Report of the Engineering Physics Program Advisory Board to the Department of Physics of New Mexico State University. March, 2006

The Engineering Physics Advisory Board (EPAB) met for the third time on Thursday and Friday March 9th and 10th 2004, in Gardiner Hall on the NMSU Main Campus in Las Cruces, New Mexico. In attendance for the EPAB were: Dr. Frank Addessio, Fuid Dynamics Group Leader, Los Alamos National Laboratory, Los Alamos, NM; Mr. Jon Haas (Chair), Deputy Program Manager, Environmental Program, NASA Johnson Space Center, White Sands Test Facility, Las Cruces, NM.; Dr. James A. McNeil, Professor and Head of the Physics Department, Colorado School of Mines, Golden, CO.; Mr. John Schaub (B.S.E.P. NMSU 2004) Physics Department, NMSU, Las Cruces, NM.; Mr. Vincent Salazar, Senior Manager, Sensors and Information Technologies, Sandia National Laboratories, Albuquerque, NM.; Dr. Ronald Tafoya, Senior Software Engineer, Intel Corporation, Albuquerque, NM. Unable to attend were: Dr. Robert Sanderson, High Technology Consortium of Southern New Mexico, Las Cruces, NM, and Dr. James Small, Director of Advanced Programs, Raytheon Missile Systems, Tucson, AZ. Also, Dr. Dennis Buss of Texas Instruments, and Dr. Demetris Agrotis of Delphi Corp. have resigned form the board.

First, the board would like to congratulate Prof. Kyle, the BSEP committee, and the faculty for the significant progress toward ABET accreditation of the Engineering Physics program.

One function of the board is to represent the needs of the constituencies served by the program, and provide feedback to the program. In this respect, the board feels that the choice of members does represent those served most directly by the program. As such, the board strongly endorses the concept of an Engineering Physics curriculum based in the rigors and fundamentals of engineering and physics. The work in today's high-tech world is increasingly characterized by challenges which are simultaneously broadening in their scope, and deepening in their fundamental nature. The Engineering-Physics student is significantly advantaged to meet those challenges and emerge as an innovator and leader. Broadly speaking, the need for computational and simulation skills as well as systems engineering and integration skills were identified as a need in current industry.

The Board's findings for 2006 can be broken down into three categories:
Positives – Those aspects of the program that are strengths to be built upon or other aspects of the program that are mature or maturing at a healthy rate.
Needs – Those aspects of the program which will benefit form additional attention.
Observations – Those aspects or features that may represent potential problems or opportunities, but do not currently represent material strengths or weaknesses.

Positives

- The draft ABET Self Study Report looks good. Significant progress has been made toward establishing a workable program that not only serves the needs of the students, but the constituencies who will ultimately rely on the BSEP graduates for productive work.
- The Outcomes and program objectives are maturing and appear reflective of constituent needs.

- The proposed outcomes assessment matrix is a good start. Some opportunities for improvement are given below.
- The definition and representation of constituencies served by the program is adequate and well represented by the Board.
- The support to the program from both faculty and the administration appears to be improving over the past two years.
- The outcomes are well-reflected in the physics curriculum.
- The students who met with the board had very positive comments about the quality of instruction they are receiving from the physics department.

Needs

- Be able to demonstrate firm definition on all assessment-evaluation-feedback loops (what demonstrates closure) with documentation available. Though some appear closable now, demonstrating closure on all loops is not as critical as having a well defined process in place.
- Though the faculty and administrators of both colleges have done well in establishing the program and have worked productively to bridge cross-college difficulties, the ultimate success of the program will depend on a permanent program structure becoming institutionalized thus eliminating any reliance on agreements or individuals to make decisions and resolve disputes.
- Look at expanding the program objectives to better indicate capturing positive societal impacts.
- The EP skill set is still not widely understood by many employers or well-enough appreciated by university career placement offices. Consider working with your placement office to engage them in promoting the advantage of the EP skill set.
- It is important to engage all instructors in the keeping of course notebooks. Those notebooks completed looked good, but the set was incomplete.
- EP students need to know that there are program objectives (not necessarily be able to quote them) and where to find them. They should understand the ideas behind ABET accreditation and why it adds value to their degree.
- The program descriptions (e.g. university catalog, literature website, etc…) should prominently display the programs objectives.

Observations

- The current curriculum appears to be an adequate start. The Board agrees that changes, if any, should be made after full evaluation cycles have been performed.
- Adopting outcomes EC 3(a-k) as written in the ABET guidelines is probably safe, but limits the program from fully defining itself and may inhibit capitalizing on unique strengths at NMSU. Using this approach, the program can better define its individuality.
- The outcomes-objectives matrix is populated with what appear to be only primary linkages, though there are arguably many secondary linkages present.
- Another source of objectives feedback may be found in student exit interviews.
- The idea of “triangulation” or examining outcomes from more than one perspective was raised. This may be advantageous in documenting an outcome, particularly those more difficult to measure.

- Marketing: The program should benefit form increased marketing at the high-school level. It was noted that this effort has begun in the Engineering College.
- It is unnecessary to let design be the exclusive purview of the engineering college. There is an opportunity to capture design elements within the physics curriculum and take credit for it as most physics labs already contain elements of design.
- There appears to be a precedent for interdepartmental coordination of the capstone design course. There may be an opportunity for physics faculty involvement with the capstone course. Likewise, there may be an opportunity for engineering faculty involvement with the laboratory projects of the engineering physics student. This does not necessarily mean through course instruction, but through project guidance, expectation or evaluation. The manner, level, and form of the involvement needs to be worked out with the engineering college.