Engineering Faculty Council
Meeting Agenda
October 24th, 2017
11:00 a.m.
202 Hammond Building (Stavely Conference Room)

1. Approval of minutes for the meeting of September 26th, 2017
2. Dean’s Report
3. Updates from Undergraduate Studies Committee
4. Updates from Graduate Studies Committee
   • No updates
5. Updates from Engineering Technology Committee
   • No updates
6. Updates from Faculty Senate
7. Other Business
EFC Meeting September 26th 2017

Attendees:
Howard Salis, Chris Giebink, Doug Wolfe, Justin Schwartz, Jose Palacios, Chip Elliott, Daniel Hayes, Shelley Stoffels, Gang Tan, Gary Gray, Hosam Fathy, Pat Clements, Charles Tierney, Chris Masters

A. Dean’s Report

1. Hiring a new Senior Director of Development
2. Hiring a new Associate Dean
3. Goal: gender-equality COE UG admissions in 6 years
   Data-driven & outcome-based approach to admission
   Improve perspectives on campus environment & curriculum

4. Continuation & expansion of successful Law, Policy & Energy proposal areas, including the development of new Law, Policy & X proposal areas

5. Proposed new seed grants for team-building to pursue larger ERC, Center, MURI, and DURIP grants

6. Proposed a target of 7500 COE undergraduate and 2500 COE graduate students, requiring recruitment of more graduate students.

7. Updates on Facilities plans. Two new COE buildings are being built on West Campus. A forward-looking campus plan was proposed to identify & develop 1 million sq.ft. total accessible space for COE departments and future Centers.

B. UG Committee

Several course changes. All approved.

C. Updates from Faculty Senate

Updates to LionPath policy, academic suspension policy, petition policy when late-adding courses past the deadline, bylaws/rules, filing of minority reports on policy discussions in sub-committees, more faculty involvement in policies affecting athletics, discussion of faculty policy involving World Campus, changes to bylaws to allow digital access to Faculty Senate archives, improved definitions of UG poor academic standing, updates to the “All-In” video for freshmen orientation, updated information for faculty to help students obtaining mental health support, discussion of policy to improve best-practices for P&T of women faculty, revised multi-year contracts for research/clinical non-tenured faculty, updated non-tenure track faculty career progression policies, discussion of low P&T rates for commonwealth faculty to full professor, changes to Aetna insurance policies & time-to-choose
period, status report on health care at UP & commonwealth campuses, video telecon tech update, looking into new email/calendar system,
<table>
<thead>
<tr>
<th>Course Change</th>
<th>Description or Rationale for Curricular Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IE 305 Product Design, Specification and Measurement</strong>&lt;br&gt;Submitted by: M Chandra</td>
<td>The materials covered in MATSE 259 are not required for learning the materials covered in IE 305. The course EDSGN 100, which is a required course for all undergraduate students in the Department of Industrial Engineering during their first year, lays the foundation for the design concepts such as Solid Works, covered in IE 305.</td>
</tr>
<tr>
<td><strong>IE 425 Stochastic Models in Operations Research</strong>&lt;br&gt;Submitted by: M Chandra and Catherine Harmonosky</td>
<td>IE 405 is no longer required as a co-requisite course for IE 425, as the topics of Network Analysis and Project management have been shifted from IE 425 to IE 405 in 2013.</td>
</tr>
</tbody>
</table>
| **Industrial Engineering Program Proposal**<br>Submitted by: M Chandra and Catherine Harmonosky | **Change 1:** Removing CMPSC 202 and adding CMPSC 200: CMPSC 202 is no longer offered frequently by the Computer Science Department and also it covers FORTRAN Programming, which is not required for the students in the industrial engineering major. Hence it is removed from the list. CMPSC 201 is being kept in the list, because it covers C++ which is relevant to the students in the major. Because MATLAB is being taught in CMPSC 200, which is very relevant to the students in the industrial engineering major, CMPSC 200 is added to the list.  

**Change 2:** Expanding the list of non-major electives: This change is related to change 3, as per which the students will not be able to take any non-major courses towards the 6 credits of technical electives. Hence, the list of non-major electives is expanded in order to give the students majoring in industrial engineering, more choices in non-major electives.  

**Change 3:** Restricting the technical electives only to the courses offered in the Department of Industrial Engineering: The elective courses offered in the Department of Industrial Engineering out of which the students will have to take six credits as per this change, cover the industrial engineering tools and techniques. This will help the students in the industrial engineering major, to learn these tools, which will immensely help in their careers. This will also help our program to control and satisfy the ABET criteria for the minimum credit requirements in Engineering Topics. |
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>M CHANDRA</td>
<td>MJC3</td>
<td>Engineering</td>
<td>(EN) Not Available</td>
</tr>
</tbody>
</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
(IE 305) Product Design, Specification and Measurement

Course Information

Cross-Listed Courses:

Prerequisites:
EDSGN 100

Corequisites:

Concurrents:

Recommended Preparations:

Abbreviated Title: Prod Des Spec&Meas
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
Course Outline

A brief outline or overview of the course content:

A listing of the major topics to be covered with an approximate length of time allotted for their discussion:

Course Description:
Principles of product design and specifications and methods for product verification. IE 305 Product Design, Specification and Measurement (3) Product Design, Specification and Measurements a first level junior course in manufacturing, required for all the baccalaureate students in the Department of Industrial and Manufacturing Engineering. It will be offered in fall and spring semesters. It exposes students to the principles required for designing a product and developing the specifications for its components and the methods for product verification and checking conformance to specifications. Students taking this course should be familiar with introduction to engineering design and should have graphical communication skills.

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

- Name: EL-AMINE LEHTIHET (ivo)
  Title: PROF OF INDUSTRIAL ENGR
  Phone: +1 814 863 2350
  Address: 0310 LEONHARD BUILDING
  Campus: UP
  City: UNIVERSITY PARK
  Fax:

- Name: M CHANDRA (MJC3)
  Title: Emeritus Professor of IE
  Phone: +1 814 863 2358
  Address: 0310 LEONHARD BUILDING
  Campus: UP
  City: UNIVERSITY PARK
  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.
Campuses That Have Offered (IE 305) 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 |
|---------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Fall 2017     | ☑  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Summer 2017   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Spring 2017   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Fall 2016     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Summer 2016   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Spring 2016   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Fall 2015     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Summer 2015   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Spring 2015   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Fall 2014     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Summer 2014   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Spring 2014   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Fall 2013     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |

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
### Consultant: OLADEPO ONIPEDE
- **Position:** Consultation
- **Title:** ASSOC PROF MECH_ENGR

**Request sent:** 9/8/2017 at 2:10 PM  
**Last sent:** 9/18/2017 at 7:30 AM  
**Concur:** Yes  
**Comments:** This change is strongly supported. Makes academic sense as it will help students that are behind on EMCH 213-MATSE 259 track.  
**Reviewed On:** 9/20/2017 at 8:43 AM

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### Head of Department
- **Recipient Name:** JANIS TERPENNY  
- **Position:** Head of Department  
- **Title:**  

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

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### SCCA Representative
- **Recipient Name:** ROBERT MELTON  
- **Position:** SCCA Representative  
- **Title:**  

**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  
- **Title:**  

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

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### SCCA Subcommittee Review
- **Recipient Name:** ALLISON ALBINSKI  
- **Title:**  

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---
Position: SCCA Subcommittee Review  
Title: 

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

Recipient Name: KADI CORTER  
Department: (Not Available)  
Position: SCCA Subcommittee Review  
Title:  

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

SCCA Review  

Recipient Name: ALLISON ALBINSKI  
Department: (Not Available)  
Position: SCCA Review  
Title: 

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

Recipient Name: KADI CORTER  
Department: (Not Available)  
Position: SCCA Review  
Title: 

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

Faculty Senate Review  

Recipient Name: ALLISON ALBINSKI  
Department: (Not Available)  
Position: Faculty Senate Review  
Title: 

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

Blue Sheet Item #: 
Review Date:

SCRID Numbers

(IE 305):

Uploaded Documents:

Context Type: Supporting Documents
File Description: Results of stakeholder consultations
File Name: IE305Consultations.pdf

Proposal ID: 4709 created on 10/13/2017 10:40 AM
Uploaded Documents Follow:
Please find below the complete results of all consultations already conducted for the attached proposal.

<table>
<thead>
<tr>
<th>Name</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Director Warley (Behrend)</td>
<td>“Would it be possible to make the pre-requisite EDSGN100 or EDSGN100S? We use our “S” course as our freshman seminar so it has a different course number. Adding this alternate won’t affect the UP program at all and will help for students who start at BD and transfer to UP as well.”</td>
</tr>
<tr>
<td>Susan Sinnott Department Head (E&amp;MS)</td>
<td>“I have no objections to the proposed changes.”</td>
</tr>
</tbody>
</table>
SENATE COMMITTEE ON CURRICULAR AFFAIRS
COURSE SUBMISSION AND CONSULTATION FORM

Principal Faculty Member(s) Proposing Course

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<td>M CHANDRA</td>
<td>MJC3</td>
<td>Engineering</td>
<td>(EN)</td>
</tr>
<tr>
<td>CATHERINE MARY HARMONOSKY</td>
<td>c1h</td>
<td>Engineering</td>
<td>(EN)</td>
</tr>
</tbody>
</table>

Academic Home: Engineering (EN)
Type of Proposal: [x] Add  [ ] Change  [ ] Drop

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

Course Designation
(IE 425) Stochastic Models in Operations Research

Course Information
Cross-Listed Courses:

Prerequisites:
MATH 220, IE 322

Corequisites:
None

Concurrents:
None.

Recommended Preparations:

Abbreviated Title: Stoch Oper Res
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
Course Outline

A brief outline or overview of the course content:

1. Dynamic Programming (DP): Characteristics of DP models, principle of optimality, discounting, deterministic DP models and stochastic DP models. (3 weeks)
3. Queueing Models: Little’s Law, Poisson processes, balance equations, single server queues, multiple server queues, infinite queues in series, Jackson networks, and approximations. (3 weeks)
4. Applications of Stochastic Models: Self-service models, machine interference models, waiting cost functions and decision models, production and service systems. (2 weeks)
5. Inventory Models: ABC classification, deterministic economic order quantity (EOQ) models, EOQ models with quantity discounts, dynamic inventory models, stochastic inventory models, stochastic single-period models for perishable products. (3 weeks)

A listing of the major topics to be covered with an approximate length of time allotted for their discussion:

Please see above.

Course Description:

This course will be an introduction to the modeling of stochastic systems. The student will learn about Poisson processes, Markov Chains, Dynamic Programming, and Queueing systems; both model formulations and solutions strategies. The students will learn several applications of these models in manufacturing and service systems, so that they can synthesize the lecture material. The student will study the topic of inventory theory, including fundamental trade-offs, economic order quantity (EOQ) modeling, and stochastic models. Grading will be based on exams and homework. This will be a required course for all undergraduate students pursuing a baccalaureate degree in Industrial Engineering.

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

- Name: CATHERINE MARY HARMONOSKY (c1h)
  Title: Associate Professor
  Phone: 814-865-2107
  Address: 304 Leonhard
  Campus: UP
  City: University Park
  Fax:

- Name: M CHANDRA (MJC3)
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 field of operations research focuses on the formulation, analysis, and implementation of quantitative methods to support effective management decision-making. This course will introduce students to several important types of mathematical and stochastic models, and solution techniques, including dynamic programming, Markov chains, queueing theory and inventory control. Such models and techniques can provide students with valuable insights into several design and planning problems, and thus facilitate their effective analysis.

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.
Quizzes 15%
Case Study 10%
Two Mid-term Examinations 50%
Final Examination 25%

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.
IE 405 is no longer required as a co-requisite course for IE 425, as the topics of Network Analysis and Project Management have been shifted from IE 425 to IE 405 in 2013. This then led to the addition of MATH 220 as the prerequisite for IE 425, because this was a prerequisite for IE 405 and knowledge of linear algebra is important to understand the topics of Markov Chains and Queueing Theory taught in IE 425. IE 322 is a prerequisite for IE 425, because the concepts of random variables and probability distributions are necessary in all the stochastic models covered in IE 425.

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.
It is a required course for all undergraduate students in Industrial Engineering.

A description of any special facilities:
This course does not require any additional technology needs, other than what is available currently in the department.

Frequency of Offering and Enrollment:
It is offered every semester with an enrollment of about 90 students every semester.

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.
IE 405 is no longer required as a co-requisite course for IE 425, as the topics of Network Analysis and Project Management have been shifted from IE 425 to IE 405 in 2013.

Campuses That Have Offered (IE 425) 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 | SH | UP | WB | WS | XC | XP | XS | YK |
|----------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Fall 2017 | ✔ |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Summer 2017 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Spring 2017 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Fall 2016 |    |    | ✔ |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Summer 2016 |    |    | ✔ |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Spring 2016 |    |    | ✔ |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
## 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)
- ![(#)](image) - Review Order Sequence Number

### Consultation

<table>
<thead>
<tr>
<th>Recipient Name: OLADIPO ONIPEDE</th>
<th>Department: Engineering</th>
</tr>
</thead>
<tbody>
<tr>
<td>Position: Consultation</td>
<td>Campus: PENN STATE ERIE, THE BEHREND COLLEGE</td>
</tr>
<tr>
<td>Title: ASSOC PROF MECH_ENGR</td>
<td></td>
</tr>
</tbody>
</table>

1. **Request sent:** 9/18/2017 at 4:00 PM
   - **Concur:** Yes
   - **Comments:** The IE faculty at Behrend are fully supportive of the proposed changes. These changes will better prepare our students.
   - **Reviewed On:** 9/20/2017 at 8:38 AM

### Head of Department

<table>
<thead>
<tr>
<th>Recipient Name: JANIS P TERPENNY</th>
<th>Department: (Not Available)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Position: Head of Department</td>
<td>Campus: UNIVERSITY PARK CAMPUS</td>
</tr>
<tr>
<td>Title:</td>
<td></td>
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- **Concur:** [Not Yet Reviewed]
- **Comments:** [Not Yet Reviewed]
- **Reviewed On:** [Not Yet Reviewed]

### SCCA Representative

<table>
<thead>
<tr>
<th>Recipient Name: ROBERT MELTON</th>
<th>Department: (Not Available)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Position: SCCA Representative</td>
<td>Campus: UNIVERSITY PARK CAMPUS</td>
</tr>
<tr>
<td>Title:</td>
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- **Concur:** [Not Yet Reviewed]
- **Comments:** [Not Yet Reviewed]
- **Reviewed On:** [Not Yet Reviewed]
Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

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**Dean of the College**

Recipient Name: **PETER BUTLER**
Position: Dean of the College
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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**SCCA Subcommittee Review**

Recipient Name: **ALLISON ALBINSKI**
Position: SCCA Subcommittee 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: SCCA Subcommittee Review
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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**SCCA Review**

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

Title:  

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

Faculty Senate Review

Recipient Name: ALLISON ALBINSKI  
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]  

Curricular Information
Blue Sheet Item #:  
Review Date:  

SCRID Numbers
(IE 425):  
Proposal ID: 4976 created on 10/13/2017 10:38 AM
Proposal Designation: Industrial Engineering
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>
</tr>
</thead>
<tbody>
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<td>Engineering (EN)</td>
<td>Not Available</td>
</tr>
<tr>
<td>CATHERINE HARMONOSKY</td>
<td>C1H</td>
<td>Engineering (EN)</td>
<td>Not Available</td>
</tr>
</tbody>
</table>

Academic Home: Engineering (EN)

Program Definition
Degree Offered: Bachelor of Science (BS)
Effective Semester: Upon Approval
   Offering College(s)
   - Behrend College
   - 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.
*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 Industrial Engineering, a minimum of 129 credits is required. This baccalaureate program in Industrial Engineering is accredited by the Engineering Accreditation Commission of ABET, Inc., www.abet.org (Opens New Window).
Scheduling Recommendation by Semester Standing given like (Sem:1-2)

Justification: Change 1: Removing CMPSC 202 and adding CMPSC 200: CMPSC 202 is no longer offered frequently by the Computer Science Department and also it covers FORTRAN Programming, which is not required for the students in the industrial engineering major. Hence it is removed from the list. CMPSC 201 is being kept in the list, because it covers C++ which is relevant to the students in the major. Because MATLAB is being taught in CMPSC 200, which is very relevant to the students in the industrial engineering major, CMPSC 200 is added to the list.
Change 2: Expanding the list of non-major electives: This change is related to change 3, as per which the students will not be able to take any non-major courses towards the 6 credits of technical electives. Hence, the list of non-major electives is expanded in order to give the students majoring in industrial engineering, more choices in non-major electives.
Change 3: Restricting the technical electives only to the courses offered in the Department of Industrial Engineering: The elective courses offered in the Department of Industrial Engineering out of which the students will have to take six credits as per this change, cover the industrial engineering tools and techniques. This will help the students in the industrial engineering major, to learn these tools, which will immensely help in their careers. This will also help our program to control and satisfy the ABET criteria for the minimum credit requirements in Engineering Topics.
Objectives and Justification

Objectives:

Justification:

Justification For The Change Proposal:

Change 1: Removing CMPSC 202 and adding CMPSC 200: CMPSC 202 is no longer offered frequently by the Computer Science Department and also it covers FORTRAN Programming, which is not required for the students in the industrial engineering major. Hence it is removed from the list. CMPSC 201 is being kept in the list, because it covers C++ which is relevant to the students in the major. Because MATLAB is being taught in CMPSC 200, which is very relevant to the students in the industrial engineering major, CMPSC 200 is added to the list.

Change 2: Expanding the list of non-major electives: This change is related to change 3, as per which the students will not be able to take any non-major courses towards the 6 credits of technical electives. Hence, the list of non-major electives is expanded in order to give the students majoring in industrial engineering, more choices in non-major electives.

Change 3: Restricting the technical electives only to the courses offered in the Department of Industrial Engineering: The elective courses offered in the Department of Industrial Engineering out of which the students will have to take six credits as per this change, cover the industrial engineering tools and techniques. This will help the students in the industrial engineering major, to learn these tools, which will immensely help in their careers. This will also help our program to control and satisfy the ABET criteria for the minimum credit requirements in Engineering Topics.

Proposal Outline

CIP Code: 143501

Faculty Member(s) in Charge:

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Phone</th>
<th>Address</th>
<th>Campus</th>
<th>City</th>
<th>Fax</th>
</tr>
</thead>
<tbody>
<tr>
<td>CATHERINE HARMONOSKY</td>
<td>Associate Prof</td>
<td>814-865-2107</td>
<td>304 Leonhard</td>
<td>UP</td>
<td>University Park</td>
<td></td>
</tr>
<tr>
<td>M CHANDRA</td>
<td>Professor</td>
<td>814-863-2358</td>
<td>205 Leonhard</td>
<td>UP</td>
<td>University Park</td>
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Program Description:
The undergraduate program in industrial engineering, being the first established in the world, has a long tradition of providing a strong, technical, hands-on education in design, control, and operation of manufacturing processes and systems. The curriculum provides a broad-based education in manufacturing, operations research and ergonomics through a base of mathematics, physical and engineering sciences, and laboratory and industrial experiences. It builds a strong foundation for the development of a professionally competent and versatile industrial engineer, able to function in a traditional manufacturing environment as well as in a much broader economy, including careers in financial services, communication, information technology, transportation, health care, consulting, or academia.

Program Educational Objectives:
We expect our graduates to:
• Participate in and lead cross-functionally defined project teams, designing, implementing and improving processes and systems in the manufacturing, service, or government sectors, using state-of-the-art tools and methodologies;
• Work effectively in managerial and leadership positions, to establish and execute engineering and business strategies;
• Work and communicate effectively with internal and external stakeholders in the global environment, while satisfying engineering,
business and financial goals and the end customers; and
• Engage in continuous learning through varied work assignments, graduate school, professional training programs and independent study.

Program Outcomes (Student Outcomes):
These are the specific competencies that our students are taught through the curriculum offered by the department. Our students are expected to know and be able to demonstrate these outcomes by the time they graduate. These relate to the skills, knowledge and behaviors that students acquire as they progress through the program. These are related to the ABET Outcomes (a) through (k). They are listed below.
1.1 Analyze and design both the job and the worksite in a cost-effective manner, as well as measure the resulting output.
1.2 Understand and apply cognitive systems engineering: identify visual, auditory, cognitive, perceptual and environmental aspects of human performance; Perform task analysis and evaluate human-computer interfaces.
1.3 Understand information contained in typical specifications and methods of product verification and conformance to specifications.
1.4 Program flexible manufacturing equipment and system controllers; design logical manufacturing layouts and implement contemporary systems issues.
1.5 Perform work measurement: develop an MTM analysis and carry out a work sampling study.
1.6 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.
1.7 Understand and apply principles of effective human/interface design to address improved human performance, visual displays and software design.
2.1 Ability to apply time value of money and select cost-effective engineering solutions; understand cost-accounting principles.
2.2 Ability to apply probability concepts to solve engineering problems, including reliability issues.
2.3 Ability to apply statistical concepts to solve real life problems, such as hypotheses testing, design of experiments and statistical quality control methods such as process capability and control charts.
2.4 Formulate, solve and analyze the results of linear programming models of real-world applications.
2.5 Formulate, solve and analyze real problems using Markov chains, network models, dynamic programming, queuing theory and inventory models.
2.6 Gain in-depth knowledge of data storage, analysis and visualization related to manufacturing and service domains.
2.7 Ability to create simulation models of manufacturing and service systems and analyze simulation output.
2.8 Ability to apply mathematical models to optimally design and control service systems.
3.1 Present engineering study results in technical reports and orally.
3.2 Demonstrate life-long learning by synthesizing information from several sources.
4.1 Work effectively in groups on case studies and projects.
4.2 Demonstrate knowledge of contemporary issues.
4.3 Understand professional and ethical responsibility.
4.4 Understand the impact of engineering decisions in a global and societal context.

After completing courses required for the core and fundamental competencies in the major, students can choose two technical elective courses from the department list, out of which must be an I E course. In addition, the students must also complete the three-credit capstone design course.

ENTRANCE TO MAJOR -- 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.

*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 Industrial Engineering, a minimum of 129 credits is required. This baccalaureate program in Industrial Engineering is accredited by the Engineering Accreditation Commission of ABET, Inc., www.abet.org (Opens New Window).

Scheduling Recommendation by Semester Standing given like (Sem:1-2)
GENERAL EDUCATION: 45 credits
(27 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)
FIRST-YEAR SEMINAR:
(Included in REQUIREMENTS FOR THE MAJOR)
UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in GENERAL EDUCATION course selection)
WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)
REQUIREMENTS FOR THE MAJOR: 111 credits
(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.)
PRESCRIBED COURSES (77 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 210(5)[1], ENGL 202C GWS(3), MATH 220 GQ(2), MATH 231(2), MATH 250(3)[1], PHYS 212 GN(4)[1] (Sem: 3-4)
IE 302(3)[1], IE 305(3)[1], IE 322(3)[1], IE 323(3)[1], IE 327(3)[1], IE 330(3)[1], IE 405(3)[1], MATSE 259(3) (Sem: 5-6)
IE 425(3), IE 453(3), IE 460(3), IE 470(3), IE 480(3) (Sem: 7-8)
ADDITIONAL COURSES (16 credits)
Select 1 credit of First-Year Seminar (Sem: 1-2)
ENGL 15 GWS(3) or ENGL 30 GWS(3) (Sem: 1-2)
CAS 100A GWS(3) or CAS 100B GWS(3) (Sem: 3-4)
CMPSC 200 GQ(3) or CMPSC 201 GQ(3) (Sem: 1-2)
ECON 102 GS(3) or ECON 104 GS(3) (Sem: 1-2)
IE 408(3), IE 418(3), or IE 419(3) (Sem: 7-8) (The courses not taken to satisfy this requirement can be taken as a track elective. Please see the department list)

SUPPORTING COURSES AND RELATED AREAS (18 credits)
Select 3 credits as a science selection from department list (Sem: 3-4)
Select 6 credits as non-major electives from department list (Sem: 3-8)
Department List: Any 200, 300 or 400-level courses from the following programs:
Architectural Engineering (A E)
Aerospace Engineering (AERSP)
Biological Engineering (B E)
Biomedical Engineering (BME)
Chemical Engineering (CH E)
Civil Engineering (C E)
Computer Engineering (CMPEN)
Computer Science (CMPSC) (except CMPSC 200 and CMPSC 201)
Electrical Engineering (E E)
Engineering Mechanics (E MCH) (except E MCH 210)
Engineering Science (E SC) (Except E SC 261M)
Environmental Systems Engineering (ENVSE)
Materials Science and engineering (MATSE) (Except MATSE 259)
Mechanical Engineering (ME)
Mining (MNG)
Nuclear Engineering (NUC E)
Petroleum and Natural Gas Engineering (P N G)
(3 credits of any combination of Co-op or Internship upon the completion of three rotations); and (3 credits of ROTC upon completion of the ROTC program).
Select 3 credits in manufacturing processes from department list. (Sem: 5-6) (The course not taken to satisfy this requirement can be taken as a technical elective. Please see the department list)
Select 6 credits of technical electives from the department list; all 6 credits must be IE credits.
[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

For a Bachelor of Science in Industrial Engineering a minimum of 129 credits are required.

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

Academic Outline

REQUIREMENTS FOR THE MAJOR:
A minimum of 111 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: (111 Credits)

PRESCRIBED COURSES (77 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 210 (5)[1], ENGL 202C GWS(3), MATH 220 GQ(2-3), MATH 231 (2), MATH 250 (3), PHYS 212 GN(4)(Sem: 3-4)
IE 302 (3)[1], IE 305 (3)[1], IE 322 (3)[1], IE 327 (3)[1], IE 330 (3)[1], IE 405 (3)[1], MATSE 259 (3)(Sem: 5-6)

ADDITIONAL COURSES (16 Credits)

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

ENGL 15 (3); ENGL 30 (3)(Sem: 1-2)
CAS 100A (3); CAS 100B (3)(Sem: 3-4)
CMPSC 201 (3); CMPSC 202 (3)(Sem: 1-2)
ECON 102 (3); ECON 104 (3)(Sem: 1-2)
IE 408 (3); IE 418 (3); IE 419 (3)(Sem: 7-8)

(The courses not taken to satisfy this requirement can be taken as a track elective. Please see the department list)

SUPPORTING COURSES (18-185 Credits)

Select 3 credits as a science selection from department list (Sem: 3-4)
Select 6 credits as non-major electives from department list (Sem: 3-8)
Select 3 credits in manufacturing processes from department list. (Sem: 5-6) (The course not taken to satisfy this requirement can be taken as a technical elective. Please see the department list)
Select 6 credits of technical electives from the department list, all 6 credits credits must be I E credits.

[1] A student enrolled in this program must receive a grade of C or better, as specified in Senate Policy 82-44.

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  Moved to  Approved

(#{#) - Review Order Sequence Number
Consultation

Recipient Name: CHENG DONG
Position: Consultation
Title: DEPT HEAD/DIST. PROF BIO

Department: Biomedical Engineering
Campus: UNIVERSITY PARK CAMPUS

Request sent: 7/25/2017 at 9:52 AM
Last sent: 8/7/2017 at 7:30 AM
Concur: Yes
Comments:
Reviewed On: 8/7/2017 at 8:39 AM

Recipient Name: CHITARANJAN DAS
Position: Consultation
Title: DISTINGUISHED PROF CSE

Department: Computer Science And Engineering
Campus: UNIVERSITY PARK CAMPUS

Request sent: 7/25/2017 at 9:52 AM
Last sent: 8/7/2017 at 7:30 AM
Concur: Yes
Comments:
Reviewed On: 8/7/2017 at 2:30 PM

Recipient Name: DAVID HUNTER
Position: Consultation
Title: DEPT HEAD STATISTICS

Department: Statistics
Campus: UNIVERSITY PARK CAMPUS

Request sent: 7/25/2017 at 9:52 AM
Last sent: 8/7/2017 at 7:30 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 8/9/2017 at 7:15 AM

Recipient Name: JUDITH TODD
Position: Consultation
Title: HEAD/PROF ESM

Department: Engineering Science And Mechanics
Campus: UNIVERSITY PARK CAMPUS
Request sent: 7/25/2017 at 9:52 AM
Concur: Yes
Comments:
Reviewed On: 7/25/2017 at 5:48 PM

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

Request sent: 7/25/2017 at 9:52 AM
Concur: Yes
Comments:
Reviewed On: 7/25/2017 at 6:22 PM

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

Request sent: 7/25/2017 at 9:52 AM
Concur: Yes
Comments:
Reviewed On: 7/31/2017 at 3:26 PM

Recipient Name: MARY BETH ROSSON
Position: Consultation
Title: Associate Dean
Department: Information Sciences And Technology
Campus: UNIVERSITY PARK CAMPUS

Request sent: 7/25/2017 at 9:52 AM
Concur: Yes
Comments:
Reviewed On: 7/25/2017 at 3:31 PM

Recipient Name: OLADIPO ONIPEDE
Position: Consultation
Title: ASSOC PROF MECH_ENGR
Department: Engineering
Campus: PENN STATE ERIE, THE BEHREND COLLEGE
Behrend does not offer CMPSC 202, so this will not have any impact on our Industrial Engineering Program (IESBD) Curriculum.

Change 2 Good idea

Change 3 May have some impact on us as students minoring in Supply Chain Management use one of these courses, but we think this is something we can work around.

After consulting with the IE faculty here at Behrend, we fully support all three changes.

Reviewed On: 8/8/2017 at 9:29 AM

---

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

---

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

---

Recipient Name: PHILIP MORRIS
Department: Aerospace Engineering
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: BOEING PROFESSOR OF AERSP
Recipient Name: PHILLIP SAVAGE  
Department: Chemical Engineering  
Position: Consultation  
Campus: UNIVERSITY PARK CAMPUS  
Title: PROF/DEPT HEAD CHEM ENGR

Request sent: 7/25/2017 at 9:52 AM  
Last sent: 8/7/2017 at 7:30 AM  
Concur: Yes  
Comments: (Completed By Default - Exceeded Time Limit)  
Reviewed On: 8/9/2017 at 7:15 AM

Recipient Name: SANJAY SRINIVASAN  
Department: Energy And Mineral Engineering  
Position: Consultation  
Campus: UNIVERSITY PARK CAMPUS  
Title: DEPT HEAD

Request sent: 7/25/2017 at 9:52 AM  
Concur: Yes  
Comments:  
Reviewed On: 7/31/2017 at 1:37 PM

Recipient Name: SUSAN SINNOTT  
Department: Materials Science And Engineering  
Position: Consultation  
Campus: UNIVERSITY PARK CAMPUS  
Title: Professor and Department Head

Request sent: 7/25/2017 at 9:52 AM  
Concur: Yes  
Comments:  
Reviewed On: 7/27/2017 at 2:07 PM

Recipient Name: YUXI ZHENG  
Department: Mathematics  
Position: Consultation  
Campus: UNIVERSITY PARK CAMPUS  
Title: DEPARTMENT HEAD

Request sent: 7/25/2017 at 9:52 AM  
Concur: Yes  
Comments:  
Reviewed On: 7/25/2017 at 10:56 AM
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<tr>
<td>Head of Department</td>
<td>JANIS TERPENNY</td>
<td>(Not Available)</td>
<td>UNIVERSITY PARK CAMPUS</td>
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<tr>
<td>Position: Head of Department</td>
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<td>SCCA Representative</td>
<td>ROBERT MELTON</td>
<td>(Not Available)</td>
<td>UNIVERSITY PARK CAMPUS</td>
</tr>
<tr>
<td>Position: SCCA Representative</td>
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<tr>
<td>Dean of the College</td>
<td>PETER BUTLER</td>
<td>(Not Available)</td>
<td>UNIVERSITY PARK CAMPUS</td>
</tr>
<tr>
<td>Position: Dean of the College</td>
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<tr>
<td>Vice President Of The Commonwealth Campuses</td>
<td>DAVID CHRISTIANSEN</td>
<td>(Not Available)</td>
<td>UNIVERSITY PARK CAMPUS</td>
</tr>
<tr>
<td>Position: Vice President Of The Commonwealth Campuses</td>
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<td>SCCA Subcommittee Review</td>
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<td>(Not Available)</td>
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Faculty Senate Review

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

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

---

**Recipient Name:** PAULA HAMATY  
**Position:** Registrar Data Entry  
**Department:** (Not Available)  
**Campus:** UNIVERSITY PARK CAMPUS  

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

---

Final Confirmation

**Recipient Name:** ALLISON ALBINISKI  
**Position:** Final Confirmation  
**Department:** (Not Available)  
**Campus:** UNIVERSITY PARK CAMPUS  

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

Blue Sheet Item #: 
Review Date: 

Program Codes

Behrend College: 
Engineering: IE_BS 

Option Codes

Industrial Engineering: 

Uploaded Documents:

Context Type: Prospectus Memo
File Description: BSIE program changes
File Name: Proposal2.pdf

Context Type: Supporting Documents
File Description: Consultation suggestion letter
File Name: ENG BS Industrial Engineering Revisions.pdf

Context Type: Prospectus Memo
File Description: BSIE prospectus
File Name: Prospectus_UndergraduateBulletinChange.pdf

Proposal ID: 4754 created on 10/13/2017 10:40 AM

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]
UPLOADDED DOCUMENTS FOLLOW:
Major, Options or Minor Proposal Form

Use this form for all undergraduate major, option, or minor adds, changes, or drops. Submit 1 copy of the form and 2 copies of the supporting documentation to the Curriculum Coordinator, University Faculty Senate Office, 101 Kern Graduate Building. For a detailed explanation of this form, see the Guide to Curricular Procedures. A signed, original Costing Analysis Form must be submitted with the original proposal to add a new major, add an option to an existing major, or add a new minor.

College: College of Engineering

Department or Instructional Area: Industrial Engineering

NEW MAJOR, OPTION, OR MINOR

Designation of major

Classification of Instructional Programs Code (CIP)

Designation of option

Designation of minor

Effective date: New majors, options, or minors become available for offering following administrative approval.

OLD MAJOR, OPTION, OR MINOR: Change __ x ___ Drop _____

Old designation of major: Industrial Engineering

New designation of major (if changed)

Old designation of option(s)

New designation of option(s), if changed

Old designation of minor

New designation of minor, if changed

Indicate effective date: 7/1/2017
SUBMITTED BY Janis Terpenne Date 1/17/2017
Head of Department (or person in charge of Instructional Area)

REVIEWED BY ___________________________________________ Date _____
College Representative to the Senate Committee on Curricular Affairs

APPROVED BY ___________________________________________ Date _____
Dean of College/Chancellor

For Commonwealth Campuses Only

APPROVED BY ___________________________________________ Date _____
Vice President for Commonwealth Campuses

If you have any questions regarding the Major, Option, or Minor Proposal Form, please contact the University Curriculum Coordinator, Office of the Faculty Senate at 814-863-1202.

Accessibility Statement
The University Faculty Senate is committed to making its websites accessible to all users and welcomes comments or suggestions on accessibility improvements. Please send comments or suggestions on accessibility to senate@psu.edu. All documents are available in alternative formats upon request.
Section being revised:

Three changes are made to the current bulletin. These are shown on pages 4 and 5, as changes 1, 2 and 3.

Industrial Engineering

University Park, College of Engineering (IE)

PROFESSOR JANIS TERPENNY, Head, Harold and Inge Marcus Department of Industrial and Manufacturing Engineering

The undergraduate program in industrial engineering, being the first established in the world, has a long tradition of providing a strong, technical, hands-on education in design, control, and operation of manufacturing processes and systems. The curriculum provides a broad-based education in manufacturing, operations research and ergonomics through a base of mathematics, physical and engineering sciences, and laboratory and industrial experiences. It builds a strong foundation for the development of a professionally competent and versatile industrial engineer, able to function in a traditional manufacturing environment as well as in a much broader economy, including careers in financial services, communication, information technology, transportation, health care, consulting, or academia.

Program Educational Objectives:

We expect our graduates to:

- Participate in and lead cross-functionally defined project teams, designing, implementing and improving processes and systems in the manufacturing, service, or government sectors, using state-of-the-art tools and methodologies;

- Work effectively in managerial and leadership positions, to establish and execute engineering and business strategies;

- Work and communicate effectively with internal and external stakeholders in the global environment, while satisfying engineering, business and financial goals and the end customers; and

- Engage in continuous learning through varied work assignments, graduate school, professional training programs and independent study.

Program Outcomes (Student Outcomes):
These are the specific competencies that our students are taught through the curriculum offered by the department. Our students are expected to know and be able to demonstrate these outcomes by the time they graduate. These relate to the skills, knowledge and behaviors that students acquire as they progress through the program. These are related to the ABET Outcomes (a) through (k). They are listed below.

1.1 Analyze and design both the job and the worksite in a cost-effective manner, as well as measure the resulting output.
1.2 Understand and apply cognitive systems engineering: identify visual, auditory, cognitive, perceptual and environmental aspects of human performance; Perform task analysis and evaluate human-computer interfaces.
1.3 Understand information contained in typical specifications and methods of product verification and conformance to specifications.
1.4 Program flexible manufacturing equipment and system controllers; design logical manufacturing layouts and implement contemporary systems issues.
1.5 Perform work measurement: develop an MTM analysis and carry out a work sampling study.
1.6 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.
1.7 Understand and apply principles of effective human/interface design to address improved human performance, visual displays and software design.

2.1 Ability to apply time value of money and select cost-effective engineering solutions; understand cost-accounting principles.
2.2 Ability to apply probability concepts to solve engineering problems, including reliability issues.
2.3 Ability to apply statistical concepts to solve real life problems, such as hypotheses testing, design of experiments and statistical quality control methods such as process capability and control charts.

2.4 Formulate, solve and analyze the results of linear programming models of real-world applications.
2.5 Formulate, solve and analyze real problems using Markov chains, network models, dynamic programming, queuing theory and inventory models.
2.6 Gain in-depth knowledge of data storage, analysis and visualization related to manufacturing and service domains.
2.7 Ability to create simulation models of manufacturing and service systems and analyze simulation output.
2.8 Ability to apply mathematical models to optimally design and control service systems.

3.1 Present engineering study results in technical reports and orally.
3.2 Demonstrate life-long learning by synthesizing information from several sources.

4.1 Work effectively in groups on case studies and projects.
4.2 Demonstrate knowledge of contemporary issues.
4.3 Understand professional and ethical responsibility.
4.4 Understand the impact of engineering decisions in a global and societal context.

After completing courses required for the core and fundamental competencies in the major, students can choose two technical elective courses from the department list, out of which must be an I E course. In addition, the students must also complete the three-credit capstone design course.

ENTRANCE TO MAJOR -- 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. *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 Industrial Engineering, a minimum of 129 credits is required. This baccalaureate program in Industrial Engineering is accredited by the Engineering Accreditation Commission of ABET, Inc., [www.abet.org](http://www.abet.org) (Opens New Window).

*Scheduling Recommendation by Semester Standing given like (Sem:1-2)

**GENERAL EDUCATION:** 45 credits
(27 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in this bulletin.)

**FIRST-YEAR SEMINAR:**
(Included in REQUIREMENTS FOR THE MAJOR)

**UNITED STATES CULTURES AND INTERNATIONAL CULTURES:**
(Included in GENERAL EDUCATION course selection)

**WRITING ACROSS THE CURRICULUM:**
(Included in REQUIREMENTS FOR THE MAJOR)

**REQUIREMENTS FOR THE MAJOR:** 111 credits
(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.)

**PRESCRIBED COURSES** (77 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 210(5)[1], ENGL 202C GWS(3), MATH 220 GQ(2), MATH 231(2), MATH 250(3)[1],
Additional Courses (16 credits)
Select 1 credit of First-Year Seminar (Sem: 1-2)
ENGL 15 GWS(3) or ENGL 30 GWS(3) (Sem: 1-2)
CAS 100A GWS(3) or CAS 100B GWS(3) (Sem: 3-4)

CMPSC 201 GQ(3) or CMPSC 202 GQ(3) (Sem: 1-2)

Change 1

CMPSC 201 GQ(3) or CMPSC 202 GQ(3) (Sem: 1-2) → to be changed to

CMPSC 200 GQ(3) or CMPSC 201 GQ(3) (Sem: 1-2)

ECON 102 GS(3) or ECON 104 GS(3) (Sem: 1-2)
IE 408(3), IE 418(3), or IE 419(3) (Sem: 7-8) (The courses not taken to satisfy this requirement can be taken as a track elective. Please see the department list)

Supporting Courses and Related Areas (18 credits)
Select 3 credits as a science selection from department list (Sem: 3-4)
Select 6 credits as non-major electives from department list (Sem: 3-8)

Change 2

The existing department list of non-major electives (out of which 6 credits must be taken) is expanded as follows. No course is removed from the existing list.

Current Department List: Engineering Elective - 6 credits - students may choose 3 credits from two sets of (): (CMPEN 271: Introduction to Digital Systems, E E 211: Electric Circuits and Power Distribution or E E 212: Introduction to Electronic Measuring Systems); (M E 201: Introduction to Thermal Science or M E 300: Engineering Thermodynamics); (E MCH 212: Dynamics); (3 credits from a minor upon completion of the minor as approved by the department); (3 credits of any combination of Co-op or Internship upon the completion of three rotations); and (3 credits of ROTC upon completion of the ROTC program)

Proposed Department List: Any 200, 300 or 400-level courses from the following programs:

Architectural Engineering (A E)
Aerospace Engineering (AERSP)
Biological Engineering (B E)
Biomedical Engineering (BME)
Chemical Engineering (CH E)
Civil Engineering (C E)
Computer Engineering (CMPEN)
Computer Science (CMPSC) (except CMPSC 200 and CMPSC 201)
Electrical Engineering (E E)
Engineering Mechanics (E MCH) (except E MCH 210)
Engineering Science (E SC) (Except  E SC 261M)
Environmental Systems Engineering (ENVSE)
Materials Science and engineering (MATSE) (Except MATSE 259)
Mechanical Engineering (ME)
Mining (MNG)
Nuclear Engineering (NUC E)
Petroleum and Natural Gas Engineering (P N G)

(3 credits of any combination of Co-op or Internship upon the completion of three rotations); and (3 credits of ROTC upon completion of the ROTC program).

Select 3 credits in manufacturing processes from department list. (Sem: 5-6) (*The course not taken to satisfy this requirement can be taken as a technical elective. Please see the department list*)

Select 6 credits of technical electives from the department list, out of which at least 3 credits must be IE credits.

**Change 3**

Select 6 credits of technical electives from the department list, out of which at least 3 credits must be IE credits. → to be changed to

Select 6 credits of technical electives from the department list; all 6 credits must be IE credits.

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Spring Semester 2013

Blue Sheet Item #: 41-05-090

Review Date: 02/19/2013
b) Changes in the List of courses

**For change 1:** List of courses which are being **added** to the program: CMPSC 200

List of courses which are being **removed** from the program: CMPSC 202

**For change 2:** List of courses which are being **added** to the department list:

Any 200, 300 or 400-level courses from the following programs:

- Architectural Engineering (A E)
- Aerospace Engineering (AERSP)
- Biological Engineering (B E)
- Biomedical Engineering (BME)
- Chemical Engineering (CH E)
- Civil Engineering (C E)
- Computer Engineering (CMPEN)
- Computer Science (CMPSC) (except CMPSC 200 and CMPSC 201)
- Electrical Engineering (E E)
- Engineering Mechanics (E MCH) (except E MCH 210)
- Engineering Science (E SC)
- Environmental Systems Engineering (ENVSE)
- Materials Science and engineering (MATSE) (Except MATSE 259)
- Mechanical Engineering (ME)
- Mining (MNG)
- Nuclear Engineering (NUC E)
- Petroleum and Natural Gas Engineering (P N G)

List of courses which are being **removed** from the department list: None.

**For change 3:**

List of courses which are being **added** to the department technical elective list: None.

List of courses which are being removed from the department technical elective list:

- BME 402: Biomedical Instrumentation and Measurements
BME 406: Medical Imaging
C E 422: Transportation Planning
E SC 445: Semiconductor Optoelectronic Devices
E SC 450/MATSE 450: Semiconductor Optoelectronic Devices
E SC 475/MATSE 475: Particulate Materials Processing
ENVSE 400: Safety Engineering
ENVSE 450: Environmental Health and Safety
ENVSE 457: Industrial Hygiene Measurements
ENVSE 470: Systems Safety and Risk Engineering
IST 441: Information Retrieval and Organization
MATH 416/STAT 416: Stochastic Modeling
MATH 451/CMPSC 451: Numerical Computations
MATH 455/CMPSC 455: Introduction to Numerical Analysis
MATH 456/CMPSC 456: Introduction to Numerical Analysis II
M E 446: Reliability and Risk Concepts in Design
STAT 462: Applied Regression Analysis

Justification:

**Change 1:** Removing CMPSC 202 and adding CMPSC 200: CMPSC 202 is no longer offered frequently by the Computer Science Department and also it covers FORTRAN Programming, which is not required for the students in the industrial engineering major. Hence it is removed from the list. CMPSC 201 is being kept in the list, because it covers C++ which is relevant to the students in the major. Because MATLAB is being taught in CMPSC 200, which is very relevant to the students in the industrial engineering major, CMPSC 200 is added to the list.

**Change 2:** Expanding the list of non-major electives: This change is related to change 3, as per which the students will not be able to take any non-major courses towards the 6 credits of technical electives. Hence, the list of non-major electives is expanded in order to give the students majoring in industrial engineering, more choices in non-major electives.

**Change 3:** Restricting the technical electives only to the courses offered in the Department of Industrial Engineering: The elective courses offered in the Department of Industrial Engineering out of which the students will have to take six credits as per this change, cover the industrial engineering tools and techniques. This will help the students in the industrial engineering major, to learn these tools, which will immensely help in their careers. This will also help our program to control and satisfy the ABET criteria for the minimum credit requirements in Engineering Topics.
DATE:    July 13, 2017
FROM:    Yvonne Gaudelius
TO:      Peter Butler

Thank you for the submission of your P-2 prospectus to make curricular revisions to the Bachelor of Science in Industrial Engineering. Consultation with the Computer Science and Engineering department and any department whose courses are being added or removed as an elective, as well as continued consultation with Penn State Erie, The Behrend College was recommended during the ACUE discussion. In line with AAPPM P-2 criteria and consultation, you may now move to the formal P-2 submission process.

cc:     Dawn Blasko
       David J. Christiansen
       Kadi K. Corter
       Michele L. Duffey
       Anna M. Griswold
       Tracy S. Hoover
       Robert N. Pangborn
       Pamela Silver
P-2: Curricular Changes in Undergraduate Programs/Majors, Options, IUGs, and Minors

ACUE Curricular Program Prospectus

Submission Authority

Each prospectus must be submitted by the college’s Associate Dean a minimum of one week prior to the ACUE meeting at which it will be considered. Electronic submission from the Associate Dean creates verification that the document has the college’s preliminary support. Prospectuses that do not originate with the Associate Dean cannot be accepted for consideration. An Associate Dean may identify to the Office of Undergraduate Education a staff member who is authorized to submit electronic prospectus forms on her or his behalf.

Submission Date:

Associate Dean Submitting This Prospectus:

Associate Dean Email:

Staff Assistant Email:

College and Campus: Engineering/University Park

Department with Responsibility for the Program: Industrial and Manufacturing Engineering

What type of program action is under consideration?

✓ Curricular Change in Major
  Curricular Change in Option
  Curricular Change in IUG
  Curricular Change in Minor

Name of major, option, IUG or minor: Industrial Engineering

Brief description of program

The undergraduate program in industrial engineering, being the first established in the world, has a long tradition of providing a strong, technical, hands-on education in design, control, and operation of manufacturing processes and systems. The curriculum provides a broad-based education in manufacturing, operations research and ergonomics through a base of mathematics, physical and engineering sciences, and laboratory and industrial experiences. It builds a strong foundation for the development of a professionally competent and versatile industrial engineer, able to function in a traditional manufacturing environment as well as in a much broader economy, including careers in financial services, communication, information technology, transportation, health care, consulting, or academia.
Briefly provide the rationale for changing this program.

Change 1 (change in additional courses): Removing CMPSC 202 and adding CMPSC 200: CMPSC 202 is no longer offered frequently by the Computer Science Department and also it covers FORTRAN Programming, which is not required for the students in the industrial engineering major. Hence it is removed from the list. CMPSC 201 is being kept in the list, because it covers C++ which is relevant to the students in the major. Because MATLAB is being taught in CMPSC 200, which is very relevant to the students in the industrial engineering major, CMPSC 200 is added to the list.

Change 2 (expansion of the department list): Expanding the list of non-major electives: This change is related to change 3, as per which the students will not be able to take any non-major courses towards the 6 credits of technical electives. Hence, the list of non-major electives is expanded in order to give the students majoring in industrial engineering, more choices in non-major electives.

Change 3 (change in requirements for technical electives): Restricting the technical electives only to the courses offered in the Department of Industrial Engineering: The elective courses offered in the Department of Industrial Engineering out of which the students will have to take six credits as per this change, cover the industrial engineering tools and techniques. This will help the students in the industrial engineering major, to learn these tools, which will immensely help in their careers. This will also help our program to control and satisfy the ABET criteria for the minimum credit requirements in Engineering Topics.

Describe briefly how this action supports-or requires an exception to-the University's commitment to curricular integrity and to disciplinary unity. Please also indicate if program accreditation is involved.

Changing the Computer Science course requirements will help our students to learn the relevant computer programs, which will help them in their careers. Requiring the students to take all six credits of technical electives in the major will help them to learn the industrial engineering tools and techniques, which will immensely help in their careers. This will also help our program to control and satisfy the accreditation criteria for the minimum credit requirements in Engineering topics. Expanding the non-major elective list will give our students more choices in non-major electives.

Resources (Check all that apply)

*No new resources required
Faculty
Staff
Physical resources
How will the changing of this program affect other programs or other Penn State campuses and colleges?

It will affect the Behrend campus, which is the only other campus, which offers the B.S. degree in Industrial Engineering, other than the University Park campus. That campus will be included in our consultation process.