Engineering Faculty Council

Meeting Agenda
November 10, 2015
11:00 a.m.
228 Hammond Building

1. Approval of minutes for the meeting of October 20, 2015
2. Updates from Undergraduate Studies Committee (Chris Giebink)
3. Updates from Graduate Studies Committees (Esther Gomez)
4. Updates from Engineering Technology Committee (Ron Land)
5. Updates from Faculty Senate (Doug Wolfe)
6. Dean’s Report (Amr Elnashai)
7. Other Business
Engineering Faculty Council

Meeting Minutes
October 20, 2015
11:00 a.m.
202 Hammond, Stavely Conference Room

Present: Christine Masters, Chris Giebink, Esther Gomez, Arm Elnashai, Blaine Prichard, Douglas Wolfe, Terry Speicher, Zoubeida Ounaies, Peter Butler, Anthony Ashley, Harsha Garimella, Ronald Land

1. Approval of minutes for the meeting of September 22, 2015
   Unanimously approved.

2. Entry to Major Changes Briefing (Peter Butler, Christine Masters, Chris Giebink) – See Memo below
   • New credit window requirements and GPA described
   • Petition for Engineering Faculty Council to assist with a subcommittee or entire Council by providing:
     o Pros and Cons for college
     o Suggested changes to increase benefits
     o List what other universities do to gain competitive advantage when attracting undergraduate students
     o Survey students, faculty, and administrators (January time frame)
     o Proposed 2-3 changes to Entry to Major Committee
   • Advantages provided by Entry to Major Committee:
     o Very good way to control enrollment numbers
     o Justify expansion
     o Uncertainty on enrollment minimized
     o Reduce student complaints regarding the lack of early entry to major
   • Disadvantages provided by Entry to Major Committee:
     o Significant change
     o Engineering Science & Mechanics: tools based broad discipline. Potential for fewer students
     o Is there a difficulty to switch back to another major? Policy not defined yet
     o Capability to provide major courses at the campuses: online courses proposed as a solution
   • Subcommittee creation proposed in the Undergraduate Committee
Memo - Review of Entrance to Major

Date: October 20, 2015
To: Engineering Faculty Council Planning Committee
From: Peter J. Butler, Associate Dean for Education, College of Engineering
Re: Review of Entrance to Major in the College of Engineering; Creation of an ETM review subcommittee

Dear Engineering Faculty Council Members,

The deans of COE are interested in soliciting your advice on whether the current entry to major (ETM) mechanisms best serve the interests of our students. A review of the mechanisms can be found at: http://www.engr.psu.edu/AdvisingCenter/ETM/.

Briefly, most majors now will have a credit window (40-59 credits earned at Penn State) during which students can select the major of their choice. Each major has a GPA cutoff that is in place largely to control enrollments to that major.

However, this mechanism may not be universal. Recognizing that Penn State is unique as a geographically dispersed university, it is nevertheless likely that other universities have other mechanism for matching student’s interests to a major, which may be useful to consider adopting at Penn State. Certain ETM guidelines may be appealing to high achieving students thus providing these universities with a competitive advantage in recruiting.

The main aims of the subcommittee will be to answer the following questions:

1. What challenges does the current ETM process present to students, faculty, staff, and administrators?
2. What benefits are associated with the flexible ETM process?
3. Is there a proposed change to the ETM process that may lead to addressing the challenges and maintaining and increasing the benefits?

In order to address these aims, the committee will be encouraged to:

1. Benchmark PSU ETM COE process against those of peer institutions and institutions with higher rankings than PSU COE
2. Survey students, faculty, administrators, for departmental review of challenges to current ETM
3. Propose 2-3 changes in ETM and assess pros and cons of implementation.

The main deliverable will be a report to the Dean, presented during an EFC meeting, on the findings of the committee. The committee can be assured that the dean will carefully review the committee’s findings and consider them for a proposal to the Vice President of undergraduate education.

We thank you in advance for your consideration of this important work.

3. Updates from Graduate Studies Committees (Esther Gomez)
   - Two-faculty nomination approved,
   - 16 course proposals for 1 year Masters (10 approved, 6 sent back for review due to not clear evaluation methods or lack of difference between already offered courses)
   - New programs: 3 approved, 2 send back.
     - Masters of Engineering Leadership (not suitable for the College of Engineering)
     - Master on Biomedical Engineering (degree requirements not clear)
   - One year Masters of Engineering future demand and resources discussed
• Dual degree title between Industrial Engineering and Humanities and Arts Design Program been studied
• No feedback requested from EFC

4. **Updates from undergraduate Studies Committees (Chris Giebink)**
   Course Proposal Changes voted and approved: A E 494A Senior Honors Thesis Curricular Review

5. **Updates from Engineering Technology Committee (Ron Land)**
   Nothing to report.

6. **Updates from Faculty Senate (Doug Wolfe)**
   • Dean search for Law School
   • Transition from Angel to Canvas approved
   • Strategic plan: comments will be sent out
   • Temple University professor unjustified arrest due to ITAR concerns sparked discussion on the protection offered by the University to faculty. Plan for faculty defense in case of potential ITAR irregularities discussed
   • Undergraduate enrollment discussion (up to 250 in UP, 100 up in satellite campuses). There is a large growth in the number of international students
   • Entrepreneurship minor close to approval
   • PPO Savings vs standard PPO demand due to concerns that one of them might be eliminated. Both plans are in similar demand, and the case to phase one of them out is not substantiated

   Legislative reports:
   • Vote on entry to major requirements
   • Repeating courses (3 times) to be voted on
   • LionPath driven changes to be discussed

7. **Dean’s Report (Amr Elnashai)**
   • Blueprint for global preeminence in engineering (84 pages) document being finalized
   • Blueprint summarizes hiring plan for next 5 years and linkage with University plan. 35 new faculty sought. The details have been moved to an appendix to reduce the size of the document
   • Blueprint summarizes hiring plan for administration office. 25 new administrators sought. Details also moved to appendix
   • Two pages of executive summary added: emphasized need for growth to maintain performance
   • Document details space renovation, repurposing, and collaborator space creation. Funds requested for those activities
   • Planned expansion of student body: 10% per year if new facilities are available
   • Currently: no advertising for undergraduate students
   • Meeting with provost, associate deans, and department heads scheduled for Nov. 12, 2015
• Paragraph to be added to reduce student body if support from the University is not allocated.
• Questions raised by EFC members:
  o Are there issues with other colleges?
  o Is there room for alliances in seeking university support?

8. **Policy AD-77 Update: Engaging in Outside Activities (Anthony Atchley)**
   • Faculty would teach for another university, potentially having tenure at both universities
   • Defines what type of activities need approval from the College
   • Consulting beyond policy does not require approval from the Dean
   • Visiting professor overseas typically must sign agreements with foreign universities:
     o Financial reimbursements involved
     o Requires proposal submission, paper publication with new foreign affiliation
   • Questions to EFC:
     • What guidelines are needed?
     • What role does EFC takes to modify existent guidelines?

Links provided:
[http://guru.psu.edu/policies/AD77.html](http://guru.psu.edu/policies/AD77.html)

9. **Other Business**
   None.
<table>
<thead>
<tr>
<th>Type and Description of Change</th>
<th>Description or Rationale for Curricular Actions</th>
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<tbody>
<tr>
<td>A E 453 - Load and Energy Use Simulations for Buildings</td>
<td>Building systems use more primary energy utilization and generate more emissions than either the U.S. transportation or industrial manufacturing sectors. Due to the significance of the building sector on national energy used and emissions profiles, the development of quantitatively predictive energy and performance simulation of buildings is a rapidly advancing technical field. The Architecture and Architectural Engineering communities are pursuing aggressive programs to establish a data-based, protocol methodologies and computer based modeling tools that enable accurate predictions of the expected energy utilization and indoor environment performance of alternative building designs. The developing modeling tools are to be integrated with on-site performance measurements and protocol based energy auditing of facilities. Expected performance characteristics predicted by the modeling tools are compared with the measured values. The building design community is evolving to design simulation methodologies used by the transportation and manufacturing sectors.</td>
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<td>ADD - Permanent Course Number</td>
<td>In this course, the means of measuring and monitoring of the energy use associated with a building system, both on whole building and significant subsystems – lighting, heating ventilation and air conditioning, occupant operated equipment – are reviewed. Inverse modeling techniques of using the data with associated significant independent variables, such as ambient weather parameters and occupant density, to establish, empirical expected building energy use models, as well as document energy efficiency renovation impacts are detailed. Industry established building performance rating scales which use such data are discussed.</td>
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<td>Submitted by: James Freihaut</td>
<td>Fundamental heat transfer and thermal capacitance relationships as used by the engineering design community are discussed along with linearization approximations and Fourier series techniques used to simplify the resulting complex, coupled partial differential equations that result from energy balancing model equations. Analytical and numerical approaches to solving the equations to arrive at predicted thermal loads developed by a building system are reviewed. Readily available, building simulation software packages commonly used in the building design community to determined energy used by equipment configurations to meet predicted loads are discussed. Students are required to exercise one of the standard software tools to model a specific building facility.</td>
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<td>Course</td>
<td>Description</td>
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<td><strong>M E 315 - Heat Transfer Laboratory</strong></td>
<td>The course is not being changed. A long description of the course was missing from the university bulletin and the department would like to ensure this course has one. This action will assist our students in making informed choices when selecting courses. This one-credit laboratory course is structured to reinforce the various principles taught in the corresponding 3-credit lecture course- M E 410, Heat Transfer. The laboratory includes several different experiments whose objective is to reintroduce and reinforce the various principles associated with conduction, convection, radiation and heat exchangers. Each laboratory session begins with a thorough review of the relevant material covered in the lecture course, including the use of energy conservation on control volumes related to the experiment and related simplifications. Prior to conducting any experiment, the students are informed about the particular safety issues that vary from one experiment to another. The students are then briefed about the setup of the data acquisition systems, what type of data the need to be collected, and how the data then is coupled to the review of the specific laboratory topic. At the end of the semester, the students should be able to interface a typical data acquisition system with those used in industry and elsewhere. The students generally work in groups to collect data, with reports prepared individually after an experiment is completed.</td>
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<td><strong>M E 320 - Fluid Flow</strong></td>
<td>The course is not being changed. A long description of the course was missing from the university bulletin and the department would like to ensure this course has one. This action will assist our students in making informed choices when selecting courses. This course is an introduction to fluid mechanics, and emphasizes fundamental concepts and problem-solving techniques. Topics to be covered include fluid properties (density, viscosity, vapor pressure, surface tension); fluid statics (hydrostatic pressure, pressure forces on planar and curved surfaces); fluid kinematics (flow visualization, vorticity, Reynolds transport theorem); control volume analysis (conservation laws of mass, momentum, and energy, Bernoulli equation); dimensional analysis (dimensional homogeneity, method of repeating variables, experimental testing, similarity); internal flows (pipe flows, major and minor losses, piping networks, matching pumps to systems); differential analysis (Navier-Stokes equation, creeping flow, potential flow, boundary layers); external flows (lift and drag, pressure vs. friction drag); and compressible flow (isentropic flow through nozzles, shock waves). Brief introductions to computational fluid dynamics (CFD), and turbomachinery (pumps and turbines) will also be provided.</td>
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<td>Course</td>
<td>Change Description</td>
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<td>M E 325 - Fluids Laboratory</td>
<td>Change – Addition of long description for bulletin</td>
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<td>M E 375 - Vibrations Laboratory</td>
<td>Change – Addition of long description for bulletin</td>
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<td>Course</td>
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<tr>
<td>M E 404 - Gas Turbines</td>
<td>Eric Marsh</td>
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<tr>
<th>Course</th>
<th>Submitted by</th>
<th>Change - Prerequisite Change</th>
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<tbody>
<tr>
<td>M E 431 - Internal Combustion Engines</td>
<td>Eric Marsh</td>
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<td>Request: remove ME302 as pre-requisite for ME431 ME302 is a service course that is taught to Engineering Science and Mechanics students and is no longer offered to ME students. Request: make ME300 a pre-requisite for ME431 ME431 teaches fundamentals of internal combustion engine performance and design. In particular, the specific goals for the course, as mapped to the ABET learning outcomes, are the following:</td>
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<td>1. Learn to classify different types of internal combustion engines and their applications [3c].</td>
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<td>2. Apply principles of thermodynamics, fluid mechanics, and heat transfer to the design and analysis of engines and engine components [1a,2b,2e].</td>
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<td>3. Become aware of the relevance of environmental and social issues on the design process of internal combustion engines [3b].</td>
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<td>4. Develop mathematical methods for designing components and systems [2c,2f].</td>
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<td>5. Apply numerical methods to perform design calculations [3f,4d,4e].</td>
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<td>6. Advance proficiency in professional communications and interactions [3d,3f].</td>
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<td>These goals are met through a semester-long course that focuses on seven areas:</td>
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<td>1. Performance parameters and design for performance</td>
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<td>2. Engine cycles and thermodynamic modeling</td>
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<td>3. Spark-ignition fuels, combustion, and emissions</td>
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<td>4. Gas exchange processes and in-cylinder flows</td>
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<td>5. Forced induction (turbocharging and the like)</td>
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<td>6. Compression-ignition fuels, combustion, and emissions</td>
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<td>7. Advanced engine cycles</td>
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<td>The basics of all of these goals and focus areas are developed in ME300. The basic concepts of work, efficiency, thermodynamic state, and cycle analysis are developed in ME300 and used extensively in each of the seven focus areas described above. In particular, the following course objectives for ME300 completely prepare students for the material in ME431:</td>
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<tr>
<td>Course</td>
<td>Description</td>
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| ME 431 | 1. Obtain thermodynamic data necessary to solve thermodynamic problems and when necessary use appropriate approximations. These skills include the use of equations of state and/or tabulated property tables. [2b]  
2. Write the First Law of Thermodynamics in their appropriate forms for both closed system and control volume problem. [2b]  
4. Make appropriate assumptions when applying the First Law to a “real-world” problem. [2b]  
5. Write the Second Law of Thermodynamics in their appropriate forms for both closed system and control volume problem. [2b]  
6. Apply the Second Law to determine the performance limitations of a given thermodynamic system. [2b]  
7. Apply thermodynamic concepts to describe the performance of the individual components of an engineering system, e.g. a power plant, a jet engine, etc., and then relate that information to the overall performance of the entire system. [2e]  
8. Physically interpret and apply integrals and derivatives to solve thermodynamic problems. [4d]  
9. Translate complex word problems into an orderly and logical problem solving approach. [4d]  
10. Use software to solve thermodynamics problems. [4d]  

No other pre-requisite is required for ME431 because all of the course outcomes for ME431 are direct extensions of those from ME300. |
| ME 452 - Vehicle Road Dynamics | The course is not being changed. A long description of the course was missing from the university bulletin and the department would like to ensure this course has one. This action will assist our students in making informed choices when selecting courses.  

This course conducts investigations of one-dimensional, two-dimensional, and three-dimensional dynamics, kinematics and design integrated into the study of vehicle dynamics. Topics include body kinematics, steady state body dynamics, transient stability, tire forces, suspension, automatic control, and driver interaction. The emphasis is on the analysis of a vehicle as a complex system, recognizing how to abstract observed behaviors into appropriate mathematical models, how to decompose behaviors into subsystems, how to construct and perform numerical simulations, and how to design and analyze experiments to test models and simulations to gain insights into design goals and tradeoffs. |

Submitted by: Eric Marsh | CHANGE – Addition of long description for bulletin |
<table>
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<tr>
<th>ME 460 - Advanced Machine Design Problems</th>
<th><strong>CHANGE</strong> – Addition of long description for bulletin</th>
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<tbody>
<tr>
<td>Submitted by: Eric Marsh</td>
<td>The course is not being changed. A long description of the course was missing from the university bulletin and the department would like to ensure this course has one. This action will assist our students in making informed choices when selecting courses.</td>
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<td>This course is designed to approach and analyze fundamental problems in the design of advanced level machine components and systems. It integrates advanced concepts in fatigue, vibrations, mechanics of materials and tribology for component and system level reliability. The course emphasizes elements of power transmission through detailed discussion on kinematics and reliability based design of cams, flywheels, transmission couplings and gear chains. Example cases involve single and multiple cylinder automotive engine system with analysis of dynamics and balancing, power transmission through both flexible and rigid elements as well as different kinds of differentials built of spur, helical, bevel and worm gears. Another thrust is the application of tribology on machine design with special focus on hydrostatic and hydrodynamic bearings. Through case studies drawn from design and failure from real life systems, the course develops knowledge and skills for translating design concepts from components to system level.</td>
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<tr>
<th>Retention and Transfer Proposal for EE Academic Controls Request</th>
<th>Request for Academic Controls</th>
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<tbody>
<tr>
<td>Submitted by: David Salvia</td>
<td>Over the years, we have observed that an alarmingly high percentage of academically weaker students who enter the BSEE program at University Park struggle greatly in our program. Many of them take 5-6 years to graduate (due primarily to having to repeat our C-required core courses multiple times) and many more leave the program without earning a BSEE degree at all. The difference in success between students who enter the major with a GPA 2.8 or greater (at the end of their 2nd year) versus those who enter the major with a GPA &lt; 2.8 is alarming. This difference is even more pronounced if we look at the success of students who enter the major with a GPA &lt; 2.6.</td>
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<td>With enrollment controls on virtually every other COE major, the EE program is quickly becoming the 2nd, 3rd or 4th option for academically weaker students who do not qualify for other Engineering majors. Therefore, we expect the number of entering EE students with GPA &lt; 2.6 to increase significantly. The fact that Electrical Engineering is not the desired major for many of these lower-GPA students to begin with will make it even more difficult for them to successfully complete the degree.</td>
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</table>
A total of 7 proposals were reviewed

- 3 Course Proposals
  - AE 579 – Approved
  - IE 586 - Approved
  - BME 594 - returned to department for revision

- 4 Program Proposals
  - Engineering Leadership and Innovation Management one-year MEng - Approved
  - Biomedical Engineering one-year MS - Approved
  - Architectural Engineering change of requirements for MEng to make it a one-year program - Approved
  - Computer Science MEng program to be offered at Reston, Virginia campus of PSU - overall the committee was supportive of this proposal but it wasn’t clear who would teach the courses
## Proposals Submitted to EFC

<table>
<thead>
<tr>
<th>Proposal Type</th>
<th>Course/Program</th>
<th>Faculty Nom</th>
<th>Program Name</th>
<th>One Year Masters (OYM)</th>
<th>Number or Degree</th>
<th>Action Requested (Add/Change/New)</th>
<th>Vote</th>
<th>EFC Proposal Report</th>
<th>Summary of Discussion Points</th>
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<tbody>
<tr>
<td>Course</td>
<td>Sustainable Building Project Leadership</td>
<td>A E</td>
<td>579</td>
<td>Add</td>
<td>Approved U</td>
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<td>The primary educational goal of this course is to cultivate leadership and integration skills needed to spearhead the design, construction, commissioning, and operation of high performance buildings. An emphasis is placed on the integrative process required to design healthy and productive buildings which require minimal site disruption, energy, materials, and water for construction and operation. Upon completion of this course students will be able to: a. Articulate and apply advanced concepts and techniques to manage the delivery of sustainable buildings during initial goal setting, team selection, design, construction, operation, and deconstruction phases of a project lifecycle; b. Understand and manage the key factors that affect the outcome of sustainable building projects including project delivery and contracting methods; c. Engage building project team members in integrative processes that yield commitments and reliable project communication and information management systems. d. Assess the feasibility of variable design strategies and technologies using analysis tools and integrative collaborative teams. e. Interpret and adapt lessons learned from exemplary strategies demonstrated by detailed case studies of successful high performance building projects.</td>
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<tr>
<td>Course</td>
<td>Machining Process Design and Theory</td>
<td>E</td>
<td>586</td>
<td>Add</td>
<td>Approved U</td>
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<td>This graduate course is designed to fulfill the &quot;manufacturing process&quot; course requirement of the Manufacturing Option of the Industrial Engineering MS degree and the Ph.D. degree. The vast majority of graduate students pursuing the manufacturing option have B.S. degrees in related fields such as mechanical engineering, materials engineering, and industrial engineering, but have little knowledge of manufacturing engineering. Nearly all have no significant &quot;hands on&quot; experience using machining processes. Those that do have little knowledge of machining process engineering and machining process science. This course is designed as an entry level, graduate course for engineers who have an interest in implementing and optimizing machining processes in industry. It is also intended for graduate students who wish to conduct machining process research in the area of machining processes.</td>
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<tr>
<td>Course</td>
<td>Mentored Research Project</td>
<td>BME</td>
<td>594</td>
<td>Add</td>
<td>Returned to department for revision</td>
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<td>This course is designed as a mentored research course, as exists in other programs. The MS is designed such that a cohort of students moves through the 1 year program together. As such, each semester yields expectations of progress that are assessed by individual faculty mentors, but the overall theme is maintained by the 594 credits. Goals for the first semester will be defining the project, assembling groups, and carrying out literature review. Goals for the second semester will be computational and experimental work toward the final work product. Goals for the summer sessions will be completion of work and writing the final proposal. Expectations are 1 credit for each of Fall and Spring semesters and 2 credits for each summer session; 6 credits of BME 594 will be required for graduation. Students will move through the program as a cohort, taking BME 594 for 1 credit in Fall and Spring semesters and 2 credits in each of the two summer sessions. Thus, Credit Count is 1-2 credits. Course is designed to be taken every semester until graduation.</td>
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- The contact hours (260 min/wk) seem high for a 3-credit, graduate-level class. Is there a precedent for this? I wonder how this content—in particular since the students taking it are described as having little experience in the area—is appropriate for a graduate course. Perhaps this should be a 400-level course? |
- This looks good. My only concern is that none of the consultants responded. |
- This proposal formalizes the research component of the 1-year MS non-thesis for BME. Overall, it looks good, though the description of the "final proposal" or "final word product" should be expanded. Is this a research article (Introduction, Methods, Results, Discussion) that could in principle be submitted to a peer-review journal? The current description suggests that the students’ goals are to write a grant proposal and to obtain the needed preliminary results to support it. Both types of final "work products" would be acceptable in my mind. |
- From the description within the justification section, please clarify how the semester sequence in the 1-year MS plan is applied. From my reading, it appears that students will start the MS in summer, go through Fall, and Spring and complete in the following summer. If this is the case, what do the students do in the first summer? The description says “…summer sessions will be completion of work and writing the final proposal.” |
- Within the evaluation section, is “groups” referring to human subjects? Or, team of students working on the same project theme? |
- “If the project involves human subjects and/or NIH-defined clinical research, are the plans to address 1) the protection of human subjects from research risks, and 2) the inclusion (or exclusion) of individuals on the basis of sex/gender, race, and ethnicity, as well as the inclusion (exclusion) of children, justified in terms of the scientific goals and research strategy proposed?” Please clarify this statement—do the students go through a human subjects review if their project involves one, or they show a framework for preparing material for human subjects review? If it is the former, the timeline of completing in one year may need to be re-vitalized. It might be unrealistic—very much project specific.
<table>
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<tr>
<th>Proposal Type (course/progr</th>
<th>Faculty Nom</th>
<th>Program Name</th>
<th>One Year Masters</th>
<th>Number or Degree</th>
<th>Action Requested (Add/Change/New)</th>
<th>Vote</th>
<th>Justification (Why/What for)</th>
<th>Summary of Discussion Points</th>
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<tbody>
<tr>
<td>Proposal — Master of Engin</td>
<td>ELIM</td>
<td>Engineering Leadership and Innovation Management (ELIM)</td>
<td>OYM M ENG</td>
<td>New</td>
<td>Approve U</td>
<td>Leadership training for engineers in the new century: To enhance the nation's economic productivity and improve the quality of life worldwide, engineering education in the United States must anticipate and adapt to the dramatic changes of engineering practice. The Engineer of 2020 urges the engineering profession to recognize what engineers can build for the future through a wide range of leadership roles in industry, government, and academia not just through technical jobs. Engineering schools should attract the best and brightest students and be open to new teaching and training approaches. With the appropriate education and training, the engineer of the future will be called upon to become a leader not only in business but also in nonprofit and government sectors.” (Engineer of 2020, National Academy of Engineering). In response to this need, there has been an emergence of leadership education over the past decade. A recent benchmarking study identified 29 leadership programs (both undergraduate and graduate) across the US and Canada, with formation dates available for 21 programs. Of the 21 programs, 15 were established in the last decade. In addition, there has been amazing growth of the American Society of Engineering Education’s Engineering Leadership Division from a handful of members a year ago to over 800 current members.</td>
<td>- I support the proposal. However, I could not find the course proposal for BIOE 594. Has this course been approved already? From the current description of the course, it is not clear if this will be a course on numerical methods (as the title implies) or a graduate course on using a specific software package to focus on applications.</td>
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<tr>
<td>Proposal to Add a Non-Thes</td>
<td>BME</td>
<td>Degree in Biomedical Engineering</td>
<td>OYM MS</td>
<td>New</td>
<td>Approve U</td>
<td>The Biomedical Engineering program at Penn State has graduated many undergraduates who have gone on to very successful careers in the biomedical industry. However, various alumni have reported to us that some employers would like employees to be educated at the master’s level in order to advance to leadership positions within the company. Therefore, there is a critical niche to fill at the master’s level for biomedical companies wishing to obtain highly trained students capable of carrying out cutting-edge work in translational medicine, device development, and related areas. To fill this niche, the Dept. of Biomedical Engineering proposes a one-year course-based master's program, entitled MS in Biomedical Engineering (BME MS). The degree will consist of advanced instruction in biomedical engineering fundamentals, courses in advanced biotechnology and applications, and a culminating research proposal that incorporates experiments and computational work. This degree will result in the students developing foundational knowledge and skills in biomedical engineering that will make them competitive for industry leadership positions or doctoral-level graduate programs in BME and related disciplines.</td>
<td>- Other than the comments by XXX and XXX, this looks okay.</td>
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<td>Proposal to Create a One-</td>
<td>A E</td>
<td>Year Master of Engineering Degree (M.Eng.) in Architectural Engineering</td>
<td>OYM M ENG</td>
<td>New</td>
<td>Approve U</td>
<td>The purpose of this proposal is to change the existing M.Eng. degree in Architectural Engineering to a one-year master's degree with a revised set of entry and coursework requirements. The motivation for this proposal is to streamline degree requirements such that students can complete this degree in one calendar year. Currently, most students seeking the M.Eng. degree complete their degree within two years.</td>
<td>- The projected size indicates up to 30 students in each cohort, after the program is established (capped in two or three years). The fiscal responsibility statement assumes 24 students per year in each cohort. Should these be consistent in regards to cohort size estimates? - I concur with XXX comment about instruction. It is not clear who will provide the resident instructional needs to support the program. Section 4.3 indicates that ARL research faculty will provide guest lectures and support, but perhaps the Reston research faculty will have take on a larger role to deliver the entire program? - This is an interesting program that will likely have demand. The proposal states that this will be a resident program in Virginia, however, it is not clear who will teach the courses. Interactions with the world campus suggest that some course content may be delivered online or through webex type delivery mechanisms. Is this the intention? - I agree with earlier comments about the lack of clarity on who will teach the courses. Otherwise, this looks ok.</td>
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<td>Delivery of the M.Eng. in</td>
<td>CSE</td>
<td>Computer Science and Engineering at Penn State's Facility in Reston, Virginia</td>
<td>OYM M ENG</td>
<td>New</td>
<td>Approve U</td>
<td>That there is an extremely high and increasing demand for cybersecurity professionals, particularly in the National Capital Region, is an understatement. For several years, the demand has significantly outpaced supply. The following statistics provide examples of the substantial evidence of demand.</td>
<td>- At any given time, there are up to 200,000 national postings for cybersecurity jobs. Many firms have more job openings than they can fill because candidates do not have the necessary skills. - The National Capital Region is consistently the area with the greatest demand for cybersecurity professionals. At any given time, there are up to 23,000 postings (over 10% of the national demand) for cybersecurity jobs in the region. More than 70 federal agencies and over 300 cybersecurity-focused companies reside in the greater Washington, DC, metropolitan area. - The U.S. Department of Defense faces thousands of cyberattacks per day. Individual U.S. companies are targeted multiple times per day. The average cost per company for successful cyber attacks in 2014 is estimated at $20.8 million for financial services firms; $14.5 million in the technology sector; and $12.7 million in the communications industry.</td>
<td>- The project size indicates up to 30 students in each cohort, after the program is established (capped in two or three years). The fiscal responsibility statement assumes 24 students per year in each cohort. Should these be consistent in regards to cohort size estimates? - I concur with XXX comment about instruction. It is not clear who will provide the resident instructional needs to support the program. Section 4.3 indicates that ARL research faculty will provide guest lectures and support, but perhaps the Reston research faculty will have take on a larger role to deliver the entire program? - This is an interesting program that will likely have demand. The proposal states that this will be a resident program in Virginia, however, it is not clear who will teach the courses. Interactions with the world campus suggest that some course content may be delivered online or through webex type delivery mechanisms. Is this the intention? - I agree with earlier comments about the lack of clarity on who will teach the courses. Otherwise, this looks ok.</td>
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