Engineering Faculty Council
Meeting Agenda
April 18, 2017
11:00 a.m.
101F Hammond Building (large conference room in Dean’s Suite)

1. Approval of minutes for the meeting of March 21, 2017
2. Dean’s Report (Anthony Atchley for Amr Elnashai)
3. Updates from Undergraduate Studies Committee (Chris Giebink)
   - Special EE Program Change Proposal (Peter Butler)
4. Updates from Graduate Studies Committee (Esther Gomez)
   - Graduate Faculty Membership Policy (Shelley Stoffels)
5. Updates from Engineering Technology Committee (Engr Tech Chair)
6. Updates from Faculty Senate (Doug Wolfe)
7. Other Business
Meeting Minutes

1. Approval of minutes for the meeting of February 21, 2016
   Unanimously approved.

2. Dean’s Report (Amr Elnashai)
   - Infrastructure:
     o College will receive significant investment to improve infrastructure. Board of trustee is interested in borrowing money to improve infrastructure. COE co-laboratory is at the top of the list.
     o Request received from OPP for the formation of a committee to do the programming for the co-laboratory. The committee is being formed, and (more or less) all departments will be represented.
     o The University will not pay for all costs. We are asked to raise $10 millions for the co-laboratory. Can involve all alumni for the fund raising.
     o The Director of OPP gave a presentation for the Academic Leadership Council focused on the next capital plan. A list of projects were recommended under ‘to be replaced’ and ‘to be refurbished. The top two items in the ‘to be replaced’ are Hammond and Engineering units. Sacket and EE west are on the list of ‘to be refurbished’. The plan will be presented it to the Board of Trustee and Director’s fellow subcommittee members.
   - Faculty hiring: hired 9, 3 offers out. 28 additional searches are ongoing.
   - On-line programs: Committed to supporting the existing courses. Putting in for a new position of Director for the Office of Digital Learning. In addition to online education, this office will look for innovation and technology in classroom in general. Hope to have the person hired by May 1st. Working on a plan for online education for CoE. The plan was distributed to department heads 6 mons ago. The plan needs to be tweaked in terms of how many programs will go ahead with it and how we initiate these programs. Another development, with the help of the graduate school, is the program of professional Masters, which probably will grow out of the program of one-year Masters. Revenue sharing is that 2/3 goes to departments and 1/3 stays at College.
   - Engineering Development: Senior Director of Development, Christina Randal decided to resign and return to Idaho for personal reasons. Five positions to fill. Ads have been crafted to hire two Directors and three Assistant Directors for Development.
   - Departmental reviews: Objectives: 1) We need to have a comprehensive annual report for the College that include all the statistics from departments. The annual report will be published by the Office of Data Analysis and Assessment. 2) To establish a continuous procedure of internal assessment of the departments. Three departments will be reviewed this coming fall: Industrial Engineering, ESM and Civil Engineering. The external review
panels are high-end. Internally, Finance and Personnel were reviewed. Currently reviewing Education and Research. Departmental review will be conducted every five years.

- The amount of money we obtained from Old Main: \(7^{th}\) and \(8^{th}\) per faculty and per student, respectively (out of 10).

3. Updates from Undergraduate Studies Committee (Chris Giebink).
   - Course Add
     - EDSGN 468 – Engineering Design and Analysis with CAD
     - ME 397 - Special Topics
   - Course Change
     - ME 422 - Principles of Turbomachinery
   - Program Change
     - Mechanical Engineering Program Proposal
     
     Four Program changes are being requested in this proposal.
     
     #1. The objectives for the ME major were changed in accordance with the mandated ABET review cycle.
     #2. A change was made to the supporting courses and related areas updating verbiage to clarify degree requirements for students.
     #3. A change was made to the additional courses section adding the recently developed capstone course option of ME 442 and ME 443 for students to meet student demand.
     #4. Removal of the Integrated BS-MS degree in Mechanical Engineering.

     Unanimously approved by EFC.

4. Updates from Graduate Studies Committees (Howard Salis).
   - Program Proposals:
     - None
   - Course Proposals:
     - CE 835 (Course number change): Integrated Project Management for Civil Engineers - Approved
   - Graduate Faculty Nominations:
     - None

     Unanimously approved by EFC.

5. Updates from Engineering Technology Committee (Engr Tech Chair)
   
   
   Approved.

   Unanimously approved by EFC.

6. Updates from Faculty Senate (Doug Wolfe) None.

7. Other Business
   
   Invitations were sent to department chairs for nominations of the Graduate Council. Election will be carried out.
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<th>Type and Description of Change</th>
<th>Description or Rationale for Curricular Actions</th>
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| **AE 468** – Advanced Building Electrical and Communication Systems  
Submitted by: Richard George Mistrick | Changing course number from AE 468a to AE 468. The original AE 468 (Daylight Analysis of Roman Architecture) is in the process of changing course number to AE 463. In order to get the current course (Advanced Building Electrical and Communication Systems) approved in a timely manner, we submitted the course as AE 468a on 11/14/16.  
Special Building Electrical and Communication Systems is an elective course within the architectural engineering program. It addresses specialized components and analysis of building electrical systems, cost and availability of electrical energy, and power quality. Students will also develop an in-depth understanding of alternative electrical sources, the National Electric Code, advanced design issues of electrical systems, as well as other electrical and building communication issues. In addition, part of the course will focus on the fundamentals of special systems typically included within the electrical discipline scope of work such as fire alarm, access control, surveillance, voice, video and data systems. Upon completion of this course, students will be able to explain the fundamentals of special electrical and communication systems within a building. |
| **EDSGN 401** – Engineering Systems Design  
Submitted by: Asad Azemi | There is no change in the course content. We are only changing the prerequisites. As it was pointed out in the original proposal, the prerequisites, with the exception of EDSGN 100, were deemed necessary for course projects. With the proposed changes in the curriculum, dropping CMPEN required courses, the course project(s) will no longer include CMPEN 271 material as a necessary background. EMCH 213 has been dropped, since it was determined that the course projects would not require the technical knowledge from this course. The reason for including MATH 251 as a prerequisite, in the initial course proposal, was to have the freedom of assigning projects that may involve differential equations. After several offerings of the course, we concluded that such projects may not fit the focus of the course and therefore decided to remove it. Moreover, EDSGN 401 course is a fifth semester course and cannot be taken before being admitted to the program, since Math 251 is an ETM requirement, this requirement was removed. Furthermore, our transfer students (outside or inside Penn State) may have MATH 250 and we wanted to provide more flexibility in that regard and based on the aforementioned points it was decided to be remove MATH 251 as a prerequisite. Finally, in light of dropping the aforementioned prerequisites, in order to ensure that only students with proper background would enroll in this course, the fourth-semester prerequisite has been added to the list. Please note that having a fifth-semester standing prerequisite (or co-
A fourth-semester prerequisite was adopted. This course provides the knowledge and skills necessary to translate needs and priorities into system requirements, and develop derived requirements, which together form the starting point for engineering of complex systems. Students will develop an understanding of the larger context in which requirements for a system are developed, and learn about trade-offs between developing mission needs or market opportunities first versus assessing available technology first. Techniques for translating needs and priorities into an operational concept and then into specific functional and performance requirements will be presented. Students will assess and improve the usefulness of requirements, including such aspects as correctness, completeness, consistency, measurability, testability, and clarity of documentation.

EDSGN 402 – Materials and Manufacturing
Submitted by: Asad Azemi, Uladzislau Ivashyn

Students will study principles and properties of engineering materials and manufacturing processes with a focus on their appropriate selection in design. Based on these principles and properties, as well as hands-on laboratory experiences, students will develop systematic methods for matching material and process choices to the mechanical, thermal, electro-magnetic, and environmental constraints set by the technical requirements of a design problem or project.

Knowledge of current manufacturing processes is required to align appropriate processes and materials with the requirements of designed products. Students will develop basic, practical knowledge and skills in operating manual and CNC machine tools. Both subtractive and additive manufacturing processes will be explored, and students will learn best practices for making informed choices between them based on design needs. Computer aided manufacturing will be introduced to provide background for future courses (e.g., senior capstone projects).

Student performance will be assessed via written homework assignments, laboratory activities and reports, written exams, and a design project that integrates material and process selection, as well as manufacture and testing of simple engineered components and/or products.

CHEM 110 provides knowledge of the chemical composition of engineering materials and their physical properties. EMCH 211 and EMCH 213 provide knowledge of statics and strength of materials, which are important in understanding manufacturing processes and material selection. CMPSC 200, 201 or 121 and EDSGN 401 help establish the necessary foundation for Computer Aided Manufacturing processes (CAM), as well as an understanding of the systemic nature of design for manufacturing.
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| EDSGN 403 – Product Realization | This course provides students with practical experience in the product design and development process. Computer aided design and a variety of related analytical tools are employed in team-oriented design activities. The course includes considerable in-class team interactions. Team progress will be monitored through weekly team check-ins, during which two project status communication tools will be reviewed – an updated GANTT Chart and a Weekly Project Activity Plan document. The hands-on design activities will culminate in the presentation and demonstration of a functioning engineering system. In working toward this goal, students will employ the following:  
• Project management scheduling tools (GANTT chart or PERT chart)  
• Formal brainstorming techniques (e.g., “6-3-5 Brainwriting,” Mind Maps)  
• Generation of conceptual designs (e.g., morphological charts)  
• Deterministic design tradeoff techniques (House of Quality)  
• Programmable fabrication equipment; this will include:  
  - One additive manufacturing technique (3D printing)  
  - Subtractive manufacturing techniques (CNC milling, water-jet, laser cutting).  
• Verification testing in the context of design-build-test iteration |
| EDSGN 410 – Robotics Design and Applications | We are requesting 2 changes in the prerequisites for EDSGN 410 only. There are no requested changes in the description, objectives or content of the course.  
1) Add EE 316, Introduction to Embedded Controllers (3), as an alternative to CMPEN 472. The justification for this change is that we are removing CMPEN 331 from the MDE option curriculum and CMPEN 331 was a prerequisite for CMPEN 472. EE 316 is an equivalent course with less emphasis on low-level computer architecture and offers a treatment of microcontrollers and embedded systems that is academically appropriate for EDSGN 410. We are keeping CMPEN 472 to accommodate potential transfer students who have taken the course.  
2) Adding CMPSC 200 (3) to the existing list of prerequisites for EDSGN 410. The proposed list of computer science course prerequisites will be CMPSC 121 or CMPSC 201 or CMPSC 200. The justification for this change is that CMPSC 200 (MATLAB programming) covers the necessary programming skills to achieve academic success in EDSGN 410. Basic programming concepts covered in any of the 3 programming courses of CMPSC 121 (Python), CMPSC 201 (C++ & MATLAB) or CMPSC 200 (MATLAB), which include algorithm development, control structures, functions and arrays in a procedure-oriented language is sufficient background for success in EDSGN 410.  
The course includes a discussion of applications of robotics in such areas as manufacturing, science, transportation, military, health care, and entertainment. Students will apply the basic concepts of electrical, mechanical, and software technologies to analyze and design a robotics |
system to achieve a particular task or set of tasks. Students will be introduced to mechanical systems analysis, sensors, software development, electrical systems, control, testing, prototyping, design and simulation of robot systems. This course is project-based and will have a substantial laboratory component supporting team-based multidisciplinary design, integration and testing of a robot system.

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<td><strong>EDSGN 420 – Advanced Robotics Design and Applications</strong></td>
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<td>Submitted by: Robert Avanzato</td>
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<td>The objective of this course is to apply advanced topics in robotics. It serves as the second course of a possible two-course sequence in robotics design and applications. This second course will enable students to explore advanced topics not covered in the first course, or to continue a complex robot system design that would incorporate advanced topics and span two semesters in duration. One or more advanced topics, such as computer vision, artificial intelligence, biologically-inspired robots, multi-robotics, collaborative robots, human-robot interface, advanced navigation, or others, will be introduced based on background of the instructor. Students will work in teams to design and prototype a robot that integrates the advanced algorithms and technology and satisfies a set of design requirements. Laboratory exercises will provide experience in key areas to support the design and implementation process. Professional communication and documentation will be included in the course experience. This course is a multi-disciplinary, project-based course and will have a substantial laboratory component supporting team-based design, integration, and testing of an advanced robot system. Students’ performance will be assessed via written homework assignments, laboratory activities, reports, written exams, oral presentations, and a design project that incorporates both hardware design and software design.</td>
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<td><strong>General Engineering Program Proposal</strong></td>
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<tr>
<td>Submitted by: Robert Avanzato, Asad Azemi, Kathryn Jablokow, Daudi Waryoba, Wieslaw Grebski, Ivan Esparragoza</td>
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| 1) The proposed change of the program name is in response to recommendations made by the program-wide industrial advisory committee in 2015, who felt that the General Engineering designation did not accurately communicate the nature of the program. Analysis of comparable programs at other universities suggests that the designation General Engineering is used primarily to describe either a) programs for students who have not yet matriculated to a specific engineering department (i.e. ENGR designation at Penn State), or b) programs meant to provide a very broad overview of engineering that is not intended to meet ABET accreditation requirements. The fact that Penn State’s program is in fact a four-year program, and provides an accredited degree creates confusion when compared to the marketplace’s use of the General Engineering designation. The proposed new designation, Engineering, was the nomenclature proposed by the program-wide Industrial Advisory committee that was subsequently approved by the individual option Industrial Advisory committees, as well as the program curriculum committee (composed of faculty). Current students in all three options were surveyed about the proposed program name change, with 71% indicating support or strong support (17% neutral) for the change. Reasons provided by students indicated that it affected their ability to search for jobs and internships, including comments such as that the major is “mistakenly understood as an undecided major with extra curriculum geared towards engineering,” and that people assume “my program isn’t as
rigorous as it actually is." Additionally, potential employers for graduates of the program were surveyed with 86% supporting the change (14% neutral).

2) We propose that several courses be moved from Common Requirements to Requirements for the Option. These courses are CHEM 112, CHEM 113, ME 300/EME 301. The reasoning for this change is to allow the options to independently permit substitutions or alternate options for these courses. Reasoning is given as follows:

--- The Multidisciplinary Engineering Design option does not require CHEM 112 or CHEM 113 as a prerequisite for any of their courses. Therefore, the GN credits could be satisfied with any other GN course.

The Applied Materials and Alternative Energy and Power Generation options will retain these courses as previously listed to meet subsequent prerequisites.

--- The Multidisciplinary Engineering Design option does not require ME 300 or EME 301 as a prerequisite for any of their courses. ME 201 Introduction to Thermal Science will cover basic concepts of thermodynamics, fluid dynamics and heat transfer that will be more valuable for the option than just the thermodynamics topics covered by ME 300.

--- The Applied Materials and Alternative Energy and Power Generation options will retain ME 300 or EME 301 as previously listed to meet subsequent prerequisites.

3) The change proposed to allow CMPSC 200 as an alternative course relates to the needs of all three options. Many of the junior and senior Level courses require MATLAB programming skills to perform analysis and design. For the AE&PG option, CMPSC 200 has been taught exclusively for the past 2 years of the program and students have benefited from being capable to apply MATLAB programming in their upper level engineering courses. This was done because MATLAB has been strongly recommended by Industrial Advisory Committees. Making the requirement CMPSC 121, or CMPSC 200, or CMPSC 201 also gives us the flexibility to accept various CMPSC credits of transfer students coming into the program. It should also be noted that the required programming skills used in ENGR 350 (Computational Methods) are not tied to any specific programming language and will be taught across all three options using MATLAB or a compiled language such a C++.

4) In the Alternative Energy and Power Generation option, changes are proposed to the prescribed courses for the option, in order to allow students flexibility to accommodate their emerging interests while still meeting the intent of the option curriculum. These changes are consistent with the type of flexibility offered by other College of Engineering majors (e.g. Mechanical Engineering, Electrical Engineering), which contain technical electives to allow students to target specific interest areas, or obtain training in response to internship or co-op
education experiences. Additionally, these changes may allow additional flexibility for non-traditional or transfer students who may have partially completed a different engineering major to have some of their prior coursework contribute to a Multidisciplinary Engineering degree. These changes would not be expected to have any negative impact on enrollment or interest in the major, as the current “prescribed” curriculum would continue to meet the new requirements. For the same reason, no course changes are required to accommodate this change.

5) The MDE option’s proposed curricular changes are based on recommendations from its Curriculum Committee. These recommendations were made based on the continuous assessment process for the option that takes into account comments/recommendations from the option’s Industry and Professional Advisory Council (IPAC), faculty, and students. Overall, the recommendations call for a more focused approach to teaching engineering design by introducing two new courses focused on product realization, an additional robotics course, and replacement or elimination of three courses that were not fully aligned with the curriculum. The implementation details follow.

The MDE option proposal to add the new courses, EDSGN 402 Materials and Manufacturing and EDSGN 403 Product Realization, is based on industry and student feedback recommending more manufacturing and product design coursework in the MDE option, as well as achieving alignment with and more fully utilizing the fabrication laboratory at the Great Valley campus. The inclusion of these two design courses, EDSGN 402 and EDSGN 403, will better support the multidisciplinary design theme of the option and offer the breadth and depth of coursework and laboratory experiences to achieve that goal; it will also more fully support the multidisciplinary design option capstone experience. The current MDE option curriculum (prior to these proposed changes) offers no explicit coursework in manufacturing, materials, or product design.

The addition of the EDSGN 420 Advanced Robotics Design and Applications course is designed to serve as a more appropriate course and substitute for CMPEN 454 Fundamentals of Computer Vision within the MDE option. The CMPEN 454 computer vision course is an analysis-focused course in computer vision and provides too specialized a focus for the MDE option. The appropriateness of the CMPEN 454 course was also questioned by the visiting ABET team in 2014. The new EDSGN 420 Advanced Robotics and Applications course is a project-based design course that supports a range of advanced topics in robotics design, including topics such as advanced manufacturing, computer vision, and collaborative robotics, among others, based on instructor background and program needs. EDSGN 420 will also serve as a follow-on course to EDSGN 410 Robotics Design and Applications; the sequence of two courses may optionally support a two-semester robotics design project. EDSGN 420 will be designated as an Engineering Technical Elective (ETE) to be offered in the 8th semester of the MDE option curriculum.
In order to support the curriculum changes above and to maintain a multidisciplinary design focus, the CMPEN 311 Computer Organization and CMPEN 472 Microprocessors and Embedded Systems courses have been both replaced by EE 316 Introduction to Embedded Microcontrollers. The justification for this change is that EE 316 provides very strong coverage of microcontrollers for the MDE option and is more appropriate than the CMPEN 331 and 472 sequence, which focused on more low-level computer architecture concepts. EE 316 will serve as a prerequisite to EDSGN 410 Robotics Design and Applications. EE 352 Signals and Systems has also been removed as a requirement from the MDE option, because this course was not aligned with the multidisciplinary theme. There were no courses in the option which required EE 352 as a prerequisite.
Dear EFC members,

I wanted to ask a favor that you review an important proposal that is being considered by the undergraduate studies committee in preparation for a vote at the EFC meeting on Tuesday.

The proposal is from EE and seeks to change the courses required for the EE major. The main change is that the department seeks to align its curriculum with the Computer Engineering and Computer Science curricula, which currently do not require EDSGN 100.

Because EDSGN 100 is a course that is central to the first year experience for our students, this change touches on a number of different issues. I recently charged a committee, chaired by Tom Litzinger, to look at these issues in depth and they issued a report, which is attached. I am asking that you carefully read this report, look at the EE proposal, and read an EFC-approved document that outlines the main guiding principles of an engineering core curriculum. I have also attached a sample syllabus for EDSN100 and a short related segment of the college strategic plan.

As the EFC is the main mechanism for the college to weigh in on issues that affect departmental programs and students, I wanted to make sure that when you vote on this, you have all of the information necessary.

I apologize in advance for the short timeline to consider this issue. One reason is that this is the last EFC meeting of the year. Depending on the outcome of the vote, the proposal could move on to the faculty senate in a timely manner, or the vote could provide the department time over the summer to revise the proposal.

Thanks in advance for helping on this.

Best

-Peter
Materials related to the Proposed EE Curriculum Change

Related Documents (Provided in Common Box Folder)

1. Proposed EE curriculum change with comments from consultations (DOC1)
2. Proposed EE Academic Plan (DOC2)
3. COE Core Curriculum Document written by EFC in 2005 (DOC3)
4. Two documents from EFC discussions of EDSGN 100 in 2004 (DOC4A and 4B)
5. Two EDSGN 100 syllabi (DOC5A and DOC5B)
6. CoE Strategic Planning Documents (DOC6A and 6B)
8. Articles on First-year Design and Retention (DOC 8A and 8B)

Background and drivers for proposed change

- Consideration of curriculum changes to better align CSE and EE, and provide EE students a more comprehensive programming sequence, began a number of years ago, during discussions by the EE/CS school formation committee (ultimately that merger attempt failed), and continued during the second (and successful) school formation committee. It was the #1 motivation for forming the school from the undergraduate perspective.
- For the current proposal, EE faculty wanted deeper exposure to CS courses to better educate EE grads for jobs that require programming.
- IPAC asked for integration at “management level” and at curricular level. EECS agreed it was important to have commonality among the three majors for the first 3 semesters of the programs.
- Faculty of EE voted nearly unanimously in favor of the entire curriculum change proposal, which was prepared by the EE Curriculum Committee

Considerations in choice to drop EDSGN 100 from EE Curriculum

- Need to drop one or more time-intensive courses to make room for CMPSC 121/122 and to keep student workload at a manageable level.
- CHEM 111, PHYS 213, EDSGN 100 were considered by the committee as possible courses to drop. These courses were selected as candidates because none of the three courses are in CMPEN curriculum, so this would also achieve the added goal of having identical EE/CMPEN curricula in the first 2 years. After much debate, the curriculum committee decided on dropping all 3 courses. The perceived workload of EDSGN 100 was a major consideration, along with the fact that it is not required for CMPEN/CMPSC students.\(^2\)
- The curriculum committee considered the impact of dropping EDSGN 100 on design experience of EE students. They decided that there would still be sufficient design classes as a result of substantial curriculum revision. EE recently completed a substantial curriculum revision to add design across the EE curriculum and to enhance the design experiences of their students.

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\(^1\) This document was prepared following the meeting of Sven Bilén, Tom LaPorta, David Salvia, Chris Masters and Tom Litzinger on 31 January 2017.

\(^2\) The amount of out-of-class time required by EDSGN 100 was discussed by the group on 31 January. The Lecture/Recitation format of the course is intended to keep the out-of-class work by the students within reasonable bounds, and meet University Faculty Senate guidelines for faculty-directed learning.
The Core Curriculum Guidelines from 2005 permit the use of CSE 120 (which evolved into CMPSC 122) in place of ED&G 100 (now EDSGN 100) for Computer Engineering Students.

Guiding Principles on the Core Curriculum and First-year Engineering Course

- In 2005, the EFC produced a set of Guidelines for the Core Curriculum.
- In Point 1, the EFC sets out the advantages of a common first year.³
- In point 2, the pathway is opened for departments to develop their own version of a first-year engineering course that includes design, teamwork, problem-solving, and communication, if they choose not to use EDSGN 100.
- In the listing of the Basic Core, the document allows CSE 120 (now CMPSC 122) as a ED&G 100 (now EDSGN 100) replacement for Computer Engineering Students

Alternative Designs for EE Curriculum Revision that are consistent with the Core Curriculum

- Creating a version of CMPSC 121 that includes design, teamwork, problem-solving, and communication is one option to keep the proposed curriculum change consistent with the Core Curriculum Document.
- Adding a first-year design course to Computer Science and Computer Engineering is another option to achieve the desired alignment of programs across EECS.⁴

EFC Discussions of First-year Design in 2004

- EFC discussed first-year design in Fall of 2004. A major driver for these discussions was the fact that Chemical Engineering was considering dropping EDSGN 100.
- Documents DOCU4A and 4B summarize discussions by EFC.
- Ultimately Chemical Engineering decided to keep EDSGN 100 after discussions by the faculty and the department’s IPAC with the EDSGN 100 Course Chair.
- These deliberations resulted in Document DOC3, Core Curriculum written by EFC in 2005.

EDSGN 100 History and Impact in the College

- The transformation of EG 50 into ED&G/EDSGN 100 was part of a major change to the undergraduate engineering programs at Penn State and six partner schools. The change was implemented as part of the NSF-funded ECSEL coalition efforts to integrate design across the curriculum in the early 1990s. The curricular change to ED&G 100 (now EDSGN 100) helped earn the engineering college Boeing’s 1998 Boeing Outstanding Educator Award.⁵,⁶
- The coalition schools were leading the nation in integrating design into the first year. Many schools eventually followed this model.

³ The group spent time discussing the extent to which commonality of the first two years influenced the College’s view of the proposed change. Discussions of this topic led to consideration of options for students to get into other majors. For example, a student who starts out intending to be EE but decides to switch to ME.
⁴ This approach was not considered by EECS. The reasons that this option was not considered are that a first-year design course is not appropriate for Computer Science, and that Computer Science and Computer Engineering require commonality of their programs. Another major consideration was that the curricula are already “packed”.
⁵ There was a historical point raised that, at the time CMPEN came out of EE, EG 50 was the course that was being offered, and not the course more similar to EDSGN 100 today.
⁶ http://www.prism-magazine.org/february/html/Campus.html
• Research has shown that first-year design can increase retention\textsuperscript{7,8} and similar effects are expected from EDSGN 100.
• Per the Core Curriculum guidance that the “content of the core should be kept ‘fresh’,” EDSGN 100 is currently implementing a course revision, funded by the Leonhard Center for Enhancement of Engineering Education, to infuse elements of the World-Class Engineer into the course via a series of modules.

Open questions regarding the Proposed EE Curriculum Change
1. What is the next step of the process? Will it go to EFC?
2. What if EFC votes against the proposal? Can the Associate Dean for Education override? Is the reverse possible, EFC approves and the Associate Dean rejects?
3. How fast can decisions be made? \textsuperscript{9}
4. What are the longer-term implications of this decision? If the EE proposal is approved, will other programs drop the first-year design course?
5. What are the impacts to the offerings at the campuses if the EE proposal is approved?
6. What are the implications for the College’s strategic goals for education on the proposed EE curriculum revision?
7. Does the COE Core Curriculum from EFC represents the College’s current vision for the first-year curriculum? If not, should Core Curriculum document should be revised before a decision is made regarding removal of EDSGN 100 from the EE curriculum?
8. Does the vision for education within the Strategic Plan expand or replace the Core Curriculum document?
9. From a procedural perspective, how are conflicts between the College’s vision and proposed program curriculum changes resolved and by whom?

\textsuperscript{8} Improving Engineering Student Retention through Hands-on, Team Based, First-Year Design Projects, International Conference on Research in Engineering Education, Honolulu, HI, 2007. (DOC 8B)
\textsuperscript{9} During discussion on 31 January, the group noted that it would be best if the decisions are made this semester so that we to avoid having another summer of NSOs where the future structure of the EE curriculum is uncertain. (In the 2016 NSOs, the assumption was made that the curriculum proposal would pass. So many EE students were advised not to take EDSGN 100.)
Proposal Designation: Electrical Engineering (E E)
This is a proposed Change to Undergraduate Stand Alone Major

Initiators

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<th>College</th>
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<td>DAVID SALVIA</td>
<td>ads102</td>
<td>Engineering (EN)</td>
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College with curricular responsibility: Engineering (EN)

Program Definition
Degree Offered: Bachelor of Science (BS)
Effective Semester: Upon Approval

Offering College(s)
Engineering

Entrance and/or Retention Policies

Entrance Requirement
Requested Policy: In addition to the minimum grade point average (GPA) requirements* described in the University Policies, all College of Engineering entrance to major course requirements must also be completed with a minimum grade of C: CHEM 110 (GN), MATH 140 (GQ), MATH 141 (GQ), MATH 250 or MATH 251, PHYS 211 (GN) and PHYS 212 (GN). All of these courses must be completed by the end of the semester during which the admission to major process is carried out.

Admission to the Electrical Engineering major also requires that the applicant have a cumulative GPA of 2.6 or higher by the end of the semester during which the admission to major process is carried out.

Justification: There is no change to the entrance requirements. The statement regarding the minimum GPA of 2.6 was missing online, however, so it has been added to this proposal.
Objectives and Justification

Objectives:

Justification:

Justification For The Change Proposal:

When the school of Electrical Engineering and Computer Science (EECS) was formed in 2015, one of the goals was to modify the undergraduate majors (EE/CMPEN/CMPSC) to better meet the needs of the students. Specifically, we wanted to (a) leverage the association between the EE and CSE departments to make more elective courses available to the students and (b) make it easier for first- and second-year students to switch between the various majors in the new school.

For many years, the EE Department has been hearing from our graduates, our student advisory committee, and our Industrial and Professional Advisory Council (IPAC) that the BSEE curriculum does not provide our students with sufficient background in computer science and algorithm design. The EE major had a single required programming course, CMPSC 201, that had no follow-up electives. This made it difficult for EE students to get additional programming experience. In addition, the EE and Computer Engineering curricula, although similar in the first two years, are different enough to make it somewhat of a challenge for first-year and second-year students to change their mind between these two related majors. Often, a student headed towards one of the majors would decide to select the other one instead and, due to the differences in the curricula in the first two years, would possibly waste some credits.

The purpose of this curriculum change proposal is to address the issues above through a few minor changes in the EE curriculum. The net effect of these proposed changes is a credit reduction of 3 credits, from 130 to 127. The specific changes are:

1. We are proposing to change the programming requirement from CMPSC 201 (a stand-alone programming course taken primarily by EE students and a few other engineering majors) to a more-rigorous 2-course sequence in computer science, CMPSC 121 + CMPSC 122. CMPSC 121 and 122 are required courses for Computer Science and Computer Engineering majors. Besides giving EE students 6 credits of computer science, rather than just a single 3-credit programming course, this new sequence opens up the possibility for EE students to take follow-up computer science courses as electives in the junior/senior year. The follow-up elective courses all have CMPSC 121/122 as prerequisites.

Replacing CMPSC 201 with CMPSC 121 will not require any additional resources for the CSE Department. Faculty/TA resources earmarked to CMPSC 201 can simply be moved to CMPSC 121. Adding CMPSC 122 as a requirement for EE students will result in additional teaching burden to the CSE Department. However, as partners with EE in the school of EECS, the CSE Department is committed to making this work.

2. We are also proposing to drop 3 courses (6 credits total) from our curriculum: CHEM 111 (a 1-credit chemistry lab that is taken in the first semester), PHYS 213 (a 2-credit thermal physics course taken in the third semester), and EDSGN 100 (a 3-credit Engineering design course taken in the 2nd semester). There are a number of reasons for this decision:

a) First and foremost, as stated above, we desire to make the EE major more closely aligned with the Computer Engineering major (and, to a lesser extent, the Computer Science major). None of these 3 courses that we're proposing to drop are required for either CMPEN or CMPSC majors. Having one of the majors in the school of EECS (EE) require 3 courses in the first 3 semesters that are not required in the other 2 majors (CMPEN, CMPSC) makes it more difficult for students to switch from one major to the other and impedes one of the stated goals of the new school.

b) The EE curriculum in the first 2 years already had a high technical content, especially in the 3rd semester (which is currently 17 credits of all-technical coursework). Adding a 2nd programming course in the 3rd semester requires us to remove some technical credits to make space. By removing EDSGN 100 (a 3-credit 2nd semester course), PHYS 213 (a 2-credit 3rd semester course), and moving MATH 220 (a 2-credit 3rd semester course) to the 2nd semester, we were able to free up 4 credits in the 3rd semester to accommodate CMPSC 122.

c) After much discussion in the EE curriculum committee and in EE faculty meetings, the EE faculty came to the conclusion that these 3 courses that we are proposing to remove are not necessary for our EE students, especially considering other curriculum changes made recently. CHEM 111 and PHYS 213 are not prerequisites for any required or elective courses in the EE curriculum and are simply holdovers from the 1980's. There were no objections among our faculty regarding the dropping of either course from our curriculum. The decision to drop EDSGN 100 was a bit more difficult to make. The engineering design experience in EDSGN 100 is nice, but it should be noted that the EE major recently added 2 design courses (one in the 2nd year -- EE 200, and one in the 3rd year -- EE 300), so our students already have a 3-course design sequence, even without EDSGN 100. Ultimately, although EDSGN 100 is a quality course, our faculty felt that it is more important that our students get a stronger background in computer science, so faced with the option of EDSGN 100 vs. a 2-course computer science sequence, our faculty voted almost unanimously in favor of dropping EDSGN 100. Only one EE faculty member objected.
d) Finally, the EE major currently required 130 credits, making it one of the highest credit totals in the university. By dropping 6 credits while adding only 3, we reduce the total number of credits to 127, making it a bit easier for students to complete their degree in 4 years.

It should be noted that EE students who still want to take EDSGN 100 (or PHYS 213 or CHEM 111, for that matter) could use these courses to fulfill either the Engineering elective or Related elective, so the curriculum change does not preclude future EE students from taking any of these 3 courses. This is particularly useful for students who may have initially headed towards another engineering major but then switched to EE.

Dropping these 3 courses from our curriculum should not raise any objection from the departments offering these courses. These courses are already over-subscribed, so the reduction in the number of students taking these classes should be welcomed.

3. In the course listings, we also fixed an error regarding MATH 250 (it wasn't listed as a C-required course, even though it is C-required for all Engineering students). We also re-arranged the recommended semester for a small number of courses. For example, MATH 220 was moved from the 3rd to 2nd semester because the 3rd semester had too many technical courses.

Proposal Outline

CIP Code: 141099

Faculty Member(s) in Charge:

<table>
<thead>
<tr>
<th>Name</th>
<th>KULTEGIN AYDIN (AQX)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title</td>
<td>DEPT HEAD/PROF ELECT ENGR</td>
</tr>
<tr>
<td>Phone</td>
<td>+1 814 863 2788</td>
</tr>
<tr>
<td>Address</td>
<td>0129 ELEC ENGR EAST</td>
</tr>
<tr>
<td>Campus</td>
<td></td>
</tr>
<tr>
<td>City</td>
<td></td>
</tr>
<tr>
<td>Fax</td>
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</tbody>
</table>

Program Description:

Electrical Engineering (E E) is one of the broadest of all engineering majors and is much more than just building electrical circuits. Electrical engineering is the application of electronics, electrical science and technology, and computer systems to the needs of society. An electrical engineer is responsible for designing and integrating electronic/electrical systems in diverse industries such as defense, communications, transportation, manufacturing, health care, construction, and entertainment.

The mission of our undergraduate program is to provide a high-quality education in electrical engineering for our students and to instill in them the attitudes, values, and vision that will prepare them for lifetimes of success, continued learning, and leadership in their chosen careers. A combination of required and elective courses ensures that students acquire a broad knowledge base in electrical circuits, digital systems, electronic devices, electromagnetics, and linear systems, as well as expertise in one or more areas of specialization. Additional problem-solving skills and practical experience are developed through design projects and laboratory assignments, which also provide opportunities for developing team-building and technical communication skills.

Program Educational Objectives:

The BSEE Program provides undergraduates with a broad technical education important for employment in the private or public sector, and it teaches them fundamentals, current issues, and creative problem solving skills essential for future years of learning. Several years after earning their degrees, our graduates should be able to accomplish the following:

1. Electrical engineering practice in technical assignments such as design, product development, research, manufacturing, consulting, testing, sales, and management;
2. Participation and leadership on teams comprised of individuals with diverse professional and cultural backgrounds;
3. Continued learning and professional development through such activities as graduate school, distance education, professional training, and membership in professional societies.

Program Outcomes (Student Outcomes):

At the time of graduation, our students are expected to have attained the following:

1. A fundamental background in mathematics, the natural sciences, and computer programming necessary for further study in electrical engineering;
2. A broad knowledge base in both the quantitative and physical aspects of electrical engineering;
3. The design skills necessary for electrical engineering practice;
4. An ability to apply the core electrical engineering knowledge base to the solution of more advanced engineering problems;
5. Development of interpersonal and communication skills in a professional context;
6. The perspective of electrical engineering as a profession.

*In the event that the major is under enrollment control, a higher minimum cumulative grade-point average is likely to be needed and students must be enrolled in the College of Engineering or Division of Undergraduate Studies at the time of confirming their major choice.

For the B.S. degree in Electrical Engineering, a minimum of 127 credits is required. This baccalaureate program in Electrical Engineering is accredited by the Engineering Accreditation Commission of ABET, Inc., www.abet.org.

For a Bachelor of Science in Electrical Engineering (E E) a minimum of 127 credits are required.

Scheduling Recommendation by Semester Standing Given Like (Sem: 1-2)

Academic Outline

REQUIREMENTS FOR THE MAJOR: 
109 - 110 credits are required
(This includes 27 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GS courses; 9 credits of GWS courses.)

GENERAL EDUCATION: 45 Credits
(27 of these 45 credits are included in REQUIREMENTS FOR THE MAJOR)

FIRST-YEAR SEMINAR:
Included in Requirements for the Major

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
Included in General Education Requirements

WRITING ACROSS THE CURRICULUM:
Included in Requirements for the Major

COMMON REQUIREMENTS FOR THE MAJOR: (Min: 109 Max: 111 Credits)

PRESCRIBED COURSES (68-69 Credits)

CHEM 110 GN(3)[1], CMPSC 121 GQ(3), MATH 140 GQ(4)[1], MATH 141 GQ(4)[1], MATH 220 GQ(2-3), PHYS 211 GN(4)[1],
PHYS 212 GN(4)(Sem: 1-2)
CMPSC 122 (3), EE 200 (3), EE 210 (4)[1], EE 310 (4)[1], MATH 230 (4), MATH 250 (3)[1], PHYS 214 GN(2)(Sem: 3-4)
EE 300W (3), EE 330 (4)[1], EE 340 (4)[1], EE 350 (4)[1](Sem: 5-6)
EE 403W (3), ENGL 202C GWS(3)(Sem: 7-8)

ADDITIONAL COURSES (17-18 Credits)

Select 1 credit of First-Year Seminar (Sem: 1-2)

ECON 102 (3); ECON 104 (3), ENGL 15 (3); ENGL 30 (3)(Sem: 1-2)
CMPEN 270 (4)[1]; CMPEN 271 (3)[1], CMPEN 275 (1), CAS 100A (3); CAS 100B (3)(Sem: 3-4)

Select 3-4 credits from:

IE 424 (3); PHYS 410 (3-4); STAT 401 (3); STAT 414 (3); STAT 418 (3)(Sem: 7-8)

SUPPORTING COURSES (24 Credits)

Select 6 credits from program-approved list of 300-level courses (Sem: 5-6)
Select 3 credits from program-approved lists of 300-level or 400-level courses (Sem: 7-8)
Select 6 credits from program-approved list of 400-level courses (Sem: 7-8)
Select 3 credits of engineering /science courses from a program-approved list (Sem: 7-8)
Select 6 additional credits, which may include up to 6 credits of ROTC, up to 6 co-op credits, and others from a program-approved list (Sem: 7-8)
A student enrolled in this program must receive a grade of C or better, as specified in Senate Policy 82-44.

Courses modified by this proposal
CMPSC 121 GQ(3); CMPSC 122 (3); MATH 250 (3); ECON 104 (3); CMPEN 275 (1); STAT 418 (3)

Existing Courses Added to This Program
CMPSC 121; CMPSC 122

Existing Courses Removed from This Program
CHEM 111; CMPSC 121; CMPSC 201; EDSGN 100; PHYS 213

Academic Program Costing Analysis Form
Anticipated Costs: No costs are anticipated.

Academic Program Admissions Form

Baccalaureate (4-year) programs
First-year: N/A
Transfer: N/A
Non-Degree: N/A
Already graduated: N/A

Associate (2-year) programs
First-year: N/A
Transfer: N/A
Non-Degree: N/A
Already graduated: N/A

Review History
This section represents all consultation history that has occurred on this proposal

Legend

Approve
Rejected
Waiting Review
User Action Required

Pending Action(s)
Moved to Rejected Status
Approved
(#) - Review Order Sequence Number

Consultation

Recipient Name: DAVID SPENCER
Department: Aerospace Engineering
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: PROFESSOR AEROSPACE ENGR

Request sent: 7/18/2016 at 10:31 AM
Concur: Yes
Comments: Aerospace has no objection to this proposed change.
Reviewed On: 7/18/2016 at 12:18 PM

Respond To Comments
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<tr>
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<th>Position</th>
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<tr>
<td>Elena Joshi</td>
<td>Industrial And Manufacturing Engineering</td>
<td>Consultation</td>
<td>UNIVERSITY PARK CAMPUS</td>
<td>INSTR</td>
<td>8/1/2016 at 7:30 AM</td>
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<td>(Completed By Default - Exceeded Time Limit)</td>
<td>8/2/2016 at 7:15 AM</td>
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<td>Eric Marsh</td>
<td>Mechanical Engineering</td>
<td>Consultation</td>
<td>UNIVERSITY PARK CAMPUS</td>
<td>PROFESSOR OF MECH ENGR</td>
<td>7/18/2016 at 10:31 AM</td>
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<td>Computer Science And Engineering</td>
<td>Consultation</td>
<td>UNIVERSITY PARK CAMPUS</td>
<td>INTRM ASC HEAD CMPSCI&amp;ENG</td>
<td>7/18/2016 at 10:31 AM</td>
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<td>7/18/2016 at 12:22 PM</td>
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<tr>
<td>Lucas Passmore</td>
<td>Engineering Science And Mechanics</td>
<td>Consultation</td>
<td>UNIVERSITY PARK CAMPUS</td>
<td>Assistant Professor</td>
<td>8/1/2016 at 7:30 AM</td>
<td>Yes</td>
<td>(Completed By Default - Exceeded Time Limit)</td>
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The BME department does not have concerns about this proposal and these changes will not likely impact us or BME bound students in any significant way. There is one caveat, that with the removal of EDSGN 100 as a requirement, significant advising will be needed for students as they determine as to whether or not they should enroll in EDSGN 100. As EDSGN 100 is a requirement for nearly all of the other engineering majors, clear information about the impact of not taking it and acceptable substitutions for the requirement in other departments if the student changes majors within engineering will be necessary.

I agree that the fact that EDSGN 100 is required for most (but not all) majors in the College of Engineering makes first-year advising a bit trickier. The fact that Computer Engineering and Computer Science (the two majors that are MOST similar to EE) don't require EDSGN 100 is precisely one of the reasons why we are proposing to remove this course from our list of requirements. As I pointed out in the proposal, we will accept EDSGN 100 as either an Engineering elective or Related elective, so students who end up in EE who were previously headed towards a major that required EDSGN 100 will not be wasting the credits.

I have no objections to this proposal and it will not impact BE students directly, and I can certainly understand the benefit of CMPSC 121-122 to EE students. The rationale to remove EDSGN 100 seems to be based largely on credits, but the proposal actually reduces the total number of credits by 3 (in other words - removing CHEM 111 and PHYS 214 already frees up 3 credits to add CMPSC 122). If the reason to remove EDSGN 100 has more to do with creating a manageable semester plan in the first 4 semesters (as opposed to total credits), then perhaps that can be
Initiator Comments: There are 3 reasons for removing EDSGN 100:
1) With the addition of CMPSC 122, there would be too many technical courses in the first 2 years
2) We very much want to have EE/CMPEN students have identical course requirements for the first 2 years because the 2 majors are so similar and students often switch from one to the other
3) We desire to have a slight reduction in the number of credits
I will add something to this effect in the justification.

Request sent: 8/8/2016 at 7:30 AM
Concur: Yes
Comments:
Reviewed On: 8/8/2016 at 12:23 PM

Recipient Name: MOSES LING
Department: Architectural Engineering
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: ASSOC PROF

Request sent: 8/1/2016 at 7:30 AM
Concur: Yes
Comments:
Reviewed On: 8/1/2016 at 8:41 AM

Recipient Name: STEPHANIE BUTLER VELEGOL
Department: Civil And Environmental Engineering
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: INSTR

Request sent: 8/1/2016 at 7:30 AM
Concur: Yes
Comments:
Reviewed On: 8/1/2016 at 11:04 AM

Recipient Name: THEMIS MATSOUKAS
Department: Chemical Engineering
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: PROFESSOR OF CHEM ENGR
(7) Request sent: 7/18/2016 at 10:31 AM
Concur: Yes
Comments:
Reviewed On: 7/20/2016 at 12:36 PM

Recipient Name: AB Shafaye
Department: Science, Engineering And Technology
Position: Consultation
Campus: PENN STATE HARRISBURG, THE CAPITAL COLLEGE
Title: EE/EET Programs Chair

(4) Request sent: 7/18/2016 at 10:31 AM
Concur: Yes
Comments:
Reviewed On: 7/19/2016 at 2:40 AM

Recipient Name: THOMAS HEMMINGER
Department: (Not Available)
Position: Consultation
Campus: (Not Available)
Title: PROFESSOR ELEC & COMP ENG

(17) Request sent: 8/1/2016 at 7:30 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 8/2/2016 at 7:15 AM

Recipient Name: JAMES SELLERS
Department: Mathematics
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: DIR UNDERGRADUATE STUDIES

(10) Request sent: 7/18/2016 at 10:31 AM
Concur: Yes
Comments:
Reviewed On: 7/24/2016 at 5:29 PM

Respond To Comments
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<tr>
<td>JOSEPH THOMAS KEISER</td>
<td>(Not Available)</td>
<td>Consultation</td>
<td>(Not Available)</td>
</tr>
<tr>
<td>RICHARD ROBINETT</td>
<td>Physics</td>
<td>Consultation</td>
<td>UNIVERSITY PARK CAMPUS</td>
</tr>
<tr>
<td>SVEN BILEN</td>
<td>School of Engr Design, Technology and Prof Prgrms</td>
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</tbody>
</table>

| Request sent:          | 8/1/2016 at 7:30 AM           |
| Concur:                | Yes                           |
| Comments:              | (Completed By Default - Exceeded Time Limit) |
| Reviewed On:           | 8/2/2016 at 7:15 AM           |

**Comments:**

Initiator Comments: In the College of Engineering, all of the majors have the FYS requirement listed in requirements for the major. This is not something new in our proposal. The College has talked about removing the FYS requirement from the requirements for the major, but this would be a college-wide decision, so we're keeping things as they are with regard to the FYS. To answer your question, we DP routinely waive this FYS requirement (but not the credit associated with it) for students who start at a campus that doesn't require a first-year seminar and for advanced-standing students.
Concur: No, this proposal needs significant changes

Comments: This curriculum revision proposal has a stated goal to make the first years of the CSE, CMPEN, and EE curricula easier for students to select one or the other. It does this by eliminating 6 credits, 3 of which are EDSGN 100, which is noted as a valuable course. Initial, early discussions within EECS were to have CSE and CMPEN add EDSGN 100, as opposed to dropping it for all EECS majors. Currently, programs within the college are to abide by EFC’s guidelines “Some Guiding Principles on the Core Curriculum”, voted on and approved in 2005 after a lengthy forensics session regarding core courses, of which EDSGN 100 is one. Although not EDSGN 100 is not required to be the course, programs are to ensure “that at least one course in the core (beyond the First-Year Seminar) is offered by the College of Engineering. This course should help develop competencies in design tools and processes, teamwork, problem-solving and communication (written, oral and graphical). It is expected that the Engineering Design Program will deliver this course with sufficient capacity to accommodate the entering students interested in engineering. However, any department may develop and offer a similar course, as long as the objectives and competencies to be achieved are the same, and the course is accepted by all other majors as equivalent to the Introduction to Engineering Design (ED&G [now EDSGN -- sgb]) course.” In my view, this requirement is not met by the existing proposal. Perhaps one of the CMPSC courses could be changed to include all of the elements required (such that it would meet this guideline and also be accepted by all other majors as a replacement). There is value, as noted, in EECS students taking EDSGN 100. In addition, the course is currently undergoing a significant rework with funding from the Leonhard Center that makes it even more aligned with goals at the College level. It will be best to have EE students (and, for that matter, CSE/CMPEN students) take this course.

Initiator Comments: Although it was brought to our attention that in 2005 the EFC released a document entitled “Some Guiding Principles on the Core Curriculum” that recommends a course, such as EDSGN 100, for developing competencies in design tools and processes, teamwork, problem-solving and communication (written, oral and graphical), we do not concur that EDSGN 100, specifically, is essential for electrical engineering students. In addition, we question some of the comments/claims made in the comments above.

1. First, this document provides guidelines rather than requirements. The fact that CMPEN and CMPSC do not require EDSGN 100 reinforces this claim. Furthermore, we question the relevance of a document that is a decade old, seldom cited, and difficult to find.

2. Second, electrical engineering students are already required to complete two courses, EE 200 and EE 300W, that together provide a far richer experience than EDSGN 100 for achieving the objectives recommended by the EFC. EE 200 Design Tools is a required sophomore course that provides students with a working knowledge of design tools for hardware realization of electrical engineering systems. Many of the tools covered in EE 200 are inappropriate for EDSGN 100 because first-year students do not possess the technical prerequisites to use the design tools. The second course, EE 300W Design Processes, focuses on providing experience in teamwork, communication, particularly writing as indicated by the W designation, and problem solving.

3. We found no basis for the statement that early discussions within EECS were to have CMPSC and CMPEN add EDSGN 100 to their curricula. John Hannan, Associate Head in CSE, verified that this option was never considered for either major. In fact,
as part of the formation of EECS, the courses EE 200 and EE 300W, not EDSGN 100, were/are being discussed as possible additions to CMPEN (and possibly even CMPSC). This further supports our claim that EE 200 and/or EE 300W serve the purpose of meeting the objectives recommended by the EFC.

4. With the exception of providing a first-year design experience and interaction with students who may not pursue a degree in EE or CMPEN, there is little value added by requiring students to complete EDSGN 100 in addition to EE 200 and EE 300W. In contrast, we believe it is much more important that electrical engineering and CMPEN students share a common core. As stated in the proposal, the removal of EDSGN 100 from the EE curriculum is needed to (a) fit in CMPSC 122 and (b) better match the EE and CMPEN core curricula in the first two years.

Request sent: 8/15/2016 at 7:30 AM

Concur: No, this proposal needs significant changes

Comments: To address points made in the response:
1) Regarding the guidelines document, many people consulted (e.g., fmr. Asst. Dean, fmr. Assoc. Dean) distinctly remembered the guidelines, the effort behind developing it, and the desired results on the first-year experience. The fact that the document was difficult to find was an issue of bookkeeping in the EFC. If the document, regardless of age, are no longer the guidelines to follow, this should first be addressed by EFC.
2) It is agreed that EE 200 and 300 provide a richer EE-focused design environment at the second and third year, but they are not in the first year, where EDSGN 100 is located and contributes to the first-year experience. It is this first year experience which needs to be addressed.
3) The basis for my statement comes from a strategic planning session I was in attendance immediately after EECS school formation. At that session adding EDSGN 100 for CMPEN/CMPSC was discussed; however, whether it was discussed further in the committee I would not be aware of.
4) There is a larger collective first-year experience in the college, of which EDSGN 100 is significant component. Without EDSGN 100, this proposal must address how it will meet the larger first-year experience goals within the CoE. It is suggest the proposal receive input from the CoE administration as to their goals for the first year.

Reviewed On: 8/17/2016 at 5:18 PM

Initiator Comments: Even if the recommendations in this 11-year-old document “Some Guiding Principles on the Core Curriculum” are considered by the College of Engineering to be binding (which is not at all clear in the document itself), this document specifically permits CSE 120 (which has since been renamed/renumbered as CMPSC 122) as a substitute for ED&G 100 (subsequently renamed EDSGN 100) in the list of core Engineering courses. Therefore, by requiring CMPSC 122 instead of EDSGN 100 in the proposed Electrical Engineering curriculum, the Electrical Engineering major is still in compliance with the afore-mentioned document. For the record, we discussed with the CSE administration the suggestion put forth by Sven Bilen that CMPSC and CMPEN should add EDSGN 100 to their curriculum rather than having EE remove it. The response from the CSE Department was that they had no interest in doing this.
SCCA Representative

Recipient Name: ROBERT MELTON
Position: SCCA Representative
Campus: UNIVERSITY PARK CAMPUS

Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

Dean of the College

Recipient Name: PETER BUTLER
Position: Dean of the College
Campus: UNIVERSITY PARK CAMPUS

Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

SCCA Subcommittee Review

Recipient Name: CORTNEY SMITH
Position: SCCA Subcommittee Review
Campus: UNIVERSITY PARK CAMPUS

Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

Recipient Name: CYNTHIA ZOOK
Department: (Not Available)
SCCA Review

Recipient Name: KADI CORTER
Position: SCCA Subcommittee Review
Department: (Not Available)
Campus: UNIVERSITY PARK CAMPUS
Title:

Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

SCCA Review

Recipient Name: CORTNEY SMITH
Position: SCCA Review
Department: (Not Available)
Campus: UNIVERSITY PARK CAMPUS
Title:

Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

SCCA Review

Recipient Name: CYNTHIA ZOOK
Position: SCCA Review
Department: (Not Available)
Campus: UNIVERSITY PARK CAMPUS
Title:

Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

SCCA Review

Recipient Name: KADI CORTER
Position: SCCA Review
Department: (Not Available)
Campus: UNIVERSITY PARK CAMPUS
Title:
Faculty Senate Review

Recipient Name: CORTNEY SMITH
Position: Faculty Senate Review
Title:

Department: (Not Available)
Campus: UNIVERSITY PARK CAMPUS

Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

Recipient Name: KADI CORTER
Position: Faculty Senate Review
Title:

Department: (Not Available)
Campus: UNIVERSITY PARK CAMPUS

Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

Registrar Data Entry

Recipient Name: PAULA HAMATY
Position: Registrar Data Entry
Title:

Department: (Not Available)
Campus: UNIVERSITY PARK CAMPUS

Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

Final Confirmation

Recipient Name: CORTNEY SMITH
Position: Final Confirmation

Department: (Not Available)
Campus: UNIVERSITY PARK CAMPUS
Curricular Information

Blue Sheet Item #: [Not Yet Reviewed]
Review Date: [Not Yet Reviewed]

Program Codes
Engineering: EE_BS

Option Codes
Electrical Engineering (E E):
College of Engineering

Some Guiding Principles on the Core Curriculum

1. It is desirable to have an engineering core which ensures that all engineering students receive the needed foundation in math, science, writing, and design in a consistent manner; further, that students will have the time and flexibility to explore the disciplines before taking courses that may not be required by the eventual choice of major; and which enhances retention by creating more of an engineering “cohort” or “learning community” of students, all taking the same classes.

The basic core for all engineering students, typically taken along with several general education electives during the first three semesters, would be expected to include: introductory math, physics, chemistry, engineering design, and English composition. The EFC may stipulate other core courses or areas to be taken by all students, consistent with the general education requirements and engineering accreditation criteria, including: additional math, technical writing, speech communication, and economics. The various programs may wish to supplement the core with additional courses particular to broad disciplinary areas (such as structural/mechanical, chemical/biological and electrical/computer). The supplemental core would typically draw from the sciences, mechanics, electrical circuits, computer programming, thermodynamics or other fields, depending on the needs of the majors. The more consistency that can be maintained in the supplemental core (and through the first four semesters of study) for majors with similar disciplinary emphases, the more latitude students will have in their eventual major selection. This will require collaboration among faculty in related majors as well as consultation with the campus colleges on the feasibility of delivering the supplemental courses.

2. It is important that at least one course in the core (beyond the First-Year Seminar) is offered by the College of Engineering. This course should help develop competencies in design tools and processes, teamwork, problem-solving and communication (written, oral and graphical). It is expected that the Engineering Design Program will deliver this course with sufficient capacity to accommodate the entering students interested in engineering. However, any department may develop and offer a similar course, as long as the objectives and competencies to be achieved are the same, and the course is accepted by all other majors as equivalent to the Introduction to Engineering Design (ED&G) course.

3. The faculty in any major should be free to work with the Engineering Design Program faculty to develop and deliver a special version of the course, offered in sections reserved primarily for students with that particular major interest. Alternatively, a major could help develop a product-, process- or system-oriented design project that would exemplify that particular discipline, and provided as an alternative project choice for student teams in one or more sections of the course. In either case, the “sponsoring” department will need to help provide the resources
(instructional and other) to deliver the special sections of the course, and the special versions should be acceptable to all other majors to meet the ED&G core requirement.

4. The content of the core should be kept “fresh” and up-to-date through dialogue and collaboration with the delivery departments and review of the evolving nature of the profession. For instance, the faculty should provide feedback to the math or science departments when asked about what content should be included and stressed; share views on knowledge domains or competencies such as biology or computer programming; and review/decide which subjects belong in the core and what topics should be part of the major or otherwise integrated into the curriculum. These discussions should occur in the department curriculum committees, IPACs, Leonhard Center Advisory Boards, and Faculty Council.

5. The courses in the core should be accessible to all students pursuing engineering in the Penn State system. If the major programs desire to offer additional courses specific to their major in the first 2-3 semesters, these likewise should be accessible to students regardless of location, or an alternative course scheduling pattern should be provided that does not put the student in a disadvantageous situation in terms of making progress in the curriculum. Departments may consider on-line delivery via the e-Learning@PSU Cooperative or World Campus for making courses available to students who need them.

<table>
<thead>
<tr>
<th>Basic Core</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 140,141</td>
</tr>
<tr>
<td>CHEM 12</td>
</tr>
<tr>
<td>ED&amp;G 100 or 130 (or CSE 120 for CMP EN)</td>
</tr>
<tr>
<td>PHYS 211, 212</td>
</tr>
<tr>
<td>ENGL 15 or 30</td>
</tr>
<tr>
<td>MATH 220, 230 or 231</td>
</tr>
<tr>
<td>MATH 250 or 251</td>
</tr>
<tr>
<td>ENGL 202C</td>
</tr>
<tr>
<td>CAS 100A/B</td>
</tr>
<tr>
<td>ECON 2 or 4</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Supplemental Core</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selected majors also include:</td>
</tr>
<tr>
<td>CHEM 14 (all except AERSP, ME)</td>
</tr>
<tr>
<td>EE 210, 220, 271, 305 or 340 (all except CH E)</td>
</tr>
<tr>
<td>CMP SC 201 (all except ABE, CH E)</td>
</tr>
<tr>
<td>EMCH 11, 12, 13 or 110/210 (all except CH E, CSE, EE)</td>
</tr>
<tr>
<td>ME 23, 30 or 120 (all except CH E, CE, CMP EN)</td>
</tr>
<tr>
<td>PHYS 213, 214</td>
</tr>
<tr>
<td>STAT 401 or 418</td>
</tr>
<tr>
<td>CHEM 13, 15, 38</td>
</tr>
<tr>
<td>BIOL 141, 142, BMB 251</td>
</tr>
<tr>
<td>EMCH 215, 216</td>
</tr>
</tbody>
</table>
## SUPPLEMENTAL CORE BY AREA

(Notes: 1. ABE and E SC each appear in two areas; 2. Listings reflect proposed curricula in CMP EN, E SC & ME)

<table>
<thead>
<tr>
<th>Structural/Mechanical</th>
<th>Chemical/Biological</th>
<th>Electrical/Computer</th>
</tr>
</thead>
<tbody>
<tr>
<td>(AERSP, ABE, AE, CE, E SC, IE, ME, NUC E)</td>
<td>(ABE, BIO E, CH E)</td>
<td>(EE, E SC, CMP EN)</td>
</tr>
</tbody>
</table>

### Sciences

- CHEM 14 (except AERSP, ME)
- CHEM 13 (E SC, ME)
- or BIOL 141 (ME)
- PHYS 213 (AE)
- PHYS 214 (AERSP, E SC, NUC E)
- CHEM 14, 15 (except ABE)
- CHEM 13 (CH E), 38 (CH E, BIO E – MSE option)
- BIOL 141, 142 (BIO E)
- BIOL 141 (EE elective)
- BMB 251 (CH E)
- PHYS 213 (EE, CMP EN)
- PHYS 214 (E SC)

### Programming

- CMP SC 201 (except ABE)
- CMP SC 201 (BIO E)
- CMPSC 201 (E SC, EE)
- CSE 121, 221, 321 (CMP EN)

### Engineering Sciences

- EE 210, 220, 305, or CSE 271
- EMCH 11, 12, 13 or 210
- EMCH 215, 216 (AERSP, NUC E, ME)
- ME 23, 30 or 120 (except CE)
- EE 210 (BIO E), 305 (ABE)
- EMCH 11, 13 or 210 (ABE, BIO E)
- EMCH 215, 216 (ABE)
- EMCH 12 (ABE)
- ME 30 (except CH E)
- ME 120 (E SC) or 23 (EE elec)

### Statistics

- STAT 401 (AE, CE)
- STAT 418 (CMP EN, EE)
EDSGN 100: Introduction to Engineering Design

Instructor information: Matt Parkinson
parkinson@psu.edu (use subject: EDSGN100)
http://www.mattparkinson.com
Office: 213K Hammond Building, 314 Leonhard Building

Course homepage: http://canvas.psu.edu

Welcome to the big show. The course you are about to experience has received national awards and is a model for similar courses taught at other universities, so you should have high expectations. This syllabus will provide some basic information about the course including attendance, homework, and grading policies, course objectives, a schedule, and the like.

What the Blue Book has to say
Introduction to engineering design through team-oriented design projects supported by communication skills: graphical, verbal, written.

Which means
You will have a basic awareness of the engineering design process and an appreciation for the science and art that engineers wield. You will become meaningfully engaged in design, using tools and techniques that can facilitate successful execution of the process, enabling you to identify, formulate, and solve engineering problems. After working through many smaller, guided projects, you and your team will successfully complete an industry-sponsored design project. These experiences will provide the setting for the development of team-related and communication skills. Ultimately, you will leave EDSGN100 confident and excited—ready to embark on your journey to becoming an engineer.

Because this is a design course we’re going to do things differently. You will work harder and in more interesting ways. The class will also be more rewarding. There will be significant discussion, writing, and creative elements to the course. You will also have to show lots of initiative.

Basic skills you will develop and tools you will learn
Design Methods customer needs assessment, concept generation, design selection matrices, prototyping and model development, safety, cost effectiveness, teamwork

Computing solid modeling/CAD, spreadsheets, slideware, other tools
Internet Skills basic security, Canvas, online portfolio

Graphical Communication sketching, reading detailed drawings (multiview, oblique, isometric, scales, dimensions, sections), some solid modeling

Lab Skills product dissection and benchmarking, experimental methods, data acquisition & analysis, building and testing physical and predictive prototypes

Writing we can all become better writers, and this will be a significant component of this course

**What you need**

Textbook Selected readings chosen by the instructor.

CAE Software SolidWorks may be used in the labs for free. You can download a student copy with a license that will last for 6 months here: [www.engr.psu.edu/swdownload](http://www.engr.psu.edu/swdownload). We will also use SketchUp and Excel. Depending on the needs of the project we may use other tools (e.g., R, LaTeX, etc.).

Drawing Instruments **dry erase marker(s); a pen that makes you happy**

Drawing Paper Engineer’s Computation Pad (cool, green, ruled paper) or a design journal (e.g., lab notebook, moleskine, etc.)

Computer Storage Media All lab computers have USB ports for flash drives. You will have access to PASS space through the university. You will need to determine the method of transferring files that works best for you.

Project Materials In addition to the items above, students may also find that no more than $20 per student may be needed to purchase materials for design prototypes or models. The EDSGN100 course will make attempts to purchase prototyping items in bulk for use in multiple sections and a small allotment will be made for use of the rapid prototyping machine, if desired, in order to minimize costs to the student. You will need safety glasses.

**What grade will I get?**

<table>
<thead>
<tr>
<th>Points and Assignments</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design Projects</td>
<td>30%</td>
</tr>
<tr>
<td>Final Design Project</td>
<td>20%</td>
</tr>
<tr>
<td>Scholarship</td>
<td>20%</td>
</tr>
<tr>
<td>CAD and Other Homework</td>
<td>10%</td>
</tr>
<tr>
<td>Comprehensive Design Quiz</td>
<td>10%</td>
</tr>
<tr>
<td>CAD and Modeling Quiz</td>
<td>10%</td>
</tr>
</tbody>
</table>
Teamwork

How you and your teams function will affect your grade. If you are a cooperative contributor to your teams, you will earn the team's grade for the project. If you don't complete tasks, are non-cooperative, or otherwise hinder progress, your grade will go down for that assignment up to two letter grades.

Attendance

You really should come to class (someone is paying a lot of good money for you to be here). I will do my part to make class time informative and interesting. That said, you are welcome to come and go as you please. While you will not specifically be penalized for missing class, you will be responsible for the materials and activities that take place during class time. Due to the “hands-on” nature of the course many of these activities can not be made up.

Late Homework

Homework is due at the start of class unless otherwise specified. Homework turned in after that time will be considered late and will be penalized 10% for each 24-hour period after it was due. You may place late homework in my box in 213 Hammond, email it to me, or upload it to CANVAS (as appropriate). If anything really serious turns up, shoot me an email.

Cell Phones

Cell phones must be off or in silent mode during class. If this becomes a problem, points will be taken from the periodic unannounced and terribly easy quizzes.

Grade Distribution

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>&gt;94</td>
<td>A</td>
</tr>
<tr>
<td>90-93</td>
<td>A-</td>
</tr>
<tr>
<td>87-89</td>
<td>B+</td>
</tr>
<tr>
<td>83-86</td>
<td>B</td>
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<td>80-82</td>
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<td>C+</td>
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<tr>
<td>70-74</td>
<td>C</td>
</tr>
<tr>
<td>60-69</td>
<td>D</td>
</tr>
<tr>
<td>0-59</td>
<td>F</td>
</tr>
</tbody>
</table>

Major Deliverables

Project prototypes and write-ups, CAE Tutorials, Design Icon, Global Product Development Primer, Instructional Video, Design Exam, CAE Exam, Project 2 Prototype, Project 2 Report, Outside Lectures (2).

Why do we meet for 6 hours but only receive 3 credits?

Because we love you. You should be able to complete the majority of your homework during the in-class meeting times. Since much of the work requires teamwork (where everyone needs to have free time at the same time) or special facilities that must be shared across many students, homework time has been built into the course.
Don’t cheat.
This includes plagiarism (e.g., copying stuff from Wikipedia or other web sources), copying someone else’s work and claiming it as your own, getting materials from previous semesters, telling other students the answers to quiz questions, changing your own answers while we grade, etc. If you participate in any of these behaviors it’s out of my hands: there is a college- and university-determined process that is set in motion. And it’s not fun for anybody.

Can I make your life easier?
Penn State welcomes students with disabilities into the University’s educational programs. Every Penn State campus has an office for students with disabilities. The Student Disability Resources Web site provides contact information for every Penn State campus: http://equity.psu.edu/student-disability-resources/disability-coordinator. For further information, please visit the Student Disability Resources Web site: http://equity.psu.edu/student-disability-resources.

Counseling & Psychological Services (CAPS)
CAPS can help students resolve personal concerns that may interfere with their academic progress, social development, and satisfaction at Penn State. Some of the more common concerns include anxiety, depression, difficulties in relationships (friends, roommates, or family); sexual identity; lack of motivation or difficulty relaxing, concentrating or studying; eating disorders; sexual assault and sexual abuse recovery; and uncertainties about personal values and beliefs.

You can contact CAPS by calling the Main CAPS number/Appointment Scheduling: 814-863-0395 (Please call between the hours of 8am and 5pm, Monday-Friday to schedule an appointment) or visit us at our office location, 5th Floor Student Health Center.

Online Resources for Relaxation
Your first year at Penn State can be incredibly rewarding. It can also be very stressful. Learn how stress impacts your health and life, as well as some self-help strategies for managing it through the PSU Student Affairs EDGE online workshop. There are a number of other online resources that may help you relax. Or consider visiting a fish spa!

Sexual Assault and Relationship Violence Hotline
A hotline has been established for victims and observers of sexual assault and relationship violence. Trained counselors on the hotline will help students access appropriate resources. Penn State students from any campus can call 1 (800) 560-1637 to access the 24 hour a day, seven day a week hotline.
Books about Design and Designers

Steve Jobs, Walter Isaacson

The Innovator’s Dilemma or The Innovator’s DNA, Clayton Christensen

Designing for People, Henry Dreyfuss

The Visual Display of Quantitative Information and Envisioning Information, Edward Tufte

Wizard: The Life and Times of Nikola Tesla; Biography of a Genius, Marc Seifer

The Savage Mind, Claude Levi-Strauss

The Design of Everyday Things, Don Norman

Designing with the Mind in Mind, Jeff Johnson

Biomimicry: Innovation Inspired by Nature, Janine Benyus

Cradle to Cradle: Remaking the Way We Make Things, Michael Braungart

Thinking with Type, Ellen Lupton

Edison, a Biography, Matthew Josephson

The Boy Who Harnessed the Wind, William Kamkwamba

Longitude: The True Story of a Lone Genius Who Solved the Greatest Scientific Problem of His Time, Dava Sobel

Democratizing Innovation, Eric Von Hippel

The Great Bridge: The Epic Story of the Building of the Brooklyn Bridge, David McCullough

The People’s Tycoon: Henry Ford and the American Century, Steven Watts

The Creative Habit: Learn It and Use It for Life, Twyla Tharp

Innovation and Entrepreneurship, Peter Drucker

Lost Moon, Kluger and Lovell

Skunk Works, Rich and Janos

The Double Helix, James Watson

The Cheese Monkeys, Chip Kidd

The Evolution of Useful Things, Henry Petroski

Creativity, Inc, Ed Catmull and Amy Wallace

Creative Confidence, Tom Kelley and David Kelley
Implementation Plan related to Strategic Goal 1:

Enhance the Penn State deep, fundamental undergraduate educational experience with leadership and entrepreneurial training; global awareness; cultural sensitivity; presentation and communication skills; intense project-based and service learning; and more online degree programs.

a) Project-based curricula throughout all years, not just first and last.

b) Create college-wide course (s) to provide development experience with leadership and entrepreneurial training; global awareness; cultural sensitivity, academic integrity

c) Growing participation in intense experiences through existing programs, HESE, Leadership Minor, Global Certificate/Minor, Study Abroad/Faculty Led experience, service learning projects, and other engaged scholarship activities

d) Remote degree programs

e) Communication course sections specific to engineering students
SENATE COMMITTEE ON CURRICULAR AFFAIRS
COURSE SUBMISSION AND CONSULTATION FORM

Principal Faculty Member(s) Proposing Course

<table>
<thead>
<tr>
<th>Name</th>
<th>User ID</th>
<th>College</th>
<th>Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>RICHARD GEORGE MISTRICK</td>
<td>rgm1</td>
<td>Engineering (EN)</td>
<td>Not Available</td>
</tr>
</tbody>
</table>

Academic Home: Engineering (EN)

Type of Proposal: □ Add  □ Change  □ Drop

Current Bulletin Listing

Abbreviation: AE

Number: 468a

☑ I am requesting recertification of this course for the new Gen Ed and/or University Requirements Guidelines?

Course Designation

(AE 468) Advanced Building Electrical and Communication Systems

Course Information

Cross-Listed Courses:

Prerequisites:

AE 467

Corequisites:

Concurrents:

Recommended Preparations:

Abbreviated Title: Bldg Elc & Com Sys

Discipline: None

Course Listing:

Special categories for Undergraduate (001-499) courses

Foundations

☒ Writing/Speaking (GWS)

☒ Quantification (GQ)

Knowledge Domains

☒ Health & Wellness (GHW)

☑ Natural Sciences (GN)

☒ Arts (GA)

☒ Humanities (GH)

☒ Social and Behavioral Sciences (GS)

Additional Designations

☒ Bachelor of Arts

☒ International Cultures (IL)

☒ United States Cultures (US)

☒ Honors Course

☒ Common course number - x94, x95, x96, x97, x99
Writing Across the Curriculum

First-Year Engagement Program

First-Year Seminar

Miscellaneous

Common Course

GE Learning Objectives

- GenEd Learning Objective: Effective Communication
- GenEd Learning Objective: Creative Thinking
- GenEd Learning Objective: Crit & Analytical Think
- GenEd Learning Objective: Global Learning
- GenEd Learning Objective: Integrative Thinking
- GenEd Learning Objective: Key Literacies
- GenEd Learning Objective: Soc Resp & Ethic Reason

Bulletin Listing

- Minimum Credits: 3
- Maximum Credits: 3
- Repeatable: NO
- Department with Curricular Responsibility: 
- Effective Semester: Upon Approval
- Travel Component: NO

Course Outline

A brief outline or overview of the course content:
Energy Use in Buildings
Power Quality
Alternate Power Sources
UPS Systems
Alternate Power Differences
Emergency Systems
Energy Saving Techniques
Fault Studies
System Coordination
Special Systems
Intrusion Detection
Health Care Systems

A listing of the major topics to be covered with an approximate length of time allotted for their discussion:
Numbers in parentheses refer to hours

A. Energy Use (4)
a. Production
b. Cost
B. Power Quality (4)
a. Issues
b. Needs
c. Remediation Techniques
C. Alternate Power Sources (4)
a. Integration with Building Systems
D. Emergency Systems (4)
E. UPS Systems (4)
a. Generators
b. PV Arrays
c. Wind Turbines
d. Fuel Cells
F. Energy Saving Techniques (5)
a. PF Correction
b. VSDS
c. Efficient Design
G. Fault Studies (4)
a. System Coordination
H. Special Systems (4)
a. Structured Cabling Communication Systems
Course Description:
Special Building Electrical and Communication Systems is an elective course within the architectural engineering program. It addresses specialized components and analysis of building electrical systems, cost and availability of electrical energy, and power quality. Students will also develop an in-depth understanding of alternative electrical sources, the National Electric Code, advanced design issues of electrical systems, as well as other electrical and building communication issues. In addition, part of the course will focus on the fundamentals of special systems typically included within the electrical discipline scope of work such as fire alarm, access control, surveillance, voice, video and data systems. Upon completion of this course, students will be able to explain the fundamentals of special electrical and communication systems within a building.

The name(s) of the faculty member(s) responsible for the development of the course:
Name: RICHARD MISTRICK (rgm1)
Title: ASSOC PROF ARCH ENGR
Phone: +1 814 863 2086
Address: 104 ENGINEERING UNIT A
Campus:
City:
Fax:

Instructional, Educational, and Course Objectives:
This section should define what the student is expected to learn and what skills the student will develop.
Upon completion of this course students will be able to:
• Calculate current, voltage, impedance, and power for 1Ø and 3Ø networks;
• Understand various voltage systems, select the proper electrical distribution system configuration for various facility types, comprehensions of different facility needs;
• Calculate power factor, load factor, and power factor correction.
• Understand and compute short circuit currents using ohmic and per-unit methods;
• Understand concepts and types of emergency generation systems and automatic transfer switches;
• Identify the importance of power quality and the effects of harmonics on building electrical systems;
• Understand basic concepts and computations of electric deregulation and utility rates;
• Explain uninterruptible power supplies, motor generator sets, and alternative power sources;
• Demonstrate protective device time-current curves and perform coordination studies for protective devices;
• Understand grounding systems and ground fault protection;
• Apply the National Electrical Code in design and device selection;
• Explain the fundamentals of special systems, communications systems, structured cabling systems.

Evaluation Methods:
Include a statement that explains how the achievement of the educational objective identified above will be assessed. The procedures for determining students' grades should be specifically identified.
AE 468 will rely upon a variety of methods to assess and evaluate student learning, including:

a. Students will be evaluated on their ability to comprehend and understand materials presented in class and in readings through the accurate and appropriate use of terminology in written reports – 40%.
b. Students will be evaluated on their ability to comprehend and understand materials presented in class and in reading through three exams – 20% each

Relationship/Linkage of Course to Other Courses:
This statement should relate the course to existing or proposed new courses. It should provide a rationale for the level of instruction, for any prerequisites that may be specified, or for the course's role as a prerequisite for other courses.
The prerequisite for this course is AE 467 - Advanced Building Electrical System Design.

Relationship of Course to Major, Option, Minor, or General Education:
This statement should explain how the course will contribute to the major, option, or minor and indicate how it may function as a service course for other departments.
This course will be used as an elective for the architectural engineering program.

A description of any special facilities:
No special facilities are needed for this course.

Frequency of Offering and Enrollment:
AE 468 will be offered each fall, with an anticipated enrollment of 20 students. Additional offerings during the fall and summer may be added to accommodate enrollment demands.
Justification for Changing The Proposal:
Include a justification for each change to the course. Particular attention should be paid to the effects of the course change within the discipline and in other disciplines where the course may be required within a major or used as a service course. When a unit submits several course changes, with or without new course proposals, a general statement covering the programmatic effects of the changes should be submitted.

Changing course number from AE 468a to AE 468.

The original AE 468 (Daylight Analysis of Roman Architecture) is in the process of changing course number to AE 463. In order to get the current course (Advanced Building Electrical and Communication Systems) approved in a timely manner, we submitted the course as AE 468a on 11/14/16.

Campuses That Have Offered (AE 468a) Over The Past 4 Years

Review History

This section represents all consultation history that has occurred on this proposal

Legend

Approve
Rejected
Waiting Review
User Action Required
Pending Action(s)
Moved to Rejected Status
Approved
(#) - Review Order Sequence Number

Head of Department

Recipient Name: M PARFITT
Department: (Not Available)
Position: Head of Department
Campus: UNIVERSITY PARK CAMPUS
Title:

Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

SCCA Representative

Recipient Name: ROBERT MELTON
Department: (Not Available)
Position: SCCA Representative
Campus: UNIVERSITY PARK CAMPUS
Title:

Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

Dean of the College

Recipient Name: PETER BUTLER
Department: (Not Available)
Position: Dean of the College
Campus: UNIVERSITY PARK CAMPUS
Title:
### SCCA Subcommittee Review

<table>
<thead>
<tr>
<th>Recipient Name</th>
<th>Department</th>
<th>Position</th>
<th>Campus</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALLISON ALBINSKI</td>
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<td>UNIVERSITY PARK CAMPUS</td>
</tr>
<tr>
<td>CORTNEY SMITH</td>
<td>(Not Available)</td>
<td>SCCA Subcommittee Review</td>
<td>UNIVERSITY PARK CAMPUS</td>
</tr>
<tr>
<td>KADI CORTER</td>
<td>(Not Available)</td>
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### SCCA Review

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</tbody>
</table>
Faculty Senate Review

Recipient Name: KADI CORTER
Position: SCCA Review
Campus: UNIVERSITY PARK CAMPUS

Recipient Name: ALLISON ALBINSKI
Position: Faculty Senate Review
Campus: UNIVERSITY PARK CAMPUS

Recipient Name: CORTNEY SMITH
Position: Faculty Senate Review
Campus: UNIVERSITY PARK CAMPUS

Recipient Name: KADI CORTER
Position: Faculty Senate Review
Campus: UNIVERSITY PARK CAMPUS

Curricular Information
Blue Sheet Item #:
SCRID Numbers

(AE 468):
SENATE COMMITTEE ON CURRICULAR AFFAIRS

COURSE SUBMISSION AND CONSULTATION FORM

Principal Faculty Member(s) Proposing Course

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<tbody>
<tr>
<td>ASAD AZEMI</td>
<td>axa20</td>
<td>Engineering (EN)</td>
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</tr>
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</table>

Academic Home: Engineering (EN)

Type of Proposal: [ ] Add  [X] Change  [ ] Drop

I am requesting recertification of this course for the new Gen Ed and/or University Requirements Guidelines?

Course Designation

(EDSGN 401) Engineering Systems Design

Course Information

Special categories for Undergraduate (001-499) courses

Foundations

[ ] Writing/Speaking (GWS)
[ ] Quantification (GQ)

Knowledge Domains

[ ] Health & Wellness (GHW)
[ ] Natural Sciences (GN)
[ ] Arts (GA)
[ ] Humanities (GH)
[ ] Social and Behavioral Sciences (GS)

Additional Designations

[ ] Bachelor of Arts
[ ] International Cultures (IL)
[ ] United States Cultures (US)
[ ] Honors Course
[ ] Common course number - x94, x95, x96, x97, x99
[ ] Writing Across the Curriculum

First-Year Engagement Program

[ ] First-Year Seminar

Miscellaneous

[ ] Common Course

GE Learning Objectives

[ ] GenEd Learning Objective: Effective Communication
[ ] GenEd Learning Objective: Creative Thinking
[ ] GenEd Learning Objective: Crit & Analytical Think
[ ] GenEd Learning Objective: Global Learning
[ ] GenEd Learning Objective: Integrative Thinking
[ ] GenEd Learning Objective: Key Literacies
[ ] GenEd Learning Objective: Soc Resp & Ethic Reason
Cross-Listed Courses:

Prerequisites:
EDSGN 100, 4th Semester standing

Corequisites:

Concurrents:

Recommended Preparations:

Abbreviated Title: Engr Sys Design

Bulletin Listing

| Minimum Credits: | 3 |
| Maximum Credits: | 3 |
| Repeatable: | NO |

Department with Curricular Responsibility: School of Engr Technology and Commonwealth Engr (UPEN_SETCE)

Effective Semester: FA 2017

Travel Component: NO

Course Outline

A brief outline or overview of the course content:
This course provides the knowledge and skills necessary to translate needs and priorities into system requirements, and develop derived requirements, which together form the starting point for engineering of complex systems. Students will develop an understanding of the larger context in which requirements for a system are developed, and learn about trade-offs between developing mission needs or market opportunities first versus assessing available technology first. Techniques for translating needs and priorities into an operational concept and then into specific functional and performance requirements will be presented. Students will assess and improve the usefulness of requirements, including such aspects as correctness, completeness, consistency, measurability, testability, and clarity of documentation.

A listing of the major topics to be covered with an approximate length of time allotted for their discussion:
1. Introduction to Systems Engineering & Complex Systems [1 week]
2. The System Life Cycle [1 week]
   a. Systems Engineering Process Models – Vee model
3. Concept Studies and Problem Definition [2 weeks]
   a. Concept of Operations
   b. Use Case Scenarios
4. System Requirements [3 weeks]
   a. Stakeholder Analysis
   b. Constraints
   c. Writing Requirements
5. Trade Studies and Risk Analysis [3 weeks]
   a. Quantifying Risk
   b. Risk avoidance vs. Risk Management
   c. Trade-off Analysis
   a. Functional Architecture
   b. Physical Architecture
7. Preliminary Design [1 week]
   a. Preliminary Design Report
8. Verification and Validation [1 week]
   a. Definitions
   b. V&V Plan

Course Description:
Design requirements for complex systems; trade-offs between market opportunities and technology; translation of priorities and needs into an operational concept. EDSGN 401 Engineering Systems Design (3) This course provides the knowledge and skills necessary to translate needs and priorities into system requirements, and develop derived requirements, which together form the starting point for engineering of complex systems. Students will develop an understanding of the larger context in which requirements for a system are developed, and learn about trade-offs between developing mission needs or market opportunities first versus assessing available technology first. Techniques for translating needs and priorities into an operational concept and then into specific functional and performance requirements will be presented. Students will assess and improve the usefulness of requirements, including such aspects as correctness, completeness, consistency, measurability, testability, and clarity of documentation. The course explores the role of techniques such as decision analysis, cost-benefit analysis, and risk assessment. Students will understand the limitations of the way that current systems engineering is practiced in terms of dealing with complexity, lifecycle uncertainty and other factors.

The name(s) of the faculty member(s) responsible for the development of the course:
Course Justification

Instructional, Educational, and Course Objectives:
This section should define what the student is expected to learn and what skills the student will develop.

- Be able to describe systems engineering process and complex systems
- Be able to summarize the key steps in the systems engineering process starting with stakeholder analysis and ending with transitioning systems to operations
- Be able to apply techniques for translating needs and priorities into an operational concept and then into specific functional and performance requirements
- Be able to articulate the limitations of the way that current systems engineering is practiced in terms of dealing with complexity, lifecycle uncertainty and other factors
- Be able to apply some of the fundamental methods and tools
- Understand the important role of humans as beneficiaries, designers, operators and maintainers of complex systems

Evaluation Methods:
Include a statement that explains how the achievement of the educational objective identified above will be assessed.
The procedures for determining students’ grades should be specifically identified.
A recommended point grading scheme follows:
Homework 30%
Semester exams (2) 30%
Design projects 40%

Relationship/Linkage of Course to Other Courses:
This statement should relate the course to existing or proposed new courses. It should provide a rationale for the level of instruction, for any prerequisites that may be specified, or for the course’s role as a prerequisite for other courses.
EDSGN 100 introduces students to the basic concepts of engineering design and this course provides them with an in-depth understanding of engineering systems and design methodology and the associated processes.

Relationship of Course to Major, Option, Minor, or General Education:
This statement should explain how the course will contribute to the major, option, or minor and indicate how it may function as a service course for other departments.
This course provides students with a strong and complementary background to EDSGN 410, EDSGN 420, ENGR 490W, and ENGR 491W.

A description of any special facilities:
No special facilities are required.

Frequency of Offering and Enrollment:
The course will be offered once per year, either Fall or Spring semester, with an expected enrollment of 15 to 25 students.

Justification for Changing The Proposal:
Include a justification for each change to the course. Particular attention should be paid to the effects of the course change within the discipline and in other disciplines where the course may be required within a major or used as a service course. When a unit submits several course changes, with or without new course proposals, a general statement covering the programmatic effects of the changes should be submitted.
There is no change in the course content. We are only changing the prerequisites. As it was pointed out in the original proposal, the prerequisites, with the exception of EDSGN 100, were deemed necessary for course projects. With the proposed changes in the curriculum, dropping CMPEN required courses, the course project(s) will no longer include CMPEN 271 material as a necessary background. EMCH 213 has been dropped, since it was determined that the course projects would not require the technical knowledge from this course. The reason for including MATH 251 as a prerequisite, in the initial course proposal, was to have the freedom of assigning projects that may involve differential equations. After several offerings of the course, we concluded that such projects may not fit the focus of the course and therefore decided to remove it. Moreover, EDSGN 401 course is a fifth semester course and cannot be taken before being admitted to the program, since Math 251 is an ETM requirement, this requirement was removed. Furthermore, our transfer students (outside or inside Penn State) may have MATH 250 and we wanted to provide more flexibility in that regard and based on the aforementioned points it was decided to remove MATH 251 as a prerequisite. Finally, in light of dropping the aforementioned prerequisites, in order to ensure that only students with proper background would enroll in this course, the fourth-semester prerequisite has been added to the list. Please note that having a fifth-semester standing prerequisite (or co-requisite) would force admitted General Engineering students to finish their fourth semester before being able to enroll for the course. Therefore, a fourth-semester prerequisite was adopted.
Campuses That Have Offered (EDSGN 401) Over The Past 4 Years

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Review History
This section represents all consultation history that has occurred on this proposal

Legend
- Approve
- Rejected
- Wating Review
- User Action Required
- Pending Action(s)
- Moved to Rejected Status
- Approved
- (#) - Review Order Sequence Number

Consultation

Recipient Name: JANICE MARGLE
Department: Abington College (Pre-Major)
Position: Consultation
Campus: ABINGTON CAMPUS
Title: ASSOC PROF ENGINEERING

(17) Request sent: 2/15/2017 at 8:32 AM
Concur: Yes
Comments:
Reviewed On: 2/16/2017 at 6:18 PM

Recipient Name: MARCUS BESSER
Department: Abington College (Pre-Major)
Position: Consultation
Campus: ABINGTON CAMPUS
Title: ASSOC PROF M ENGINEERING

(9) Request sent: 2/15/2017 at 8:32 AM
Concur: Yes
Comments:
Reviewed On: 2/15/2017 at 2:08 PM

Recipient Name: ROBERT AVANZATO
Department: (Not Available)
Position: Consultation
Campus: ABINGTON CAMPUS
Title: ASSOC PROF ENGINEERING

(21) Request sent: 2/15/2017 at 8:32 AM
Concur: Yes
Comments:
Reviewed On: 2/24/2017 at 8:38 AM
Recipient Name: ZAFER HATAHET
Department: Abington College (Pre-Major)
Position: Consultation
Title: DIV HEAD SCI & ENGINEER

Request sent: 2/27/2017 at 7:41 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: GRANT ALEXANDER
Department: (Not Available)
Position: Consultation
Title: PROF OF MECH.ENGRC

Request sent: 2/27/2017 at 7:34 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: JENNILYN
Department: Business And Engineering
Position: Consultation
Title: INSTRUCTOR IN ENGINEERING

Request sent: 2/27/2017 at 7:35 AM
Concur: Yes
Comments:
Reviewed On: 2/28/2017 at 10:33 AM

Recipient Name: JUNGWOO RYOO
Department: Business And Engineering
Position: Consultation
Title: PROFESSOR OF INFOSCI/TECH

Request sent: 2/27/2017 at 7:35 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: SOHAIL ANWAR
Department: (Not Available)
Position: Consultation
Title: PROF ENGINEERING

Request sent: 2/27/2017 at 7:39 AM
Concur: Yes
Recipient Name: DALE HENRY LITWHILER
Department: Engineering, Business and Human Development
Position: Consultation
Campus: BERKS CAMPUS
Title: ASSOC PROF ENGINEERING

Request sent: 2/27/2017 at 7:32 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 2/28/2017 at 10:40 PM

Recipient Name: JANELLE LARSON
Department: Engineering, Business and Human Development
Position: Consultation
Campus: BERKS CAMPUS
Title: ASSOC PROF

Request sent: 2/27/2017 at 7:34 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: RUNGUN NATHAN
Department: Engineering, Business and Human Development
Position: Consultation
Campus: BERKS CAMPUS
Title: ASSOC PROF ENGINEERING

Request sent: 2/27/2017 at 7:38 AM
Concur: No, this proposal needs significant changes
Comments: Freshmen in the first semester finish EDSGN 100, so potentially a student can take this course in the second semester as stated now. Can this be justified to be a 400 level then? I suggest that rather than make the assumption that ETM will take care of pre-requisites, it should be stated explicitly.
Reviewed On: 2/27/2017 at 6:45 PM

Initiator Comments: Thanks for the comment; a fifth semester standing has been added to the requirement. Please note, that the course is part of the General Engineering MDE-option and it is only offered at Great Valley for those who have been admitted to the program, after passing ETM requirements. Again, thanks for the comment and we agree that a 400 level course should have proper prerequisites that would not allow first-year students (or even second-year students in this case) to enroll in the course.

Request sent: 2/27/2017 at 7:07 PM
Concur: Yes
Comments: I would still recommend making it 300 level. Thanks for the detailed discussion Asad on all the changes
Reviewed On: 2/27/2017 at 7:28 PM
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<td>TERRY SPEICHER</td>
<td>Department: School of Engr Technology and Commonwealth Engr</td>
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<td>ASAD AZEMI</td>
<td>Department: School of Engr Technology and Commonwealth Engr</td>
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<td>Department: School of Engr Technology and Commonwealth Engr</td>
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<td>🎯 Recipient Name: DOUGLAS MILLER</td>
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<td>🎯 Recipient Name: CHENG DONG</td>
<td>Department: Biomedical Engineering</td>
<td>Position: Consultation</td>
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<td>🎯 Recipient Name: JOHN HANNAN</td>
<td>Department: Computer Science And Engineering</td>
<td>Position: Consultation</td>
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Concur: Yes
Comments: With the change in prerequisites to be only EDSGN 100, does this mean that first-year students could take this course in the spring after taking EDSGN in the fall? With no other prerequisite knowledge or semester standing, how is this still 400-level course?
Reviewed On: 2/15/2017 at 3:05 PM

Recipient Name: JUDITH TODD
Department: Engineering Science And Mechanics
Position: Consultation
Title: HEAD/PROF ESM
Campus: UNIVERSITY PARK CAMPUS

Recipient Name: M PARFITT
Department: Architectural Engineering
Position: Consultation
Title: PROFESSOR ARCH ENGR
Campus: UNIVERSITY PARK CAMPUS

Recipient Name: PATRICK FOX
Department: Civil And Environmental Engineering
Position: Consultation
Title: PROF AND DEPT HEAD
Campus: UNIVERSITY PARK CAMPUS

Recipient Name: PAUL HEINEMANN
Department: Agricultural And Biological Engineering
Position: Consultation
Title: DEPT HD/PROF AG & BIO ENG
Campus: UNIVERSITY PARK CAMPUS

Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/2/2017 at 7:15 AM
Recipient Name: PHILIP MORRIS  Department: Aerospace Engineering
Position: Consultation  Campus: UNIVERSITY PARK CAMPUS
Title: BOEING PROFESSOR OF AERSP

Request sent: 2/27/2017 at 7:38 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: PHILIP SAVAGE  Department: Chemical Engineering
Position: Consultation  Campus: UNIVERSITY PARK CAMPUS
Title: PROF/DEPT HEAD CHEM ENGR

Request sent: 2/27/2017 at 7:37 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: THOMAS F LAPORTA  Department: Computer Science And Engineering
Position: Consultation  Campus: UNIVERSITY PARK CAMPUS
Title: LNHRDCHAIRPROF & DIR EECS

Request sent: 2/15/2017 at 8:32 AM
Concur: Yes
Comments:
Reviewed On: 2/15/2017 at 4:49 PM

Recipient Name: DAVID LOKER  Department: Engineering
Position: Consultation  Campus: PENN STATE ERIE, THE BEHREND COLLEGE
Title: ASSOC PROF ENGR

Request sent: 2/27/2017 at 7:33 AM
Concur: Yes
Comments:
Reviewed On: 2/27/2017 at 12:25 PM

Recipient Name: EDWARD EVANS  Department: Engineering
Position: Consultation  Campus: PENN STATE ERIE, THE BEHREND COLLEGE
Title: SR LECT ENGINEERING

Request sent: 2/27/2017 at 7:33 AM
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Request sent: 2/27/2017 at 7:32 AM
Concur: Yes
Comments:
Reviewed On: 2/27/2017 at 11:37 AM

Recipient Name: JAMES NEMES
Department: Data Analytics
Position: Consultation
Campus: PENN STATE GREAT VALLEY
Title: PROFESSOR & DAA

Request sent: 2/27/2017 at 7:34 AM
Concur: Yes
Comments:
Reviewed On: 2/27/2017 at 8:18 AM

Recipient Name: SALLY RICHMOND
Department: (Not Available)
Position: Consultation
Campus: PENN STATE GREAT VALLEY
Title: LECTURER IN INFO SCIENCE

Request sent: 2/15/2017 at 8:32 AM
Concur: Yes
Comments:
Reviewed On: 2/15/2017 at 1:46 PM

Recipient Name: AB Shafaye
Department: Science, Engineering And Technology
Position: Consultation
Campus: PENN STATE HARRISBURG, THE CAPITAL COLLEGE
Title: EE/EET Programs Chair

Request sent: 2/27/2017 at 7:36 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: Ameet Banerjee
Department: Science, Engineering And Technology
Position: Consultation
Campus: PENN STATE HARRISBURG, THE CAPITAL COLLEGE
Title: ASSOC PROF OF MECH ENG

Request sent: 2/27/2017 at 7:30 AM
Concur: Yes
Comments:
Recipient Name: ISSAM ABU-MAHFOUZ  
Department: Science, Engineering And Technology  
Position: Consultation  
Campus: PENN STATE HARRISBURG, THE CAPITAL COLLEGE  
Title: ASSOC PRF ENGINEERING

Request sent: 2/27/2017 at 7:34 AM  
Concur: Yes  
Comments: (Completed By Default - Exceeded Time Limit)  
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: OMID ANSARY  
Department: Capital Administration  
Position: Consultation  
Campus: PENN STATE HARRISBURG, THE CAPITAL COLLEGE  
Title: Senior Associate Dean for Academic Affairs

Request sent: 2/15/2017 at 8:32 AM  
Concur: Yes  
Comments:  
Reviewed On: 2/16/2017 at 2:24 PM

Recipient Name: RAFIC BACHNAK  
Department: Science, Engineering And Technology  
Position: Consultation  
Campus: PENN STATE HARRISBURG, THE CAPITAL COLLEGE  
Title: PROF OF ELECTRICAL ENG.

Request sent: 2/27/2017 at 7:38 AM  
Concur: Yes  
Comments: (Completed By Default - Exceeded Time Limit)  
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: RICHARD CIOCCI  
Department: Science, Engineering And Technology  
Position: Consultation  
Campus: PENN STATE HARRISBURG, THE CAPITAL COLLEGE  
Title: ASSOC PROF MECH ENG

Request sent: 2/27/2017 at 7:38 AM  
Concur: Yes  
Comments:  
Reviewed On: 2/27/2017 at 9:48 AM

Recipient Name: JOSEPH RANALLI  
Department: UC Engineering  
Position: Consultation  
Campus: HAZLETON CAMPUS
(5) 
Request sent: 2/15/2017 at 8:32 AM  
Concur: Yes  
Comments:  
Reviewed On: 2/15/2017 at 9:39 AM  

Recipient Name: KENNETH DUDECK  
Department: UC Engineering  
Position: Consultation  
Campus: HAZLETON CAMPUS  
Title: ASSOC PROF ENGR  

(20) 
Request sent: 2/15/2017 at 8:32 AM  
Concur: Yes  
Comments:  
Reviewed On: 2/22/2017 at 10:40 AM  

Recipient Name: WIESLAW GREBSKI  
Department: School of Engr Design, Technology and Prof Prgms  
Position: Consultation  
Campus: HAZLETON CAMPUS  
Title: ASSOCIATE PROF  

(3) 
Request sent: 2/15/2017 at 8:32 AM  
Concur: Yes  
Comments:  
Reviewed On: 2/15/2017 at 8:50 AM  

Recipient Name: DAVID SALVIA  
Department: Electrical Engineering  
Position: Consultation  
Campus: UNIVERSITY PARK CAMPUS  
Title: ASST PROF ELECT. ENGR.  

(7) 
Request sent: 2/15/2017 at 8:32 AM  
Concur: Yes  
Comments: I believe that you have a typo in your justification section. You wrote:  
As it was pointed out in the original proposal, the prerequisites, with the exception of EDSGN 100, were deemed necessary for course projects.  
I think you meant to write:  
As it was pointed out in the original proposal, NONE OF the prerequisites, with the exception of EDSGN 100, were deemed necessary for course projects.  
Reviewed On: 2/15/2017 at 1:51 PM  

Recipient Name: ERIC MARSH  
Department: Mechanical Engineering  
Position: Consultation  
Campus: UNIVERSITY PARK CAMPUS  
Title: PROFESSOR OF MECH ENGR  

(1) 
Request sent: 2/15/2017 at 8:32 AM  
Concur: Yes  
Comments:  
Reviewed On: 2/15/2017 at 8:32 AM
<table>
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<th>Recipient Name</th>
<th>Department</th>
<th>Position</th>
<th>Campus</th>
</tr>
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<tbody>
<tr>
<td>JANIS TERPENNY</td>
<td>Industrial And Manufacturing Engineering</td>
<td>Consultation</td>
<td>UNIVERSITY PARK CAMPUS</td>
</tr>
<tr>
<td>KAREN THOLE</td>
<td>Mechanical Engineering</td>
<td>Consultation</td>
<td>UNIVERSITY PARK CAMPUS</td>
</tr>
<tr>
<td>KULTEGIN AYDIN</td>
<td>Electrical Engineering</td>
<td>Consultation</td>
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<tr>
<td>MATTHEW PARKINSON</td>
<td>School of Engr Design, Technology and Prof Prgrms</td>
<td>Consultation</td>
<td>UNIVERSITY PARK CAMPUS</td>
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<tr>
<td>SCARLETT MILLER</td>
<td>School of Engr Design, Technology and Prof Prgrms</td>
<td>Consultation</td>
<td>UNIVERSITY PARK CAMPUS</td>
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</tbody>
</table>
College Administrator Review

Recipient Name: Asad Azemi  
Department: (Not Available)  
Position: College Administrator Review  
Campus: (Not Available)  
Title:  

Request sent: 4/11/2017 at 5:50 PM  
Concur: Yes  
Comments: Extensive Consultations has Taken Place with All Offering Colleges and Campuses. Below is the list of Consultants that have concurred/approved the General Engineering Curriculum changes and EDSGN Course changes (new and modified):  
*Penn State Altoona*  
Sohail Anwar (sxa15@psu.edu)  
Grant Risha (gar108@psu.edu)  
Jungwoo Ryoo (jrr65@psu.edu)  
Jennilyn Vallejera (jmv22@psu.edu)  
Berks Janelle Larson (jbl6@psu.edu)  
Dale Lithwiler (dlh10@psu.edu)  
Rungun Nathan (rmn13@psu.edu)  
Terry Speicher (tls20@psu.edu)  
Erie Russ Warley (rrw27@psu.edu)  
Dipo Onipede (ouo1@psu.edu)  
Edward Evans (ere100@psu.edu)  
Thomas Hemminger (thh5@psu.edu)  
William Lasher (wcl2@psu.edu)  
David Loker (drl3@psu.edu)  
*Penn State Brandywine*  
Asad Azemi (axa20@psu.edu)  
Ivan Esparragoza (iee1@psu.edu)  
Vlad Kashyn (uxi1@psu.edu)  
*Penn State DuBois*  
Douglas Miller (dmj290@psu.edu)  
Ramakrishnan Ragopalan (rur12@psu.edu)  
Daudi Waryoba (dnw29@psu.edu)  
Pingjuan Werner (pw7@psu.edu)  
*Penn State Great Valley*  
Kathryn Jablakow (kwl3@psu.edu)  
Sally Richmond (sss135@psu.edu)
### Head of Department

Recipient Name: **SVEN G BILEN**  
Department: (Not Available)  
Position: Head of Department  
Campus: UNIVERSITY PARK CAMPUS  
Title:  
Concur: [Not Yet Reviewed]  
Comments: [Not Yet Reviewed]  
Reviewed On: [Not Yet Reviewed]

### SCCA Representative

Recipient Name: **ROBERT MELTON**  
Department: (Not Available)  
Position: SCCA Representative  
Campus: UNIVERSITY PARK CAMPUS  
Title:  
Concur: [Not Yet Reviewed]  
Comments: [Not Yet Reviewed]  
Reviewed On: [Not Yet Reviewed]

### Dean of the College

Recipient Name: **PETER BUTLER**  
Department: (Not Available)  
Position: Dean of the College  
Campus: UNIVERSITY PARK CAMPUS  
Title:  
Concur: [Not Yet Reviewed]  
Comments: [Not Yet Reviewed]  
Reviewed On: [Not Yet Reviewed]

### SCCA Subcommittee Review

Recipient Name: **CORTNEY SMITH**  
Department: (Not Available)  
Position: SCCA Subcommittee Review  
Campus: UNIVERSITY PARK CAMPUS
Faculty Senate Review

Recipient Name: CORTNEY SMITH  Department: (Not Available)
Position: Faculty Senate Review  Campus: UNIVERSITY PARK CAMPUS

Recipient Name: KADI CORTER  Department: (Not Available)
Position: Faculty Senate Review  Campus: UNIVERSITY PARK CAMPUS

Recipient Name: ALLISON ALBINSKI  Department: (Not Available)
Position: Faculty Senate Review  Campus: UNIVERSITY PARK CAMPUS

Request sent: 2/17/2017 at 2:02 PM
Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]
Curricular Information

Blue Sheet Item #:

Review Date:

**SCRID Numbers**

(EDSGN 401)
SENATE COMMITTEE ON CURRICULAR AFFAIRS

COURSE SUBMISSION AND CONSULTATION FORM

Principal Faculty Member(s) Proposing Course

<table>
<thead>
<tr>
<th>Name</th>
<th>User ID</th>
<th>College</th>
<th>Department</th>
</tr>
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<tbody>
<tr>
<td>ULADZISLAU IVASHYN</td>
<td>uxi1</td>
<td>Engineering</td>
<td>Not Available</td>
</tr>
<tr>
<td>ASAD AZEMI</td>
<td>AXA20</td>
<td>Engineering</td>
<td>Not Available</td>
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<tr>
<td>ASAD AZEMI</td>
<td>AXA20</td>
<td>Engineering</td>
<td>Not Available</td>
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Academic Home: Engineering (EN)

Type of Proposal: [ ] Add [ ] Change [ ] Drop

Course Designation
(EDSGN 402) Materials and Manufacturing

Course Information

Cross-Listed Courses:

Prerequisites:
CHEM 110, EMCH 211, EMCH 213, CMPSC 200; CMPSC 201; CMPSC 121, EDSGN 401

Corequisites:

Concurrents:

Recommended Preparations:

Abbreviated Title: MATS & MANUF

Discipline: None

Course Listing:

Special categories for Undergraduate (001-499) courses

Foundations

☐ Writing/Speaking (GWS)
☐ Quantification (GQ)

Knowledge Domains

☐ Health & Wellness (GHW)
☐ Natural Sciences (GN)
☐ Arts (GA)
☐ Humanities (GH)
☐ Social and Behavioral Sciences (GS)

Additional Designations

☐ Bachelor of Arts
☐ International Cultures (IL)
☐ United States Cultures (US)
☐ Honors Course
☐ Common course number - x94, x95, x96, x97, x99
☐ Writing Across the Curriculum

First-Year Engagement Program
Course Outline

A brief outline or overview of the course content:
This course provides fundamental knowledge of engineering materials and manufacturing processes, with a focus on material and process selection for design. Students develop basic hands-on skills with selected machine tools and processes, as well as additive manufacturing techniques. Computer Aided Manufacturing (CAM) is introduced to establish a basic understanding of these methods to be applied in future courses (e.g., senior capstone projects).

A listing of the major topics to be covered with an approximate length of time allotted for their discussion:
A listing of the major topics:
1. Health and Safety in the Lab (1 week)
   Hazards in the workshop, health and safety at work, employer and employee personal protection, machine guards and workshop layouts. The Act of the Occupational Safety and Health Administration (OSHA).
2. Materials Testing (1 week)
   Selection of test, suitable test methods and application of methods. Destructive testing: Hardness testing, tensile testing, fatigue testing and Weld Bend tests. Non-destructive testing: X-Ray, Visual, Ultrasonic, Dye-penetrant and Magnetic Particle
3. Materials, Form, and Function (2 weeks)
4. Materials and Sustainability (1 week)
   Critical understanding of practicing responsible engineering from a materials and products perspective. Concept of product life cycle and product selection. Connection between material use and serious health, social, and environmental issues. Concept of sustainable materials and products. Development of "green material/product" tools resulting from the growing awareness of global environmental problems, need for product transparency, and the realization of the impact of certain chemicals on human health.
5. Material Selection in Design (3 weeks)
   Design considerations in the use of materials; selecting materials to optimize multiple properties; materials failure; long-term materials properties; materials behavior under extreme conditions; corrosion; discussion of design and materials selection strategy; processing and process selection strategy; process economics; life-cycle thinking and eco-design.
6. Subtractive Manufacturing Processes (1 week)
   Basic cutting processes with single point tools, tool geometry, cutting tool materials, forces, torque, power required and cutting fluids. Cutting tool inserts; carbide and ceramic tool inserts, indexable tools. Speeds and feeds, cutting times. Pedestal grinder. Wheel safety. Elements of a machine tool, degrees of freedom, generating, forming and copying. The power transmission, slideways, alignment, accuracy and typical machining operations for a center lathe, drilling machine and milling machine. Workholding devices.
7. Additive Manufacturing Processes (1 week)
   Advanced/Additive manufacturing processes and their relationship with subtractive manufacturing; Processes in additive manufacturing - extrusion, jetting, photopolymerization, powder bed fusion, direct-write, sheet lamination, directed-energy deposition; Scaffolds, bio-printing, tissue and organ engineering; Applications of additive manufacturing; Processes related to AM, such as 3D scanning, mold-making, casting and sintering.
8. Assembly and Fabrication (1 weeks)
   Design of components, joining methods, permanent joints e.g. riveting, soldering, welding, brazing, braze welding, adhesive bonding. Semi-permanent joints, Screwed fastenings, locking devices, keys, dowels and circlips.
9. Process Selection in Design (2 weeks)
marking out, surface development, cutting and bending. Limits and fits, limits gauges, slip gauges, interchangeability.

10. Computer Aided Design and Manufacturing (2 weeks)
Applications in assembly and metal cutting and forming, advantages and limitations, axis nomenclature, control systems, data input, tool offsets, Tool Library, Cutting feeds and speeds, part programming, cutter compensation, program proofing. Concepts and application of Computer Aided Manufacturing (CAM) software programs for creating CNC milling machine part programs.

**Course Description:**
Students will study principles and properties of engineering materials and manufacturing processes with a focus on their appropriate selection in design. Based on these principles and properties, as well as hands-on laboratory experiences, students will develop systematic methods for matching material and process choices to the mechanical, thermal, electro-magnetic, and environmental constraints set by the technical requirements of a design problem or project.

Knowledge of current manufacturing processes is required to align appropriate processes and materials with the requirements of designed products. Students will develop basic, practical knowledge and skills in operating manual and CNC machine tools. Both subtractive and additive manufacturing processes will be explored, and students will learn best practices for making informed choices between them based on design needs. Computer aided manufacturing will be introduced to provide background for future courses (e.g., senior capstone projects).

Student performance will be assessed via written homework assignments, laboratory activities and reports, written exams, and a design project that integrates material and process selection, as well as manufacture and testing of simple engineered components and/or products.

**The name(s) of the faculty member(s) responsible for the development of the course:**

- **Name:** ULADZISLAU IVASHYN (uxi1)
  **Title:**
  **Phone:**
  **Address:**
  **Campus:** BW
  **City:**
  **Fax:**

- **Name:** KATHRYN WEED JABLOKOW (kw3)
  **Title:** ASSOC PROF MECHANICAL ENG
  **Phone:** +1 610 648 3372
  **Address:** ENGR GREAT VALLEY GRAD CNTR GRT VALLEY CTR GREAT VALLEY,
  **Campus:**
  **City:**
  **Fax:**

- **Name:** ASAD AZEMI (AXA20)
  **Title:**
  **Phone:**
  **Address:**
  **Campus:** BW
  **City:**
  **Fax:**

- **Name:** ASAD AZEMI (AXA20)
  **Title:**
  **Phone:**
  **Address:**
  **Campus:** BW
  **City:**
  **Fax:**

**Course Justification**

**Instructional, Educational, and Course Objectives:**
This section should define what the student is expected to learn and what skills the student will develop.
At the end of this course, students should be able to:

1. State the safety and personal protection procedures, as well as Health and Safety regulations, associated with the manufacturing processes used in this course.

2. Make informed choices between the use of additive and subtractive manufacturing processes based on design requirements.

3. Make informed choices of materials based on the mechanical, thermal, electro-magnetic, and environmental constraints set by the technical requirements of a design problem or project.
4. Determine the proper machining sequence and operations for the manufacture of components using basic machine tools.

5. Create and convert 3D models into CNC programs using CAM software.

6. Produce engineering components and products using a variety of manufacturing processes (additive and subtractive) and evaluate the quality of the items produced.

Recommended Texts:

Evaluation Methods:
Include a statement that explains how the achievement of the educational objective identified above will be assessed. The procedures for determining students' grades should be specifically identified.

Students will be evaluated based on Homework Assignments spread throughout the semester (10%); Lab Assignments to include manufacturing precise components using universal and CNC lathe, mill, waterjet and laser equipment (30%); traditional and/or web-based Midterm Exam (20%) and Final Exam (20%); and an open-ended Design Project (20%).

Relationship/Linkage of Course to Other Courses:
This statement should relate the course to existing or proposed new courses. It should provide a rationale for the level of instruction, for any prerequisites that may be specified, or for the course's role as a prerequisite for other courses.

CHEM 110 provides knowledge of the chemical composition of engineering materials and their physical properties. EMCH 211 and EMCH 213 provide knowledge of statics and strength of materials, which are important in understanding manufacturing processes and material selection. CMPSC 200, 201 or 121 and EDSGN 401 help establish the necessary foundation for Computer Aided Manufacturing processes (CAM), as well as an understanding of the systemic nature of design for manufacturing.

Relationship of Course to Major, Option, Minor, or General Education:
This statement should explain how the course will contribute to the major, option, or minor and indicate how it may function as a service course for other departments.

The knowledge and skills developed in this course can provide theoretical and practical background for ENGR 490W and ENGR 491W (senior capstone).

A description of any special facilities:
Fabrication Lab

Frequency of Offering and Enrollment:
The course will be offered once per year, either Fall or Spring semester, with an expected enrollment of 10 to 20 students.

Campuses That Have Offered ( ) Over The Past 4 Years

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Review History
This section represents all consultation history that has occurred on this proposal

Legend
Approved  Rejected  Waiting Review  User Action Required
Pending Action(s)  Moved to Rejected Status  Approved  (#) - Review Order Sequence Number

Consultation

Recipient Name: JANICE MARGLE
Department: Abington College (Pre-Major)
Position: Consultation
Campus: ABINGTON CAMPUS

Request sent: 2/15/2017 at 8:25 AM
Concur: Yes
Recipient Name: MARCUS BESSER  Department: Abington College (Pre-Major)
Position: Consultation  Campus: ABINGTON CAMPUS
Title: ASSOC PROF M ENGINEERING

Request sent: 2/15/2017 at 8:25 AM
Concur: Yes
Comments:
Reviewed On: 2/15/2017 at 2:27 PM

Recipient Name: ROBERT AVANZATO  Department: (Not Available)
Position: Consultation  Campus: ABINGTON CAMPUS
Title: ASSOC PROF ENGINEERING

Request sent: 2/27/2017 at 7:38 AM
Concur: Yes
Comments:
Reviewed On: 2/27/2017 at 8:15 AM

Recipient Name: ZAFER HATAHET  Department: Abington College (Pre-Major)
Position: Consultation  Campus: ABINGTON CAMPUS
Title: DIV HEAD SCI & ENGINEER

Request sent: 2/27/2017 at 7:41 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: GRANT ALEXANDER RISHA  Department: (Not Available)
Position: Consultation  Campus: (Not Available)
Title: PROF OF MECH.ENGRRG

Request sent: 2/27/2017 at 7:34 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: JENNILYN VALLEJERA  Department: Business And Engineering
Position: Consultation  Campus: ALTOONA CAMPUS
Title: INSTRUCTOR IN ENGINEERING
Recipient Name: JUNGWOO RYOO  Department: Business And Engineering  Position: Consultation  Campus: ALTOONA CAMPUS  Title: PROFESSOR OF INFOSCI/TECH

Recipient Name: SOHAIL ANWAR  Department: (Not Available)  Position: Consultation  Campus: (Not Available)  Title: PROF ENGINEERING

Recipient Name: DALE HENRY LITWHILER  Department: Engineering, Business and Human Development  Position: Consultation  Campus: BERKS CAMPUS  Title: ASSOC PROF ENGINEERING

Recipient Name: JANELLE LARSON  Department: Engineering, Business and Human Development  Position: Consultation  Campus: BERKS CAMPUS  Title: ASSOC PROF

Recipient Name: RUNGUN NATHAN  Department: Engineering, Business and Human Development
Title: ASSOC PROF ENGINEERING
Position: Consultation
Campus: BERKS CAMPUS

Request sent: 2/27/2017 at 7:38 AM
Concur: No, this proposal needs significant changes
Comments: 1. Prerequisites stated CHEM 110, CMPSC 200; CMPSC 201; CMPSC 121, EMCH 211, EDSGN 401. I think this should read CHEM 110, CMPSC 200 OR CMPSC 201 OR CMPSC 121, EMCH 211, EDSGN 401
2. Based on prerequisites a sophomore could potentially take this course. (see my comments for EDSGN 401).
3. An assumption is being made that only students who have satisfied ETM can take this course, but there is no way to ensure this requirement is met.
Reviewed On: 2/27/2017 at 6:55 PM

Initiator Comments: Dear Rungun, In the curriculum system the semicolon does equal "or." and the comma equals "and." In other words, when you select the "or" the semicolon is added and when you select an "and" the comma is added. This is not new. The comma and semicolon have had these meanings for years and been used in both the program descriptions and course descriptions in the Undergraduate Bulletin. Best wishes! Sherry

Request sent: 2/28/2017 at 9:15 AM
Concur: Yes
Comments: Reviewed On: 3/6/2017 at 5:29 PM

Recipient Name: TERRY SPEICHER
Department: School of Engr Technology and Commonwealth Engr
Position: Consultation
Campus: BERKS CAMPUS
Title: ASST PROF ENGINEERING

Request sent: 2/15/2017 at 8:25 AM
Concur: Yes
Comments: Reviewed On: 2/16/2017 at 3:20 PM

Recipient Name: ASAD AZEMI
Department: School of Engr Technology and Commonwealth Engr
Position: Consultation
Campus: BRANDYWINE CAMPUS
Title: ASSOC PROF ENGINEERING

Request sent: 2/15/2017 at 8:25 AM
Concur: Yes
Comments: Reviewed On: 2/15/2017 at 10:32 AM

Recipient Name: IVAN ESPARRAGOZA
Department: UC Engineering
Position: Consultation
Campus: BRANDYWINE CAMPUS
Title: ASSOC PROF ENGINEERING

Request sent: 2/15/2017 at 8:25 AM
Recipient Name: ULADZISLAV IVASHYN
Department: School of Engr Technology and Commonwealth Engr
Position: Consultation
Campus: BRANDYWINE CAMPUS
Title: ENGINEERING

Recipient Name: DAUDI WARYOBA
Department: School of Engr Technology and Commonwealth Engr
Position: Consultation
Campus: DUBOIS CAMPUS
Title: ASST PROF / ENGINEERING

Recipient Name: DOUGLAS MILLER
Department: (Not Available)
Position: Consultation
Campus: DUBOIS CAMPUS
Title: INSTRUCTOR

Recipient Name: PINGJUAN WERNER
Department: UC University College (Pre-Major)
Position: Consultation
Campus: DUBOIS CAMPUS
Title: PROF ENGINEERING

Recipient Name: RAMAKRISHNAN RAJAGOPALAN
Department: UC Engineering
Position: Consultation
Campus: DUBOIS CAMPUS
Title: RES ASSOC & ASST. PROF

Request sent: 2/27/2017 at 7:39 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: CHENG DONG
Position: Consultation
Department: Biomedical Engineering
Campus: UNIVERSITY PARK CAMPUS
Title: DEPT HEAD/DIST. PROF BIO

Request sent: 2/15/2017 at 8:25 AM
Concur: Yes
Comments:
Reviewed On: 2/16/2017 at 3:53 PM

Recipient Name: JOHN HANNAN
Position: Consultation
Department: Computer Science And Engineering
Campus: UNIVERSITY PARK CAMPUS
Title: ASC HEAD CMPSCI&ENG

Request sent: 2/15/2017 at 8:25 AM
Concur: Yes
Comments:
Reviewed On: 2/15/2017 at 3:06 PM

Recipient Name: JUDITH TODD
Position: Consultation
Department: Engineering Science And Mechanics
Campus: UNIVERSITY PARK CAMPUS
Title: HEAD/PROF ESM

Request sent: 2/15/2017 at 8:25 AM
Concur: Yes
Comments:
Reviewed On: 2/20/2017 at 11:51 AM

Recipient Name: M PARFITT
Position: Consultation
Department: Architectural Engineering
Campus: UNIVERSITY PARK CAMPUS
Title: PROFESSOR ARCH ENGR

Request sent: 2/27/2017 at 7:37 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/2/2017 at 7:15 AM
Recipient Name: PATRICK FOX  Department: Civil And Environmental Engineering
Position: Consultation  Campus: UNIVERSITY PARK CAMPUS
Title: PROF AND DEPT HEAD

Request sent: 2/15/2017 at 8:25 AM
Concur: Yes
Comments: Reviewed On: 2/15/2017 at 8:29 AM

Recipient Name: PAUL HEINEMANN  Department: Agricultural And Biological Engineering
Position: Consultation  Campus: UNIVERSITY PARK CAMPUS
Title: DEPT HD/PROF AG & BIO ENG

Request sent: 2/15/2017 at 8:25 AM
Concur: Yes
Comments: Reviewed On: 2/15/2017 at 4:12 PM

Recipient Name: PHILIP MORRIS  Department: Aerospace Engineering
Position: Consultation  Campus: UNIVERSITY PARK CAMPUS
Title: BOEING PROFESSOR OF AERSP

Request sent: 2/27/2017 at 7:38 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit) Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: PHILLIP SAVAGE  Department: Chemical Engineering
Position: Consultation  Campus: UNIVERSITY PARK CAMPUS
Title: PROF/DEPT HEAD CHEM ENGR

Request sent: 2/27/2017 at 7:37 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit) Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: THOMAS F LAPORTA  Department: Computer Science And Engineering
Position: Consultation  Campus: UNIVERSITY PARK CAMPUS
Title: LNHRDCHAIRPROF & DIR EECS

Request sent: 2/15/2017 at 8:25 AM
Concur: Yes
Comments:
Recipient Name: DAVID LOKER
Department: Engineering
Position: Consultation
Campus: PENN STATE ERIE, THE BEHREND COLLEGE
Title: ASSOC PROF ENGR

Request sent: 2/27/2017 at 7:33 AM
Concur: Yes
Comments:
Reviewed On: 2/27/2017 at 11:54 AM

Recipient Name: EDWARD EVANS
Department: Engineering
Position: Consultation
Campus: PENN STATE ERIE, THE BEHREND COLLEGE
Title: SR LECT ENGINEERING

Request sent: 2/27/2017 at 7:33 AM
Concur: Yes
Comments:
Reviewed On: 2/27/2017 at 1:20 PM

Recipient Name: OLADIPO ONIPEDE
Department: Engineering
Position: Consultation
Campus: PENN STATE ERIE, THE BEHREND COLLEGE
Title: ASSOC PROF MECH_ENGR

Request sent: 2/15/2017 at 8:25 AM
Concur: Yes
Comments:
Reviewed On: 2/15/2017 at 8:56 AM

Recipient Name: RUSSELL WARLEY
Department: Engineering
Position: Consultation
Campus: PENN STATE ERIE, THE BEHREND COLLEGE
Title: Interim Director, School of Engineering

Request sent: 2/15/2017 at 8:25 AM
Concur: Yes
Comments:
Reviewed On: 2/21/2017 at 8:28 AM

Recipient Name: THOMAS HEMMINGER
Department: Engineering
Position: Consultation
Campus: PENN STATE ERIE, THE BEHREND COLLEGE
Title: PROFESSOR ELEC & COMP ENG

Request sent: 2/27/2017 at 7:39 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: WILLIAM LASHER  Department: Engineering
Position: Consultation  Campus: PENN STATE ERIE, THE BEHREND COLLEGE
Title: PROFESSOR MECH ENG

Request sent: 2/15/2017 at 8:25 AM
Concur: Yes
Comments:
Reviewed On: 2/25/2017 at 3:15 PM

Recipient Name: DOUGLAS SCHUMER  Department: (Not Available)
Position: Consultation  Campus: PENN STATE GREAT VALLEY
Title: ASST PROF ENGINEERDESIGN

Request sent: 2/27/2017 at 7:32 AM
Concur: Yes
Comments:
Reviewed On: 2/27/2017 at 11:36 AM

Recipient Name: JAMES NEMES  Department: Data Analytics
Position: Consultation  Campus: PENN STATE GREAT VALLEY
Title: PROFESSOR & DAA

Request sent: 2/27/2017 at 7:34 AM
Concur: Yes
Comments:
Reviewed On: 2/27/2017 at 8:18 AM

Recipient Name: SALLY RICHMOND  Department: (Not Available)
Position: Consultation  Campus: PENN STATE GREAT VALLEY
Title: LECTURER IN INFO SCIENCE

Request sent: 2/15/2017 at 8:25 AM
Concur: Yes
Comments:
Reviewed On: 2/15/2017 at 3:23 PM
Recipient Name: AB Shafaye  
Department: Science, Engineering And Technology  
Position: Consultation  
Campus: PENN STATE HARRISBURG, THE CAPITAL COLLEGE  
Title: EE/EET Programs Chair

Request sent: 2/27/2017 at 7:36 AM  
Concur: Yes  
Comments: (Completed By Default - Exceeded Time Limit)  
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: Ameet Banerjee  
Department: Science, Engineering And Technology  
Position: Consultation  
Campus: PENN STATE HARRISBURG, THE CAPITAL COLLEGE  
Title: ASSOC PROF OF MECH ENG

Request sent: 2/27/2017 at 7:30 AM  
Concur: Yes  
Comments: (Completed By Default - Exceeded Time Limit)  
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: ISSAM ABU MAHFOUZ  
Department: Science, Engineering And Technology  
Position: Consultation  
Campus: PENN STATE HARRISBURG, THE CAPITAL COLLEGE  
Title: ASSOC PRF ENGINEERING

Request sent: 2/27/2017 at 7:34 AM  
Concur: Yes  
Comments: (Completed By Default - Exceeded Time Limit)  
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: Omid Ansary  
Department: Capital Administration  
Position: Consultation  
Campus: PENN STATE HARRISBURG, THE CAPITAL COLLEGE  
Title: Senior Associate Dean for Academic Affairs

Request sent: 2/15/2017 at 8:25 AM  
Concur: Yes  
Comments:  
Reviewed On: 2/16/2017 at 2:24 PM

Recipient Name: Rafic Bachnak  
Department: Science, Engineering And Technology  
Position: Consultation  
Campus: PENN STATE HARRISBURG, THE CAPITAL COLLEGE  
Title: PROF OF ELECTRICAL ENG.
| Request sent: | 2/27/2017 at 7:38 AM |
|-------------------------------------------------|
| Concur: Yes                                    |
| Comments: (Completed By Default - Exceeded Time Limit) |
| Reviewed On: 3/2/2017 at 7:15 AM |

Recipient Name: **RICHARD CIOCCI**  
Department: Science, Engineering And Technology  
Position: Consultation  
Campus: PENN STATE HARRISBURG, THE CAPITAL COLLEGE  
Title: ASSOC PROF MECH ENG

| Request sent: | 2/27/2017 at 7:38 AM |
|-------------------------------------------------|
| Concur: Yes                                    |
| Comments:                                      |
| Reviewed On: 2/27/2017 at 9:36 AM               |

Recipient Name: **JOSEPH RANALLI**  
Department: UC Engineering  
Position: Consultation  
Campus: HAZLETON CAMPUS  
Title: ASST PROF ASST PROF ENGR

| Request sent: | 2/15/2017 at 8:25 AM |
|-------------------------------------------------|
| Concur: Yes                                    |
| Comments:                                      |
| Reviewed On: 2/15/2017 at 9:39 AM               |

Recipient Name: **KENNETH DUDECK**  
Department: UC Engineering  
Position: Consultation  
Campus: HAZLETON CAMPUS  
Title: ASSOC PROF ENGR

| Request sent: | 2/15/2017 at 8:25 AM |
|-------------------------------------------------|
| Concur: Yes                                    |
| Comments:                                      |
| Reviewed On: 2/22/2017 at 10:40 AM              |

Recipient Name: **WIESLAW GREBSKI**  
Department: School of Engr Design, Technology and Prof Prgms  
Position: Consultation  
Campus: HAZLETON CAMPUS  
Title: ASSOCIATE PROF

| Request sent: | 2/15/2017 at 8:25 AM |
|-------------------------------------------------|
| Concur: Yes                                    |
| Comments:                                      |
| Reviewed On: 2/15/2017 at 8:50 AM               |
Recipient Name: DAVID SALVIA
Position: Consultation
Title: ASST PROF ELECT. ENGR.
Department: Electrical Engineering
Campus: UNIVERSITY PARK CAMPUS

Concur: Yes
Comments: One comment:
E MCH 213 is listed as a co-requisite for this course. I believe that you mean for it to be a concurrent course as per PSU Senate policy 34-60:
Concurrent Courses are similar to prerequisites except that they may be taken prior to, or in the same semester as, the given course.
Co-requisite Courses are pairs of courses required to be taken together in the same semester.
Reviewed On: 2/15/2017 at 1:44 PM

Recipient Name: ERIC MARSH
Position: Consultation
Title: PROFESSOR OF MECH ENGR
Department: Mechanical Engineering
Campus: UNIVERSITY PARK CAMPUS

Concur: Yes
Comments:
Reviewed On: 2/15/2017 at 8:35 AM

Recipient Name: JANIS TERPENNY
Position: Consultation
Title: DEPT HEAD & PROF INDUSTL
Department: Industrial And Manufacturing Engineering
Campus: UNIVERSITY PARK CAMPUS

Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: KAREN THOLE
Position: Consultation
Title: DEPT HEAD MNE
Department: Mechanical Engineering
Campus: UNIVERSITY PARK CAMPUS

Concur: Yes
Comments:
Reviewed On: 2/15/2017 at 2:06 PM

Recipient Name: KULTEGIN AYDIN
Position: Consultation
Title: DEPT HEAD/PROF ELECT ENGR
Department: Electrical Engineering
Campus: UNIVERSITY PARK CAMPUS

Concur: Yes
Comments:
Reviewed On: 2/15/2017 at 8:25 AM
Title: ASSOC PROF ENGR DESIGN

Recipient Name: MATTHEW PARKINSON  
Department: School of Engr Design, Technology and Prof Prgrms  
Position: Consultation  
Campus: UNIVERSITY PARK CAMPUS

Title: ASSOC PROF ENGR DESIGN

Initiator Comments: Dr. Parkinson,
Thank you for your comments/recommendations.
Please, see below the details, which will be added to the course proposal:
A listing of the major topics:
1. Health and Safety in the Lab (1 week)
   Hazards in the workshop, health and safety at work, employer and employee personal protection, machine guards and workshop layouts. The Act of the Occupational Safety and Health Administration (OSHA).
2. Materials Testing (1 week)
   Selection of test, suitable test methods and application of methods.
   Destructive testing: Hardness testing, tensile testing, fatigue testing and Weld Bend tests.
   Non-destructive testing: X-Ray, Visual, Ultrasonic, Dye-penetrant and Magnetic Particle
3. Materials, Form, and Function (2 weeks)
4. Materials and Sustainability (1 week)
   Critical understanding of practicing responsible engineering from a materials and products perspective. Concept of product life cycle and product selection. Connection between material use and serious health, social, and environmental issues. Concept of sustainable materials and products. Development of "green material/product" tools resulting from the growing awareness of global environmental problems, need for product transparency, and the realization of the impact of certain chemicals on human health.
5. Material Selection in Design (3 weeks)
   Design considerations in the use of materials; selecting materials to optimize multiple properties; materials failure; long-term materials properties; materials behavior under extreme conditions; corrosion; discussion of design and materials selection strategy; processing and process selection strategy; process economics; life-cycle thinking and eco-design.
6. Subtractive Manufacturing Processes (1 week)
   Basic cutting processes with single point tools, tool geometry, cutting tool materials, forces, torque, power required and cutting fluids. Cutting tool inserts: carbide and ceramic tool inserts, indexable tools. Speeds and feeds, cutting times. Pedestal grinder. Wheel safety. Elements of a machine tool, degrees of freedom, generating, forming and copying. The power transmission, slideways, alignment, accuracy and typical machining operations for a
center lathe, drilling machine and milling machine.

Workholding devices.

7. Additive Manufacturing Processes (1 week)
Advanced/Additive manufacturing processes and their relationship with subtractive manufacturing;
Processes in additive manufacturing - extrusion, jetting, photopolymerization, powder bed fusion,
direct-write, sheet lamination, directed-energy deposition; Scaffolds, bio-printing, tissue and organ
engineering; Applications of additive manufacturing;
Processes related to AM, such as 3D scanning,
mold-making, casting and sintering.

8. Assembly and Fabrication (1 weeks)
Design of components, joining methods, permanent
joints e.g. riveting, soldering, welding, brazing, braze
welding, adhesive, bonding. Semi-permanent joints,
Screwed fastenings, locking devices, keys, dowels and circlips.

9. Process Selection in Design (2 weeks)
Selection of appropriate processes, Oxy/Acetylene,
MMA, MIG, TIG, Resistance welding. Soft and hard
soldering, plastic welding. Consideration of joint
design and welding metallurgy. Linear and angular
measurement, measuring standards, Datum
surfaces, marking out, surface development, cutting
and bending. Limits and fits, limits gauges, slip
gauges, inter-changeability.

10. Computer Aided Design and Manufacturing (2 weeks)
Applications in assembly and metal cutting and
forming, advantages and limitations, axis
nomenclature, control systems, data input, tool
offsets, Tool Library, Cutting feeds and speeds, part
programming, cutter compensation, program
proofing. Concepts and application of Computer
Aided Manufacturing (CAM) software programs for
creating CNC milling machine part programs.

Evaluation Methods:
Students will be evaluated based on Homework
Assignments spread throughout the semester (10%);
Lab Assignments to include manufacturing precise
components using universal and CNC lathe, mill,
waterjet and laser equipment (30%); traditional
and/or web-based Midterm Exam (20%) and Final
Exam (20%); and an open-ended Design Project
(20%).

(56) Request sent: 3/6/2017 at 7:30 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/7/2017 at 7:15 AM

Recipient Name: SCARLETT MILLER Department: School of Engr Design,
Technology and Prof Prgms
Position: Consultation Campus: UNIVERSITY PARK CAMPUS
Title: ASST PROF ENGR DESIGN

(54) Request sent: 2/27/2017 at 7:39 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: SVEN BILEN Department: School of Engr Design,
Technology and Prof Prgms
Position: Consultation Campus: UNIVERSITY PARK CAMPUS
Title: College Administrator Review

Recipient Name: Vlad Ivashyn
Department: (Not Available)
Position: College Administrator Review
Campus: (Not Available)

Request sent: 4/11/2017 at 5:47 PM
Concur: Yes
Comments: Extensive Consultations has Taken Place with All Offering Colleges and Campuses. Below is the list of Consultants that have concurred/approved the General Engineering Curriculum changes and EDSGN Course changes (new and modified):

*Penn State Altoona*
- Sohail Anwar (sxa15@psu.edu)
- Grant Risha (gar108@psu.edu)
- Jungwoo Ryoo (jrr65@psu.edu)
- Jennilyn Vallejera (jmv22@psu.edu)
- Berks Janelle Larson (bjl6@psu.edu)
- Dale Lithwhiler (dhl10@psu.edu)
- Rungun Nathan (rmn13@psu.edu)
- Terry Speicher (tss20@psu.edu)
- Erie Russell Warley (rwr27@psu.edu)
- Dipo Onipede (ouo1@psu.edu)
- Edward Evans (ere100@psu.edu)
- Thomas Hemminger (ths5@psu.edu)
- William Lasher (wcl2@psu.edu)
- David Loker (drl3@psu.edu)

*Penn State Harrisburg*
- Rafic Bachnak (rab65@psu.edu)
- Omid Ansary (aax8@psu.edu)
- AB Shafaye (mes121@psu.edu)
- Issam Abu-Mahfouz (iim2@psu.edu)
- Ameet Banerjee (aub25@psu.edu)
- Richard Ciocci (rci102@psu.edu)
- Abington Robert Avanzato (rala5@psu.edu)
- Marcus Besser (mpb20@psu.edu)
- Janice Margle (jmm8@psu.edu)
- Zafer Hatahet (zuh11@psu.edu)

*Penn State Brandywine*
- Asad Azemi (axa20@psu.edu)
- Ivan Esparragoza (iee1@psu.edu)
- Vlad Ivashyn (uxi1@psu.edu)

*Penn State DuBois*
- Douglas Miller (dmj290@psu.edu)
- Ramakrishnan Rajagopalan (rur12@psu.edu)
- Daudi Waryoba (dwr29@psu.edu)
- Pingjuan Werner (plu7@psu.edu)

*Penn State Great Valley*
- Kathryn Jablokow (kwl3@psu.edu)
- Sally Richmond (ssr315@psu.edu)
- Douglas Schumer (lbs376@psu.edu)
- James Nemes (jan16@psu.edu)

*Penn State Hazleton*
- Kenneth Dudeck (ked2@psu.edu)
- Wieslaw Grebksi (wxg3@psu.edu)
- Joseph Ranalli (jar339@psu.edu)

*Penn State University Park*
- Sven Bilen (sbg100@psu.edu)
- Karen Thole (kat18@psu.edu)
- Eric Marsh (erm7@psu.edu)
- Kultegin Aydin (aqx@psu.edu)
- David Salvia (dgs102@psu.edu)
- Jenis Terpeny (jpt5311@psu.edu)
<table>
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<th>Role</th>
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<th>Department</th>
<th>Position</th>
<th>Comments</th>
<th>Reviewed On</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head of Department</td>
<td>Sven Bilen</td>
<td>(Not Available)</td>
<td>Head of Department</td>
<td>[Not Yet Reviewed]</td>
<td>[Not Yet Reviewed]</td>
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<tr>
<td>SCCA Representative</td>
<td>Robert Melton</td>
<td>(Not Available)</td>
<td>SCCA Representative</td>
<td>[Not Yet Reviewed]</td>
<td>[Not Yet Reviewed]</td>
</tr>
<tr>
<td>Dean of the College</td>
<td>Peter Butler</td>
<td>(Not Available)</td>
<td>Dean of the College</td>
<td>[Not Yet Reviewed]</td>
<td>[Not Yet Reviewed]</td>
</tr>
<tr>
<td>SCCA Subcommittee Review</td>
<td>Cortney Smith</td>
<td>(Not Available)</td>
<td>SCCA Subcommittee Review</td>
<td>[Not Yet Reviewed]</td>
<td>[Not Yet Reviewed]</td>
</tr>
<tr>
<td></td>
<td>Kadi Corter</td>
<td>(Not Available)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Position: SCCA Subcommittee Review  
Campus: UNIVERSITY PARK CAMPUS

Recipient Name: ALLISON ALBINSKI  
Position: SCCA Subcommittee Review  
Campus: UNIVERSITY PARK CAMPUS

Request sent: 2/17/2017 at 2:02 PM
Concur: [Not Yet Reviewed]  
Comments: [Not Yet Reviewed]  
Reviewed On: [Not Yet Reviewed]

Recipient Name: CORTNEY SMITH  
Position: SCCA Review  
Campus: UNIVERSITY PARK CAMPUS

Concur: [Not Yet Reviewed]  
Comments: [Not Yet Reviewed]  
Reviewed On: [Not Yet Reviewed]

Recipient Name: KADI CORTER  
Position: SCCA Review  
Campus: UNIVERSITY PARK CAMPUS

Concur: [Not Yet Reviewed]  
Comments: [Not Yet Reviewed]  
Reviewed On: [Not Yet Reviewed]

Recipient Name: ALLISON ALBINSKI  
Position: SCCA Review  
Campus: UNIVERSITY PARK CAMPUS

Request sent: 2/17/2017 at 2:02 PM
Concur: [Not Yet Reviewed]  
Comments: [Not Yet Reviewed]  
Reviewed On: [Not Yet Reviewed]
Recipient Name: CORTNEY SMITH
Department: (Not Available)
Position: Faculty Senate Review
Campus: UNIVERSITY PARK CAMPUS
Title:

Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

Recipient Name: KADI CORTER
Department: (Not Available)
Position: Faculty Senate Review
Campus: UNIVERSITY PARK CAMPUS
Title:

Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

Recipient Name: ALLISON ALBINSKI
Department: (Not Available)
Position: Faculty Senate Review
Campus: UNIVERSITY PARK CAMPUS
Title:

Request sent: 2/17/2017 at 2:01 PM
Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]
SENATE COMMITTEE ON CURRICULAR AFFAIRS

COURSE SUBMISSION AND CONSULTATION FORM

Principal Faculty Member(s) Proposing Course

<table>
<thead>
<tr>
<th>Name</th>
<th>User ID</th>
<th>College</th>
<th>Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOUGLAS SCHUMER</td>
<td>dbs5376</td>
<td>Engineering (EN)</td>
<td>Not Available</td>
</tr>
<tr>
<td>ASAD AZEMI</td>
<td>AXA20</td>
<td>Engineering (EN)</td>
<td>Not Available</td>
</tr>
</tbody>
</table>

Academic Home: Engineering (EN)
Type of Proposal: Add □ □ Change □ □ Drop □

Course Designation
(EDSGN 403) Product Realization

Course Information

Cross-Listed Courses:

Prerequisites:
( EDSGN 402; IE 312 ) AND ( EE 316; ME 357 )

Corequisites:

Concurrents:
ENGR 490W

Recommended Preparations:

Abbreviated Title:
PROD REAL

Discipline:
None

Course Listing:

Special categories for Undergraduate (001-499) courses

Foundations

☐ Writing/Speaking (GWS)
☐ Quantification (GQ)

Knowledge Domains

☐ Health & Wellness (GHW)
☐ Natural Sciences (GN)
☐ Arts (GA)
☐ Humanities (GH)
☐ Social and Behavioral Sciences (GS)

Additional Designations

☐ Bachelor of Arts
☐ International Cultures (IL)
☐ United States Cultures (US)
☐ Honors Course
☐ Common course number - x94, x95, x96, x97, x99
☐ Writing Across the Curriculum

First-Year Engagement Program
First-Year Seminar

Miscellaneous

Common Course

GE Learning Objectives

- GenEd Learning Objective: Effective Communication
- GenEd Learning Objective: Creative Thinking
- GenEd Learning Objective: Crit & Analytical Think
- GenEd Learning Objective: Global Learning
- GenEd Learning Objective: Integrative Thinking
- GenEd Learning Objective: Key Literacies
- GenEd Learning Objective: Soc Resp & Ethic Reason

Bulletin Listing

Minimum Credits: 3
Maximum Credits: 3
Repeatable: NO
Department with Curricular Responsibility: School of Engr Design, Technology and Prof Prgrms (UPEN_SEDTP)
Effective Semester: Upon Approval
Travel Component: NO

Course Outline

A brief outline or overview of the course content:
This course provides students with practical experience implementing the design process in the broader context of product development. It incorporates analytical tools, a team experience, and hands-on laboratory experience in covering all stages of the process, including conceptual design, detail design, prototyping, material and process selection, production, and product evaluation.

A listing of the major topics to be covered with an approximate length of time allotted for their discussion:
- New product design and development process (1 week)
- Concept generation (2 weeks)
- Concept selection (2 weeks)
- Prototyping (2 weeks)
- Detail design (2 weeks)
- Material and process selection (1 week)
- Product evaluation (2 weeks)
- Project management (1 week)
- Computer aided design and computer aided manufacturing tools (2 weeks)

Course Description:
This course provides students with practical experience in the product design and development process. Computer aided design and a variety of related analytical tools are employed in team-oriented design activities. The course includes considerable in-class team interactions. Team progress will be monitored through weekly team check-ins, during which two project status communication tools will be reviewed – an updated GANTT Chart and a Weekly Project Activity Plan document. The hands-on design activities will culminate in the presentation and demonstration of a functioning engineering system. In working toward this goal, students will employ the following:
- Project management scheduling tools (GANTT chart or PERT chart)
- Formal brainstorming techniques (e.g., “6-3-5 Brainwriting,” Mind Maps)
- Generation of conceptual designs (e.g., morphological charts)
- Deterministic design tradeoff techniques (House of Quality)
- Programmable fabrication equipment; this will include:
  - One additive manufacturing technique (3D printing)
  - Subtractive manufacturing techniques (CNC milling, water-jet, laser cutting).
- Verification testing in the context of design-build-test iterations

The name(s) of the faculty member(s) responsible for the development of the course:
- Name: DOUGLAS SCHUMER (dbs5376)
- Title:
- Phone:
- Address:
- Campus: GV
- City:
Instructional, Educational, and Course Objectives:
This section should define what the student is expected to learn and what skills the student will develop.
The course supports the Multidisciplinary Engineering Design (MDE) option of the General Engineering program by addressing the following objectives for enrolled students:

• Develop proficiency in design engineering skills and methodologies, and an understanding of their importance, including:
  - Project management tools
  - Product design tools

• Gain direct experience with the design process on a multidisciplinary team project.

• Build trust in the power of collaboration and teamwork.

• Develop an appreciation of product design as an example of systems engineering, including global, societal, ethical, economic, and environmental considerations.

• Gain expertise in professional communications, both oral and written.

• Gain an experiential understanding that iteration is an intrinsic aspect at several points in the course of solving engineering problems.

Required Text:

Evaluation Methods:
Include a statement that explains how the achievement of the educational objective identified above will be assessed. The procedures for determining students' grades should be specifically identified.
• Written assignments (15%)
• Oral presentations (10%)
• Instructor evaluation of participation (15%)
• In-class and take-home quizzes (15%)
• Two semester exams (15%)
• Team design/build project (30%)

Relationship/Linkage of Course to Other Courses:
This statement should relate the course to existing or proposed new courses. It should provide a rationale for the level of instruction, for any prerequisites that may be specified, or for the course's role as a prerequisite for other courses.
• EDSGN 100 (prerequisite for EDSGN 401) and EE 316 are important prerequisites for providing basic background knowledge of the engineering design process and microelectronics, which may be used in specific design projects.
  We have included ME 357 as an acceptable alternative to accommodate transfer students from University Park.
• EDSGN 401 (prerequisite for EDSGN 402) provides background on the systemic nature of engineering design, which is key in developing new engineering products and systems.
• EDSGN 402 provides important background knowledge relating to materials selection and manufacturing process choices in design.
  We have included IE 312 as an acceptable alternative to accommodate transfer students from University Park.
• This course supplements and reinforces the product development process provided in Senior Design I, ENGR 490W, using the same nomenclature.
• This course is also used as a foundation for the team project in Senior Design II, ENGR 491W.

Relationship of Course to Major, Option, Minor, or General Education:
This statement should explain how the course will contribute to the major, option, or minor and indicate how it may function as a service course for other departments.

This course is central to the fundamental mission of the GE-MDE program in the following ways:

- Develops product design skills and best practices
- Provides context for product design within the broader process of new product development.

A description of any special facilities:
- Online, self-paced teaching modules for instruction of CAD and CAM
- Fabrication Lab

Frequency of Offering and Enrollment:
The course will be offered once per year, either in Fall or Spring semester, with an expected enrollment of 10 to 20 students.

### Campuses That Have Offered ( ) Over The Past 4 Years

| semester | AB | AL | BK | BR | BW | CR | DS | ER | FE | GA | GV | HB | HN | HY | LV | MA | NK | PC | SL | UP | WB | WC | WS | XC | XP | XS | YK |
|----------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|

### Review History

This section represents all consultation history that has occurred on this proposal

Legend

- ![Approve](image)
- ![Rejected](image)
- ![Waiting Review](image)
- ![User Action Required](image)
- ![Pending Action(s)](image)
- ![Moved to Rejected Status](image)
- ![Approved](image)
- ![# - Review Order Sequence Number](image)

Consultation

- **Recipient Name:** JANICE MARGLE
  - Department: Abington College (Pre-Major)
  - Campus: ABINGTON CAMPUS
  - Request sent: 2/15/2017 at 8:27 AM
  - Concur: Yes
  - Comments:
  - Reviewed On: 2/16/2017 at 6:18 PM

- **Recipient Name:** MARCUS BESSER
  - Department: Abington College (Pre-Major)
  - Campus: ABINGTON CAMPUS
  - Request sent: 2/15/2017 at 8:27 AM
  - Concur: Yes
  - Comments:
  - Reviewed On: 2/15/2017 at 2:28 PM

- **Recipient Name:** ROBERT AVANZATO
  - Department: (Not Available)
  - Campus: ABINGTON CAMPUS
  - Request sent: 2/15/2017 at 8:27 AM
  - Concur: Yes
  - Comments:
  - Reviewed On: 2/15/2017 at 2:28 PM
Request sent: 2/15/2017 at 8:27 AM
Concur: Yes
Comments:
Reviewed On: 2/24/2017 at 9:45 AM

Recipient Name: ZAFER HATAHET
Department: Abington College (Pre-Major)
Position: Consultation
Campus: ABINGTON CAMPUS
Title: DIV HEAD SCI & ENGINEER

Request sent: 2/27/2017 at 7:41 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: GRANT ALEXANDER
Position: Consultation
Campus: (Not Available)
Title: PROF OF MECH.ENG RG

Recipient Name: JENNILYN VALLEJERA
Department: Business And Engineering
Position: Consultation
Campus: ALTOONA CAMPUS
Title: INSTRUCTOR IN ENGINEERING

Request sent: 2/27/2017 at 7:35 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: JUNGWOO RYOO
Department: Business And Engineering
Position: Consultation
Campus: ALTOONA CAMPUS
Title: PROFESSOR OF INFOSCI/TECH

Request sent: 2/27/2017 at 7:35 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/2/2017 at 7:15 AM
Recipient Name: SOHAIL ANWAR
Department: PROF ENGINEERING
Position: Consultation
Campus: (Not Available)
Title: PROF ENGINEERING

Request sent: 2/27/2017 at 7:39 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: DALE HENRY LITWHILER
Department: Engineering, Business and Human Development
Position: Consultation
Campus: BERKS CAMPUS
Title: ASSOC PROF ENGINEERING

Request sent: 2/27/2017 at 7:32 AM
Concur: Yes
Comments:
Reviewed On: 2/28/2017 at 10:40 PM

Recipient Name: JANELLE LARSON
Department: Engineering, Business and Human Development
Position: Consultation
Campus: BERKS CAMPUS
Title: ASSOC PROF

Request sent: 2/27/2017 at 7:34 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: RUNGUN NATHAN
Department: Engineering, Business and Human Development
Position: Consultation
Campus: BERKS CAMPUS
Title: ASSOC PROF ENGINEERING

Request sent: 2/27/2017 at 7:38 AM
Concur: No, this proposal needs significant changes
Comments: ENGR 402 and hence ENGR 401 have to be completed to take this course. The concurrent course ENGR 490W is the first of the two capstone design courses. This will require that the student take ENGR 401 in junior first semester, ENGR 402 in junior second semester and then can fit in ENGR 403 in the senior first semester OR senior second semester. I do see that the RAP for multidisciplinary option does list ENGR 401 as a junior first semester course. It may worth considering ENGR 401 (renumbered ENGR 301) and ENGR 402 (renumbered ENGR 302) to be 300 level courses to be taken in the junior year. This will fit well with the schemes of 100 level being freshmen, 200 - sophomore, 300 - junior and 400 for seniors. The current RAP does not have EE 316 as a required course in the program (I do see the EE 310 listed) Looks like ENGR 401,402 and 403 are a sequence, but what courses would students have to NOT take to be able to take this sequence.
Reviewed On: 2/27/2017 at 7:10 PM
Initiator Comments: Thank you for your comment and recommendation. We would like to bring your attention to the following two points, (1) as far as we are aware there is no set requirement that a 400 level course cannot be taken/offered during the junior
(2) the general engineering (MDE-Option) is in its fifth year and this is the first time we have been able to develop and introduce new courses in the program. By having 400 level courses we are giving the program the flexibility of offering the courses during the junior and senior year, and dropping or changing the 400 level courses without going below the required number of 400 level courses for the program. Again, thank you for your recommendations, we will discuss them in our curriculum committee for future changes in the program.

| Request sent: | 3/2/2017 at 12:20 AM |
| Concur: | Yes |
| Comments: | Thanks Asad for the detailed explanation on the EDSGN 401-402-403 sequence. I am glad you clarified my questions. I still feel that we should try and stick to 400 level for senior classes. As explained to me, EE 316 is being added to the RAP as part of this package of curriculum changes. |
| Reviewed On: | 3/6/2017 at 5:32 PM |

Recipient Name: TERRY SPEICHER  
Department: School of Engr Technology and Commonwealth Engr  
Position: Consultation  
Campus: BERKS CAMPUS  
Title: ASST PROF ENGINEERING

| Request sent: | 2/15/2017 at 8:27 AM |
| Concur: | Yes |
| Comments: |  |
| Reviewed On: | 2/16/2017 at 3:20 PM |

Recipient Name: ASAD AZEMI  
Department: School of Engr Technology and Commonwealth Engr  
Position: Consultation  
Campus: BRANDEYWINE CAMPUS  
Title: ASSOC PROF ENGINEERING

| Request sent: | 2/15/2017 at 8:27 AM |
| Concur: | Yes |
| Comments: |  |
| Reviewed On: | 2/15/2017 at 10:32 AM |

Recipient Name: IVAN ESPARRAGOZA  
Department: UC Engineering  
Position: Consultation  
Campus: BRANDEYWINE CAMPUS  
Title: ASSOC PROF ENGINEERING

| Request sent: | 2/15/2017 at 8:27 AM |
| Concur: | Yes |
| Comments: |  |
| Reviewed On: | 2/15/2017 at 2:19 PM |

Recipient Name: ULADZISLAU IVASHYN  
Department: School of Engr Technology and Commonwealth Engr  
Position: Consultation  
Campus: BRANDEYWINE CAMPUS  
Title: ASSOC PROF ENGINEERING
Title: ENGINEERING

Request sent: 2/27/2017 at 7:40 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: DAUDI WARYOBA
Department: School of Engr Technology and Commonwealth Engr
Position: Consultation
Title: ASST PROF / ENGINEERING
Campus: DUBOIS CAMPUS

Request sent: 2/27/2017 at 7:33 AM
Concur: Yes
Comments:
Reviewed On: 2/28/2017 at 3:56 PM

Recipient Name: DOUGLAS MILLER
Department: (Not Available)
Position: Consultation
Title: INSTRUCTOR
Campus: DUBOIS CAMPUS

Request sent: 2/27/2017 at 7:32 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: PINGJUAN WERNER
Department: UC University College (Pre-Major)
Position: Consultation
Title: PROF ENGINEERING
Campus: DUBOIS CAMPUS

Request sent: 2/27/2017 at 7:38 AM
Concur: Yes
Comments:
Reviewed On: 2/27/2017 at 9:09 AM

Recipient Name: RAMAKRISHNAN RAJAGOPALAN
Department: UC Engineering
Position: Consultation
Title: RES ASSOC & ASST. PROF
Campus: DUBOIS CAMPUS

Request sent: 2/27/2017 at 7:39 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/2/2017 at 7:15 AM
Recipient Name: CHENG DONG  Department: Biomedical Engineering
Position: Consultation  Campus: UNIVERSITY PARK CAMPUS
Title: DEPT HEAD/DIST. PROF BIO

Request sent: 2/15/2017 at 8:27 AM  Concur: Yes  Comments:
Reviewed On: 2/16/2017 at 3:53 PM

Recipient Name: JOHN HANNAN  Department: Computer Science And Engineering
Position: Consultation  Campus: UNIVERSITY PARK CAMPUS
Title: ASC HEAD CMPSCI&ENG

Request sent: 2/15/2017 at 8:27 AM  Concur: Yes  Comments:
Reviewed On: 2/15/2017 at 3:07 PM

Recipient Name: JUDITH TODD  Department: Engineering Science And Mechanics
Position: Consultation  Campus: UNIVERSITY PARK CAMPUS
Title: HEAD/PROF ESM

Request sent: 2/15/2017 at 8:27 AM  Concur: Yes  Comments:
Reviewed On: 2/20/2017 at 11:52 AM

Recipient Name: M PARFITT  Department: Architectural Engineering
Position: Consultation  Campus: UNIVERSITY PARK CAMPUS
Title: PROFESSOR ARCH ENGR

Request sent: 2/27/2017 at 7:37 AM  Concur: Yes  Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: PATRICK FOX  Department: Civil And Environmental Engineering
Position: Consultation  Campus: UNIVERSITY PARK CAMPUS
Title: PROF AND DEPT HEAD

Request sent: 2/15/2017 at 8:27 AM  Concur: Yes  Comments:
Recipient Name: **PAUL HEINEMANN**  
Department: Agricultural And Biological Engineering  
Position: Consultation  
Campus: UNIVERSITY PARK CAMPUS  
Title: DEPT HD/PROF AG & BIO ENG

Request sent: 2/15/2017 at 8:27 AM  
Concur: Yes  
Comments:  
Reviewed On: 2/15/2017 at 4:10 PM

Recipient Name: **PHILIP MORRIS**  
Department: Aerospace Engineering  
Position: Consultation  
Campus: UNIVERSITY PARK CAMPUS  
Title: BOEING PROFESSOR OF AERSP

Request sent: 2/27/2017 at 7:38 AM  
Concur: Yes  
Comments: (Completed By Default - Exceeded Time Limit)  
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: **PHILIP SAVAGE**  
Department: Chemical Engineering  
Position: Consultation  
Campus: UNIVERSITY PARK CAMPUS  
Title: PROF/DEPT HEAD CHEM ENGR

Request sent: 2/27/2017 at 7:37 AM  
Concur: Yes  
Comments: (Completed By Default - Exceeded Time Limit)  
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: **THOMAS F LAPORTA**  
Department: Computer Science And Engineering  
Position: Consultation  
Campus: UNIVERSITY PARK CAMPUS  
Title: LNHRDCHAIRPROF & DIR EECS

Request sent: 2/15/2017 at 8:27 AM  
Concur: Yes  
Comments:  
Reviewed On: 2/15/2017 at 4:48 PM

Recipient Name: **DAVID LOKER**  
Department: Engineering  
Position: Consultation  
Campus: PENN STATE ERIE, THE BEHREND COLLEGE  
Title: ASSOC PROF ENGR
(30) Request sent: 2/27/2017 at 7:33 AM
Concur: Yes
Comments: Reviewed On: 2/27/2017 at 12:16 PM

- **Recipient Name:** EDWARD EVANS
- **Department:** Engineering
- **Position:** Consultation
- **Campus:** PENN STATE ERIE, THE BEHREND COLLEGE
- **Title:** SR LECT ENGINEERING

(31) Request sent: 2/27/2017 at 7:33 AM
Concur: Yes
Comments: Reviewed On: 2/27/2017 at 1:23 PM

- **Recipient Name:** OLADIPO ONIPEDE
- **Department:** Engineering
- **Position:** Consultation
- **Campus:** PENN STATE ERIE, THE BEHREND COLLEGE
- **Title:** ASSOC PROF MECH_ENGR

(4) Request sent: 2/15/2017 at 8:27 AM
Concur: Yes
Comments: Reviewed On: 2/15/2017 at 8:53 AM

- **Recipient Name:** RUSSELL WARLEY
- **Department:** Engineering
- **Position:** Consultation
- **Campus:** PENN STATE ERIE, THE BEHREND COLLEGE
- **Title:** Interim Director, School of Engineering

(20) Request sent: 2/15/2017 at 8:27 AM
Concur: Yes
Comments: Reviewed On: 2/21/2017 at 8:30 AM

- **Recipient Name:** THOMAS HEMMINGER
- **Department:** Engineering
- **Position:** Consultation
- **Campus:** PENN STATE ERIE, THE BEHREND COLLEGE
- **Title:** PROFESSOR ELEC & COMP ENG

(47) Request sent: 2/27/2017 at 7:39 AM
Concur: Yes
Comments: Completed By Default - Exceeded Time Limit
Reviewed On: 3/2/2017 at 7:15 AM
Recipient Name: WILLIAM LASHER  Department: Engineering
Position: Consultation
Campus: PENN STATE ERIE, THE BEHREND COLLEGE
Title: PROFESSOR MECH ENG

Request sent: 2/15/2017 at 8:27 AM
Concur: Yes
Comments:
Reviewed On: 2/25/2017 at 3:12 PM

Recipient Name: DOUGLAS SCHUMER  Department: (Not Available)
Position: Consultation
Campus: PENN STATE GREAT VALLEY
Title: ASST PROF ENGINEERDESIGN

Request sent: 2/27/2017 at 7:32 AM
Concur: Yes
Comments:
Reviewed On: 2/27/2017 at 11:37 AM

Recipient Name: JAMES NEMES  Department: Data Analytics
Position: Consultation
Campus: PENN STATE GREAT VALLEY
Title: PROFESSOR & DAA

Request sent: 2/27/2017 at 7:34 AM
Concur: Yes
Comments:
Reviewed On: 2/27/2017 at 8:18 AM

Recipient Name: SALLY RICHMOND  Department: (Not Available)
Position: Consultation
Campus: PENN STATE GREAT VALLEY
Title: LECTURER IN INFO SCIENCE

Request sent: 2/15/2017 at 8:27 AM
Concur: Yes
Comments:
Reviewed On: 2/15/2017 at 3:26 PM

Recipient Name: AB Shafaye  Department: Science, Engineering And Technology
Position: Consultation
Campus: PENN STATE HARRISBURG, THE CAPITAL COLLEGE
Title: EE/EET Programs Chair

Request sent: 2/27/2017 at 7:36 AM
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</table>
Recipient Name: **RICHLARD CIOCCI**  
Department: Science, Engineering And Technology  
Position: Consultation  
Campus: PENN STATE HARRISBURG, THE CAPITAL COLLEGE  
Title: ASSOC PROF MECH ENG

**Request sent:** 2/27/2017 at 7:38 AM  
Concur: Yes  
Comments:  
Reviewed On: 2/27/2017 at 9:40 AM

Recipient Name: **JOSEPH RANALLI**  
Department: UC Engineering  
Position: Consultation  
Campus: HAZLETON CAMPUS  
Title: ASST PROF ASST PROF ENGR

**Request sent:** 2/15/2017 at 8:27 AM  
Concur: Yes  
Comments:  
Reviewed On: 2/15/2017 at 9:39 AM

Recipient Name: **KENNETH DUDECK**  
Department: UC Engineering  
Position: Consultation  
Campus: HAZLETON CAMPUS  
Title: ASSOC PROF ENGR

**Request sent:** 2/15/2017 at 8:27 AM  
Concur: Yes  
Comments:  
Reviewed On: 2/22/2017 at 10:39 AM

Recipient Name: **WIESLAW GREBSKI**  
Department: School of Engr Design, Technology and Prof Prgrms  
Position: Consultation  
Campus: HAZLETON CAMPUS  
Title: ASSOCIATE PROF

**Request sent:** 2/15/2017 at 8:27 AM  
Concur: Yes  
Comments:  
Reviewed On: 2/15/2017 at 8:50 AM

Recipient Name: **DAVID SALVIA**  
Department: Electrical Engineering  
Position: Consultation  
Campus: UNIVERSITY PARK CAMPUS  
Title: ASST PROF ELECT. ENGR.

**Request sent:** 2/15/2017 at 8:27 AM  
Concur: Yes  
Comments:
Recipient Name: **ERIC MARSH**  
Department: Mechanical Engineering  
Position: Consultation  
Campus: UNIVERSITY PARK CAMPUS  
Title: PROFESSOR OF MECH ENGR

Request sent: 2/15/2017 at 8:27 AM  
Concur: Yes  
Comments:  
Reviewed On: 2/15/2017 at 8:32 AM

Recipient Name: **JANIS TERPENNY**  
Department: Industrial And Manufacturing Engineering  
Position: Consultation  
Campus: UNIVERSITY PARK CAMPUS  
Title: DEPT HEAD & PROF INDUSTL

Request sent: 2/15/2017 at 8:27 AM  
Concur: Yes  
Comments: (Completed By Default - Exceeded Time Limit)  
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: **KAREN THOLE**  
Department: Mechanical Engineering  
Position: Consultation  
Campus: UNIVERSITY PARK CAMPUS  
Title: DEPT HEAD MNE

Request sent: 2/15/2017 at 8:27 AM  
Concur: Yes  
Comments:  
Reviewed On: 2/15/2017 at 2:06 PM

Recipient Name: **KULTEGIN AYDIN**  
Department: Electrical Engineering  
Position: Consultation  
Campus: UNIVERSITY PARK CAMPUS  
Title: DEPT HEAD/PROF ELECT ENGR

Request sent: 2/15/2017 at 8:27 AM  
Concur: Yes  
Comments:  
Reviewed On: 2/24/2017 at 4:42 PM

Recipient Name: **MATTHEW PARKINSON**  
Department: School of Engr Design, Technology and Prof Prgms  
Position: Consultation  
Campus: UNIVERSITY PARK CAMPUS  
Title: ASSOC PROF ENGR DESIGN
**Request sent:** 2/27/2017 at 7:36 AM  
**Concur:** Yes  
**Comments:** (Completed By Default - Exceeded Time Limit)  
**Reviewed On:** 3/2/2017 at 7:15 AM

**Recipient Name:** SCARLETT MILLER  
**Department:** School of Engr Design, Technology and Prof Pgrms  
**Position:** Consultation  
**Campus:** UNIVERSITY PARK CAMPUS  
**Title:** ASST PROF ENGR DESIGN

**Request sent:** 2/27/2017 at 7:39 AM  
**Concur:** Yes  
**Comments:** (Completed By Default - Exceeded Time Limit)  
**Reviewed On:** 3/2/2017 at 7:15 AM

**Recipient Name:** SVEN BILEN  
**Department:** School of Engr Design, Technology and Prof Pgrms  
**Position:** Consultation  
**Campus:** UNIVERSITY PARK CAMPUS  
**Title:** DEPT HEAD/SEDTAPP

**Request sent:** 2/15/2017 at 8:27 AM  
**Concur:** Yes  
**Comments:**  
**Reviewed On:** 2/24/2017 at 12:18 PM

College Administrator Review

**Recipient Name:** Douglas Schumer  
**Department:** (Not Available)  
**Position:** College Administrator Review  
**Campus:** (Not Available)  
**Title:**

**Request sent:** 4/11/2017 at 5:38 PM  
**Concur:** Yes  
**Comments:** Extensive Consultations has Taken Place with All Offering Colleges and Campuses. Below is the list of Consultants that have concurred/approved the General Engineering Curriculum changes and EDSGN Course changes (new and modified):  
*Penn State Altoona*  
Sohail Anwar (sxa15@psu.edu)  
Grant Risha (gar108@psu.edu)  
Jungwoo Ryoo (jxr65@psu.edu)  
Jennilyn Vallejera (jmv22@psu.edu)  
Berks Janelle Larson (jbl6@psu.edu)  
Dale Lithwiler (dh10@psu.edu)  
Rungun Nathan (rnm13@psu.edu)  
Terry Speicher (tls20@psu.edu)  
Erie Russ Warley (rlw27@psu.edu)  
Dipo Onipede (ouo1@psu.edu)  
Edward Evans (ere100@psu.edu)  
Thomas Hemminger (th56@psu.edu)  
William Lasher (wcl2@psu.edu)  
David Loker (drl3@psu.edu)  
*Penn State Harrisburg*  
Rafic Bachnak (rab65@psu.edu)  
Omid Ansary (axa8@psu.edu)  
AB Shafaye (mes121@psu.edu)  
Issam Abu-Mahfouz (iaa2@psu.edu)
Head of Department

Recipient Name: Sven Bilen
Department: (Not Available)
Campus: UNIVERSITY PARK CAMPUS

SCCA Representative

Recipient Name: Ling Rothrock
Department: (Not Available)
Campus: UNIVERSITY PARK CAMPUS

Dean of the College

Recipient Name: Peter Butler
Department: (Not Available)
Campus: UNIVERSITY PARK CAMPUS
<table>
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<tr>
<td>CORTNEY SMITH</td>
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<tr>
<td>KADI CORTER</td>
<td>(Not Available)</td>
<td>UNIVERSITY PARK CAMPUS</td>
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<tr>
<td>ALLISON ALBINSKI</td>
<td>(Not Available)</td>
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<td>CORTNEY SMITH</td>
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<td>KADI CORTER</td>
<td>(Not Available)</td>
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**SCCA Subcommittee Review**

**SCCA Review**
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**Recipient Name:** ALLISON ALBINSKI
**Position:** SCCA Review
**Campus:** UNIVERSITY PARK CAMPUS

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**Faculty Senate Review**

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**Recipient Name:** CORTNEY SMITH
**Position:** Faculty Senate Review
**Campus:** UNIVERSITY PARK CAMPUS

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**Recipient Name:** KADI CORTER
**Position:** Faculty Senate Review
**Campus:** UNIVERSITY PARK CAMPUS

| Concur: | [Not Yet Reviewed] |
| Comments: | [Not Yet Reviewed] |
| Reviewed On: | [Not Yet Reviewed] |

**Recipient Name:** ALLISON ALBINSKI
**Position:** Faculty Senate Review
**Campus:** UNIVERSITY PARK CAMPUS

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Curricular Information

Blue Sheet Item #:
Review Date:

**SCRID Numbers**

(EDSGN 403):
SENATE COMMITTEE ON CURRICULAR AFFAIRS
COURSE SUBMISSION AND CONSULTATION FORM

Principal Faculty Member(s) Proposing Course

<table>
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<tr>
<th>Name</th>
<th>User ID</th>
<th>College</th>
<th>Department</th>
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<tbody>
<tr>
<td>ROBERT AVANZATO</td>
<td>RLA5</td>
<td>Abington College (AB)</td>
<td>Not Available</td>
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Academic Home: Engineering (EN)

Type of Proposal: [ ] Add  [x] Change  [ ] Drop

☐ I am requesting recertification of this course for the new Gen Ed and/or University Requirements Guidelines?

Course Designation

(EDSGN 410) Robotics Design and Applications

Course Information

Special categories for Undergraduate (001-499) courses

Foundations

☐ Writing/Speaking (GWS)
☐ Quantification (GQ)

Knowledge Domains

☐ Health & Wellness (GHW)
☐ Natural Sciences (GN)
☐ Arts (GA)
☐ Humanities (GH)
☐ Social and Behavioral Sciences (GS)

Additional Designations

☐ Bachelor of Arts
☐ International Cultures (IL)
☐ United States Cultures (US)
☐ Honors Course
☐ Common course number - x94, x95, x96, x97, x99
☐ Writing Across the Curriculum

First-Year Engagement Program

☐ First-Year Seminar

Miscellaneous

☐ Common Course

GE Learning Objectives

☐ GenEd Learning Objective: Effective Communication
☐ GenEd Learning Objective: Creative Thinking
☐ GenEd Learning Objective: Crit & Analytical Think
☐ GenEd Learning Objective: Global Learning
☐ GenEd Learning Objective: Integrative Thinking
☐ GenEd Learning Objective: Key Literacies
☐ GenEd Learning Objective: Soc Resp & Ethic Reason
Cross-Listed Courses:

Prerequisites:
( EE 316; CMPEN 472 ) AND ( CMPSC 200; CMPSC 201; CMPSC 121 ) AND ( EE 310 ) AND ( EMCH 212 )

Corequisites:

Concurrents:

Recommended Preparations:

Abbreviated Title: Robot Dsgn & Appl

Bulletin Listing
Minimum Credits: 4
Maximum Credits: 4
Repeatable: NO

Department with Curricular Responsibility: School of Engr Technology and Commonwealth Engr (UPEN_SETCE)
Effective Semester: FA 2017
Travel Component: NO

Course Outline

A brief outline or overview of the course content:
The course includes a discussion of applications of robotics in such areas as manufacturing, science, transportation, military, health care, and entertainment. Students will apply the basic concepts of electrical, mechanical, and software technologies to analyze and design a robotics system to achieve a particular task or set of tasks. Students will be introduced to mechanical systems analysis, sensors, software development, electrical systems, control, testing, prototyping, design and simulation of robot systems. This course is project-based and will have a substantial laboratory component supporting team-based multidisciplinary design, integration and testing of a robot system.

A listing of the major topics to be covered with an approximate length of time allotted for their discussion:
1. Introduction to robotics and real-world applications (1 week)
2. Effectors and actuators (1 week)
3. Motors, gear mechanisms (1 week)
4. 2D kinematics (example: wheeled kinematics) (1 week)
5. Power systems (1 week)
6. Sensors (1 week)
7. Microcontroller interfacing (1.5 week)
8. Software design and testing for an embedded system (1.5 week)
9. Software simulation and modeling of a robot system using CAD (ie, AutoCAD, Solidworks, etc) (1 week)
10. Introduction to robot intelligence, artificial intelligence and vision (1 week)
11. Design and system integration process; team presentations (4 weeks)

Course Description:
Introduction to robotics, with emphasis on the design of robotics systems through multidisciplinary integration of electrical, mechanical, and software components. EDSGN 410 Robotics Design and Applications (4) The objective of this course is to apply the basic concepts of electrical, mechanical, and software technologies to analyze, design and test a robotics system. This course will draw from skills in prior coursework in electricity and electronics, statics and dynamics, and software design. The course includes a discussion of present applications and future directions of robotics in such areas as manufacturing, science, transportation, military, healthcare, and entertainment. Students will be introduced to mechanical systems analysis, sensors, software development, electrical systems, control algorithms, testing, prototyping, design, modeling, and simulation of robot systems. Students will work in teams to design and prototype a robot to perform a task and to satisfy a set of design requirements. Professional communication and documentation will be included in the course experience. This course is a multi-disciplinary, project-based course and will have a substantial laboratory component supporting team-based design, integration and testing of a robot system.

The name(s) of the faculty member(s) responsible for the development of the course:
Name: ROBERT AVANZATO (RLAS)
Title: ASSOC PROF ENGINEERING
Phone: +1 215 881 7358
Address: 119 SUTHERLAND BUILDING
Campus:
City:
Fax:
Course Justification

Instructional, Educational, and Course Objectives:
This section should define what the student is expected to learn and what skills the student will develop.
Outcomes: Students completing this course will be able to:
1. Communicate the present and future role of robotics in a variety of application areas in industry and for society in general.
2. Evaluate, test, and interface sensors to a robot system.
3. Develop a 2D kinematic analysis of a subsystem of the robot system mechanics (example: kinematics of a wheeled mobile robot).
4. Calculate the power requirements and create a circuit diagram for the power and control system of a robot system.
5. Create a CAD model and simulation of a subsystem of a robotics system.
6. Design, program, and test software for a robot system.
7. Design, prototype, test, document a complete robotics system to meet a set of design requirements.
8. Work collaboratively in a team to achieve engineering design goals.

Evaluation Methods:
Include a statement that explains how the achievement of the educational objective identified above will be assessed. The procedures for determining students' grades should be specifically identified.
Achievement of educational outcomes will be through evaluation of written work, laboratory skills, oral presentations, and design projects. Achievement of each educational outcome will be defined through simple rubrics that directly correlate student performance to level of achievement, based upon a traditional point grading scheme.
A recommended point grading scheme follows:
Homework 10%
Semester exams (2) 30%
Laboratory Assignments 30%
Design project 30%

Relationship/Linkage of Course to Other Courses:
This statement should relate the course to existing or proposed new courses. It should provide a rationale for the level of instruction, for any prerequisites that may be specified, or for the course's role as a prerequisite for other courses.
This course is multidisciplinary in nature will integrate skills obtained in coursework in electricity and electronics (EE 210), dynamics (E MCH 212), and software design (CMPSC 201 or CMPSC 121), which serve as prerequisites. There are two existing, robotics-related courses offered in the College of Engineering: 1) ME 456 (IE 456) Industrial Robot Applications (3), and 2) EE 483 Introduction to Automation and Robotics Systems (3). ME 456 lists prerequisites of MATH 220; MATH 250 or MATH 251; I E 305 or M E 360; CMPSC 200 or CMPSC 201. The prerequisite for EE 483 is EE 481 Control Systems (4).
It was determined that 1) neither ME 456 nor EE 483 were designed focused, 2) neither course contained a significant laboratory experience, and 3) the prerequisites courses for ME 456 (specifically EE 481) and the prerequisites for EE 483 (specifically I E 305 or M E 360) could not be readily satisfied in the GE MED degree track and these prerequisites were not compatible with the MED track theme. Based on these limitations, it was necessary to propose a new robotics course to satisfy the requirements of the GE MED track.

Relationship of Course to Major, Option, Minor, or General Education:
This statement should explain how the course will contribute to the major, option, or minor and indicate how it may function as a service course for other departments.
This course is a core C-required, upper-division course for the General Engineering, Multidisciplinary Engineering Design with emphasis on design with a multidisciplinary approach. This senior level course will be offered at Abington, Brandywine or Great Valley. It has a significant, hands-on laboratory component. It is not likely that this course will function as a service course for other departments.

A description of any special facilities:
The course requires access to 20-24 computer workstations with specialized robotic software. Workspace similar to that provided in EDSGN 100 is need for 10 to 12 work-groups. Special robotic hardware and software will be needed, as defined by the course instructor based upon the direction of robotic design chosen by the instructor. No special facilities other than traditional engineering laboratory with computer workstations and project workspace, are required for this course.

Frequency of Offering and Enrollment:
The course will be offered once per year, either Fall or Spring semester, with an expected enrollment of 15 to 25 students.

Justification for Changing The Proposal:
Include a justification for each change to the course. Particular attention should be paid to the effects of the course change within the discipline and in other disciplines where the course may be required within a major or used as a service course. When a unit submits several course changes, with or without new course proposals, a general statement covering the programmatic effects of the changes should be submitted.
We are requesting 2 changes in the prerequisites for EDSGN 410 only. There are no requested changes in the description, objectives or content of the course.
1) Add EE 316, Introduction to Embedded Controllers (3), as an alternative to CMPEN 472. The justification for this change is that we are removing CMPEN 331 from the MDE option curriculum and CMPEN 331 was a prerequisite for CMPEN 472. EE 316 is an equivalent course with less emphasis on low-level computer architecture and offers a treatment of microcontrollers and embedded systems that is academically appropriate for EDSGN 410.
We are keeping CMPEN 472 to accommodate potential transfer students who have taken the course.
2) Adding CMPSC 200 (3) to the existing list of prerequisites for EDSGN 410. The proposed list of computer science course prerequisites will be CMPSC 121 or CMPSC 201 or CMPSC 200. The justification for this change is that CMPSC 200 (MATLAB programming) covers the necessary programming skills to achieve academic success in EDSGN 410. Basic programming concepts covered in any of the 3 programming courses of CMPSC 121 (Python), CMPSC 201 (C++ & MATLAB) or CMPSC 200 (MATLAB), which include algorithm development, control structures, functions and arrays in a procedure-oriented language is sufficient background for success in EDSGN 410.

General Education Designation Requirements

Campuses That Have Offered (EDSGN 410) Over The Past 4 Years

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Review History

This section represents all consultation history that has occurred on this proposal

Legend

- Approve
- Rejected
- Waiting Review
- User Action Required
- Pending Action(s)
- Moved to Rejected Status
- Approved
- (#) - Review Order Sequence Number

Consultation

Recipient Name: JANICE MARGLE
Position: Consultation
Campus: ABINGTON CAMPUS
Title: ASSOC PROF ENGINEERING

Request sent: 2/15/2017 at 8:34 AM
Concur: Yes
Comments:
Reviewed On: 2/16/2017 at 6:19 PM

Recipient Name: MARCUS BESSER
Position: Consultation
Campus: ABINGTON CAMPUS
Title: ASSOC PROF M ENGINEERING

Request sent: 2/15/2017 at 8:34 AM
Concur: Yes
Comments:
Reviewed On: 2/15/2017 at 2:06 PM

Recipient Name: ROBERT AVANZATO
Position: Consultation
Campus: ABINGTON CAMPUS
Title: ASSOC PROF ENGINEERING

Request sent: 2/15/2017 at 8:34 AM
Concur: Yes
Comments:
Reviewed On: 2/15/2017 at 2:06 PM
(35) Request sent: 2/27/2017 at 7:38 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: ZAFER HATAHET
Department: Abington College (Pre-Major)
Position: Consultation
Campus: ABINGTON CAMPUS
Title: DIV HEAD SCI & ENGINEER

(36) Request sent: 2/27/2017 at 7:41 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: GRANT ALEXANDER RISHA
Department: (Not Available)
Position: Consultation
Campus: (Not Available)
Title: PROF OF MECH.ENGRG

(37) Request sent: 2/27/2017 at 7:34 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: JENNILYN VALLEJERA
Department: Business And Engineering
Position: Consultation
Campus: ALTOONA CAMPUS
Title: INSTRUCTOR IN ENGINEERING

(32) Request sent: 2/27/2017 at 7:35 AM
Concur: Yes
Comments: 
Reviewed On: 2/28/2017 at 10:33 AM

Recipient Name: JUNGWOO RYOO
Department: Business And Engineering
Position: Consultation
Campus: ALTOONA CAMPUS
Title: PROFESSOR OF INFOSCI/TECH

(38) Request sent: 2/27/2017 at 7:35 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: SOHAIL ANWAR
Department: (Not Available)
Title: PROF ENGINEERING
Position: Consultation
Campus: (Not Available)

(39) Request sent: 2/27/2017 at 7:39 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: DALE HENRY LITWHILER
Department: Engineering, Business and Human Development
Position: Consultation
Campus: BERKS CAMPUS
Title: ASSOC PROF ENGINEERING

(34) Request sent: 2/27/2017 at 7:32 AM
Concur: Yes
Comments:
Reviewed On: 2/28/2017 at 10:40 PM

Recipient Name: JANELLE LARSON
Department: Engineering, Business and Human Development
Position: Consultation
Campus: BERKS CAMPUS
Title: ASSOC PROF

(40) Request sent: 2/27/2017 at 7:34 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: RUNGUN NATHAN
Department: Engineering, Business and Human Development
Position: Consultation
Campus: BERKS CAMPUS
Title: ASSOC PROF ENGINEERING

(31) Request sent: 2/27/2017 at 7:38 AM
Concur: No, this proposal needs significant changes
Comments: Is there a reason DH parameters are not included? Also I am wondering why inverse kinematics, and robot dynamics are not listed in the topics. These are important topics and could be at least introduced as part of the 2D problems.
Reviewed On: 2/27/2017 at 6:37 PM

Initiator Comments: The only changes contained in this current proposal are the changes to the prerequisites. The CMPEN 472 microprocessors course prerequisite is changing to EE 316 Introduction to Embedded Controllers, and we are adding CMPSC 200. We are not considering course topic changes in this proposal.

(56) Request sent: 3/6/2017 at 4:54 PM
Concur: Yes
Comments: I still feel a robotics course without DH representation is a bit strange
Reviewed On: 3/6/2017 at 5:27 PM
Recipient Name: TERRY SPEICHER  Department: School of Engr Technology and Commonwealth Engr
Position: Consultation  Campus: BERKS CAMPUS
Title: ASST PROF ENGINEERING

Request sent: 2/15/2017 at 8:34 AM
Concur: Yes
Comments:
Reviewed On: 2/16/2017 at 3:16 PM

Recipient Name: ASAD AZEMI  Department: School of Engr Technology and Commonwealth Engr
Position: Consultation  Campus: BRANDYWINE CAMPUS
Title: ASSOC PROF ENGINEERING

Request sent: 2/15/2017 at 8:34 AM
Concur: Yes
Comments:
Reviewed On: 2/15/2017 at 10:28 AM

Recipient Name: IVAN ESPARRAGOZA  Department: UC Engineering
Position: Consultation  Campus: BRANDYWINE CAMPUS
Title: ASSOC PROF ENGINEERING

Request sent: 2/15/2017 at 8:34 AM
Concur: Yes
Comments:
Reviewed On: 2/15/2017 at 2:23 PM

Recipient Name: ULADZISLAU IVASHYN  Department: School of Engr Technology and Commonwealth Engr
Position: Consultation  Campus: BRANDYWINE CAMPUS
Title: ENGINEERING

Request sent: 2/27/2017 at 7:40 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: DAUDI WARYOBA  Department: School of Engr Technology and Commonwealth Engr
Position: Consultation  Campus: DUBOIS CAMPUS
Title: ASST PROF / ENGINEERING
Recipient Name: **DOUGLAS MILLER**  
Department: (Not Available)  
Position: Consultation  
Campus: DUBOIS CAMPUS  
Title: INSTRUCTOR

Recipient Name: **PINGJUAN WERNER**  
Department: UC University College (Pre-Major)  
Position: Consultation  
Campus: DUBOIS CAMPUS  
Title: PROF ENGINEERING

Recipient Name: **RAMAKRISHNAN RAJAGOPALAN**  
Department: UC Engineering  
Position: Consultation  
Campus: DUBOIS CAMPUS  
Title: RES ASSOC & ASST. PROF

Recipient Name: **CHENG DONG**  
Department: Biomedical Engineering  
Position: Consultation  
Campus: UNIVERSITY PARK CAMPUS  
Title: DEPT HEAD/DIST. PROF BIO

Recipient Name: **JOHN HANNAN**  
Department: Computer Science And Engineering  
Position: Consultation  
Campus: UNIVERSITY PARK CAMPUS
Title: ASC HEAD CMPSCI&ENG

Request sent: 2/15/2017 at 8:34 AM
Concur: Yes
Comments:
Reviewed On: 2/15/2017 at 2:56 PM

Recipient Name: Judith Todd
Department: Engineering Science And Mechanics
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: HEAD/PROF ESM

Request sent: 2/15/2017 at 8:34 AM
Concur: Yes
Comments:
Reviewed On: 2/20/2017 at 11:52 AM

Recipient Name: M Parfitt
Department: Architectural Engineering
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: PROFESSOR ARCH ENGR

Request sent: 2/27/2017 at 7:37 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: Patrick Fox
Department: Civil And Environmental Engineering
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: PROF AND DEPT HEAD

Request sent: 2/15/2017 at 8:34 AM
Concur: Yes
Comments:
Reviewed On: 2/15/2017 at 8:43 AM

Recipient Name: Paul Heinemann
Department: Agricultural And Biological Engineering
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: DEPT HD/PROF AG & BIO ENG

Request sent: 2/15/2017 at 8:34 AM
Concur: Yes
Comments:
Reviewed On: 2/15/2017 at 4:12 PM
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<tr>
<td>PHILIP MORRIS</td>
<td>Consultation</td>
<td>Aerospace Engineering</td>
<td>UNIVERSITY PARK CAMPUS</td>
<td>BOEING PROFESSOR OF AERSP</td>
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<td>PHILIP SAVAGE</td>
<td>Consultation</td>
<td>Chemical Engineering</td>
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<td>THOMAS F LAPORTA</td>
<td>Consultation</td>
<td>Computer Science And Engineering</td>
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<td>DAVID LOKER</td>
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<td>Engineering</td>
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<td>ASSOC PROF ENGR</td>
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<td>EDWARD EVANS</td>
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<td>Engineering</td>
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Recipient Name: OLADIPO ONIPEDE
Position: Consultation
Department: Engineering
Campus: PENN STATE ERIE, THE BEHREND COLLEGE
Title: ASSOC PROF MECH_ENGR

Request sent: 2/27/2017 at 7:37 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: RUSSELL WARLEY
Position: Consultation
Department: Engineering
Campus: PENN STATE ERIE, THE BEHREND COLLEGE
Title: Interim Director, School of Engineering

Request sent: 2/15/2017 at 8:34 AM
Concur: Yes
Comments:
Reviewed On: 2/21/2017 at 8:33 AM

Recipient Name: THOMAS HEMMINGER
Position: Consultation
Department: Engineering
Campus: PENN STATE ERIE, THE BEHREND COLLEGE
Title: PROFESSOR ELEC & COMP ENG

Request sent: 2/27/2017 at 7:39 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: WILLIAM LASHER
Position: Consultation
Department: Engineering
Campus: PENN STATE ERIE, THE BEHREND COLLEGE
Title: PROFESSOR MECH ENG

Request sent: 2/15/2017 at 8:34 AM
Concur: Yes
Comments:
Reviewed On: 2/25/2017 at 3:19 PM

Recipient Name: DOUGLAS SCHUMER
Position: Consultation
Department: (Not Available)
Campus: PENN STATE GREAT VALLEY
Title: ASST PROF ENGINEERDESIGN

Request sent: 2/27/2017 at 7:32 AM
Concur: Yes
Comments:
Reviewed On: 2/27/2017 at 11:38 AM

Recipient Name: JAMES NEMES
Department: Data Analytics
Position: Consultation
Campus: PENN STATE GREAT VALLEY
Title: PROFESSOR & DAA

Request sent: 2/27/2017 at 7:34 AM
Concur: Yes
Comments:
Reviewed On: 2/27/2017 at 8:19 AM

Recipient Name: KATHRYN JABLOKOW
Department: Mechanical Engineering
Position: Consultation
Campus: PENN STATE GREAT VALLEY
Title: ASSOC PROF MECH ENGR AND

Request sent: 2/15/2017 at 8:34 AM
Concur: Yes
Comments:
Reviewed On: 2/15/2017 at 1:50 PM

Recipient Name: SALLY RICHMOND
Department: (Not Available)
Position: Consultation
Campus: PENN STATE GREAT VALLEY
Title: LECTURER IN INFO SCIENCE

Request sent: 2/15/2017 at 8:34 AM
Concur: Yes
Comments:
Reviewed On: 2/15/2017 at 1:39 PM

Recipient Name: AB Shafaye
Department: Science, Engineering And Technology
Position: Consultation
Campus: PENN STATE HARRISBURG, THE CAPITAL COLLEGE
Title: EE/EET Programs Chair

Request sent: 2/27/2017 at 7:36 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
In the section "Relationship/Linkage of Course to Other Courses", while talking about why ME 456 and EE 483 are not suitable for your students, you say...prerequisites courses for ME 456 (specifically EE 481) and the prerequisites for EE 483 (specifically I E 305 or M E 360) could not be readily satisfied in the GE MED degree track...".
You have EE 481 and I E 305/M E 360 the other way around. EE 481 is a prerequisite for EE 483 and I E 305 or M E 360 for ME 456.
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<tr>
<th>Recipient Name: Richard Ciocci</th>
<th>Department: Science, Engineering And Technology</th>
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<tr>
<td>Position: Consultation</td>
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Request sent: 2/27/2017 at 7:38 AM  
Concur: Yes  
Comments:  
Reviewed On: 2/27/2017 at 9:33 AM

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<tr>
<th>Recipient Name: Joseph Ranalli</th>
<th>Department: UC Engineering</th>
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Request sent: 2/15/2017 at 8:34 AM  
Concur: Yes  
Comments:  
Reviewed On: 2/15/2017 at 9:39 AM

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<th>Recipient Name: Kenneth Dudeck</th>
<th>Department: UC Engineering</th>
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Request sent: 2/15/2017 at 8:34 AM  
Concur: Yes  
Comments:  
Reviewed On: 2/22/2017 at 10:41 AM

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<tr>
<th>Recipient Name: Wieslaw Grebski</th>
<th>Department: School of Engr Design, Technology and Prof Prgms</th>
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<tbody>
<tr>
<td>Position: Consultation</td>
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Request sent: 2/15/2017 at 8:34 AM  
Concur: Yes  
Comments:  
Reviewed On: 2/15/2017 at 8:43 AM

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<tr>
<th>Recipient Name: David Salvia</th>
<th>Department: Electrical Engineering</th>
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<tbody>
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<td>Position: Consultation</td>
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<td>Title: ASST PROF ELECT. ENGR.</td>
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Request sent: 2/15/2017 at 8:34 AM  
Concur: Yes  
Comments: One comment -- E MCH 213 is listed as a co-requisite course. I believe that you mean to list it as a
Concurrent Courses are similar to prerequisites except that they may be taken prior to, or in the same semester as, the given course. Co-requisite Courses are pairs of courses required to be taken together in the same semester.

Reviewed On: 2/15/2017 at 1:40 PM

![Recipient Name: ERIC MARSH](image)
Department: Mechanical Engineering
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: PROFESSOR OF MECH ENGR

![Recipient Name: JANIS TERPENNY](image)
Department: Industrial And Manufacturing Engineering
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: DEPT HEAD & PROF INDUSTL

![Recipient Name: KAREN THOLE](image)
Department: Mechanical Engineering
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: DEPT HEAD MNE

![Recipient Name: KULTEGIN AYDIN](image)
Department: Electrical Engineering
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: DEPT HEAD/PROF ELECT ENGR

![Recipient Name: MATTHEW PARKINSON](image)
Department: School of Engr Design, Technology and Prof Prgrms
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
College Administrator Review

Recipient Name: **Robert Avanzato**  
Department: (Not Available)  
Position: College Administrator Review  
Campus: (Not Available)  
Title:

**Request sent:** 4/11/2017 at 5:54 PM
Concur: Yes
Comments: Extensive Consultations has Taken Place with All Offering Colleges and Campuses. Below is the list of Consultants that have concurred/approved the General Engineering Curriculum changes and EDSGN Course changes (new and modified):
*Penn State Altoona*
- Sohail Anwar (sxa15@psu.edu)
- Grant Risha (gar108@psu.edu)
- Jungwoo Ryoo (jxr65@psu.edu)
- Jennilyn Vallejera (jmv22@psu.edu)
- Berks Janelle Larson (jbl6@psu.edu)
- Dale Litwiler (dhl10@psu.edu)
- Rungun Nathan (rrn13@psu.edu)
- Terry Speicher (tls20@psu.edu)
- Erie Russ Warley (rwh27@psu.edu)
- Dipo Onipede (ouo1@psu.edu)
- Edward Evans (ere100@psu.edu)
- Thomas Hemminger (thm5@psu.edu)
- William Lasher (wcl2@psu.edu)
- David Loker (drl3@psu.edu)

*Penn State Harrisburg*
- Rafic Bachnak (rab65@psu.edu)
Head of Department

Recipient Name: SVEN G BILEN
Position: Head of Department
Title:
Department: (Not Available)
Campus: UNIVERSITY PARK CAMPUS

Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

SCCA Representative

Recipient Name: ROBERT MELTON
Position: SCCA Representative
Title:
Department: (Not Available)
Campus: UNIVERSITY PARK CAMPUS

Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]
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<td>PETER BUTLER</td>
<td>(Not Available)</td>
<td>Dean of the College</td>
<td>UNIVERSITY PARK CAMPUS</td>
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<td>UNIVERSITY PARK CAMPUS</td>
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**SCCA Subcommittee Review**

**Recipient Name:** CORTNEY SMITH  
**Position:** SCCA Subcommittee Review  
**Campus:** UNIVERSITY PARK CAMPUS

**Concur:** [Not Yet Reviewed]  
**Comments:** [Not Yet Reviewed]  
**Reviewed On:** [Not Yet Reviewed]
Recipient Name: KADI CORTER
Department: (Not Available)
Position: SCCA Review
Campus: UNIVERSITY PARK CAMPUS

Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

Recipient Name: ALLISON ALBINSKI
Department: (Not Available)
Position: SCCA Review
Campus: UNIVERSITY PARK CAMPUS

Request sent: 2/17/2017 at 2:02 PM
Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

Faculty Senate Review

Recipient Name: CORTNEY SMITH
Department: (Not Available)
Position: Faculty Senate Review
Campus: UNIVERSITY PARK CAMPUS

Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

Recipient Name: KADI CORTER
Department: (Not Available)
Position: Faculty Senate Review
Campus: UNIVERSITY PARK CAMPUS

Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

Recipient Name: ALLISON ALBINSKI
Department: (Not Available)
Position: Faculty Senate Review
Campus: UNIVERSITY PARK CAMPUS

Request sent: 2/17/2017 at 2:01 PM
Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]
Curricular Information

Blue Sheet Item #: 
Review Date: 

**SCRID Numbers**

(EDSGN 410):

**UPLOADED DOCUMENTS:**

Context Type: Supporting Documents
File Description: List of Consultants
File Name: Consultants for GE Proposals.pdf
Uploaded Documents Follow:
Consultants for the General Engineering Curriculum changes and Course changes (new and modified)

**Altoona**
Sohail Anwar (sxa15@psu.edu)
Grant Risha (gar108@psu.edu)
Jungwoo Ryoo (jxr65@psu.edu)
Jennilyn Vallejera (jmv22@psu.edu)

**Berks**
Janelle Larson (jbl6@psu.edu)
Dale Litwhiler (dhl10@psu.edu)
Rungun Nathan (rrn13@psu.edu)
Terry Speicher (tls20@psu.edu)

**Erie**
Russ Warley (rlw27@psu.edu)
Dipo Onipede (ouo1@psu.edu)
Edward Evans (ere100@psu.edu)
Thomas Hemmiinger (tlh5@psu.edu)
William Lasher (wcl2@psu.edu)
David Loker (drl3@psu.edu)

**Harrisburg**
Rafic Bachnak (rab65@psu.edu)
Omid Ansary (axa8@psu.edu)
AB Shafaye (mes121@psu.edu)
Issam Abu-Mahfouz (iaa2@psu.edu)
Ameet Banerjee (aub25@psu.edu)
Richard Ciocci (rcc102@psu.edu)

**Abington**
Robert Avanzato (rla5@psu.edu)
Marcus Besser (mpb20@psu.edu)
Janice Margle (jmm8@psu.edu)
Zafer Hatahet (zuh11@psu.edu)

**Brandywine**
Asad Azemi (axa20@psu.edu)
Ivan Esparragoza (ilee1@psu.edu)
Vlad Ivashyn (uxi1@psu.edu)
DuBois
Douglas Miller (djm290@psu.edu)
Ramakrishnan Rajagopalan (rur12@psu.edu)
Daudi Waryoba (drw29@psu.edu)
Pingjuan Werner (plw7@psu.edu)

Great Valley
Kathryn Jablokow (kwl3@psu.edu)
Sally Richmond (sss135@psu.edu)
Douglas Schumer (dbs5376@psu.edu)
James Nemes (jan16@psu.edu)

Hazleton
Kenneth Dudeck (ked2@psu.edu)
Wieslaw Grebski (wxg3@psu.edu)
Joseph Ranalli (jar339@psu.edu)

University Park
Sven Bilen (sgb100@psu.edu)
Karen Thole (kat18@psu.edu)
Eric Marsh (erm7@psu.edu)
Kultegin Aydin (aqx@psu.edu)
David Salvia (ads102@psu.edu)
Jenis Terpenny (jpt5311@psu.edu)
Scarlett Miller (shm13@psu.edu)
Matthew Parkinson (mbp11@psu.edu)
SENATE COMMITTEE ON CURRICULAR AFFAIRS
COURSE SUBMISSION AND CONSULTATION FORM

Principal Faculty Member(s) Proposing Course

<table>
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<tr>
<th>Name</th>
<th>User ID</th>
<th>College</th>
<th>Department</th>
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<tbody>
<tr>
<td>ROBERT LOUIS AVANZATO</td>
<td>rla5</td>
<td>Engineering (EN)</td>
<td>Not Available</td>
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</table>

Academic Home: Engineering (EN)

Type of Proposal: [ ] Add  [ ] Change  [ ] Drop

Course Designation
(EDSGN 420) Advanced Robotics Design and Applications

Course Information

Cross-Listed Courses:

Prerequisites:
EDSGN 410

Corequisites:

Concurrents:

Recommended Preparations:

Abbreviated Title: ADV ROB DSGN & APP
Discipline: None

Course Listing:

Special categories for Undergraduate (001-499) courses

Foundations
[ ] Writing/Speaking (GWS)
[ ] Quantification (GQ)

Knowledge Domains
[ ] Health & Wellness (GHW)
[ ] Natural Sciences (GN)
[ ] Arts (GA)
[ ] Humanities (GH)
[ ] Social and Behavioral Sciences (GS)

Additional Designations
[ ] Bachelor of Arts
[ ] International Cultures (IL)
[ ] United States Cultures (US)
[ ] Honors Course
[ ] Common course number - x94, x95, x96, x97, x99
[ ] Writing Across the Curriculum

First-Year Engagement Program
[ ] First-Year Seminar

Miscellaneous
Common Course

GE Learning Objectives

- GenEd Learning Objective: Effective Communication
- GenEd Learning Objective: Creative Thinking
- GenEd Learning Objective: Crit & Analytical Think
- GenEd Learning Objective: Global Learning
- GenEd Learning Objective: Integrative Thinking
- GenEd Learning Objective: Key Literacies
- GenEd Learning Objective: Soc Resp & Ethic Reason

Bulletin Listing

| Minimum Credits: | 3 |
| Maximum Credits: | 3 |
| Repeatable: | NO |

Department with Curricular Responsibility: School of Engr Design, Technology and Prof Prgrms (UPEN_SEDTP)

Effective Semester: Upon Approval

Travel Component: NO

Course Outline

A brief outline or overview of the course content:
Students will be introduced to advanced topics in the design, prototyping, testing and simulation of complex robotic systems or subsystems. This course is project-based and will have a substantial laboratory component supporting team-based multidisciplinary design, integration, and testing of an advanced robotic system or subsystem.

A listing of the major topics to be covered with an approximate length of time allotted for their discussion:
1. Introduction to advanced topic(s) in robotics design and application (4 weeks)
2. Simulation, implementation, and demonstration of advanced algorithm or technology (1 week)
3. Design, develop, test, integrate, and prototype advanced robotic system or subsystem (8 weeks)
4. Communication and documentation of advanced robotic system (2 weeks)

Course Description:
The objective of this course is to apply advanced topics in robotics. It serves as the second course of a possible two-course sequence in robotics design and applications. This second course will enable students to explore advanced topics not covered in the first course, or to continue a complex robot system design that would incorporate advanced topics and span two semesters in duration. One or more advanced topics, such as computer vision, artificial intelligence, biologically-inspired robots, multi-robotics, collaborative robots, human-robot interface, advanced navigation, or others, will be introduced based on background of the instructor. Students will work in teams to design and prototype a robot that integrates the advanced algorithms and technology and satisfies a set of design requirements. Laboratory exercises will provide experience in key areas to support the design and implementation process. Professional communication and documentation will be included in the course experience. This course is a multi-disciplinary, project-based course and will have a substantial laboratory component supporting team-based design, integration, and testing of an advanced robot system. Students’ performance will be assessed via written homework assignments, laboratory activities, reports, written exams, oral presentations, and a design project that incorporates both hardware design and software design.

The name(s) of the faculty member(s) responsible for the development of the course:
- Name: ROBERT LOUIS AVANZATO (rla5)
- Title:
- Phone:
- Address:
- Campus: BW
- City:
- Fax:

Course Justification

Instructional, Educational, and Course Objectives:
This section should define what the student is expected to learn and what skills the student will develop.
Outcomes – Students completing this course will be able to:

1. Identify, communicate, and discuss one or more advanced topics in robotics design and applications from a variety of application areas in industry and research. (Example: facial recognition algorithms in the area of computer vision.)

2. Research, analyze, simulate, implement, and test algorithms and technology related to an advanced topic in robotics (Example: research, evaluate, implement facial recognition algorithms in a software tool and study performance.)

3. Design, program, and test software for a robotic system that implements an advanced algorithm or technology. (Example: integrating and testing facial recognition software into a mobile robot system.)

4. Design, develop, and test required hardware and mechanisms for an advanced robotics system. (Example: design camera mounting and servo system for robot to support computer vision.)

5. Design, prototype, integrate, test, and document a robotics system utilizing an advanced robotics technology to meet a set of design requirements. (Example: developing and integrating facial recognition technology in a mobile robot that will navigate through an office space and recognize faces of employees.)

6. Work collaboratively in a team to achieve engineering design goals.

Recommended Text (for a computer vision theme; other themes are possible)

Evaluation Methods:
Include a statement that explains how the achievement of the educational objective identified above will be assessed. The procedures for determining students' grades should be specifically identified.
Achievement of educational outcomes will be assessed through evaluation of written work, laboratory skills, oral presentations, and design projects. Achievement of each educational outcome will be defined through simple rubrics that directly correlate student performance to level of achievement, based upon a traditional point grading scheme.

A recommended point grading scheme follows:

- Homework (10%)
- Two semester exams (30%)
- Laboratory (20%)
- Robot system design project (30%)
- Communication and presentation skills (10%)

Relationship/Linkage of Course to Other Courses:
This statement should relate the course to existing or proposed new courses. It should provide a rationale for the level of instruction, for any prerequisites that may be specified, or for the course’s role as a prerequisite for other courses.
This course will leverage multidisciplinary robot design concepts and skills from EDSGN 410 Robotics Design and Applications (which is a prerequisite). It serves as the second course of a possible two-course sequence in robotics design and applications. This second course will enable students to explore advanced topics not covered in the first course or to continue a complex robot system design that would incorporate advanced topics and span two semesters in duration.

Relationship of Course to Major, Option, Minor, or General Education:
This statement should explain how the course will contribute to the major, option, or minor and indicate how it may function as a service course for other departments.
This course will provide extensive design and implementation experience, which can be used as a supplement to the ENGR 490W and 491W capstone design courses, but that would be determined on a case by case basis. Please note that EDSGN 420 is an Engr Tech Elective and it is independent of ENGR 490. EDSGN 420 would be offered based on industry need and faculty availability and there is no direct linkage between EDSGN 420 and ENGR 490/491.

A description of any special facilities:
Computer lab with prototyping area and machine shop/fabrication lab.

Frequency of Offering and Enrollment:
The course will be offered once per year, either Fall or Spring semester, with an expected enrollment of 10 to 20 students.

Campuses That Have Offered ( ) Over The Past 4 Years

| semester | AB | AL | BK | BR | BW | CR | DS | ER | FE | GA | GV | HB | HN | HY | LV | MA | NK | PC | SH | SL | UP | WB | WC | WS | XC | XP | XS | YK |
|----------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|

Review History
This section represents all consultation history that has occurred on this proposal

Legend
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<tr>
<th>Title: ASSOC PROF ENGINEERING</th>
<th>Recipient Name: JANICE MARGLE</th>
<th>Department: Abington College (Pre-Major)</th>
<th>Position: Consultation</th>
<th>Campus: ABINGTON CAMPUS</th>
<th>Request sent: 2/15/2017 at 8:30 AM</th>
<th>Concur: Yes</th>
<th>Comments:</th>
<th>Reviewed On: 2/16/2017 at 6:18 PM</th>
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<td>Title: ASSOC PROF M ENGINEERING</td>
<td>Recipient Name: MARCUS BESSER</td>
<td>Department: Abington College (Pre-Major)</td>
<td>Position: Consultation</td>
<td>Campus: ABINGTON CAMPUS</td>
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Recipient Name: GRANT ALEXANDER RISHA
Department: (Not Available)
Position: Consultation
Campus: (Not Available)
Title: PROF OF MECH.ENGRT

Request sent: 2/27/2017 at 7:34 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: JENNILYN VALLEJERA
Department: Business And Engineering
Position: Consultation
Campus: ALTOONA CAMPUS
Title: INSTRUCTOR IN ENGINEERING

Request sent: 2/27/2017 at 7:35 AM
Concur: Yes
Comments:
Reviewed On: 2/28/2017 at 10:33 AM

Recipient Name: JUNGWOO RYOO
Department: Business And Engineering
Position: Consultation
Campus: ALTOONA CAMPUS
Title: PROFESSOR OF INFOSCI/TECH

Request sent: 2/27/2017 at 7:35 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: SOHAIL ANWAR
Department: (Not Available)
Position: Consultation
Campus: (Not Available)
Title: PROF ENGINEERING

Request sent: 2/27/2017 at 7:39 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: DALE HENRY LITWHILER
Department: Engineering, Business and Human Development
Position: Consultation
Campus: BERKS CAMPUS
Title: ASSOC PROF ENGINEERING

Request sent: 2/27/2017 at 7:32 AM
Concur: Yes
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<th>Comments: (Completed By Default - Exceeded Time Limit)</th>
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<td>Request sent: 2/27/2017 at 7:38 AM</td>
<td>Concur: Yes</td>
<td>Comments: Is it possible to have more detailed description for the lab and prototyping needs? This will help if any other campus wants to consider offering these courses.</td>
<td>Reviewed On: 2/27/2017 at 6:30 PM</td>
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Title: ASSOC PROF ENGINEERING

Request sent: 2/15/2017 at 8:30 AM
Concur: Yes
Comments: 
Reviewed On: 2/15/2017 at 2:17 PM

Recipient Name: ULADZISLAU IVASHYN
Department: School of Engr Technology and Commonwealth Engr
Position: Consultation
Campus: BRANDYWINE CAMPUS
Title: ENGINEERING

Request sent: 2/27/2017 at 7:40 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: DAUDI WARYOBA
Department: School of Engr Technology and Commonwealth Engr
Position: Consultation
Campus: DUBOIS CAMPUS
Title: ASST PROF / ENGINEERING

Request sent: 2/27/2017 at 7:33 AM
Concur: Yes
Comments: 
Reviewed On: 2/28/2017 at 3:59 PM

Recipient Name: DOUGLAS MILLER
Department: (Not Available)
Position: Consultation
Campus: DUBOIS CAMPUS
Title: INSTRUCTOR

Request sent: 2/27/2017 at 7:32 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: PINGJUAN WERNER
Department: UC University College (Pre-Major)
Position: Consultation
Campus: DUBOIS CAMPUS
Title: PROF ENGINEERING

Request sent: 2/27/2017 at 7:38 AM
Concur: Yes
Comments: 
Reviewed On: 2/27/2017 at 9:09 AM
Recipient Name: RAMAKRISHNAN RAJAGOPALAN
Department: UC Engineering
Position: Consultation
Campus: DUBOIS CAMPUS
Title: RES ASSOC & ASST. PROF

Request sent: 2/27/2017 at 7:39 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: CHENG DONG
Department: Biomedical Engineering
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: DEPT HEAD/DIST. PROF BIO

Request sent: 2/15/2017 at 8:30 AM
Concur: Yes
Comments: 
Reviewed On: 2/16/2017 at 3:53 PM

Recipient Name: JOHN HANNAN
Department: Computer Science And Engineering
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: ASC HEAD CMPSCI&ENG

Request sent: 2/15/2017 at 8:30 AM
Concur: Yes
Comments: 
Reviewed On: 2/15/2017 at 2:56 PM

Recipient Name: JUDITH TODD
Department: Engineering Science And Mechanics
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: HEAD/PROF ESM

Request sent: 2/15/2017 at 8:30 AM
Concur: Yes
Comments: 
Reviewed On: 2/20/2017 at 11:52 AM

Recipient Name: M PARFIT
Department: Architectural Engineering
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: PROFESSOR ARCH ENGR

Request sent: 2/27/2017 at 7:37 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
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<td>PATRICK FOX</td>
<td>Civil And Environmental Engineering</td>
<td>Consultation</td>
<td>UNIVERSITY PARK CAMPUS</td>
<td>2/15/2017 at 8:30 AM</td>
<td>Yes</td>
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<td>PAUL HEINEMANN</td>
<td>Agricultural And Biological Engineering</td>
<td>Consultation</td>
<td>UNIVERSITY PARK CAMPUS</td>
<td>2/15/2017 at 8:30 AM</td>
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<td>PHILIP MORRIS</td>
<td>Aerospace Engineering</td>
<td>Consultation</td>
<td>UNIVERSITY PARK CAMPUS</td>
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<td>PHILLIP SAVAGE</td>
<td>Chemical Engineering</td>
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<td>THOMAS F LAPORTA</td>
<td>Computer Science And Engineering</td>
<td>Consultation</td>
<td>UNIVERSITY PARK CAMPUS</td>
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</table>
Recipent Name: **DAVID LOKER**  
Department: Engineering  
Position: Consultation  
Campus: PENN STATE ERIE, THE BEHREND COLLEGE  
Title: ASSOC PROF ENGR

Recipent Name: **EDWARD EVANS**  
Department: Engineering  
Position: Consultation  
Campus: PENN STATE ERIE, THE BEHREND COLLEGE  
Title: SR LECT ENGINEERING

Recipent Name: **OLADIPO ONIPEDE**  
Department: Engineering  
Position: Consultation  
Campus: PENN STATE ERIE, THE BEHREND COLLEGE  
Title: ASSOC PROF MECH_ENGR

Recipent Name: **RUSSELL WARLEY**  
Department: Engineering  
Position: Consultation  
Campus: PENN STATE ERIE, THE BEHREND COLLEGE  
Title: Interim Director, School of Engineering

Recipent Name: **THOMAS HEMMINGER**  
Department: Engineering
Title: PROFESSOR ELEC & COMP ENG

Request sent: 2/27/2017 at 7:39 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: WILLIAM LASHER
Department: Engineering
Position: Consultation
Campus: PENN STATE ERIE, THE BEHREND COLLEGE
Title: PROFESSOR MECH ENG

Request sent: 2/15/2017 at 8:30 AM
Concur: Yes
Comments: 
Reviewed On: 2/25/2017 at 3:11 PM

Recipient Name: DOUGLAS SCHUMER
Department: (Not Available)
Position: Consultation
Campus: PENN STATE GREAT VALLEY
Title: ASST PROF ENGINEERDESIGN

Request sent: 2/27/2017 at 7:32 AM
Concur: Yes
Comments: 
Reviewed On: 2/27/2017 at 11:35 AM

Recipient Name: JAMES NEMES
Department: Data Analytics
Position: Consultation
Campus: PENN STATE GREAT VALLEY
Title: PROFESSOR & DAA

Request sent: 2/27/2017 at 7:34 AM
Concur: Yes
Comments: 
Reviewed On: 2/27/2017 at 8:18 AM

Recipient Name: SALLY RICHMOND
Department: (Not Available)
Position: Consultation
Campus: PENN STATE GREAT VALLEY
Title: LECTURER IN INFO SCIENCE

Request sent: 2/15/2017 at 8:30 AM
Concur: Yes
Comments: 2/15/2017 at 3:28 PM

Recipient Name: AB Shafaye  Department: Science, Engineering And Technology
Position: Consultation  Campus: PENN STATE HARRISBURG, THE CAPITAL COLLEGE
Title: EE/EET Programs Chair

Request sent: 2/27/2017 at 7:36 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: Ameet Banerjee  Department: Science, Engineering And Technology
Position: Consultation  Campus: PENN STATE HARRISBURG, THE CAPITAL COLLEGE
Title: ASSOC PROF OF MECH ENG

Request sent: 2/27/2017 at 7:30 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: Issam Abu Mahfouz  Department: Science, Engineering And Technology
Position: Consultation  Campus: PENN STATE HARRISBURG, THE CAPITAL COLLEGE
Title: ASSOC PRF ENGINEERING

Request sent: 2/27/2017 at 7:34 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: Omid Ansary  Department: Capital Administration
Position: Consultation  Campus: PENN STATE HARRISBURG, THE CAPITAL COLLEGE
Title: Senior Associate Dean for Academic Affairs

Request sent: 2/27/2017 at 7:30 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: Rafic Bachnak  Department: Science, Engineering And Technology

(Completed By Default - Exceeded Time Limit)
Title: PROF OF ELECTRICAL ENG.

Request sent: 2/27/2017 at 7:38 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: RICHARD CIOCCI
Department: Science, Engineering And Technology
Position: Consultation
Campus: PENN STATE HARRISBURG, THE CAPITAL COLLEGE
Title: ASSOC PROF MECH ENG

Request sent: 2/27/2017 at 7:38 AM
Concur: Yes
Comments:
Reviewed On: 2/27/2017 at 9:45 AM

Recipient Name: JOSEPH RANALLI
Department: UC Engineering
Position: Consultation
Campus: HAZLETON CAMPUS
Title: ASST PROF ASST PROF ENGR

Request sent: 2/15/2017 at 8:30 AM
Concur: Yes
Comments:
Reviewed On: 2/15/2017 at 9:38 AM

Recipient Name: KENNETH DUDECK
Department: UC Engineering
Position: Consultation
Campus: HAZLETON CAMPUS
Title: ASSOC PROF ENGR

Request sent: 2/15/2017 at 8:30 AM
Concur: Yes
Comments:
Reviewed On: 2/15/2017 at 8:43 AM

Recipient Name: WIESLAW GREBSKI
Department: School of Engr Design, Technology and Prof Prgrms
Position: Consultation
Campus: HAZLETON CAMPUS
Title: ASSOCIATE PROF

Request sent: 2/15/2017 at 8:30 AM
Concur: Yes
Comments:
Recipient Name: DAVID SALVIA  Department: Electrical Engineering  Position: Consultation  Campus: UNIVERSITY PARK CAMPUS

Request sent: 2/15/2017 at 8:30 AM  Concur: Yes  Comments:  Reviewed On: 2/15/2017 at 1:48 PM

Recipient Name: ERIC MARSH  Department: Mechanical Engineering  Position: Consultation  Campus: UNIVERSITY PARK CAMPUS

Request sent: 2/15/2017 at 8:30 AM  Concur: Yes  Comments:  Reviewed On: 2/15/2017 at 2:33 AM

Recipient Name: JANIS TERPENNY  Department: Industrial And Manufacturing Engineering  Position: Consultation  Campus: UNIVERSITY PARK CAMPUS

Request sent: 2/27/2017 at 7:35 AM  Concur: Yes  Comments: (Completed By Default - Exceeded Time Limit)  Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: KAREN THOLE  Department: Mechanical Engineering  Position: Consultation  Campus: UNIVERSITY PARK CAMPUS

Request sent: 2/15/2017 at 8:30 AM  Concur: Yes  Comments:  Reviewed On: 2/15/2017 at 2:06 PM

Recipient Name: KULTEGIN AYDIN  Department: Electrical Engineering  Position: Consultation  Campus: UNIVERSITY PARK CAMPUS  Title: DEPT HEAD/PROF ELECT ENGR

Request sent: 2/15/2017 at 8:30 AM
Recipient Name: MATTHEW PARKINSON  
Department: School of Engr Design, Technology and Prof Prgrms  
Position: Consultation  
Campus: UNIVERSITY PARK CAMPUS  
Title: ASSOC PROF ENGR DESIGN

Request sent: 2/27/2017 at 7:36 AM  
Concur: Yes  
Comments: (Completed By Default - Exceeded Time Limit)  
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: SCARLETT MILLER  
Department: School of Engr Design, Technology and Prof Prgrms  
Position: Consultation  
Campus: UNIVERSITY PARK CAMPUS  
Title: ASST PROF ENGR DESIGN

Request sent: 2/27/2017 at 7:39 AM  
Concur: Yes  
Comments: (Completed By Default - Exceeded Time Limit)  
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: SVEN BILEN  
Department: School of Engr Design, Technology and Prof Prgrms  
Position: Consultation  
Campus: UNIVERSITY PARK CAMPUS  
Title: DEPT HEAD/SEDTAPP

Request sent: 2/15/2017 at 8:30 AM  
Concur: Yes  
Comments:  
Reviewed On: 2/24/2017 at 12:19 PM

College Administrator Review

Recipient Name: Ivan Esparragoza  
Department: (Not Available)  
Position: College Administrator Review  
Campus: (Not Available)  
Title: 

Request sent: 4/11/2017 at 5:35 PM  
Concur: Yes  
Comments: Extensive Consultations has Taken Place with All Offering Colleges and Campuses. Below is the list of Consultants that have concurred/approved the General Engineering Curriculum changes and EDSGN Course changes (new and modified):  
*Penn State Altoona*  
Soail Anwar (sxa15@psu.edu)  
Grant Risha (gar108@psu.edu)  
Jungwoo Ryoo (jxr65@psu.edu)  
Jennilyn Vallejera (jmv22@psu.edu)
Head of Department

Recipient Name: **SVEN BILEN**

Position: Head of Department

Department: (Not Available)

Campus: UNIVERSITY PARK CAMPUS

Title:

Concur: [Not Yet Reviewed]

Comments: [Not Yet Reviewed]

Reviewed On: [Not Yet Reviewed]

———

SCCA Representative

Recipient Name: **ROBERT MELTON**

Position: SCCA Representative

Department: (Not Available)

Campus: UNIVERSITY PARK CAMPUS

Title:
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<tr>
<th>Recipient Name</th>
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<tr>
<td>KADI CORTER</td>
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<td>ALLISON ALBINSKI</td>
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<tr>
<td>CORTNEY SMITH</td>
<td>(Not Available)</td>
<td>Faculty Senate Review</td>
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<td>ALLISON ALBINSKI</td>
<td>(Not Available)</td>
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Position: Faculty Senate Review  
Campus: UNIVERSITY PARK CAMPUS

Request sent: 2/17/2017 at 2:01 PM  
Concur: [Not Yet Reviewed]  
Comments: [Not Yet Reviewed]  
Reviewed On: [Not Yet Reviewed]

Curricular Information
Blue Sheet Item #:  
Review Date:

SCRID Numbers
(EDSGN 420):
Proposal Designation: General Engineering (GE)
This is a proposed Change to Undergraduate Stand Alone Major

Initiators

<table>
<thead>
<tr>
<th>Name</th>
<th>User ID</th>
<th>College</th>
<th>Department</th>
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</thead>
<tbody>
<tr>
<td>ROBERT LOUIS AVANZATO</td>
<td>rla5</td>
<td>Abington College (AB)</td>
<td>Not Available</td>
</tr>
<tr>
<td>ASAD AZEMI</td>
<td>AXA20</td>
<td>Engineering (EN)</td>
<td>Not Available</td>
</tr>
<tr>
<td>KATHRYN JABLOKOW</td>
<td>KWL3</td>
<td>Engineering (EN)</td>
<td>Not Available</td>
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<tr>
<td>DAUDI WARYOBA</td>
<td>DRW29</td>
<td>Engineering (EN)</td>
<td>Not Available</td>
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<tr>
<td>WIESLAW GREBSKI</td>
<td>WXG3</td>
<td>Engineering (EN)</td>
<td>Not Available</td>
</tr>
<tr>
<td>IVAN ESPARRAGOZA</td>
<td>IEE1</td>
<td>University College (UC)</td>
<td>Not Available</td>
</tr>
</tbody>
</table>

Academic Home: Engineering (EN)

Program Definition
Degree Offered: Bachelor of Science (BS)
Effective Semester: Summer 2017

Options
- None.
- None.
- None.

Offering College(s)
- Abington College
- Engineering
- University College
Objectives and Justification

Objectives:

Justification:

Justification For The Change Proposal:

B. Provide a list of new courses to be established in the program, provide a list of all changing courses, and provide a list of any courses that are being dropped.

All pertain to the Multidisciplinary Engineering Design option:

New Courses: EDSGN 402(4), EDSGN 403(3), EDSGN 420(4)

Dropped Courses: CMPEN 331, CMPEN 454, CMPEN 472, EE 352

Added Courses: EE 316

C. In instances where a requirement is selected from a department list, or area, include a copy of the list of courses that are acceptable for meeting that requirement.

The proposed change to the major does not alter the list of courses for the Alternative Energy and Power Generation or Applied Materials options.

The departmental list for the Multidisciplinary Engineering Design option is as follows:

CMPEN 331(3), CMPEN 371(3), EDSGN 420(4), EE 352(4), ME 357(3), ME 380(3)

1) The proposed change of the program name is in response to recommendations made by the program-wide industrial advisory committee in 2015, who felt that the General Engineering designation did not accurately communicate the nature of the program. Analysis of comparable programs at other universities suggests that the designation General Engineering is used primarily to describe either a) programs for students who have not yet matriculated to a specific engineering department (i.e. ENGR designation at Penn State), or b) programs meant to provide a very broad overview of engineering that is not intended to meet ABET accreditation requirements. The fact that Penn State’s program is in fact a four-year program, and provides an accredited degree creates confusion when compared to the marketplace’s use of the General Engineering designation. The proposed new designation, Engineering, was the nomenclature proposed by the program-wide Industrial Advisory committee that was subsequently approved by the individual option Industrial Advisory committees, as well as the program curriculum committee (composed of faculty). Current students in all three options were surveyed about the proposed program name change, with 71% indicating support or strong support (17% neutral) for the change. Reasons provided by students indicated that it affected their ability to search for jobs and internships, including comments such as that the major is “mistakenly understood as an undecided major with extra curriculum geared towards engineering,” and that people assume “my program isn’t as rigorous as it actually is.” Additionally, potential employers for graduates of the program were surveyed with 86% supporting the change (14% neutral).

2) We propose that several courses be moved from Common Requirements to Requirements for the Option. These courses are CHEM 112, CHEM 113, ME 300/EME 301. The reasoning for this change is to allow the options to independently permit substitutions or alternate options for these courses. Reasoning is given as follows:

--- The Multidisciplinary Engineering Design option does not require CHEM 112 or CHEM 113 as a prerequisite for any of their courses. Therefore, the GN credits could be satisfied with any other GN course.

The Applied Materials and Alternative Energy and Power Generation options will retain these courses as previously listed to meet subsequent prerequisites.

--- The Multidisciplinary Engineering Design option does not require ME 300 or EME 301 as a prerequisite for any of their courses. ME 201 Introduction to Thermal Science will cover basic concepts of thermodynamics, fluid dynamics and heat transfer that will be more valuable for the option than just the thermodynamics topics covered by ME 300.

--- The Applied Materials and Alternative Energy and Power Generation options will retain ME 300 or EME 301 as previously listed to meet subsequent prerequisites.

3) The change proposed to allow CMPSC 200 as an alternative course relates to the needs of all three options. Many of the junior and senior Level courses require MATLAB programming skills to perform analysis and design. For the AE&PG option, CMPSC 200
has been taught exclusively for the past 2 years of the program and students have benefited from being capable to apply MATLAB programming in their upper level engineering courses. This was done because MATLAB has been strongly recommended by Industrial Advisory Committees. Making the requirement CMPSC 121, or CMPSC 200, or CMPSC 201 also gives us the flexibility to accept various CMPSC credits of transfer students coming into the program. It should also be noted that the required programming skills used in ENGR 350 (Computational Methods) are not tied to any specific programming language and will be taught across all three options using MATLAB or a compiled language such as C++.

4) In the Alternative Energy and Power Generation option, changes are proposed to the prescribed courses for the option, in order to allow students flexibility to accommodate their emerging interests while still meeting the intent of the option curriculum. These changes are consistent with the type of flexibility offered by other College of Engineering majors (e.g. Mechanical Engineering, Electrical Engineering), which contain technical electives to allow students to target specific interest areas, or obtain training in response to internship or co-op education experiences. Additionally, these changes may allow additional flexibility for non-traditional or transfer students who may have partially completed a different engineering major to have some of their prior coursework contribute to a Multidisciplinary Engineering degree. These changes would not be expected to have any negative impact on enrollment or interest in the major, as the current “prescribed” curriculum would continue to meet the new requirements. For the same reason, no course changes are required to accommodate this change.

5) The MDE option’s proposed curricular changes are based on recommendations from its Curriculum Committee. These recommendations were made based on the continuous assessment process for the option that takes into account comments/recommendations from the option’s Industry and Professional Advisory Council (IPAC), faculty, and students. Overall, the recommendations call for a more focused approach to teaching engineering design by introducing two new courses focused on product realization, an additional robotics course, and replacement or elimination of three courses that were not fully aligned with the curriculum. The implementation details follow.

The MDE option proposal to add the new courses, EDSGN 402 Materials and Manufacturing and EDSGN 403 Product Realization, is based on industry and student feedback recommending more manufacturing and product design coursework in the MDE option, as well as achieving alignment with and more fully utilizing the fabrication laboratory at the Great Valley campus. The inclusion of these two design courses, EDSGN 402 and EDSGN 403, will better support the multidisciplinary design theme of the option and offer the breadth and depth of coursework and laboratory experiences to achieve that goal; it will also more fully support the multidisciplinary design option capstone experience. The current MDE option curriculum (prior to these proposed changes) offers no explicit coursework in manufacturing, materials, or product design.

The addition of the EDSGN 420 Advanced Robotics Design and Applications course is designed to serve as a more appropriate course and substitute for CMPEN 454 Fundamentals of Computer Vision within the MDE option. The CMPEN 454 computer vision course is an analysis-focused course in computer vision and provides too specialized a focus for the MDE option. The appropriateness of the CMPEN 454 course was also questioned by the visiting ABET team in 2014. The new EDSGN 420 Advanced Robotics and Applications course is a project-based design course that supports a range of advanced topics in robotics design, including topics such as advanced manufacturing, computer vision, and collaborative robotics, among others, based on instructor background and program needs. EDSGN 420 will also serve as a follow-on course to EDSGN 410 Robotics Design and Applications; the sequence of two courses may optionally support a two-semester robotics design project. EDSGN 420 will be designated as an Engineering Technical Elective (ETE) to be offered in the 8th semester of the MDE option curriculum.

In order to support the curriculum changes above and to maintain a multidisciplinary design focus, the CMPEN 311 Computer Organization and CMPEN 472 Microprocessors and Embedded Systems courses have been both replaced by EE 316 Introduction to Embedded Microcontrollers. The justification for this change is that EE 316 provides very strong coverage of microcontrollers for the MDE option and is more appropriate than the CMPEN 331 and 472 sequence, which focused on more low-level computer architecture concepts. EE 316 will serve as a prerequisite to EDSGN 410 Robotics Design and Applications. EE 352 Signals and Systems has also been removed as a requirement from the MDE option, because this course was not aligned with the multidisciplinary theme. There were no courses in the option which required EE 352 as a prerequisite.

Proposal Outline

University College Locations:
- BRANDYWINE CAMPUS (BW)
- DUBOIS CAMPUS (DS)
- HAZLETON CAMPUS (HN)

CIP Code: 140101

Faculty Member(s) in Charge:
- Name: SVEN BILEN (SGB100)
  Title: DEPT HEAD/SEDTAPP
  Phone: +1 814 863 1526
Address: 0213N HAMMOND BLDG
Campus:
City:
Fax:

Name: IVAN ESPARRAGOZA (IEE1)
Title: ASSOC PROF ENGINEERING
Phone: +1 610 892 1420
Address: 0207K MAIN BUILDING
Campus:
City: Monacca
Fax:

Name: ROBERT AVANZATO (RLA5)
Title: ASSOC PROF ENGINEERING
Phone: +1 215 881 7358
Address: 119 SUTHERLAND BUILDING
Campus:
City:
Fax:

Name: ASAD AZEMI (AXA20)
Title: ASSOC PROF ENGINEERING
Phone: +1 610 892 1421
Address: 207L MAIN BUILDING
Campus:
City: Monacca
Fax:

Name: DAUDI WARYOBA (DRW29)
Title: ASST PROF / ENGINEERING
Phone: +1 814 375 4835
Address: 110J HILLER BUILDING
Campus:
City:
Fax:

Name: KATHRYN JABLOKOW (KWL3)
Title: ASSOC PROF MECH ENGR AND
Phone: +1 610 648 3372
Address: ENGR GREAT VALLEY GRAD CNTR
Campus:
City:
Fax:

Name: WIESLAW GREBSKI (WXG3)
Title: ASSOCIATE PROF
Phone: +1 570 450 3087
Address: A001 ADMINISTRATION BLDG
Campus:
City:
Fax:

Program Description:
The Engineering program provides students with a broad foundation in engineering with specialization in a technically and professionally relevant topic. Students must choose the Multidisciplinary Engineering Design option at Abington, Brandywine and
Great Valley campuses, Applied Materials option at the DuBois campus or the Alternative Energy and Power Generation option at the Hazleton campus. From this degree program, students will acquire the ability to work as members of a team toward successful attainment of a common goal, thus preparing them to work in for-profit or nonprofit organizations, or to further their studies in graduate school. Typical employment for Engineering graduates includes positions such as engineer, product engineer, process engineer, manufacturing engineer, development engineer, and materials engineer. With employment opportunities such as these and others, graduates or the Engineering program can attain professional and economically sustaining employment in their desired regional area. This degree program develops written and oral communication skills, culminating in a two-semester senior design course sequence consisting of a project based largely on student interest and faculty input.

Program Educational Objectives:

The educational objectives of the Engineering program are designed to prepare graduates who, during the first few years of professional practice will

1. Be employed by industry or government in the fields, such as, design, research and development, experimentation and testing, manufacturing, and technical sales
2. Assume an increasing level of responsibility and leadership within their respective organizations
3. Communicate effectively and work collaboratively in multidisciplinary and multicultural work environments
4. Recognize and understand global, environmental, social, and ethical contexts of their work
5. Progress to an advanced degree and certificate programs and be committed to lifelong learning to enhance their careers and provide flexibility in responding to changing social and technical environments.

Program Outcomes (Student Outcomes):

Graduates of the Engineering program shall be able to:

a) Apply knowledge of mathematics, science, and engineering
b) Design and conduct experiments, as well as to analyze and interpret data
c) Design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
d) Function on multidisciplinary teams
e) Identify, formulate, and solve engineering problems
f) Demonstrate an understanding of professional and ethical responsibility
g) Communicate effectively
h) Demonstrate the understanding of the impact of engineering solutions in a global, economic, environmental, and societal context
i) Recognize the need for, and an ability to engage in life-long learning
j) Demonstrate knowledge of contemporary issues
k) Use the techniques, skills, and modern engineering tools necessary for engineering practice.

In addition to the minimum grade point average (GPA) requirements* described in the University Policies, all College of Engineering entrance to major course requirements must also be completed with a minimum grade of C: CHEM 110 (GN), MATH 140 (GQ), MATH 141 (GQ), MATH 250 or MATH 251, PHYS 211 (GN) and PHYS 212 (GN). All of these courses must be completed by the end of the semester during which the admission to major process is carried out.

For the B.S. degree in Engineering, a minimum of 127 credits are required.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

For a Bachelor of Science in General Engineering (G E) a minimum of 127 credits are required.

Scheduling Recommendation by Semester Standing Given Like (Sem: 1-2)

Options

- Name: Alternative Energy and Power Generation
  Description: None.

- Name: Applied Materials
  Description: None.

- Name: Multidisciplinary Engineering Design
  Description: None.
Academic Outline

REQUIREMENTS FOR THE MAJOR:
A minimum of 109 credits are required
(This includes 27 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GS courses; 9 credits of GWS courses.)

GENERAL EDUCATION: 45 Credits
(27 of these 45 credits are included in REQUIREMENTS FOR THE MAJOR)

FIRST-YEAR SEMINAR:
Included in Requirements for the Major

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
Included in General Education Requirements

WRITING ACROSS THE CURRICULUM:
Included in Requirements for the Major

COMMON REQUIREMENTS FOR THE MAJOR (ALL OPTIONS): (Min: 41 Max: 64 Credits)

PRESCRIBED COURSES (-41 Credits)

CHEM 110 GN(3)[1], CHEM 111 GN(1), EDSGN 100 (3), MATH 140 GQ(4)[1], MATH 141 GQ(4)[1], PHYS 211 GN(4)[1](Sem: 1-2)
EMCH 211 (3)[1], EMCH 213 (3), MATH 231 (2), MATH 251 (4)[1], PHYS 212 GN(4)[1], PHYS 214 GN(2)(Sem: 3-4)
ENGR 490W (1), ENGR 491W (3)(Sem: 7-8)

ADDITIONAL COURSES (19 Credits)

(Select 1 credit of First-Year Seminar (Sem:1-2))
Select 3 credits from:

(CAS 100A (3); CAS 100B (3)(Sem: 1-2))
Select 3 credits from:

(ENGL 15 (3); ENGL 30 (3)(Sem: 1-2))
Select 3 credits from:

(CMPS 121 (3); CMPS 200 GQ(3); CMPS 201 (3)(Sem: 3-4))
Select 3 credits from:

(ECON 102 (3); ECON 104 (3)(Sem: 3-4))
Select 3 credits from:

(ENGL 202C GWS(3); ENGL 202D GWS(3)(Sem: 3-4))
Select 3 credits from:

(SUPPORTING COURSES (4 Credits)
Select 4 credits in General Technical Electives, in consultation with an advisor, from the program approved list.

COMMON REQUIREMENTS FOR THE OPTION: Alternative Energy and Power Generation (Min: 27 Max: 45 Credits)

PRESCRIBED COURSES (-27 Credits)
CHEM 112 GN(3), CHEM 113 GN(1)(Sem: 1-2)
EE 210 (4)[1](Sem: 3-4)
EE 314 (3), EGEE 302 (3), EME 303 (3), ME 345 (4)(Sem: 5-6)
EE 485 (3), EGEE 420 (3)(Sem: 7-8)

ADDITIONAL COURSES (12 Credits)

ME 300 (3)[1]; EME 301 (3)[1](Sem: 3-4)
(Select 9 credits from NUCE 401 (3); EE 488 (3); EGEE 437 (3); EGEE 438 (3); EGEE 441 (3)(Sem: 5-8))

SUPPORTING COURSES (6 Credits)

Select 6 credits in Engineering Technical Elective courses, any 400-level courses in the College of Engineering or any 400-level courses with the Energy and Geoenvironmental Engineering (EGEE) abbreviation. Other substitutions outside the approved list must be approved by petition. (Sem: 5-8)

COMMON REQUIREMENTS FOR THE OPTION: Applied Materials (Min: 42 Max: 45 Credits)

PRESCRIBED COURSES (-42 Credits)

CHEM 112 GN(3), CHEM 113 GN(1)(Sem: 1-2)
EMCH 212 (3), ENGR 320 (3), MATSE 201 (3)[1], MATSE 400 (3), MATSE 413 (3), STAT 200 GQ(4)(Sem: 5-6)

ADDITIONAL COURSES (3 Credits)

ME 300 (3)[1]; EME 301 (3)[1](Sem: 3-4)

COMMON REQUIREMENTS FOR THE OPTION: Multidisciplinary Engineering Design (Min: 35 Max: 45 Credits)

PRESCRIBED COURSES (-35 Credits)

CMPEN 271 (3), EE 210 (4), EMCH 212 (3)[1](Sem: 3-4)
EDSGN 402 (4), EE 310 (4)[1], EE 316 (3)(Sem: 5-6)
EDSGN 401 (3), EDSGN 403 (3), EDSGN 410 (4)[1], EDSGN 495 (1), ENGR 407 (3)(Sem: 7-8)

ADDITIONAL COURSES (7 Credits)

(CHEM 112 GN(3);
or Any GN(3)
(Sem: 1-2)
)
(CHEM 113 GN(1);
or Any GN(1)
(Sem: 1-2)
)
ME 201 (3)[1]; (ME 300 (3)[1]; EME 301 (3)[1](Sem: 5-6))

SUPPORTING COURSES (3 Credits)

Select 3 credits in Engineering Technical Elective courses, in consultation with an advisor, from department list (Sem: 7-8)

[1] A student enrolled in this program must receive a grade of C or better, as specified in Senate Policy 82-44.
Courses modified by this proposal
MATH 251 (4); ME 345 (4); EDSGN 495 (1)

Courses added by this proposal
EDSGN 402; EDSGN 403

Existing Courses Added to or Moved Within Requirements for This Program
CHEM 112; CHEM 113; EDSGN 402; EDSGN 403; EE 316; EE 488; EGEE 437; EGEE 438; EGEE 441; EME 301; ME 201; ME 300; NUCE 401; CMPSC 200

Existing Courses Removed from or Moved Within Requirements for This Program
CMPEN 331; CMPEN 454; CMPEN 472; EE 352; EE 488; EGEE 437; EGEE 438; EGEE 441; NUCE 401; CHEM 112; CHEM 113; EME 301; ME 300

Academic Program Costing Analysis Form
Anticipated Costs: No costs are anticipated.

Academic Program Admissions Form

Baccalaureate (4-year) programs
First-year: N/A
Transfer: N/A
Non-Degree: N/A
Already graduated: N/A

Associate (2-year) programs
First-year: N/A
Transfer: N/A
Non-Degree: N/A
Already graduated: N/A

Review History
This section represents all consultation history that has occurred on this proposal

Legend

- Approve
- Rejected
- Waiting Review
- User Action Required
- Pending Action(s)
- Moved to Rejected Status
- Approved
- (#) - Review Order Sequence Number

Consultation
Recipient Name: JANICE MARGLE
Position: Consultation
Department: Abington College (Pre-Major)
Campus: ABINGTON CAMPUS

(16) Request sent: 2/15/2017 at 8:23 AM
Concur: Yes
Comments:
Reviewed On: 2/16/2017 at 6:16 PM
Recipient Name: MARCUS BESSER  Department: Abington College (Pre-Major)
Position: Consultation  Campus: ABINGTON CAMPUS
Title: ASSOC PROF M ENGINEERING

Request sent: 2/15/2017 at 8:23 AM
Concur: Yes  Comments:
Reviewed On: 2/15/2017 at 2:12 PM

Recipient Name: ROBERT AVANZATO  Department: (Not Available)
Position: Consultation  Campus: ABINGTON CAMPUS
Title: ASSOC PROF ENGINEERING

Request sent: 2/15/2017 at 8:23 AM
Concur: Yes  Comments:
Reviewed On: 2/24/2017 at 10:47 AM

Recipient Name: ZAFER HATAHET  Department: Abington College (Pre-Major)
Position: Consultation  Campus: ABINGTON CAMPUS
Title: DIV HEAD SCI & ENGINEER

Request sent: 2/27/2017 at 7:41 AM
Concur: Yes  Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: GRANT ALEXANDER RISHA  Department: (Not Available)
Position: Consultation  Campus: (Not Available)
Title: PROF OF MECH.ENGRG

Request sent: 2/27/2017 at 7:34 AM
Concur: Yes  Comments: (Completed By Default - Exceeded Time Limit)
Recipient Name: JENNILYN VALLEJERA  
Department: Business And Engineering  
Position: Consultation  
Campus: ALTOONA CAMPUS  
Title: INSTRUCTOR IN ENGINEERING

Request sent: 2/27/2017 at 7:35 AM  
Concur: Yes  
Comments:  
Reviewed On: 2/28/2017 at 10:32 AM

Recipient Name: JUNGWOO RYOO  
Department: Business And Engineering  
Position: Consultation  
Campus: ALTOONA CAMPUS  
Title: PROFESSOR OF INFOSCI/TECH

Request sent: 2/27/2017 at 7:35 AM  
Concur: Yes  
Comments: (Completed By Default - Exceeded Time Limit)  
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: SOHAIL ANWAR  
Department: (Not Available)  
Position: Consultation  
Campus: (Not Available)  
Title: PROF ENGINEERING

Request sent: 2/27/2017 at 7:39 AM  
Concur: Yes  
Comments: (Completed By Default - Exceeded Time Limit)  
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: DALE HENRY LITWHILER  
Department: Engineering, Business and Human Development  
Position: Consultation  
Campus: BERKS CAMPUS  
Title: ASSOC PROF ENGINEERING

Request sent: 2/27/2017 at 7:32 AM  
Concur: Yes  
Comments:
Recipient Name: **JANELLE LARSON**  
Department: Engineering, Business and Human Development  
Position: Consultation  
Title: ASSOC PROF  
Campus: BERKS CAMPUS

---

Request sent: 2/27/2017 at 7:34 AM  
Concur: Yes  
Comments: (Completed By Default - Exceeded Time Limit)  
Reviewed On: 3/2/2017 at 7:15 AM

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Recipient Name: **RUNGUN NATHAN**  
Department: Engineering, Business and Human Development  
Position: Consultation  
Title: ASSOC PROF ENGINEERING  
Campus: BERKS CAMPUS

---

Request sent: 2/27/2017 at 7:38 AM  
Concur: Yes  
Comments: I concur with the decision. I still feel that the name change is a sticky issue and I feel “Engineering” does not capture it well either. We will probably revisit this in the future again.  
Reviewed On: 2/27/2017 at 6:17 PM

---

Recipient Name: **TERRY SPEICHER**  
Department: School of Engr Technology and Commonwealth Engr  
Position: Consultation  
Title: ASST PROF ENGINEERING  
Campus: BERKS CAMPUS

---

Request sent: 2/15/2017 at 8:23 AM  
Concur: Yes  
Comments:  
Reviewed On: 2/16/2017 at 3:21 PM

---

Recipient Name: **ASAD AZEMI**  
Department: School of Engr Technology and Commonwealth Engr  
Position: Consultation  
Title: ASSOC PROF ENGINEERING  
Campus: BRANDYWINE CAMPUS

---

Request sent: 2/27/2017 at 7:30 AM
Recipient Name: IVAN ESPARRAGOZA
Department: UC Engineering
Position: Consultation
Campus: BRANDYWINE CAMPUS
Title: ASSOC PROF ENGINEERING

Request sent: 2/15/2017 at 8:23 AM
Concur: Yes
Comments:
Reviewed On: 2/15/2017 at 2:13 PM

Recipient Name: ULADZISLAU IVASHYN
Department: School of Engr Technology and Commonwealth Engr
Position: Consultation
Campus: BRANDYWINE CAMPUS
Title: ENGINEERING

Request sent: 2/27/2017 at 7:40 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: DAUDI WARYOBA
Department: School of Engr Technology and Commonwealth Engr
Position: Consultation
Campus: DUBOIS CAMPUS
Title: ASST PROF / ENGINEERING

Request sent: 2/27/2017 at 7:33 AM
Concur: Yes
Comments:
Reviewed On: 2/28/2017 at 3:45 PM

Recipient Name: DOUGLAS MILLER
Department: (Not Available)
Position: Consultation
Campus: DUBOIS CAMPUS
Title: INSTRUCTOR

Request sent: 2/27/2017 at 7:32 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: PINGJUAN WERNER  
Department: UC University College (Pre-Major)
Position: Consultation
Title: PROF ENGINEERING
Campus: DUBOIS CAMPUS

Request sent: 2/27/2017 at 7:38 AM
Concur: Yes
Comments:  
Reviewed On: 2/27/2017 at 9:09 AM

Recipient Name: RAMAKRISHNAN RAJAGOPALAN  
Department: UC Engineering
Position: Consultation
Title: RES ASSOC & ASST. PROF
Campus: DUBOIS CAMPUS

Request sent: 2/27/2017 at 7:39 AM
Concur: Yes
Comments:  
Reviewed On: 2/27/2017 at 9:56 AM

Recipient Name: CHENG DONG  
Department: Biomedical Engineering
Position: Consultation
Title: DEPT HEAD/DIST. PROF BIO
Campus: UNIVERSITY PARK CAMPUS

Request sent: 2/15/2017 at 8:23 AM
Concur: Yes
Comments:  
Reviewed On: 2/16/2017 at 3:53 PM

Recipient Name: JOHN HANNAN  
Department: Computer Science And Engineering
Position: Consultation
Title: ASC HEAD CMPSCI&ENG
Campus: UNIVERSITY PARK CAMPUS
Request sent: 2/15/2017 at 8:23 AM
Concur: Yes
Comments:
Reviewed On: 2/15/2017 at 3:14 PM

Recipient Name: JUDITH TODD
Department: Engineering Science And Mechanics
Position: Consultation
Title: HEAD/PROF ESM
Campus: UNIVERSITY PARK CAMPUS

Request sent: 2/15/2017 at 8:23 AM
Concur: Yes
Comments:
Reviewed On: 2/20/2017 at 11:52 AM

Recipient Name: M PARFITT
Department: Architectural Engineering
Position: Consultation
Title: PROFESSOR ARCH ENGR
Campus: UNIVERSITY PARK CAMPUS

Request sent: 2/27/2017 at 7:37 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: PATRICK FOX
Department: Civil And Environmental Engineering
Position: Consultation
Title: PROF AND DEPT HEAD
Campus: UNIVERSITY PARK CAMPUS

Request sent: 2/15/2017 at 8:23 AM
Concur: Yes
Comments:
Reviewed On: 2/15/2017 at 8:28 AM

Recipient Name: PAUL HEINEMANN
Department: Agricultural And Biological Engineering
Position: Consultation
Title: DEPT HD/PROF AG & BIO ENG
Campus: UNIVERSITY PARK CAMPUS
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<td>Recipient Name: <strong>PHILIP MORRIS</strong></td>
<td>Department: Aerospace Engineering</td>
<td>Position: Consultation</td>
<td>Campus: UNIVERSITY PARK CAMPUS</td>
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<td>Title: <strong>BOEING PROFESSOR OF AERSP</strong></td>
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<td>Recipient Name: <strong>PHILLIP SAVAGE</strong></td>
<td>Department: Chemical Engineering</td>
<td>Position: Consultation</td>
<td>Campus: UNIVERSITY PARK CAMPUS</td>
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<td>Title: <strong>PROF/DEPT HEAD CHEM ENGR</strong></td>
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<td>Recipient Name: <strong>THOMAS F LAPORTA</strong></td>
<td>Department: Computer Science And Engineering</td>
<td>Position: Consultation</td>
<td>Campus: UNIVERSITY PARK CAMPUS</td>
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<td>Title: <strong>LNHRDCHAIRPROF &amp; DIR EECS</strong></td>
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<td>Recipient Name: <strong>DAVID LOKER</strong></td>
<td>Department: Engineering</td>
<td>Position: Consultation</td>
<td>Campus: PENN STATE ERIE, THE BEHREND COLLEGE</td>
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<td>Title: <strong>ASSOC PROF ENGR</strong></td>
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Request sent: 2/27/2017 at 7:33 AM
Concur: Yes
Comments:
Reviewed On: 2/27/2017 at 12:24 PM

Recipient Name: EDWARD EVANS
Department: Engineering
Position: Consultation
Campus: PENN STATE ERIE, THE BEHREND COLLEGE
Title: SR LECT ENGINEERING

Request sent: 2/27/2017 at 7:33 AM
Concur: Yes
Comments:
Reviewed On: 2/27/2017 at 1:17 PM

Recipient Name: OLADIPO ONIPEDE
Department: Engineering
Position: Consultation
Campus: PENN STATE ERIE, THE BEHREND COLLEGE
Title: ASSOC PROF MECH_ENGR

Request sent: 2/27/2017 at 7:37 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: RUSSELL WARLEY
Department: Engineering
Position: Consultation
Campus: PENN STATE ERIE, THE BEHREND COLLEGE
Title: Interim Director, School of Engineering

Request sent: 2/15/2017 at 8:23 AM
Concur: Yes
Comments:
Reviewed On: 2/21/2017 at 8:27 AM

Recipient Name: THOMAS HEMMINGER
Department: Engineering
Position: Consultation
Campus: PENN STATE ERIE, THE BEHREND COLLEGE
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| Recipient Name: WILLIAM LASHER | Department: Engineering |
|---|
| Position: Consultation |
| Campus: PENN STATE ERIE, THE BEHREND COLLEGE |
| Title: PROFESSOR MECH ENG |

| (25) Request sent: 2/15/2017 at 8:23 AM |
| Concur: Yes |
| Comments: |
| Reviewed On: 2/25/2017 at 3:08 PM |

| Recipient Name: DOUGLAS SCHUMER | Department: (Not Available) |
|---|
| Position: Consultation |
| Campus: PENN STATE GREAT VALLEY |
| Title: ASST PROF ENGINEERDESIGN |

| (30) Request sent: 2/27/2017 at 7:32 AM |
| Concur: Yes |
| Comments: |
| Reviewed On: 2/27/2017 at 11:37 AM |

| Recipient Name: JAMES NEMES | Department: Data Analytics |
|---|
| Position: Consultation |
| Campus: PENN STATE GREAT VALLEY |
| Title: PROFESSOR & DAA |

| (26) Request sent: 2/27/2017 at 7:34 AM |
| Concur: Yes |
| Comments: |
| Reviewed On: 2/27/2017 at 8:17 AM |

| Recipient Name: SALLY RICHMOND | Department: (Not Available) |
|---|
| Position: Consultation |
| Campus: PENN STATE GREAT |
Title: LECTURER IN INFO SCIENCE

Request sent: 2/15/2017 at 8:23 AM
Concur: Yes
Comments:  
Reviewed On: 2/15/2017 at 3:13 PM

Recipient Name: AB Shafaye
Department: Science, Engineering And Technology
Position: Consultation
Campus: PENN STATE HARRISBURG, THE CAPITAL COLLEGE
Title: EE/EET Programs Chair

Request sent: 2/27/2017 at 7:36 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: Ameet Banerjee
Department: Science, Engineering And Technology
Position: Consultation
Campus: PENN STATE HARRISBURG, THE CAPITAL COLLEGE
Title: ASSOC PROF OF MECH ENG

Request sent: 2/27/2017 at 7:30 AM
Concur: Yes
Comments:  
Reviewed On: 2/27/2017 at 9:47 AM

Recipient Name: ISSAM ABU-MAHFOUZ
Department: Science, Engineering And Technology
Position: Consultation
Campus: PENN STATE HARRISBURG, THE CAPITAL COLLEGE
Title: ASSOC PRF ENGINEERING

Request sent: 2/27/2017 at 7:34 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/2/2017 at 7:15 AM
Recipient Name: OMID ANSARY  
Department: Capital Administration  
Position: Consultation  
Campus: PENN STATE HARRISBURG, THE CAPITAL COLLEGE  
Title: Senior Associate Dean for Academic Affairs

Request sent: 2/15/2017 at 8:23 AM  
Concur: Yes  
Comments:  
Reviewed On: 2/16/2017 at 2:17 PM

Recipient Name: RAFIC BACHNAK  
Department: Science, Engineering And Technology  
Position: Consultation  
Campus: PENN STATE HARRISBURG, THE CAPITAL COLLEGE  
Title: PROF OF ELECTRICAL ENG.

Request sent: 2/27/2017 at 7:38 AM  
Concur: Yes  
Comments: (Completed By Default - Exceeded Time Limit)  
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: RICHARD CIOCCI  
Department: Science, Engineering And Technology  
Position: Consultation  
Campus: PENN STATE HARRISBURG, THE CAPITAL COLLEGE  
Title: ASSOC PROF MECH ENG

Request sent: 2/27/2017 at 7:38 AM  
Concur: Yes  
Comments: (Completed By Default - Exceeded Time Limit)  
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: JOSEPH RANALLI  
Department: UC Engineering  
Position: Consultation  
Campus: HAZLETON CAMPUS  
Title: ASST PROF ASST PROF ENGR

Request sent: 2/15/2017 at 8:23 AM  
Concur: Yes  
Comments:
Recipient Name: KENNETH DUDECK
Department: UC Engineering
Position: Consultation
Title: ASSOC PROF ENGR

Recipient Name: WIESLAW GREBSKI
Department: School of Engr Design, Technology and Prof Prgrms
Position: Consultation
Title: ASSOCIATE PROF

Recipient Name: DAVID SALVIA
Department: Electrical Engineering
Position: Consultation
Title: ASST PROF ELECT. ENGR.

Initiator Comments: The Curriculum Committee for the GENERAL ENGINEERING program found that the current name is not adequate for the program offered at four different campuses outside University Park. This deduction is based on research conducted after students and members of the industry expressed concerns about the name of the program. The main findings of this research, expressed in the proposal, are summarized as follows:

1. The term General Engineering suffers from a severe perception problem. Most schools that use the term General Engineering do so to refer to non-
accredited programs that are not suitable for engineering graduates seeking technical careers. This already creates confusion for students that apply to the program and for potential employers, as evidenced by the surveys conducted by the General Engineering Curriculum Committee. In the words of a current DuBois GE student who responded to the survey, “The name of general engineering had come to be mistakenly understood as an undecided major with extra curriculum geared towards engineering instead of the more appropriate name of multidisciplinary engineering which is much more clearly understood.”

2. Surveys conducted by the General Engineering Curriculum Committee of current students at all General Engineering campuses, and of potential employers for General Engineering graduates demonstrated overwhelming support (71% of students, 86% of potential employers) for the name change. Over 50% of students with experience in job/internship seeking believe that the name General Engineering hurts them in their job search. One respondent states: “I am a retired Senior Computer Scientist and Project Manager. In my hiring for various companies over the years the title General Engineer would not have grabbed my interest in reading a resume...”

These findings were discussed within the Curriculum Committee and presented to the Industry and Professional Advisory Council (IPAC) of the options and the program-wide council receiving a unanimous support for the name change. The proposed new designation, Engineering, was the nomenclature proposed by the program-wide Industrial Advisory council that was subsequently approved by the individual option IPACs, as well as the program curriculum committee (composed of faculty).

An internal research revealed that there is an antecedent in the use of the name of “Engineering” to designate a program in the university. Penn State Behrend used the name of Engineering for a program that was later changed to Mechanical Engineering. The proposal to change the name from “General Engineering” to “Engineering” was presented and discussed with Peter Butler, Associate Dean of Engineering, Christine Masters, Assistant Dean of Engineering, David Christiansen, Associate Vice President and Senior Associate Dean for Academic Programs for University College, Sven Bilen, Head of School of Engineering Design Technology and Professional Programs, and Ivan Esparragoza, Director of Engineering Technology and Commonwealth Engineering receiving unanimous support. This proposal was also presented and discussed with the Chancellors of all the campuses offering the program who unanimously supported it. Additionally, the name change proposal was presented to the ACUE receiving the support to move it forward.

(19) Request sent: 2/21/2017 at 9:07 AM

Concur: No, this proposal needs significant changes

Comments: Thank you for your detailed response. You did not address my question/concern, however. These arguments that you give for using the term “Engineering” instead of “General Engineering” are the same arguments that you gave when the major was first proposed a number of years ago. At that time, the concerns about the name “Engineering” led
to a decision to use the term "General Engineering" instead. My question, which I am still asking, is why the concerns about the term "Engineering" are no longer relevant. One of the main concerns back then (which is still a concern) is that the use of the term "Engineering" for this major could cause lots of confusion because, as you know, pre-major students in the College of Engineering are already given the designation of Engineering -- ENGR. If this major's name were changed to "Engineering" then the College of Engineering would have a pre-major status of "Engineering" as well as a major called "Engineering." THIS concern, a holdover from when this major was formed, is the one that you still haven't addressed.

I am not debating your claims that "General Engineering" may be a poor name choice. I agree that it is not very descriptive and may be viewed negatively externally. I may add, however, that the name "Engineering" doesn't really solve the problem, either, and, in fact, creates additional INTERNAL confusion (as explained above). I think that this major would benefit from having a truly descriptive title -- one that does not cause confusion either internally or externally.

Reviewed On: 2/21/2017 at 9:56 AM

Initiator Comments: After identifying serious concerns about the name General Engineering for the program, the Curriculum Committee of the program initiated the consultation process and the search for a better descriptor of the program instead of the General term. No single descriptive term is possible for the program since this major includes options of Applied Materials, Alternative Energy and Power Generation, and Multidisciplinary Design. There is no unifying specific terminology that would encompass these fields, and still allow the possibility of new options to be added in the future. We did propose to change the name in the form of “Multidisciplinary Engineering”. The final decision to pursue a name change to “Engineering” as opposed to an alternate option (e.g. Multidisciplinary Engineering) was made at a meeting of administrators from the College of Engineering (Dr. Peter Butler and Dr. Christine Masters), University College (Dr. David Christensen), SEDTAPP (Dr. Sven Bilen) and representatives from the GE program. Concerns about the pre-engineering terminology were absolutely considered as part of this discussion. Other existing programs in the university, e.g., Business and Science, were considered as part of the discussion. They have programs with the name “Business” and “Science” and still have students in the first two years also recognized as “Business” or “Science” students. The codes and designation of students is an internal administrative issue to identify the status of the students within a program and they should not be a problem or confusion for the students. Additionally, the use of pre-major designation in the codes now used in LionPath avoid any confusion since the codes to identify students in the first two years (before entering into a major) are: Program UGEN, Plan ENGR_PMAJ, while codes to identify students in a major are: program UGEN, Plan ME_BS. This shows a clear distinction between students in pre-major status and students in a program.

The strongest concerns over the use of Engineering when the major was formed was Dr. Jean Pytel, who has since retired. Dr. Masters currently serves in Dr. Pytel's former role as Assistant Dean for Student Services and Global Programs in the college and was an active part of the decision-making process leading to the choice of Engineering, and thus, does not feel that the previous concerns are disqualifying. The decision to pursue the name Engineering for the program ultimately reflects the perception that any internal confusion is not as serious as the demonstrated career and recruitment impacts of the term "General." The administrators have expressed a
preference for the name “Engineering” for the program over the alternatives. Given the seriousness of the impacts we have observed on our students, we feel that this compromise would be an acceptable approach.

(20) Request sent: 2/22/2017 at 10:05 AM
Concur: Yes
Comments: Thanks for addressing my concern. I am ok with the name change.
Reviewed On: 2/22/2017 at 10:19 AM

Recipient Name: **ERIC MARSH**
Department: Mechanical Engineering
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: PROFESSOR OF MECH ENGR

(2) Request sent: 2/15/2017 at 8:23 AM
Concur: Yes
Comments:
Reviewed On: 2/15/2017 at 8:31 AM

Recipient Name: **JANIS TERPENNY**
Department: Industrial And Manufacturing Engineering
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: DEPT HEAD & PROF INDUSTL

(54) Request sent: 2/27/2017 at 7:35 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: **KAREN THOLE**
Department: Mechanical Engineering
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: DEPT HEAD MNE

(5) Request sent: 2/15/2017 at 8:23 AM
Concur: Yes
Comments:
Reviewed On: 2/15/2017 at 2:07 PM

Recipient Name: **KULTEGIN AYDIN**
Department: Electrical Engineering
Position: Consultation  
Campus: UNIVERSITY PARK CAMPUS  
Title: DEPT HEAD/PROF ELECT ENGR

Request sent: 2/15/2017 at 8:23 AM  
Concur: Yes  
Comments:  
Reviewed On: 2/24/2017 at 4:49 PM

Recipient Name: MATTHEW PARKINSON  
Department: School of Engr Design, Technology and Prof Prgrms  
Position: Consultation  
Campus: UNIVERSITY PARK CAMPUS  
Title: ASSOC PROF ENGR DESIGN

Request sent: 2/27/2017 at 7:36 AM  
Concur: Yes  
Comments: (Completed By Default - Exceeded Time Limit)  
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: SCARLETT MILLER  
Department: School of Engr Design, Technology and Prof Prgrms  
Position: Consultation  
Campus: UNIVERSITY PARK CAMPUS  
Title: ASST PROF ENGR DESIGN

Request sent: 2/27/2017 at 7:39 AM  
Concur: Yes  
Comments: (Completed By Default - Exceeded Time Limit)  
Reviewed On: 3/2/2017 at 7:15 AM

Recipient Name: SVEN BILEN  
Department: School of Engr Design, Technology and Prof Prgrms  
Position: Consultation  
Campus: UNIVERSITY PARK CAMPUS  
Title: DEPT HEAD/SEDTAPP

Request sent: 2/15/2017 at 8:23 AM  
Concur: Yes  
Comments:  
Reviewed On: 2/24/2017 at 12:12 PM

College Administrator Review
Title:

(57) Request sent: 4/11/2017 at 10:12 AM
Concur: Yes
Comments:
Common Requirements for the Option: Multidisciplinary Engineering Design-Prescribed Courses:
- Yes, every student in the MDE Option is required to take the 1 credit internship course.
- The number of credits for the internship course (EDSGN 495) is prescribed to be 1.
- Credits have been added to EDSGN 402 and 403.
- The prescribed credits for the MDE Option have been revised.
Thank you!
Reviewed On: 4/11/2017 at 10:12 AM

Head of Department

Recipient Name: SVEN BILEN
Position: Head of Department
Title:

Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

SCCA Representative

Recipient Name: LING ROTHROCK
Position: SCCA Representative

Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

Dean of the College

Recipient Name: PETER BUTLER
Position: Dean of the College

Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]
Vice President Of The Commonwealth Campuses

Recipient Name: **DAVID CHRISTIANSEN**  
Department: (Not Available)  
Position: Vice President Of The Commonwealth Campuses  
Campus: UNIVERSITY PARK CAMPUS

SCCA Subcommittee Review

Recipient Name: **CORTNEY SMITH**  
Department: (Not Available)  
Position: SCCA Subcommittee Review  
Campus: UNIVERSITY PARK CAMPUS

Recipient Name: **KADI CORTER**  
Department: (Not Available)  
Position: SCCA Subcommittee Review  
Campus: UNIVERSITY PARK CAMPUS

Recipient Name: **ALLISON ALBINSKI**  
Department: (Not Available)  
Position: SCCA Subcommittee Review  
Campus: UNIVERSITY PARK CAMPUS
SCCA Review

Recipient Name: CORTNEY SMITH
Department: (Not Available)
Position: SCCA Review
Campus: UNIVERSITY PARK CAMPUS

Recipient Name: KADI CORTER
Department: (Not Available)
Position: SCCA Review
Campus: UNIVERSITY PARK CAMPUS

Recipient Name: ALLISON ALBINSKI
Department: (Not Available)
Position: SCCA Review
Campus: UNIVERSITY PARK CAMPUS

Faculty Senate Review

Recipient Name: CORTNEY SMITH
Department: (Not Available)
Position: Faculty Senate Review  
Campus: UNIVERSITY PARK CAMPUS

Title:

Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

Recipient Name: KADI CORTER  
Department: (Not Available)

Position: Faculty Senate Review  
Campus: UNIVERSITY PARK CAMPUS

Title:

Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

Recipient Name: ALLISON ALBINSKI  
Department: (Not Available)

Position: Faculty Senate Review  
Campus: UNIVERSITY PARK CAMPUS

Title:

Request sent: 2/17/2017 at 2:01 PM
Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

Registrar Data Entry

Recipient Name: PAULA HAMATY  
Department: (Not Available)

Position: Registrar Data Entry  
Campus: UNIVERSITY PARK CAMPUS

Title:

Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

Final Confirmation

Recipient Name: CORTNEY SMITH  
Department: (Not Available)
Position: Final Confirmation
Campus: UNIVERSITY PARK CAMPUS

Title:

Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

Recipient Name: KADI CORTER
Department: (Not Available)
Position: Final Confirmation
Campus: UNIVERSITY PARK CAMPUS

Title:

Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

Recipient Name: ALLISON ALBINSKI
Department: (Not Available)
Position: Final Confirmation
Campus: UNIVERSITY PARK CAMPUS

Title:

Request sent: 2/17/2017 at 2:03 PM
Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]
Program Codes
Abington College: XX
Engineering: GE_BS
University College: XX

Option Codes
General Engineering (G E):
Alternative Energy and Power Generation: AE&PG
Applied Materials: APMTL
Multidisciplinary Engineering Design: MDE

Uploaded Documents:
Context Type: Prospectus Memo
File Description: Name Change from General Engineering to Engineering
File Name: ACUE-Prospectus-ENG-AB-UC-BS-GeneralEngineering.pdf
UPLOADED DOCUMENTS FOLLOW:
Thank you for the submission of your P-1 prospectus to change the name of the Bachelor of Science in General Engineering to Bachelor of Science in Engineering and to make curricular revisions. The ACUE Prospectus Committee has reviewed your prospectus and recommends continued consultation with the other colleges offering the program (Abington and University College at Brandywine, DuBois, and Hazleton). In line with AAPPM P-1 criteria and consultation, you may now move to the formal P-1 submission process.

cc: David J. Christiansen
Kadi K. Corter
Michele L. Duffey
Anna M. Griswold
Daniel R. Hagen
Tracy S. Hoover
Robert N. Pangborn
Andrew G. August
Graduate Studies and Research Committee Activity Summary
for EFC Meeting- April 18, 2017
Prepared by Lori Long
Proposal report and proposals attached to email

Program Proposals:
- None

Course Proposals:
  Approved
  - (ESC 503) Low Dimensional Nanoelectronics – Add
  - (NUCE 544) Global Nuclear Security Policies – Add

Reviewed - Returned to Proposer for Revisions
- (EMCH 501) Mechanics in Emerging Electro)- Add
- (BME 509) Mechanobiology – Add

Graduate Faculty Nominations:
  Approved
  - Suresh Iyer – Category R-Fixed Term
<table>
<thead>
<tr>
<th>Proposal Type</th>
<th>Title</th>
<th>Mnemonic</th>
<th>Action Requested (Add/Change/Drop)</th>
<th>Vote</th>
<th>Justification (Why/What for)</th>
<th>Summary of Discussion Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course</td>
<td>Low Dimensional Nanoelectronics</td>
<td>ESC</td>
<td>Add</td>
<td>Approved</td>
<td>The instructional objectives for this course are to use class lectures, homework assignments, and group projects as effective teaching instruments to familiarize students with new physical concepts, provide deeper and/or new insights to already learned concepts, and improve and execute these concepts in engineering applications. Hands-on experiences, cleanroom demonstrations, as well as journal literature review, will also be used as viable teaching tools. Students will be asked to use their learning from this course to review engineering and scientific journal articles and present in class to other students. They will also be required to write a project report in the form of a manuscript. Proficiency in journal article reading, writing, understanding, and utilization will be an integral part of the course instructional objectives.</td>
<td>The educational objectives of this course focus on conveying the fundamental physics behind the operation of low dimensional materials and novel devices based on the same. The course will also educate the students about the wide spectrum of applications of novel nanomaterials and promote critical and innovative thinking in order to overcome the technological challenges associated with their implementation. After successfully completing this course, the students will have holistic knowledge of how to implement and engineer unique properties of novel low dimensional materials into advanced devices for next generations of electronic, optoelectronic, and energy related applications. Students will master how to design, simulate, and analyze novel devices. They will also learn how to evaluate unique and unprecedented experimental results.</td>
</tr>
<tr>
<td>Course</td>
<td>Global Nuclear Security Policies</td>
<td>NUCE</td>
<td>Add</td>
<td>Approved</td>
<td>The primary goal of this course is to review and analyze the policies and laws that are intended to provide a secure environment for the pursuit of legitimate nuclear activities in order to make informed solution recommendations. Student papers and presentations will address complex unresolved issues in nuclear security. Students will research, analyze, and provide recommendations for ways to implement incomplete policies, laws, and treaties. After completion of the course, students will be able to:</td>
<td>The primary goal of this course is to review and analyze the policies and laws that are intended to provide a secure environment for the pursuit of legitimate nuclear activities in order to make informed solution recommendations. Student papers and presentations will address complex unresolved issues in nuclear security. Students will research, analyze, and provide recommendations for ways to implement incomplete policies, laws, and treaties. After completion of the course, students will be able to:</td>
</tr>
</tbody>
</table>

*Looks Good*

*Gocks good overall*

*Overall, this course proposal looks fine and I am supportive of it. I do not think that an undergraduate level course can be listed as a prerequisite for a graduate level course (ESC 414 is listed).*

**Only existing Penn State course abbreviations and numbers of courses at the 400-level or higher may be listed as prerequisites for graduate courses.**

http://gradschool.psu.edu/faculty-and-staff/faculty/graduate-course-proposal-submission/
COURSE SUBMISSION AND CONSULTATION FORM

Principal Faculty Member(s) Proposing Course

<table>
<thead>
<tr>
<th>Name</th>
<th>User ID</th>
<th>College</th>
<th>Department</th>
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</thead>
<tbody>
<tr>
<td>SAPTARSHI DAS</td>
<td>sud70</td>
<td>Engineering (EN)</td>
<td>Not Available</td>
</tr>
</tbody>
</table>

College with curricular responsibility: Engineering (EN)

Type of Proposal: [ ] Add  [ ] Change  [ ] Drop

Course Designation

(ESC 503) Low Dimensional Nanoelectronics

Course Information

Cross-Listed Courses:

Prerequisites:

ESC 414; OR Equivalent

Corequisites:

Concurrents:

Recommended Preparations:

Students with elementary background in semiconductors, solid state physics, and quantum mechanics can attend this course.

Abbreviated Title:       Low Dim Nano

This course will be delivered:

[ ] in residence

[ ] off-site

[ ] online

Bulletin Listing

Minimum Credits: 3
Maximum Credits: 3
Repeatable: NO

Department with Curricular Responsibility: Engineering Science And Mechanics (UPEN_ESCM)

Effective Semester: FA 2017

Travel Component: NO

Campuses That Have Offered ( ) Over The Past 4 Years

| semester | AB | AL | BK | BR | BW | CR | DS | ER | FE | GA | GV | HB | HN | HY | LV | MA | NK | PC | SH | SL | UP | WB | WC | WS | XC | XP | XS | YK |

Course Outline

A brief outline or overview of the course content:

1. Review of Carrier Transport in Bulk Semiconductors
   1.1. Carrier statistics: Fermi-Dirac and Boltzmann
   1.2. Band structure and density of states
   1.3. Electron density, electron velocity, electron energy
   1.4. Drift-diffusion model of current transport

2. Landauer Model for Transport
   2.1. Bottom-up View
2.2. Ballistic Transport
2.3. Modes in Transport
2.4. Quantum conductance
2.5. Quasi Ballistic and Diffusive Transport

3. Transport in Various Nanomaterials
3.1. Quantum dots
3.2. Carbon Nano Tube
3.3. Graphene
3.4. Modulation Doped Semiconductors
3.5. MoS2

4. Thermoelectricity from Landauer Formalism for Various Nanomaterials
4.1. Correlation between heat current and charge current
4.2. Soret coefficient
4.3. Seebeck coefficient
4.4. Peltier Cooling
4.5. Kelvin Relationship
4.6. Wiedemann-Frantz Law

5. Metal Oxide Semiconductor Field Effect Transistor (MOSFET)
5.1. MOS Electrostatics
5.2. MOS Capacitor
5.3. Ultra-thin-body Silicon-on-Insulator (SOI)
5.4. Partially depleted and fully depleted SOIs
5.5. Square Law MOSFET
5.6. Self-consistent solution for Poisson’s equation and Landauer model
5.7. MOSFET scaling
5.8. Short channel effects
5.9. Beyond Boltzmann device concepts

6. Ballistic Nanotransistors
6.1. Ballistic mobility
6.2. Velocity overshoot
6.3. Scattering
6.4. Quantum capacitance limit
6.5. Contact resistance

7. Quantum Effects in Transport
7.1. Quantum Hall effect
7.2. Energy level Broadening
7.3. Coulomb Blockade
7.4. Single electron versus Multi-electron model
7.5. Folks space
7.6. Fundamental Limits

8. Non Equilibrium Green’s Function (NEGF)
8.1. Schrodinger equation and effective mass equation
8.2. Nearest Neighbor Semi Empirical Model for band structure calculation
8.3. Self-energy matrices
8.4. Green’s function
8.5. Transport equations

A listing of the major topics to be covered with an approximate length of time allotted for their discussion:
1. Review of Carrier Transport in Bulk Semiconductors (4.5 hours)
2. Landauer Model for Transport (7.5 hours)
3. Transport in Various Nanomaterials (6 hours)
4. Thermoelectricity from Landauer for Various Nanomaterials (3 hours)
5. Metal Oxide Semiconductor Field Effect Transistor (6 hours)
6. Ballistic Nanotransistors (6 hours)
7. Quantum Effect in Transport (6 hours)
8. Non Equilibrium Green’s Function (NEGF) (3 hours)
9. Class Project (3 hours)

Course Description:
This course will cover basic concepts which are essential to understand modern electronic devices based on novel nanomaterials. The course is designed for experimentalists, material scientists, and device physicists who are interested to learn how carrier transport takes place in low dimensional semiconductors such as zero dimensional quantum dots, one dimensional nanotubes (CNT), quasi-one dimensional nanowires, and two dimensional nanosheets (graphene, MoS2). The course will begin with a review of semiconductor physics which includes Fermi-Dirac statistics, dispersion relationship (E-k),
The educational objectives of this course focus on conveying the fundamental physics behind the operation of low dimensional materials and novel devices based on the same. The course will also educate the students about the wide spectrum of applications related to nanomaterials and novel devices. Students will be required to write a project report in the form of a manuscript. Proficiency in journal article reading, writing, understanding, and utilization will be an integral part of the course instructional objectives.

The educational objectives of this course focus on conveying the fundamental physics behind the operation of low dimensional materials and novel devices based on the same. The course will also educate the students about the wide spectrum of applications related to nanomaterials and novel devices. Students will be required to write a project report in the form of a manuscript. Proficiency in journal article reading, writing, understanding, and utilization will be an integral part of the course instructional objectives.

The instructional objectives for this course are to use class lectures, homework assignments, and group projects as effective teaching instruments to familiarize students with new physical concepts, provide deeper and/or new insights to already learned concepts, and improvise and execute these concepts in engineering applications. Hands-on experiences, cleanroom demonstrations, as well as journal literature review, will also be used as viable teaching tools. Students will be asked to use their learning from this course to review engineering and scientific journal articles and present in class to other students. They will also be required to write a project report in the form of a manuscript. Proficiency in journal article reading, writing, understanding, and utilization will be an integral part of the course instructional objectives.

The educational objectives of this course focus on conveying the fundamental physics behind the operation of low dimensional materials and novel devices based on the same. The course will also educate the students about the wide spectrum of applications related to nanomaterials and novel devices. Students will master how to design, simulate, and analyze novel devices. They will also learn how to evaluate unique and unprecedented experimental results.

Evaluation Methods:
Include a statement that explains how the achievement of the educational objective identified above will be assessed. The procedures for determining students' grades should be specifically identified.
The course evaluation involves three components:
(1) Three (3) in-class examinations (20% each totaling to 60%)
(2) Eight (8) written homework assignments weighted equally (20%)
(3) A class project (small group or individual) (20%)

Relationship/Linkage of Course to Other Courses:
This statement should relate the course to existing or proposed new courses. It should provide a rationale for the level of instruction, for any prerequisites that may be specified, or for the course's role as a prerequisite for other courses. Except for few basic concepts on semiconductor physics and MOSFET, this course does not have any significant overlap with any other courses offered by ESM, EE, MatSE, or Physics. E SC 503 is not a prerequisite for any other course.

Relationship of Course to Major, Option, Minor, or General Education:
This statement should explain how the course will contribute to the major, option, or minor and indicate how it may function as a service course for other departments.
Students seeking graduate studies in nanomaterials, nanoelectronics, or nanotechnology would benefit from the content of this course. This course is also useful for students studying condensed matter physics, materials engineering, solid state devices, and microelectronics.
A description of any special facilities:
The Nanofabrication Laboratory at the Materials Research Institute will be used for demonstrations.
The nanotechnology cleanroom of the Center for Nanotechnology Education and Utilization (CNEU) may also be used for demonstrations and hands-on experiences.

Frequency of Offering and Enrollment:
It is anticipated that this course will be offered every fall semester. A pilot course was offered in the fall semester 2016. The enrollment was 11 students. It is expected that the enrollment will increase in the subsequent offerings. The anticipated number of students is 20/semester.

Review History
This section represents all consultation history that has occurred on this proposal

Legend
Approve  Rejected  Waiting Review  User Action Required
Pending Action(s)  Moved to Rejected Status  Approved  (#) - Review Order Sequence Number

Consultation

Position: Consultation  Campus: UNIVERSITY PARK CAMPUS
Title: BINDER PROFESSOR IN ESM

Request sent: 2/7/2017 at 12:41 PM
Concur: Yes
Comments: I am in favor of this course being offered in the ESM Department. Since this is going to be a regularly scheduled course, I strongly urge that you compare the contents of this courses with those of existing courses (if relevant) in the Physics Department. That comparison must be added to the proposal.
Reviewed On: 2/7/2017 at 12:50 PM

Position: Consultation  Campus: UNIVERSITY PARK CAMPUS
Title: PROF ESM/MSE

Request sent: 2/7/2017 at 12:41 PM
Concur: Yes
Comments:
Reviewed On: 2/8/2017 at 8:06 AM

Position: Consultation  Campus: UNIVERSITY PARK CAMPUS
Title: DIR. CTR NANO ED & UTILIZ

Request sent: 2/7/2017 at 12:41 PM
Recipient Name: CHITARANJAN DAS  
Department: Computer Science And Engineering  
Position: Consultation  
Campus: UNIVERSITY PARK CAMPUS  
Title: DISTINGUISHED PROF CSE

Concur: Yes  
Comments:  
Reviewed On: 2/7/2017 at 3:12 PM

Recipient Name: JANIS TERPENNY  
Department: Industrial And Manufacturing Engineering  
Position: Consultation  
Campus: UNIVERSITY PARK CAMPUS  
Title: DEPT HEAD & PROF INDUSTL

Concur: Yes  
Comments:  
Reviewed On: 2/22/2017 at 5:06 PM

Recipient Name: KAREN THOLE  
Department: Mechanical Engineering  
Position: Consultation  
Campus: UNIVERSITY PARK CAMPUS  
Title: DEPT HEAD MNE

Concur: Yes  
Comments:  
Reviewed On: 3/6/2017 at 11:18 AM

Recipient Name: KULTEGIN AYDIN  
Department: Electrical Engineering  
Position: Consultation  
Campus: UNIVERSITY PARK CAMPUS  
Title: DEPT HEAD/PROF ELECT ENGR

Concur: Yes  
Comments:  
Reviewed On: 2/24/2017 at 4:35 PM

Recipient Name: M PARFIT  
Department: Architectural Engineering  
Position: Consultation  
Campus: UNIVERSITY PARK CAMPUS  
Title: UNIVERSITY PARK CAMPUS
(12) Request sent: 3/6/2017 at 7:30 AM
Concur: Yes
Comments:
Reviewed On: 3/6/2017 at 9:07 AM

Recipient Name: PATRICK FOX
Department: Civil And Environmental Engineering
Position: Consultation
Title: PROF AND DEPT HEAD
Campus: UNIVERSITY PARK CAMPUS

(5) Request sent: 2/21/2017 at 12:33 PM
Concur: Yes
Comments:
Reviewed On: 2/21/2017 at 1:28 PM

Recipient Name: PAUL HEINEMANN
Department: Agricultural And Biological Engineering
Position: Consultation
Title: DEPT HD/PROF AG & BIO ENG
Campus: UNIVERSITY PARK CAMPUS

(4) Request sent: 2/21/2017 at 12:33 PM
Concur: Yes
Comments:
Reviewed On: 2/21/2017 at 1:03 PM

Recipient Name: PHILIP JOHN MORRIS
Department: Aerospace Engineering
Position: Consultation
Title: BOEING PROFESSOR OF AERSP
Campus: UNIVERSITY PARK CAMPUS

(15) Request sent: 3/6/2017 at 7:31 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/8/2017 at 7:15 AM

Recipient Name: PHILLIP SAVAGE
Department: Chemical Engineering
Position: Consultation
Title: PROF/DEPT HEAD CHEM ENGR
Campus: UNIVERSITY PARK CAMPUS

(16) Request sent: 3/6/2017 at 7:31 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/8/2017 at 7:15 AM
Recipient Name: SUSAN SINNOTT  
Department: Materials Science And Engineering  
Position: Consultation  
Title: Professor and Department Head  
Campus: UNIVERSITY PARK CAMPUS

Request sent: 2/21/2017 at 12:33 PM  
Concur: Yes  
Comments:  
Reviewed On: 2/22/2017 at 8:56 PM

Recipient Name: SVEN BILEN  
Department: School of Engr Design, Technology and Prof Prgms  
Position: Consultation  
Title: DEPT HEAD/SEDTAPP  
Campus: UNIVERSITY PARK CAMPUS

Request sent: 2/21/2017 at 12:33 PM  
Concur: Yes  
Comments:  
Reviewed On: 2/24/2017 at 12:14 PM

Recipient Name: THOMAS LAPORTA  
Department: Computer Science And Engineering  
Position: Consultation  
Title: LNHRDCHAIRPROF & DIR EECS  
Campus: UNIVERSITY PARK CAMPUS

Request sent: 2/21/2017 at 12:33 PM  
Concur: Yes  
Comments:  
Reviewed On: 2/21/2017 at 2:13 PM

Recipient Name: WILLIAM HANCOCK  
Department: Bioengineering  
Position: Consultation  
Title: PROFESSOR BIOENGINEERING  
Campus: UNIVERSITY PARK CAMPUS

Request sent: 2/27/2017 at 7:41 AM  
Concur: Yes  
Comments:  
Reviewed On: 2/27/2017 at 8:32 AM

Head of Department

Recipient Name: JUDITH TODD  
Department: (Not Available)  
Position: Head of Department  
Title:  
Campus: UNIVERSITY PARK CAMPUS

Concur: [Not Yet Reviewed]
College/School Representative to the Graduate Council Subcommittee on New and Revised Programs and Courses

Recipient Name: MATTHEW PARKINSON  
Department: (Not Available)  
Position: College/School Representative to the Graduate Council Subcommittee on New and Revised Programs and Courses  
Campus: UNIVERSITY PARK CAMPUS

Concur: [Not Yet Reviewed]  
Comments: [Not Yet Reviewed]  
Reviewed On: [Not Yet Reviewed]

Dean of the College

Recipient Name: PETER BUTLER  
Department: (Not Available)  
Position: Dean of the College  
Campus: UNIVERSITY PARK CAMPUS

Concur: [Not Yet Reviewed]  
Comments: [Not Yet Reviewed]  
Reviewed On: [Not Yet Reviewed]

Review on Behalf of the Dean of the Graduate School

Recipient Name: VICKI HEWITT  
Department: (Not Available)  
Position: Review on Behalf of the Dean of the Graduate School  
Campus: UNIVERSITY PARK CAMPUS

Concur: [Not Yet Reviewed]  
Comments: [Not Yet Reviewed]  
Reviewed On: [Not Yet Reviewed]

Feedback from the Graduate Council Joint Curricular Committee

Recipient Name: ROBERT BANNON  
Department: (Not Available)  
Position: Feedback from the Graduate Council Joint Curricular Committee  
Campus: UNIVERSITY PARK CAMPUS

Concur: [Not Yet Reviewed]  
Comments: [Not Yet Reviewed]  
Reviewed On: [Not Yet Reviewed]
Final Confirmation

Recipient Name: CORTNEY SMITH
Department: (Not Available)
Position: Final Confirmation
Campus: UNIVERSITY PARK CAMPUS

Title:

Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

Recipient Name: KADI CORTER
Department: (Not Available)
Position: Final Confirmation
Campus: UNIVERSITY PARK CAMPUS

Title:

Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

Recipient Name: ALLISON ALBINSKI
Department: (Not Available)
Position: Final Confirmation
Campus: UNIVERSITY PARK CAMPUS

Title:

Request sent: 2/17/2017 at 2:01 PM
Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

Curricular Information
Blue Sheet Item #:
Review Date:

SCRID Numbers
(ESC 503):
Graduate Council Subcommittee On New And Revised Programs and Courses

COURSE SUBMISSION AND CONSULTATION FORM

Principal Faculty Member(s) Proposing Course

<table>
<thead>
<tr>
<th>Name</th>
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<th>College</th>
<th>Department</th>
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<tr>
<td>KENAN UNLU</td>
<td>kxu2</td>
<td>Engineering</td>
<td>(EN)</td>
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College with curricular responsibility: Engineering (EN)

Type of Proposal: [X] Add  [ ] Change  [ ] Drop

Course Designation
(NUCE 544) Global Nuclear Security Policies

Course Information

Cross-Listed Courses:

Prerequisites:

Corequisites:

Concurrents:

Recommended Preparations:

Abbreviated Title: Glob Nuc Sec Polcs

This course will be delivered:

[X] in residence

[X] off-site

[X] online

Bulletin Listing

Minimum Credits: 3

Maximum Credits: 3

Repeatable: NO

Department with Curricular Responsibility: Nuclear Engineering (UPEN_NUCE)

Effective Semester: Upon Approval

Travel Component: NO

Campuses That Have Offered ( ) Over The Past 4 Years

| semester | AB | AL | BK | BR | BW | CR | DS | ER | FE | GA | GV | HB | HN | HY | LV | MA | NK | PC | SH | SL | UP | WB | WC | WS | XC | XP | XS | YK |

Course Outline

A brief outline or overview of the course content:

Global policies and laws for nuclear security that are intended to provide a secure environment for the pursuit of legitimate nuclear activity.

A listing of the major topics to be covered with an approximate length of time allotted for their discussion:

Class 1: Introduction to the course, course objectives; grading; homework; midterm, short paper, long paper

Classes 2-6: Perspectives on International Relations – context for nuclear security policy

Classes 7-11: State motivations for nuclear weapon proliferation

Classes 12-13: US Domestic Nuclear Strategy after the Cold War

Classes 14-16: National Nuclear Security Decision Making

Classes 17-18: Nuclear Security Structure and Strategy
Course Description:
This course reviews the historical development and examines the current state of American and international policies and laws related to global nuclear security. US policy has evolved over a period of more than sixty years since the Manhattan Project and has embraced the importance of both safeguards (applicable to weapons states and non-weapons states that commit to peaceful use of nuclear materials) and proliferation prevention (policies intended to deter and detect attempts to illicitly acquire nuclear weapons). Over this time improvements in technology have increased the potential for proliferation but have also increased the ability to detect proliferation. Recently, heightened danger of unauthorized proliferation by states and, more worrisome, transnational non-states, has led to increased emphasis on control and detection.

Within this context students in this course will study US national security strategy in the areas of counterterrorism and nonproliferation. We will discuss those policies aimed at enhancing nuclear security and examine the roles of various agencies, including the Department of Homeland Security, the Department of Energy (including the National Nuclear Security Administration), the Nuclear Regulatory Commission, the Department of Defense, and Environmental Protection Agency. International treaties and conventions on nuclear safeguards, arms control, and terrorism will be covered.

Regulations promulgated by the US Nuclear Regulatory Commission and the International Atomic Energy Agency will also be studied. The course will consider how these policies are intended to control the actions of both state and non-state adversaries and applications to both government and private sector nuclear activities. The role of transnational and domestic groups will be discussed, especially with regard to motivation and potential capabilities.

The name(s) of the faculty member(s) responsible for the development of the course:

Name: KENAN UNLU (kxu2)
Title: DIRECTOR RSEC
Phone: +1 814 865 6351
Address: 0101 BREAZEALE NUCLEAR REAC
Campus:
City:
Fax:

Course Justification

Instructional, Educational, and Course Objectives:
This section should define what the student is expected to learn and what skills the student will develop.

The primary goal of this course is to review and analyze the policies and laws that are intended to provide a secure environment for the pursuit of legitimate nuclear activities in order to make informed solution recommendations. Student papers and presentations will address complex unresolved issues in nuclear security. Students will research, analyze, and provide recommendations for ways to implement incomplete policies, laws, and treaties. After completion of the course, students will be able to:

• Demonstrate how the origins and history of controlling nuclear materials impact current and future nuclear security challenges.
• Identify and communicate the future implications of increased civilian use of nuclear technology.
• Incorporate present and future technologies in ideas for the development of new policies.
• Understand how US and international strategies, policies, and laws interact to promote global nuclear security.
• Understand the roles and responsibilities of various agencies both national and international and the regulated parties in nuclear security.
• Apply nuclear background and experience to understanding the political and economic basis for policies; or apply non-technical background to understand the technical limitations of policies and how they may change with changing technology.
• Recommend new approaches to better control these risks created by strains imposed on the existing nuclear security framework by the increased risk from non-state adversaries.
• Recommend new approaches for the reduction of nuclear material and radioisotope inventories.

Evaluation Methods:
Include a statement that explains how the achievement of the educational objective identified above will be assessed.

The procedures for determining students' grades should be specifically identified.

• Students will be evaluated on the basis of: Homework 30%
Midterm Exam 20%
Short Paper 20% (Paper with Memo Format with a designated topic for each student. Short papers are discussed in class with Q&A session)

Long Paper 30% (Report with an executive summary for a selected topic for each student with minimum six page and maximum 10 pages long. Fifteen minutes
presentation in power point format and additional time for each presentation for Q&A).

**Relationship/Linkage of Course to Other Courses:**
This statement should relate the course to existing or proposed new courses. It should provide a rationale for the level of instruction, for any prerequisites that may be specified, or for the course’s role as a prerequisite for other courses.

Nuc E 441, Nuclear Security Threat Analysis and Assessment. Nuc E 441 covers materials related to nuclear security threat assessment and analysis for non-state actors and the threats to nuclear and radiological facilities and supply lines. Some of the topics discussed in this course is related to Nuc E 544 but Nuc E 441 course is not a formal prerequisites.

**Relationship of Course to Major, Option, Minor, or General Education:**
This statement should explain how the course will contribute to the major, option, or minor and indicate how it may function as a service course for other departments.

Graduate students in Nuclear Engineering can use this course toward satisfying their degree requirements as an elective course. Graduate students from other colleges (e.g., School of International Affairs) can also take this course as an elective.

**A description of any special facilities:**
A multi-media classroom, under the auspices of the College of Engineering (Continuing & Distance Education), is required for the conduct of this course.

**Frequency of Offering and Enrollment:**
This course will be offered each Fall, with anticipated enrollments of 15-20 students via Resident Instruction and 15-20 students via Distance Education.

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**Review History**
This section represents all consultation history that has occurred on this proposal

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**Consultation**

✅ **Recipient Name:** ARTHUR MOTTA  
**Department:** Nuclear Engineering  
**Position:** Consultation  
**Campus:** UNIVERSITY PARK CAMPUS  
**Title:** PROF & CHAIR OF NUCL ENGR

(2) **Request sent:** 3/20/2017 at 7:30 AM  
**Concur:** Yes  
**Comments:**  
**Reviewed On:** 3/20/2017 at 10:09 AM

✅ **Recipient Name:** LEE BANASZAK  
**Department:** Political Science  
**Position:** Consultation  
**Campus:** UNIVERSITY PARK CAMPUS  
**Title:** HEAD PLSC, PROF PLSC/WMNST

(3) **Request sent:** 3/20/2017 at 7:30 AM  
**Concur:** Yes  
**Comments:** (Completed By Default - Exceeded Time Limit)  
**Reviewed On:** 3/22/2017 at 7:15 AM
Recipient Name: SCOTT GARTNER  Department: International Affairs

Position: Consultation  Campus: UNIVERSITY PARK CAMPUS

Title: Director OF INTL AFFAIRS

Request sent: 3/7/2017 at 3:36 PM
Concur: Yes
Comments:
Reviewed On: 3/12/2017 at 12:33 PM

Head of Department

Recipient Name: KAREN THOLE  Department: (Not Available)

Position: Head of Department  Campus: UNIVERSITY PARK CAMPUS

Title:

Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

College/School Representative to the Graduate Council Subcommittee on New and Revised Programs and Courses

Recipient Name: MATTHEW PARKINSON  Department: (Not Available)

Position: College/School Representative to the Graduate Council Subcommittee on New and Revised Programs and Courses  Campus: UNIVERSITY PARK CAMPUS

Title:

Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

Dean of the College

Recipient Name: PETER BUTLER  Department: (Not Available)

Position: Dean of the College  Campus: UNIVERSITY PARK CAMPUS

Title:

Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

Review on Behalf of the Dean of the Graduate School

Recipient Name: VICKI HEWITT  Department: (Not Available)

Position: Review on Behalf of the Dean of  Campus: UNIVERSITY PARK CAMPUS
Feedback from the Graduate Council Joint Curricular Committee

Recipient Name: ROBERT BANNON  Department: (Not Available)
Position: Feedback from the Graduate Council Joint Curricular Committee  Campus: UNIVERSITY PARK CAMPUS


Final Confirmation

Recipient Name: ALLISON ALBINSKI  Department: (Not Available)
Position: Final Confirmation  Campus: UNIVERSITY PARK CAMPUS


Recipient Name: CORTNEY SMITH  Department: (Not Available)
Position: Final Confirmation  Campus: UNIVERSITY PARK CAMPUS


Recipient Name: KADI CORTER  Department: (Not Available)
Position: Final Confirmation  Campus: UNIVERSITY PARK CAMPUS

Curricular Information

Blue Sheet Item #:  
Review Date: 

SCRID Numbers

(NUCE 544):

**UPLOADED DOCUMENTS:**
Context Type: Supporting Documents  
File Description: Intl Affairs Approval Letter  
File Name: Gartner.544[1].pdf

Context Type: Supporting Documents  
File Description: Pol Sci Approval Letter  
File Name: Pol Science approval[1].pdf
Uploaded Documents Follow:
September 8, 2015  
Re: Global Nuclear Security Policy” (544)  

Dear Senate Committee on Curricular Affairs,

I would like to support the proposal by Professor Kenan Unlu for the new course, “Global Nuclear Security Policy” (544). I believe that three School of International Affairs’ students attended this course last year and I would anticipate that there would be continued interest among our students. The course also complements our own courses, current and in development, in this area.

Given the importance of the nuclear topic, the current curricular offerings at PSU, and the School of International Affairs’ audience for this class, I support the approval of this course at Penn State.

Very Respectfully,

Scott Sigmund Gartner
Dear Senate committee on Curricular Affairs,

I am writing to support the proposal by Professor Kenan Unlu for the new course “Global Nuclear Security Policy (NucE 544). Political Science offers no policy courses at the graduate level, and so I do not anticipate any overlap with graduate programs in Political Science. The course provides an important option for nuclear engineers and more policy oriented students in the School of International Affairs to receive training on this important topic.

Given the significance of the topic, the current offerings at Penn State, and a strong potential audience for this class in other units, I support the approval of this course at Penn State.

Sincerely,

Lee Ann Banaszak
Department Head, Political Science
NOMINATION FOR MEMBERSHIP IN THE GRADUATE FACULTY - CATEGORY “R”

For detailed information on graduate faculty policies and eligibility criteria please refer to http://www.gradschool.psu.edu/faculty-and-staff/faculty/criteria/.

Category of Nominee’s Doctoral Degree: (check all that apply)

☑ Research doctorate (Ph.D.)
☐ Professional doctorate (e.g., M.D., D.P.H., J.D.)

Nominee Information (Please print or type all information entered)
1) Full name of nominee: Suresh S. Iyer

(Print or type)

2) Campus address: 201 Transportation Research Building


4) Other academic title (if any): N/A

5) Highest degree earned PhD

6) Field/discipline of degree: Mechanical Engineering

7) Institution of highest degree: Pennsylvania State University

8) PSU ID #: 953137145

9) PSU ACCESS ID: ssi105

10) E-mail: ssi105@psu.edu

11) Nominee’s home unit/administrative area: Larson Transportation Institute

Date of first appointment at Penn State (mm/dd/yyyy): ** 03/15/2005

**FORM WILL BE RETURNED TO THE COLLEGE IF SUBMITTED PRIOR TO APPOINTMENT DATE.

Appointment Type and Term (if applicable)

☐ Tenure-line (tenured or tenure-track)

☐ Standing

☑ Fixed-Term -- Indicate end date of appointment (mm/dd/yyyy): 06/30/2017

Graduate Program (Ph.D., M.A. and/or M.S.) Information:

1) Graduate program submitting nomination, to which nominee will contribute*:

Mechanical Engineering

*NOTE: Must be title of an approved graduate major exactly as listed in the Graduate Degree Programs Bulletin; do not list departments, options, emphasis areas, centers, or other entities.

2) Academic home of graduate program:
   (Academic Department/Division): Department of Mechanical and Nuclear Engineering
   (College/School): College of Engineering

3) Campus location(s) of the graduate program (i.e., resident PSU campus(es): World Campus; and/or approved off-site location): University Park - UP and World Campus - WC
NOMINATION FOR MEMBERSHIP IN THE GRADUATE FACULTY - CATEGORY “R”

REQUIRED SIGNATURES:
Nominee’s Unit Leader:
Karen A. Thole
Name (Print or type) ____________________________  Signature ____________________________  Date: 3/24/2017
Nominee’s Unit Leader:
Eric T. Donnell
Name (Print or type) ____________________________  Signature ____________________________  Date: 3/24/17
Head of Graduate Program Submitting Nomination (if other than nominee’s unit leader):
Mary L. Frecker
Name (Print or type) ____________________________  Signature ____________________________  Date: 3/24/17

Chair of the Graduate Faculty Evaluation Committee of the College/School in which the Ph.D., M.S.,
and/or M.A. program resides [Not required for Tenure-line faculty who hold a research doctorate (Ph.D.)]:
Name (Print or type) ____________________________  Signature ____________________________  Date: ____________________________

Dean/Chancellor/designee of the College/School in which the Ph.D., M.S., and/or M.A. program resides:
Name (Print or type) ____________________________  Signature ____________________________  Date: ____________________________

Dean of the Graduate School/Dean’s designee:
Name (Print or type) ____________________________  Signature ____________________________  Date: ____________________________

OPTIONAL INFORMATION:
Name and email address of administrative staff member who should be notified in the event of errors,
omissions, or other notifications related to the processing of this form:
Name (Print or type): Julie Co ms ____________________________  Email: jmcs82@psu.edu

NOMINATION FOR MEMBERSHIP IN THE GRADUATE FACULTY - CATEGORY “R”

Page 2 of 4
Updated: August 2015
REQUIRED SUPPORTING DOCUMENTS:

Supporting documents required for:
- Nominees on Fixed-term and Standing appointments;
- Nominees in Tenure-line appointments who do not hold a research doctorate (Ph.D.).

Supporting documents not required for nominees in tenure-line positions who hold a research doctorate (Ph.D.)

☑ Nominee’s Curriculum Vitae listing the following:
  a. **Education**: List all colleges, universities, or other institutions attended whether or not a degree was granted; dates attended; major field; degree earned; date degree conferred.
  b. **Professional Experience**: Inclusive dates, employer, and position/type of work done.
  c. **Scholarly achievements by the nominee appropriate to the discipline** (to include any of the following that are applicable):
     1) Peer-reviewed journal papers, proceedings, scholarly books, and/or other published works of a scholarly or professional nature and of recognized significance in the nominee's field. Include: Author(s), title, date, inclusive page nos., journal or publisher.
     2) Popular articles and books: Author(s), title, date, page nos., journal or publisher.
  d. **Patents or other intellectual property developed**

☑ A brief statement providing information on the following:
  a. Justification for the nomination.
  b. Description/evidence of nominee’s active program of research/scholarship relevant to the graduate program field in which the nominee would contribute.
  c. A statement of the proposed duties of the nominee as a member of the Graduate Faculty with respect to teaching, directing research, and mentoring of Ph.D., M.S. and/or M.A. students.

☑ List of doctoral and/or master’s theses, and/or master’s papers supervised by the nominee if applicable (include date, student’s name, degree, university conferring degree (if none, so indicate in attachments).

☑ List of membership on doctoral or master’s thesis committees, including as Special Member, if applicable. (include date, student’s name, degree, university conferring degree (if none, so indicate in attachments).

☑ List of university courses taught (include course number and title; for non-PSU courses, indicate if undergraduate or graduate level), if applicable.

☑ Other scholarly work or achievements/recognition of the nominee pertinent to recommendation for Graduate Faculty membership.

NOMINATIONS SUBMITTED WITHOUT ALL REQUIRED ITEMS IN CHECKLIST WILL BE RETURNED TO THE COLLEGE
Send hard copy of fully completed form with all required signatures and supporting documents to:

The Office of the Vice Provost for Graduate Education and Dean of the Graduate School  211 Kern Building, University Park, PA, 16802

Note: Forms and supporting documents will only be accepted as hard copies.

Questions may be directed to L-GRAD-DEANS-OFFICE@lists.psu.edu.
CURRICULUM VITAE

a. Education

Ph.D. Mechanical Engineering, May 2005, Penn State University, University Park, PA 16802, USA
Area of research – Emissions from of transit buses
Area of dissertation- ‘Enhanced Optical Methods of Soot Characterization for Application to Diesel Emission Measurements’


B Sc. (Engineering) in Mechanical Engineering, June 1978, College of Engineering, Trivandrum, Kerala, India First Class (Honors)

b. Publications

A. Research and/or scholarly publications

1. Refereed publications

   a. Articles published in refereed journals:

   SAE, 2106-01-0984, ‘Recovery of tail pipe species concentrations and its effect on emissions calculations from raw exhaust gas streams during chassis dynamometer tests’ Venkatraman Mahadevan (student), and Suresh Iyer (11 pages)


Combustion and Flame, 2012, 159:4, pp. 1444-1466, “The experimental evaluation of a methodology for surrogate fuel formulation to emulate gas phase combustion kinetic phenomena”, Dooley, Stephen ; Won, Sang Hee; Heyne, Joshua; Farouk, Tanvir I.; Ju, Yiguang; Dryer, Frederick L.; Kumar, Kamal; Hui, Xin; Sung, Chih-Jen; Wang, Haowei; Oehlschlaeger, Matthew A.; Iyer, Venkatesh; Iyer (student), Suresh; Litzinger, Thomas A.; Santoro, Robert J.; Malewicki, Tomasz; Brezinsky, Kenneth.


b. Articles published in refereed proceedings:


2008 32nd International Symposium on Combustion, McGill University, Montreal, Canada, August, "Flame Flicker in High Pressure Diffusion Flames", Arvind Menon (student), Suresh Iyer, Seong-Young Lee, Thomas Litzinger, and Robert Santoro,


c. Papers refereed by abstract (Proceedings)


2013 Fall Technical Meeting, Eastern States Section of the Combustion Institute, Clemson University, SC, "Soot and Aromatic Species in Non-premixed and Partially premixed Laminar
Co-flow Flames" Yefu Wang (student), Suresh S. Iyer, Venkatesh R. Iyer, Milton J. Linevsky, Thomas A. Litzinger, Robert J. Santoro, and Viswanath Katta. (6 pages)

2011 Fall Technical Meeting of the Eastern States Section of the Combustion Institute at the University of Connecticut, Storrs, CT, Oct 2011,"Comparison of Sooting Propensity of JP-8 with its Surrogates in a Wick Burner and a Model Gas Turbine Combustor" Venkatesh Iyer (student), Suresh Iyer, Stephen Dooley, Milton Linevsky, Frederick Dryer, Thomas Litzinger, Christopher Mordaunt, Robert Santoro. (6 pages)


2009 Fall Technical Meeting of the Eastern States Section of the Combustion Institute’ University of Maryland College Park, "Development of a wick-fed diffusion flame burner for liquid hydrocarbon fuels", Venkatesh Iyer (student), Suresh Iyer, Milton Linevsky, Thomas Litzinger, and Robert Santoro. (6 pages)

2009 Fall Technical Meeting of the Eastern States Section of the Combustion Institute’ University of Maryland College Park, , "Reaction Mechanism for Hypergolic Ignition of Dicyanamide based Ionic Liquids", Suresh Iyer and Thomas Litzinger (6 pages)


2005 Technical meeting of the Eastern States Section of the Combustion Institute, University of Central Florida, Florida, "In-situ Measurements of Primary Particle Diameter and Structure of Soot in a Laminar Diffusion Flame," Suresh Iyer, Thomas Litzinger, Seong-Young Lee, and Robert Santoro. (4 pages)

2005 Technical meeting of the Eastern States Section of the Combustion Institute, University of Central Florida, Florida, "Are the Fractal Characteristics of Soot Constant?," Suresh Iyer , Thomas Litzinger, and Robert Santoro. (4 pages)


2. Parts of books


3. Articles in-house organs.


2012-Penn State news article about our team receiving ‘Project of the Year’ award: http://news.psu.edu/story/152158/2012/01/30/penn-state-researchers-recognized-clean-air-research

2012: Penn State news article about federal grant: http://news.psu.edu/story/145710/2012/10/10/larson-institute-receives-6-million-federal-grant


4. Research reports to sponsor

2016- “Dynamometer-based emissions tests using transit driving cycles on an MCI motor coach model J4500 diesel bus” Suresh Iyer, sponsor Motor Coach Industries, Canada.

2016- “Tractive force measurements of a Karsan bus using chassis dynamometer” Suresh Iyer. sponsor Hexagon Studio, Turkey

2016 “Fuel Economy and Emissions Tests on a Class 8 truck”; evaluation of a new exhaust system” Suresh Iyer, sponsor NG1 Technologies


2014, "Emissions Tests using Transit Driving Cycles on an Articulated Chassis Bus with Diesel fuel for New York City Transit Authority" Suresh Iyer, sponsor: Newflyer of America, MN (6 pages)

2014 “Advanced Low Floor Vehicle Specifications Research”, Suresh Iyer, Partha Mishra, David Klinikowski, Boyd Thompson, Myra Strange, Wanda Boggs, and Carl Thornblad, sponsor: Mineta National Transportation Research Consortium (117 pages)

2013, "Effect of chocked diesel particulate filter on fuel economy and emissions on an articulated chassis bus" Suresh Iyer, sponsor: Newflyer of America, MN (6 pages)
2013, "Performance, Fuel Economy, Noise, and emissions of a CNG bus on Transit Driving Cycles" Suresh Iyer, sponsor: Newflyer of America, PA (37 pages)


2012, “Dynamometer-based Emissions Tests using Transit Driving Cycles on a Newflyer Diesel Bus with Navistar Engine” (6 pages)

2012, “Dynamometer-based Emissions Tests using Transit Driving Cycles on a Newflyer Model Xd40 Diesel Bus” (6 pages)

2012, “Dynamometer-Based Emissions Tests Using Transit Driving Cycles on an Articulated Novabus-L643” (6 pages)


2010, "Comparative Chassis Dynamometer based Fuel Consumption and Emissions Measurements, and Fuel and Engine Lube Oil Analysis on a Truck fueled with diesel and biodiesel" Suresh Iyer, David Klinikowski, Tom Wardrop, Drew Kane, Ryan Johnson, Steve Kirby and André L. Boehman, Volvo Powertrain North America (18 pages)

2010, "Comparative Chassis Dynamometer Based Fuel Consumption Tests on Graders" Suresh Iyer and David Klinikowski, Volvo Construction Equipment, Shippensburg, PA (12 pages)

B. Papers Presented at Technical and Professional Meetings

2016 Society of Automotive Engineers, World Congress, Detroit, MI ‘Recovery of tail pipe species concentrations and its effect on emissions calculations from raw exhaust gas streams during chassis dynamometer tests’ Venkatraman Mahadevan (student), and Suresh Iyer (presenter)


2015 Makwana, A. (student), Iyer, S. S., and Litzinger, T., SERDP (Strategic Environmental Research and Development Program Team meeting, Department of Energy, Web meeting, "Jet

2015 Makwana, A. (Penn State), Iyer, S. S. (Author Only), Litzinger, T., SERDP (Strategic Environmental Research and Development Program Team meeting, Department of Energy, Wright Patterson AFB, OH, "Jet Flame Studies," (September 15, 2015).


2010 MURI meeting on Surrogate Fuels, Princeton University, February 2010, "Relationship between TSI and Soot Levels for Surrogate Fuels", Venkatesh Iyer, Suresh Iyer, Milton Linevsky, Thomas Litzinger (presenter), and Robert Santoro.

2010 Summit Meeting of Multi-Agency Coordination Committee for Combustion Research (MACCR) of the Air Force Office of Sponsored Research (AFOSR), Princeton, NJ, September 2010, "Relationship between Threshold Soot Index and Soot Levels for Surrogate Fuels", Venkatesh Iyer, Suresh Iyer, Milton Linevsky, Thomas Litzinger (presenter), and Robert Santoro.

2009 Fall Technical Meeting of the Eastern States Section of the Combustion Institute’ University of Maryland College Park, "Development of a wick-fed diffusion flame burner for liquid hydrocarbon fuels", Venkatesh Iyer (student, presenter), Suresh Iyer, Milton Linevsky, Thomas Litzinger, and Robert Santoro.

2009 Fall Technical Meeting of the Eastern States Section of the Combustion Institute’ University of Maryland College Park, , "Reaction Mechanism for Hypergolic Ignition of Dicyanamide based Ionic Liquids", Suresh Iyer (presenter) and Thomas Litzinger


2005 Technical meeting of the Eastern States Section of the Combustion Institute, University of Central Florida, Florida, "In-situ Measurements of Primary Particle Diameter and Structure of Soot in a Laminar Diffusion Flame," Suresh Iyer (presenter), Thomas Litzinger, Seong-Young Lee, and Robert Santoro.

2005 Technical meeting of the Eastern States Section of the Combustion Institute, University of Central Florida, Florida, "Are the Fractal Characteristics of Soot Constant?," Suresh Iyer (presenter), Thomas Litzinger, and Robert Santoro.

C. Record of Participation in, and Description of, Seminars and Workshops

<table>
<thead>
<tr>
<th>Seminar/Workshop Title</th>
<th>Dates</th>
<th>Sponsor</th>
<th>Your Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>4th International Conference on Real Driving Emissions, Berlin, Germany</td>
<td>October 2016</td>
<td>International Quality and Productivity Centre (IQPC)</td>
<td>Invited speaker, workshop chair</td>
</tr>
<tr>
<td>International Symposium on Automotive Technology, Pune, India</td>
<td>January, 2015</td>
<td>Automotive Association of India/SAE</td>
<td>Author, presenter</td>
</tr>
<tr>
<td>APTA Conference and Annual Meeting - Professional Development and Sponsor Meeting</td>
<td>2006 to 2016</td>
<td>American Public Transportation Association</td>
<td>Participant, committee member</td>
</tr>
<tr>
<td>Technical Meeting of the Combustion Institute</td>
<td>2006 to 2016</td>
<td>The Combustion Institute</td>
<td>Member, author, presenter</td>
</tr>
<tr>
<td>Bus and Paratransit Conference - Professional Development and Sponsor Meeting,</td>
<td>2006 to 2014</td>
<td>American Public Transportation Association</td>
<td>Participant, committee member</td>
</tr>
<tr>
<td>SAE World Congress and Exhibition, Society of Automotive Engineers</td>
<td>2010 to 2016</td>
<td>Society of Automotive Engineers.</td>
<td>Member, author, presenter</td>
</tr>
<tr>
<td>Bus Conference and Meeting - Professional development, Sponsor Meeting, New technologies</td>
<td>2010 to 2016</td>
<td>Buscon</td>
<td>participant</td>
</tr>
<tr>
<td>7th International Fuel Cell Bus Workshop, San Francisco, CA</td>
<td>2011</td>
<td>Federal Transit Administration</td>
<td>Member</td>
</tr>
<tr>
<td>Automotive testing Expo of North America, Novi, MI- new test equipment</td>
<td>2010 to 2014</td>
<td>Automotive testing Expo of North America</td>
<td>Member</td>
</tr>
<tr>
<td>Intelligent Transportation Systems Workshop</td>
<td>2009</td>
<td>Federal Transit Administration</td>
<td>invited member</td>
</tr>
</tbody>
</table>

c. Other work or recognition of the nominee pertinent to recommendation for graduate faculty

1. Description of Outreach or Other Activities in Which There was Significant Use of Candidate's Expertise


2016: Invited speaker and workshop chair at the 4th International Conference on Real Driving Emissions at Berlin, Germany, October 2016.
2016: Member of the Fall 2016 ME Candidacy Examination Committee

2015-2016: Reviewed student submissions-REU program, Penn state, Reviewed and graded 10 submissions for the College of Engineering-Research Experience for Undergraduates program

2016 Millennium Scholars program, Penn State, Interviewed and evaluated 6 finalists candidates for the Millennium Scholars Program

2014: Invited speaker at Workshop on ‘Emissions and our Environment’ at the Automotive Research Association of India, Pune, India, August 2014.

2013-2014: Designed and built a low-cost partial flow sampling system for Particulate Matter (PM) and Gaseous Emissions measurement. The design included the hardware for collecting a proportional sample in a bag, and the control logic of the software for computer control of the test. This system uses a novel partial sampling method where a fraction, proportional to the vehicle exhaust flow rate is sampled by this system, diluted with air, and the diluted sample is drawn through filters. The gaseous samples are collected in a bag for later analysis. The system is described in an SAE paper 2015-26-0096, co-authored by a graduate student.

2012 : Teaching - ME 431 Internal Combustion engines (45 students)

2006 – Present: Took the lead in laying out the specifications, procuring, and installing a state-of-the-art heavy-duty emissions test facility costing approximately $ 2,500,000 around the 300 hp chassis dynamometer at the Bus Research and Testing Center of the Larson Institute. This project, funded by the FTA, was completed from 2006 through 2009, and includes a full-scale dilution tunnel and associated gas analyzers and particulate matter measuring system suitable for emissions measurements on medium- and heavy- duty vehicles including transit buses using EPA 2010 and later engines. This facility was commissioned during 2009, fully functional in 2010 and is one of the few facilities in the Americas capable of gaseous and particulate emissions testing of medium- and heavy-duty vehicles using different fuels, including hybrid vehicles. I oversee the management and maintenance of this facility and conduct contracted and sponsored research described in the next section. Recently, this facility was accredited with a2la laboratory certification and requires periodic traceable calibrations. The facility is described in a SAE paper 2014-01-1584, co-authored by two graduate students.

2006-Present: Reviewed emissions and fuel economy measurements, data collection, and other testing procedures for the Bus research and Testing Center, developed a LabVIEW based computer program for acquiring fuel consumption data of transit buses during test track testing, modified and implemented software for calculating the fuel consumption and performance.

2006-Present: Reviewed papers for the following journals/symposium:

Journal: Fuel
Journal - Air and Waste management
Journal – Energy and Fuel
Journal - Journal of Optics
Journal - Measurement Science and Technology
SAE Technical papers
International Symposium on Heavy Vehicles Weights and Dimensions

2011: Organized a one to one test with West Virginia University for comparison of results from emission measurements of Penn State Larson Institute (LI)’s Heavy-duty Chassis Dynamometer and Emissions Testing Laboratory with WVU Center for Alternate Fuels and Emissions' Transportable Emissions Laboratory. The purpose of the test was to compare the emissions results from the same test vehicle when tested on the recently installed emissions test facility at LI with the well-established EPA approved WVU facility. It was observed that the results from both laboratories compared well for CO₂, CO, NOₓ, HC, and PM emissions.

2009: Designed research experiments to study the hypergolic reaction mechanisms of ionic liquids using a triple quad cross beam mass spectrometer.

2007: Designed experiments to investigate the interaction of plasma with propellants; the comparison of ignition delay times between conventional and plasma ignition of propellants, using a high voltage plasma generator.

2. Research, Projects and Contracts

Conducted sponsored research and contracted emissions research tests for the Federal Transit Administration (Department of Transport). Details are below:

<table>
<thead>
<tr>
<th>Year</th>
<th>Total</th>
<th>My Share</th>
<th># @ $ 44,000 each</th>
<th>Total</th>
<th>Total –All Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>50,000</td>
<td>51,250</td>
<td>10</td>
<td>440,000</td>
<td>475,000</td>
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<td>2015</td>
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<td>35,000</td>
<td>8</td>
<td>352,000</td>
<td>403,250</td>
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<tr>
<td>2014</td>
<td>263,462</td>
<td>184,423</td>
<td>11</td>
<td>484,000</td>
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<td>2013</td>
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<td>78,816</td>
<td>11</td>
<td>484,000</td>
<td>596,595</td>
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<tr>
<td>2012</td>
<td>177,080</td>
<td>123,956</td>
<td>13</td>
<td>572,000</td>
<td>749,080</td>
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<tr>
<td>2011</td>
<td>115,295</td>
<td>68,707</td>
<td>17</td>
<td>748,000</td>
<td>863,295</td>
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<tr>
<td>2010</td>
<td>196,869</td>
<td>118,838</td>
<td>13</td>
<td>572,000</td>
<td>768,869</td>
</tr>
</tbody>
</table>

Research projects completed.

October 2016- December 2016 “Dynamometer-based emissions tests using transit driving cycles on an MCI motor coach model J4500 diesel bus” Suresh Iyer, Motor Coach Industries, Canada, $ 44,000 Principal Investigator (70%)

June 2016- December 2016 “Tractive force measurements of a Karsan bus using chassis dynamometer” Hexagon Studio, Turkey, $ 6000, Principal Investigator (70%)
December 2015 “Fuel Economy and Emissions Tests on a Class 8 truck”; evaluation of a new exhaust system”, NG1 Technologies $55,000 Principal Investigator (70%)

January 2015-December 2015, “Creating a Hardware-in-the-Loop Engine Testing Capability through the Innovative Modification of a Chassis Dynamometer” 2015 COE Instructional and Research Equipment Grant Program $85,000 (Investigator, 15%)


October 2012-December 2014, "Advanced Low Floor Vehicle Specifications Research," The Mineta National Transit research Consortium, The Federal Transit Administration, and Florida DOT, $249,991.00—Principal Investigator (70%)

June 2013-August 2013, "Chassis Dynamometer based Fuel Economy and Emissions Tests on a Truck Fueled by DME”," DOE-Battelle Oak Ridge National Laboratories, and Volvo Group Truck Technologies, $11,000.00—Principal Investigator (70%)

April 2013-July 2013, "Performance, Fuel Economy, Noise, and emissions of a CNG bus on Transit Driving Cycles," Newflyer of America, PA, $54,095.00—Principal Investigator (70%)

January 2013-April 2013, "Effect of chocked diesel particulate filter on fuel economy and emissions on an articulated chassis bus"," Newflyer of America, MN, $47,500.00—Principal Investigator (70%)

November 2012-December 2012, "Fuel Economy, Dynamometer-Based Fuel Economy, Interior Noise, Exterior Noise Tests On Novabus," Novabus, Canada, $17,035.00—Principal Investigator (70%)

October 2012-December 2012, "Dynamometer-based Emissions Tests using Transit Driving Cycles on a Newflyer Diesel Bus with Navistar Engine," Newflyer Industries, $44,000.00—Principal Investigator (70%)

September 2012-November 2012, "Dynamometer-based Emissions Tests using Transit Driving Cycles on a Newflyer Model Xd40 Diesel Bus," Newflyer Industries, $23,500.00—Principal Investigator (70%)

June 2012-August 2012, "Performance, Fuel Economy, Noise, and Dynamometer-Based Emissions Tests using Transit Driving Cycles on a Newflyer CNG bus," Newflyer Industries, $50,000.00—Principal Investigator (70%)

January 2012-March 2012, "Emissions Test on a Nova Articulated Bus," Novabus, Canada, $42,545.00—Principal Investigator (70%)

October 2011-December 2011, "Weights, Fuel Economy, and Noise Nova LFS (BAE-L548)," Novabus, Québec, Canada, $54,095.00—Principal Investigator (70%)

October 2011-December 2011, "Fuel Economy and Noise Tests on Nova diesel-hybrid bus," Novabus, Canada, $21,200.00—Principal Investigator (70%)

March 2011-September 2011, "Automated Smoke Point Testing Apparatus for Military Applications Phase I," Department of Defense, $40,000.00—Investigator (40%)
September 2010-December 2010, "Comparative Fuel Efficiency Tests for Volvo Construction Equipment North America"," Volvo Construction Equipment, $23,982.00—Principal Investigator (70%)

August 2010-November 2010, "Comparative Chassis Dynamometer based Fuel Consumption Tests on Three Graders - Volvo," Volvo Construction Equipment, $40,539.00—Principal Investigator (70%)

February 2010-September 2010, "Comparative Chassis Dynamometer based Emissions tests on a Truck with Diesel and Bio-diesel - Volvo Powertrain," Volvo Powertrain, $94,849.00—Principal Investigator (50%)

December 2009-February 2010, "Comparative chassis dynamometer tests on a double deck bus, Coach USA," Cameron Dynamics, LLC, $37,499.00—Principal Investigator (70%)

December 2007-June 2008, "Comparative Fuel Consumption tests on two Class-8 tractors.," Mack Trucks Inc., $23,872.00—Principal Investigator. (90%)

February 2007-April 2007, "Fuel Consumption and NOx Emissions Test for "NOx-OUT" catalyst," Mass Media Underwriters, $36,012.00—Principal Investigator (80%)

March 2006-June 2006, "Chassis dynamometer testing of Airport Shuttle Bus.," General Engine Products LLC., $6,148.00—Principal Investigator (100%)

3. Record of Membership in Professional and Learned Societies

Associate member of Society of Automotive Engineers, 2006 to present

Member of the Combustion Institute, 2007 to present

Member of the American Public Transport Association, 2007 to present

4. List of Honors or Awards for Scholarship or Professional Activity

2011, Co-Performer Award from Strategic Environmental Research and Development Program (SERDP) - Project of the Year, Weapons Systems & Platforms—'Combustion Science to Reduce Particulate Matter Emissions for Military Platforms': sponsors DOD, DOE and EPA

5. Application of Research Scholarships in the Field Including New Applications Developed and Tested: New or Enhanced Systems and Procedures Demonstrated or Evaluated for Government Agencies, Professional and Industrial Associations, Educational Institutions, etc.

2008-2011: Developed new test procedures for Federal Transit Administration: Emissions test for new transit buses was mandated by the FTA from 2010. I developed new procedures for coast down and emissions tests for the bus testing program, in collaboration with the FTA, Booz Allen Hamilton, and West Virginia University. This test protocol is adapted by the FTA for conducting emissions tests at the bus testing center, using the heavy-duty chassis dynamometer and full scale emissions laboratory. From 2010, emissions test results are published for new model transit buses and include measurements of carbon dioxide, carbon monoxide, nitrogen oxides, hydrocarbons, and particulates for simulated test cycles.
Professional Experience

3/2005-Present: The Larson Transportation Institute, Penn State University, University Park, USA.
Position: Senior Research Associate/Research Associate: I have supported, supervised, mentored, and continue to work with graduate students in the following activities:

1. Research on particulate and gaseous emissions from heavy-duty vehicles using full scale dilution systems and partial dilution systems, on-board emission measurements, and chassis dynamometer based research experiments.
2. Uncertainties in emissions measurements of chassis dynamometer based systems.
3. Alternate fuels and fuel economy improvements of heavy-duty vehicles.
5. Hardware-in-the-Loop Engine Testing Stand using chassis dynamometer
6. Hydrogen Internal Combustion Engine
7. Thermal decomposition of high energy salts.

8/2001 – 2/2005: The Larson Transportation Institute, Penn State University, University Park, USA.
Position: Research Assistant (Ph.D. student)

1. Develop instruments for heavy-duty engines’ emissions measurements
2. Laser extinction, laser scattering, and laser induced incandescence measurements
3. Soot characterization in a laminar diffusion flame

Position: Technical Director
Supervise the following:
1. Design, development, prototype testing, and pilot manufacture of automotive components
2. Indigenous manufacture of electronic gasoline fuel pump for cars, and a conversion kit for using liquefied petroleum gas (propane) in carbureted gasoline engines
3. Manage technical and administrative staff

6/1986 – 6/1993: Hindustan Motors Ltd, Indore, India,
Positions: Manager-Testing
Deputy Manager Product development
Senior Engineer Product Engineering

1. Supervision of research and development of passenger car engines using engine dynamometers
2. Development of a prototype three cylinder gasoline engine
3. Supervision of vendors in developing engine components as per specifications during technology transfer from Isuzu Motors Ltd., Japan for the manufacture of gasoline engines.
4. Setting up an in house testing facility for bought out engine components
Position: Development Engineer

1. Supervision of development of indigenous motorcycle parts in India per Suzuki specifications
2. Development of testing rigs for motorcycle parts
3. Supervision of Quality Audit for motorcycles and parts

Position: Engineer R&D

1. Development of natural gas adaptor for stationary spark ignited engines
2. Reduction of specific fuel consumption of stationary engines
3. Testing new products for reliability
4. Supervision of conformance of engines to Bureau of Indian Standards specifications
MEMORANDUM

Date: March 27, 2017

To: Dr. Michael F. Verderame, Senior Associate Dean of the Graduate School

From: Dr. Karen A. Thole, Department Head of Mechanical and Nuclear Engineering

Subject: Dr. Suresh S. Iyer – Request for Graduate Faculty Appointment in Mechanical Engineering

Dr. Suresh S. Iyer has requested membership in the graduate faculty list in Mechanical Engineering. Dr. Iyer received his doctoral degree in mechanical engineering from The Pennsylvania State University in 2005. He is a Senior Research Associate at the Larson Transportation Institute at The Pennsylvania State University. Taking into account the number of faculty in the Mechanical and Nuclear Engineering Department that he currently collaborates with, the number of MNE graduate students he currently works with and has supervised previously, and the strong support from the MNE Promotion and Tenure Committee, I support his request to be added to the graduate faculty list in Mechanical Engineering.

With Dr. Iyer’s research interests, I believe he will be an important addition to our ME Graduate Faculty and I believe our students would benefit greatly.

Dr. Iyer’s current fixed-term appointment ends on 6/30/2017. If this request is approved, it is the intent of the program to request that Dr. Iyer’s membership on the ME Graduate faculty list be extended after he is re-appointed.
To: Karen A. Thole, Professor and Department Head  
Department of Mechanical and Nuclear Engineering

December 21, 2016

Re: Membership in the Graduate Faculty in Mechanical Engineering

I am eager to apply for membership in the Graduate Faculty in Mechanical Engineering. I have advised/mentored three PhD and three MS students to graduation in ME, and I am currently advising four PhD student and one MS student. A list of graduate students I worked with, and currently work with is attached. I do not get formal credit for these activities, as I am not a member of the Graduate Faculty. Membership in the Graduate faculty would allow me to serve officially as a member of students’ thesis committees and to obtain formal credit for these efforts.

I have supported, and will continue to support, graduate students in ME through the Bus Testing program at the Larson Transportation Institute. Membership in the Graduate Faculty would help me to engage more with graduate students, and to further align the program’s activities with the mission of the University.

In the event that my application is approved, I will continue to supervise and mentor graduate students. For example, I would continue to assist them in publishing in peer-reviewed journals and conference venues, introduce them to modern research methods related to combustion, alternative fuels, heavy-duty vehicle emissions and their measurement, and train them in data analysis methods related to experimental vehicle data collection. Further, this status would make my research proposals more competitive, as it would give me more direct access to high-quality graduate students.

In addition to research activities, I could teach undergraduate- and graduate-level ME core thermodynamics and fluid mechanics courses including combustion and IC engines, if the opportunity arises. I would also participate in ME graduate program functions, including graduate student recruiting and PhD candidacy exams.

Thank you for your consideration, and I look forward to hearing from you.

Sincerely,

Suresh S. Iyer
Senior Research Associate, LTI
Doctoral and Masters students currently supervised by Dr. Suresh Iyer

<table>
<thead>
<tr>
<th>Date</th>
<th>Student’s name</th>
<th>Degree</th>
<th>Title of thesis</th>
<th>University</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring 2020</td>
<td>Stephen Boyle</td>
<td>Ph D ME</td>
<td>Modeling hydrogen combustion in two-stroke engines seeking improved power density</td>
<td>The Pennsylvania State University</td>
</tr>
<tr>
<td>Fall 2018</td>
<td>Michael Dogal</td>
<td>MS ME</td>
<td>Investigating sensor fusion to determine hydrogen to natural gas blend ratios in automotive fuel tanks</td>
<td>The Pennsylvania State University</td>
</tr>
<tr>
<td>Fall 2020</td>
<td>Evan Pelletier</td>
<td>PhD ME</td>
<td>To be decided</td>
<td>The Pennsylvania State University</td>
</tr>
<tr>
<td>Spring 2018</td>
<td>Wahba Mohamed</td>
<td>PhD ME</td>
<td>Reducing Fuel Usage for a Fleet of Connected Vehicles using Big-data Methods</td>
<td>The Pennsylvania State University</td>
</tr>
<tr>
<td>Spring 2018</td>
<td>Anand Makwana</td>
<td>PhD ME</td>
<td>Capturing soot formation with the use of isoctane as a surrogate for Fischer-Tropsche fuel</td>
<td>The Pennsylvania State University</td>
</tr>
</tbody>
</table>

Doctoral and masters theses supervised by Dr. Suresh Iyer

<table>
<thead>
<tr>
<th>Date</th>
<th>Student’s name</th>
<th>Degree</th>
<th>Title of thesis</th>
<th>University</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring 2016</td>
<td>Venkatraman Mahadevan</td>
<td>MS</td>
<td>Corrections for time alignment in emissions measurements in raw exhaust gas sampling systems</td>
<td>The Pennsylvania State University</td>
</tr>
<tr>
<td>Spring 2015</td>
<td>Yefu Wang</td>
<td>PhD</td>
<td>Effects of fuel molecular structures on pollutants in co-flow laminar flames</td>
<td>The Pennsylvania State University</td>
</tr>
<tr>
<td>Fall 2014</td>
<td>Partha Mishra</td>
<td>MS</td>
<td>Uncertainties in emissions measurements in a partial flow sampling system</td>
<td>The Pennsylvania State University</td>
</tr>
<tr>
<td>Fall 2012</td>
<td>Venkatesh Iyer</td>
<td>PhD</td>
<td>Effect of aromatic components in surrogate fuels on soot in co-flow flames and a model gas turbine combustor</td>
<td>The Pennsylvania State University</td>
</tr>
<tr>
<td>Spring 2010</td>
<td>Arvind Menon</td>
<td>PhD</td>
<td>Effect of m-xylene on soot formation in a high pressure diffusion flame</td>
<td>The Pennsylvania State University</td>
</tr>
<tr>
<td>Spring 2007</td>
<td>Gagan Gothania</td>
<td>MS</td>
<td>Effect of experimental set up and burner operating conditions on the measured soot volume fraction in a premixed laminar flame</td>
<td>The Pennsylvania State University</td>
</tr>
</tbody>
</table>
a. List of membership on doctoral and master’s thesis committees, including as special member, if applicable.

| Spring 2016 | Venkatraman Mahadevan | MS | Corrections for time alignment in emissions measurements in raw exhaust gas sampling systems | The Pennsylvania State University |

b. List of university courses taught
- 2012 - ME 431 Internal Combustion engines (45 students), undergraduate and graduate students

c. Other work or recognition of the nominee pertinent to recommendation for graduate faculty

1. Description of Outreach or Other Activities in Which There was Significant Use of Candidate's Expertise

2017:
- Member of the Spring 2017 ME Candidacy Examination Committee
- Invited speaker at Real Driving Emissions Forum at Amsterdam, The Netherlands, April 2017
- Millennium Scholars program, Penn State, Interview and evaluation of 6 finalists for the Millennium Scholars Program, February 25, 2017

2016:
- Invited speaker and workshop chair at the 4th International Conference on Real Driving Emissions at Berlin, Germany, October 2016.
- Member of the Fall 2016 ME Candidacy Examination Committee.
Reviewed student submissions-REU program, Penn State, Reviewed and graded 10 submissions for the College of Engineering-Research Experience for Undergraduates Program

2016 Millennium Scholars program, Penn State, Interviewed and evaluated 6 finalists for the Millennium Scholars Program

2015:
Reviewed student submissions-REU program, Penn State, Reviewed and graded 10 submissions for the College of Engineering-Research Experience for Undergraduates Program

2014:
Invited speaker at Workshop on ‘Emissions and our Environment’ at the Automotive Research Association of India, Pune, India, August 2014.

2014-2013:
Mentored a graduate student to design and build a low-cost partial flow sampling system for Particulate Matter (PM) and Gaseous Emissions measurement for heavy-duty vehicles. The design included the hardware for collecting a proportional sample in a bag, and the control logic of the software for computer control of the test. This system uses a novel partial sampling method where a fraction, proportional to the vehicle exhaust flow rate is sampled by this system, diluted with air, and the diluted sample is drawn through filters. The gaseous samples are collected in a bag for later analysis. The system is described in an SAE paper 2015-26-0096, co-authored by the graduate student.

2012:
Teaching - ME 431 Internal Combustion engines (45 students)

2006 – Present:
Took the lead in laying out the specifications, procuring, and installing a state-of-the-art heavy-duty emissions test facility costing approximately $2,500,000 around the 300 hp chassis dynamometer at the Bus Research and Testing Center of the Larson Institute. This project, funded by the FTA, was completed between 2006 and 2009, and includes a full-scale dilution tunnel and associated gas analyzers and particulate matter measuring system suitable for emissions measurements on medium- and heavy-duty vehicles including transit buses using EPA 2010 and later engines. This facility was commissioned during 2009, fully functional in 2010 and is one of the few facilities in the Americas capable of gaseous and particulate emissions testing of medium- and heavy-duty vehicles using different fuels, including hybrid vehicles. I oversee the management and maintenance of this facility and conduct contracted and sponsored research described in the next section. Recently, this facility was accredited with a2la laboratory certification and requires periodic traceable calibrations. The facility is described in a SAE paper 2014-01-1584, co-authored by two graduate students.
• Reviewed emissions and fuel economy measurements, data collection, and other testing procedures for the Federal Transit Administration’s Bus Research and Testing Center at the Larson Institute, developed a LabVIEW based computer program for acquiring fuel consumption data of transit buses during test track testing, modified and implemented software for calculating the fuel consumption and performance.

• Reviewed papers for the following journals/symposium:
  o Journal: Fuel
  o Journal - Air and Waste management
  o Journal – Energy and Fuel
  o Journal - Journal of Optics
  o Journal - Measurement Science and Technology
  o SAE Technical papers
  o International Symposium on Heavy Vehicles Weights and Dimensions

2011:
• Organized a one to one test with West Virginia University for comparison of results from emission measurements of Penn State Larson Institute (LI)’s Heavy-duty Chassis Dynamometer and Emissions Testing Laboratory with WVU Center for Alternate Fuels and Emissions’ Transportable Emissions Laboratory. The purpose of the test was to compare the emissions results from the same test vehicle when tested on the recently installed emissions test facility at LI with the well-established EPA approved WVU facility. It was observed that the results from both laboratories compared well for CO₂, CO, NOₓ, HC, and PM emissions.

2009:
• Designed research experiments to study the hypergolic reaction mechanisms of ionic liquids using a triple quad cross beam mass spectrometer.

2007:
• Designed experiments to investigate the interaction of plasma with propellants; the comparison of ignition delay times between conventional and plasma ignition of propellants, using a high voltage plasma generator.

2. Research, Projects and Contracts

Conducted sponsored research and contracted emissions research tests for the Federal Transit Administration (Department of Transport). The numbers for 2017 are anticipated*. Details are below:
Table of summary of research dollars

<table>
<thead>
<tr>
<th>Sponsored Research projects</th>
<th>Emissions Research Tests for FTA</th>
<th>Total –All Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>My Share</td>
<td>Total</td>
</tr>
<tr>
<td>2017*</td>
<td>548,847*</td>
<td>10*</td>
</tr>
<tr>
<td>2016</td>
<td>216,203</td>
<td>100</td>
</tr>
<tr>
<td>2015</td>
<td>130,000</td>
<td>10</td>
</tr>
<tr>
<td>2014</td>
<td>263,462</td>
<td>10</td>
</tr>
<tr>
<td>2013</td>
<td>112,595</td>
<td>10</td>
</tr>
<tr>
<td>2012</td>
<td>177,080</td>
<td>10</td>
</tr>
<tr>
<td>2011</td>
<td>115,295</td>
<td>10</td>
</tr>
<tr>
<td>2010</td>
<td>196,869</td>
<td>10</td>
</tr>
</tbody>
</table>

Research projects completed.

October 2016- December 2016 “Dynamometer-based emissions tests using transit driving cycles on an MCI motor coach model J4500 diesel bus” Suresh Iyer, Motor Coach Industries, Canada, $ 44,000 Principal Investigator (70%)

June 2016- December 2016 “Tractive force measurements of a Karsan bus using chassis dynamometer” Hexagon Studio, Turkey, $ 6000, Principal Investigator (70%)

December 2015 “Fuel Economy and Emissions Tests on a Class 8 truck”; evaluation of a new exhaust system”, NG1 Technologies $ 55,000 Principal Investigator (70%)

January 2015- December 2015, “Creating a Hardware-in-the-Loop Engine Testing Capability through the Innovative Modification of a Chassis Dynamometer” 2015 COE Instructional and Research Equipment Grant Program $ 85,000 (Investigator, 15%)


October 2012-December 2014, "Advanced Low Floor Vehicle Specifications Research," The Mineta National Transit research Consortium, The Federal Transit Administration, and Florida DOT, $249,991.00—Principal Investigator (70%)

June 2013-August 2013, "Chassis Dynamometer based Fuel Economy and Emissions Tests on a Truck Fueled by DME"," DOE-Battelle Oak Ridge National Laboratories, and Volvo Group Truck Technologies, $11,000.00—Principal Investigator (70%)

April 2013-July 2013, "Performance, Fuel Economy, Noise, and emissions of a CNG bus on Transit Driving Cycles," Newflyer of America, PA, $54,095.00—Principal Investigator (70%)

January 2013-April 2013, "Effect of chocked diesel particulate filter on fuel economy and emissions on an articulated chassis bus"," Newflyer of America, MN, $47,500.00—Principal Investigator (70%)

November 2012-December 2012, "Fuel Economy, Dynamometer-Based Fuel Economy, Interior Noise, Exterior Noise Tests On Novabus,” Novabus, Canada, $17,035.00—Principal Investigator (70%)
October 2012-December 2012, "Dynamometer-based Emissions Tests using Transit Driving Cycles on a Newflyer Diesel Bus with Navistar Engine," Newflyer Industries, $44,000.00—Principal Investigator (70%)

September 2012-November 2012, "Dynamometer-based Emissions Tests using Transit Driving Cycles on a Newflyer Model Xd40 Diesel Bus," Newflyer Industries, $23,500.00—Principal Investigator (70%)

June 2012-August 2012, "Performance, Fuel Economy, Noise, and Dynamometer-Based Emissions Tests using Transit Driving Cycles on a Newflyer CNG bus," Newflyer Industries, $50,000.00—Principal Investigator (70%)

January 2012-March 2012, "Emissions Test on a Nova Articulated Bus," Novabus, Canada, $42,545.00—Principal Investigator (70%)

October 2011-December 2011, "Weights, Fuel Economy, and Noise Nova LFS (BAE-L548)," Novabus, Québec, Canada, $54,095.00—Principal Investigator (70%)

October 2011-December 2011, "Fuel Economy and Noise Tests on Nova diesel-hybrid bus," Novabus, Canada, $21,200.00—Principal Investigator (70%)

March 2011-September 2011, "Automated Smoke Point Testing Apparatus for Military Applications Phase I," Department of Defense, $40,000.00—Investigator (40%)

September 2010-December 2010, "Comparative Fuel Efficiency Tests for Volvo Construction Equipment North America"," Volvo Construction Equipment, $23,982.00—Principal Investigator (70%)

August 2010-November 2010, "Comparative Chassis Dynamometer based Fuel Consumption Tests on Three Graders - Volvo," Volvo Construction Equipment, $40,539.00—Principal Investigator (70%)

February 2010-September 2010, "Comparative Chassis Dynamometer based Emissions tests on a Truck with Diesel and Bio-diesel - Volvo Powertrain," Volvo Powertrain, $94,849.00—Principal Investigator (50%)

December 2009-February 2010, "Comparative chassis dynamometer tests on a double deck bus, Coach USA," Cameron Dynamics, LLC, $37,499.00—Principal Investigator (70%)

December 2007-June 2008, "Comparative Fuel Consumption tests on two Class-8 tractors.," Mack Trucks Inc., $23,872.00—Principal Investigator. (90%)

February 2007-April 2007, "Fuel Consumption and NOx Emissions Test for "NOx-OUT" catalyst," Mass Media Underwriters, $36,012.00—Principal Investigator (80%)

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4. List of Honors or Awards for Scholarship or Professional Activity

- 2011 - Co-Performer Award from Strategic Environmental Research and Development Program (SERDP) - Project of the Year, Weapons Systems & Platforms—‘Combustion Science to Reduce Particulate Matter Emissions for Military Platforms’: sponsors DOD, DOE and EPA)

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- 2008-2011: Developed new test procedures for Federal Transit Administration: Emissions test for new transit buses was mandated by the FTA from 2010. I developed new procedures for coast down and emissions tests for the bus testing program, in collaboration with the FTA, Booz Allen Hamilton, and West Virginia University. This test protocol is adapted by the FTA for conducting emissions tests at the bus testing center, using the heavy-duty chassis dynamometer and full scale emissions laboratory. From 2010, emissions test results are published for new model transit buses and include measurements of carbon dioxide, carbon monoxide, nitrogen oxides, hydrocarbons, and particulates for simulated test cycles.
I request that we add discussion of a Graduate Council matter to the agenda. This discussion has been ongoing throughout the academic year, and at yesterday's meeting, the Academic Standards committee provided a proposed policy change. This policy change would alter the designations of graduate faculty members. The change is principally due to differences in artistic and creative disciplines in the College of Arts & Architecture, but the overall new policy may have some implications for others.

I have attached the proposed policy. The intent is for the vote to be held at the May 3 meeting, providing that a quorum is present on that date. It is my opinion that the proposed new category is well-considered, but that it is not likely to significantly affect any of our engineering programs.

If it isn't appropriate or doesn't work on the agenda, I still ask that you share it with your departments, as appropriate, and provide any feedback, concerns or questions back to me and our other Graduate Council members.

Shelley

Shelley M. Stoffels
Professor of Civil Engineering
Department of Civil and Environmental Engineering
Office: 212 Sackett Building; Telephone: 814-865-7254; Facsimile: 814-863-7304
Coordinator, Civil Infrastructure and Testing Laboratory (CITEL); Telephone: 814-865-3813
The Pennsylvania State University | University Park, Pennsylvania 16802
Report to the Graduate Council

At its October 19, 2016 meeting, the Graduate Council requested that the Committee on Academic Standards review the Graduate Faculty Membership policy in light of the concerns raised by Dean Barbara Korner at the September Council meeting, and bring back to Council any recommendations it might have to revise the policy.

Over the course of the academic year the Committee discussed this policy and the issues raised by the College of Arts and Architecture formally at five consecutive regular Committee meetings as well as two special meetings for a total of over 12 hours of discussion. There were also considerable informal discussions between and among the members of the Committee.

During that time, the committee considered three specific requests from the College of Arts and Architecture (as communicated through its representative on the Committee) regarding faculty members holding terminal masters degrees:

1) teaching of 500-level courses
2) service on Ph.D. committees, and specifically serving as dissertation adviser for PhD students
3) advising M.S. and M.A. students

In the end, issues #2 and 3 were combined.

Several proposals were brought to the committee by the Arts and Architecture representative to address their concerns. In addition, the committee proposed to Arts and Architecture several different ways of meeting the concerns raised. Most were rejected, either by the committee or by Arts and Architecture, without coming to a vote. Two proposals, addressing these three issues, did come to a vote.

**Issue 1 - Faculty members holding terminal masters degrees teaching 500-level research education courses.**

The College of Arts and Architecture asked the Committee to consider allowing all Category P Graduate Faculty Members the privilege of teaching 500-level research education courses. The Committee recognized that under the current policy, all tenure-line Category P members of the Graduate Faculty already have the privilege of teaching 500-level research education courses (as well as 800-level professional practice education courses). The committee also acknowledged that qualified non-tenure-line Category P Graduate Faculty members can be approved to teach 500-level courses with review through the approval-to-teach process. With appropriate documentation after a first approval, subsequent approval can be allowed for up to three years, recognizing that most fixed-term appointments are for one-year, with multiyear appointments most often being for three years.

The Committee considered a motion to allow all non-tenure line Category P Graduate Faculty members to teach 500-level courses without further review.

The motion was lost (2 yeas, 5 nays).
Issues 2 and 3 - Service on Ph.D. committees and advising M.S. and M.A. students

The Committee came forward with a proposal to create a third Category of the Graduate Faculty for members of the faculty holding a terminal master’s degree and with a record and active program of artistic, humanistic, and/or scientific research appropriate to the graduate program field that would permit such individuals to participate in all aspects of research education. After considerable discussion a motion was made to recommend that the Graduate Faculty Membership policy be revised to: 1) create a new Graduate Faculty category for tenure-line faculty members holding terminal master’s degrees to participate broadly in the education of M.S., M.A., and Ph.D. students, including serving as dissertation co-adviser for Ph.D. students, and 2) define the number and roles such faculty members may fulfill on research doctoral committees. The Committee also considered a recommended name for the Category, as well as clarifications the names of the existing categories.

The motion was adopted (4 yeas, 3 nays).

See Appendix A of the Graduate Council Agenda for April 12, 2017, for the motion as adopted.

Members of Graduate Council are encouraged to review the Graduate Faculty Policy (found [here](#)) in preparation for the discussion.
Proposed New Graduate Faculty Category – “Tenure-Line Master’s Faculty Who Contribute to Research Doctorate (and Related Research Master’s, M.A./M.S.) Education” (Category TMRD)

Qualifications:
1) A Tenure-line appointment;

2) Either a terminal master’s degree with research training, or a terminal master’s degree and a record of research, in either case sufficient to contribute to research doctorate training; and

3) An active program of research appropriate to the graduate program field.

Expected Duties:
Academic advising of graduate students in master’s degree programs; teaching 500-, 600-, and 800-level graduate courses; supervising M.A. and M.S. research and the culminating experience in professional master’s degree programs; serving on master’s degree committees; co-advising research doctorate (Ph.D.) students and co-supervising Ph.D. dissertation research with a Category R member of the Graduate Faculty; serving on Ph.D. committees as a regular member, including as Major Field Member, Outside Field Member, Outside Unit Member, and/or Minor Field Member. May not serve as Chair. Perform other academic duties as may be authorized by the dean of the Graduate School.

Proposed Change to Policy on Doctoral Committees

Doctoral Committee

General guidance of a doctoral candidate is the responsibility of a doctoral committee consisting of four or more active members of the Graduate Faculty, which includes at least two faculty members in the major field. For research doctorate (Ph.D.) committees, one member of the committee may be a Category TMRD member of the Graduate Faculty and serve in the roles specified under Expected Duties of Category TMRD members. The dissertation/performance adviser must be a member of the doctoral committee. The dissertation/performance adviser usually serves as chair, but this is not required. If the candidate is also pursuing a dual-title field of study, a co-chair representing the dual-title field must be appointed. In most cases, the same individual (e.g., dissertation/performance adviser) is a member of the Graduate Faculty in both the major and dual-title fields, and in such cases may serve as sole chair.

Proposed Revised Names for Existing Categories and Proposed Name for Proposed New Category of Graduate Faculty Membership:

Current “R” Category changed to “RD” = Graduate Faculty who contribute to Research Doctorate (and related research master’s, M.A./M.S.) Education.

Current “P” Category changed to “PCS” = Graduate Faculty who contribute to Professional and Creative Scholarship Education.

New category = “TMRD” = Tenure-Line Master’s Faculty who contribute to Research Doctorate (and related research master’s, M.A./M.S.) Education.