

# Graduate Program in EE Department at KFUPM

King Fahd University of Petroleum & Minerals (KFUPM) was officially established by Royal Decree on 5 Jumada I, 1383 H. (23 September 1963). The first students were admitted a year later, on 23 September 1964, when 67 young men enrolled in what was then the College of Petroleum and Minerals (CPM). Since that time, the University enrollment has grown to more than 10000 students.

KFUPM is an institution of higher learning committed to: preparing professionals empowered with the knowledge, skills, values and confidence to take a leadership role in the fields of science, engineering, environmental design and business; Producing research that contributes to the knowledge and sustainable development of the region by providing innovative solutions to identified economic and technical problems and opportunities; Providing a stimulating campus environment for the welfare of its students, faculty and staff.

## Electrical Engineering Department at KFUPM

The Electrical Engineering Department at KFUPM came into existence along with the establishment of the University in 1967. The EE Department is one of the largest departments in the University. The average number of students is approximately 1000, 10% of them are in the graduate program. The graduate program offers Ph.D. in Electrical Engineering besides the Master of Science in Electrical Engineering and Master of Science in Telecommunication Engineering. The department has about 55 full-time teaching faculty

members who are spread in 6 specialized disciplines. The department has very vibrant research groups. Besides personal research, faculty members are involved in collaborative and sponsored research with various organizations and industries. Some of the major organizations through which faculty members participate in collaborative research are KACST (King Abdul-Aziz City for Science & Technology), KFUPM RI (Research Institute), and ECRA (Electricity and Co-generation Regularity Authority); industries and utilities include SEC (Saudi Electric Company), SABIC (Saudi Arabian Basic Industries Company), and Saudi Aramco.

## Areas of Specialization

KFUPM's EE Department is home to a wide variety of research programs. We house some of the most successful research groups in the gulf region.

### Communication Systems

Research in this area encompasses: Digital Video Conferencing, Video Compression and Coding, Noise Filtering in Video Sequences, Bit-rate Control for Video Coding, Multichannel and Multipath Communication, Channel Characterization, Channel Capacity, Channel Coding, Error Control Systems, Underwater Acoustic Digital Communication, Design of Phased and Adaptive Antenna Array Systems, Antenna Array Design, Transducer Array Design, Non Destructive Testing via Ultrasound, Telephony and Switching System, Speech Processing, Signals Protocols, Common Channel Signaling Systems and Protocols, Digital Transmission over Wireless

Networks, Random Access Protocols in Local Area Networks, Mobile Communication System, Adaptive Systems, Equalizers and Echo Cancellers.

### Control Systems

Research in this area encompasses: Computer process control, Application of control theory to power systems, and oil and petrochemical industries, Model reduction, System identification, Estimation and filtering, Adaptive control, Application of AI in power systems and robotics, Motor and power electronic circuit control, Neural networks, Fuzzy logic, Genetic algorithms

### Electromagnetics

Research in this area encompasses: Phased and adaptive array antennas, Microwave integrated circuits, Optical structures simulation and modeling, Microwave antennas, Underwater acoustic communication, Electromagnetic wave scattering and inverse scattering, Propagation of electromagnetic waves along waveguides with discontinuities, Numerical simulation using Finite difference method, Neural network and applications, Remote sensing, Optical transmission and interconnection, Antenna measurements, Electromagnetic compatibility, Non-Destructive Testing (NDT) of Materials.

### Energy Systems

Research in this area encompasses: Power System Control, Dynamic Security Assessment, Application of Neural Networks & Fuzzy Logic into Power Systems, Power System Reliability, Power System Planning & Operation, Harmonic Signals in Power Systems, Maintenance Scheduling of Generating Units,

Electromagnetic Fields and Biological Effects, Voltage Stability, High Voltage Engineering & Electrostatics, Electrical Insulators and Flashover Problems, Power Electronics & Unity Power Factor Application, Demand Side Management & Load Control, Electrical Power Systems Design.

### **Digital Signal Processing**

Research in this area encompasses: multi-dimensional digital signal processing, multi-dimensional filter design; speech, image & video coding & compression; multimedia communication & application development; computer & robotics vision; pattern recognition and application to document management systems; image identification and restoration; color and multi-channel imaging; artificial neural networks; fuzzy logic & application to speech and image processing.

### **Electronics**

Research in this area encompasses: Special-purpose VLSI designs including array processors and parallel structures, Analysis and design of VLSI circuits, Analog electronic circuits and systems: Analysis, design and implementation, Analog IC design and simulation, Modeling and simulation of heterostructures and optoelectronic devices, Modeling and simulation of microwave semi-conductor devices, Feedback amplifiers, Microprocessor-based & microcontroller-based systems.

## **Ph.D. in Electrical Engineering**

**30 credit hours of course work in addition to 12 credit hours of thesis dissertation.**

The program leading to the degree of Doctor of Philosophy is intended for those exceptional individuals who plan to pursue a career in fundamental applied research.

A Ph.D. student is required to pass a comprehensive examination covering his area of study, a preliminary dissertation proposal defense, and presentation and defense of the dissertation. The student must declare a major area and a minor area by the end of the first semester of enrollment in the Ph.D. program.

## **Master of Science in Electrical Engineering**

**24 credit hours of course work in addition to 6 hours of thesis dissertation.**

The program leading to the degree of Master of Science provides an opportunity for the student to pursue advanced studies in a particular field of major interest and an opportunity to engage in research and engineering design. A thesis and oral examination to defend is required of all candidates for the M.Sc.

## **Master of Science in Telecommunications**

**24 credit hours of course work in addition to 6 hours of thesis dissertation.**

The Master of Science in Telecommunication Engineering is a unique graduate program designed to prepare highly trained professionals to practice in the fast-changing telecommunications industry. The program is open to students holding a BS degree in EE, COE or equivalent. Students enrolled in this program are required to complete 24 credit hours of courses (eight 3-credit hour courses), plus a 6 credit hour of thesis, in excess of any remedial courses to rectify possible deficiency in a student undergraduate education.

## **Financial Aid**

KFUPM offers financial support for all full time graduate students. Full-time graduate students receive full fellowships, including tuition, fees, partial transportation, room and board, in accordance with the terms of their grant. Student assistantship for graduate students is available in the form of part-time teaching. Such employment offers the student a professionally rewarding experience as well as a modest stipend while he is doing graduate study.

## **Admission Procedure**

Applicants are required to submit the following:

- Electronic application form
- Reference letters
- Official transcripts from institutes attended
- Proof of English Proficiency (TOEFL)
- General Graduate Record Examination (GRE)
- MS Thesis Abstract (required for PhD program)

Instructions for completing the application are available on KFUPM Graduate Studies website at <http://www.kfupm.edu.sa/gs/Checklist.asp>

## **Contact Information**

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