

Program Assessment Team Worksheet

Assessment Team Findings and Program Strengths, Weaknesses and Recommendations for Improvement

Considering the Assessment Team findings and the identified strengths and shortcomings of the program and using the ratings below, please give a rating for each standard and provide recommendations for improvements when applicable in the appropriate boxes of the Table below.

Ratings:

“E.E.” for Exceeds Expectations, “M.E.” for Meets Expectations and “N.I.” for Needs Improvement.

Definition of Terms:

Exceeds Expectations (E.E.): The evidence observed and material presented regarding the standard or the criterion exceeds substantially the requirement in the standard or the criterion as defined in the self-assessment document.

Meets Expectations (M.E.): The evidence observed and material presented regarding the standard or the criterion meets the requirement in the standard or the criterion as defined in the self-assessment document. *In such situations the AT is expected to identify actions that may assist the department in achieving an EE class or rating.*

Need Improvement (N.I.): The evidence observed and material presented regarding the standard or the criterion is below the requirements in the standard or the criterion as defined in the self-assessment document. *In such situations the AT is expected to identify corrective action needed to meet the standard or the criterion.*

C 1: Program Mission, Objectives and Outcomes

Standard	Rating	AT Findings and Recommendations for Improvement
S 1-1: The program must have documented measurable objectives that support college and institution mission statements.	M.E.	The Physics program mission and objectives are clearly stated in the catalog and support the broader institutional goals. However, the Physics department should develop a strategic plan. The plan should cover the future research directions of the department to serve as a guide to hiring and expenditures. It should cover plans for reviewing and improving teaching as well as the departmental infrastructure. Explicit goals should be stated. The plan should represent the consensus of the Physics faculty and be shared with the University administration.

S 1-2: The program must have documented outcomes for graduating students. It must be demonstrated that the outcomes support the program objectives and that graduating students are capable of performing these outcomes.	E.E.	The Department has clearly defined procedures to measure the outcomes for the graduating students as described in the Physics Self-Assessment Report. The Team finds the procedures described quite adequate.
S 1-3: The results of program's assessment and the extent to which they are used to improve the program must be documented.	M.E.	Not all results of assessments have been implemented.
S 1-4: The department must assess its overall performance periodically using quantifiable measures.	M.E.	Given the very low number of physics majors in recent years, new evaluation metrics need to be developed.

C 2: Curriculum Design and Organization

S 2-1: The curriculum must be consistent and supports the program's documented objectives.	M.E.	<p>The physics curriculum is consistent with that at top tier US universities and supports the current stated objectives very well.</p> <p>The AT feels that the courses are harshly graded. Particularly, the course GPAs for Phys 101 and Phys 102 cluster around 2.0. This is alarmingly small. The AT feels that this will lead to low morale among students and the complete avoidance of the area as a major. The physics course GPAs should be comparable to the student overall GPAs, perhaps in the range of 2.7 – 3.0. In peer institutions in USA, it has been shown that the large introductory physics courses can be an excellent source of physics majors. Under current environment, this would not be possible.</p>
S 2-2: Theoretical background, problems analysis and solution design must be stressed within the program's core material.	E.E.	<p>Theoretical background, problems analysis and solution design are stressed within the program's core material.</p> <p>The physics students the AT met had a firm grounding in physics knowledge commensurate with their level, were highly motivated, and would compare well with their peers at similar US universities. The exams the AT reviewed were at a comparable level to those of Top Tier universities in the US and, if anything, were more difficult.</p>
S 2-3: The curriculum must satisfy the mathematics and basic sciences requirements for the program, as specified by the respective accreditation body.	N.A = not applicable	Although there is no accreditation body for physics programs, the Physics program has similar mathematics and basic sciences requirements as most top tier US universities.
S 2-4: The curriculum must satisfy the major requirements for the program as specified by the respective accreditation body.	N.A.	Although there is no accreditation body for physics programs, the Physics program has similar requirements and courses to most top tier US universities.

S 2-5: The curriculum must satisfy general education, arts, and professional and other discipline requirements for the program, as specified by the respective accreditation body.	N.A.	The curriculum satisfies the university general education, arts, professional and other discipline requirements.
S 2-6: Information technology component of the curriculum must be integrated throughout the program.	E.E.	Computers and information technology are integrated throughout the program.
S 2-7: Oral and written communication skills of the student must be developed and applied in the program.	M.E.	The few lab reports the committee read were in general well written. We did not hear any oral reports from students, but note that there is a required seminar class to measure oral communication skills.

C 3: Laboratories and Computing Facilities

S 3-1: Lab manuals/documentation/instructions for experiments must be available and readily accessible to faculty and students.	E.E.	Lab manuals/documentation/instructions for experiments are available and readily accessible to faculty and students.
S 3-2: There must be adequate support personnel for instruction and maintaining the laboratories.	M.E.	Extra support personnel (technicians, postdocs or teaching assistants) would help in coping with the large load from the numerous Physics 101 and 102 students. Particularly, excellent undergraduate students including engineering students could serve as TAs for lab and recitation sections.
S 3-3: The University computing infrastructure and facilities must be adequate to support program's objectives.	M.E.	The University computing infrastructure and facilities are adequate to support the program's objectives. A faster University internet connection to the outside is a needed improvement.

C 4: Student Support and Advising

S 4-1: Courses must be offered with sufficient frequency and number for students to complete the program in a timely manner.	M.E.	Courses need to be offered with sufficient frequency and number for students to complete the program in a timely manner. Due to the very small number of students, currently, it will be hard to meet this requirement. Perhaps some of the courses can be coordinated with the other departments to have sufficient number of students to justify class offering.
S 4-2: Guidance on how to complete the program must be available to all students and access to qualified advising must be available to make course decisions and career choices.	M.E.	There are relatively few physics majors and guidance does seem to be readily available. This guidance needs to include course decisions and career options.

C 5: Faculty

<p>S 5-1 There must be enough full time faculty who are committed to the program to provide adequate coverage of the program areas/courses, continuity and stability. The interests and qualifications of all faculty members must be sufficient to teach all courses, plan, modify and update courses and curricula. All faculty members must have a level of competence that would normally be obtained through graduate work in the discipline. The majority of the faculty must hold a Ph.D. in the discipline.</p>	<p>E.E.</p>	<p>The Department has assembled a faculty with diverse backgrounds. The atmosphere among the physicists at KFUPM is commendably very positive; the entire faculty showing what appears to be a sincere respect for their colleagues. Students particularly noted that the faculty is very approachable. The AT was pleased with the genuine interest of the faculty in all areas: teaching, research, and service. The faculty research areas are mostly commensurate with the activity areas in the engineering departments for synergistic interaction through interdisciplinary research centers. The faculty are currently over burdened with an excessive teaching load. Even active research faculty teach 9-12 hours per week. This will increase to 12-15 hours next semester. This is well above the 3-hour per week teaching load in peer institutions in US.</p> <p>Under these conditions, the research activity suffers and requires extraordinary efforts to sustain it.</p> <p>The AT feels that the quantity and quality of research by the Physics department would increase dramatically if the teaching load were lowered, and that this would have a large impact on the Physics department's visibility and the University's prestige. This was also noted in the 1996 review. (The AT would like to stress our admiration for the excellent research that is being done given the current conditions.)</p>
<p>S 5-2: All faculty members must remain current in the discipline and sufficient time must be provided for scholarly activities and professional development. Also, effective programs for faculty development must be in place.</p>	<p>M.E.</p>	<p>Most faculty are active in research and publish papers. They have access to shared research facilities. It is pleasing to see the establishment of new interdisciplinary research centers such as the Nanotechnology Center with significant Physics faculty participation.</p> <p>All of the Physics faculty is involved in teaching and recognize teaching as one of their primary missions at KFUPM.</p> <p>The textbooks and the teaching aids are comparable to the ones used in the peer institutions in US. The required and optional courses seem to be of high quality.</p>

<p>S 5-3: The process of recruiting and retaining highly qualified faculty members must be in place and clearly documented. Also processes and procedures for faculty evaluation, promotion must be consistent with institution mission statement. These processes must be periodically evaluated to ensure that it is meeting its objectives.</p>	<p>M.E.</p>	<p>Faculty compensation should be purely based on the performance in the faculty activity areas.</p> <p>A separate Teaching award for Lecturers could be created. This would improve morale among these valued members of the community.</p>
---	-------------	--

C 6: Process Control

<p>S 6-1: The process by which students are admitted to the program must be based on quantitative and qualitative criteria and clearly documented. This process must be periodically evaluated to ensure that it is meeting its objectives.</p>	<p>M.E.</p>	<p>The small number of undergraduate Physics students is a serious problem. The main reason for this situation rests with what appear to be negative cultural perceptions of careers in Physics.</p> <p>The Department should pursue all the standard recruitment avenues represented by visits of faculty members or instructional staff to High Schools at the local and national level, the institution of systematic training sessions for High School teachers, the institution of “best scientist” prizes, etc.</p>
<p>S 6-2: The process by which students are registered in the program and monitoring of students progress to ensure timely completion of the program must be documented This process must be periodically evaluated to ensure that it is meeting its objectives.</p>	<p>E.E.</p>	<p>The current monitoring of student progress is adequate.</p> <p>In addition to the double major programs under consideration, a minor in engineering for the physics students may be appropriate. This would enable students to add engineering study to their time at KFUPM and still graduate in five years (Five years includes the prep year.)</p>
<p>S 6-3: The process and procedures used to ensure that teaching and delivery of course material to the students emphasizes active learning and that course learning outcomes are met. The process must be periodically evaluated to ensure that it is meeting its objectives.</p>	<p>M.E.</p>	<p>Demonstrations during lectures should be used to illustrate the basic ideas and motivate students, whenever it is appropriate.</p>
<p>S 6-4 : The process that ensures that graduates have completed the requirements of the program must be based on standards, effective and clearly documented procedures. This process must be periodically evaluated to ensure that it is meeting its objectives.</p>	<p>E.E.</p>	<p>The requirements of the physics undergraduate program are clearly documented.</p>
<p>S 6-5: The process and procedures of curriculum/course, textbook and lab update and development must be effective and clearly documented.</p>	<p>E.E.</p>	<p>Excellent.</p>

C 7: Institutional Facilities

<p>S 7-1: The institution must have the infrastructure to support new trends in learning such as e-learning.</p>	<p>E.E.</p>	<p>Excellent.</p>
<p>S 7-2: The library must possess an up-to-date technical collection relevant to the program and must be adequately staffed with professional personnel.</p>	<p>E.E.</p>	<p>Excellent.</p>
<p>S 7-3: Class-rooms must be adequately equipped and offices must be adequate to enable faculty to carry out their responsibilities.</p>	<p>M.E.</p>	<p>The availability of 2-3 large lecture halls in the Physics building (each up to 300 seats) would help to hold large classes.</p>

C 8: Institutional Support

<p>S 8-1: There must be sufficient support and financial resources to attract and retain high quality faculty and provide the means for them to maintain competence as teachers and scholars.</p>	<p>M.E.</p>	<p>Salary level should be competitive with all peer universities in the Middle East. New faculty should to be hired on a continuous basis after forming consensus on School and institutional priorities following the department's strategic plan. Faculty contracts should be at least four years to provide opportunity for long term planning and project development. This would also improve faculty morale.</p>
<p>S 8-2: There must be an adequate number of high quality graduate students, research assistants and Ph.D. students.</p>	<p>M.E.</p>	<p>The University admission policy could be revised temporarily in such a way as to guarantee that a certain number of excellent students who express interest in Physics (or other Science subjects) are admitted. The AT strongly supports the planned Ph.D. program in Physics. Without this program, it would be impossible to compete with the top research universities.</p>
<p>S 8-3: Financial resources must be provided to acquire and maintain Library holdings, laboratories and computing facilities.</p>	<p>M.E.</p>	<p>Financial resources seem to be readily available. However, the budget allocation and management should be somewhat decentralized to increase efficiency. Purchasing procedures should be improved. Numerous faculty commented about the length of time to make purchases of research and other equipment.</p>

Exit Statement to the University
(To be read at the Exit Meeting)

The Exit Statement should first address the exceptional strengths identified in each program. Next, address only those criteria in which deficiencies, weaknesses, concerns, or observations have been identified. This statement should include the Program Assessment Team's findings concerning review and assessment processes in place, and the use of process results to improve the effectiveness of the program.

In describing specific deficiencies, weaknesses, or concerns, utilize the exact language from the criteria where possible.

PROGRAM EXIT STATEMENT

In the attachment.

**Report of the Assessment Committee for the Physics Department
of the King Fahd University of Petroleum and Minerals
June 19, 2009**

Ahmet Erbil (Georgia Institute of Technology), Gabriele Giuliani (Purdue University), Nicholas Hadley (The University of Maryland)

Introduction

We would like to thank Dean Al-Sabah and Chair Al-Jalal for leading the assessment process and Prof. Musazay for organizing our visit and the department for its hospitality.

The committee visited KFUPM from June 6-9, 2009. We held discussions with faculty and students, visited classes and teaching labs, attended lectures given by professors and visited research labs and institutes.

Overall Assessment

Our overall conclusion is that KFUPM is a leading technical university in the Middle East, and that the Physics department contributes significantly to this through its vigorous teaching and research activities.

The AT feels that there are many opportunities within reach to make the Physics department even stronger.

KFUPM Physics Department: Findings

A major strength of the KFUPM Physics Department is the faculty. The Department has assembled a faculty with diverse backgrounds. The atmosphere among the physicists at KFUPM is commendably very positive; the entire faculty showing what appears to be a sincere respect for their colleagues. Students particularly noted that the faculty is very approachable. We were pleased with the genuine interest shown by the faculty in all of the areas of teaching, research, and service. The faculty research areas are mostly commensurate with the activity areas in the engineering departments for synergistic interaction through interdisciplinary research centers.

Most faculty are active in research and publish papers. They have access to shared research facilities. It is pleasing to see the establishment of new interdisciplinary research centers such as the Nanotechnology Center with significant Physics faculty participation.

All of the Physics faculty are involved in teaching. They recognize teaching as one of their primary missions at KFUPM. The textbooks and the teaching aids are comparable to the ones used in the peer institutions in US. The required and optional courses seem to be of high quality.

The physics students that we met had a firm grounding in physics knowledge commensurate with their level, were highly motivated, and would compare well with

their peers at similar US universities. The exams we reviewed were at a comparable level to those of Top Tier universities in the US and, if anything, were more difficult.

KFUPM Physics Department: Recommendations

We recommend that the Physics department should develop a strategic plan. The plan should cover the future research directions of the department to serve as a guide to hiring and expenditures. It should cover plans for reviewing and improving teaching as well as the upgrading the departmental infrastructure. Explicit goals should be stated. The plan should represent the consensus of the Physics faculty and be shared with the University administration.

We support the establishment of a Physics PhD program, a step that, if properly effected could be important in further establishing the intellectual primacy of KFUPM in the kingdom and increasing its fame abroad. Moreover the program will strengthen research activities, provide a source of teaching assistants, and improve the visibility and reputation of the department and the University. We note that the PhD program will require sufficient resources, careful planning and patience to ensure a successful start.

The Physics faculty are currently burdened with an excessive teaching load. Even active research faculty teach 9 to 12 hours per week. This will increase to 12 to 15 hours next semester. This is well above the 3 hour per week teaching load in peer institutions in US. Under these conditions, the research activity suffers and requires extraordinary efforts to sustain it. There are not enough support personnel such as technicians, teaching assistants and postdocs. Excellent undergraduate students including engineering students could serve as TAs for lab and recitation sections. We feel that the quantity and quality of research by the Physics department would increase dramatically if the teaching load were lowered, and that this would have a large impact on the Physics department's visibility and the University's prestige. This was also noted in the 1996 review. (Also, we would like to stress our admiration for the excellent research that is being done given the current conditions.) Finally there is a perceived need for the establishment of an open and effective departmental course assignment procedure. Specifically the procedure should account for the various level of commitment demanded by the various courses.

Faculty compensation should be purely based on the performance in the faculty activity areas. Salary level should be competitive with all peer universities in the Middle East. New faculty should be hired on a continuous basis after forming consensus on School and institutional priorities following the department's strategic plan. Faculty contracts could be extended at least four years to provide opportunity for long term planning and project development. This would also improve faculty morale.

Financial resources seem to be readily available. However, the budget allocation and management should be somewhat decentralized to increase efficiency. Purchasing procedures should be improved. Numerous faculty members commented about the length of time to make purchases of research and other equipment.

A separate Teaching award for Lecturers could be created. This would improve morale among these valued members of the community.

The small number of undergraduate Physics students is a serious problem. The main reason for this situation rests with what appear to be negative cultural perceptions of careers in Physics. The Department should pursue all the standard recruitment avenues represented by visits of faculty members or instructional staff to High Schools at the local and national level, the institution of systematic training sessions for High School teachers, the institution of “best scientist” prizes, etc. The University admission policy could be revised temporarily in such a way as to guarantee that a certain number of still excellent students who express interest in Physics (or other Science subjects) are admitted.

In addition to the double major programs, a minor in engineering for the physics students might be considered. This would enable students to add engineering study to their time at KFUPM and still graduate in five years (Five years includes the prep year.)

We recommend increasing the engagement of the Physics department with the rest of the university. This can be accomplished by developing and offering more specialty Physics courses designed to be of interest for engineering students. In particular, although modern topics are already included in some of the current courses, we would recommend that the scope and number of modern advanced condensed matter courses be increased. A number of interdisciplinary courses could be also introduced in collaboration with other Science Departments. A particularly timely and appropriate topic for KFUPM would be that of complex systems a subject that would be of interest not only to chemists, biologists and Earth scientist, but also to many engineers.

We believe that the courses are harshly graded. In particular, the course GPAs for Physics 101 and Physics 102 cluster around 2.0. This is alarmingly small. We feel that this will lead to low morale among students and the avoidance of Physics as a major. The physics course GPAs should be comparable to the student overall GPAs, perhaps in the range of 2.7 – 3.0. In peer institutions in USA, it has been shown that the large introductory physics courses can be an excellent source of physics majors. Under current environment, this would not be possible.