 003 University Study Skills (0-2-1)

The course will cover some of the key skills needed by college students including: goal-setting, motivation, time and stress management, classroom skills, preparing for exams, and analytical/critical thinking.

SYSTEMS ENGINEERING

SE 201 Introduction to Systems Engineering (2-0-2)

Introduction to systems engineering, Some Areas of Industrial Engineering/Operations Research : Facility Location, Quality Control, Production Planning, and Linear Programming. Some Areas of Automation/Control: Automation, The Concepts of Automatic Control, Open and Closed Loop Control. Instrumentation, and Use of Computers in Control. Systems Approach to Engineering Problems, Integrating the Above Tools. Applications of Systems Concepts in Engineering.

Prerequisite: MATH 102

SE 205 Engineering Probability and Statistics (2-3-3)

Sample space, events, random variables, conditional probability, some discrete and continuous distributions, functions of random variables, sampling distributions, estimation and test of hypotheses.

Prerequisite: MATH 201

SE 207 Modeling and Simulation (2-3-3)

Principles of modeling, linear and nonlinear lumped parameter dynamic models. Introduction to Laplace transform and system analysis. Linearization of nonlinear models. Modeling of Mechanical and Electrical systems. Transfer function and state space models. Laboratory activities include analog and digital simulation of models.

Prerequisite: SE 201, MATH 260
Co requisite: EE 201

SE 301 Numerical Methods (3-0-3)

Roots of nonlinear equations. Solution of systems of linear and nonlinear algebraic equations. Numerical differentiation and integration. Interpolation, extrapolation, and approximation. Least-squares approximation and regression analysis. Numerical solution of ordinary differential equations. Introduction to error analysis. Engineering case studies.

Note: SE 301 and MATH 321 are equivalent; only one can be taken for credit.

Prerequisite: ICS 101, MATH 201

SE 302 Linear Control Systems (3-3-4)

Linear Systems; time and frequency domain representations; open and closed loop systems; time and frequency domain analysis, stability; root locus; frequency response; compensators, output and state feedback, PID, lag, lead and lead-lag compensators. Design of simple compensators. Laboratory activities include analysis and control of physical processes as well as analog simulation.

Note: SE 302 and EE 380 are equivalent; only one can be taken for credit.

Prerequisite: SE 207

SE 303 Operations Research I (3-3-4)

New description : Modeling in Operations Research. Linear Programming : Simplex Method, Duality, Sensitivity Analysis. Network Models : Shortest Path, PERT/CPM, Maximum Flow Problems, Transportation and Assignment Problems. Elements of Queuing Models. Case Studies.

Prerequisite: SE 201 and SE 205 or STAT 319

SE 305 Optimization Methods (2-3-3)

Unconstrained optimization; necessary and sufficient conditions for unconstrained minima. Derivative-free algorithm. The steepest descent and Newton algorithms. Conjugate gradient and quasi-Newton methods. Constrained optimization: Karush-Kuhn-Tucker conditions for optimality, algorithms for constrained optimization including SUMT, approximation and methods of feasible directions. Case studies in different engineering disciplines.

Prerequisite: SE 301
Co requisite: SE 303

SE 307 Engineering Economic Analysis (3-0-3)

Introduction to concepts of economic decision-making from a cash flow viewpoint. It includes worth analysis, cash flow equivalence, rates of return, replacement analysis, benefit-cost analysis, depreciation and taxes, and projects break-even point, selection, and sensitivity analysis.

Prerequisite: Junior Standing

SE 311 Digital Systems Design (2-3-3)

Binary arithmetic. Boolean algebra. Boolean functions and their simplification. Implementation of Boolean functions using logic gates. SSI, MSI, and LSI chips. Analysis and design of combinational circuits. Sequential logic: flip-flops, counters and registers. Analysis and design of sequential circuits. Basic elements of digital computers: register-transfer, micro operations, instruction codes, processor organization, arithmetic logic unit.

Prerequisite: EE 203

SE 312 Instrumentation (2-3-3)

General measurement systems; static and dynamic characteristics, loading effects, signals and noise; sensing elements, resistive, inductive, electromagnetic, thermoelectric, elastic, piezoelectric, electromechanical, optical etc.; signal conditioning elements, d.c. and a.c. bridges, compensation by linearization, feedback, operational amplifiers, modulation/demodulation; signal processing elements, microcomputer based instrumentation, I/O devices, interfaces, data display units, examples of measurement systems such as flow, pressure, level, temperatures, etc.

Prerequisite: EE 203

SE 315 Signals & Systems (3-0-3)

Basic models of continuous and discrete-time signals and systems. Basic characteristics of signals (energy, power, peak amplitude). Properties of LTI systems. Review of block diagrams. Signal flow graph representations of LTI systems. Fourier analysis of continuous and discrete-time signals and systems. Basic concepts of signal modulation, signal sampling and reconstruction. Basic properties of Z-transforms and concept of transfer function. Basic random signal analysis. Applications of signals and systems concepts to linear control systems and digital signal processing.

Prerequisite: SE 207

SE 320 Quality Control and Industrial Statistics (3-0-3)

Statistical models for quality assurance and control. Control charts for variables and attributes and their applications in process control. Process capability studies. Quality audits. Operating characteristic curves. Acceptance sampling. Statistical analysis and design of integrated quality control systems and computer applications. Cost of quality and the effects of quality on productivity. Case studies in applied quality assurance and control.

Prerequisite: SE 205, or STAT 319
Co requisite: SE 325

SE 322 Manufacturing Technology (3-3-4)

Manufacturing methods of metals and plastics including metal casting, forming, machining, welding, and plastic processing. Laboratory experiments and demonstrations in material behavior, forming, casting, welding and machining operations, metrology and dimensional control.

Prerequisite: ME 215, CE 101

SE 323 Methods Engineering (2-3-3)

History of methods design and work measurement. Methods design. Process analysis. Operation analysis. Introduction to human engineering. Standardization. Work measurement. Predetermined motion-time systems. Standard data. Work sampling. Term project.

Prerequisite: SE 201, SE 205

SE 325 Engineering Statistics (3-0-3)

Review and Extension of Estimation and Test of Hypothesis and their application in Engineering. Introduction to Planned industrial experiments including Analysis of Variance, Regression and Design of Experiments, Taguchi Arrays and their Application in Quality Control.

Prerequisite: SE 205

SE 399 Summer Training (0-0-0)

A continuous period of 8 weeks of training spent in industry to gain exposure and appreciation of the systems engineering profession. Students are required to submit a report and make a presentation about their summer training experience and knowledge gained before receiving a grade of Pass or Fail for the course.

Prerequisite: ENGL 214, Junior Standing, Approval of the Department.

SE 401 Computer Control Systems (2-3-3)

Elements of Computer Control Systems, A/D and D/A, Sampling theorem, signal conditioning, anti-alias filters, sensors, actuators. Feedback, feed forward, cascade and ratio controls. DDC. Control implementation with centralized and distributed computer systems. Architecture, Communication, Sequential Control, programmable controllers. Multi-tasking environment, concurrent languages, software engineering, communication protocols, case studies of distributed control systems and programmable controllers.

Prerequisite: SE 302 or CHE 401 or equivalent.

SE 402 Production Systems and Inventory Control (3-0-3)

Elements of functional organization. Forecasting in production systems. Product and process design considerations. Deterministic and Stochastic Inventory Systems. Production scheduling and line balancing. Capacity planning. Material Requirement Planning (MRP). Computer applications in Production Control. Case studies and applications.

Prerequisite: SE 303

SE 405 Stochastic Systems Simulation (2-3-3)

Basic discrete-event simulation modeling, review of basic probability and statistics, selecting input probability distributions, random-number generators, generating random variables, output data analysis for a single system, validation of simulation models. A simulation language is used to stimulate selected industrial and computer models.

Prerequisite: SE 205 or STAT 319

SE 417 Microprocessors in Automation Systems (3-3-4)

Microprocessor Architecture; basic microprocessor concepts, timing and sequencing, memory and I/O synchronization, data transfers, arithmetic and logic operations. Software development, assembler source programs, assembler directives and pseudo instructions. Interrupts and DMA; interrupt structure, priority, FIFO buffers, time and DMA. Microprocessor interfaces, parallel and serial interfaces, digital/analog conversion, input/output programming. Case-studies of microprocessor based systems in automation.

Prerequisite: SE 311

SE 418 Industrial Process Control (3-0-3)

Review of processes modeling principles, Mass balance, Energy balance, Models of representative processes, Dynamic response, and Linearization. Process identification using time and frequency domain techniques. Time delay, Smith predictor. Basic and advanced control strategies, e.g. PID, Feedforward, Internal model, and supervisory control. Time domain controller design, Controller tuning. Controller design in the frequency domain. Digital control. Case studies.

Prerequisite: SE 302

SE 421 Operations Research II (3-0-3)

Advanced topics in linear programming: Integer programming, dynamic programming. Introduction to Stochastic Processes. Case studies.

Prerequisite: SE 303

SE 422 Facility Layout and Location (3-0-3)

Introduction to facility planning issues. Material handling. Facility location and layout and computer-aided techniques and packages. Storage and warehousing functions, emphasizing quantitative and simulation techniques.

Prerequisite: SE 303

SE 429 Maintenance Planning and Control (3-0-3)

Maintenance organization, maintenance strategy, forecasting maintenance work, maintenance capacity planning, component replacement decision models, maintenance Measurement and standards, scheduling of maintenance, maintenance material control, quality of maintenance jobs, maintenance productivity, maintenance audit, maintenance management information systems, case studies.

Prerequisite: Junior Standing

SE 432 Digital Signal Processing (3-0-3)

Discrete-time signals and systems. Z-transform. Discrete-Fourier transform, Fast-Fourier transform. Digital filter design techniques. Effect of parameter and signal quantization. Power spectrum estimation.

Note: SE 432 and EE 406 are equivalent; only one can be taken for credit.

Prerequisite: SE 315

SE 435 Control Systems Design (2-3-3)

Basic classical design techniques, i.e. lead/lag, PID, Minor loop, etc. Process identification. Introduction to advanced control strategies. Lab projects will include design and hardware implementation.

Prerequisite: SE 401

SE 436 Introduction to Robust Control (3-0-3)

This course introduces the concepts of uncertainty and Modeling Error in Control System Analysis and Design. Review the basic methods and tools of Classical Control. Introduction to H_2, H_∞ Optimal Control and *m* (the Structural Singular Value) Analysis and Synthesis.

Prerequisite: SE 302

SE 438 Instrumentation for Process Control (2-3-3)

Introduction to instrumentation and its role in process control. Analog and digital signal conditioning. Thermal, mechanical, optical, sensors. Analog controllers. Digital controllers. Control loop characteristics. Data acquisition.

Prerequisite: SE 312

SE 439 Special Topics in Automation (3-0-3)

A course in an area of Automation reflecting current theory and practice.

Prerequisite: Permission of the Department.

SE 443 Human Factors Engineering (2-3-3)

Study of human response into man-machine systems. Study of visual displays as a medium of input. Auditory and tactual displays. Human control of systems. Human/computer interface, forms and CRT design, code design. Applied anthropometry and work space. Environments, illumination, atmospheric conditions and noise. Conducting comparison studies.

Prerequisite: Junior Standing

SE 447 Decision Making (3-0-3)

Introduction to structuring decision problems with single and multiple criteria under certainty, uncertainty, risk and conflict. Discrete MCDM: MVT, AHP, TOPSIS and interactive methods; Expert choice. Single and sequential decision problems under uncertainty and risks static and dynamic models. Decision problems under conflict : Game theory. Case studies.

Prerequisite: SE 205 or equivalent.

SE 448 Sequencing and Scheduling (3-0-3)

Scheduling problems, optimality of schedules, single machine processing, basic results, precedence constraints and efficiency, constructive algorithms for flow-shops and job-shops, dynamic programming approaches, branch and bound methods, integer programming formulations, hard problems and NP-completeness. Heuristic methods: general approaches and worst case bounds, simulated annealing approach.

Prerequisite: SE 402

SE 449 Special Topics in Industrial Engineering & Operations Research (3-0-3)

Selected topics in Industrial Engineering and/or Operations Research.

Prerequisite: Permission of the Department.

SE 450 Methodology for Large Scale Systems (3-0-3)

An overview of large scale problems and the framework for Systems Engineering. Graphic tools for Systems Engineering. Interaction matrices and graphs, interpretive structure modeling. Spare matrix and decomposition techniques. Model reduction techniques. Case studies.

Prerequisite: SE 302, SE 303

SE 461 Computer-Aided Manufacturing and Robotics (2-3-3)

High volume discrete parts production systems. Fundamentals of CAD/CAM. Computers in manufacturing. Computer process monitoring. Systems for manufacturing support. Group technology and integrated manufacturing systems. Case studies for robots in industry. CAD/CAM using computer graphics laboratory.

Prerequisite: SE 401 or Consent of the Instructor (Also offered under ME 461)

SE 463 Theory of Stochastic Systems (3-0-3)

Review of basic Probability, Statistical Independence, Conditional Expectation and Characteristic Function. Introduction to Stochastic Processes, Stationarity and Ergodicity. Markov Chains and Poisson Processes. Linear Models of Continuous and Discrete Stochastic Processes. Engineering Applications.

Prerequisite: SE 205 or STAT 319

SE 464 Industrial Information Systems (3-3-4)

Design of Industrial Information Systems in both operational and decision-making modes, special attention to the planning and control activities, engineering and production data control, systems requirements, analysis, design and implementation of typical computerized industrial information systems, including: Manufacturing activity planning, Plant monitoring and control, Inventory management, Plant maintenance system. Case studies involving available packages. Students are required to complete a major project.

Prerequisite: Junior Standing or Consent of the Instructor.

SE 465 Industrial Safety (3-0-3)

The scope of occupational safety: human safety; environmental safety; setting safety standards; safety administration; legal aspects of industrial safety in the Kingdom.

Prerequisite: Junior Standing

SE 470 Digital Computing Techniques I (3-0-3)

Background matrix algebra, measuring vectors and matrices, the singular value decomposition, numerical matrix algebra, theory of linear system of equations, the eigenvalue problem. Variational principles and perturbation theory. Numerical solution of Lyapunov and Riccati equations.

Prerequisite: SE 301

SE 475 Digital Computing Techniques II (3-0-3)

Floating-point computation. Numerical solution of ordinary differential equations; initial value and boundary value problems. Stiffness. Numerical solution of partial differential equations: finite differences, applications to the heat conduction. Laplace, and wave equations. Introduction to the finite elements method. The use of numerical software in modeling and digital simulation. Case studies drawn from various engineering disciplines.

Prerequisite: SE 301

SE 480 Reliability and Maintainability (3-0-3)

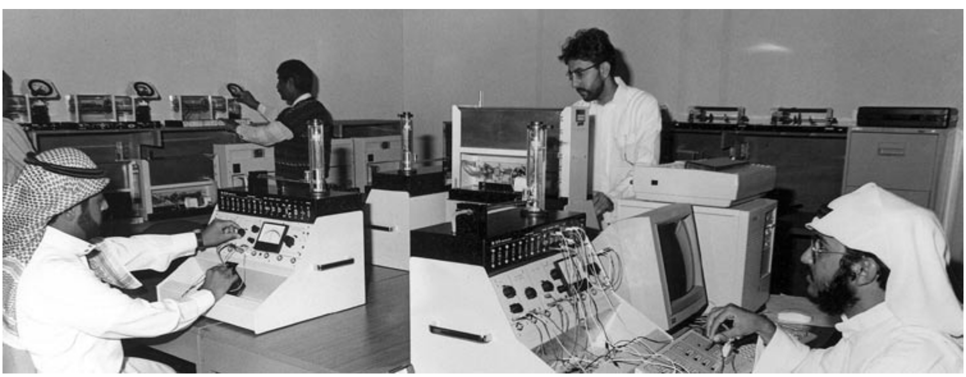
Introduction to reliability engineering, hazard and reliability functions, analyzing reliability data, reliability prediction and modeling, fault tree construction and decision tables, Maintainability, maintenance and availability, reliability improvement.

Prerequisites: SE 205 or STAT 319, Junior Standing.

SE 490 Systems Engineering Senior Project (0-9-3)

A design course that draws upon various components of the undergraduate curriculum. The project typically contains problem definition, analysis, evaluation and selection of alternatives. Real life applications are emphasized where appropriate constraints are considered. Oral presentation and a report are essential for course completion. The work should be supervised by faculty members. Team projects are acceptable wherever appropriate.

Prerequisite: Senior Standing



STATISTICS

STAT 201 Introduction to Statistics (2-2-3)

Descriptive statistics: measures of location, dispersion, and skewness. Probability. Random variables. Normal and Binomial probability distributions. Sampling distribution of the mean. Estimation. Testing hypotheses. Regression and correlation. Applications using statistical packages. (It cannot to be taken for credit with Stat 319 or SE 205).

Prerequisite: MATH 102

STAT 211 Statistics for Business-I (3-0-3)

Data description: Frequency table, histogram, measures of central tendency, scatter diagram and correlation. Probability theory; sampling; probability distributions; point and confidence interval estimation; application for managerial decision. A statistical package will be used.

(The course is not open for credit to Statistics or Mathematics Majors, and cannot be taken for credit with SE 205, STAT 201 and STAT 319).

Prerequisites: MATH 131 and MATH 132

STAT 212 Statistics for Business-II (3-0-3)

Hypothesis testing for means and variances; index numbers and time series; simple linear progression and correlation analysis; multiple regression analysis; the chi-squared and *F* distributions and their applications. A statistical package will be used.

(The course is not open for credit to Statistics or Mathematics Majors, and cannot be taken for credit with SE 205, STAT 201 and STAT 319).

Prerequisite: STAT 211

STAT 301 Introduction to Probability Theory (3-0-3)

Basic classical models of probability. Set functions. Axiomatic definition of probability. Conditional probability and Bayes' theorem. Random variables and their types. Distributions, moments, and moment generating functions. Special discrete and continuous distributions. Random vectors and their distributions. Marginal and conditional distributions. Independent random variables. Functions of random variables. Sums of independent random variables. Weak law of large numbers and the central limit theorem.

Prerequisite: MATH 201

STAT 302 Statistical Inference (3-0-3)

Random sampling and the sampling distributions: *t*, chi-square, and F. Order Statistics. Methods of estimation: maximum likelihood and moments. Properties of a good estimator: unbiasedness, consistency, efficiency, sufficiency, and approximate normality. Testing of simple hypotheses, the Neyman-Pearson lemma. Testing composite hypotheses, uniformly most powerful and likelihood ratio tests. Bayesian Statistics.

Prerequisite: STAT 301

STAT 310 Regression Analysis (3-0-3)

Simple linear regression: The least squares method, parameter estimation, confidence intervals, tests of hypotheses and model adequacy checking. Multiple linear regression, including estimation of parameters, confidence intervals, tests of hypotheses and prediction. Model adequacy checking and multicollinearity. Polynomial regression. Variable selection and model building.

Prerequisite: STAT 201

STAT 319 Probability and Statistics for Engineers and Scientists (2-3-3)

Presentation and interpretation of data, elementary probability concepts, random variables and probability distributions, binomial, Poisson, exponential, Weibull, normal and lognormal random variables. Estimation, tests of hypotheses for the one sample problem. Simple and multiple linear regression, application to engineering problems. The lab session will be devoted to problem solving using statistics software.

(The course is not open for credit to Statistics or Mathematics Majors and cannot be taken for credit with SE 205 or STAT 201).

Prerequisite: MATH 201

STAT 320 Statistical Quality Control (3-0-3)

How control charts work. Control chart methods for attributes and variables. Process-control chart techniques. Process-capability analysis. Acceptance-sampling by attributes and variables.

(It cannot be taken for credit with SE 320).

Prerequisite: STAT 201 or STAT 319

STAT 325 Nonparametric Statistical Methods (3-0-3)

One sample problem, the sign, and Wilcoxon signed rank tests. Two-Sample problem, Wilcoxon rank sum and Mann-Whitney tests. Kruskal-Wallis test for one-way layout. Friedman test for randomized block design. Run test for randomness. Goodness of fit tests.

Prerequisite: STAT 201 or Consent of the Instructor.

STAT 342 Applied Statistics (3-0-3)

Review for descriptive statistics, estimation, and testing hypotheses. Simple linear regression. One way analysis of variance. Multiple regression. Randomized block designs. Factorial experiments. Random and mixed effect models.

(It cannot be taken for credit with STAT 310 and/or STAT 430).

Prerequisite: STAT 201

STAT 355 Demographic Methods (3-0-3)

Scope of demography. Vital events. Demographic survey. History of world population and distribution. Demographic transition. Fertility and its measures. Mortality and its measures. Direct and indirect standardization. The life table. Construction of a life table. Stationary population. Stable population. Migration. Theories of migration. Consequences of migration. Population estimates and projections.

Prerequisite: STAT 201

STAT 361 Operations Research I (3-0-3)

Problem solving and decision making. Linear programming: formulation, the graphical method, the simplex method, sensitivity analysis, and duality. Transportation and assignment problem. Integer programming. Project scheduling PERT/CPM.

(It cannot be taken for credit with SE 303).

Prerequisite: STAT 201 or equivalent course

STAT 365 Data Collection and Sampling Methods (3-0-3)

Concept of data collection. Sample surveys, finite and infinite populations, execution and analysis of samples. Basic sampling designs: simple, stratified, systematic, cluster, two-stage cluster. Methods of estimation of population means, proportions, totals, sizes, variances, standard errors, ratio, and regression.

Prerequisite: STAT 201 or Consent of the Instructor.

STAT 375 Categorical Data Analysis (3-0-3)

2×2 contingency tables, two-way contingency tables, three-way and higher dimensional contingency tables. Loglinear models for contingency tables. Logistic regression. Building and applying loglinear models.

Prerequisite: STAT 201

STAT 399 Summer Training (0-0-2)

Students are required to spend one summer working in industry prior to the term in which they expect to graduate. Students are required to submit a report and make a presentation on their summer training experience and the knowledge gained.

Prerequisites: ENGL 214, Junior Standing and Approval of the Department.

STAT 415 Stochastic Processes (3-0-3)

Basic classes of Stochastic processes. Poisson and renewal processes with applications in simple queuing systems. Discrete and continuous time Markov chains. Birth-Death and Yule processes. Branching models of population growth and physical processes.

Prerequisite: STAT 301

STAT 430 Experimental Design (3-0-3)

Importance of statistical design of experiments. Single-factor and multifactor analysis of variance. Factorial designs. Randomized blocks. Nested designs. Latin squares. Confounding and 2-level fractional factorials. Analysis of covariance.

Prerequisite: STAT 302

STAT 435 Linear Models (3-0-3)

Review of multiple regression. The general linear model. Quadratic forms. Gauss- Markov theorem. Multivariate normal distribution. Computational aspects. Full rank models. Models not of full rank. Computer applications.

Prerequisite: STAT 310

STAT 440 Multivariate Analysis (3-0-3)

Introduction to multivariate analysis. Multivariate normal distribution theory. Distribution of the sum of product matrix. Inference about the parameters of the multivariate normal distribution. Comparison of means. Linear models. Principal components. Factor analysis. Classification and discrimination techniques.

Prerequisite: STAT 310

STAT 460 Time Series (3-0-3)

Examples of simple time series. Stationary time series and autocorrelation. Autoregressive moving average processes. Modeling and forecasting with ARMA processes. Maximum likelihood and least squares estimator. Nonstationary time series.

Prerequisite: STAT 301

STAT 461 Operations Research II (3-0-3)

Inventory models. Waiting line models. Decision Analysis. Multicriteria decision problem. Markov process. Dynamic programming. Calculus-based Procedures.

(It cannot be taken for credit with SE 421).

Prerequisites: STAT 301, STAT 361

STAT 470 Senior Project in Statistics (1-3-2)

This course is designed to draw upon various components of the undergraduate curriculum. The project could be in the area of data analysis, sampling survey, experimental design, regression analysis, multivariate data analysis, time series and etc. A report is essential for course completion.

Prerequisite: Senior Standing

STAT 475 Statistical Models for Lifetime Data (3-0-3)

Life tables, graph and related procedures. Single samples: complete or Type II censored data and Type I censored data for Exponential, Weibull, Gamma and other distributions. Parametric regression for Exponential, Weibull and Gamma distributions. Distributions-free methods for proportional hazard and related regression models.

Prerequisites: STAT 302, STAT 310

STAT 499 Topic in Statistics (3-0-3)

Variable content. Open for senior students interested in studying an advanced topic in statistics with a departmental faculty member.

Prerequisites: Senior Standing,
Permission of the Department Chairman upon Recommendation of the Instructor.

SOFTWARE ENGINEERING

SWE 214 Introduction to Software Engineering (3-3-4)

Study of software engineering process models, requirements engineering process, and system models. Methods, tools, notations, and verification and validation techniques for the analysis and specification of software requirements. Introduction to the principles of project management. Students participate in a group project on software requirements.

Prerequisite: ICS 201

SWE 312 User-Interface Design (3-0-3)

Study of both theoretical and practical issues in human-computer interfaces. Principles of user interface design, development, and programming. Topics include user psychology and cognitive science, adaptive user interfaces, icon and window design, media design, command language design, user guidance systems, and collaborative working.

Prerequisites: ICS 202, SWE 214

SWE 316 Software Design and Architecture (3-0-3)

Study of fundamental design concepts, design notations, and architectural design methods for large-scale software systems. Several design methods are presented and compared, with examples of their use. Concepts such as information hiding, data abstraction, concurrency, and object-oriented software construction are discussed in depth. Students participate in a group project on software design.

Prerequisites: SWE 214, ICS 334

SWE 321 Formal Methods and Models in Software Engineering (3-0-3)

Formal mechanisms for specifying, validating, and verifying software systems. Topics include program verification through Hoare's method and Dijkstra's weakest preconditions; formal specifications, including initial specification and refinement toward implementation; integration of formal methods with existing programming languages, and the application of formal methods to requirements analysis, testing, safety analysis, and object-oriented approaches.

Prerequisites: SWE 214, ICS 252

SWE 322 Principles of Concurrent Software Systems (3-0-3)

Study of issues related to the development of concurrent software systems. Topics include the basics of synchronization and coordination techniques, concurrent programming languages and constructs and the specification, design, verification, and validation of concurrent programs. Students are required to solve concurrent programming problems and to check their solutions by using verification, testing, and debugging tools.

Prerequisite: ICS 202

SWE 344 Internet Protocols and Client-Server Programming (2-3-3)

Principles of Internet work architecture and communication protocols. Open systems and interoperability. Wide area connectivity through interconnection of autonomous networks. Case studies of particular protocols from network layer and above. Selected examples of networked client-server applications such as e-mail, news, file-transfer, HTTP. Socket programming. Programming Project(s).

Prerequisite: ICS 202

SWE 415 Software Testing and Quality Assurance (3-0-3)

Concept of software quality, software metrics, & Total Quality Management. SQA planning & implementation. Validation & verification. Reviews, walkthroughs, & inspections. Automatic and manual techniques for generating and validating test data. Static vs. dynamic analysis, functional testing, inspections, and reliability assessment. Students participate in a group project on software validation and verification.

Prerequisites: ICS 252, SWE 316, STAT 319

SWE 417 Software Engineering Project I (2-3-3)

Principles of software project management; cooperative work; metrics; cost estimation; software project planning, organizing, resource allocation, directing and controlling; risk management; software configuration management; reuse management; role of standards; management tools; case studies.

Students work in teams to analyze, design, and manage a software project up to the development of the design document. Sound principles of software systems engineering, along with both industrial and academic standards are used to assess the quality of the work products.

Co requisite: SWE 415

SWE 418 Software Engineering Project II (1-6-3)

A continuation of the work done in ICS 417. Students implement their designed software, and test and evaluate and their final product.

Prerequisite: SWE 417

SWE 421 Principles of Information Security (3-0-3)

Study of security policies, models, and mechanisms for secrecy, integrity, and availability. Topics include mechanisms for mandatory and discretionary controls; data models, concepts, and mechanisms for database security; basic cryptography and its applications; security in computer networks and distributed systems; and control and prevention of viruses and other rogue programs.

Prerequisite: ICS 334

SWE 422 Real-Time Software Systems (3-0-3)

Real-time software systems and the principles supporting their design and implementation. Emphasis is placed upon fundamental results from real-time scheduling theory and their relevance to computer system design. Topics include a survey of real-time deign methods, real-time programming languages, exception handling, reliability, and data acquisition.

Prerequisite: Senior Standing

SWE 423 Multimedia Systems (3-0-3)

Why multimedia systems? Fonts and hypertext. Digital audio. Synthesized audio & MIDI. Audio on the Internet & audio streaming. Speech recognition. Computer graphics and images. Image formats and standards. Color models in images. Image compression. Principles of animation. Digital video. Video compression. Video on the Internet & video streaming. Videoconferencing. Multimedia software tools. Issues in multimedia applications design. Multimedia programming techniques.

Prerequisite: Senior Standing

SWE 444 Internet and Web Application Development (3-0-3)

Frameworks for web-application development. Component Architectures. Multi-tier Applications. End-to-end functional building blocks and their use in adaptive and non-adaptive applications, including multimedia: coding, compression, security, and directory services. Database connectivity. Integration of media services into applications.

Prerequisites: Senior Standing

SWE 446 Selected Topics on Emerging Internet Technologies (2-3-3)

Design and implementation of computer models of learning and adaptation in autonomous intelligent agents. E-commerce models and architectures. IP telephony and video conferencing. Designing applications to support user mobility. Emulation of virtual application specific network architectures. Trends and new directions in Internet technologies, protocols, architectures, and applications.

Prerequisite: SWE 344

SWE 490 Special Topics I (3-0-3)

State-of-the-art topics in Software Engineering.

Prerequisites: Senior Standing

SWE 491 Special Topics II (3-0-3)

State-of-the-art topics in Software Engineering.

Prerequisites: Senior Standing

UNIVERSITY BOARD AND ADMINISTRATION

UNIVERSITY BOARD

H.E. Dr. Khalid M. Al-Ankari	Minister of Higher Education and Chairman of the University Board
H.E. Dr. Khalid Saleh Al-Sultan	Rector of the University and Deputy Chairman of the University Board
Dr. Mohammed Abdulaziz Al-Saleh	Secretary General of the Council of Higher Education
Dr. Mohammad O. Budair	Vice Rector for Graduate Studies & Scientific Research – Secretary, University Board
Dr. Abdulaziz A. Al-Suwaiyan	Vice Rector for Academic Affairs
Dr. Mohammad O. Budair	Acting Vice Rector for Applied Research
Dr. Samir O. Baiyat	Dean of the College of Engineering Sciences, Acting Dean of the College of Applied Engineering
Dr. Muhammad A. Al-Ohali	Dean of Graduate Studies
Dr. Hamza A. Maghrabi	Dean of Hafr Al-Batin Community College
Dr. Sahel N. Abduljauwad	Dean, Academic Development
Dr. Solaiman A. Al-Mohawis	Dean of College of Environmental Design
Dr. Aref A. Al-Ashban	Dean of College of Industrial Management
Dr. Mohammad S. Al-Mulhem	Dean of Educational Affairs
Dr. Walid S. Al-Sabah	Dean of College of Sciences
Dr. Jarullah Saleh Al-Ghamdi	Dean of College of Computer Sciences and Engineering
Dr. Sami A. Khayyat	Dean of Student Affairs
Dr. Talal H. Maghrabi	Dean of Library Affairs
Dr. Abdulrahman A. Al-Khathlan	Dean of Faculty & Personnel Affairs
Dr. Omar A. Al-Suwailem	Dean of Admissions & Registration
Dr. Muhammad A. Al-Naafa	Dean of Ha'il Community College
Dr. Muhammad A. Garwan	Dean of Dammam Community College
Dr. Muhammad S. Al-Homoud	Dean, Scientific Research

UNIVERSITY ADMINISTRATION

Rector & Chief Executive Officer	***Dr. Khaled S. Al-Sultan, Ph.D.*** University of Michigan, Ann Arbor (1990)
Vice Rector for Graduate Studies & Scientific Research	***Dr. Mohammad O. Budair, Ph.D.*** Stanford University (1981)
Vice Rector for Academic Affairs	***Dr. Abdulaziz A. Al-Suwaiyan, Ph.D.*** Sheffield University (1982)
Vice Rector for Applied Research (Acting)	***Dr. Mohammad O. Budair, Ph.D.*** Stanford University (1981)
Supervisor, Financial & Administrative Affairs	***Dr. Muhammad A. Al-Khaldi, Ph.D.*** Oklahoma State University (1991)
Supervisor, Technical Affairs	***Dr. Ismail M. Budaiwi, Ph.D.*** Concordia University (1994)
Supervisor, Information & Communication Technology	***Dr. Mamdouh M. Najjar, Ph.D.*** Illinois Institute of Technology (1989)
Dir. General, Public Relations & Information	***Engr. Ibrahim A. Al-Khaldi, B.S.*** King Fahd University of Petroleum & Minerals (1996)
Dean, College of Engineering Sciences	***Dr. Samir A. Al-Baiyat, Ph.D.*** University of Notre Dame (1986)
Dean, College of Sciences	***Dr. Walid S. Al-Sabah, Ph.D.*** University of California - Riverside (1993)
Dean, College of Computer Sciences & Engineering	***Dr. Jarallah S. Al-Ghamdi, Ph.D.*** Arizona State University (1994)
Dean, College of Industrial Management	***Dr. Aref A. Al-Ashban, Ph.D.*** University of Houston (1995)
Dean, College of Environmental Design	***Dr. Soliman A. Al-Mohawis, Ph.D.*** University of Texas at Austin (1986)
Dean, Graduate Studies	***Dr. Mohammad A. Al-Ohali, Ph.D.*** Duke University, North Carolina (1993)
Dean, Educational Services	***Dr. Mohammad S. Al-Mulhem, Ph.D.*** Oregon State University (1990)
Dean, Library Affairs	***Dr. Talal H. Maghrabi, Ph.D.*** Arizona State University (1992)
Dean, Faculty & Personnel Affairs	***Dr. Abdulrahman A. Al-Khathlan, Ph.D.*** Stanford University (1987)
Dean, Admissions & Registration	***Dr. Omar A. Al-Suwailem, Ph.D.*** University of Missouri, Columbia (1996)
Dean, Student Affairs	***Dr. Sami A. Khaiyat, Ph.D.*** Texas A&M University (1994)
Dean, Academic Development	***Dr. Sahel N. Abdul-Jauwad, Ph.D.*** University of Colorado, Boulder (1985)
Dean, Dammam Community College	***Dr. Muhammad A. Garwan, Ph.D.*** University of Toronto (1992)
Dean, Hail Community College	***Dr. Mohammed A. Al-Naafa, Ph.D.*** Colorado School of Mines (1990)
Dean, Hafr Al-Batin Community College	***Dr. Hamza A. Maghrabi, Ph.D.*** University of Manchester (1993)
Dean of Scientific Research	***Dr. Muhammad S. Al-Homoud, Ph.D.*** Texas A&M University (1994)

UNIVERSITY FACULTY

ORDER OF EACH ENTRY

Name
Highest Earned Degree and Year of Graduation
The University Granting the Degree
Academic Rank
Department and Year of Appointment at KFUPM

The list in the following pages was provided by the Office of Faculty Affairs.

It reflects, as much as possible, the faculty roster as of April 2006.

Dr. Abbas, Nureddin Mohammad
Ph.D. (1981)
Stanford University
Associate Professor
Chemical Engineering (1972)

Dr. Abdel-Aal, Radwan El-Said
Ph.D. (1983)
University of Strathclyde
Associate Professor
Computer Engineering (1985)

Dr. Abd-El-Barr, Mostafa Hassanin
Ph.D. (1986)
University of Toronto
Professor
Computer Engineering (1993)

Dr. Abdelmonem, Mohamed S. El-Din
Ph.D. (1974)
University of Houston
Associate Professor
Physics (1992)

Dr. Abdou, Adel Abdel Moneim
Ph.D. (1995)
Concordia University
Associate Professor
Architectural Engineering (1996)

Mr. Abdul Aleem, Bangalore J.
M.S. (1989)
King Fahd University of Petroleum & Minerals
Lecturer
Mechanical Engineering (1989)

Mr. Abdul Majid, Mohammed
M.S. (2002)
King Fahd University of Petroleum & Minerals
Lecturer
Electrical Engineering (2002)

Mr. Abdul Samad, Mohammed
M.S. (1997)
King Fahd University of Petroleum & Minerals
Lecturer
Mechanical Engineering (1997)

Dr. Abdul-Ghani, Walid Muhammad R.
Ph.D. (2003)
University of Manchester
Assistant Professor
Earth Sciences (1986)

Dr. Abduljauwad, Sahel Nashat
Ph.D. (1985)
University of Colorado - Boulder
Professor
Civil Engineering (1978)

Dr. Abdul-Jauwad, Samir Husain
Ph.D. (1985)
University of Sheffield
Associate Professor
Electrical Engineering (1974)

Dr. Abdullatif, Osman Mahmoud
Ph.D. (1993)
University of Khartoum
Assistant Professor
Earth Sciences (2001)

Dr. Abdul-Muhmin, Alhassan Gariba
Ph.D. (1994)
Norwegian School of Economics
Associate Professor
Management & Marketing (1994)

Dr. Abdur-Rahim, Abu Hamed Mohamed
Ph.D. (1972)
University of Alberta
Professor
Electrical Engineering (1995)

Dr. Abido, Mohamed Ali Yousif
Ph.D. (1997)
King Fahd University of Petroleum & Minerals
Associate Professor
Electrical Engineering (1998)

Mr. Ablorh, John Cecil
B.A. (1989) + Cert.E.L.T.
De Montfort University
Lecturer
English Language Center (2001)

Dr. Abokhodair, Abdul-Wahab Abdulaziz
Ph.D. (1978)
University of California - Santa Cruz
Associate Professor
Earth Sciences (1972)

Dr. Abraham, Abraham
Ph.D. (1989)
Boston University
Associate Professor
Finance & Economics (1993)

Dr. Abu Dieh, Walid Ahmad Nemer
Ph.D. (1989)
University of Illinois - Urbana, Champaign
Associate Professor
Mathematical Sciences (2005)

Dr. Abualhamayel, Habib Ibrahim
Ph.D. (1981)
University of Colorado - Boulder
Professor
Mechanical Engineering (1973)

Dr. Abu-Al-Saud, Wajih Abd-Al-Ilah
Ph.D. (1996)
Georgia Institute of Technology
Assistant Professor
Electrical Engineering (1994)

Dr. Abu-Amara, Marwan Hassan
Ph.D. (1995)
Texas A & M University
Assistant Professor
Computer Engineering (2003)

Dr. Abu-Amshah, Mufeed Mohammad
Ph.D. (1982)
Um Al-Qura University
Assistant Professor
Islamic & Arabic Studies (1989)

Dr. Abuelmaatti, Muhammad Taher
Ph.D. (1979)
University of Bradford
Professor
Electrical Engineering (1991)

Mr. Abu-Ghandar, Nabil Salem
B.S. (2000)
King Fahd University of Petroleum & Minerals
Lecturer
Chemical Engineering (2000)

Mr. Abu-Hilal, Hamed
M.A. (1987)
Michigan State University
Lecturer
Physical Education (2000)

Dr. Abuihlail, Jawad Younes
Ph.D. (2001)
Heinrich-Heine University
Assistant Professor
Mathematical Sciences (2003)

Mr. Abujiya, Mu'azu Ramat
M.S. (2003)
King Fahd University of Petroleum & Minerals
Lecturer
Mathematical Sciences (2003)

Dr. Abu-Khamsin, Sidqi Ahmad
Ph.D. (1984)
Stanford University
Professor
Petroleum Engineering (1975)

Dr. Abul-Hamayel, Mohammad A.
Ph.D. (1979)
Oklahoma State University
Associate Professor
Chemical Engineering (1970)

Dr. Abulkibash, Abdalla Mahmud Shihadeh
Ph.D. (1979)
University of Exeter
Professor
Chemistry (1980)

Dr. Abu-Musa, Ahmad Abd-Elsalam
Ph.D. (2001)
University of Aberdeen
Assistant Professor
Accounting & M I S (2003)

Mr. Abu-Sagar, Abdulaziz
M.S. (1984)
King Saud University
Lecturer
Islamic & Arabic Studies (1984)

Dr. Abu-Saleh, Ali Mohammad
Ph.D. (1983)
University of Oregon
Associate Professor
Physical Education (1974)

Dr. Abu-Sbeih, Mohamed Zuheir I.
Ph.D. (1983)
Pennsylvania State University
Associate Professor
Mathematical Sciences (1984)

Dr. Abu-Sharkh, Basel Fathi
Ph.D. (1996)
University of Wisconsin - Madison
Associate Professor
Chemical Engineering (1996)

Dr. Achoui, Mustafa Mouloud
Ph.D. (1983)
Rensselaer Polytechnic Institute
Associate Professor
Management & Marketing (2000)

Mr. Adejumo, Adewale Olumide
M.A. (1985)
Reading University
Lecturer
Physical Education (1993)

Mr. Afzal, Hafiz Muhammad
Ph.D. (1999)
University of Punjab
Lecturer
Islamic & Arabic Studies (1995)

Dr. Ahmad, Shamshad
Ph.D. (1996)
Indian Institute of Technology
Assistant Professor
Civil Engineering (2001)

Dr. Ahmad, Zaki
Ph.D. (1970)
University of Leeds
Professor
Mechanical Engineering (1980)

Mr. Ahmar, Sha
M.S. (1999)
King Fahd University of Petroleum & Minerals
Lecturer
Electrical Engineering (1999)

Mr. Ahmed, Akram Mohamed Musa
M.S. (1989)
Yarmouk University
Lecturer
Mathematical Sciences (1995)

Mr. Ahmed, Ejaz
M.S. (1997)
Coventry University
Instructor
Information & Computer Science (2003)

Dr. Ahmed, Mirghani Nimir
Ph.D. (1992)
University of Manchester
Assistant Professor
Accounting & M I S (1998)

Mr. Ahmed, Mohammed Faisal M.
M.S. (1993)
University of Oklahoma
Lecturer
Mechanical Engineering (1996)

Mr. Ahmed, Mohiuddin
M.S. (1984)
King Fahd University of Petroleum & Minerals
Lecturer
Mechanical Engineering (1988)

Mr. Ahmed, Mustafa Faisal
M. B. A. (1997)
Chadron State College
Lecturer
Accounting & M I S (2000)

Dr. Ahmed, Zulfiqar
Ph.D. (1983)
University of London
Associate Professor
Earth Sciences (1998)

Dr. Ahsan, Javed
Ph.D. (1977)
Dundee University
Adjunct Professor
Mathematical Sciences (2001)

Mr. Ahsan, Mohammed
M.S. (2003)
King Fahd University of Petroleum & Minerals
Lecturer
Mechanical Engineering (2003)

Dr. Aiban, Saad Ali
Ph.D. (1991)
University of Colorado - Boulder
Associate Professor
Civil Engineering (1982)

Mr. Akhtar, Sohail
M.S. (1998)
King Fahd University of Petroleum & Minerals
Lecturer
Academic Development Center (1999)

Dr. Aksoy, Abddelkadir
Ph.D. (1981)
Ghent State University
Associate Professor
Physics (1985)

Dr. Al Abdali, Obaid Saad
Ph.D. (1996)
University of Manchester
Assistant Professor
Management & Marketing (1991)

Mr. Al Moslem, Hassan Abdulkareem
M.A. (1991)
Adrigown State University
Lecturer
Physical Education (2002)

Mr. Al-Abandy, Husain Habib
M.S. (1981)
King Fahd University of Petroleum & Minerals
Lecturer
Finance & Economics (1979)

Dr. Al-Abdulwahab, Hamad Ibrahim
Ph.D. (1985)
Oregon State University
Professor
Civil Engineering (1979)

Dr. Alabri, Khalid Hassan
Ph.D. (2000)
Al-Imam Mohammed Bin Saud Islamic University
Assistant Professor
Islamic & Arabic Studies (2004)

Mr. Al-Absi, Bassam Ibrahim Abbas
M.S. (1995)
King Fahd University of Petroleum & Minerals
Lecturer
Mathematical Sciences (1995)

Dr. Al-Absi, Munir Ahmed Kulaib
Ph.D. (2001)
University of Manchester
Assistant Professor
Electrical Engineering (2000)

Dr. Al-Adel, Fida Fouad
Ph.D. (1981)
University of Paris
Professor
Physics (1982)

Dr. Al-Ahmadi, Hassan Mousaid
Ph.D. (1990)
Michigan State University
Assistant Professor
Civil Engineering (1982)

Dr. Al-Ahmari, Abdallah Said Muhammad
Ph.D. (2003)
Georgia Institute of Technology
Assistant Professor
Electrical Engineering (1991)

Mr. Alaimia, Mohamed Ridha
M.Phil (1989)
Lancaster University
Lecturer
Mathematical Sciences (1999)

Dr. Al-Aithan, Thamer Abdulmohsen
Ph.D. (1997)
Syracuse University
Assistant Professor
Physics (1985)

Dr. Al-Akhdar, Al-Sayyedzaki Haidar
Ph.D. (1989)
University of Colorado - Boulder
Assistant Professor
Electrical Engineering (1982)

Dr. Al-Ali, Habib Husain
Ph.D. (1988)
Colorado School of Mines
Associate Professor
Chemical Engineering (1980)

Dr. Al Ameer, Abdulhameed
Ph.D. (1992)
Florida State University
Associate Professor
Physical Education (2005)

Dr. Al-Amer, Adnan M
Ph.D. (1983)
University of British Columbia
Professor
Chemical Engineering (1976)

Dr. Al-Amer, Samir Hasan Husain
Ph.D. (1999)
King Fahd University of Petroleum & Minerals
Assistant Professor
Systems Engineering (1984)

Dr. Al-Amoudi, Omar Saeed Baghabra
Ph.D. (1992)
King Fahd University of Petroleum & Minerals
Professor
Civil Engineering (1992)

Dr. Al-Amoudi, Saeed Mohammed Saeed
Ph.D. (1999)
University of Pittsburgh
Assistant Professor
Physics (1991)

Dr. Al-Arfaj, Abdulrahman Ahmad
Ph.D. (1985)
University of Washington
Professor
Chemistry (1978)

Dr. Al-Arfaj, Mohammad Abdallah
Ph.D. (2002)
Lehigh University
Assistant Professor
Chemical Engineering (1995)

Dr. Al-Ashban, Aref Abdulla
Ph.D. (1995)
University of Houston
Assistant Professor
Management & Marketing (1989)

Dr. Al-Assaf, Abdulaziz Mohammed
Ph.D. (2002)
Northeastern University
Assistant Professor
Mathematical Sciences (1991)

Dr. Al-Assaf, Abdulla Khalaf
Ph.D. (1989)
Halab University
Assistant Professor
Islamic & Arabic Studies (1996)

Dr. Al-Assar, Rajaie Samih Moussa
Ph.D. (1996)
King Fahd University of Petroleum & Minerals
Associate Professor
Mathematical Sciences (1998)

Dr. Al-Attas, Husain Salem
Ph.D. (2002)
University of Pittsburgh
Assistant Professor
Mathematical Sciences (1991)

Mr. Alawami, Ali Taleb
M.S. (2001)
King Fahd University of Petroleum & Minerals
Lecturer
Electrical Engineering (2002)

Dr. Al-Baghli, Nadhir Abbas
Ph.D. (2001)
Colorado School of Mines
Assistant Professor
Chemical Engineering (1991)

Dr. Al-Baiyat, Samir Alwan
Ph.D. (1986)
University of Notre Dame
Professor
Electrical Engineering (1977)

Dr. Al-Bar, Mohammad Alawi
Ph.D. (1981)
Nottingham University
Professor
Mathematical Sciences (1975)

Dr. Al-Baridi, Saleh Abdulkarim
Ph.D. (1994)
Florida State University
Assistant Professor
Islamic & Arabic Studies (1984)

Dr. Albinali, Khaled
Ph.D. (2004)
Kent State University
Assistant Professor
Finance & Economics (1996)

Dr. Al-Buraey, Mohammad Abdalla
Ph.D. (1981)
University of North Carolina
Associate Professor
Management & Marketing (1977)

Dr. Al-Daajani, Mansour Abdulaziz
Ph.D. (2001)
University of California - Los Angeles
Assistant Professor
Systems Engineering (1994)

Dr. Al-Daffa, Ali Abdulla
Ph.D. (1973)
Peabody College
Adjunct Professor
Mathematical Sciences (1973)

Dr. Aldamer, Shafi Abdulrahman
Ph.D. (2001)
Durham University
Assistant Professor
Islamic & Arabic Studies (2003)

Dr. Aldaous, Mohammed Abdulmajeed
Ph.D. (1997)
University of Minnesota
Assistant Professor
Chemistry (1997)

Dr. Al-Darwish, Nasir Ali Nasir
Ph.D. (1989)
Oregon State University
Assistant Professor
Information & Computer Science (1982)

Mr. Al-Dhafeer, Mansour Mohammad
M.S. (1981)
University of Southern California
Lecturer
Petroleum Engineering (1978)

Dr. Aldheylan, Khalid Abdulaziz
Ph.D. (1996)
Pennsylvania State University
Assistant Professor
Mechanical Engineering (2001)

Dr. Al-Dini, Salem Ahmed Salem
Ph.D. (2005)
Texas A & M University
Assistant Professor
Mechanical Engineering (1994)

Dr. Al-Dosary, Adel Shaheen
Ph.D. (1991)
University of Michigan - Ann Arbor
Associate Professor
Architecture (1983)

Dr. Aldukayyil, Salman Saleh
M.S. (1998)
Al-Imam Mohammed Bin Saud Islamic University
Assistant Professor
Islamic & Arabic Studies (1999)

Dr. Al-Dulaijan, Salah Othman
Ph.D. (1997)
Pennsylvania State University
Assistant Professor
Civil Engineering (1984)

Dr. Al-Duwaish, Husain Naser
Ph.D. (1995)
Colorado State University
Associate Professor
Electrical Engineering (1988)

Dr. Al-Elg, Ali Habib
Ph.D. (1993)
University of Mississippi
Assistant Professor
Finance & Economics (1982)

Mr. Alfagih, Ashraf Ehsan
B.S. (2000)
King Fahd University of Petroleum & Minerals
Lecturer
Information & Computer Science (2000)

Dr. Al-Faraj, Taqi Nasr
Ph.D. (1986)
University of Texas - Austin
Associate Professor
Management & Marketing (1977)

Dr. Al-Farayedhi, Abdulghani A.
Ph.D. (1987)
University of Colorado - Boulder
Associate Professor
Mechanical Engineering (1977)

Dr. Al-Fares, Hesham Kamal
Ph.D. (1991)
Arizona State University
Associate Professor
Systems Engineering (1984)

Dr. Al-Furaidan, Monther Rashid
Ph.D. (1995)
Michigan State University
Assistant Professor
Mathematical Sciences (1995)

Dr. Al-Gadhib, Ali Husain
Ph.D. (1989)
North Carolina State University
Associate Professor
Civil Engineering (1980)

Dr. Al-Gahtani, Ahmad Saad
Ph.D. (1986)
University of Iowa
Associate Professor
Civil Engineering (1978)

Dr. Al-Gahtani, Husain Jubran
Ph.D. (1992)
Michigan State University
Associate Professor
Civil Engineering (1986)

Dr. Algahtani, Ibrahim Mohammad
Ph.D. (1987)
University of Wisconsin - Milwaukee
Assistant Professor
Finance & Economics (1979)

Dr. Al-Gahtani, Mohammad Ali
Ph.D. (2002)
University of Manchester
Assistant Professor
Electrical Engineering (1994)

Dr. Al-Garni, Abdallah Mohammad
Ph.D. (2003)
University of Michigan
Assistant Professor
Aerospace Engineering (1996)

Dr. Al-Garni, Ahmed Zafer
Ph.D. (1991)
University of Maryland
Professor
Aerospace Engineering (1984)

Mr. Al-Garni, Saeed Ali
B.S. (1996)
King Fahd University of Petroleum & Minerals
Lecturer
Mathematical Sciences (1998)

Dr. Al-Ghadhban Samir
Ph.D. (2005)
Virginia Tech.
Assistant Professor
Electrical Engineering (2000)

Dr. Al-Ghahtani, Mesfer Ali
Ph.D. (2001)
Um Al-Qura University
Assistant Professor
Islamic & Arabic Studies (1996)

Dr. Al-Ghamdi, Abdul-Rahim Saeed
Ph.D. (1992)
University of Illinois - Urbana, Champaign
Assistant Professor
Systems Engineering (1981)

Dr. Al-Ghamdi, Jarallah Saleh
Ph.D. (1994)
Arizona State University
Assistant Professor
Information & Computer Science (1982)

Mr. Alghamdi, Mohammad Khalf
B.S. (2001)
King Fahd University of Petroleum & Minerals
Lecturer
Electrical Engineering (2001)

Mr. Al-Ghamdi, Mohammad Saeed
M.S. (1980)
King Fahd University of Petroleum & Minerals
Lecturer
Management & Marketing (1978)

Dr. Al-Ghamdi, Mubarak Ali
Ph.D. (1988)
West Virginia University
Assistant Professor
Finance & Economics (1973)

Dr. Al-Ghamdi, Saeid A.
Ph.D. (1988)
Arizona State University
Assistant Professor
Civil Engineering (1982)

Dr. Al-Ghamdi, Salem Matar Saeed
Ph.D. (1994)
Virginia Polytechnic Institute
Associate Professor
Management & Marketing (1982)

Dr. Al-Ghamedy, Hamdan Naser
Ph.D. (1986)
University of Colorado - Boulder
Associate Professor
Civil Engineering (1983)

Dr. Al-Ghatani, Saeed Hussain Saeed
Ph.D. (2002)
Islamic University
Assistant Professor
Islamic & Arabic Studies (1996)

Dr. Al-Habboubi, Mohammad Husain
Ph.D. (1987)
Oregon State University
Professor
Systems Engineering (1978)

Dr. Al-Haddad, Muyaser Noorulddin
Ph.D. (1993)
University of Missouri
Assistant Professor
Mechanical Engineering (1986)

Dr. Al-Hadhrami, Luai Muhammad
Ph.D. (2002)
Texas A & M University
Assistant Professor
Mechanical Engineering (1994)

Dr. Al-Haidari, Abdulaziz Dakhel
Ph.D. (1987)
University of California - Los Angeles
Associate Professor
Physics (1978)

Dr. Al-Hammad, Abdalmohsen Abdalla
Ph.D. (1984)
University of Kansas
Professor
Architectural Engineering (1978)

Dr. Al-Hamoud, Mohammad Saad
Ph.D. (1994)
Texas A & M University
Associate Professor
Architectural Engineering (1986)

Dr. Al-Hamouz, Zakariya Mahmoud
Ph.D. (1994)
King Fahd University of Petroleum & Minerals
Associate Professor
Electrical Engineering (1994)

Dr. Al-Harbi, Dulaihan Khulaiwi
Ph.D. (1982)
Oklahoma State University
Associate Professor
Chemical Engineering (1970)

Dr. Al-Harby, Abdullah Daghaiyem
Ph.D. (2003)
Florida Atlantic University
Assistant Professor
Accounting & M I S (1993)

Dr. Al-Harthi, Yahya S.
Ph.D. (2005)
University Minnesota
Assistant Professor
Electrical Engineering (2002)

Dr. Al-Hashim, Hasan Salman
Ph.D. (1982)
Colorado School of Mines
Associate Professor
Petroleum Engineering (1977)

Dr. Al-Hazmi, Mohammad Hasan
Ph.D. (1996)
University of Manchester
Assistant Professor
Accounting & M I S (1984)

Dr. Al-Hejji, Mohsen Ahmad
Ph.D. (1987)
University of Colorado - Boulder
Assistant Professor
Finance & Economics (1979)

Dr. Al-Hinai, Khattab Ghaleb
Ph.D. (1988)
University of London
Associate Professor
Earth Sciences (1981)

Dr. Al-Homaid, Nasser Abdullah
Ph.D. (1978)
Albert Ludwig University
Assistant Professor
Earth Sciences (1978)

Dr. Al-Homidan, Suliman Saleh
Ph.D. (1993)
Dundee University
Associate Professor
Mathematical Sciences (1996)

Mr. Al-Humaidan, Saleh Ali
M.B.A. (1981)
King Fahd University of Petroleum & Minerals
Lecturer (Part-time)
Management & Marketing (1996)

Mr. Al-Humaidi, Bader Ahmed
M.S. (2001)
King Fahd University of Petroleum & Minerals
Lecturer
Mathematical Sciences (1998)

Dr. Al-Humeidan, Esam Abdul- Mohsen
Ph.D. (2001)
Al-Imam Mohammed Bin Saud Islamic University
Assistant Professor
Islamic & Arabic Studies (1996)

Dr. Ali, Shaikh Asrof
Ph.D. (1980)
State University of New York
Professor
Chemistry (1981)

Dr. Al-Jabri, Ibrahim Muhammad
Ph.D. (1991)
Illinois Institute of Technology
Associate Professor
Accounting & M I S (1997)

Dr. Al-Jalal, Abdulaziz Mohammad
Ph.D. (2001)
Massachusetts Institute of Technology
Assistant Professor
Physics (1987)

Dr. Al-Jamid, Husain Ali
Ph.D. (1986)
King Fahd University of Petroleum & Minerals
Professor
Electrical Engineering (1984)

Dr. Al-Jarallah, Mohammad Ibrahim
Ph.D. (1976)
University of Aston in Birmingham
Professor
Physics (1978)

Dr. Al-Juruf, Radwan Saadu
Ph.D. (1978)
Vanderbilt University
Associate Professor
Civil Engineering (1973)

Dr. Al-Kaabi, Saif Ahmad
Ph.D. (1995)
University of Colorado - Boulder
Assistant Professor
Mechanical Engineering (1982)

Dr. Alkadi, Abdulrahman M.
Ph. D. (1990)
Walden University
Assistant Professor (Part-time)
Management & Marketing (2001)

Mr. Al-Kafi, Abdullah
MS (2005)
King Fahd University of Petroleum & Minerals
Lecturer
Physics (2006)

Dr. Alkahtani, Abdulwahab Said
Ph.D. (1998)
University of North Texas
Assistant Professor
Management & Marketing (2002)

Dr. Al-Karkhy, Ali Salman Mohammed
Ph.D. (1997)
University of Manchester
Assistant Professor
Mathematical Sciences (2004)

Dr. Al-Karmi, Anan Mohammad
Ph.D. (1993)
University of Mississippi
Assistant Professor
Physics (2000)

Dr. Al-Khaldi, Muhammad Abdulmohsen
Ph.D. (1991)
Oklahoma State University
Assistant Professor
Accounting & M I S (1980)

Dr. Al-Kharroubi, Talal Mousa M.
Ph.D. (1998)
Texas A & M University
Assistant Professor
Computer Engineering (1993)

Dr. Al-Khathlan, Abdulrahman Abdulla
Ph.D. (1987)
Stanford University
Assistant Professor
Civil Engineering (1980)

Dr. Al-Khatib, Wasfi Ghassan
Ph.D. (2001)
Purdue University
Assistant Professor
Information & Computer Science (2002)

Dr. Al-Khattaf, Sulaiman Saleh Fahad
Ph.D. (2001)
University of Western Ontario
Associate Professor
Chemical Engineering (1996)

Dr. Al-Khedair, Khedair Saud
Ph.D. (1978)
University of Arizona - Tucson
Professor
Islamic & Arabic Studies (1973)

Dr. Al-Khulaifv, Naser Ali Naser
Ph.D. (1990)
Cairo University
Assistant Professor
Islamic & Arabic Studies (1980)

Dr. Al-Kuhaili, Mohammad Fayad
Ph.D. (1999)
University of Texas - Dallas
Associate Professor
Physics (1988)

Mr. Al-Labadi, Luai Mohammad Saleem
M.S. (2000)
University of Jordan
Lecturer
Mathematical Sciences (2002)

Dr. Allam, Ibrahim Mohammad
Ph.D. (1978)
University of Liverpool
Associate Professor
Mechanical Engineering (1984)

Dr. Al-Layla, Rasheed Ibrahim
Ph.D. (1980)
Colorado State University
Professor
Civil Engineering (1973)

Dr. Al-Maghrabi, Hamza Mohammad
Ph.D. (1993)
University of Manchester
Assistant Professor
Electrical Engineering (1980)

Dr. Al-Majed, Abdulaziz Abdulla
Ph.D. (1988)
University of Southern California
Associate Professor
Petroleum Engineering (1978)

Dr. Al-Malack, Muhammad Hassan
Ph.D. (1993)
University Newcastle Upon Tyne
Associate Professor
Civil Engineering (1981)

Mr. Al-Mana, Saleh Abdulla
M.S. (1980)
University of Washington
Lecturer
Civil Engineering (1976)

Dr. Al-Mandil, Mustafa Yousif
Ph.D. (1981)
Duke University
Associate Professor
Civil Engineering (1975)

Dr. Al-Marhoun, Muhammad Ali
Ph.D. (1978)
University of Oklahoma
Professor
Petroleum Engineering (1973)

Dr. Al-Mashookhy, Abdullah Sulaiman
Ph.D. (1985)
Imam Mohammad Saud University
Assistant Professor
Islamic & Arabic Studies (1982)

Dr. Al-Matoug, Ahmad Mohammad
Ph.D. (1987)
University of Pennsylvania
Professor
Islamic & Arabic Studies (1976)

Dr. Al-Meer, Abdulrahim Ali
Ph.D. (1983)
Arizona State University
Professor
Management & Marketing (1976)

Dr. Almohawis, Solaiman Abdullah
Ph.D. (1986)
University of Texas - Austin
Associate Professor
Construction Engineering & Mgt. (1980)

Mr. Al-Momani, Marwan Mohammad Ali
M.S. (2000)
Yarmouk University
Lecturer
Mathematical Sciences (2002)

Dr. Al-Mouhamed, Mayez
Ph.D. (1982)
University of Paris
Professor
Computer Engineering (1983)

Dr. Al-Muallem, Hassan Ali
Ph.D. (2000)
Colorado University
Assistant Professor
Chemistry (1989)

Dr. Al-Muallim, Hussein Saleh
Ph.D. (1992)
Oregon State University
Associate Professor
Information & Computer Science (1986)

Dr. Al-Mubaiyedh, Saad Abdulaziz
Ph.D. (1991)
Northwestern University
Assistant Professor
City & Regional Planning (1981)

Dr. Al-Mubaiyedh, Usamah Ahmad Aibrahim
Ph.D. (2001)
Washington University in St. Louis
Assistant Professor
Chemical Engineering (1994)

Dr. Al-Mubarak, Abdul Majeed
M.S. (1997)
Um Al-Qura University
Lecturer
Islamic & Arabic Studies (1997)

Dr. Al-Mubarak, Alameen Yosef
Ph.D. (1998)
Islamic University
Assistant Professor
Islamic & Arabic Studies (1998)

Dr. Al-Muhammadi, Sultan
Ph.D. (2005)
University of Southern California
Assistant Professor
Information & Computer Science (2005)

Mr. Al-Muhtaseb, Husni A.
M.S. (1988)
King Fahd University of Petroleum & Minerals
Instructor
Information & Computer Science (1988)

Dr. Al-Mulhem, Abdulaziz Sultan Ibrahim
Ph.D. (1998)
Victoria University
Assistant Professor
Computer Engineering (1990)

Dr. Al-Mulhem, Mohammad Saleh
Ph.D. (1990)
Oregon State University
Associate Professor
Information & Computer Science (1979)

Mr. Almulla, Osamah Abdullatif
M.S. (1998)
King Faisal University
Lecturer
Islamic & Arabic Studies (2001)

Dr. Al-Musallam, Abdulla Abdulkarim
Ph.D. (1989)
Marquette University
Professor
Civil Engineering (1978)

Dr. Al-Mutrif, Ibrahim Abdulla
Ph.D. (1982)
North Arizona University
Associate Professor
Islamic & Arabic Studies (1975)

Mr. Almuzeini, Khalid Abdullah
M.S. (1996)
Imam Mohammad Saud University
Lecturer
Islamic & Arabic Studies (1997)

Dr. Al-Naafa, Mohammed Abdulaziz
Ph.D. (1990)
Colorado School of Mines
Associate Professor
Chemical Engineering (1979)

Dr. Al-Naffouri, Tariq Yousuf
Ph.D. (2005)
Stanford University
Assistant Professor
Electrical Engineering (1993)

Dr. Al-Najjar, Atef Jawad
Ph.D. (1993)
Purdue University
Assistant Professor
Computer Engineering (1976)

Mr. Al-Najjar, Yahya Jawad Sadiq
M.S. (1989)
University of Washington
Lecturer
Architecture (1990)

Dr. Al-Namory, Adel Hasanain
Ph.D. (1991)
Moscow University
Lecturer
Physical Education (2000)

Dr. Al-Naser, Ali Salman
Ph.D. (1989)
University of Pennsylvania
Assistant Professor
City & Regional Planning (1981)

Dr. Al-Nassar, Yagoub Nassar
Ph.D. (1990)
University of Colorado - Boulder
Assistant Professor
Mechanical Engineering (1978)

Dr. Al-Nasser, Mohamed Abdulrahman
Ph.D. (1977)
University of California - Los Angeles
Associate Professor
Physics (1978)

Mr. Al-Nazhah, Hassan Mohammad
M.S. (1989)
Rice University
Lecturer
Architecture (1986)

Dr. Al-Nemari, Muhsen Hameed
Ph.D. (1994)
Al-Azhar University
Assistant Professor
Islamic & Arabic Studies (1984)

Dr. Al-Ofi, Khalaf Aidha
Ph.D. (1994)
King Fahd University of Petroleum & Minerals
Assistant Professor
Civil Engineering (1984)

Dr. Al-Ohali, Muhammad Abdul-Aziz
Ph.D. (1993)
Duke University
Associate Professor
Physics (1981)

Dr. Al-Osail, Abdulrahman A.
Ph.D. (1991)
University of South Carolina
Assistant Professor
Islamic & Arabic Studies (1981)

Mr. Alowaid, Mohammed
M.B.A. (1977)
University of Minnesota, Minneapolis
Lecturer (Part-time)
Management & Marketing (1983)

Dr. Al-Qahtani, Hussain Mohammad
Ph.D. (2005)
University of Colorado - Boulder
Assistant Professor
Mechanical Engineering (1997)

Dr. Al-Qahtani, Mohammad Shaaye
Ph.D. (2001)
Texas A & M University
Assistant Professor
Mechanical Engineering (1990)

Dr. Al-Qawasmi, Jamal Abdel-Qader
Ph.D. (1999)
Texas A & M University
Assistant Professor
Architecture (2003)

Dr. Al-Quraishi, Saleh Ibrahim
Ph.D. (1997)
Ohio University
Assistant Professor
Physics (1981)

Dr. Al-Qutub, Amro Mohammad
Ph.D. (1997)
University of Alabama
Associate Professor
Mechanical Engineering (1987)

Dr. Al-Ramadan, Baqer Muhammad
Ph.D. (1993)
University of Pennsylvania
Assistant Professor
City & Regional Planning (1983)

Dr. Al-Ramadhan, Ali Hassan
Ph.D. (1994)
University of Michigan
Assistant Professor
Physics (1981)

Dr. Al-Rasasi, Ibrahim Husain Ali
Ph.D. (2001)
Temple University
Assistant Professor
Mathematical Sciences (1992)

Dr. Al-Ratrout, Nidal Taisir
Ph.D. (1989)
Michigan State University
Assistant Professor
Civil Engineering (1983)

Dr. Alrugaib, Thamer Abdulla
Ph.D. (1996)
Cardiff University
Assistant Professor
Architecture (1985)

Dr. Al-Rumaihi, Jasim Shaheen
Ph.D. (1997)
Dundee University
Assistant Professor
Accounting & Mgt. Systems (2000)

Dr. Al-Saati, Zaini Jamal
Ph.D. (1974)
University of Sciences & Techniques
Assistant Professor
Electrical Engineering (1975)

Dr. Al-Sabah, Walid Sabah
Ph.D. (1993)
University of California - Riverside
Assistant Professor
Mathematical Sciences (1977)

Dr. Al-Saggaf, Ubaid Muhsen
Ph.D. (1986)
Stanford University
Associate Professor
Electrical Engineering (1979)

Dr. Al-Sahlawi, Mohammad Abdulaziz
Ph.D. (1985)
University of Wisconsin - Milwaukee
Professor
Finance & Economics (1978)

Dr. Al-Said, Fahad Abdulaziz
Ph.D. (1992)
University of Glasgow
Assistant Professor
Architecture (1982)

Mr. Al-Saif, Abbas Taqi Husain
M.A. (1985)
Western Michigan University
Lecturer
Physical Education (1986)

Mr. Alsaifi, Nayef Mesnad
M.S. (1999)
King Fahd University of Petroleum & Minerals
Lecturer
Chemical Engineering (2000)

Dr. Alsakran, Sulaiman
Ph. D. (1994)
University of Houston
Associate Professor
Finance & Economics (1985)

Dr. Alsalamah, Mohammad Fahad
M.S. (1998)
King Fahd University of Petroleum & Minerals
Assistant Professor
Systems Engineering (1997)

Dr. Al-Saleh, Mohammad Abdulla
Ph.D. (1981)
Colorado School of Mines
Professor
Chemical Engineering (1975)

Mr. Al-Sawi, Esam Abdel Qader Omar
M.S. (2003)
Yarmouk University
Lecturer
Mathematical Sciences (2003)

Dr. Al-Semari, Saud Ahmad Abdallah
Ph.D. (1995)
University of Maryland
Associate Professor
Electrical Engineering (1991)

Dr. Al-Senan, Shukri Hasan
Ph.D. (1985)
Georgia Institute of Technology
Associate Professor
Civil Engineering (1976)

Dr. Al-Shahrani, Saad Muhammad
Ph.D. (2001)
University of Virginia
Assistant Professor
Electrical Engineering (1993)

Dr. Al-Shaibani, Abdelaziz Muhareb
Ph.D. (1999)
Texas A & M University
Assistant Professor
Earth Sciences (1988)

Dr. Al-Shakhs, Adnan A.
Ph.D. (1984)
University of Pittsburgh
Assistant Professor
Mathematical Sciences (1974)

Dr. Al-Shalabi, Mazen Ahmad
Ph.D. (1977)
Colorado School of Mines
Professor
Chemical Engineering (1972)

Mr. Al-Shalhoub, Salah
M.S. (2001)
Al-Imam Mohammed Bin Saud Islamic University
Lecturer
Islamic & Arabic Studies (1998)

Mr. Al-Shallali, Abdulrahman D.
M.S. (1980)
King Fahd University of Petroleum & Minerals
Lecturer
Mathematical Sciences (1977)

Dr. Al-Shammari, Eid Sendi
Ph.D. (1990)
University of Oklahoma
Assistant Professor
Management & Marketing (1980)

Dr. Al-Shammari, Khalid Abdul-Aziz
Ph.D. (2006)
Louisiana State University
Assistant Professor
Mathematical Sciences (1995)

Mr. Al-Shawish, Elyas Mohammed
M.S. (1995)
Pittsburg State University
Lecturer
Mathematical Sciences (2005)

Dr. Al-Shayea, Naser Abdul-Rahman
Ph.D. (1994)
University of Michigan
Associate Professor
Civil Engineering (1982)

Dr. Al-Shayeb, Mohammad Rabah
Ph.D. (2002)
University of Alabama
Assistant Professor
Information & Computer Science (2003)

Dr. Al-Shehri, Abdalla Mohammad
Ph.D. (1985)
Oregon State University
Professor
Electrical Engineering (1978)

Dr. Al-Shuaibi, Abdulaziz Abdulla
Ph.D. (1992)
King Fahd University of Petroleum & Minerals
Associate Professor
Mathematical Sciences (1982)

Dr. Al-Shuhail, Abdellatif Abdulrahman
Ph.D. (1998)
Texas A & M University
Assistant Professor
Earth Sciences (1988)

Dr. Al-Shukri, Ali Mohammad
Ph.D. (1991)
Georgia State University
Assistant Professor
Physics (1977)

Dr. Al-Shuridah, Obaid Mobarak
Ph. D. (2005)
Southern Illinois University
Assistant Professor
Management & Marketing (2005)

Dr. Al-Shuwaikhat, Habib Mahdi
Ph.D. (1988)
Northwestern University
Associate Professor
City & Regional Planning (1980)

Mr. Al-Smail, Jamal Husain
M.S. (2004)
King Fahd University of Petroleum & Minerals
Lecturer
Mathematical Sciences (2000)

Dr. Al-Solami, Mohammad Ali
Ph.D. (1987)
University of South Carolina
Assistant Professor
Physics (1977)

Dr. Al-Sonaidi, Abdellah Abdelaziz
Ph.D. (1999)
University of Maryland
Assistant Professor
Physics (1989)

Dr. Al-Sowaiyan, Mohammad Saleh
Ph.D. (1993)
Colorado State University
Associate Professor
Civil Engineering (1983)

Dr. Al-Sughayyer, Mohammad Ali
Ph.D. (1995)
King Fahd University of Petroleum & Minerals
Assistant Professor
Civil Engineering (1984)

Mr. Al-Suhaimi, Adel Abdulaziz
M.B.A. (1979)
King Fahd University of Petroleum & Minerals
Lecturer (Part-time)
Management & Marketing (1998)

Dr. Al-Sukairy, Abdulla Nagy Isa
Ph.D. (1990)
Northwestern University
Assistant Professor
Information & Computer Science (1982)

Dr. Al-Sulaiman, Faleh Abdulla
Ph.D. (1985)
University of California - Davis
Associate Professor
Mechanical Engineering (1975)

Dr. Al-Sunaidi, Mohammad Abdulaziz
Ph.D. (1995)
Arizona State University
Associate Professor
Electrical Engineering (1984)

Dr. Al-Sunni, Fouad Mohammadisa
Ph.D. (1992)
University of Texas - Arlington
Professor
Systems Engineering (1984)

Dr. Al-Suwailem, Abdulaziz Mohammed
Ph.D. (1991)
University of Southampton
Assistant Professor
Chemistry (2000)

Dr. Al-Suwailem, Umer Abdallah A.
Ph.D. (1996)
University of Missouri
Assistant Professor
Electrical Engineering (1983)

Dr. Al-Suwaiyan, Abdulaziz A.
Ph.D. (1982)
University of Sheffield
Professor
Chemistry (1977)

Dr. Al-Suwaiyel, Muhammad Hamad
Ph.D. (1991)
Northwestern University
Associate Professor
Information & Computer Science (1981)

Mr. Al-Swaifi, Mohammed Mustafa
B.S. (1977)
Halwan University
Lecturer
Physical Education (1987)

Dr. Al-Tayyeb, Abdulhamid Judi
Ph.D. (1980)
Texas Technical University
Professor
Civil Engineering (1972)

Mr. Althagfi, Jameel Raddah
B.S. (2001)
King Fahd University of Petroleum & Minerals
Lecturer
Chemistry (2002)

Dr. Al-Thukair, Assad Ahmed
Ph.D. (1991)
Boston University
Assistant Professor
Chemistry (1980)

Mr. Al-Titi, Omar Ahmad Khalid
M.S. (2003)
Yarmouk University
Lecturer
Finance & Economics (2004)

Dr. Al-Turki, Umar Mustafa
Ph.D. (1994)
Rensselaer Polytechnic Institute
Associate Professor
Systems Engineering (1982)

Dr. Altwaigri, Khaled Mohammed
Ph.D. (2003)
Um Al-Qura University
Assistant Professor
Islamic & Arabic Studies (1998)

Mr. Alvi, Faisal
M.S. (2000)
King Fahd University of Petroleum & Minerals
Lecturer
Information & Computer Science (2000)

Dr. Al-Yamani, Ahmed A.J.
Ph.D. (2004)
Stanford University
Assistant Professor
Computer Engineering (2005)

Mr. Al-Yousef, Ali Khamis
M.S. (1990)
King Fahd University of Petroleum & Minerals
Lecturer
Civil Engineering (1986)

Dr. Al-Yousef, Hasan Yousef
Ph.D. (1985)
Stanford University
Associate Professor
Petroleum Engineering (1977)

Mr. Al-Zaharnah, Iyad Talal
M.S. (1993)
King Fahd University of Petroleum & Minerals
Instructor
Mechanical Engineering (1993)

Dr. Al-Zaher, Husain Abdullah
Ph.D. (2001)
Ohio University
Assistant Professor
Electrical Engineering (1994)

Dr. Alzahrani, Abdulkareem Saleh
Ph.D. (2002)
Um Al-Qura University
Assistant Professor
Islamic & Arabic Studies (2001)

Dr. Al-Zahrani, Mesfer Mohammad
Ph.D. (1995)
Pennsylvania State University
Assistant Professor
Civil Engineering (1987)

Dr. Al-Zahrani, Mohammad Abdullah M.
Ph.D. (1995)
Colorado State University
Assistant Professor
Civil Engineering (1987)

Mr. Al-Zamel, Khaled Mohammad
M.S. (1981)
King Fahd University of Petroleum & Minerals
Lecturer
Management & Marketing (1981)

Mr. Al-Zamil, Mohammad Abdulrahman
M.S. (2001)
Um Al-Qura University
Lecturer
Islamic & Arabic Studies (1996)

Dr. Al-Zayer, Jamal Ahmad
Ph.D. (1986)
University of Texas - Austin
Associate Professor
Management & Marketing (1979)

Mr. Alzoubi, Ahmad Mohammad
M.S. (1985)
Jacksonville State University
Lecturer
Mathematical Sciences (2002)

Mr. Al-Zoubi, Mohammad Odeh Mohammad
M.S. (2000)
Jordan University
Lecturer
Testing & Evaluation Center (2004)

Dr. Amin, Alaaeldin Abdul Monem
Ph.D. (1987)
University of Utah
Associate Professor
Computer Engineering (1988)

Dr. Amin, Mohammad Bakr
Ph.D. (1979)
Oklahoma State University
Professor
Chemical Engineering (1972)

Dr. Amir, Abdulgader Othman
Ph.D. (1998)
Georgia Institute of Technology
Assistant Professor
City & Regional Planning (1985)

Mr. Anabosi, Raid Fuaad Said
M.S. (1991)
University of Jordan
Lecturer
Mathematical Sciences (2004)

Dr. Andijani, Abdulbasit A.
Ph.D. (1992)
Ohio State University - Columbus
Professor
Systems Engineering (1983)

Mr. Anis, Mohammad
M.S. (1987)
New Jersey Institute of Technology
Lecturer
Mechanical Engineering (1999)

Dr. Ansari, Qamrul Hasan
Ph.D. (1989)
Aligarh Muslim University
Associate Professor
Mathematical Sciences (2003)

Dr. Antar, Mohamed Abdelkarim
Ph.D. (1996)
King Fahd University of Petroleum & Minerals
Associate Professor
Mechanical Engineering (1996)

Mr. Arafeh, Shaher Rashed
M.S. (1975)
SUNY at Albany
Lecturer
Mathematical Sciences (1989)

Dr. Arif, Abul Fazal Muhammad
Ph.D. (1991)
University of Minnesota
Associate Professor
Mechanical Engineering (1998)

Mr. Arifusalam, Shaikh
M.S. (1999)
King Fahd University of Petroleum & Minerals
Lecturer
Systems Engineering (1999)

Mr. Armstrong, Ronald Brian
M.S. (1985)
Trenton State University
Lecturer
English Language Center (1978)

Dr. Ashour, Mohammad Saleh Jamil
Ph.D. (1978)
University of Pittsburgh
Professor
Islamic & Arabic Studies (1967)

Mr. Aslam, Muhammad Waheed
M. B. A. (1996)
King Fahd University of Petroleum & Minerals
Lecturer
Information & Computer Science (1999)

Dr. Assaf, Sadi Abdelafo
Ph.D. (1982)
University of Illinois - Urbana, Champaign
Professor
Construction Engineering & Mgt. (1982)

Dr. At-Twaijri, Mohammad Ibrahim
Ph.D. (1982)
Arizona State University
Professor
Management & Marketing (1976)

Dr. Ayar, Tahir
Ph.D. (1988)
Rensselaer Polytechnic Institute
Visiting Assistant
Systems Engineering (1999)

Dr. Ayinde, Taofeek Foluso
Ph.D. (2002)
King Fahd University of Petroleum & Minerals
Assistant Professor
Mechanical Engineering (2003)

Dr. Ayub, Mohammed Sardar
Ph.D. (1988)
Heriot-Watt University
Associate Professor
Physics (1991)

Dr. Azad, Abul Kalam
Ph.D. (1973)
Concordia University
Professor
Civil Engineering (1975)

Dr. Azad, Hassan
Ph.D. (1977)
University of Notre Dame
Professor
Mathematical Sciences (1996)

Dr. Azzedin, Farag Ahmed
Ph.D. (2004)
University of Manitoba
Assistant Professor
Information & Computer Science (2004)

Mr. Baas, David William
M.S. (1980)
Arizona State University
Lecturer
English Language Center (1994)

Dr. Badawi, Hassan Mohamed
Ph.D. (1985)
University of South Carolina
Professor
Chemistry (1991)

Dr. Bader, Maher Abdulmajeed
Ph.D. (1980)
Stanford University
Assistant Professor
Civil Engineering (1972)

Dr. Badr, Hassan Mohammad
Ph.D. (1977)
University of Western Ontario
Professor
Mechanical Engineering (1979)

Dr. Badr, Talat Abdulaziz
Ph.D. (1980)
Northwestern University
Assistant Professor
Civil Engineering (1972)

Dr. Ba-Haidarah, Haitham Muhammad
Ph.D. (2004)
Texas A & M University
Assistant Professor
Mechanical Engineering (1996)

Dr. Bahlouli, Hocine
Ph.D. (1988)
University of Illinois - Urbana, Champaign
Professor
Physics (1989)

Mr. Baig, Mirza Ghouse
M.S. (1995)
King Fahd University of Petroleum & Minerals
Lecturer
Civil Engineering (2003)

Dr. Bakhashwain, Jamil M.
Ph.D. (1989)
University of Colorado - Boulder
Associate Professor
Electrical Engineering (1978)

Dr. Balah, Mohamed Ali
Ph.D. (2000)
King Fahd University of Petroleum & Minerals
Instructor
Information & Computer Science (2000)

Dr. Balghonaim, Adel Suliman
Ph.D. (1993)
University of Missouri
Assistant Professor
Electrical Engineering (1994)

Dr. Baluch, Mohammed Hussain
Ph.D. (1970)
Purdue University
Professor
Civil Engineering (1991)

Mr. Bankson, Ronald Ray
M.S. (1984)
School for International Training
Lecturer
English Language Center (1994)

Dr. Baroudi, Uthman Abdul-Rahman
Ph.D. (2000)
Concordia University
Assistant Professor
Computer Engineering (2002)

Mr. Bashar, Abul
M.S. (1999)
King Fahd University of Petroleum & Minerals
Lecturer
Electrical Engineering (1999)

Dr. Basyouni, Elsayed Mohammed Hassan
Ph.D. (1993)
Alexandria University
Lecturer
Physical Education (2000)

Mr. Bazoune, Abdelaziz
M.S. (1990)
King Fahd University of Petroleum & Minerals
Lecturer
Mechanical Engineering (1990)

Dr. Beg, Ghulam Kabir
Ph.D. (1994)
King Fahd University of Petroleum & Minerals
Assistant Professor
Mathematical Sciences (1994)

Dr. Ben Daya, Mohammad
Ph.D. (1988)
Georgia Institute of Technology
Professor
Systems Engineering (1989)

Dr. Ben-Mansour, Rached
Ph.D. (1993)
Purdue University
Assistant Professor
Mechanical Engineering (2000)

Mr. Bentercia, Abdelouahab
M.S. (2003)
King Fahd University of Petroleum & Minerals
Lecturer
Electrical Engineering (2003)

Mr. Bianchi, Dominic Richard
M.S. (1986)
San Francisco State University
Lecturer
English Language Center (1994)

Mr. Birkett, David Alexander Ros
M.Ed. (1982)
University of Manchester
Lecturer
English Language Center (1997)

Mr. Bliss, William Emmett
M.A. (1970)
San Diego State University
Lecturer
English Language Center (2003)

Dr. Bokhari, Ashfaque Hussain
Ph.D. (1987)
Quaid-I-Azam University
Professor
Mathematical Sciences (2002)

Dr. Bokhari, Muhammad Ashfaq
Ph.D. (1986)
University of Alberta
Associate Professor
Mathematical Sciences (1998)

Mr. Bouchama, Mostefa
M.S. (1987)
Eastern Michigan University
Lecturer
Civil Engineering (1989)

Dr. Boucherif, Abdelkader
Ph.D. (1979)
Brown University
Professor
Mathematical Sciences (1999)

Dr. Bouhraoua, Abdelhafid
Ph.D. (1998)
University of Paris
Assistant Professor
Computer Engineering (2005)

Mr. Bowles, Daniel
M.Phil (1980)
University of Cambridge
Lecturer
English Language Center (1995)

Mr. Bridgewater, Michael John
B.A. (2002)
University of Plymouth
Instructor
Mechanical Engineering (2003)

Mr. Brigham, Andrew Michael
M.A. (1978)
University of Lancaster
Lecturer
English Language Center (1999)

Mr. Britton, William F.V.
M.S. (1991)
University of Aston in Birmingham
Lecturer
English Language Center (1977)

Dr. Bubshait, Abdulaziz A.
Ph.D. (1985)
University of Washington
Professor
Construction Engineering & Mgt. (1978)

Dr. Bu-Bubshait, Khalid Ali
Ph.D. (1984)
Georgia State University
Professor
Management & Marketing (1976)

Dr. Budair, Mohammad Omar
Ph.D. (1981)
Stanford University
Professor
Mechanical Engineering (1972)

Dr. Budaiwi, Ismail Mohammad
Ph.D. (1994)
Concordia University
Associate Professor
Architectural Engineering (1985)

Mr. Buhari, M.I. Seyed Mohamed
M.Engg. (1998)
Bharathiyar University
Lecturer
Information & Computer Science (2000)

Dr. Bukhari, Alaadin A.
Ph.D. (1996)
University of Colorado - Boulder
Assistant Professor
Civil Engineering (1988)

Mr. Burdett, John Stephen
B.A. (1995) + Cert.E.L.T.
Brunel University
Lecturer
English Language Center (2001)

Mr. Burridge, Michael John
M.A. (1981)
Sussex University
Lecturer
English Language Center (2003)

Mr. Butterworth, Eric
B.A. (1966) + P.G.C.E.
University of Sheffield
Lecturer
English Language Center (1999)

Dr. Calcich, Stephen Eric
Ph.D. (1983)
University of Houston
Associate Professor
Management & Marketing (2000)

Mr. Callaghan, Peter Francis
M.A. (1974)
University of Essex
Lecturer
English Language Center (2000)

Mr. Cannella, Jeffrey Allen
M.A. (2003)
St. Michael's College
Lecturer
English Language Center (2005)

Mr. Caraher, Steven Paul
B.A. (1979) + Dip.E.L.T.
University of Sussex
Lecturer
English Language Center (1999)

Dr. Chanane, Bilal
Ph.D. (1990)
University of Sheffield
Professor
Mathematical Sciences (1994)

Mr. Chapman, Michael John
M.A. (1969)
University of Leeds
Lecturer
English Language Center (1998)

Dr. Chaudhry, Muhammad Anwar
Ph.D. (1977)
Kyushu University
Associate Professor
Mathematical Sciences (1992)

Dr. Chaudhry, Muhammad Aslam
Ph.D. (1984)
Carleton University
Professor
Mathematical Sciences (1984)

Dr. Cheded, Lahouari
Ph.D. (1988)
Victoria University
Associate Professor
Systems Engineering (1984)

Dr. Cherid, Ali Abdelqader
Ph.D. (1988)
King Fahd University of Petroleum & Minerals
Assistant Professor
Mathematical Sciences (1988)

Dr. Chokri, Belhaj Ahmed
Ph.D. (1996)
University of Montreal
Assistant Professor
Electrical Engineering (1991)

Dr. Choudhry, Ishtiaq Ahmed
Ph.D. (2002)
Kyoto University
Assistant Professor
Information & Computer Science (2004)

Mr. Combes, Edward Abbot
M.S. (1982)
School for International Training
Lecturer
English Language Center (1989)

Mr. Congreve, Abdulrahman William
M.A. (2002)
University of Toledo
Lecturer
English Language Center (2002)

Dr. Cooper, James Carroll
Ph.D. (1981)
Michigan State University
Associate Professor
Management & Marketing (1998)

Dr. Dakhil, Fahd Hamed
Ph.D. (1973)
Pennsylvania State University
Professor
Civil Engineering (1967)

Mr. Dale, Terry
M.S. (1981)
University of Essex
Lecturer
English Language Center (1981)

Dr. Darwish, Mohammad Abdulaziz
Ph.D. (1998)
University of Texas - Arlington
Assistant Professor
Systems Engineering (1999)

Mr. Dasa Nova, Astra Agus Pramana
M.S. (1996)
King Fahd University of Petroleum & Minerals
Lecturer
Physics (1995)

Mr. Davies, Stephen William
M.A. (1998)
University of Waikato
Lecturer
English Language Center (2001)

Dr. Dawoud, Mahmoud Mohamed
Ph.D. (1973)
University of Sheffield
Professor
Electrical Engineering (1980)

Mr. De Mello, Lurion
M.S. (2004)
Edith Cowan Univ - Australia
Lecturer
Finance & Economics (2005)

Mr. De Roo, Harry John
M.A. (1992)
Central Michigan University
Lecturer
Physical Education (1998)

Mr. Deacon, Ian Charles
M.B.A. (2005)
University of Leicester
Lecturer
English Language Center (1996)

Mr. Debenham, Leonard William
M.Ed. (2001)
Avondale College
Lecturer
English Language Center (2002)

Dr. Dehwah, Hamoud Ahmad Farhan
M.S. (1989)
King Fahd University of Petroleum & Minerals
Instructor
Mathematical Sciences (1993)

Mr. Demir, Bayram
M.S. (1996)
University of Illinois - Urbana, Champaign
Lecturer
Mathematical Sciences (2001)

Dr. Deriche, Mohamed
Ph.D. (1992)
University of Minnesota
Associate Professor
Electrical Engineering (2001)

Dr. Dincer, Ibrahim
Ph.D. (1993)
Istanbul Technical University
Adjunct Professor
Mechanical Engineering (2004)

Dr. Doklah, Mahmoud El Awady
Ph.D. (1976)
Texas A & M University
Associate Professor
Petroleum Engineering (2004)

Mr. Doman, Hargrieve M.
LL.B. (1964)
University of London
Lecturer
English Language Center (1976)

Mr. Donovan, Anthony Francis
M.A. (1970)
University of California - Berkeley
Lecturer
English Language Center (1997)

Mr. Dowling, Sean Patrick
B.Sc. (1989) + Cert.E.L.T.
National University of Ireland
Instructor
English Language Center (2004)

Dr. Duffuaa, Salih Osman
Ph.D. (1982)
University of Texas - Austin
Professor
Systems Engineering (1984)

Dr. Eid, Mustafa Ismail
Ph.D. (2003)
Massey University
Assistant Professor
Accounting & M I S (2003)

Dr. El Ali, Bassam Mohamad
Ph.D. (1989)
Universite Pierre & Marie Curie
Professor
Chemistry (1996)

Dr. El-Alfy, El-Sayed Mohamed
Ph.D. (2001)
Stevens Institute of Technology
Assistant Professor
Information & Computer Science (2004)

Dr. El-Amin, Ibrahim Mohammad
Ph.D. (1978)
University of Manchester
Professor
Electrical Engineering (1978)

Dr. Elazouni, Ashraf Mohammad
Ph.D. (1993)
Oklahoma State University
Assistant Professor
Construction Engineering & Mgt. (2004)

Mr. El-Badawi, Khalid Abdalla
M.S. (2003)
King Fahd University of Petroleum & Minerals
Lecturer
Information & Computer Science (2003)

Dr. El-Bassuny, Tarek Ahmed Helmy A.
Ph.D. (2002)
Kyushu University
Assistant Professor
Information & Computer Science (2004)

Dr. Eleiche, Abdel-Salam Mohamed
Ph.D. (1973)
Brown University
Professor
Mechanical Engineering (2000)

Dr. El-Ferik, Sami Ben Abdellaziz Ben A.
Ph.D. (1996)
Ecole Polytechnique of Montreal
Assistant Professor
Systems Engineering (2000)

Dr. El-Gebeily, Mohamed Ali
Ph.D. (1984)
Oklahoma State University
Professor
Mathematical Sciences (1988)

Dr. El-Maleh, Aiman Helmi
Ph.D. (1995)
McGill University
Assistant Professor
Computer Engineering (1998)

Dr. El-Omari, Hussein Abdulla
Ph. D. (1991)
Glasgow University
Associate Professor
Management & Marketing (2005)

Dr. Elrabaa, Mohamed Elnasir Salaheddin
Ph.D. (1995)
University of Waterloo
Assistant Professor
Computer Engineering (2001)

Dr. El-Sebakhy, Emad Ahmed
Ph.D. (2003)
Cornell University
Assistant Professor
Information & Computer Science (2005)

Dr. El-Shaarawi, Maged Ahmed
Ph.D. (1974)
University of Leeds
Professor
Mechanical Engineering (1990)

Dr. Elshafei, Ahmed Moustafa
Ph.D. (1982)
McGill University
Associate Professor
Systems Engineering (2003)

Dr. El-Sinawi, Ameen Hussein
Ph.D. (1999)
University of Dayton
Assistant Professor
Mechanical Engineering (2000)

Dr. Eltayeb, Elgaily Ahmed
Ph.D. (1987)
University of Exeter
Assistant Professor
Management & Marketing (2005)

Dr. Emara-Shabaik, Hosam Eldin
Ph.D. (1979)
University of California - Los Angeles
Professor
Systems Engineering (1988)

Mr. Enaya, Fuad Mohammad Fayez
M.S. (1998)
King Fahd University of Petroleum & Minerals
Lecturer
Physics (2002)

Dr. Ertogral, Kadir
Ph.D. (2001)
Lehigh University
Assistant Professor
Systems Engineering (2001)

Dr. Essayyad, Musa Mohammad
Ph.D. (1985)
University of Alabama
Chair Professor
Finance & Economics (2001)

Mr. Evans, Charles Albert Neil
B.Ed. (1975)
University of Western Australia
Lecturer
Physical Education (2005)

Mr. Faheemuddin, Mohammad
M.S. (2003)
King Fahd University of Petroleum & Minerals
Lecturer
Computer Engineering (2003)

Dr. Fairag, Faisal Abdulkarim M.
Ph.D. (1998)
University of Pittsburgh
Assistant Professor
Mathematical Sciences (1987)

Dr. Faisal, Kanaan Abed
Ph.D. (1990)
University of Washington
Assistant Professor
Information & Computer Science (1980)

Dr. Faiz, Mohamed M.
Ph.D. (1992)
University of Illinois - Urbana, Champaign
Associate Professor
Physics (1994)

Mr. Fazal-ur-Rehman
M. Phil (1989)
Quaid-i-Azam University
Lecturer
Physics (2000)

Mr. Ferguson, Allan Michael
M.S. (1999)
University of Montreal
Lecturer
English Language Center (2001)

Dr. Fettouhi, Mohammed Benyounes
Ph.D. (1993)
University Rennes I
Associate Professor
Chemistry (1996)

Dr. Fiagbedzi, Yawvi A.
Ph.D. (1985)
Brown University
Professor
Mathematical Sciences (1987)

Mr. Fitzsimmons, Thomas Lauren
M.Ed. (1995)
University of Manchester
Lecturer
English Language Center (2005)

Mr. Fletcher, Michael Douglas
M.A. (1997)
St. Andrews University
Lecturer
English Language Center (1998)

Mr. Flint, Robert
M.A. (1997)
University of Southampton
Lecturer
English Language Center (2002)

Mr. Fogarty, Michael Joseph
B.Ed. (1978) + Cert.E.L.T.
University of Toronto
Lecturer
English Language Center (2001)

Dr. Forner, Wolfgang
Ph.D. (1992)
Friedrich-Alexander University
Professor
Chemistry (1997)

Dr. Forristal, Ian
Ph.D. (1998)
University of Leeds
Assistant Professor
Chemistry (2000)

Mr. Foster, David Lee
M.A. (1980)
University of Kansas
Lecturer
English Language Center (2002)

Dr. Fraihat, Haidar Mohammed
Ph.D. (1992)
Illinois Institute of Technology
Assistant Professor
Accounting & M I S (2002)

Mr. Fredericks, Larry Ray
M.A. (1971)
Dalhousie University
Lecturer
English Language Center (2001)

Mr. Fry, Colin John
M.A. (1998)
University of Leicester
Lecturer
English Language Center (2002)

Dr. Furati, Khaled Mohammad
Ph.D. (1995)
Duke University
Associate Professor
Mathematical Sciences (1985)

Dr. Gandhidasan, Palanichamy
Ph.D. (1979)
Indian Institute of Technology
Professor
Mechanical Engineering (1992)

Mr. Garba, Shaibu Bala
M.S. (1997)
King Fahd University of Petroleum & Minerals
Lecturer
Architecture (1998)

Mr. Garba, Ya'u Isa
M.S. (2003)
King Fahd University of Petroleum & Minerals
Lecturer
Computer Engineering (2004)

Mr. Garout, Yahya Mohammad
M.S. (1989)
King Fahd University of Petroleum & Minerals
Lecturer
Information & Computer Science (1990)

Dr. Garwan, Muhammad Ahmad
Ph.D. (1993)
University of Toronto
Associate Professor
Physics (1980)

Mr. Gassor, Ibrahim Mohammad B.
B.S. (1977)
Halwan University
Lecturer
Physical Education (1987)

Mr. Gaylard, Robert Philip
B.A. (1979) + P.G.C.E.
University of Lancaster
Lecturer
English Language Center (1997)

Dr. Ghaleb, Amin Ramadan
Ph.D. (1993)
University of Wales
Instructor
Earth Sciences (1992)

Mr. Ghandi, Bashir Mohammed
M.S. (1994)
University of Salford
Lecturer
Information & Computer Science (1999)

Mr. Ghannam, Ayman Akram Hussein
M.S. (1997)
University of Jordan
Lecturer
Physics (1999)

Mr. Ghouseuddin, Mohammed
M.S. (1998)
King Fahd University of Petroleum & Minerals
Lecturer
Information & Computer Science (1998)

Mr. Ghouti, Lahouari
M.S. (1997)
King Fahd University of Petroleum & Minerals
Lecturer
Information & Computer Science (1997)

Mr. Gibbons, Jeffrey Martin
M.A. (1994)
St. Mary's University
Lecturer
English Language Center (2003)

Mr. Gibson, Anthony
M.S. (1988)
University of Leeds
Lecturer
English Language Center (1988)

Mr. Golding, Gerard Paul
M.A. (2005)
University of New England
Lecturer
English Language Center (2001)

Dr. Gondal, Mohammad Ashraf
Ph.D. (1983)
University of Bonn
Professor
Physics (1991)

Mr. Gray, John Andrew
M.A. (1987)
University of Canterbury
Lecturer
English Language Center (2001)

Dr. Gutub, Adnan Abdul Aziz
Ph.D. (2002)
Oregon State University
Assistant Professor
Computer Engineering (1995)

Dr. Habib, Mohamed Abdel-Aziz Mostafa
Ph.D. (1980)
Imperial College
Professor
Mechanical Engineering (1997)

Dr. Habiballah, Ibrahim Omar
Ph.D. (1993)
University of Waterloo
Associate Professor
Electrical Engineering (1984)

Dr. Hajj Ibrahim, Abdullah Omar
Ph.D. (1997)
Um Al-Qura University
Associate Professor
Islamic & Arabic Studies (1998)

Mr. Hakim, Adiche Salah
M.S. (1997)
King Fahd University of Petroleum & Minerals
Lecturer
Computer Engineering (1998)

Dr. Hamada, Gharib Moustafa
Dr.Eng. (1983)
Bordeaux University
Visiting Professor
Petroleum Engineering (2006)

Dr. Hamdan, Abdalla Jafar
Ph.D. (1986)
University of California - Irvine
Assistant Professor
Chemistry (1978)

Dr. Hamdan, Bassam Ali
Ph.D. (1983)
University of Alabama
Assistant Professor
Finance & Economics (1992)

Mr. Hamdan, Mohamed Hashem
B.S. (1990)
Alexandria University
Lecturer
Physical Education (1999)

Mr. Hammad, Samer Sulaiman
M.S. (1980)
King Fahd University of Petroleum & Minerals
Lecturer
Management & Marketing (1980)

Mr. Hands, Francis Michael
M.S. (1993)
University of London
Lecturer
English Language Center (1998)

Mr. Hanrahan, Joseph Vaughn
M.Ed. (1977)
St. Francis Xavier University
Lecturer
English Language Center (2005)

Dr. Hariri, Mustaffa Mohammad
Ph.D. (1995)
South Dakota School of Mines & Technology
Associate Professor
Earth Sciences (1988)

Dr. Haroun, Ahmed Elamin
Ph.D. (1993)
Oklahoma State University
Visiting Associate
Systems Engineering (2003)

Mr. Hasan, Masudul
M.S. (1993)
King Fahd University of Petroleum & Minerals
Lecturer
Computer Engineering (1993)

Dr. Hasanain, Mootaz Bellah
Ph.D. (1993)
Alexandria University
Lecturer
Physical Education (1989)

Mr. Hassan, Ahmed Yusuf
M.Ed. (1995)
University of Ottawa
Lecturer
Testing & Evaluation Center (1998)

Dr. Hassan, Essam Eldin Mohammad
Ph.D. (1978)
University of Manitoba
Professor
Electrical Engineering (1979)

Dr. Hassanain, Mohammad Ahmad
Ph.D. (2002)
University of British Columbia
Assistant Professor
Architectural Engineering (2002)

Mr. Hatfield, Colin
CER (1984)
University of Huddersfield
Lecturer
Mechanical Engineering (2000)

Dr. Hawwa, Mohamad Abdel Fattah
Ph.D. (1990)
University of Cincinnati
Visiting Associate
Mechanical Engineering (2003)

Dr. Hegazi, Ezzat Mahmoud
Ph.D. (1989)
University of Windsor
Associate Professor
Physics (1991)

Mr. Hennessey, Stephen Robert
M.A. (1982)
Columbia University
Lecturer
English Language Center (2004)

Dr. Hethilain, Sultan Khalid
Ph.D. (1997)
University of Birmingham
Assistant Professor
Islamic & Arabic Studies (1997)

Dr. Hogendijk, Jan Pieter
Ph.D. (1983)
University of Utrecht
Adjunct Professor
Mathematical Sciences (2004)

Dr. Hoque, Monzurul
Ph. D. (1987)
Univ of Illinois - UC
Visiting Professor
Finance & Economics (2005)

Mr. Horn, Roger Alan
M.S. (1995)
University of Aston in Birmingham
Lecturer
English Language Center (1995)

Dr. Howsawi, Abdulrahman A.
Ph.D. (2000)
Imam Mohammad Saud University
Assistant Professor
Islamic & Arabic Studies (1988)

Mr. Hussain, Ahmed Abul
M.S. (1998)
University of Florida
Lecturer
Electrical Engineering (2000)

Dr. Hussain, Mahbub
Ph.D. (1986)
University of Texas - Dallas
Associate Professor
Earth Sciences (1996)

Mr. Hussain, Syed Ameenuddin
M.S. (2003)
King Fahd University of Petroleum & Minerals
Lecturer
Systems Engineering (2004)

Dr. Hussein, Abdulrazaq Alhaj Abdulrahim
Ph.D. (1981)
Azhar University
Professor
Islamic & Arabic Studies (2002)

Dr. Hussein, Alaa El-Din
Ph.D. (2002)
University of Waterloo
Assistant Professor
Electrical Engineering (2003)

Dr. Hussein, Ibnelwaleed Ali
Ph.D. (1999)
University of Alberta
Associate Professor
Chemical Engineering (2000)

Mr. Hyoung Gyun James Shin
M.A. (1992)
University of Oregon
Lecturer
Physical Education (2001)

Mr. Ibeid, Ali Azmi
B.S. (1991)
University of Illinois - Chicago
Lecturer
Physical Education (1998)

Dr. Ibrahim, Ahmed Shawky
Ph.D. (1982)
Assiut University
Associate Professor
Mathematical Sciences (1972)

Mr. Ilyas, Irfan Ahmed
M.S. (1999)
King Fahd University of Petroleum & Minerals
Lecturer
Accounting & M I S (2000)

Dr. Inui, Tomoyuki
Ph.D. (1971)
Kyoto University
Chair Professor
Chemical Engineering (2003)

Dr. Iqbal, Mohammad
Ph.D. (1989)
University of Wales
Associate Professor
Mathematical Sciences (1991)

Dr. Isab, Anvar Husein
Ph.D. (1978)
University of London
Professor
Chemistry (1981)

Prof. Ishteeaque, Ellahi Mohammad
M.S. (1976)
University of Florida
Professor
Architecture (1980)

Mr. Islam, Mohammed Shahidul
M.S. (1981)
Harvard University
Lecturer
Accounting & M I S (1990)

Mr. Ismail, Ahmed Daud
M.S. (1985)
New Mexico State University
Lecturer
English Language Center (1989)

Dr. Jaber, Abdul Muttaleb Yousuf
Ph.D. (1977)
University of Wales
Professor
Chemistry (1982)

Dr. Jabir, Imad
Ph. D. (1990)
Oklahoma State University
Assistant Professor
Finance & Economics (2005)

Mr. Jalaluddin, Mohammed
M.S. (2001)
King Fahd University of Petroleum & Minerals
Lecturer
Construction Engineering & Mgt. (2002)

Mr. Jamal, Ahmad
M.S. (2002)
King Fahd University of Petroleum & Minerals
Lecturer
Aerospace Engineering (2003)

Mr. Jameson, Jeffrey
M.Ed. (1975)
University of Manchester
Lecturer
English Language Center (1995)

Dr. Jamjoom, Faisal Abdul-Latif
Ph.D. (1986)
University of California – Santa Barbara
Assistant Professor
Mechanical Engineering (1977)

Dr. Jarad, Abdulrahman Mohammed
Ph.D. (2005)
University of South Carolina
Assistant Professor
Earth Sciences (1998)

Dr. Jibril, Adnan Abdelqader
Ph.D. (1980)
University of Glasgow
Assistant Professor
Mathematical Sciences (1989)

Dr. Joarder, Anwarul Haque
Ph.D. (1992)
University of Western Ontario
Associate Professor
Mathematical Sciences (1997)

Mr. Johar, Umar Muhammed
M.S. (1993)
King Fahd University of Petroleum & Minerals
Lecturer
Electrical Engineering (1993)

Mr. Johnston, David Carlyle
B.Ed. (1994)
Concordia University
Lecturer
English Language Center (1998)

Dr. Junaidu, Sahalu Balarabe
Ph.D. (1998)
St. Andrews University
Assistant Professor
Information & Computer Science (1999)

Dr. Kabbaj, Salah-Eddine
Ph.D. (1988)
University of Lyon I
Professor
Mathematical Sciences (2002)

Dr. Kadi, Abdulmalek Bakr
Ph.D. (1983)
Al-Azhar University
Associate Professor
Islamic & Arabic Studies (1979)

Dr. Kahraman, Ramazan
Ph.D. (1993)
Montana State University
Associate Professor
Chemical Engineering (1993)

Dr. Kalyon, Muammer
Ph.D. (1993)
University of Michigan
Associate Professor
Mechanical Engineering (1999)

Mr. Kamal, Chenaoua
M.S. (1989)
University of Hull
Lecturer
Computer Engineering (1998)

Mr. Kandlawala, Muhammad Fareed
M.S. (2002)
King Fahd University of Petroleum & Minerals
Lecturer
Electrical Engineering (2002)

Mr. Kariapper, Mohammed Sirajuddin
M.S. (1989)
King Fahd University of Petroleum & Minerals
Lecturer
Physics (1989)

Dr. Kassas, Mahmoud
Ph.D. (1991)
Vanderbilt University
Assistant Professor
Electrical Engineering (1994)

Dr. Kassem, Ayman Hamdy
Ph.D. (1998)
Old Dominion University
Assistant Professor
Aerospace Engineering (2004)

Dr. Kayal, Aymen Abdulmageed
Ph. D. (1997)
George Washington University
Assistant Professor
Management & Marketing (1991)

Mr. Khaeruzzaman, Yaman
M.S. (1996)
Southern Illinois University
Lecturer
Information & Computer Science (2000)

Dr. Khaiyat, Sami Abdulrahman
Ph.D. (1994)
Texas A & M University
Assistant Professor
Architectural Engineering (1986)

Dr. Khaled, Mazen Mohammad
Ph.D. (1992)
University of Alabama
Associate Professor
Chemistry (1994)

Dr. Khan, Abdul Rahim
Ph.D. (1983)
University of Wales
Associate Professor
Mathematical Sciences (1997)

Dr. Khan, Israr Sardar
Ph.D. (1985)
Kanpur University
Instructor
Accounting & M I S (1992)

Mr. Khan, Mehmood
M.S. (2000)
King Fahd University of Petroleum & Minerals
Lecturer
Systems Engineering (2001)

Dr. Khan, Mohammad Aslam
Ph.D. (1974)
University of Hull
Professor
Physics (1981)

Mr. Khan, Muhammad Ajmal
M.S. (2001)
King Fahd University of Petroleum & Minerals
Lecturer
Electrical Engineering (2001)

Mr. Khan, Salman Ahmad
M.S. (1999)
King Fahd University of Petroleum & Minerals
Lecturer
Computer Engineering (2000)

Mr. Khan, Shamsuddin
M.S. (1987)
King Fahd University of Petroleum & Minerals
Lecturer
Mathematical Sciences (1992)

Mr. Khan, Sohel Majid
M.S. (2004)
King Fahd University of Petroleum & Minerals
Lecturer
Information & Computer Science (2004)

Dr. Khan, Zafarullah
Ph.D. (1985)
University of Illinois - Urbana, Champaign
Associate Professor
Mechanical Engineering (1987)

Dr. Kharab, Abdelwahab
Ph.D. (1984)
Oregon State University
Associate Professor
Mathematical Sciences (1985)

Mr. Khateeb-Ur-Rehman
M.S. (1999)
King Fahd University of Petroleum & Minerals
Lecturer
Physics (1999)

Dr. Khattak, Guldad Khan
Ph.D. (1978)
Purdue University
Professor
Physics (1980)

Dr. Khiari, Fattah Z.
Ph.D. (1987)
University of Michigan
Associate Professor
Physics (1989)

Dr. Khulief, Yehia Abdelraouf
Ph.D. (1985)
University of Illinois - Urbana, Champaign
Professor
Mechanical Engineering (1988)

Dr. Khumawala, Basheer M.
Ph. D. (1970)
Purdue University
Adjunct Professor
Management & Marketing (2004)

Mr. Kirk, Hamish
M.A. (1968)
University of Edinburgh
Lecturer
English Language Center (2005)

Mr. Knight, Michael Stewart
M.A. (1988)
Royal Academy of Arts
Lecturer
English Language Center (1998)

Dr. Kocabas, Ibrahim
Ph.D. (1990)
Stanford University
Associate Professor
Petroleum Engineering (2006)

Mr. Konash, Farouk Mohammad
M.S. (1980)
New Mexico State University
Assistant Professor
Architectural Engineering (1972)

Dr. Korvin, Gabor
Ph.D. (1979)
University of Heavy Industry
Professor
Earth Sciences (1994)

Dr. Kousa, Maan Abdulgader
Ph.D. (1994)
University of London
Associate Professor
Electrical Engineering (1988)

Dr. Landolsi, Mohamed Adnan
Ph.D. (1996)
University of Michigan
Assistant Professor
Electrical Engineering (2001)

Dr. Laradji, Abdallah
Ph.D. (1986)
University of Sheffield
Associate Professor
Mathematical Sciences (1990)

Dr. Latif, Raja Mohammad
Ph.D. (1989)
University of Alberta
Assistant Professor
Mathematical Sciences (1991)

Dr. Loughlin, Kevin Francis
Ph.D. (1970)
University of New Brunswick
Associate Professor
Chemical Engineering (1978)

Dr. Lyaghfouri, Abdeslem
Ph.D. (1997)
University of Zurich
Associate Professor
Mathematical Sciences (2001)

Mr. Lynn, Dennis Craig
M.S. (1981)
Auburn University
Lecturer
English Language Center (1993)

Dr. Maadhah, Ali Ghuramalla
Ph.D. (1978)
Oklahoma State University
Professor
Chemical Engineering (1971)

Dr. Maalej, Nabil
Ph.D. (1994)
University of Wisconsin - Madison
Associate Professor
Physics (2001)

Mr. Mabroukeh, Nizar Radi Hussein
M.S. (1998)
University of Jordan
Lecturer
Computer Engineering (1999)

Mr. Macleod, John Ross
M.A. (1995)
University of Southampton
Lecturer
English Language Center (1996)

Dr. Madani, Haidar Husain
Ph.D. (1996)
Brunel University
Assistant Professor
Accounting & M I S (1985)

Dr. Maghrabi, Aimen A.
Ph.D. (1997)
Georgetown University
Assistant Professor
Management & Marketing (1987)

Dr. Maghrabi, Talal Hamza
Ph.D. (1992)
Arizona State University
Assistant Professor
Information & Computer Science (1983)

Mr. Mahgoub, Kamal Eldin Ali
M.S. (1981)
University of Strathclyde
Lecturer
Chemical Engineering (1999)

Dr. Mahmood, Muzafferuddin
M.S. (1984)
King Fahd University of Petroleum & Minerals
Instructor
Mechanical Engineering (1984)

Dr. Mahmoud, Ashraf Sharif Hasan
Ph.D. (1997)
Carleton University
Assistant Professor
Computer Engineering (2002)

Dr. Mahmoud Elish
Ph.D. (2005)
George Mason University
Assistant Professor
Information & Computer Science (2005)

Mr. Mahmoud, Mohammed Yahya
B.S. (2000)
King Fahd University of Petroleum & Minerals
Lecturer
Computer Engineering (2000)

Mr. Malik, Musawar Amin
M.S. (1998)
University of Alberta
Lecturer
Mathematical Sciences (1998)

Dr. Mallalah, Ibrahim
Ph.D. (2004)
McGill University
Assistant Professor
Information & Computer Science (2005)

Mr. Man-Cheung, David
M.Ed. (1986)
University of Leeds
Lecturer
English Language Center (2005)

Dr. Mansour, Mourad Ben Mohamed Habib
Ph.D. (2002)
University of Tsukuba
Assistant Professor
Management & Marketing (2004)

Dr. Mantawy, Abdel-Aal Hassan
Ph.D. (1997)
King Fahd University of Petroleum & Minerals
Assistant Professor
Electrical Engineering (1998)

Dr. Masih, Abul Mansur Mohammed
Ph.D. (1974)
University of Leeds
Chair Professor
Finance & Economics (2001)

Dr. Masoud, Ahmad A.
Ph.D. (1995)
Queen's University
Assistant Professor
Electrical Engineering (2001)

Dr. Masoudi, Husain Mohammad
Ph.D. (1995)
Glasgow University
Associate Professor
Electrical Engineering (1986)

Dr. Mat-Zin, Razali Bin
Ph.D. (1993)
Florida State University
Associate Professor
Management & Marketing (2004)

Dr. Maung, Than Htun
Ph.D. (1994)
King Fahd University of Petroleum & Minerals
Associate Professor
Chemistry (1995)

Dr. Mavromatis, Harry Anthony
Ph.D. (1966)
Princeton University
Professor
Physics (1987)

Mr. McCord, John Robert
B.A. (1973) + Dip.E.L.T.
University of Texas
Lecturer
English Language Center (2003)

Mr. McGee, Iain David
M.A. (2002)
University of Leicester
Lecturer
English Language Center (2002)

Mr. McKay, Andrew
B.Sc. (1998) + Cert.E.L.T.
Leeds Metropolitan University
Lecturer
English Language Center (2005)

Mr. McLaren, Peter Bowman
M.A. (2001)
University of Leicester
Lecturer
English Language Center (2003)

Dr. Mekkawi, Mohammad Husain
Ph.D. (1998)
Colorado University
Assistant Professor
Earth Sciences (1987)

Dr. Mekki, Abdelkarim
Ph.D. (1997)
Warwick University
Assistant Professor
Physics (1990)

Mr. Mekki, Mogtaba Bakheet
M.S. (1999)
Sudan University of Science & Technology
Lecturer
Physics (2002)

Dr. Merah, Necar
Ph.D. (1995)
University of Montreal
Associate Professor
Mechanical Engineering (1996)

Dr. Messaoudi, Salim
Ph.D. (1989)
Carnegie-Mellon University
Professor
Mathematical Sciences (1997)

Dr. Mezghani, Khaled
Ph.D. (1996)
University of Tennessee
Assistant Professor
Mechanical Engineering (1998)

Mr. Miller, Patrick
M.S. (1978)
University of Essex
Lecturer
English Language Center (1993)

Dr. Mimouni, Abdeslam
Ph.D. (1995)
University of Fez
Associate Professor
Mathematical Sciences (2004)

Dr. Moftah, Aly Aly
Ph.D. (1988)
Ein Shams University
Associate Professor
Islamic & Arabic Studies (2004)

Dr. Mohamed, Mohamed Makkawi
Ph.D. (2002)
Golden Gate University
Lecturer
Management & Marketing (2003)

Dr. Mohammed, Sadiq Sait
Ph.D. (1987)
King Fahd University of Petroleum & Minerals
Professor
Computer Engineering (1981)

Dr. Mohammed, Salahadin Adem
Ph.D. (2002)
Monash University
Assistant Professor
Information & Computer Science (2003)

Dr. Mohandes, Mohamed
Ph.D. (1993)
Purdue University
Associate Professor
Electrical Engineering (1997)

Mr. Mohiuddin, Mohammed Taher
M.Tech. (2000)
Jawaharlal Nehru Technological University
Lecturer
Mechanical Engineering (2002)

Dr. Mokheimer, Esmail Mohamed Ali
Ph.D. (1996)
King Fahd University of Petroleum & Minerals
Associate Professor
Mechanical Engineering (1996)

Mr. Moloney, William Brendan
M.Ed. (2000)
University of Sheffield
Lecturer
English Language Center (2000)

Mr. Moore, David Harold
M.A. (1992)
University of Oxford
Lecturer
English Language Center (2003)

Mr. Moore, Kevan
M.A. (1979)
University of Leeds
Lecturer
English Language Center (2001)

Mr. Morgan, George Henry Peter
CER (1986)
University of Huddersfield
Lecturer
Mechanical Engineering (2003)

Mr. Morris, Andrew Philip
M.Ed. (2002)
University of Edinburgh
Lecturer
English Language Center (2002)

Mr. Morris, Christopher Olsen
B.A. (1993) + Cert.E.L.T.
Simon Fraser University
Lecturer
English Language Center (2002)

Dr. Morsy, Mohammed Ali
Ph.D. (1993)
King Fahd University of Petroleum & Minerals
Associate Professor
Chemistry (1993)

Dr. Mudawar, Muhamed Fawzi
Ph.D. (1993)
Syracuse University
Assistant Professor
Computer Engineering (2004)

Mr. Muhammad, Inam
M.S. (1984)
King Fahd University of Petroleum & Minerals
Lecturer
Mechanical Engineering (1984)

Mr. Muhammad, Said Abdallah
M.S. (1992)
King Fahd University of Petroleum & Minerals
Lecturer
Information & Computer Science (1993)

Dr. Muqaibel, Ali Hussein
Ph.D. (2003)
Virginia Polytechnic Institute & State
Assistant Professor
Electrical Engineering (2003)

Mr. Murray, Donal Joseph
B.A. (1985) + Cert.E.L.T.
National University of Ireland
Lecturer
English Language Center (2002)

Mr. Murteza, Daniel Brian
M.A. (1977)
Ohio University
Lecturer
Management & Marketing (2001)

Dr. Musa, Muhammad
Ph. D. (1985)
Claremont Graduate School
Assistant Professor
Finance & Economics (1974)

Dr. Musazey, Mohammed Saber
Ph.D. (1981)
North Carolina State University
Assistant Professor
Physics (1981)

Dr. Mustafa, Muhammad Tahir
Ph.D. (1996)
University of Leeds
Assistant Professor
Mathematical Sciences (2003)

Dr. Muttlak, Hassen Alwan
Ph.D. (1988)
University of Wyoming
Professor
Mathematical Sciences (1998)

Dr. Nagadi, Mahmoud Mohammad
Ph.D. (1992)
Duke University
Associate Professor
Physics (1979)

Mr. Nagy, Luqman Ronald
M.Ed. (1981)
University of British Columbia
Lecturer
English Language Center (1998)

Dr. Najjar, Mamdouh Mohammad
Ph.D. (1989)
Illinois Institute of Technology
Associate Professor
Information & Computer Science (1983)

Dr. Naqvi, Akhtar Abbas
Ph.D. (1980)
University of Karlsruhe - 1
Professor
Physics (1980)

Dr. Naseer, Abdul Rahim
Ph.D. (1996)
Indian Institute of Technology
Assistant Professor
Computer Engineering (2001)

Dr. Nassar, Rafat Mohammad
Ph.D. (1997)
St. Andrews University
Assistant Professor
Physics (1986)

Dr. Nasser, Ibraheem Mahmoud Ahmad
Ph.D. (1985)
University of Connecticut
Professor
Physics (1988)

Dr. Ndiaye, Malick Mody
Ph.D. (1996)
University of Burgondy
Assistant Professor
Systems Engineering (2001)

Mr. Nee, Michael John
M.Ed. (2002)
University of Edinburgh
Lecturer
English Language Center (2003)

Dr. Nehari-Talet, Amine
Ph.D. (2002)
University of Strathclyde
Assistant Professor
Accounting & M I S (2001)

Mr. Nelson, Timothy Andrew
B.A. (1991) + Dip. Ed.
University of British Columbia
Lecturer
English Language Center (2002)

Mr. Nicholas, Paul Arthur Bernard
B.A. (1983) + P.G.C.E.
University of Wolverhampton
Lecturer
English Language Center (1997)

Mr. Nour El-Din, Adel Mohammad
B.S. (1970)
Cairo University
Lecturer
Physical Education (1989)

Mr. Nuruzzaman, Mohammad
M.S. (1998)
King Fahd University of Petroleum & Minerals
Lecturer
Electrical Engineering (1998)

Mr. Nuttall, Ricky William
B.Ed. (2000)
Queensland University of Technology
Lecturer
Physical Education (2003)

Mr. O'brien, John
Diploma (1976)
College Education in UK
Lecturer
Mechanical Engineering (1992)

Mr. O'Heron, John Joseph, Jr.
M.A. (1988)
University of South Florida
Lecturer
English Language Center (2005)

Mr. O'Neill, Ernest Kelly
Diploma (1966)
City & Guilds of London Institute
Lecturer
Mechanical Engineering (1987)

Dr. Omar, Hanafy Mohammed
Ph.D. (2002)
Virginia Polytechnic Institute & State
Assistant Professor
Aerospace Engineering (2003)

Dr. Omar, Mohammad Hafidz
Ph.D. (1995)
University of Iowa
Assistant Professor
Mathematical Sciences (2004)

Mr. Omar, Sayed
M.S. (1998)
King Fahd University of Petroleum & Minerals
Lecturer
Mathematical Sciences (1999)

Dr. Oncel, Ali Osman
Ph.D. (1997)
Istanbul University
Assistant Professor
Earth Sciences (2004)

Dr. Oukil, Mohanad Said
Ph.D. (1990)
University of Strathclyde
Visiting Professor
Management & Marketing (2003)

Dr. Oweimreen, Ghassan Andrawes
Ph.D. (1977)
Georgetown University
Professor
Chemistry (1978)

Mr. Paddock, Simon Tobias
LL.B. (1995) + Cert.E.L.T.
University of London
Lecturer
English Language Center (2003)

Mr. Pasha, Jahangir Mohammed
M.S. (1998)
King Fahd University of Petroleum & Minerals
Lecturer
Electrical Engineering (1999)

Mr. Pearson, Keith Thomas
B.Sc. (1994) + Cert.E.L.T.
University of Northumbria
Lecturer
English Language Center (2002)

Dr. Perzanowski, Herman Paul
Ph.D. (1966)
University of Virginia
Associate Professor
Chemistry (1966)

Mr. Portman, Brett Allen
M.A. (1998)
Inter American University
Lecturer
English Language Center (2001)

Mr. Powell, James Elwood
M.Ed. (1982)
University of California - Los Angeles
Lecturer
English Language Center (2003)

Mr. Pryor, Robert Stirling
B.A. (1981) + Dip.E.L.T.
University of London
Lecturer
English Language Center (2003)

Dr. Qadir, Asghar
Ph.D. (1971)
University of London
Adjunct Professor
Mathematical Sciences (2000)

Dr. Qahwash, Abdellatif Ahmad
Ph.D. (1974)
University of Arizona - Tucson
Associate Professor
Earth Sciences (1974)

Dr. Qasem, Zohair Matouq Assad
Ph.D. (1999)
University of Virginia
Assistant Professor
Mechanical Engineering (1989)

Mr. Raad, Muhammad Wassim
M.S. (1985)
King Fahd University of Petroleum & Minerals
Lecturer
Computer Engineering (1986)

Mr. Raburu, George Otieno
M.S. (1998)
University of Southampton
Lecturer
Mathematical Sciences (2000)

Dr. Radhwi, Halim Hamid
Ph.D. (1988)
City University
Professor
Chemical Engineering (1978)

Dr. Ragheb, Hassan Aly
Ph.D. (1987)
University of Manitoba
Associate Professor
Electrical Engineering (1989)

Mr. Raharja, I Putu Danu
M.S. (1996)
Coventry University
Lecturer
Information & Computer Science (2000)

Dr. Rahimov, Ibrahim
D. Sc. (1991)
Steklov Mathematical Institute of Acad. of Sc.
Professor
Mathematical Sciences (1998)

Dr. Rahman, Sleem Ur
Ph.D. (1995)
King Fahd University of Petroleum & Minerals
Associate Professor
Chemical Engineering (1995)

Dr. Ramady, Mohamed
Ph. D. (1978)
University of Leicester
Associate Professor
Finance & Economics (2002)

Dr. Rao, Madala Rama K.K.
Ph.D. (1993)
Tata Institute of Fundamental Research
Associate Professor
Information & Computer Science (2002)

Mr. Raza, Muhammad Kamran
M.S. (1998)
King Fahd University of Petroleum & Minerals
Lecturer
Mechanical Engineering (1999)

Mr. Raza, Syed Arshad
M.S. (2001)
King Fahd University of Petroleum & Minerals
Lecturer
Accounting & M I S (2001)

Mr. Razzak, Saquib
M.S. (2002)
University of Texas - Austin
Lecturer
Information & Computer Science (2004)

Dr. Refaat, Walaa Rafaat Ahmad
Ph.D. (1979)
Cairo University
Assistant Professor
Management & Marketing (1980)

Dr. Reffat, Rabee Mohamed
Ph.D. (2000)
University of Sydney
Assistant Professor
Architecture (2004)

Mr. Richards, Thomas Stephen
M.A. (1988)
University of Hawaii
Lecturer
English Language Center (2004)

Mr. Ross, David Ian
M.App.Lin. (2003)
Macquarie University
Lecturer
English Language Center (2003)

Dr. Saafeen, Adly Khaleel
Ph.D. (1996)
University of London
Assistant Professor
Earth Sciences (1980)

Mr. Sabeer, Mir Hamid
M.S. (2003)
King Fahd University of Petroleum & Minerals
Lecturer
Architectural Engineering (2003)

Dr. Sabri, A. Mahmoud
Ph.D. (1987)
University of Bradford
Associate Professor
Information & Computer Science (2005)

Dr. Sadi, Muhammad Asad
Ph.D. (1994)
Virginia Polytechnic Institute
Associate Professor
Management & Marketing (2000)

Dr. Saeed, Farooq
Ph.D. (1999)
University of Illinois - Urbana, Champaign
Assistant Professor
Aerospace Engineering (2003)

Dr. Sahin, Ahmet Ziyaettin
Ph.D. (1988)
University of Michigan
Professor
Mechanical Engineering (1989)

Mr. Said, Abdella Abdel-Rahman
B.S. (1975)
Halwan University
Lecturer
Physical Education (1991)

Dr. Said, Syed Ahmad Mohammad
Ph.D. (1986)
University of Tennessee
Professor
Mechanical Engineering (1986)

Dr. Saif, Abdul-Wahed Abdul-Aziz
Ph.D. (1996)
University of Leicester - 1
Assistant Professor
Systems Engineering (1997)

Mr. Saif, Waleed Abdul-Wahed
M.S. (2003)
King Fahd University of Petroleum & Minerals
Lecturer
Electrical Engineering (2004)

Mr. Saifullah, Khaled
M.S. (1988)
King Fahd University of Petroleum & Minerals
Lecturer
Mathematical Sciences (1988)

Dr. Salah, Khaled Hamed
Ph.D. (2000)
Illinois Institute of Technology
Assistant Professor
Information & Computer Science (2000)

Dr. Salama, Ashraf Mohamed Ahmed
Ph.D. (1996)
Azhar University
Associate Professor
Architecture (2004)

Mr. Saleem, Mohamed
M.Engg. (1998)
University of Madras
Lecturer
Information & Computer Science (2000)

Mr. Saleh, Mohammad Farah Ismair
M.S. (1999)
Yarmouk University
Lecturer
Mathematical Sciences (2002)

Mr. Salem, Ahmad Fathy Abdullah Ahmed
M.S. (1999)
King Fahd University of Petroleum & Minerals
Lecturer
Physics (2000)

Dr. Samman, Mohammad Salim
Ph.D. (1998)
Edinburgh University
Associate Professor
Mathematical Sciences (1993)

Dr. Sarfraz, Muhammad
Ph.D. (1990)
Brunel University
Associate Professor
Information & Computer Science (1994)

Dr. Sarhan, Mahmoud Abdulghani
Ph.D. (1977)
University of New Mexico
Associate Professor
Mathematical Sciences (1970)

Mr. Sarif, Bambang Ali Basyah
M.S. (2003)
King Fahd University of Petroleum & Minerals
Lecturer
Computer Engineering (2004)

Dr. Seddigi, Zaki Shaker Abdallah
Ph.D. (2000)
Oklahoma State University
Associate Professor
Chemistry (1991)

Mr. Seliaman, Mohamed Elhassan
M.S. (2001)
King Fahd University of Petroleum & Minerals
Lecturer
Academic Development Center (2001)

Dr. Selim, Shokri Zaki
Ph.D. (1979)
Georgia Institute of Technology
Professor
Systems Engineering (1979)

Mr. Selmi, Hazem Helmi Muhareb
M.S. (2000)
King Fahd University of Petroleum & Minerals
Lecturer
Computer Engineering (2001)

Dr. Sendi, Hasan Khaled
Ph.D. (2001)
Cairo University
Assistant Professor
Islamic & Arabic Studies (1994)

Dr. Seyyed, Fazal
Ph. D. (1988)
University of Arkansas
Associate Professor
Finance & Economics (1999)

Dr. Shafiq, Muhammad
Ph.D. (1997)
Chiba University
Visiting Assistant Professor
Systems Engineering (1999)

Dr. Shafique, Muhammad
Ph.D. (1989)
Wayne State University
Assistant Professor
Information & Computer Science (1989)

Dr. Shaikh, Abdulla Abed
Ph.D. (1984)
University of Notre Dame
Professor
Chemical Engineering (1977)

Dr. Shaikh, Nassar Mohammad
Ph.D. (1985)
Texas Technical University
Assistant Professor
Accounting & M I S (1972)

Mr. Sharbini, Khaled Ali
M.S. (2004)
University of Miami
Lecturer
Architecture (1999)

Dr. Sharif, Al-Farabi Mohammad
Ph.D. (1982)
University of Washington
Professor
Civil Engineering (1975)

Mr. Sharqawi, Husam
M.S. (1998)
University of Malta
Lecturer
Mathematical Sciences (2001)

Dr. Shash, Ali Ali
Ph.D. (1988)
University of Texas - Austin
Associate Professor
Construction Engineering & Mgt. (1982)

Mr. Shaw, Stephen
B.A. (1995)
Nottingham University
Lecturer
Mechanical Engineering (2000)

Mr. Shazli, Syed Zafar
M.S. (2000)
King Fahd University of Petroleum & Minerals
Lecturer
Computer Engineering (2001)

Mr. Shehadeh, Yaqoub Mustafa
M.S. (1992)
King Fahd University of Petroleum & Minerals
Lecturer
Mathematical Sciences (1999)

Dr. Sheikh, Anwar Khalil
Ph.D. (1978)
Michigan Technological University
Professor
Mechanical Engineering (1979)

Dr. Sheikh, Asrar Ul Haq
Ph.D. (1969)
University of Birmingham
Chair Professor
Electrical Engineering (2000)

Dr. Sheikh, Sharif Iqbal
Ph.D. (1996)
University of Manchester
Assistant Professor
Electrical Engineering (1998)

Dr. Sheltami, Tarek Rahil
Ph.D. (2003)
Queen's University
Assistant Professor
Computer Engineering (2004)

Dr. Shuaib, Abdelrahman Nasr
Ph.D. (1980)
University of Wisconsin - Madison
Associate Professor
Mechanical Engineering (1980)

Dr. Shuja, Shahzada Zaman
Ph.D. (1998)
King Fahd University of Petroleum & Minerals
Associate Professor
Mechanical Engineering (1998)

Dr. Shwehdi, Mohamed Hamed
Ph.D. (1985)
Mississippi State University
Associate Professor
Electrical Engineering (1995)

Dr. Siddiqi, Abul Hasan
Ph.D. (1967)
Aligarh Muslim University
Professor
Mathematical Sciences (1998)

Mr. Siddiqui, Atiq Waliullah
M.S. (2001)
King Fahd University of Petroleum & Minerals
Lecturer
Systems Engineering (2001)

Mr. Siddiqui, Junaid Abdulwahid
M.S. (2000)
King Fahd University of Petroleum & Minerals
Lecturer
Academic Development Center (2001)

Dr. Siddiqui, Mohammad Nahid
Ph.D. (1997)
Heriot-Watt University
Assistant Professor
Chemistry (1988)

Mr. Siddiqui, Mohsin
M.S. (1996)
King Fahd University of Petroleum & Minerals
Lecturer
Information & Computer Science (1997)

Mr. Sienkiewicz, Richard Edmund Paul
M.A. (1975)
University of Essex
Lecturer
English Language Center (1997)

Mr. Sliwa, Jerzy Stanislaw
B.Ed. (1986)
University of Central England
Instructor
English Language Center (2004)

Mr. Smith, David George
B.A. (1983) + Cert.E.L.T.
University of Warwick
Lecturer
English Language Center (2001)

Mr. Snyman, Sarel Van Rooy
B.A. (1981) + Cert.E.L.T.
Rand Afrikaans University
Lecturer
English Language Center (2002)

Dr. Sohail, Mohammed Sadiq
Ph.D. (1991)
Agra University
Associate Professor
Management & Marketing (2002)

Dr. Sqalli, Mohammed Houssaini
Ph.D. (2002)
University of New Hampshire
Assistant Professor
Computer Engineering (2002)

Dr. Sultan, Salah Eldin Mustafa
Ph.D. (1981)
University of Exeter
Professor
Chemistry (1988)

Dr. Sunar, Mehmet
Ph.D. (1993)
Purdue University
Associate Professor
Mechanical Engineering (1994)

Mr. Surran, Scott Gary
B.S. (1981) + Cert.E.L.T.
Richard Stockton State College
Lecturer
English Language Center (2005)

Mr. Suter, Lee Ivor
M.A. (1992)
Loughborough University
Lecturer
Physical Education (2002)

Mr. Sweeney, Patrick Anthony
Dip.App.Lin. (1999) + P.G.C.E.
Trinity College, Dublin
Lecturer
English Language Center (2004)

Dr. Tabet, Nouar
Ph.D. (1988)
University of Paris
Professor
Physics (1994)

Mr. Tasadduq, Noman Ali
M.S. (1998)
King Fahd University of Petroleum & Minerals
Lecturer
Electrical Engineering (1998)

Dr. Tatar, Nasser-Eddine
Ph.D. (2000)
University Badji Mokhtar
Associate Professor
Mathematical Sciences (2002)

Dr. Tawfiq, Hattan Zain
Ph.D. (2002)
University of Pittsburgh
Assistant Professor
Mathematical Sciences (1988)

Mr. Telfer, Thomas Ronald
M.A. (1983)
University of Essex
Lecturer
English Language Center (2004)

Mr. Thomas, Andrew K.
B.Ed. (1987)
University of Wales
Lecturer
Mechanical Engineering (1989)

Mr. Thomas, William Roy
Cert. Ed. (1974) + P.G.C.E.
University of Wales
Lecturer
English Language Center (1996)

Mr. Toal, Dermot John
B.S. (1994)
University of Surrey
Lecturer
Physical Education (2003)

Mr. Tozan, Mueyyet
M.S. (1980)
Bosphorus University
Lecturer
Aerospace Engineering (2003)

Mr. Tukur, Nasiru Mohammad
M.S. (1992)
King Fahd University of Petroleum & Minerals
Lecturer
Chemical Engineering (1992)

Dr. Umar, Abdullahi
Ph.D. (1992)
St. Andrews University
Associate Professor
Mathematical Sciences (1997)

Dr. Umar, Yakubu Alhaji
Ph.D. (1989)
University of Manchester
Assistant Professor
Finance & Economics (1998)

Mr. Unwin, David Hugh
B.A. (1972) + Dip.E.L.T.
Simon Fraser University
Instructor
English Language Center (2005)

Mr. Uprichard, Joseph Edmund
M.A. (1979)
University of Essex
Lecturer
English Language Center (2000)

Dr. Uthman, Usamah Ahmad Abdulhakim
Ph.D. (1989)
University of Nebraska - Lincoln
Associate Professor
Finance & Economics (1981)

Mr. Vernon, Antony Michael
M.S. (2000)
Brunel University
Lecturer
Mechanical Engineering (2004)

Dr. Vohra, Muhammad Shariq
Ph.D. (1998)
University of Maryland
Assistant Professor
Civil Engineering (2003)

Mr. Wasiq, Muhammad
M.S. (2001)
King Fahd University of Petroleum & Minerals
Lecturer
Information & Computer Science (2001)

Dr. Wazeer, Mohamed Ismail M.
Ph.D. (1974)
University of East Anglia
Professor
Chemistry (1981)

Mr. Whittaker, Byron Kelly
B.A. (1993) + Cert.E.L.T.
University of Hull
Lecturer
English Language Center (2003)

Mr. Williams, John Christopher
M.S. (1992)
University of Wales
Lecturer
English Language Center (1990)

Mr. Williams, Keith Norman
B.A. (1974) + Dip.E.L.T.
University of Essex
Lecturer
English Language Center (2005)

Mr. Winters, Thomas Andrew
M.A. (1977)
School for International Training
Lecturer
English Language Center (2002)

Dr. Yamani, Ahmed
Ph.D. (1984)
University of Sheffield
Associate Professor
Electrical Engineering (1988)

Dr. Yamani, Zain Hasan Abdallah
Ph.D. (1999)
Illinois State University
Associate Professor
Physics (1991)

Dr. Yamani, Zohair Abdulla
Ph.D. (1994)
University of Nebraska - Lincoln
Assistant Professor
Finance & Economics (1971)

Mr. Yaqub, Mohammed
M.S. (1991)
King Fahd University of Petroleum & Minerals
Lecturer
Mechanical Engineering (1991)

Mr. Yazdani, Jaweed
M.S. (1988)
King Fahd University of Petroleum & Minerals
Lecturer
Information & Computer Science (1988)

Dr. Yilbas, Bekir Sami
Ph.D. (1981)
University of Birmingham
Professor
Mechanical Engineering (1992)

Mr. Younas, Muhammad
M.S. (1984)
King Fahd University of Petroleum & Minerals
Lecturer
Mechanical Engineering (1984)

Dr. Youssef, Mohamed Abdulhafiz
Ph.D. (1991)
City University of New York
Professor
Management & Marketing (2004)

Mr. Yusha'u, Balarabe
M.S. (1997)
King Fahd University of Petroleum & Minerals
Lecturer
Mathematical Sciences (1997)

Dr. Zaidi, Syed Mohammed Javaid
Ph.D. (2000)
University of Laval
Assistant Professor
Chemical Engineering (2000)

Dr. Zaman, Fiazuddin
Ph.D. (1977)
Cranfield Institute of Technology
Professor
Mathematical Sciences (1988)

Dr. Zerguine, Azzedine
Ph.D. (1996)
Loughborough University
Associate Professor
Electrical Engineering (1990)

Dr. Zidouri, Abdelmalek
Ph.D. (1995)
Tokyo Institute of Technology
Assistant Professor
Electrical Engineering (1999)

Dr. Ziq, Khalil Ali
Ph.D. (1989)
University of Illinois - Chicago
Associate Professor
Physics (1989)

Dr. Zubair, Syed Mohammad
Ph.D. (1985)
Georgia Institute of Technology
Professor
Mechanical Engineering (1986)

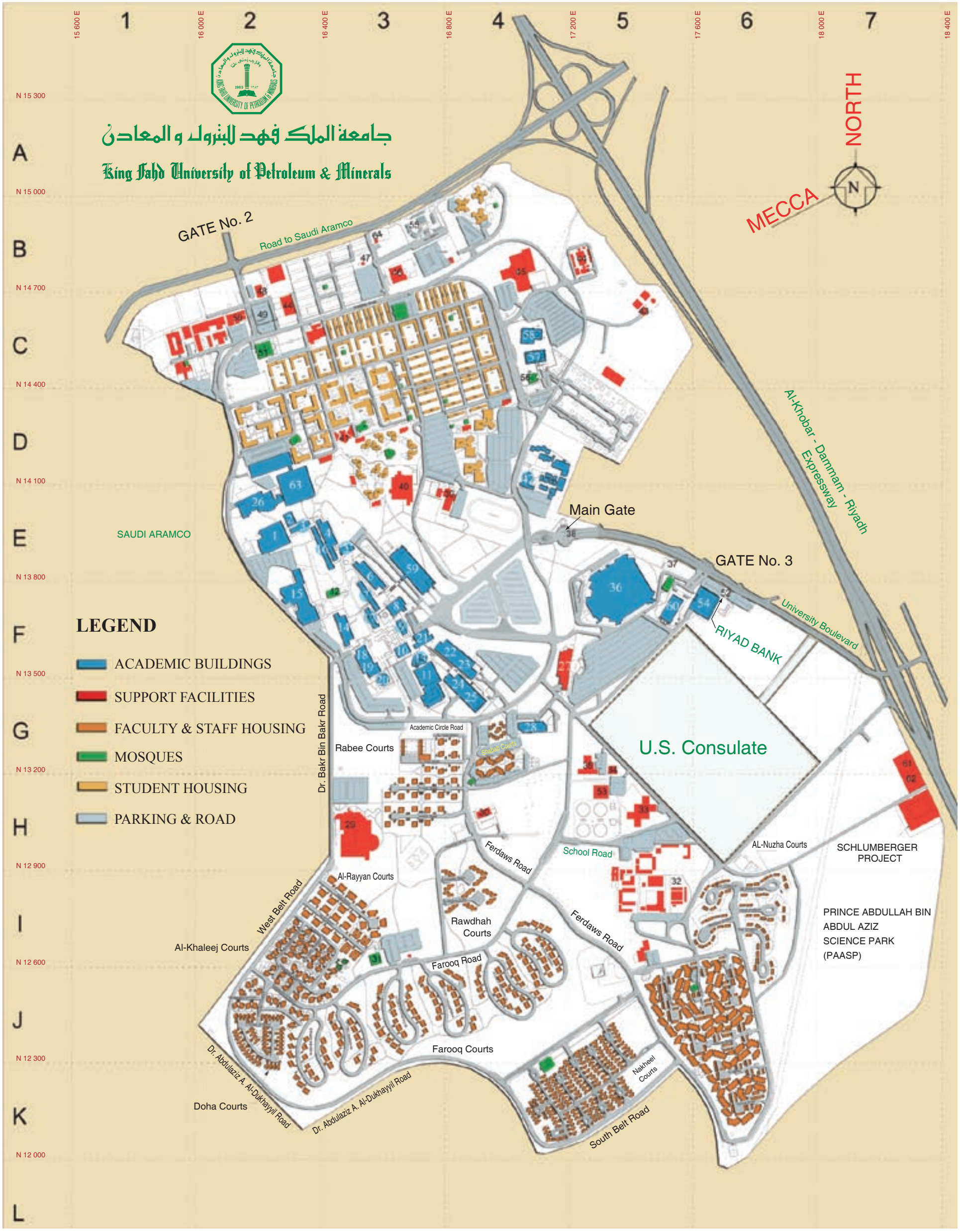
Dr. Zughbi, Habib Daoud
Ph.D. (1991)
University of New South Wales
Associate Professor
Chemical Engineering (1993)

Dr. Zummo, Salam Adel
Ph.D. (2003)
University of Michigan
Assistant Professor
Electrical Engineering (1998)

CAMPUS MAPS

UNIVERSITY CAMPUS

Legend		المفتاح
1	Building 1	١ – المبنى رقم ١
2	Building 2	٢ – المبنى رقم ٢
3	Building 3	٣ – المبنى رقم ٣
4	Building 4	٤ – المبنى رقم ٤
5	Building 5	٥ – المبنى رقم ٥
6	Building 6	٦ – المبنى رقم ٦
7	Building 7	٧ – المبنى رقم ٧
8	Building 8, Library	٨ – المبنى رقم ٨ – المكتبة المركزية
9	Building 9, Faculty & Student Center	٩ – المبنى رقم ٩ – مركز الإساتذه والطلاب
10	Building 10, Auditorium	١٠ – المبنى رقم ١٠ – قاعة المحاضرات
11	Building 11, Gymnasium	١١ – المبنى رقم ١١ – مبنى الألعاب الرياضية
12	Al-Siddique Mosque	١٢ – مسجد الصديق
13	Amphitheater	١٣ – مسرح الهواء الطلق
14	Building 14, Information Technology Center	١٤ – المبنى رقم ١٤ – مركز تقنية المعلومات
15	Building 15, Research Institute	١٥ – المبنى رقم ١٥ – معهد البحوث
16	Building 16	١٦ – المبنى رقم ١٦
17	Building 17, Student Affairs	١٧ – المبنى رقم ١٧ – شؤون الطلاب
18	Building 18, Building Garage	١٨ – المبنى رقم ١٨ – موقف السيارات
19	Building 19, College of Environment Studies	١٩ – المبنى رقم ١٩ – كلية تصاميم البيئة
20	Building 20, Conference Center	٢٠ – المبنى رقم ٢٠ – مركز المؤتمرات
21	Building 21, Administration Building	٢١ – المبنى رقم ٢١ – مبنى الإدارة
22	Building 22	٢٢ – المبنى رقم ٢٢
23	Building 23, Parking Garage	٢٣ – المبنى رقم ٢٣ – موقف السيارات
24	Building 24, College of Industrial Management	٢٤ – المبنى رقم ٢٤ – كلية الإدارة الصناعية
25	Building 25, Parking Garage	٢٥ – المبنى رقم ٢٥ – موقف السيارات
26	Building 26, Heavy Equipment Laboratory Bldg.	٢٦ – المبنى رقم ٢٦ – معامل المعدات التقنية
27	Building 27, Medical Center	٢٧ – المركز الطبي
28	Building 28, Energy Research Laboratory Bldg.	٢٨ – مركز بحوث الطاقة
29	Building 29, Community Center	٢٩ – مركز المجتمع
30	Co-op. Store (Family Super Market)	٣٠ – مخزن الجمعية التعاونية
31	Al-Farouq Mosque	٣١ – مسجد الفاروق
32	KFUPM School	٣٢ – مدارس الجامعة
33	South Water Plant	٣٣ – معامل معالجة المياه الجنوبي
34	Telephone Exchange	٣٤ – مبنى الهاتف الآلي
35	KFUPM Press	٣٥ – مطابع الجامعة
36	The Stadium	٣٦ – الأستاد الرياضي
37	King Abdul Aziz Monument	٣٧ – بوابة الملك عبدالعزيز
38	The Main Gate	٣٨ – البوابة الرئيسية
39	Physical Education Complex	٣٩ – مجمع التربية البدنية
40	Student Cafeterias	٤٠ – مطعم الطلاب
41	Student Reception Center	٤١ – مركز استقبال الطلاب
42	Preparatory Year Complex	٤٢ – مجمع طلاب السنة التحضيرية
43	North Water Plant	٤٣ – معمل معالجة المياه الشمالي
44	Storehouses & Administration	٤٤ – المستودعات وإدارتها
45	Central Kitchen / Food Services Dept.	٤٥ – المطبخ المركزي والخدمات الغذائية
46	Car's Maint. Workshop	٤٦ – ورشة صيانة السيارات
47	Transportation Dept.	٤٧ – قسم الحركة
48	Safety & Security Dept.	٤٨ – مبنى الأمن والسلامة
49	Northern Gate	٤٩ – البوابة الشمالية
50	Projects Dept. & Maint. Dept.	٥٠ – إدارة المشاريع وإدارة الصيانة
51	Dhahran Mosque	٥١ – جامع الظهران
52	Riyad Bank	٥٢ – بنك الرياض
53	Book Store	٥٣ – مستودع الكتب
54	Multipurpose Bldg.	٥٤ – قاعة متعددة الأغراض

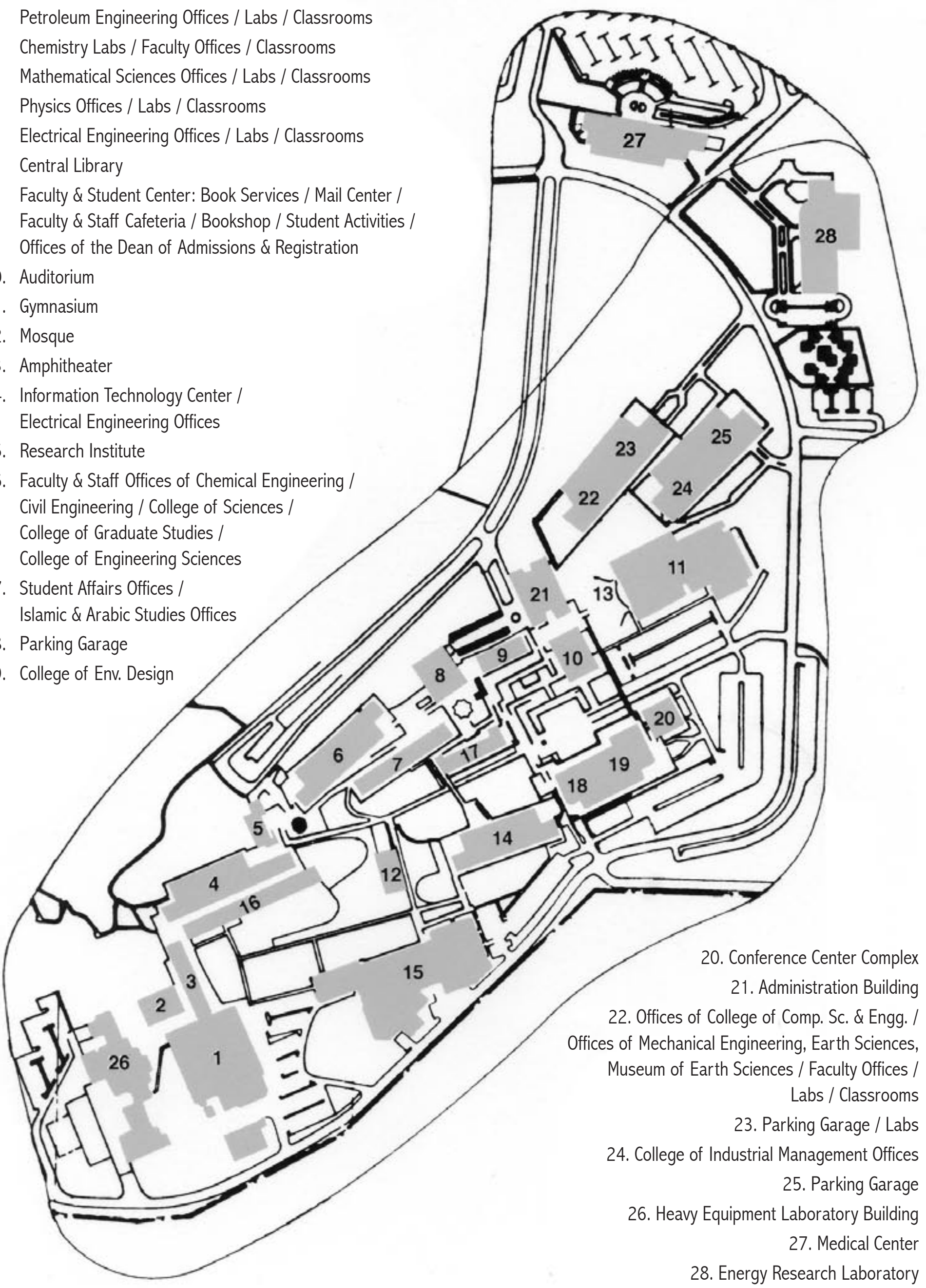


55 Gas Station — ٥٥ – محطة البنـــزين
56 Othman Bin Affan Mosque — ٥٦ – مسجد عثمان بن عفـان
57 Class Room Bldg. Prep.Year — ٥٧ – مبنى الفصول الدراسية للسنة التحضيريـة
58 Class Room Bldg. Prep.Year — ٥٨ – مبنى الفصول الدراسية للسنة التحضيريـة
59 Class Room Bldg. — ٥٩ – مبنى الفصول الدراسية
60 King Fahd Auditorium — ٦٠ – قاعة الملك فهد للمؤتمرات
61 SECO Grid Station — ٦١ – محطة سكيكـو
62 New Telephone Bldg. — ٦٢ – مبنى الإتصـــالات
63 New Class Room Building — ٦٣ – مبنى الفصول الدراسية
64 Fire Truck Shed — ٦٤ – مبنى إطفاء الحريق

ACADEMIC CAMPUS

LEGEND

1. Labs of Chemical Engineering, Civil Engineering, Electrical Engineering, Mechanical Engineering, Chemistry / Faculty Offices / Boiler House of Operations & Maintenance
2. Petroleum Engineering Labs
3. Petroleum Engineering Offices / Labs / Classrooms
4. Chemistry Labs / Faculty Offices / Classrooms
5. Mathematical Sciences Offices / Labs / Classrooms
6. Physics Offices / Labs / Classrooms
7. Electrical Engineering Offices / Labs / Classrooms
8. Central Library
9. Faculty & Student Center: Book Services / Mail Center / Faculty & Staff Cafeteria / Bookshop / Student Activities / Offices of the Dean of Admissions & Registration
10. Auditorium
11. Gymnasium
12. Mosque
13. Amphitheater
14. Information Technology Center / Electrical Engineering Offices
15. Research Institute
16. Faculty & Staff Offices of Chemical Engineering / Civil Engineering / College of Sciences / College of Graduate Studies / College of Engineering Sciences
17. Student Affairs Offices / Islamic & Arabic Studies Offices
18. Parking Garage
19. College of Env. Design



20. Conference Center Complex
21. Administration Building
22. Offices of College of Comp. Sc. & Engg. / Offices of Mechanical Engineering, Earth Sciences, Museum of Earth Sciences / Faculty Offices / Labs / Classrooms
23. Parking Garage / Labs
24. College of Industrial Management Offices
25. Parking Garage
26. Heavy Equipment Laboratory Building
27. Medical Center
28. Energy Research Laboratory

INDEX

Index

A

B

C

E

F

G

H

I

R

S

T

U

V

W

X

Y

Z