1. Approval of minutes for the meeting of April 18, 2017

2. Dean’s Report
   - Revisions to HR-21 with respect to fixed term faculty (Rebecca for Anthony Atchley)

3. Updates from Undergraduate Studies Committee

4. Updates from Graduate Studies Committee

5. Updates from Engineering Technology Committee

6. Updates from Faculty Senate

7. Other Business
Engineering Faculty Council
Meeting Minutes
April 18, 2017


1. Approval of minutes for the meeting of March 21, 2017
   Unanimously approved.

2. Dean’s Report (Anthony Atchley)
   - Search for the new Dean is moving forward. Four candidates identified for on-campus interviews in May/June.
   - Collaboratorium project is moving forward. Architect selection is slated for F2017. Building will be constructed around intellectual focus areas shared by multiple departments rather than allocating space individually to specific departments.
   - Report made to Engineering Technology Council and branch campuses at Penn Stater.

3. Updates from Undergraduate Studies Committee (Chris Giebink).
   Four changes, three new course additions.
   - Added:
     - EDSGN 402 – Materials and Manufacturing
     - EDSGN 403 – Product Realization
     - EDSGN 420 – Advanced Robotics Design and Applications
   - Change
     - AE 468 – Advanced Building Electrical and Communication Systems: Suffix change
     - EDSGN 401 – Engineering Systems Design: Prerequisite change
     - EDSGN 410 – Robotics Design and Applications: Prerequisite change
     - General Engineering Program Proposal – Change in nomenclature and addition/change of several courses to create new options in the program.

   >>Unanimously approved.

   - Discussion of proposed EE curriculum change to eliminate EDSGN 100 to allow space for CMPSC 121/122.
     - Student opposition to dropping EDSGN 100 voiced from Engineering Undergraduate Council
     - Discussion over possible options to add project/team-based learning into CMPSC 121/122 or alternatively increase the EE/CSE focus in EDSGN 100, leveraging assistance from Tom Litzinger
     - Several members felt it important to see an explicit plan on how the key project/team-based learning activities from EDSGN 100 might be incorporated in CMPSC 121/122 in the event EDSGN 100 is dropped.
     - Broader EE student and alumni input on the proposed change was also asked for.

   >>Vote 5 to 3 against the EE program proposal change; proposal will be sent back for revision.
4. Updates from Graduate Studies Committees.
   • The current P/R faculty designation negatively impacts graduate faculty in some colleges particularly Arts and Architecture, as well as Health and Human Development.
   • Committee agreed relatively little impact on COE. No major objections raised to the proposed changes in P/R faculty designation.
   • Course Proposals:
     o ESC 503_Add – Low Dimensional Nanoelectronics
     o NUCE 544_Add – Global Nuclear Security Policies

>>Unanimously approved.

5. Updates from Engineering Technology Committee
   No items to report.

6. Updates from Faculty Senate (Doug Wolfe)
   • Next Senate meeting is April 25th
   • “All In” Diversity Conference was held at the PennStater on 4-18-17.
   • University Faculty Senate seek is Ombudsperson.
   • 2015 Penn State Sexual Misconduct Climate Survey for University Park was released. This report highlights the major findings for University Park from the Sexual Misconduct Climate Survey conduct University wide in Fall 2015.

7. Other Business
## College of Engineering
### Non-Tenure-Line Faculty Promotion Review Timetable

#### Elections

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>October 1</td>
<td>Request for Non-Tenure-Line Faculty Promotion Review Committee nominations for the College from Department Heads, School Directors and appropriate Unit Leaders</td>
</tr>
<tr>
<td>October 15</td>
<td>Department Heads submit nominations for College Non-Tenure-Line Faculty Promotion Review Committee to Human Resources for ballot preparations</td>
</tr>
<tr>
<td>October 20</td>
<td>Human Resources distributes ballots and election held</td>
</tr>
<tr>
<td>October 31</td>
<td>Human Resources announces election results and distributes the Non-Tenure-Line Promotion Review Committee member list for upcoming year</td>
</tr>
</tbody>
</table>

#### General Fixed-Term Review Process

<table>
<thead>
<tr>
<th>Month</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>September</td>
<td>Department Heads, School Directors and appropriate Unit leaders review the non-tenure-line faculty for possible promotion consideration</td>
</tr>
<tr>
<td></td>
<td>Dean reviews the non-tenure-line guidelines and any changes approved by faculty and Dean</td>
</tr>
<tr>
<td></td>
<td>Human Resources distributes College Non-Tenure-Line Guidelines and Timetable</td>
</tr>
<tr>
<td></td>
<td>Department Heads, School Directors and appropriate Unit Leaders provide a list of non-tenure-line faculty promotion committee members and statement of procedures for forming review committees to the Dean</td>
</tr>
<tr>
<td></td>
<td>Dean’s Office holds a College Non-Tenure-Line Workshop for non-tenure-line candidates and new faculty</td>
</tr>
<tr>
<td></td>
<td>Activity insight training for non-tenure-line faculty</td>
</tr>
<tr>
<td>Oct. – Nov.</td>
<td>Department Head, School Director, Unit Leader meets with candidate to review dossier preparation</td>
</tr>
<tr>
<td></td>
<td>Candidate provides information for dossier to administrative support person for assembly</td>
</tr>
</tbody>
</table>
Candidate and Department Head, School Director, Unit Leader discuss revisions and dossier is updated as necessary

Candidate signs Candidate Signature Statement verifying review of final dossier contents

<table>
<thead>
<tr>
<th>Date</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dec. – Jan.</td>
<td>Dossiers submitted to Department Non-Tenure-Line Faculty Promotion Review Committee for review. The Department Committee Chair prepares assessment letter.</td>
</tr>
<tr>
<td></td>
<td>Dossiers are submitted to Department Head, School Director, Unit Leader for review and preparation of assessment letters. Consultation with Department Non-Tenure-Line Faculty Promotion Review Committee as needed</td>
</tr>
<tr>
<td>January 20</td>
<td>Department level review complete and assessments are sent to HR for forwarding to College Non-Tenure-Line Faculty Promotion Review Committee</td>
</tr>
<tr>
<td>February 1</td>
<td>Dossiers submitted to College review committee for review and vote on assessments. Consultation with Department Head, School Director, Unit Leader as needed.</td>
</tr>
<tr>
<td>March 1</td>
<td>College review committee chair sends dossiers to Human Resources Office with assessment letters and a summary of the committee vote and list of committee members. The Human Resource Office will forward to the Dean for review.</td>
</tr>
<tr>
<td>May 1</td>
<td>Dean’s review of the non-tenure-line faculty promotion reviews are completed</td>
</tr>
<tr>
<td></td>
<td>Dean notifies the candidates of the non-tenure-line faculty promotion review results</td>
</tr>
</tbody>
</table>
Non-Tenure-Line Faculty Appointment and Promotion Guidelines
College of Engineering

(Following HR21 Definition of Academic Ranks - Conditions of appointment and promotion of research and instructional faculty members who are not subject to the provisions of tenure.)

Non-tenure-line faculty include the following:

Fixed Term Multi-Year and Fixed Term 1 or 2 appointments in the ranks
Instructor
Lecturer
Assistant Teaching Professor
Associate Teaching Professor
Teaching Professor
Researcher
Assistant Research Professor
Associate Research Professor
Research Professor
Clinical Lecturer
Assistant Clinical Professor
Associate Clinical Professor
Clinical Professor
Professor of Practice

APPOINTMENT GUIDELINES

Appointment to the ranks of Instructor, Lecturer, Assistant Teaching Professor, Associate Teaching Professor, Teaching Professor, Researcher, Assistant Research Professor, Associate Research Professor, Research Professor, Clinical Lecturer, Assistant Clinical Professor, Associate Clinical Professor, Clinical Professor and Professor of Practice are made by the hiring department/unit in accordance with definitions found in HR-21 – Definition of Academic Ranks and these guidelines for the College of Engineering.

Ranks for Non-Tenure-Line Teaching Faculty

The Teaching Faculty ranks include Instructor, Lecturer, Assistant Teaching Professor, Associate Teaching Professor and Teaching Professor.

Teaching Faculty ranks are intended for faculty with assignments that are primarily instructional in nature, including administrative service focused on student instruction, advising and support. Faculty members in these ranks may also hold an administrative title within the department or college (such as Assistant Dean, Laboratory Coordinator, Program Officer, Advising Coordinator, etc.).

<table>
<thead>
<tr>
<th>Career Progression</th>
<th>Assistant Teaching Professor</th>
<th>Associate Teaching Professor</th>
<th>Teaching Professor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teaching Faculty with Terminal Degree (Ph.D.)</td>
<td>Instructor</td>
<td>Assistant Teaching Professor</td>
<td>Associate Teaching Professor</td>
</tr>
<tr>
<td>Teaching Faculty without Terminal Degree (Masters)</td>
<td>Assistant Teaching Professor</td>
<td>Associate Teaching Professor</td>
<td>Teaching Professor</td>
</tr>
</tbody>
</table>
**Appointment to the Teaching Ranks**

The chart below outlines criteria used in determining the qualifications for each level of appointment within the teaching ranks.

Typically, the rank of Lecturer is used for non-tenure-line faculty with full-time appointments of a longer period (i.e., fixed term multi or fixed term 1). The rank of Instructor is used for non-tenure-line faculty with part-time or shorter length appointments (i.e., fixed term 2).

<table>
<thead>
<tr>
<th>APPOINTMENT REQUIREMENTS</th>
<th>TEACHING RANKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>INSTRUCTOR – Short-term appointment (FT2) or LECTURER – Long term appointment (FTM or FT1)</td>
<td></td>
</tr>
<tr>
<td>Master’s degree or equivalent in academic field related to teaching specialty</td>
<td>Active candidate for terminal degree in academic field related to teaching specialty</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ASSISTANT TEACHING PROFESSOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>With terminal degree</td>
</tr>
<tr>
<td>Terminal degree or equivalent in academic field related to teaching specialty</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ASSOCIATE TEACHING PROFESSOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>With terminal degree</td>
</tr>
<tr>
<td>Terminal degree in academic field related to teaching specialty; demonstrated ability as a teacher and adviser; evidence of professional growth, scholarship, and/or mastery of subject matter</td>
</tr>
<tr>
<td>Master’s degree or equivalent in academic field related to teaching specialty; demonstrated exceptional ability as a teacher and adviser while in the rank of Assistant Teaching Professor or equivalent position at another academic institution; evidence of professional growth, scholarship, and/or mastery of subject matter at a level of distinction beyond that of the Assistant Teaching Professor or equivalent at another academic institution</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TEACHING PROFESSOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>With terminal degree</td>
</tr>
<tr>
<td>Highest rank for this track</td>
</tr>
<tr>
<td>Terminal degree in academic field related to teaching specialty; demonstrated exceptional record of performance in teaching and advising; evidence of professional growth, scholarship, and/or mastery of subject matter at a level of distinction beyond that of the Associate Teaching Professor or equivalent at another academic institution</td>
</tr>
</tbody>
</table>
**Ranks for Non-Tenure-Line Research Faculty**

Research ranks include Researcher, Assistant Research Professor, Associate Research Professor, and Research Professor. These ranks are intended for individuals who are engaged primarily in research, including research support and laboratory management.

**Career Progression**

<table>
<thead>
<tr>
<th>Researchers with Terminal Degree (Ph.D.)</th>
<th>Assistant Research Professor</th>
<th>Associate Research Professor</th>
<th>Research Professor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Researchers without Terminal Degree (Masters)</td>
<td>Researcher</td>
<td>Assistant Research Professor</td>
<td>Associate Research Professor</td>
</tr>
</tbody>
</table>

**Appointment to the Research Ranks**

The chart below outlines criteria used in determining the qualifications for each level of appointment within the research ranks.

<table>
<thead>
<tr>
<th><strong>APPOINTMENT REQUIREMENTS</strong></th>
<th><strong>RESEARCH RANKS</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RESEARCHER</strong></td>
<td></td>
</tr>
<tr>
<td>Master’s degree or equivalent in academic field related to area of research</td>
<td>Active candidate for terminal degree in academic field related to area of research</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>ASSISTANT RESEARCH PROFESSOR</strong></th>
<th><strong>With terminal degree</strong></th>
<th><strong>Without terminal degree</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Terminal degree or equivalent in academic field related to area of research</td>
<td>Master’s degree or equivalent in academic field related to area of research; <strong>demonstrated ability</strong> as a researcher; evidence of professional growth and scholarship in area of discipline</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>ASSOCIATE RESEARCH PROFESSOR</strong></th>
<th><strong>With terminal degree</strong></th>
<th><strong>Without terminal degree</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Terminal degree in academic field related to area of research; <strong>demonstrated ability</strong> as a researcher; evidence of professional growth and scholarship in area of discipline</td>
<td>Highest rank for this track</td>
<td>Master’s degree or equivalent in academic field related to area of research; <strong>demonstrated exceptional ability</strong> as a researcher; evidence of professional growth and scholarship in area of discipline at a <strong>level of distinction</strong> beyond that of the Assistant Research Professor or equivalent at another academic institution</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>RESEARCH PROFESSOR</strong></th>
<th><strong>With terminal degree</strong></th>
<th><strong>Without terminal degree</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Highest rank for this track</td>
<td></td>
<td>N/A</td>
</tr>
</tbody>
</table>

**Terminal degree** in academic field related to area of research; **demonstrated exceptional record** of performance as a researcher; evidence of professional growth and scholarship in area of discipline at a **level of distinction** beyond that of the Associate Research Professor or equivalent at another academic institution.
**Appointment to Professor of Practice**

The Professor of Practice title is limited to faculty members without the traditional academic background that is typical of faculty as they move through the professorial ranks. The title of Professor of Practice is intended to attract faculty to Penn State who have accumulated a decade or more of leadership and high-level experience in either the private or public sector that provides a unique background and wealth of knowledge to share with University students and other faculty.

The Dean may appoint a faculty member at the rank of Professor of Practice following approval by the Vice Provost for Faculty Affairs.

**Appointment to Ranks of Clinical Faculty**

Clinical Faculty appointments for non-tenure-line faculty members will follow the same criteria used in determining teaching levels. The titles for the different ranks of clinical faculty are Clinical Lecturer, Assistant Clinical Professor, Associate Clinical Professor and Clinical Professor.

**PROMOTION REVIEW PROCESS**

The purpose of this section is to define the process for the review of full-time non-tenure-line faculty members for promotion.

Full-time faculty members in all ranks are required to prepare an annual Summary Report of Activity (SRA). Department heads and/or the supervising faculty member, in accordance with HR-40 Evaluation of Faculty Performance, should ensure that all full-time non-tenure-line faculty members receive an annual written performance evaluation.

Non-tenure-line faculty members should be evaluated based on their assigned specific duties and responsibilities (i.e., Teaching, Research, and Scholarship and Service). In general, for teaching ranks, promotion will depend upon excellence in teaching, curricular innovation, instructional coordination, advising and other assignments appropriate to these ranks. For research ranks, performance pertains to productivity and accomplishment in such areas as research, dissemination and impact, and advising of graduate students.

In considering research faculty members for promotion, departments are urged not to limit standards to those expected of tenure-line faculty members. The work of research faculty is typically narrower in scope than expectations for tenure-line faculty, and may focus on research administration or technical issues that do not necessarily result in publications, presentations and other factors considered in tenure.

For those non-tenure-line faculty in primarily service-oriented roles (e.g., Assistant Dean, Director), their evaluation should be based on the work they undertake in these roles. If the work is primarily student-oriented, such as academic support, advising, and program administration, their career progression should follow the path of teaching faculty with emphasis on their role in advising and administration as it relates to evidence of professional growth, scholarship, and/or mastery of subject matter. Documentation of accomplishments related to their service and administrative work and responsibilities should be presented in the dossier and evaluated as part of the review for promotion. If the faculty member’s role is more research focused, career progression should follow the path of research faculty.

Candidates for promotion must meet the minimum qualifications for appointment at the rank to which
promotion is sought. Faculty members are expected to have served at least five years in the first rank before being considered for promotion to the second rank. There is no minimum time in rank requirement for promotion from the second to third rank. Time in rank should not be the primary consideration.

**Promotion Review Roles**

In the review sequence that follows, the term “Department Head” includes Department Heads, School Directors, Unit Directors and Associate Deans.

For non-tenure-line faculty members with appointments that are not in an academic department or school, their cases will be reviewed by the committee in the department most closely aligned with their area of expertise. Along these lines, promotion cases for the following units will be reviewed as indicated below.

<table>
<thead>
<tr>
<th>Faculty in:</th>
<th>Will be reviewed by:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Larson Transportation Institute (LTI)</td>
<td>Civil and Environmental Engineering</td>
</tr>
<tr>
<td>Radiation Science and Engineering Center</td>
<td>Mechanical and Nuclear Engineering</td>
</tr>
<tr>
<td>Dean’s Office areas</td>
<td>School of Engineering Design, Technology and Professional Programs (SEDTAPP)</td>
</tr>
</tbody>
</table>

At the Larson Transportation Institute and the Radiation Science and Engineering Center, the Directors act in the Department Head role. In the Dean’s office areas, the Associate Dean of the relevant area acts in the Department Head role.

**Promotion Review Sequence**

- The faculty member’s supervisor initiates consideration for promotion in consultation with the Department Head (as defined in above section) and the non-tenure-line faculty member. The Department Head communicates the intent to conduct a promotion review to the College’s Office of Human Resources in September.
- The faculty member prepares a dossier in the same format required for tenure-line promotion cases using Activity Insights.
- A minimum of three internal letters must be included in the dossier. External letters are not required but may be substituted for internal letters.
- The dossier is submitted to the **Department** Non-Tenure-Line Faculty Promotion Review Committee in December.
- The **Department** Non-Tenure-Line Faculty Promotion Review Committee completes review of the dossier in January and prepares a written recommendation to submit to the Department Head.
- The **Department Head** conducts a review during the month of January and prepares a written recommendation for the College Non-Tenure-Line Faculty Promotion Review Committee.
- The dossier and written recommendations of the Department Committee and the Department Head are forwarded to Human Resources by the end of January. Human Resources will submit the dossier with the written recommendations to the **College** Non-Tenure-Line Faculty Promotion Review Committee in early February.
- The **College** Non-Tenure-Line Faculty Promotion Review Committee will complete their review in February with recommendations forwarded to the **Dean** in early March.
- The **Dean** will complete review in early May. The Dean will make the final decision regarding the promotion of candidates under policy HR21 *Definition of Academic Ranks*.
- The **Dean** will provide written notification to the candidates in May.
Consideration should be given to provide a salary increase for faculty members who are promoted. The increase is the responsibility of the department/unit in which the faculty member is appointed. The increase will typically range from 5% - 8%, however, discretion will be given to the Department Head to determine the specific amount with approval from the Dean. All promotion increases are effective July 1.

NON-TENURE-LINE FACULTY PROMOTION REVIEW COMMITTEES

College Committee

College Committee Structure

The College of Engineering Non-Tenure-Line Faculty Promotion Review Committee consists of seven members, each with a two-year term. Only one non-tenure-line faculty member of any single department, school or unit within the College will be on the Committee at any given time.

The seven members are elected or appointed from a pool of eligible candidates. This pool of candidates consists of one full-time non-tenure-line faculty member from each eligible department, school or unit, within the College of Engineering. Candidates must hold the highest rank in their track and have a budgetary appointment in the College.

Five of the committee members are elected directly by the College of Engineering full-time non-tenure-line faculty members. These five members will serve staggered terms, with three members elected one year and two members elected in the following year.

Two of the committee members are appointed by the Dean. The appointed members will also serve staggered terms, with the Dean making one new appointment each year.

Administrators are not eligible to serve on the committee.

Election and Appointment of College Committee Members and the Committee Chair

Committee members are elected from the pool of candidates by the full-time non-tenure-line faculty with budgetary appointments in the College. Elections are held in the spring of each year.

Faculty members may vote for three candidates in one year and two in the other year. The election is conducted electronically.

Committee appointments by the Dean are made after the elections are complete. The College recognizes the importance of regular participation by all departments/units in the promotion review process at the College level. The Dean will take this into consideration when making these appointments.

Alternates will be determined as part of the election process. Typically, those receiving the next highest number of votes after those elected or appointed as a Committee member will be named as alternates.

The Committee Chair is elected by the members of the Committee.

Terms of Office for College Committee Members

The term of office for each regular member of the review committee is two years.

No member will serve more than two successive terms on the committee.
If an elected committee member is unable to serve the full term of two years, an alternate will be asked to serve the remainder of the term. If no alternate is available, a special election will be held.

**Guidelines for College Committee Members**

Faculty members should not serve on more than one level (department or college) of the Non-Tenure-Line Faculty Promotion Review Committee.

Each Committee member has the right to and is expected to participate fully in the discussion and vote for every faculty member whose case comes before the Committee. In order to vote, Committee members should be part of the discussion with all other Committee members. Participation may be conducted by conference call or other means if a Committee member is unable to be physically present for the discussion.

**Department/Unit Committee**

Only full-time non-tenure-line faculty members may serve on the Department/Unit Non-Tenure-Line Promotion Review Committee. Faculty serving on the Department/Unit Committee must be at the highest rank for their track.

A Department/Unit Committee must have at least three members and no more than seven members.

At least two-thirds of the Committee members are elected by the full-time non-tenure-line faculty in the department, The other one-third may be appointed by the Department Head.

The process of providing alternate members for a Department/Unit Committee should be determined and included in the written procedures. An alternate will serve only when an elected member of the Committee is unable to participate. The alternate will replace the elected member for all discussion and votes on candidates for that period.

The Chair of the Department/Unit Committee is elected by the members of the Committee.

Written procedures for development the Department/Unit Committee are prepared by each department/unit. These procedures must be approved by the full-time non-tenure-line faculty of each department/unit and are submitted to the College’s Office of Human Resources each year in September.

Only elected members of the Department/Unit Committee will be present and participate in discussions regarding promotion candidates. The only exception would be when a Department Head is requested to meet with the Committee to provide consultation on a candidate.
Policy HR21 DEFINITION OF ACADEMIC RANKS

POLICY'S INITIAL DATE: June 6, 1958
THIS VERSION EFFECTIVE: July 1, 2017

Contents:

- Purpose
- Earned Degrees
- Academic Rank
- Ranks for Tenure-Line Faculty
- Ranks for Non-Tenure-Line (Fixed-Term or Standing) Teaching Faculty
- Ranks for Non-Tenure-Line (Fixed-Term or Standing) Research Faculty
- Ranks for Clinical Faculty with Terminal Degrees
- Ranks for Clinical Faculty without Terminal Degrees
- Ranks for Faculty in the University Libraries
- Professor of Practice
- Professorial Titles for Research Faculty
- Fixed-Term Ranks and Promotion Procedures

PURPOSE:

This policy provides guidance on the qualifications necessary for appointment or promotion to the various academic ranks.

Earned Degrees:

In assessing candidates for appointment, tenure, promotion, sabbatical leave, etc., the University will accept only those degrees earned at institutions in the United States that have been accredited by regional higher education accrediting associations (such as Middle States) and professional accrediting associations (such as AASCB in Business) in disciplines in which such accrediting takes place, or foreign degrees that have been earned at institutions recognized by their respective governments. Degrees from qualified institutions (per above) are the only ones that the University will acknowledge for appointment, determination of rank, or subsequent personnel decisions. Further, misrepresentation of such information by an individual can be cause for denial or termination of employment.

ACADEMIC RANK:

A. Ranks for tenure-line faculty

1. Assistant Professor - The assistant professor should possess a terminal degree or its equivalent in organized research or professional practice; must have demonstrated ability as a teacher or research worker; and must have shown definite evidence of growth in scholarly, artistic, or professional achievement.
2. **Associate Professor** - The associate professor should possess the same qualifications as the assistant professor, but must also provide evidence of an established reputation in scholarly, artistic, or professional achievement.

3. **Professor** - The professor should possess the same qualifications as the associate professor, but must also provide evidence of a substantial record of advanced research and/or creative work, and of leadership in his/her field of specialization. This rank should be reserved for persons of proven stature in teaching and/or research.

**B. Ranks for non-tenure-line (fixed-term or standing) teaching faculty**

1. **Lecturer or Instructor** - A lecturer or instructor should possess at least a master's degree or its equivalent, or be an active candidate for a terminal degree, in an academic field related to his/her teaching specialization.

2. **Assistant Teaching Professor** - The assistant teaching professor should possess a terminal degree or its equivalent in an academic field related to his/her teaching specialization; alternatively, the assistant teaching professor without a terminal degree should possess at least a master's degree or its equivalent in an academic field related to his/her teaching specialization; must have demonstrated ability as a teacher and adviser; and must have shown evidence of professional growth, scholarship, and/or mastery of subject matter.

3. **Associate Teaching Professor** - The associate teaching professor should possess a terminal degree in an academic field related to his/her teaching specialization; must have demonstrated ability as a teacher and adviser; and must have shown evidence of professional growth, scholarship, and/or mastery of subject matter. Alternatively, the associate teaching professor without a terminal degree should possess at least a master's degree or its equivalent in an academic field related to his/her teaching specialization; must have demonstrated exceptional ability as a teacher and adviser while in the rank of senior lecturer or instructor; and must have shown evidence of professional growth, scholarship, and/or mastery of subject matter at a level of distinction beyond that of the assistant teaching professor.

4. **Teaching Professor** - The teaching professor should possess a terminal degree in an academic field related to his/her teaching specialization; must have demonstrated exceptional ability as a teacher and adviser while in the rank of associate teaching professor; and must have shown evidence of professional growth, scholarship, and/or mastery of subject matter at a level of distinction beyond that of the associate teaching professor.

**C. Ranks for non-tenure-line (fixed-term or standing) research faculty**

1. **Researcher** - The researcher should possess a master's degree or its equivalent, or be an active candidate for a terminal degree, in an academic field related to his/her research.

2. **Assistant Research Professor** - The assistant research professor should possess a terminal degree or its equivalent in an academic field related to his/her research. Alternatively, the assistant research professor without a terminal degree should possess at least a master's degree or its equivalent in an academic field related to his/her teaching specialization; must have demonstrated ability as a researcher; and must have shown evidence of professional growth and scholarship in his/her discipline.

3. **Associate Research Professor** - An associate research professor should possess a terminal degree or its equivalent in an academic field related to his/her research; must have demonstrated ability as a researcher; and must have shown evidence of professional growth and scholarship in his/her discipline. Alternatively, the associate research professor should possess at least a master's degree or its equivalent in an academic field related to his/her research; must have demonstrated exceptional ability as a researcher; and must have shown evidence of professional growth and scholarship in his/her discipline at a level of distinction beyond that of the assistant research professor.
4. **Research Professor** - A research professor should possess a terminal degree or its equivalent in an academic field related to his/her research; must have demonstrated exceptional ability as a researcher; and must have shown evidence of professional growth and scholarship in his/her discipline at a level of distinction beyond that of associate research professor.

D. **Ranks for clinical faculty with terminal degrees**

Units that designate faculty as "clinical" should establish, for faculty with terminal degrees, qualifications for each rank that track closely to the qualifications for research and teaching faculty with terminal degrees.

1. Assistant Clinical Professor
2. Associate Clinical Professor
3. Clinical Professor

D. **Ranks for clinical faculty without terminal degrees**

Units that designate faculty as “clinical” should establish, for faculty without terminal degrees, qualifications for each rank that track closely to the qualifications for research and teaching faculty without terminal degrees.

1. Clinical Lecturer
2. Assistant Clinical Professor
3. Associate Clinical Professor

F. **Ranks for faculty in the University Libraries**

Ranks for Faculty in the University Libraries are defined in internal University Libraries policies UL-HRG07 Promotion and Tenure Criteria (for tenure-line ranks) and UL-HRG16 Promotion of Full Time, Non-Tenure Track Faculty (for fixed-term ranks).

**PROFESSOR OF PRACTICE:**

The professor of practice title is limited to those individuals who are non-tenure track faculty who may not have had the traditional academic background that is typical of faculty as they move through the professorial ranks. The title of professor of practice should be reserved for persons who have accumulated a decade or more of high level and leadership experience in the private or public sectors outside the academy that would provide a unique background and wealth of knowledge that is of particular value as it is shared with the University's students and other faculty. Prior to an offer being extended to an individual being considered for the professor of practice title, the appropriate dean or academic administrator shall consult with, and receive approval from, the Vice Provost for Faculty Affairs.

**PROFESSORIAL TITLES FOR RESEARCH FACULTY:**

Research faculty who profess are entitled to professorial titles in accordance with HR24 (Professorial Dual Titles for Research Faculty).

The equivalency of rank, indicated above, is followed in granting such titles.

**FIXED-TERM RANKS and PROMOTION PROCEDURES:**

Fixed-term ranks and titles should follow the guidelines set forth above for teaching, research, and clinical faculty, as well as librarians. Units should have clear rationales for the different ranks and titles they choose to use and their expectations for faculty to achieve these various ranks.
Rather than use the titles "lecturer" and "instructor" interchangeably for fixed-term appointments, each college should determine for itself which of the two titles it chooses to use, and then use that title consistently for such appointments.

Colleges should have their own guidelines for distinguishing between lecturer/instructor, assistant/associate/full professor positions for designating a third rank beyond that of lecturer or for promoting from one rank to the other, but all units should operate under the following University assumptions:

1. Although there can be exceptions, positions above the first rank are designed to be promotion opportunities, with a recommended period of at least five years in rank as an instructor or lecturer (or, for fixed-term and standing faculty without tenure who hold terminal degrees, assistant teaching/research/clinical professors) before consideration for promotion. Fixed-Term and Standing non-tenure-line faculty should become eligible for promotion to the second rank after five years in rank, and would be permitted to compile their promotion dossiers in their fifth year. There should be no fixed time period for promotion to the third rank. Reviews for promotions should be conducted solely with regard to the merit of the candidate.

2. Reviews for promotion of the full-time fixed-term faculty shall be conducted by Fixed-Term Promotion Review Committees. Fixed-Term Promotion Review Committees shall be constituted as follows: each of the colleges at University Park shall establish a committee for that college; each of the five stand-alone campuses (Abington, Altoona, Behrend, Berks, Harrisburg) shall establish a committee for that campus; each of the Special Mission Campuses (Great Valley, College of Medicine, and Dickinson Law) shall establish a committee for that campus; and the University College shall establish one committee composed of full-time fixed-term faculty from the campuses within the University College, with no more than one member from any campus. If a unit shall have fewer than seven fixed-term faculty members, at least two members of that unit's Fixed-Term Review Committee shall be drawn from another unit's Fixed-Term Review Committee. Only full-time fixed-term faculty members in each unit are eligible to serve on and to vote for the members of the review committee in their unit. Only faculty of higher rank than the candidate should make recommendations about promotions. If there should be insufficient numbers of higher-ranked fixed-term faculty, exceptions to this provision may be permitted by the Executive Vice President and Provost at the request of the academic unit.

3. The promotion procedure itself should include recommendations by both a campus/department faculty committee, (b) the DAA or department/division head, and (c) the approval of the campus chancellor and/or dean of the college.

4. All promotions should be accompanied by a promotion raise, in addition to a merit raise, to be determined and funded by the college.

5. The exceptions to this policy are the College of Medicine, the Colleges of Law (Dickinson and University Park), and the University Libraries, since their faculty have for many years been hired off the tenure-track and do not create confusion about their relation to tenure-track faculty.

CROSS REFERENCES:

HR23 Promotion and Tenure Procedures and Regulations

UPDATES:

07-01-2017 - Titles for fixed-term and standing non-tenure-line faculty standardized.

4/20/07 - Professor of practice title added.

11/2/06 - Changed Intercollege Research Programs to interdisciplinary programs.
<table>
<thead>
<tr>
<th>Type and Description of Change</th>
<th>Description or Rationale for Curricular Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPSC 131 – Programming and Computation I: Fundamentals</td>
<td>This course introduces the fundamental concepts and processes of solving computational problems through the design, implementation, testing and evaluation of efficient and robust computer programs. The concepts include basic computational constructs found in imperative, object-oriented and functional programming languages such as iteration, conditionals, functions, recursion, and datatypes. These provide the basic building blocks found in virtually all programming languages. The processes include the stepwise refinement of a problem description into individual components that can be implemented, tested, and integrated into an effective solution. A central theme to the course is computational thinking which includes a wide range of approaches to solving problems and designing systems that draw upon concepts fundamental to computer science. Computational thinking includes thinking recursively, considering parallel processing, thinking about types and type checking, judging a program not just for correctness and efficiency but also for its esthetics, and judging a system design for its simplicity and elegance. Computational thinking is applying principles of abstraction at multiple levels to focus on important details; it is applying problem decomposition to identify small problems that can be individually solved then combined to form a solution to the original problem. Computational thinking uses program invariants to describe a system’s behavior succinctly and declaratively. Computational thinking considers multiple models of computation when designing an effective solution to a problem.</td>
</tr>
<tr>
<td>CMPSC 132 – Programming and Computation II: Data Structures</td>
<td>This course builds upon the foundations of programming and computation by introducing and studying the data structures and programming language features that support the design and construction of large-scale software systems. It introduces the foundations of object-oriented programming, the design and analysis of efficient algorithms using important data structures, and programming techniques that support reusable and modular program components, including data abstraction, polymorphism, and higher-order functions. Topics from object-oriented programming include classes, objects, inheritance, methods, message passing, static and dynamic type checking. These topics form the core of most object-oriented languages and provide a foundation for learning more advanced language topics. Data structures capture the common organization of many kinds of data arising in the design of efficient solutions to computational problems. Specific data</td>
</tr>
</tbody>
</table>
structures covered include stacks, queues, trees, graphs and linked lists. The design and analysis of efficient algorithms using these data structures provide a foundation for the study of computing, where understanding the complexity of a problem and the availability of efficient solutions are essential skills. Finally, topics including higher-order functional programming, data abstraction and parametric polymorphism, as well as principles from object-oriented programming, come together to support the design and implementation of modular, reusable and robust code.

<table>
<thead>
<tr>
<th>CMPSC 221 – Object Oriented Programming with Web-Based Applications</th>
<th>We have changed the prerequisites from just CMPSC 122 to CMPSC 122 OR CMPSC 132. This change is necessary to support the new introductory programming sequence (CMPSC 131, 132) which is language neutral, compared with the C++-focused CMPSC 121, 122. Either sequence prepares the students for CMPSC 221 in which Java is introduced. Students following either introductory sequence will have learned fundamental programming skills and been exposed to basic object-oriented programming. We have revised the long and short descriptions and included a list of topics simply to enhance the available information. These describe the course as it currently exists and do not represent any change in content or outcome. There is no change to the course content.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submitted by:  John Joseph Hannan and Alan Carl Verbanec</td>
<td></td>
</tr>
<tr>
<td>Course Change</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Computer Science Program Proposal</th>
<th>Computer Science is the study of computation, including its principles and foundations, its efficient implementation, its analysis, and its practical use in a wide range of different application areas. Computer Science is far more than just programming and no other science or engineering discipline has had a greater impact in such diverse areas as commerce, communication, entertainment, finance, medicine, the social sciences, the physical sciences and the life sciences. Computer Science impacts our daily lives in a multitude of ways and computer scientists are instrumental in driving these changes. Computer science transforms the way we look at and live in the world.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submitted by:  John Joseph Hannan</td>
<td></td>
</tr>
<tr>
<td>Program Change</td>
<td></td>
</tr>
</tbody>
</table>
The mission of our undergraduate program is to prepare our students for a wide range of careers as computer scientists, software engineers, software developers, and related positions in the field of computing. Our curriculum covers fundamental programming techniques and skills, broad knowledge of computer hardware, operating systems, programming languages, the mathematical foundations of computing, and advanced topics in software design and application development. Recurrent themes in the program include security, algorithmic complexity, cooperating systems, performance evaluation, and software correctness. This curriculum provides students with the skills needed to design, develop, evaluate and analyze software solutions to a wide spectrum of computational problems and prepares them to be leaders in the rapidly changing field of computing throughout their careers.

Program Educational Objectives:
In particular, within a few years after graduation, graduates in computer science should be able to:
1. Apply appropriate theory, practices, and tools to the specification, design, implementation, maintenance and evaluation of both large and small software systems.
2. Work in teams to design, implement, and/or maintain components of computer software systems.
3. Stay current through professional conferences, certificate programs, post-baccalaureate degree programs, or other professional educational activities.

Program Outcomes (Student Outcomes):
(a) An ability to analyze a problem, and to identify and define the computing requirements appropriate to its solution
(b) An ability to design, implement, and evaluate a computer-based solution to meet a given set of computing requirements in the context of the discipline
(c) An ability to communicate effectively with a range of audiences about technical information
(d) An ability to make informed judgments in computer practice based on legal and ethical principles
(e) An ability to function effectively on teams to establish goals, plan tasks, meet deadlines, manage risk, and produce deliverables
(f) An ability to apply theory in the design and implementation of computer-based solutions
(g) An ability to reason about and explain computer-based solutions at multiple levels of abstraction

For the B.S. degree in Computer Science, a minimum of 126 credits is required.

For a Bachelor of Science in Computer Science a minimum of 127 credits are required.

*Scheduling Recommendation by Semester Standing Given Like (Sem: 1-2)*
### Justification For The Change Proposal:

We are replacing the CMPEN 271 requirement with CMPEN 270. The lectures are the same. 270 adds a laboratory component and is currently only required for the computer engineering major. We feel students will benefit with hands-on experience in the lab. Students can take CMPEN 271 & CMPEN 275 sequence to satisfy this requirement. If CMPEN 275 is not offered at a campus students will take a 1-credit independent study after they transfer to University Park and complete the same laboratory experience. This arrangement currently works well for the Computer Engineering major and so should not cause any difficulties.

We have updated the program description and outline to provide current and more detailed information. The program description includes specific student outcomes which correspond to accreditation outcomes.

Adding CMPSC 131 and CMPSC 132 as alternatives to CMPSC 121 and CMPSC 122. CMPSC 221 prerequisites revised to allow either CMPSC 122 or CMPSC 132. We made explicit the options for satisfying the probability and statistics requirements to include STAT 414,415,418.

### CHE 210 Introduction to Material Balances

**Submitted by:** Themis Matsoukas  
**Course Change**

The current prerequisites read Prerequisite: or concurrent: MATH 251. This will be changed to Prerequisite: MATH 251. The course covers among other topics transient material balances and this part requires knowledge of differential equations. The chemical engineering program has consistently advised students to take this MATH course before taking CHE 210 but had allowed it as concurrent to facilitate academic scheduling in some exceptional cases. Since MATH 251 is now one of the ETM courses, and since the material is necessary in the coverage of CHE 210, the chemical engineering program will no longer accept MATH as a concurrent with 210. The change applies to both the regular and honors section of CHE 210.

### CHE 210H Introduction to Material Balances (Honors)

**Submitted by:** Themis Matsoukas  
**Course Change**

The current prerequisites read Prerequisite: or concurrent: MATH 251. This will be changed to Prerequisite: MATH 251. The course covers among other topics transient material balances and this part requires knowledge of differential equations. The chemical engineering program has consistently advised students to take this MATH course before taking CHE 210 but had allowed it as concurrent to facilitate academic scheduling in some exceptional cases. Since MATH 251 is now one of the ETM courses, and since the material is necessary in the coverage of CHE 210, the chemical engineering program will no longer accept MATH as a concurrent with 210. The change applies to both the regular and honors section of CHE 210.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Current Prerequisites</th>
<th>Proposed Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHE 220 Introduction to Chemical Engineering Thermodynamics</td>
<td>CHE 220H Introduction to Chemical Engineering Thermodynamics (Honors)</td>
<td>The current prerequisites read “Prerequisite: or concurrent:MATH 230”. This will be changed to “Prerequisite: MATH 231”. The change from MATH 230 to MATH 231 is a technical change as the chemical engineering program now requires MATH 231 instead of Math 230 previously. The change from “prerequisite or concurrent” to prerequisite only is made because CHE 220 makes extensive use of calculus of multivariate functions. The chemical engineering program has consistently advised students to take this MATH course before taking CHE 220 but also accepted it as concurrent to facilitate scheduling for students transferring to University Park from other campuses who might otherwise fall a whole year behind. This situation is no longer likely as CHE 220 is offered both semesters, as well as an online course during the summer.</td>
<td>The current prerequisites read “Prerequisite: or concurrent:MATH 230”. This will be changed to “Prerequisite: MATH 231”. The change from MATH 230 to MATH 231 is a technical change as the chemical engineering program now requires MATH 231 instead of Math 230 previously. The change from “prerequisite or concurrent” to prerequisite only is made because CHE 220 makes extensive use of calculus of multivariate functions. The chemical engineering program has consistently advised students to take this MATH course before taking CHE 220 but also accepted it as concurrent to facilitate scheduling for students transferring to University Park from other campuses who might otherwise fall a whole year behind. This situation is no longer likely as CHE 220 is offered both semesters, as well as an online course during the summer.</td>
</tr>
<tr>
<td>CHE 450 Process Dynamics and Control</td>
<td>CHE 452 Chemical Process Safety</td>
<td>Its current prerequisites are listed as Prerequisite or concurrent: CHE 410, CHE 430 and will be changed to CHE 210 with minimum grade of “C” and CHE 230. CHE 230, a recently introduced course, covers numerical tools that are used in CHE 450. The upper level courses CHE 410 and 430 are typically scheduled in the senior year, too late to contribute meaningfully to prerequisite knowledge in CHE 450.</td>
<td>Its current prerequisites are Prerequisite: Prerequisite or concurrent:CHE 410, CHE 430 and will be changed to Prerequisite: CHE 320; Prerequisite or concurrent:CHE 330, 350. In the past this course was offered as a senior elective but it its current form the course may be taken in the senior or junior year. The updated prerequisites better reflect that material covered in the course.</td>
</tr>
</tbody>
</table>
**CHE 480M Chemical Engineering Laboratory (Honors)**
Submitted by: Themis Matsoukas

<table>
<thead>
<tr>
<th>Course Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>The current prerequisites are listed as Prerequisite: ENGL 202C, CHE 320, CHE 330, CHE 350 and will be changed to Prerequisite: CHE 230, CHE 320, CHE 330, CHE 350, Prerequisite or concurrent: CHE 410. The addition of CHE 410 is needed because two major experiments involve distillation columns and extraction columns that are covered in CHE 410. The scope of these experiments is such that prior exposure to this material is very strongly recommended. The addition of CHE 230 is needed because the lab makes extensive use of Excel and Mathematica (or similar software) for solving systems of equations, making appropriate graphs, and statistical analysis, all of which are covered in CHE 230. ENGL 202C is removed as a prerequisite because the material covered in ENGL 202C is not necessary for successful completion of CHE 480W/480M.</td>
</tr>
</tbody>
</table>

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**CHE 480W Chemical Engineering Laboratory**
Submitted by: Themis Matsoukas

<table>
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<tr>
<td>The current prerequisites are listed as Prerequisite: ENGL 202C, CHE 320, CHE 330, CHE 350 and will be changed to Prerequisite: CHE 230, CHE 320, CHE 330, CHE 350, Prerequisite or concurrent: CHE 410. The addition of CHE 410 is needed because two major experiments involve distillation columns and extraction columns that are covered in CHE 410. The scope of these experiments is such that prior exposure to this material is very strongly recommended. The addition of CHE 230 is needed because the lab makes extensive use of Excel and Mathematica (or similar software) for solving systems of equations, making appropriate graphs, and statistical analysis, all of which are covered in CHE 230. ENGL 202C is removed as a prerequisite because the material covered in ENGL 202C is not necessary for successful completion of CHE 480W/480M.</td>
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</tbody>
</table>

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**Chemical Engineering Program Proposal**
Submitted by: Themis Matsoukas

<table>
<thead>
<tr>
<th>Program Change</th>
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</thead>
<tbody>
<tr>
<td>The following changes are made to the chemical engineering program:</td>
</tr>
<tr>
<td>1. All options are dropped and the program reverts to the requirements of the general option.</td>
</tr>
<tr>
<td>2. CHEM 466 is opened into a pool of acceptable electives</td>
</tr>
<tr>
<td>3. Materials elective is moved under Supporting Courses and Related Areas category</td>
</tr>
<tr>
<td>4. COURSE CHANGES</td>
</tr>
<tr>
<td>4a CHE 210: Change prerequisite from Prerequisite: or concurrent: MATH 251 to Prerequisite:MATH 251</td>
</tr>
<tr>
<td>4b CHE 220 and CHE 220H: change prerequisite from Prerequisite: or concurrent:MATH 230 to Prerequisite: MATH 231</td>
</tr>
<tr>
<td>4c CHE 450: change prerequisites from Prerequisite or concurrent:CHE 410, CHE 430 to Prerequisite: CHE 210 with minimum grade of &quot;C&quot; and Math 251</td>
</tr>
<tr>
<td>4e CHE 452: change prerequisites from Prerequisite or concurrent:CHE 410, CHE 430 to</td>
</tr>
</tbody>
</table>
Prerequisite: CHE 320; Prerequisite or concurrent: CHE 330, 350

4d CHE 480 and 480M: change from Prerequisite: ENGL 202C, CHE 320, CHE 330, CHE 350 to Prerequisite: CHE 230, CHE 320, CHE 330, CHE 350, Prerequisite or concurrent: CHE 410.

JUSTIFICATION FOR THE CHANGES

1. DROPPING OPTIONS

Currently, the chemical engineering program has five options, the largest number in the college:

1. General option (GEN)
2. Bioprocess and biomolecular engineering option (BPME)
3. Energy and fuels engineering option (E&FE)
4. Polymer engineering option (PLMRE)
5. Research intensive option

The four specialized options (2-4) address topics in bioprocess engineering, energy and polymers. The research intensive option focuses in preparing students for graduate school. The general option is more flexible and allows students to pursue electives according to personal interest or to use some of these electives to obtain minors in other programs. The decision to drop the options is based on the following considerations:

Enrollment in all specialized options has declined significantly in recent years with a large majority of students graduating in the general option (attached graph). Between 2008 and 2014 the general option has graduated on average 82% of all graduating seniors. In 2014-15 this percentage rose to 87%, with the remaining 13% going to the other four options combined. The polymer option has had very low enrollments for several years and there is broad agreement that the option cannot be maintained.

Input from recruiters who have indicated that the option on a student’s transcript is not a significant factor in hiring decisions. This is supported by data collected by the chemical engineering department that show options add no significant advantage in employment. In 2014, 77% of the students in the general option had a job at graduation time, compared to 83% of the students in the specialized options. Given that the number of graduates in the general option was 122 as compared to 10 in all specialized options together, the difference is not statically significant.

While specialized options allow in-depth coverage of certain engineering topics, the strict requirements of the options limit other academic opportunities, most notably coop. Students in the general option may receive credit for coop while students in the specialized options do not have room for such credit. Data collected by the department of chemical engineering in 2014...
show that among the cohort of students with coop experience the rate of job placement at the
time of graduation was 90%, as opposed to 71% overall. Even with formal options in place,
students will be able to pursue in-depth studies in areas of technological interest by making use
of 18 credits of electives under the Supporting Courses and Related Areas category. The
chemical engineering program will facilitate this by compiling study plans with specialized focus.

2. CHEM 466 is opened into a pool of acceptable electives

CHEM 466 is currently a required course with focus in molecular and statistical topics in physical
chemistry. The course is afforded once a year and given the large number of students that must
pass through it per year (in 2014 the number of students admitted into chemical engineering
topped 200), this course has become a scheduling bottleneck. The chemical engineering
department worked with the chemistry department (Marc Maroncelli and Will Noid) and came up
with a list of existing chemistry courses in the general area of physical chemistry that will also
satisfy the CHEM 466 requirement. CHEM will continue to be offered and is one of the courses
the students may select, but it is no longer the only required course in this category.

3. Materials Course

The requirement for a course in materials was built-in into individual options. This category will
now appear in the Supporting Courses and Related Areas category. This is a technical change
in the published catalog, not a curriculum change.

4. Course Changes

4a: CHE 210/210H Introduction to Material Balances: The current prerequisites read
Prerequisite: or concurrent: MATH 251. This will be changed to Prerequisite: MATH 251. The
course covers among other topics transient material balances and this part requires knowledge
of differential equations. The chemical engineering program has consistently advised students to
take this MATH course before taking CHE 210 but had allowed it as concurrent to facilitate
academic scheduling in some exceptional cases. Since MATH 251 is now one of the ETM
courses, and since the material is necessary in the coverage of CHE 210, the chemical
engineering program will no longer accept MATH as a concurrent with 210. The change applies
to both the regular and honors section of CHE 210.

4b. CHE 220/220H Introduction to Chemical Engineering Thermodynamics. The current
prerequisites read “Prerequisite: or concurrent: MATH 230”. This will be changed to “Prerequisite:
MATH 231”. The change from MATH 230 to MATH 231 is a technical change as the chemical
engineering program now requires MATH 231 instead of Math 230 previously. The change from
“prerequisite or concurrent” to prerequisite only is made because CHE 220 makes extensive use
of calculus of multivariate functions. The chemical engineering program has consistently advised
students to take this MATH course before taking CHE 220 but also accepted it as concurrent to
facilitate scheduling for students transferring to University Park from other campuses who might otherwise fall a whole year behind. This situation is no longer likely as CHE 220 is offered both semesters, as well as an online course during the summer.

4c. CHE 450 Process Dynamics and Control is a senior elective in chemical engineering. Its current prerequisites are listed as Prerequisite or concurrent: CHE 410, CHE 430 and will be changed to CHE 210 with minimum grade of “C” and CHE 230. CHE 230, a recently introduced course, covers numerical tools that are used in CHE 450. The upper level courses CHE 410 and 430 are typically scheduled in the senior year, too late to contribute meaningfully to prerequisite knowledge in CHE 450.

4d. CHE 452 Chemical Process Safety is a new requirement in chemical engineering. Its current prerequisites are Prerequisite: Prerequisite or concurrent:CHE 410, CHE 430 and will be changed to Prerequisite: CHE 320; Prerequisite or concurrent:CHE 330, 350. In the past this course was offered as a senior elective but it its current form the course may be taken in the senior or junior year. The updated prerequisites better reflect that material covered in the course.

4e. CHE 480W/CHE 480M Chemical Engineering Laboratory is a laboratory course that provides hands-on experience with process units that are covered in other courses. The current prerequisites are listed as Prerequisite: ENGL 202C, CHE 320, CHE 330, CHE 350 and will be changed to Prerequisite: CHE 230, CHE 320, CHE 330, CHE 350, Prerequisite or concurrent: CHE 410. The addition of CHE 410 is needed because two major experiments involve distillation columns and extraction columns that are covered in CHE 410. The scope of these experiments is such that prior exposure to this material is very strongly recommended. The addition of CHE 230 is needed because the lab makes extensive use of Excel and Mathematica (or similar software) for solving systems of equations, making appropriate graphs, and statistical analysis, all of which are covered in CHE 230. ENGL 202C is removed as a pre-requisite because the material covered in ENGL 202C is not necessary for successful completion of CHE 480W/480M.
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>JOHN JOSEPH HANNAN</td>
<td>jjh9</td>
<td>Engineering (EN)</td>
<td>Not Available</td>
</tr>
<tr>
<td>STEVEN SHAFFER</td>
<td>scs12</td>
<td>Engineering (EN)</td>
<td>Not Available</td>
</tr>
</tbody>
</table>

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

Course Designation
(CMPCS 131) Programming and Computation I: Fundamentals

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:

Corequisites:

Concurrents:
MATH 110; MATH 140

Recommended Preparations:

Abbreviated Title: PROG & COMP I

Bulletin Listing

Minimum Credits: 3
Maximum Credits: 3
Repeatable: NO
Department with Curricular Responsibility: Computer Science And Engineering (UPEN_CSE)
Effective Semester: Upon Approval
Travel Component: NO

Course Outline

A brief outline or overview of the course content:
This course introduces the fundamental concepts and processes of solving computational problems through the design, implementation, testing and evaluation of efficient and robust computer programs. The course is intended as the first course for computation-oriented majors such as computer science, computer engineering and data science, as it covers not just basic programming concepts but also broader concepts of computational problem solving. This course uses three different programming paradigms: imperative, object oriented, and functional. The first component of the course studies the imperative model of programming and computation and the process of developing programs using this model. Programming language topics include variables, data types, primitive data structures, destructive assignment, sequential computation and control flow. Programming process topics include problem specification, problem decomposition, modular program construction, program analysis, and program testing. The second component of the course introduces the basic concepts of representing data as objects (foundation of object-oriented programming), treating functions as data (passing them as arguments to other functions) and treating data structures as immutable (in the style of functional programming). Interleaved throughout the course is an introduction to algorithms for searching and sorting over collections of data. Upon completion of the course students will be able to use imperative and functional computational models to design, construct, analyze and test computer programs that are robust and efficient.

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

- Overview of Programming, Computation, Algorithms (1 week)
- Imperative Programming Fundamentals: Variables, Expressions, Assignment, Sequencing (1 week)
- Imperative Programming Fundamentals: Control Flow with Conditionals and Iteration (2 weeks)
- Imperative Programming Fundamentals: Control Flow with Functions and Parameter Passing (2 weeks)
- Data Structure Fundamentals: Homogeneous Collections - Arrays, possibly Sets and Vectors (2 weeks)
- Data Structure Fundamentals: Heterogeneous Collections - Structures or Classes (1 week)
- Functional Programming Fundamentals: Stateless programming, Recursion (1 week)
- Functional Programming Fundamentals: Functions as Values/Arguments (1 week)
- Searching and Sorting (2 weeks)
- Design, Analysis, Verification and Testing (2 weeks)

Course Description:
This course introduces the fundamental concepts and processes of solving computational problems through the design, implementation, testing and evaluation of efficient and robust computer programs. The concepts include basic computational constructs found in imperative, object-oriented and functional programming languages such as iteration, conditionals, functions, recursion, and datatypes. These provide the basic building blocks found in virtually all programming languages. The processes include the stepwise refinement of a problem description into individual components that can be implemented, tested, and integrated into an effective solution. A central theme to the course is computational thinking which includes a wide range of approaches to solving problems and designing systems that draw upon concepts fundamental to computer science. Computational thinking includes thinking recursively, considering parallel processing, thinking about types and type checking, judging a program not just for correctness and efficiency but also for its esthetics, and judging a system design for its simplicity and elegance. Computational thinking is applying principles of abstraction at multiple levels to focus on important details; it is applying problem decomposition to identify small problems that can be individually solved then combined to form a solution to the original problem. Computational thinking uses program invariants to describe a system's behavior succinctly and declaratively. Computational thinking considers multiple models of computation when designing an effective solution to a problem.

Specific outcomes of this course include the abilities to:

- Conceptualize and implement computational solutions to problems
- Utilize imperative model of computation to solve problems
- Utilize functional model of computation to solve problems
- Reason about problems at multiple levels of abstraction
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.
Students will develop the skills required to employ abstraction and stepwise refinement, in conjunction with three different programming paradigms (imperative, object-oriented, and functional), to create small programs (on the order of a hundred lines of code) to solve a variety of problems.

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.
Assessment will be through individual programming assignments and proctored evaluations (online or offline).

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.
No prior programming experience is expected, but a good mathematical background, as provided by concurrent enrollment in MATH 110 or MATH 140. We have found that students without this background struggle in this kind of course. The level of instruction in this course is more rigorous and advanced than in any other introductory programming course, as this course provides the foundation for advanced topics students in the computational majors will see in subsequent courses.

This course will be a prerequisite for a second new course, CMPSC 132. To maintain flexibility, a specific programming language is not specified in the course description but the planned language of instruction is Python. The language must support all of imperative, object-oriented and functional models of computation. Python has the benefit of also being very easy to learn and to teach. It is also the language that been adopted in most introductory programming classes at top universities around the country. Python is also very popular choice for data science applications. The essential outcomes of CMPSC 131 are language independent and are the same as those of CMPSC 121.

We initially proposed to change the content of CMPSC 131 instead of creating a new course, but due to the varied needs of introductory programming across different campuses and programs we reached a point where creating a new provided the best solution for all, despite some added complications.

The content of this course differs from the existing course CMPSC 121 in the following notable ways: (1) CMPSC 121 course description specifies the use of the programming language C++ while CMPSC 131 makes no specific language requirement. It will most likely use the Python programming language; (2) CMPSC 121 includes one week of pointers while CMPSC 131 will not cover such low-level material; (3) CMPSC 131 includes content covering object-oriented and functional programming - this material is not covered in CMPSC 121.

Even though CMPSC 121 and CMPSC 131 may use different languages, students taking either one will still be prepared to take either subsequent course, either CMPSC 122 or CMPSC 132, as the outcomes are the same. Instructors for these subsequent courses need only provide some basic online tutorial material for adjusting to a different language. Penn State students have access to Lynda tutorials (lynda.psu.edu) which contain suitable materials. While this places a slight burden on both students and instructors, the alternative was to remain with a single introductory programming course using the C++ language. This (current) situation places a much larger burden on programs seeking to draw students from a wider range of backgrounds and interests and seeking to support a wider range of majors and disciplines.

Note that accommodating students who may have had a first course in programming using one programming language followed by a second programming course using a different programming language is not a new phenomenon. Students receiving a 5 on the AP Computer Science test are given credit for CMPSC 121, even though the AP course and test use the Java programming language and CMPSC 121 uses C++. Similarly, when students transfer programming courses from other institutions, the programming language used in these transfer courses is not a significant factor in determining whether they can substitute for a course like
Rather, we look at the underlying programming concepts taught in these courses. This process has worked well in the past and we do not foresee issues with similar programming language transitions that may be required with the introduction of CMPSC 131 and 132.

**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 satisfy the introductory programming course requirement for the computer science (UP), computer engineering (UP), and data science majors. We also expect it to become a required course for electrical engineering majors and recommended for the Social Data Analytics (SoDA) major. CMPSC 131 and CMPSC 132 together provide a foundational programming experience for computational majors.

We have concurrently submitted a course change proposal for CMPSC 221 to have either CMPSC 122 or CMPSC 132 as its prerequisite. Currently its prerequisite is only CMPSC 122. Other courses that have CMPSC 122 as a corequisite or prerequisite (e.g., CMPSC 360, CMPSC 442, etc) will also be modified to include CMPSC 132 as an alternative.

The Computer Science, Data Science and SoDA majors at University Park will be revised to allow either CMPSC 121 or 131 and CMPSC 122 or 132. Note that the relevant faculty members at University Park strongly believe that the new course sequence of CMPSC 131 and 132 provides a better and broader introduction to computing that targets a wider range of students and prepares them better for a wider range of majors. However, to accommodate students coming from other campuses the existing programming sequence will remain adequate preparation for the majors.

We will work with other departments (e.g., Mathematics and Statistics) that have computational options that include CMPSC 121 and CMPSC 122. We anticipate these programs being updated to accept the alternative courses.

A description of any special facilities:
None required.

**Frequency of Offering and Enrollment:**
Offered every semester. Enrollment expected to be 200 per semester at university park.

### General Education Designation Requirements

**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:

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

**Consultation**

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

**Request sent:** 10/22/2016 at 10:26 AM
**Last sent:** 10/31/2016 at 7:30 AM
**Concur:** Yes
**Comments:** (Completed By Default - Exceeded Time Limit)
**Reviewed On:** 11/6/2016 at 7:15 AM
Recipient Name: CHARLES GASTON  
Department: (Not Available)  
Position: Consultation  
Campus: YORK CAMPUS  
Title: ASST. PROF. ENGINEERING

Request sent: 10/22/2016 at 10:26 AM  
Last sent: 10/31/2016 at 7:30 AM  
Concur: Yes  
Comments: (Completed By Default - Exceeded Time Limit)  
Reviewed On: 11/6/2016 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: 10/22/2016 at 10:26 AM  
Last sent: 10/31/2016 at 7:30 AM  
Concur: Yes  
Comments: (Completed By Default - Exceeded Time Limit)  
Reviewed On: 11/6/2016 at 7:15 AM

Recipient Name: DAVID BRUCE MEREDITH  
Department: School of Engr Technology and Commonwealth Engr  
Position: Consultation  
Campus: FAYETTE CAMPUS  
Title: ASSOC PROF GEN ENG

Request sent: 10/22/2016 at 10:26 AM  
Last sent: 10/31/2016 at 7:30 AM  
Concur: Yes  
Comments: (Completed By Default - Exceeded Time Limit)  
Reviewed On: 11/6/2016 at 7:15 AM

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

Request sent: 10/22/2016 at 10:26 AM  
Last sent: 10/31/2016 at 7:30 AM  
Concur: Yes  
Comments: From Meng Su, Computer Science Dept. Chair at Behrend:   
1. It’s important to teach first programming course with computational thinking which may be a fundamental skill for everyone, not just computer scientists, and for the importance of integrating computational ideas into other disciplines. I look forward to seeing this development in the course.  
2. Suggest to change the sentence on page 3 line 22 ”while CMPSC 131 will not cover such low-level material;” to “while CMPSC 131 will not cover such machine system-level material;” for better understanding of broader audience.  
Reviewed On: 11/4/2016 at 1:52 PM
Recipent Name: HAROLD N SCHOLZ  Department: (Not Available)
Position: Consultation  Campus: LEHIGH VALLEY CAMPUS
Title: INSTRUCTOR

Request sent: 10/22/2016 at 10:26 AM
Last sent: 10/31/2016 at 7:30 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 11/6/2016 at 7:15 AM

Recipent Name: JAMES HENDRICKSON  Department: (Not Available)
Position: Consultation  Campus: (Not Available)
Title: LECT ENGINEERING

Request sent: 10/22/2016 at 10:26 AM
Last sent: 10/31/2016 at 7:30 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 11/6/2016 at 7:15 AM

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

Request sent: 10/22/2016 at 10:26 AM
Last sent: 10/24/2016 at 7:30 AM
Concur: Yes
Comments: Sent to engineering faculty at Abington, but received no feedback.
Reviewed On: 10/30/2016 at 10:23 PM

Recipent Name: JEFFREY STONE  Department: UC Information Sciences & Technology
Position: Consultation  Campus: SCHUYLKILL CAMPUS
Title: SENIOR INSTR INFO SCI/TECH

Request sent: 10/22/2016 at 10:26 AM
Concur: No, this proposal needs significant changes
Comments: My biggest concern with this proposal is the aggressive nature of the course (three paradigms in one course?) and the difficulties involved is having students at non-UP campuses take the CMPSC 121/122 sequence, which could potentially leave transfer students ill prepared compared to UP students taking CMPSC 131/132. The material in CMPSC 121/122 is significantly different, historically, and I am concerned that offering CMPSC 131/132 would not be feasible at some non-UP campuses due to the content of the course and the normal student academic profiles. Would students taking the CMPSC 121/122 sequence be as prepared as those at UP? Given the content expectations, my assumption is no - what would this mean for transfer students attempting to integrate into the UP CS curriculum?
Reviewed On: 10/24/2016 at 8:03 AM

Initiator Comments: We believe that the proposed courses are no more aggressive than the existing courses (121/122), but rather an updated and improved introduction to the foundations of
We really do not plan on introducing three distinct programming paradigms (as understood in earlier days of languages), but rather one language which incorporates modern features such as objects and functions as data. Teaching these concepts as integrated aspects of a language is really no different than teaching other aspects of a language such as iteration and structs/records.

We do not believe that students taking one sequence or the other would be better or less prepared for subsequent courses such as CMPSC 221 and CMPC 311, except that we believe a language like Python is easier for students to learn. So it is possible that students learning Python will master concepts sooner than students using C++. The core outcomes of both sequences are the same. Students taking 121/122 will actually have a bit of an advantage when they get to CMPSC 311, as they will have seen a language closer to C (C++) and some memory management concepts.

We do not understand why offering CMPSC 131/132 at campuses would not be feasible due to course content and student academic profiles. Anyone capable of teaching 121/122 in C++ should have little trouble adapting to 131/132 in Python. And we strongly believe that students can and will have greater success learning introductory programming in a language like Python versus a language like C++. This ease of learning should broaden the appeal of programming to a wider range of students.

Request sent: 11/9/2016 at 2:43 PM
Concur: Yes
Comments: I still have concerns but will not stand in the way of this proposal.
Reviewed On: 11/10/2016 at 8:25 AM

Recipient Name: JENIFER MARY SHANNON
Department: (Not Available)
Position: Consultation
Campus: (Not Available)
Title: LECTURER ENGINEERING

Request sent: 10/22/2016 at 10:26 AM
Last sent: 10/31/2016 at 7:30 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 11/6/2016 at 7:15 AM

Recipient Name: KENNETH DUDECK
Department: (Not Available)
Position: Consultation
Campus: (Not Available)
Title: ASSOC PROF ENGR

Request sent: 10/22/2016 at 10:26 AM
Last sent: 10/31/2016 at 7:30 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 11/6/2016 at 7:15 AM

Recipient Name: KHALED AMLEH
Department: UC Engineering
Position: Consultation
Campus: MONT ALTO CAMPUS
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<tr>
<td>1</td>
<td>Linda Null</td>
<td>Computer Science</td>
<td>Consultation</td>
<td>PENN STATE HARRISBURG, THE CAPITAL COLLEGE</td>
<td>ASSOC PROF COMPUTER SCIENCE</td>
<td>Concur: Yes, Reviewed On: 10/23/2016 at 7:09 AM</td>
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<td><strong>RICHARD SINGER</strong></td>
<td><strong>Business And Engineering</strong></td>
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<td><strong>SHERRY LEA KRATSAS</strong></td>
<td><strong>(Not Available)</strong></td>
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**Comments:** I share the concern that 3 paradigms in one course is aggressive in a truly introductory programming course. However, given the increasing amount of students entering with prior programming experience I do not object to the more aggressive courses if they are deemed necessary for the new majors. I do not object based on the statements that CMPSC 121/122 will still be accepted. I want to note that, at least for the near future, our campus will plan to continue with CMPSC 121/122 as is for the following reasons:
- CMPSC 221, with an OOP focus, has not been modified and that is the course sequence affecting the majority of our current students (for CMPSC/CMPEN).
- As I understand it, Behrend will continue with C++. Many of our students continue on to that campus, so sticking with 121/122 would keep them on a consistent track with that campus.

**Reviewed On:** 11/1/2016 at 10:46 PM

**Recipients:**
- **STEPHANIE M CARDONA**
  - Department: **Liberal Arts**
  - Interdisciplinary Programs
  - Position: Consultation
  - Campus: **WORLD CAMPUS**

**Comments:**

**Reviewed On:** 11/1/2016 at 10:46 PM
I concur with colleagues’ comments regarding transfer student course substitutions and MATH prerequisites. Please make sure dialog occurs around these issues as well as considerations for the design of these courses in online delivery for adult learners.

Reviewed On: 10/31/2016 at 8:07 AM

Recipient Name: XIAOCONG FAN
Department: Engineering
Position: Consultation
Campus: PENN STATE ERIE, THE BEHREND COLLEGE
Title: ASSOC PROF CMPSC/SFTW ENG

Request sent: 10/22/2016 at 10:26 AM
Concur: Yes
Comments: It should be stated clearly that “this sequence would be required for the Data Science major and the SoDA major, while the UP computer science major would accept either the 121/122 or the 131/132 sequence. This may remove some concerns about transferred students.

Reviewed On: 10/24/2016 at 2:51 PM

Recipient Name: DAVID RUSSELL HUNTER
Department: Statistics
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: DEPT HEAD STATISTICS

Request sent: 10/26/2016 at 12:57 PM
Concur: Yes
Comments: Course proposal looks good. Electrical Engineering will very likely follow the CMPEN/CMPSC lead in allowing either 121/122 or 131/132. One minor issue -- the stated prerequisite lists only MATH 140 (as a concurrent), but the relationship/linkage section mentions 140 or 110. This needs to be clarified in the final version of the proposal.

Reviewed On: 10/26/2016 at 5:15 PM

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

Request sent: 10/26/2016 at 12:57 PM
Concur: Yes
Comments: Course proposal looks good. Electrical Engineering will very likely follow the CMPEN/CMPSC lead in allowing either 121/122 or 131/132. One minor issue -- the stated prerequisite lists only MATH 140 (as a concurrent), but the relationship/linkage section mentions 140 or 110. This needs to be clarified in the final version of the proposal.

Reviewed On: 10/26/2016 at 5:15 PM

Recipient Name: MARIE HOJNACKI
Department: Political Science
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: ASSOC PROF POLITICAL SCI

Request sent: 10/26/2016 at 12:57 PM
Concur: Yes
Comments: Course proposal looks good. Electrical Engineering will very likely follow the CMPEN/CMPSC lead in allowing either 121/122 or 131/132. One minor issue -- the stated prerequisite lists only MATH 140 (as a concurrent), but the relationship/linkage section mentions 140 or 110. This needs to be clarified in the final version of the proposal.

Reviewed On: 10/26/2016 at 5:15 PM
Comments: CMPSC 121 & 122 are part of the core curriculum for the undergraduate SoDA major offered through political science. Those courses also are prerequisites for DS courses that are part of the SoDA core curriculum. In consultation with CMPSC, we plan to modify our core to allow students to take either 121 & 122 or 131 & 132. We expect that the DS courses requiring 121 & 122 will be similarly modified so that SoDA students who opt for 131 & 132 satisfy the prerequisites for the DS courses. If the DS prerequisites are not changed, we would not be supportive of altering our requirements to allow students to take 131 & 132 in lieu of 121 & 122.

Reviewed On: 11/8/2016 at 8:24 PM

Request sent: 10/26/2016 at 12:57 PM
Last sent: 11/7/2016 at 7:30 AM
Concur: Yes
Comments: While I like the direction of these changes, I also realize that they will raise issues for students at the campuses who take the existing sequence, so CSE should be careful to plan for their integration into the CSE, DATSC and other programs on arrival at UP.

Reviewed On: 11/7/2016 at 8:42 AM

Head of Department

Recipient Name: JOHN JOSEPH HANNAN
Position: Head of Department

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

SCCA Representative

Recipient Name: ROBERT MELTON
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]
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Curricular Information

Blue Sheet Item #:  
Review Date:  

SCRID Numbers  
(CMPSC 131):
Principal Faculty Member(s) Proposing Course

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<th>Name</th>
<th>User ID</th>
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<tr>
<td>JOHN JOSEPH HANNAH</td>
<td>jh9</td>
<td>Engineering (EN)</td>
<td>Not Available</td>
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<tr>
<td>STEVEN SHAFFER</td>
<td>scs12</td>
<td>Engineering (EN)</td>
<td>Not Available</td>
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Academic Home: Engineering (EN)
Type of Proposal: [X] Add  [ ] Change  [ ] Drop

Course Designation
(CMPC 132) Programming and Computation II: Data Structures

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
Course Outline:

A brief outline or overview of the course content:
This course provides a foundation for the design, implementation, testing and analysis of large-scale software projects. It introduces the principles of the design and analysis of efficient algorithms using important data structures and programming techniques that support reusable and modular program components. These topics include data abstraction, polymorphism, and higher-order functions. Topics from object-oriented programming include inheritance, methods, message passing, static and dynamic type checking. These topics form the core of most object-oriented languages and provide a foundation for learning more advanced language topics. Data structures capture the common organization of many kinds of data arising in the design of efficient solutions to computational problems. Specific data structures covered include stacks, queues, trees, graphs and linked lists. The design and analysis of efficient algorithms using these data structures provide a foundation for the study of computing, where understanding the complexity of a problem and the availability of efficient solutions are essential skills. Finally, topics including higher-order functional programming, data abstraction and parametric polymorphism, as well as principles from object-oriented programming, come together to support the design and implementation of modular, reusable and robust code.

A listing of the major topics to be covered with an approximate length of time allotted for their discussion:
• Overview of language and programming environments (1 week)
• Foundations of object-oriented programming - classes, objects, inheritance, methods, message passing, static and dynamic type checking (3 weeks)
• Introduction to algorithms and complexity - Big O notation (3 weeks)
• Data structures and algorithms - E.g., linked lists, stacks, queues, trees, graphs, hash tables (5 weeks)
• Types and parametric polymorphism (1 week)
• Higher-order functional programming (2 weeks)

Course Description:
This course builds upon the foundations of programming and computation by introducing and studying the data structures and programming language features that support the design and construction of large-scale software systems. It introduces the foundations of object-oriented programming, the design and analysis of efficient algorithms using important data structures, and programming techniques that support reusable and modular program components, including data abstraction, polymorphism, and higher-order functions. Topics from object-oriented programming include classes, objects, inheritance, methods, message passing, static and dynamic type checking. These topics form the core of most object-oriented languages and provide a foundation for learning more advanced language topics. Data structures capture the common organization of many kinds of data arising in the design of efficient solutions to computational problems. Specific data structures covered include stacks, queues, trees, graphs and linked lists. The design and analysis of efficient algorithms using these data structures provide a foundation for the study of computing, where understanding the complexity of a problem and the availability of efficient solutions are essential skills. Finally, topics including higher-order functional programming, data abstraction and parametric polymorphism, as well as principles from object-oriented programming, come together to support the design and implementation of modular, reusable and robust code.

Specific outcomes of this course include the abilities to:
1. Design and implement classes that support encapsulation of data
2. Design and implement computational solutions to problems using standard composite data structures including linked lists, trees and graphs
3. Analyze the efficiency of algorithms manipulating these data structures
4. Design and implement computational solutions to problems using higher-order functions and parametric polymorphism
5. Design and implement a software system composed of modular reusable software components.

The name(s) of the faculty member(s) responsible for the development of the course:
Name: JOHN JOSEPH HANNAN (jjh9)
We will submit course change proposals for these to allow either Penn State students have this (current) CMPSC 132. For some of these courses, particularly ones in Data Science, machine learning and artificial intelligence, CMPSC 132 will not cover such machine system-level material; (3) CMPSC 132 includes content covering functional programming, i.e., passing functions as data and computing with immutable data structures - this material is not covered in CMPSC 122. CMPSC 311 covers systems-level programming and this is where students will be exposed to dynamic memory management.

A number of courses have CMPSC 122 as a prerequisite. We will submit course change proposals for these to allow either CMPSC 122 or CMPSC 132 as the prerequisite. None of these courses requires knowledge of dynamic memory management and so the difference in the courses (CMPSC 122 & CMPSC 132) will not impact the students' preparation for these subsequent courses. For some of these courses, particularly ones in Data Science, machine learning and artificial intelligence, CMPSC 132 provides much better preparation.

Even though CMPSC 121 and CMPSC 131 may use different languages, students taking either one will still be prepared to take CMPSC 132 or CMPSC 122, as the outcomes for these prerequisite courses are the same. Instructors for these subsequent courses need only provide some basic online tutorial material for adjusting to a different language. Penn State students have access to Lynda tutorials (lynda.psu.edu) which contain suitable materials. While this places a slight burden on both students and instructors, the alternative was to remain with a single introductory programming course using the C++ language. This (current) situation places a much larger burden on programs seeking to draw students from a wider range of backgrounds and interests and seeking to support a wider range of majors and disciplines.

Note that accommodating students who may have had a first course in programming using one programming language followed by a second programming course using a different programming language is not a new phenomenon. Students receiving a 5 on the AP Computer Science test are given credit for CMPSC 121, even though the AP course and test use the Java programming language and CMPSC 121 uses C++. Similarly, when students transfer programming courses from other institutions, the programming language used in these transfer courses is not a significant factor in determining whether they can substitute for a course like

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**Course Justification**

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**Instructional, Educational, and Course Objectives:**  
This section should define what the student is expected to learn and what skills the student will develop. Students will develop the skills necessary to design, construct, compose, and analyze larger scale (on the order of one thousand lines of code) modular programs using various models of computation.

**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. Assessment will be through programming assignments and proctored evaluations.

**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 successful completion of CMPSC 121 or 131, the prerequisite for this course, ensures that students have the skills to construct software using the imperative model of computation and have some exposure to the functional model of computation. The level of instruction in this course is more rigorous and advanced than in other intermediate programming courses, as this course provides the required skills for advanced topics students in the computational majors will see in subsequent courses.

To maintain flexibility, the language of instruction is not specified but we recommend using Python. The essential outcomes of CMPSC 132 are language independent but achieving them does require choosing one or more appropriate languages. This course is a prerequisite for other CMPSC and Data Science courses where knowledge of the models of computation, experience with constructing large software, and exposure to parametric polymorphism are required.

We initially proposed to change the content of CMPSC 122 instead of creating a new course, but due to the varied needs of introductory programming across different campuses and programs we reached a point where creating a new provided the best solution for all, despite some added complications.

The content of this course differs from the existing course CMPSC 122 in a number of notable ways: (1) CMPSC 122 course description specifies the use of the programming language C++ while CMPSC 132 makes no specific language requirement. It will most likely use the Python programming language; (2) CMPSC 122 includes the topic of using pointers and other dynamic memory management features to efficiently implement data structures. It also focuses on the use of libraries found in the C++ language. CMPSC 132 will not cover such machine system-level material; (3) CMPSC 132 includes content covering functional programming, i.e., passing functions as data and computing with immutable data structures - this material is not covered in CMPSC 122. CMPSC 311 covers systems-level programming and this is where students will be exposed to dynamic memory management.

A number of courses have CMPSC 122 as a prerequisite. We will submit course change proposals for these to allow either CMPSC 122 or CMPSC 132 as the prerequisite. None of these courses requires knowledge of dynamic memory management and so the difference in the courses (CMPSC 122 & CMPSC 132) will not impact the students' preparation for these subsequent courses. For some of these courses, particularly ones in Data Science, machine learning and artificial intelligence, CMPSC 132 provides much better preparation.

Even though CMPSC 121 and CMPSC 131 may use different languages, students taking either one will still be prepared to take CMPSC 132 or CMPSC 122, as the outcomes for these prerequisite courses are the same. Instructors for these subsequent courses need only provide some basic online tutorial material for adjusting to a different language. Penn State students have access to Lynda tutorials (lynda.psu.edu) which contain suitable materials. While this places a slight burden on both students and instructors, the alternative was to remain with a single introductory programming course using the C++ language. This (current) situation places a much larger burden on programs seeking to draw students from a wider range of backgrounds and interests and seeking to support a wider range of majors and disciplines.

Note that accommodating students who may have had a first course in programming using one programming language followed by a second programming course using a different programming language is not a new phenomenon. Students receiving a 5 on the AP Computer Science test are given credit for CMPSC 121, even though the AP course and test use the Java programming language and CMPSC 121 uses C++. Similarly, when students transfer programming courses from other institutions, the programming language used in these transfer courses is not a significant factor in determining whether they can substitute for a course like
CMPSC 121. Rather, we look at the underlying programming concepts taught in these courses. This process has worked well in the past and we do not foresee issues with similar programming language transitions that may be required with the introduction of CMPSC 131 and 132.

**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 the second programming course for several majors with an emphasis on computation, including computer science (UP), computer engineering (UP), data science, and SoDA. CMPSC 131 and CMPSC 132 together provide a foundational programming experience for computational majors.

We have concurrently submitted a course change proposal for CMPSC 221 to have either CMPSC 122 or CMPSC 132 as its prerequisite. Currently its prerequisite is only CMPSC 122. Other courses that have CMPSC 122 as a corequisite or prerequisite (e.g., CMPSC 360, CMPSC 442, etc) will also be modified to include CMPSC 132 as an alternative.

The Computer Science, Data Science and SoDA majors at University Park will be revised to allow either CMPSC 121 or 131 and CMPSC 122 or 132. Note that the relevant faculty members at University Park strongly believe that the new course sequence of CMPSC 131 and 132 provides a better and broader introduction to computing that targets a wider range of students and prepares them better for a wider range of majors. However, to accommodate students coming from other campuses the existing programming sequence will remain adequate preparation for the majors. CMPSC 311, a required course for the CMPEN and CMPSC majors at UP, will now spend additional time covering dynamic memory management, including pointers. The UP faculty in computer science and engineering strongly feel that this material is better covered at this level than at an introductory level.

We will work with other departments (e.g., Mathematics and Statistics) that have computational options that include CMPSC 121 and CMPSC 122. We anticipate these programs being updated to accept the alternative courses.

**A description of any special facilities:**
None required

**Frequency of Offering and Enrollment:**
Every Semester with enrollment of 120.

### General Education Designation Requirements

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

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</table>

**Legend**

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

### Review History

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

**Consultation**

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

- **Request sent:** 10/22/2016 at 10:27 AM
- **Last sent:** 10/31/2016 at 7:30 AM
- **Concur:** Yes
- **Comments:** (Completed By Default - Exceeded Time Limit)
- **Reviewed On:** 11/6/2016 at 7:15 AM
Title: ASST. PROF. ENGINEERING
Recipient Name: CHARLES GASTON
Department: (Not Available)
Position: Consultation
Campus: YORK CAMPUS
Title: ASST PROF/ENGINEERING

Request sent: 10/22/2016 at 10:27 AM
Last sent: 10/31/2016 at 7:30 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 11/6/2016 at 7:15 AM

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

Request sent: 10/22/2016 at 10:27 AM
Last sent: 10/31/2016 at 7:30 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 11/6/2016 at 7:15 AM

Title: ASSOC PROF GEN ENG
Recipient Name: DAVID BRUCE MEREDITH
Department: School of Engr Technology and Commonwealth Engr
Position: Consultation
Campus: FAYETTE CAMPUS
Title: ASSOC PROF GEN ENG

Request sent: 10/22/2016 at 10:27 AM
Last sent: 10/31/2016 at 7:30 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 11/6/2016 at 7:15 AM

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

Request sent: 10/22/2016 at 10:27 AM
Last sent: 10/31/2016 at 7:30 AM
Concur: Yes
Comments: From Meng Su, Computer Science Dept. Chair at Behrend:
We concur with this as long as these courses are not used to replace CMPSC 122 for CMPSC and Computer Engineering majors.
User Action Required for CMPSC132:
1. Suggest to change the sentence on page 4 line 7 “CMPSC 132 will not cover such low-level and language-focused material;” to “CMPSC 132 will not cover such machine system-level material;” for better understanding of broader audience, plus system level operations covered in CMPSC121/122 are still important common features in the most popular programming languages such as C++, Java, C#, etc.
2. Need to clarify how the system-level materials in CMPSC121/122 such as pointers, dynamic memory management which are still key contents for Computer Science and Computer Engineering majors will be made up in the subsequent courses. And if these two courses CMPSC131/132 can substitute CMPSC121/122 which are the fundamental courses for
almost all computing majors, what are the effect and solutions to the university wide subsequent courses which need CMPSC121/122 as the prerequisites.

Reviewed On: 11/4/2016 at 1:57 PM

Recipient Name: HAROLD N SCHOLZ  
Department: (Not Available)  
Position: Consultation  
Campus: LEHIGH VALLEY CAMPUS  
Title: INSTRUCTOR

Request sent: 10/22/2016 at 10:27 AM  
Last sent: 10/31/2016 at 7:30 AM  
Concur: Yes  
Comments: (Completed By Default - Exceeded Time Limit)  
Reviewed On: 11/6/2016 at 7:15 AM

Recipient Name: JAMES HENDRICKSON  
Department: (Not Available)  
Position: Consultation  
Campus: (Not Available)  
Title: LECT ENGINEERING

Request sent: 10/22/2016 at 10:27 AM  
Last sent: 10/31/2016 at 7:30 AM  
Concur: Yes  
Comments: (Completed By Default - Exceeded Time Limit)  
Reviewed On: 11/6/2016 at 7:15 AM

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

Request sent: 10/22/2016 at 10:27 AM  
Last sent: 10/24/2016 at 7:30 AM  
Concur: Yes  
Comments: Sent to engineering faculty at Abington, but received no feedback.  
Reviewed On: 10/30/2016 at 10:24 PM

Recipient Name: JEFFREY STONE  
Department: UC Information Sciences & Technology  
Position: Consultation  
Campus: SCHUYLKILL CAMPUS  
Title: SENIOR INSTR INFO SCI/TECH

Request sent: 10/22/2016 at 10:27 AM  
Concur: No, this proposal needs significant changes  
Comments: Again, as with the proposal for CMPSC 131, my biggest concern with this proposal is the aggressive nature of the course (e.g. the inclusion of functional programming) and the difficulties involved is having students at non-UP campuses take the CMPSC 121/122 sequence, which could potentially leave transfer students ill prepared compared to UP students taking CMPSC 131/132.  
Reviewed On: 10/24/2016 at 8:08 AM

Initiator Comments: We believe that the proposed
courses are no more aggressive than the existing courses (121/122), but rather an updated and improved introduction to the foundations of programming. We really do not plan on introducing three distinct programming paradigms (as understood in earlier days of languages), but rather one language which incorporates modern features such as objects and functions as data. Teaching these concepts as integrated aspects of a language is really no different than teaching other aspects of a language such as iteration and structs/records. We do not believe that students taking one sequence or the other would be better or less prepared for subsequent courses such as CMPSC 221 and CMPC 311, except that we believe a language like Python is easier for students to learn. So it is possible that students learning Python will master concepts sooner than students using C++. The core outcomes of both sequences are the same. Students taking 121/122 will actually have a bit of an advantage when they get to CMPSC 311, as they will have seen a language closer to C (C++) and some memory management concepts. We do not understand why offering CMPSC 131/132 at campuses would not be feasible due to course content and student academic profiles. Anyone capable of teaching 121/122 in C++ should have little trouble adapting to 131/132 in Python. And we strongly believe that students can and will have greater success learning introductory programming in a language like Python versus a language like C++. This ease of learning should broaden the appeal of programming to a wider range of students.

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(28) Request sent: 11/9/2016 at 2:43 PM
Concur: Yes
Comments: I still have concerns but will not stand in the way of this proposal.
Reviewed On: 11/10/2016 at 8:23 AM

Recipient Name: JENIFER MARY SHANNON
Department: (Not Available)
Position: Consultation
Campus: (Not Available)
Title: LECTURER ENGINEERING

(17) Request sent: 10/22/2016 at 10:27 AM
Last sent: 10/31/2016 at 7:30 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 11/6/2016 at 7:15 AM

Recipient Name: KENNETH DUDECK
Department: (Not Available)
Position: Consultation
Campus: (Not Available)
Title: ASSOC PROF ENGR
Recipient Name: KHALED AMLEH  Department: UC Engineering
Position: Consultation  Campus: MONT ALTO CAMPUS
Title: ASSOC PROF ENGINEERING

Request sent: 10/22/2016 at 10:27 AM
Concur: Yes
Comments:
Reviewed On: 10/23/2016 at 7:03 AM

Recipient Name: Linda Null  Department: Computer Science
Position: Consultation  Campus: PENN STATE HARRISBURG, THE CAPITAL COLLEGE
Title: ASSOC PROF COMPUTER SCIEN

Request sent: 10/22/2016 at 10:27 AM
Last sent: 10/31/2016 at 7:30 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 11/6/2016 at 7:15 AM

Recipient Name: MAJID R CHATSAZ  Department: School of Engr Design, Technology and Prof Prgms
Position: Consultation  Campus: WORTHINGTON SCRANTON CAMPUS
Title: ASST PROF GENERAL ENGR

Request sent: 10/22/2016 at 10:27 AM
Last sent: 10/31/2016 at 7:30 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 11/6/2016 at 7:15 AM

Recipient Name: MICHAEL ROBERT GALLIS  Department: UC Science
Position: Consultation  Campus: SCHUYLKILL CAMPUS
Title: ASSOC PROF PHYSICS

Request sent: 10/22/2016 at 10:27 AM
Last sent: 10/31/2016 at 7:30 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 11/6/2016 at 7:15 AM

Recipient Name: RICHARD CIOCCI  Department: Science, Engineering And Technology
Position: Consultation  Campus: PENN STATE HARRISBURG, THE CAPITAL COLLEGE
(4) Request sent: 10/22/2016 at 10:27 AM
Concur: Yes
Comments:
Reviewed On: 10/25/2016 at 11:20 PM

Recipient Name: RICHARD SINGER  Department: Business And Engineering
Position: Consultation  Campus: ALTOONA CAMPUS
Title: SR INSTR COMPUTER SCIENCE AND ENGINEERING

(22) Request sent: 10/22/2016 at 10:27 AM
Last sent: 10/31/2016 at 7:30 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 11/6/2016 at 7:15 AM

Recipient Name: RONALD LAND  Department: (Not Available)
Position: Consultation  Campus: (Not Available)
Title: ASSOC PROF SETCE

(23) Request sent: 10/22/2016 at 10:27 AM
Last sent: 10/31/2016 at 7:30 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 11/6/2016 at 7:15 AM

Recipient Name: SALVATORE A MARSICO  Department: (Not Available)
Position: Consultation  Campus: (Not Available)
Title: ASSOC PROF ENGR CC

(24) Request sent: 10/22/2016 at 10:27 AM
Last sent: 10/31/2016 at 7:30 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 11/6/2016 at 7:15 AM

Recipient Name: SHERRY LEA KRATSA  Department: (Not Available)
Position: Consultation  Campus: BEAVER CAMPUS
Title: INSTR COMP SCI

(8) Request sent: 10/22/2016 at 10:27 AM
Last sent: 10/31/2016 at 7:30 AM
Concur: Yes
Comments: Same note as 131:
I share the concern that 3 paradigms in one course is aggressive in a truly introductory programming course. However, given the increasing amount of students entering with prior programming experience I do not object to the more aggressive courses if they are deemed necessary for the new majors. I do not object based on the statements that CMPSC 121/122 will still be accepted. I want to note that, at least for the near future, our campus will plan to continue with CMPSC 121/122 as is for the following reasons:
-CMPSC 221, with an OOP focus, has not been modified and that is the course sequence affecting the majority of our current students (for CMPSC/CMPEN).
-As I understand it, Behrend will continue with C++. Many of our students continue on to that campus, so sticking with 121/122 would keep them on a consistent track with that campus.

Reviewed On: 11/1/2016 at 10:48 PM

Recipient Name: STEPHANIE M CARDONA
Department: Liberal Arts
Position: Consultation
Campus: WORLD CAMPUS
Title: ACADEMIC ADVISER 3

Request sent: 10/22/2016 at 10:27 AM
Last sent: 10/31/2016 at 7:30 AM
Concur: Yes
Comments: I concur with colleagues’ comments regarding transfer student course substitutions and MATH prerequisites. Please make sure dialog occurs around these issues as well as considerations for the design of this course in online delivery for adult learners.
Reviewed On: 10/31/2016 at 8:06 AM

Recipient Name: XIAOCONG FAN
Department: Engineering
Position: Consultation
Campus: PENN STATE ERIE, THE BEHREND COLLEGE
Title: ASSOC PROF CMPSC/SFTW ENG

Request sent: 10/22/2016 at 10:27 AM
Concur: Yes
Comments: It should be stated clearly that "this sequence would be required for the Data Science major and the SoDA major, while the UP computer science major would accept either the 121/122 or the 131/132 sequence. This may remove some concerns about transferred students.
Reviewed On: 10/24/2016 at 2:52 PM

Recipient Name: DAVID RUSSELL HUNTER
Department: Statistics
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: DEPT HEAD STATISTICS

Request sent: 10/26/2016 at 12:57 PM
Last sent: 11/7/2016 at 7:30 AM
Concur: Yes
Comments:
Reviewed On: 11/7/2016 at 7:35 AM

Recipient Name: DAVID SALVIA
Department: Electrical Engineering
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: ASST PROF ELECT. ENGR.
Note: The listing of topics adds up to 14 weeks. Is this intentional or an oversight?

Comments: CMPSC 121 & 122 are part of the core curriculum for the undergraduate SoDA major offered through political science. Those courses also are prerequisites for DS courses that are part of the SoDA core curriculum. In consultation with CMPSC, we plan to modify our core to allow students to take either 121 & 122 or 131 &132. We expect that the DS courses requiring 121 & 122 will be similarly modified so that SoDA students who opt for 131 & 132 satisfy the prerequisites for the DS courses. If the DS prerequisites are not changed, we would not be supportive of altering our requirements to allow students to take 131 & 132 in lieu of 121 & 122.

Comments: While I like the direction of these changes, I also realize that they will raise issues for students at the campuses who take the existing sequence, so CSE should be careful to plan for their integration into the CSE, DATSC and other programs on arrival at UP.

Comments: This looks like a good course. I wonder if it would make sense to add something about big data sets. It would be good to capture this trend in a lower level programming course. Forgive me if this is already covered elsewhere or if that goes beyond the topic of this course.
SCCA Representative

Recipient Name: LING ROTHROCK  
Position: SCCA Representative  
Department: (Not Available)  
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  
Position: Dean of the College  
Department: (Not Available)  
Campus: UNIVERSITY PARK CAMPUS

Title:

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

SCCA Subcommittee 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]

Recipient Name: ALLISON ALBINSKI  
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]

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

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<tr>
<td>ALLISON ALBINSKI</td>
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Curricular Information

Blue Sheet Item #: 

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]

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]
Review Date:

SCRID Numbers

(CMPSC 132):
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>
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<tr>
<td>JOHN HANNAN</td>
<td>JJH9</td>
<td>Engineering (EN)</td>
<td>Not Available</td>
</tr>
<tr>
<td>ALAN CARL VERBANEC</td>
<td>acv</td>
<td>Engineering (EN)</td>
<td>Not Available</td>
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Academic Home: Engineering (EN)

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

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

Course Designation

(CMPS 221) Object Oriented Programming with Web-Based Applications

Course Information

Cross-Listed Courses:

Prerequisites:

CMPS 122 OR CMPS 132

Corequisites:

Concurrents:

Recommended Preparations:

Abbreviated Title: Oop With Web

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 covers advanced object-oriented programming concepts including graphical user interfaces, virtual machines, client/server programming and web-based programming using Java.

A listing of the major topics to be covered with an approximate length of time allotted for their discussion:
1. Introducing Java (1 week)
2. Classes and Objects: In Depth Study (1 week)
3. Inheritance in Object-Oriented Languages (1 week)
4. Polymorphism in Object-Oriented Languages (1 week)
5. Exception Handling: In Depth Study (1 week)
6. Graphical User Interfaces: Basic Elements (1 week)
7. Graphical User Interfaces: Components (2 weeks)
8. Graphics and Java 2D (1 week)
9. Databases and JDBC (2 weeks)
10. Generic Collections (1 week)
11. Multimedia: Applets and Applications (2 weeks)
12. Optional Topics (1 week)

Course Description:
The course covers advanced object-oriented principles and their application to web-based, net-centric computing. Major topics include virtual machines, intermediate code generation (Java-specific), graphical user interfaces (GUI) design, event handling, server-side programming with database queries, and security, permissions and file management concepts for client/server systems. Extensive programming assignments provide an understanding of the entire process of client/server development including interface prototyping, program design, implementation of both client and server programs, unit testing, and documentation. This course prepares students to meet immediate demands in solving complex computational problems.

The name(s) of the faculty member(s) responsible for the development of the course:
1. Name: JOHN HANNAN (JJH9)
   Title: ASC HEAD CMPSCI&ENG
   Phone: 814-863-0702
   Address: 0360C Westgate Building
   Campus: UP
   City: University Park
   Fax:
2. Name: ALAN CARL VERBANEC (acv)
   Title: INSTRUCTOR OF CSE
   Phone: 814-863-1469
   Address: 111J Westgate Building
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.

**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.

**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.

**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.

A description of any special facilities:

**Frequency of Offering and Enrollment:**

**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 have changed the prerequisites from just CMPSC 122 to CMPSC 122 OR CMPSC 132. This change is necessary to support the new introductory programming sequence (CMPSC 131, 132) which is language neutral, compared with the C++-focused CMPSC 121, 122. Either sequence prepares the students for CMPSC 221 in which Java is introduced. Students following either introductory sequence will have learned fundamental programming skills and been exposed to basic object-oriented programming.

We have revised the long and short descriptions and included a list of topics simply to enhance the available information. These describe the course as it currently exists and do not represent any change in content or outcome. There is no change to the course content.

**Campuses That Have Offered (CMPSC 221) 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      | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ |
| Spring 2017    | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ |
| Fall 2016      | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ |
| Summer 2016    | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ |
| Spring 2016    | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ |
| Fall 2015      | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ |
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| Summer 2014    | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ |
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**Review History**
This section represents all consultation history that has occurred on this proposal.
### Consultation

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<tr>
<td>ASSOCIATE PROFESSOR</td>
<td>Eric Lipsky</td>
<td>Mechanical Engineering</td>
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<td>INSTRUCTOR</td>
<td>Harold N Scholz</td>
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<td>LECT ENGINEERING</td>
<td>James Hendrickson</td>
<td>(Not Available)</td>
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</table>
Recipient Name: JANICE MARGLE
Department: Abington College (Pre-Major)
Position: Consultation
Campus: ABINGTON CAMPUS
Title: ASSOC PROF ENGINEERING

Request sent: 3/16/2017 at 7:09 AM
Concur: Yes
Comments:
Reviewed On: 3/19/2017 at 9:38 PM

Recipient Name: JEFFREY STONE
Department: UC Information Sciences & Technology
Position: Consultation
Campus: SCHUYLKILL CAMPUS
Title: SENIOR INSTR INFO SCI/TECH

Request sent: 3/16/2017 at 7:09 AM
Concur: Yes
Comments:
Reviewed On: 3/16/2017 at 7:20 AM

Recipient Name: JENIFER MARY SHANNON
Department: (Not Available)
Position: Consultation
Campus: (Not Available)
Title: LECTURER ENGINEERING

Request sent: 3/16/2017 at 7:09 AM
Last sent: 3/27/2017 at 7:30 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/30/2017 at 7:15 AM

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

Request sent: 3/16/2017 at 7:09 AM
Last sent: 3/27/2017 at 7:30 AM
Concur: Yes
Comments:
Reviewed On: 3/27/2017 at 1:28 PM

Recipient Name: KHALED AMLEH
Department: UC Engineering
Position: Consultation
Campus: MONT ALTO CAMPUS
Title: ASSOC PROF ENGINEERING
Recipient Name: Linda Null  
Department: Computer Science  
Position: Consultation  
Campus: PENN STATE HARRISBURG, THE CAPITAL COLLEGE  
Title: ASSOC PROF COMPUTER SCIEN

Recipient Name: MAJID R CHATSAZ  
Department: School of Engr Design, Technology and Prof Prgms  
Position: Consultation  
Campus: WORTHINGTON SCRANTON CAMPUS  
Title: ASST PROF GENERAL ENGR

Recipient Name: MICHAEL ROBERT GALLIS  
Department: UC Science  
Position: Consultation  
Campus: SCHUYLKILL CAMPUS  
Title: ASSOC PROF PHYSICS

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

Recipient Name:  
Department:  
Position:  
Campus:  
Title: 
(22) Request sent: 3/16/2017 at 7:09 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/30/2017 at 7:15 AM

Recipient Name: JEFFREY CHIAMPI  Department: Engineering
Position: Consultation  Campus: WILKES-BARRE CAMPUS
Title: COMPUTER SCIENCE

(23) Request sent: 3/20/2017 at 1:40 PM
Last sent: 4/3/2017 at 7:30 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 4/4/2017 at 7:15 AM

Head of Department

Recipient Name: JOHN JOSEPH HANNAN  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: LING ROTHROCK  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

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

### SCCA Review

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Reviewed On: [Not Yet Reviewed]

### Faculty Senate Review

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Position: Faculty Senate Review
Department: (Not Available)
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 #: [Not Yet Reviewed]
Review Date: [Not Yet Reviewed]

SCRID Numbers
(CMPSC 221): [Not Yet Reviewed]
SENATE COMMITTEE ON CURRICULAR AFFAIRS
COURSE SUBMISSION AND CONSULTATION FORM

Principal Faculty Member(s) Proposing Course

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<th>Name</th>
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<tr>
<td>THEMIS MATSOUKAS</td>
<td>TXM11</td>
<td>Engineering</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
(CHE 210) Introduction to Material Balances

Course Information
Cross-Listed Courses:

Prerequisites:
MATH 251

Corequisites:

Concurrents:

Recommended Preparations:

Abbreviated Title: Mater Bal
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:
An integrated approach to the study of material balances and industrial chemical processes important in chemical engineering. CHE 210 Introduction to Material Balances (3) The objective of this course is to present an introduction to chemical engineering calculations, establish mathematical methodologies for the computation of material balances and to present an overview of industrial chemical processes. It is the introductory course in the chemical engineering curriculum and is normally taken in the sophomore year. It is prerequisite for several junior-level courses in the curriculum, including courses in process fluid dynamics, heat transfer and phase equilibrium. The course reviews the fundamentals of chemistry and physics as they pertain to chemical problems and applies mathematics to the development of time-dependent equations to describe materials flow through a process. Examples of the processes studied include stoichiometry in combustion and other reactions, materials flow with recycle streams, humidification and drying process, and the analysis of non-steady systems. In addition, the course presents an introduction to Industrial Chemistry with an overview of steam reforming, ammonia synthesis and similar examples.

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

- Name: THEMIS MATSOUKAS (TXM11)
- Title: Program Chair of UG
- Phone: 8148632002
- Address: 8H Thomas 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.

Evaluation Methods:
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Frequency of Offering and Enrollment:

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.

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Campuses That Have Offered (CHE 210) 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 | ☑ |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
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| Summer 2016 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
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| Fall 2015 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Spring 2015 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
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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

Head of Department

Recipient Name: PHILLIP SAVAGE
Department: (Not Available)
Position: Head of Department
Campus: UNIVERSITY PARK CAMPUS
Title:
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]

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]

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]

SCCA Review

Recipient Name: ALLISON ALBINSKI  
Department: (Not Available)
Title:

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

Recipient Name: KADI CORTER

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

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

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

(CHE 210):
SENATE COMMITTEE ON CURRICULAR AFFAIRS

COURSE SUBMISSION AND CONSULTATION FORM

Principal Faculty Member(s) Proposing Course

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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

(CHE 210H) Introduction to Material Balances (Honors)

Course Information

Cross-Listed Courses:

Prerequisites:

MATH 251

Corequisites:

Concurrents:

Recommended Preparations:

Abbreviated Title: Mater Bal Honors

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:
An integrated approach to honor-level study of material balances and industrial chemical processes important in chemical engineering. CHE 210H CHE 210H Introduction to Materials Balances (Honors) (3) The objective of this course is to present an introduction to chemical engineering calculations, establish mathematical methodologies for the computation of material balances and to present an overview of industrial chemical processes. The course reviews the fundamentals of chemistry and physics as they pertain to chemical problems and applies mathematics to the development of time-dependent equations to describe materials flow through a process. Examples of the processes studied include stoichiometry in combustion and other reactions, material flow with recycle streams, humidification and drying process, and the analysis of non-steady systems. The Honors version of the course places emphasis on the use of computational methods in the solution of chemical engineering problems through the use of advanced mathematical packages.

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

Name: THEMIS MATSOUKAS (TXM11)
Title: Program Chair of UG
Phone: 814-863-2002
Address: 8H Thomas
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.

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.

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.
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.

A description of any special facilities:

Frequency of Offering and Enrollment:

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.
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Campuses That Have Offered (CHE 210H) Over The Past 4 Years

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Position: Head of Department
Campus: UNIVERSITY PARK CAMPUS

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

SCCA Representative

Recipient Name: ROBERT MELTON
Department: (Not Available)
Dean of the College

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

SCCA Subcommittee Review

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

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

SCCA Review

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

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
(CHE 210H):
SENATE COMMITTEE ON CURRICULAR AFFAIRS
COURSE SUBMISSION AND CONSULTATION FORM

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Academic Home: Engineering (EN)

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

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

Course Designation

(CHE 220) Introduction to Chemical Engineering Thermodynamics

Course Information

Cross-Listed Courses:

Prerequisites:

MATH 231

Corequisites:

Concurrents:

Recommended Preparations:

Abbreviated Title: Chem Eng Thermo

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)

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☐ Social and Behavioral Sciences (GS)

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☐ 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:
Chemical process applications of energy balances, equations of state, thermodynamic properties of real fluids, second law of thermodynamics, cycles. CHE 220 Introduction to Chemical Engineering (3) This course is the introductory course in chemical engineering thermodynamics. It is normally scheduled in the sophomore year and is continued by a second course which covers the thermodynamics of phase transformations and chemical reactions. The emphasis of this course is in the development of the theory of thermodynamics and its application to pure substances. The theory is applied on the thermodynamic analysis of small- and large-scale processes with multiple streams and energy exchanges, how to compute heat and work loads, and how to assess the efficiency of the process with respect to energy utilization. Starting from small units, such as pumps, compressors, turbines, and heat exchangers, examples grow to include large systems such as power plants and refrigeration cycles, that may involve many interconnecting units and recycle streams. A parallel focus of the course is in the computation of thermodynamic properties through the use of charts, tables, and equations of state with emphasis on non-ideal systems.

The name(s) of the faculty member(s) responsible for the development of the course:
- Name: THEMIS MATSOUKAS (TXM11)
- Title: Program Chair of UG
- Phone: 814-863-2002
- Address: 8H Thomas Building
- Campus: UP
- City: University Park
- Fax:

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The current prerequisites read “Prerequisite: or concurrent: MATH 230”. This will be changed to “Prerequisite: MATH 231”. The change from MATH 230 to MATH 231 is a technical change as the chemical engineering program now requires MATH 231 instead of MATH 230 previously. The change from “prerequisite or concurrent” to prerequisite only is made because CHE 220 makes extensive use of calculus of multivariate functions. The chemical engineering program has consistently advised students to take this MATH course before taking CHE 220 but also accepted it as concurrent to facilitate scheduling for students transferring to University Park from other campuses who might otherwise fall a whole year behind. This situation is no longer likely as CHE 220 is offered both semesters, as well as an online course during the summer.

Campuses That Have Offered (CHE 220) 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 |
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| Fall 2017  | ✔  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Summer 2017| ✔  | ✔  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
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| Fall 2016  | ✔  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Summer 2016| ✔  | ✔  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Spring 2016| ✔  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
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| Summer 2015| ✔  | ✔  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Spring 2015| ✔  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
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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: PHILLIP SAVAGE
Department: (Not Available)
Position: Head of Department
Campus: UNIVERSITY PARK CAMPUS
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<td>Department: (Not Available)</td>
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<td>Recipient Name: <strong>KADI CORTER</strong></td>
<td>Department: (Not Available)</td>
<td>Campus: UNIVERSITY PARK CAMPUS</td>
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<tr>
<td>Position: SCCA Subcommittee Review</td>
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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  
Position: SCCA Review  
Title:  
Department: (Not Available)  
Campus: UNIVERSITY PARK CAMPUS  
Concur: [Not Yet Reviewed]  
Comments: [Not Yet Reviewed]  
Reviewed On: [Not Yet Reviewed]

Faculty Senate Review

Recipient Name: ALLISON ALBINSKI  
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]

Curricular Information

Blue Sheet Item #:  
Review Date: 

SCRID Numbers

(CHE 220):
SENATE COMMITTEE ON CURRICULAR AFFAIRS
COURSE SUBMISSION AND CONSULTATION FORM

Principal Faculty Member(s) Proposing Course

Name | User ID | College | Department
--- | --- | --- | ---
THEMIS MATSOUKAS | TXM11 | Engineering (EN) | Not Available

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

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

Course Designation

(CHE 220H) Introduction to Chemical Engineering Thermodynamics (Honors)

Course Information

Cross-Listed Courses:

Prerequisites:
MATH 231

Corequisites:

Concurrents:

Recommended Preparations:

Abbreviated Title: ChE Thermo Honors

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:
Chemical process applications of energy balances, equations of state, thermodynamic properties of real fluids, second law of thermodynamics, cycles. CHE 220H CHE 220H Introduction to Chemical Engineering Thermodynamics (Honors) (3) CHE 220H is the introductory course in chemical engineering thermodynamics. The emphasis of this course is in the development of the theory of thermodynamics and its application to pure substances. The theory is applied on the thermodynamics analysis of small and large-scale processes in closed and open systems. Students learn how to formulate the energy balance for a process with multiple streams and energy exchanges, how to compute heat and work loads, from small units, such as pumps, compressors, turbines, and heat exchangers, examples grow to larger systems such as power plants and refrigeration cycles, that may involve many interconnecting units and recycle streams. The Honors version of the course places special emphasis on (a) the connection between thermodynamics and molecular properties and (b) on the use of computational methods for the calculation of thermodynamic properties under non-ideal conditions.

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

- Name: THEMIS MATSOUKAS (TXM11)
- Title: Program Chair of UG
- Phone: 8148632002
- Address: 8H Thomas 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.

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.

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.
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.

A description of any special facilities:

Frequency of Offering and Enrollment:

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.
The current prerequisites read “Prerequisite: or concurrent: MATH 230”. This will be changed to “Prerequisite: MATH 231”. The change from MATH 230 to MATH 231 is a technical change as the chemical engineering program now requires MATH 231 instead of MATH 230 previously. The change from “prerequisite or concurrent” to prerequisite only is made because CHE 220 makes extensive use of calculus of multivariate functions. The chemical engineering program has consistently advised students to take this MATH course before taking CHE 220 but also accepted it as concurrent to facilitate scheduling for students transferring to University Park from other campuses who might otherwise fall a whole year behind. This situation is no longer likely as CHE 220 is offered both semesters, as well as an online course during the summer.

Campuses That Have Offered (CHE 220H) 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 |
|----------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Fall 2015 | ☑ | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Spring 2015 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Fall 2014 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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: PHILLIP SAVAGE  Position: Head of Department  Campus: UNIVERSITY PARK CAMPUS


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

Title:
### Dean of the College

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

### SCCA Subcommittee Review

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

### SCCA Review

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

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

**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  
Position: Faculty Senate Review  
Department: (Not Available)  
Campus: UNIVERSITY PARK CAMPUS  
Title: 

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  
Title: 

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

Curricular Information

Blue Sheet Item #: 
Review Date: 

SCRID Numbers

(CHE 220H):
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>
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</thead>
<tbody>
<tr>
<td>THEMIS MATSOUKAS</td>
<td>TXM11</td>
<td>Engineering (EN)</td>
<td>Not Available</td>
</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
(CHE 450) Process Dynamics and Control

Course Information
Cross-Listed Courses:
Prerequisites:
CHE 210 with minimum grade of "C" AND MATH 251
Corequisites:
Concurrents:
Recommended Preparations:
Abbreviated Title: Process Dynamics
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:
Analysis of time-dependent variables in chemical process plants; reactor design and control; computer applications. CHE 450 Process Dynamics and Control (3) The course is an introduction to chemical process dynamics and control and is offered as a technical elective. The first part of the course is devoted on the dynamical behavior of systems and the mathematical tools (differential equations, Laplace transforms) used in their analysis. The second part of the course covers the design and operation of various types of controllers, including proportional, integral and differential and their combinations. The theoretical principles are demonstrated with applications to chemical engineering processes such as storage tanks, chemical reactors and separation processes.

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

Name: THEMIS MATSOUKAS (TXM11)
Title: Program Chair of UG
Phone: 8148632002
Address: 8H Thomas 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.

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.

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.

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.

A description of any special facilities:

Frequency of Offering and Enrollment:

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.

Its current prerequisites are listed as Prerequisite or concurrent: CHE 410, CHE 430 and will be changed to CHE 210 with minimum grade of “C” and CHE 230. CHE 230, a recently introduced course, covers numerical tools that are used in CHE 450. The upper level courses CHE 410 and 430 are typically scheduled in the senior year, too late to contribute meaningfully to prerequisite knowledge in CHE 450.

Campuses That Have Offered (CHE 450) 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 |
|----------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Spring 2017 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Fall 2015 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| Spring 2014 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

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: PHILLIP SAVAGE
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]
### Dean of the College

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

### SCCA Subcommittee Review

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

### SCCA Review

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


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


Curricular Information
Blue Sheet Item #:  
Review Date:

SCRID Numbers
(CHE 450):
SENATE COMMITTEE ON CURRICULAR AFFAIRS
COURSE SUBMISSION AND CONSULTATION FORM

Principal Faculty Member(s) Proposing Course

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<th>Name</th>
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<td>TXM11</td>
<td>Engineering (EN)</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
(CHE 452) Chemical Process Safety

Course Information

Cross-Listed Courses:

Prerequisites:
CHE 320

Corequisites:

Concurrents:
CHE 330, CHE 350

Recommended Preparations:

Abbreviated Title: Chem Proc Safety
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:

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

Course Description:
This course provides an overview of Process Safety in the Chemical Industry, focusing on the nature of chemical plant accidents. CHE 452 Chemical Process Safety (3) The course will provide an overview of Process Safety in the Chemical Industry, focusing on the nature of chemical plant accidents, their causes, and steps to eliminate them, with emphasis on inherently safe designs. Chemical Plant accidents deal most often with Flammability and Toxicity issues and these are dealt with in great detail. The role of Human Error in accidents is also examined Actual case studies (including Bhopal, BP Texas City, Piper Alpha) will be examined to show the relevance in today’s workplace. The course requires active student participation via discussions of system designs, their weakness and improvements. Guest lecturers will also be invited to supplement the material. This is offered as a senior elective in Chemical Engineering.

The name(s) of the faculty member(s) responsible for the development of the course:
- Name: THEMIS MATSOUKAS (TXM11)
- Title: Program Chair of UG
- Phone: 814-863-2002
- Address: 8H Thomas 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.

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.

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.
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.

A description of any special facilities:

Frequency of Offering and Enrollment:

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.

Its current prerequisites are Prerequisite: Prerequisite or concurrent: CHE 410, CHE 430 and will be changed to Prerequisite: CHE 320; Prerequisite or concurrent: CHE 330, 350. In the past this course was offered as a senior elective but its current form the course may be taken in the senior or junior year. The updated prerequisites better reflect that material covered in the course.

Campuses That Have Offered (CHE 452) Over The Past 4 Years

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</table>

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:** PHILLIP SAVAGE  **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:**
Dean of the College

Recipient Name: PETER BUTLER
Position: Dean of the College
Department: (Not Available)
Campus: UNIVERSITY PARK CAMPUS

SCCA Subcommittee Review

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

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

SCCA Review

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

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

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

Title:  

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

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Recipient Name: KADI CORTER  
Department: (Not Available)  
Campus: UNIVERSITY PARK CAMPUS

Title:  

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

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Curricular Information  
Blue Sheet Item #:  
Review Date:  

SCRID Numbers  
(CHE 452):
SENATE COMMITTEE ON CURRICULAR AFFAIRS
COURSE SUBMISSION AND CONSULTATION FORM

Principal Faculty Member(s) Proposing Course

<table>
<thead>
<tr>
<th>Name</th>
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<tr>
<td>THEMIS MATSOUKAS</td>
<td>TXM11</td>
<td>Engineering (EN)</td>
<td>Not Available</td>
</tr>
</tbody>
</table>

Academic Home: Engineering (EN)

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

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

Course Designation

(CHE 480M) Chemical Engineering Laboratory (Honors)

Course Information

Cross-Listed Courses:

Prerequisites:

CHE 230, CHE 320, CHE 330, CHE 350

Corequisites:

Concurrents:

CHE 410

Recommended Preparations:

Abbreviated Title: ChE Lab Honors

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:

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

Course Description:
Data interpretation and analysis from student-operated experiments on pilot-plant equipment. Individual written and oral technical reports. CHE 480M CHE 480M Chemical Engineering Laboratory (Honors) (3) CHE 480M is the laboratory course in chemical engineering. The objectives of CHE 480M is to provide hands-on experience with chemical engineering equipment and consists of a series of experiments that cover the major subjects in chemical engineering, namely, fluid flow, heat transfer, separations and reactions. The subject matter on which these experiments are based is taught in various junior-senior-level classes. This course does not introduce new material but focuses instead on planning, execution and interpretation of experiments. The special aspect of the honors section is that students will be given an open-ended experimental research project.

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

Name: THEMIS MATSOUKAS (TXM11)
Title: Program Chair of UG
Phone: 814-863-2002
Address: 8H Thomas
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.

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.

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.
Frequency of Offering and Enrollment:

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.

The current prerequisites are listed as Prerequisite: ENGL 202C, CHE 320, CHE 330, CHE 350 and will be changed to Prerequisite: CHE 230, CHE 320, CHE 330, CHE 350, Prerequisite or concurrent: CHE 410. The addition of CHE 410 is needed because two major experiments involve distillation columns and extraction columns that are covered in CHE 410. The scope of these experiments is such that prior exposure to this material is very strongly recommended. The addition of CHE 230 is needed because the lab makes extensive use of Excel and Mathematica (or similar software) for solving systems of equations, making appropriate graphs, and statistical analysis, all of which are covered in CHE 230. ENGL 202C is removed as a pre-requisite because the material covered in ENGL 202C is not necessary for successful completion of CHE 480W/480M.

Writing Across the Curriculum (W,M,X,Y course suffixes)

A copy of the course syllabus:
List of files uploaded follow. These files can be viewed by viewing the print preview as a PDF (button at the top of the print preview page) or navigating to the request consultation page for this proposal.

A concise explanation of how the proposed course will fulfill each of the following criteria:

Both informal and formal writing assignments should relate clearly to the course objectives and should serve as effective instruments for learning the subject matter of the course. Instructors should communicate to students the requirements of formal, graded writing assignments in writing, not just orally. In writing-intensive courses, writing assignments are characteristically designed to help students investigate the course subject matter, gain experience in interpreting data or the results of research, shape writing to a particular audience, or practice the type of writing associated with a given profession or discipline. Much of the writing may be informal and ungraded, yet meaningful, so students are encouraged to think and discover through a process in which mistakes are a natural part of learning.
Examples of such writing include one-minute papers at the beginning, middle, or end of class; reactions to lectures, labs, and readings; journals, logs, and notebooks of observations, readings, and other experimental activities; letters to classmates; weekly digests; e-mail dialogues; records of peer group discussions; and stories of one's thinking on a problem.

Students will be afforded opportunities to practice writing throughout the semester, with emphasis given to writing as a process that develops through several iterations. Typically, writing-intensive courses require multiple writing assignments, a sequence of preparatory writings (outline, formulation of thesis, first draft) leading to a final product, or informational writing assignments (e.g., regular journal entries, field notes, short in-class papers, revision of first draft) that aid students in developing other written documents. Experimentation with assignments is encouraged.

Opportunities for students to receive written feedback from the instructor and to apply the instructor's feedback to their future writing will be built into the course. The instructor will clearly identify and explain the type of writing required in the course and will provide guidance as needed. A writing-intensive course may also include peer review of written work, tutorial assistance, instructor conferences, group writing projects, the use of writing or learning centers, teaching assistant feedback, and classroom discussions of assigned readings about writing. The use of diverse feedback mechanisms is encouraged, but none of these mechanisms should substitute for the instructor as the principal source of written feedback to the student.

Writing will be evaluated by the instructor, and writing quality will be a factor in determining each student's final grade. Before students begin writing, instructors will communicate to students the criteria by which their writing will be evaluated. Sound criteria for assessing writing quality include, but are not limited to, the writer's ability to direct the material to an intended audience, the employment of organizational strategies, the development of both content and reasoning, adherence to conventions of a particular discipline, accuracy of the information presented, citation and integration of sources, grammar, diction and syntax, and spelling. Writing assignments should be worth at least 25 percent of each student's final grade.

One or two examples of the actual writing assignment sheets the instructor plans to use in the course.

Campuses That Have Offered (CHE 480M) 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 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Fall 2016 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
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: PHILLIP SAVAGE  
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: **ALLISON ALBINSKI**  
**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**  
**Position:** SCCA Subcommittee Review  
**Campus:** UNIVERSITY PARK CAMPUS

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

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

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**Faculty Senate Review**

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

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

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COURSE SUBMISSION AND CONSULTATION FORM

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Academic Home: Engineering (EN)
Type of Proposal: □ Add □ Change □ Drop
□ I am requesting recertification of this course for the new Gen Ed and/or University Requirements Guidelines?

Course Designation
(CHE 480W) Chemical Engineering Laboratory

Course Information

Cross-Listed Courses:

Prerequisites:
CHE 230, CHE 320, CHE 330, CHE 350

Corequisites:

Concurrents:
CHE 410

Recommended Preparations:

Abbreviated Title: Chem Engr Lab
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)
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The name(s) of the faculty member(s) responsible for the development of the course:

Name: THEMIS MATSOUKAS (TXM11)
Title: Program Chair of UG
Phone: 814-863-2002
Address: 8H Thomas
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of instruction, for any prerequisites that may be specified, or for the course’s role as a prerequisite for other courses.

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.

A description of any special facilities:

Frequency of Offering and Enrollment:

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One or two examples of the actual writing assignment sheets the instructor plans to use in the course.
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- **Pending Action(s)**
- **Moved to Rejected Status**
- **Approved**
- **(#) - Review Order Sequence Number**

#### Head of Department
- **Recipient Name:** PHILLIP SAVAGE
- **Position:** Head of Department
- **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
- **Department:** (Not Available)
- **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
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- **Campus:** UNIVERSITY PARK CAMPUS
- **Concur:** [Not Yet Reviewed]
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Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

Curricular Information
Blue Sheet Item #:
Review Date:

SCRID Numbers
(CHE 480W):
Proposal Designation: Chemical Engineering (CHE)
This is a proposed Change to Undergraduate Stand Alone Major

Initiators

<table>
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<tr>
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<td>PHILLIP SAVAGE</td>
<td>PES15</td>
<td>Engineering (EN)</td>
<td>Not Available</td>
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</table>

Academic Home: Engineering (EN)

Program Definition
Degree Offered: Bachelor of Science (BS)
Effective Semester: Summer 2017
  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 PHSY 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.

Justification: No changes
Objectives and Justification

Objectives:

Justification:

Justification For The Change Proposal:

SUMMARY OF CHANGES

The following changes are made to the chemical engineering program:

1. All options are dropped and the program reverts to the requirements of the general option.
2. CHEM 466 is opened into a pool of acceptable electives
3. Materials elective is moved under Supporting Courses and Related Areas category
4. COURSE CHANGES
   4a CHE 210: Change prerequisite from Prerequisite: or concurrent: MATH 251 to Prerequisite: MATH 251
   4b CHE 220 and CHE 220H: change prerequisite from Prerequisite: or concurrent: MATH 230 to Prerequisite: MATH 231
   4c CHE 450: change prerequisites from Prerequisite or concurrent: CHE 410, CHE 430 to Prerequisite: CHE 210 with minimum grade of "C" and Math 251
   4e CHE 452: change prerequisites from Prerequisite or concurrent: CHE 410, CHE 430 to Prerequisite: CHE 320; Prerequisite or concurrent: CHE 330, 350
   4d CHE 480 and 480M: change from Prerequisite: ENGL 202C, CHE 320, CHE 330, CHE 350 to Prerequisite: CHE 230, CHE 320, CHE 330, CHE 350, Prerequisite or concurrent: CHE 410.

JUSTIFICATION FOR THE CHANGES

1. DROPPING OPTIONS

Currently, the chemical engineering program has five options, the largest number in the college:

1. General option (GEN)
2. Bioprocess and biomolecular engineering option (BPME)
3. Energy and fuels engineering option (E&FE)
4. Polymer engineering option (PLMRE)
5. Research intensive option

The four specialized options (2-4) address topics in bioprocess engineering, energy and polymers. The research intensive option focuses in preparing students for graduate school. The general option is more flexible and allows students to pursue electives according to personal interest or to use some of these electives to obtain minors in other programs. The decision to drop the options is based on the following considerations:

Enrollment in all specialized options has declined significantly in recent years with a large majority of students graduating in the general option (attached graph). Between 2008 and 2014 the general option has graduated on average 82% of all graduating seniors. In 2014-15 this percentage rose to 87%, with the remaining 13% going to the other four options combined. The polymer option has had very low enrollments for several years and there is broad agreement that the option cannot be maintained.

Input from recruiters who have indicated that the option on a student’s transcript is not a significant factor in hiring decisions. This is supported by data collected by the chemical engineering department that show options add no significant advantage in employment. In 2014, 77% of the students in the general option had a job at graduation time, compared to 83% of the students in the specialized options. Given that the number of graduates in the general option was 122 as compared to 10 in all specialized options together, the difference is not statically significant.

While specialized options allow in-depth coverage of certain engineering topics, the strict requirements of the options limit other academic opportunities, most notably coop. Students in the general option may receive credit for coop while students in the specialized options do not have room for such credit. Data collected by the department of chemical engineering in 2014 show that among the cohort of students with coop experience the rate of job placement at the time of graduation was 90%, as opposed to 71%
overall. Even with formal options in place, students will be able to pursue in-depth studies in areas of technological interest by making use of 18 credits of electives under the Supporting Courses and Related Areas category. The chemical engineering program will facilitate this by compiling study plans with specialized focus.

2. CHEM 466 is opened into a pool of acceptable electives

CHEM 466 is currently a required course with focus in molecular and statistical topics in physical chemistry. The course is afforded once a year and given the large number of students that must pass through it per year (in 2014 the number of students admitted into chemical engineering topped 200), this course has become a scheduling bottleneck. The chemical engineering department worked with the chemistry department (Marc Maroncelli and Will Noid ) and came up with a list of existing chemistry courses in the general area of physical chemistry that will also satisfy the CHEM 466 requirement. CHEM will continue to be offered and is one of the courses the students may select, but it is no longer the only required course in this category.

3. Materials Course

The requirement for a course in materials was built-in into individual options. This category will now appear in the Supporting Courses and Related Areas category. This is a technical change in the published catalog, not a curriculum change.

4. Course Changes

4a. CHE 210/210H Introduction to Material Balances: The current prerequisites read Prerequisite: or concurrent: MATH 251. This will be changed to Prerequisite: MATH 251. The course covers among other topics transient material balances and this part requires knowledge of differential equations. The chemical engineering program has consistently advised students to take this MATH course before taking CHE 210 but had allowed it as concurrent to facilitate academic scheduling in some exceptional cases. Since MATH 251 is now one of the ETM courses, and since the material is necessary in the coverage of CHE 210, the chemical engineering program will no longer accept MATH as a concurrent with 210. The change applies to both the regular and honors section of CHE 210.

4b. CHE 220/220H Introduction to Chemical Engineering Thermodynamics. The current prerequisites read “Prerequisite: or concurrent: MATH 230”. This will be changed to “Prerequisite: MATH 231”. The change from MATH 230 to MATH 231 is a technical change as the chemical engineering program now requires MATH 231 instead of Math 230 previously. The change from “prerequisite or concurrent” to prerequisite only is made because CHE 220 makes extensive use of calculus of multivariate functions. The chemical engineering program has consistently advised students to take this MATH course before taking CHE 220 but also accepted it as concurrent to facilitate scheduling for students transferring to University Park from other campuses who might otherwise fall a whole year behind. This situation is no longer likely as CHE 220 is offered both semesters, as well as an online course during the summer.

4c. CHE 450 Process Dynamics and Control is a senior elective in chemical engineering. Its current prerequisites are listed as Prerequisite or concurrent: CHE 410, CHE 430 and will be changed to CHE 210 with minimum grade of “C” and CHE 230. CHE 230, a recently introduced course, covers numerical tools that are used in CHE 450. The upper level courses CHE 410 and 430 are typically scheduled in the senior year, too late to contribute meaningfully to prerequisite knowledge in CHE 450.

4d. CHE 452 Chemical Process Safety is a new requirement in chemical engineering. Its current prerequisites are Prerequisite: Prerequisite or concurrent:CHE 410, CHE 430 and will be changed to Prerequisite: CHE 320; Prerequisite or concurrent:CHE 330, 350. In the past this course was offered as a senior elective but it its current form the course may be taken in the senior or junior year. The updated prerequisites better reflect that material covered in the course.

4e. CHE 480W/CHE 480M Chemical Engineering Laboratory is a laboratory course that provides hands-on experience with process units that are covered in other courses. The current prerequisites are listed as Prerequisite: ENGL 202C, CHE 320, CHE 330, CHE 350 and will be changed to Prerequisite: CHE 230, CHE 320, CHE 330, CHE 350, CHE 410. The addition of CHE 410 is needed because two major experiments involve distillation columns and extraction columns that are covered in CHE 410. The scope of these experiments is such that prior exposure to this material is very strongly recommended. The addition of CHE 230 is needed because the lab makes extensive use of Excel and Mathematica (or similar software) for solving systems of equations, making appropriate graphs, and statistical analysis, all of which are covered in CHE 230. ENGL 202C is removed as a pre-requisite because the material covered in ENGL 202C is not necessary for successful completion of CHE 480W/480M.

Proposal Outline

CIP Code: 140701

Faculty Member(s) in Charge:

- Name: THEMIS MATSOUKAS (TXM11)
  Title: Program Chair
  Phone: 814-863-2002
  Address: 8H Thomas
Program Description:

Chemical Engineering is one of the most versatile professions—you'll find Chemical Engineers employed in a broad array of industries ranging from pharmaceutical and biotechnical companies to semiconductor manufacturing to start-up companies converting the latest laboratory discoveries to large-scale commercial production. Chemical Engineers work with catalysts to develop new ways to manufacture medicines and plastics; they develop control systems that enable the safe production of products from semiconductors to household soap; they design chemical and petroleum plants; they research the effects of artificial organs on blood flow; and they develop the equipment and processes necessary for advances in biotechnology. While chemistry emphasizes the facts and principles of science, chemical engineering emphasizes its practical application for the development of new products and processes.

The undergraduate program in Chemical Engineering provides students with fundamental skills in problem solving, analysis, and design, along with hands-on experience in practical applications. The curriculum builds upon the traditional foundation in the chemical and energy-related industries and introduces new material in the life sciences, polymers, and environmental fields.

Program Educational Objectives:

The educational objectives of the undergraduate program in Chemical Engineering are specifically designed to produce graduates who will be able to:

1. identify and pursue their personal and professional goals using the foundation provided by the breadth of educational opportunities in chemical and biomolecular engineering offered at Penn State
2. pursue careers as practicing chemical engineers in traditional chemical and energy-related industries as well as in expanding areas of materials, environmental, biomedical, and biotechnology
3. apply their broad chemical engineering education—including their problem solving, analytical, design, research, and communication skills—in industry, government agencies, financial institutions, consulting firms, educational institutions, business, law, and medicine
4. provide the technical, educational, business, and political leadership needed in today's rapidly changing, increasingly technological, global society.

Program Outcomes (Student Outcomes):

(a) an ability to apply knowledge of mathematics, science, and engineering
(b) an ability to design and conduct experiments, as well as to analyze and interpret data
(c) an ability to 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) an ability to function on multidisciplinary teams
(e) an ability to identify, formulate, and solve engineering problems
(f) an understanding of professional and ethical responsibility
(g) an ability to communicate effectively
(h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
(i) a recognition of the need for, and an ability to engage in life-long learning
(j) a knowledge of contemporary issues
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

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 PHSY 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 Chemical Engineering, a minimum of 133 credits is required. This baccalaureate program in Chemical Engineering is accredited by the Engineering Accreditation Commission of ABET, Inc., www.abet.org.
For a Bachelor of Science in Chemical Engineering (CHE) a minimum of 133 credits are required.

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

Academic Outline

REQUIREMENTS FOR THE MAJOR:
A minimum of 115 credits are required

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: (97 Credits)

PRESCRIBED COURSES (84 Credits)

CHEM 110 GN(3)[1], CHEM 111 GN(1), CHEM 112 GN(3), CHEM 113 GN(1), EDSGN 100 (3), MATH 140 GQ(4)[1], MATH 141 GQ(4)[1], PHYS 211 GN(4)[1](Sem: 1-2)

BMB 251 (3), CHE 210 (3)[1], CHE 220 (3)[1], CHE 230 (1), CHE 300 (1), CHE 320 (3)[1], CHE 330 (3), CHE 340 (3), CHE 350 (3)[1], CHEM 210 (3), CHEM 212 (3), CHEM 213 (2), CHEM 457 (2), MATH 231 (2), MATH 251 (4), PHYS 212 GN(4), ENGL 202C GWS(3)[Sem: 3-6]

CHE 410 (3)[1], CHE 430 (3)[1], CHE 452 (3), CHE 470 (3), CHE 480W (3)(Sem: 7-8)

ADDITIONAL COURSES (10 Credits)

First-Year Seminar (1)

ENGL 15 (3); ENGL 30 (3)(Sem: 1-2)
ECON 102 (3); ECON 104 (3); ECON 14 (3)(Sem: 1-6)
CAS 100A (3); CAS 100B (3)(Sem: 3-4)

SUPPORTING COURSES (21 Credits)

Select 3 credits of physical chemistry from departmental list (Sem 5-8)
Select 3 credits of materials elective from departmental list (Sem: 5-8)
Select 6 credits in 400-level chemical engineering electives from departmental list (Sem: 5-8)
Select 3 credits of approved engineering electives from departmental list (Sem: 5-8)
Select 6 credits of professional electives from department list [31] (Sem: 5-8)

Further Clarification

A departmental list of courses under the above categories can be found as a separate file attached to this proposal.

[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
CHEM 457 (2); CAS 100B (3)

Existing Courses Removed from or Moved Within Requirements for This Program
; BMB 442 ; BME 443 ; BME 444 ; CHE 438 ; CHE 443 ; CHE 446 ; CHE 449 ; CHE 494 ; CHE 510 ; CHE 544 ; EGEE 411w ; EGEE 455 ; ENVSE 400 ; FSC 401 ; MATSE 201 ; MATSE 202 ; MATSE 403 ; MATSE 404 ; MATSE 441 ; MATSE 445 ; MATSE 446 ; MATSE 447 ; ME 403 ; CHEM 466

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](image1) Approve  
- ![Rejected](image2) Rejected  
- ![Waiting Review](image3) Waiting Review  
- ![User Action Required](image4) User Action Required

- ![Pending Action(s)](image5) Pending Action(s)  
- ![Moved to Rejected Status](image6) Moved to Rejected Status  
- ![Approved](image7) Approved  
- ![# - Review Order Sequence Number](image8) (#) - Review Order Sequence Number

**Head of Department**

**Recipient Name:** PHILLIP SAVAGE  
**Position:** Head of Department  
**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  
**Department:** (Not Available)  
**Campus:** UNIVERSITY PARK CAMPUS

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

SCCA Subcommittee Review

Recipient Name: ALLISON ALBINSKI
Position: SCCA Subcommittee Review

Title:

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

Recipient Name: KADI CORTER
Position: SCCA Subcommittee Review

Title:

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

SCCA Review

Recipient Name: ALLISON ALBINSKI
Position: SCCA Review

Title:

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

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

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

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
Title:

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
Title:

Concur: [Not Yet Reviewed]
Final Confirmation

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


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


Recipient Name: KADI CORTER  Department: (Not Available)
Position: Final Confirmation  Campus: UNIVERSITY PARK CAMPUS
Title:


Curricular Information
Blue Sheet Item #:
Review Date:

Program Codes
Engineering: CHE_BS

Option Codes
Chemical Engineering (CHE):

**UPLOADED DOCUMENTS:**

Context Type: Prospectus Memo
File Description: Prospectus Memo (PDF)
File Name: ChE prospectus.pdf

Context Type: Prospectus Memo
File Description: Approved CHE Prospectus
File Name: ENGR BS Chemical Engineering Revisions.pdf

Context Type: Supporting Documents
File Description: Consultations
File Name: ChE Consultations.pdf

Context Type: Supporting Documents
File Description: List of Approved Courses
File Name: ChE Approved Lists.pdf
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: We will fill this in

Associate Dean Submitting This Prospectus: PETER BUTLER

Associate Dean Email: PJB28@PSU.EDU

Staff Assistant Email: BVM4@PSU.EDU

College and Campus: ENGINEERING; U.P.

Department with Responsibility for the Program: COMPLETE THIS

What type of program action is under consideration? INDICATE THE ONE YOU NEED

- Curricular Change in Major √
- Curricular Change in Option √
- Curricular Change in IUG (NA)
- Curricular Change in Minor (NA)

Name of major, option, IUG or minor: CHEMICAL ENGINEERING

Brief description of program:

PROGRAM CHANGES

1. All options are dropped and the program reverts to the requirements of the general option.
2. CHEM 466 is opened into a pool of acceptable electives
3. Materials course is opened into a pool of acceptable electives
4. COURSE CHANGES
   4a CH E 210: Change prerequisite from Prerequisite: or concurrent: MATH 251 to Prerequisite: MATH 251
   4b CH E 220 and CH E 220H: change prerequisite from Prerequisite: or concurrent: MATH 230 to Prerequisite: MATH 231
   4c. CH E 450: change prerequisites from Prerequisite or concurrent: CH E 410, CH E 430 to CH E 210 with minimum grade of "C" and Math 251
Briefly provide the rationale for changing this program:

DROPPING OPTIONS

Currently, the chemical engineering program has five options, the largest number in the college:

1. General option (GEN)
2. Bioprocess and biomolecular engineering option (BPME)
3. Energy and fuels engineering option (E&FE)
4. Polymer engineering option (PLMRE)
5. Research intensive option

The four specialized options (2-4) address topics in bioprocess engineering, energy and polymers. The research intensive option focuses in preparing students for graduate school. The general option is more flexible and allows students to pursue electives according to personal interest or to use some of these electives to obtain minors in other programs. The decision to drop the options is based on the following considerations:

Enrollment in all specialized options has declined significantly in recent years with a large majority of students graduating in the general option (attached graph). Between 2008 and 2014 the general option has graduated on average 82% of all graduating seniors. In 2014-15 this percentage rose to 87%, with the remaining 13% going to the other four options combined. The polymer option has had very low enrollments for several years and there is broad agreement that the option cannot be maintained.

Input from recruiters who have indicated that the option on a student’s transcript is not a significant factor in hiring decisions. This is supported by data collected by the chemical engineering department that show options add no significant advantage in employment. In 2014, 77% of the students in the general option had a job at graduation time, compared to 83% of the students in the specialized options. Given that the number of graduates in the general option was 122 as compared to 10 in all specialized options together, the difference is not statically significant.

While specialized options allow in-depth coverage of certain engineering topics, the strict requirements of the options limit other academic opportunities, most notably coop. Students in the general option may receive credit for coop while students in the specialized options do not have room for such credit. Data collected by the department of chemical engineering in 2014 show that among the cohort of students with coop experience the rate of job placement at the time of graduation was 90%, as opposed to 71% overall. Even with formal options in place, students will be able to pursue in-depth studies in areas of technological interest by making use of 18 credits of electives under the Supporting Courses and Related Areas category. The chemical engineering program will facilitate this by compiling study plans with specialized focus.

2. CHEM 466 is opened into a pool of acceptable electives

CHEM 466 is currently a required course with focus in molecular and statistical topics in physical chemistry. The course is afford once a year and given the large number of students that must pass through it per year (in 2014 the number of students admitted into chemical engineering topped 200), this course has become a scheduling bottleneck. The chemical engineering department worked with the chemistry department (Marc Maroncelli and Will Noid) and came up with a list of existing chemistry courses in the general area of physical
chemistry that will also satisfy the CHEM 466 requirement. CHEM will continue to be offered and is one of the courses the students may select, but it is no longer the only required course in this category.

3. Materials Course

The requirement for a course in materials was built-in into individual options. This category will now appear in the Supporting Courses and Related Areas category.

4. Course Changes

4a. CH E 210/210H Introduction to Material Balances: The current prerequisites read Prerequisite: or concurrent: MATH 251. This will be changed to Prerequisite: MATH 251. The course covers among other topics transient material balances and this part requires knowledge of differential equations. The chemical engineering program has consistently advised students to take this MATH course before taking CH E 210 but had allowed it as concurrent to facilitate academic scheduling in some exceptional cases. Since MATH 251 is now one of the ETM courses, and since the material is necessary in the coverage of CH E 210, the chemical engineering program will no longer accept MATH as a concurrent with 210. The change applies to both the regular and honors section of CH E 210.

4b. CH E 220 Introduction to Chemical Engineering Thermodynamics. The current prerequisites read “Prerequisite: or concurrent: MATH 230”. This will be changed to “Prerequisite: MATH 231”. The change from MATH 230 to MATH 231 is a technical change since the chemical engineering program now requires MATH 231 instead of 230. The change from Prerequisite or concurrent to prerequisite only because CH E 220 makes extensive use of calculus of multivariate functions. The chemical engineering program has consistently advised students to take this MATH course before taking CH E 220 but also accepted it as concurrent to facilitate scheduling for students transferring to University Park from other campuses who might otherwise fall a whole year behind. This situation is no longer likely as CH E 220 is offered both semesters, as well as an online course during the summer.

4c. CH E 450 Process Dynamics and Control is a senior elective in chemical engineering. Its current prerequisites are listed as Prerequisite or concurrent: CH E 410, CH E 430 and will be changed to CH E 210 with minimum grade of "C" and Math 251. The change reflects more accurately the mathematical foundations of the course. The course discusses various applications in mass transfer unit operations and chemical reactors but does not require the full content of CH E 410/430, which cover the detailed design of such processes, as a prerequisite.

4d. CHE 480W Chemical Engineering Laboratory is a laboratory course that provides hands-on experience with process units that are covered in other courses. The current prerequisites are listed as Prerequisite: ENGL 202C, CH E 320, CH E 330, CH E 350 and will be changed to Prerequisite: ENGL 202C, CH E 320, CH E 330, CH E 350, Prerequisite or concurrent: CH E 410. The change is needed because two major experiments involve distillation columns and extraction columns that are covered in CH E 410. The scope of these experiments is such that prior exposure to this material is very strongly recommended.

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.

The program requirements will revert to those of the general option, which is the most flexible of all options currently offered and consists of 18 credits of various electives that include chemical engineering topics, (6 cr)
materials science (3 cr), general engineering topics (3 cr), and various professional electives (6 cr)). Students will be able through their electives to pursue the academic tracks previously supported by the options.

**Resources (INDICATE ALL THAT APPLY)**

No new resources required

**How will the changing of this program affect other programs or other Penn State campuses and colleges?**

The dropped options will likely decrease pressure on EGEE, PLMSC and BMB programs, which provided required courses in the options. Since the large majority of students are currently enrolled in the general option, whose requirements now become the default requirements of the program, we anticipate the effects on other programs to be very small.

With respect to Chemistry electives, the demand will be spread over several courses and will relieve the pressures in CHEM 466, which is currently required by all CH E students.

The changed prerequisites in CH E 210 and 220 will require students to complete with Math 251 and 231 before they take these two chemical engineering classes. The department is now offering CH E 220 in the summer over the world campus, and is planning to do the same with CH E 210. This will give students the opportunity to spread the Math requirements (Math 1410/141/231/251) over four semesters, take CH E 210 and/or CH E 220 in the summer, and still catch up with the academic requirements by the beginning of the fifth semester.
DATE: February 9, 2016
FROM: Jacqueline Edmondson
TO: Peter J. Butler

Thank you for the submission of your P-2 prospectus to make curricular revisions to the Bachelor of Science in Chemical Engineering. The ACUE Prospectus Committee has reviewed your prospectus. In line with AAPPM P-2 criteria and consultation, you may now move to the formal P-2 submission process.

cc: David J. Christiansen
    Kadi K. Corter
    Anna M. Griswold
    Daniel R. Hagen
    Tracy S. Hoover
    Robert N. Pangborn
    Margaret J. Slattery
CONSULTATIONS

IMPACT ON OTHER PROGRAMS

Currently, the chemical engineering program has five options:

1. General option (GEN)
2. Bioprocess and biomolecular engineering option (BPME)
3. Energy and fuels engineering option (E&FE)
4. Polymer engineering option (PLMRE)
5. Research intensive option (RSHCI)

Historical data on student enrollment in the five options of the program are given in the table below:

<table>
<thead>
<tr>
<th>YR</th>
<th>GEN</th>
<th>BPME</th>
<th>E&amp;FE</th>
<th>PLMRE</th>
<th>RSHCI</th>
<th>(tot/YR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>YR 2008–09</td>
<td>51</td>
<td>4</td>
<td>2</td>
<td>4</td>
<td>NA</td>
<td>61</td>
</tr>
<tr>
<td>YR 2009–10</td>
<td>77</td>
<td>14</td>
<td>9</td>
<td>5</td>
<td>NA</td>
<td>105</td>
</tr>
<tr>
<td>YR 2010–11</td>
<td>88</td>
<td>9</td>
<td>18</td>
<td>1</td>
<td>NA</td>
<td>116</td>
</tr>
<tr>
<td>YR 2011–12</td>
<td>96</td>
<td>18</td>
<td>6</td>
<td>4</td>
<td>NA</td>
<td>124</td>
</tr>
<tr>
<td>YR 2012–13</td>
<td>123</td>
<td>6</td>
<td>7</td>
<td>3</td>
<td>3</td>
<td>142</td>
</tr>
<tr>
<td>YR 2013–14</td>
<td>126</td>
<td>6</td>
<td>6</td>
<td>0</td>
<td>2</td>
<td>140</td>
</tr>
<tr>
<td>YR 2014–15</td>
<td>122</td>
<td>12</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>140</td>
</tr>
<tr>
<td>Total</td>
<td>683</td>
<td>69</td>
<td>50</td>
<td>18</td>
<td>8</td>
<td>828</td>
</tr>
<tr>
<td>%</td>
<td>83</td>
<td>8</td>
<td>6</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

NOTE: The RSHCI option was first established in 2012.

In the 7-year period 2008-2015, 83% of the students graduated in the general option. In the most recent academic year in this table (2014/15), 88% of the students graduated in the general option with the other 12% divided among the four other options, a trend that is fairly consistent over the three most recent academic years (2012—2015). Except for the BPME option, all other options have been graduating students in the single digits. Based on these trends and on feedback from recruiters who have indicated that options do not constitute a significant factor in offering students a job, the department of chemical engineering has decided to drop all options and revert the curriculum to the requirements of the general option. The following programs that offer required courses in the options will be impacted by this decision as these courses will no longer be required. Accordingly their enrollments are expected to decrease by the corresponding number of students in the dropped options (enrollment impacts below are estimated based on option enrollments in the period 2012-2015.)
Biochemistry and Molecular Biology (B M B) Students in the BPME option are required to take B M B 401 and B M B 442. By dropping the option the enrollment in these classes will decrease by 6-12 students per year.

Energy and Geo-Environmental Engineering (EGEE) Students in the E&FE option are required to take EGEE 411. The proposed change will decrease the enrollment in this course by 2-7 students per year.

Materials Science and Engineering (MATSE) Students in the PLMRE option are required to take the following MATSE courses: 441, 443, 446, 447, 448. The proposed change will decrease the enrollment in this course by 1-3 students per year.

Consultations from the above programs are attached.
Consultation from MATSE (Ralph Colby)

On Apr 12, 2017, at 2:46 AM, Ralph Colby <rhc5@psu.edu> wrote:

Themis—

Yes the raman computer is long gone. I think that dropping all options is a fine idea. For a while the students in the polymers option would also qualify for the Minor in Polymer Science but the university changed the rules about minors a few years ago so I think that no longer works. Without the option, ChemE students interested in polymers could now get the Minor by taking six polymer courses.

–Ralph

On 4/11/2017 4:34 PM, Themis Matsoukas wrote:

[Ralph, I am resending this because my previous email was sent to raman.plmsc.psu.edu, which gave me an error]

Ralph,

The chemical engineering department is submitting a proposal to drop all ChE options. Since this action involves several MATSE courses that will not be required any more, we need your consultation on this matter. Given the small enrollments in the option (see attachment) we anticipate the impact of the change to your enrollments to be quite small.

Because of a tight submission deadline I'd appreciate it if I could have your reply by April 12.

Themis

Themis Matsoukas
matsoukas@engr.psu.edu
Consultation from B M E (Meredith Defelice)

On Apr 10, 2017, at 4:49 PM, Meredith Rosser Defelice <mrd22@psu.edu> wrote:

Themis,

Thank you for the information. It appears the impact on BMB will be fairly minimal and we have no concerns with your proposal.

Best,
Meredith

Meredith Defelice, PhD
Pennsylvania State University
Department of Biochemistry and Molecular Biology
Associate Head for Undergraduate Affairs and Senior Lecturer I
153 N. Frear
(814)867-3365
mrd22@psu.edu

----- Original Message ----- 
From: "Themis Matsoukas" <txm11@engr.psu.edu>
To: "Meredith Defelice" <mrd22@psu.edu>
Cc: "Phillip Savage" <psavage@engr.psu.edu>
Sent: Monday, April 10, 2017 3:36:01 PM
Subject: Consultation: dropping CH E options--Please respond by April 12

Meredith,

The chemical engineering department is submitting a proposal to drop all ChE options and since this action involves several BMB courses (attachment) that will not be required any more, we need your consultation on this matter. I should point that BMB 442 is a required course but all other BMB courses are electives to be chosen from larger groups of courses. Given the small enrollments in the option (see attachment) we anticipate the impact of the change to your enrollments to be quite small.

Because of a tight submission deadline I'd appreciate it if I could have your reply by April 12.

Themis

Themis Matsoukas
matsoukas@engr.psu.edu
Consultation from ENEG (Sarma V. Pisupati)

On Apr 10, 2017, at 4:19 PM, Sarma V. Pisupati <sxp17@psu.edu> wrote:

Themis,
Looking at the numbers, I do not see a problem from our side. EGEE 411 is oversubscribed and this is not going to have any impact on our program.

Thanks and Good Luck with your changes!

Sarma

-----Original Message-----
From: Themis Matsoukas [mailto:txm11@engr.psu.edu]
Sent: Monday, April 10, 2017 3:36 PM
To: Sarma Pisupati <spisupati@psu.edu>
Cc: Semih Eser <seser@psu.edu>; Phillip Savage <psavage@engr.psu.edu>
Subject: CH E Consultation: dropping CH E options--Please respond by April 12

Sarma,

The chemical engineering department is submitting a proposal to drop all ChE options. Students in the energy and fuels option are currently required to take EGEE 411 plus several EGEE/FSC electives, and so we ask for your consultation on this proposal. As you can see in the attached document, enrollment in this option has been dropping to single digits in recent years, therefore we anticipate a very small reduction in enrollment of your classes as a result of this proposed change.

Because of a tight submission deadline I'd appreciate it if I could have your reply by April 12.

Themis

PS: I am cc'ing Semih who had been our contact for the option, I am not sure who is serving in this role these days.

Themis

Themis Matsoukas
matsoukas@engr.psu.edu
C. LISTS OF APPROVED COURSES

Physical Chemistry List (Select 3 credits of Physical Chemistry from list below)
CHEM 408 Computational Chemistry (3)
CHEM 448 Surface Chemistry (3)
CHEM 452 Physical Chemistry - Quantum Chemistry (3)
CHEM 464 Chemical Kinetics and Dynamics (3)
CHEM 466 Molecular Thermodynamics (3)

Materials Elective List (Select 3 credits of Materials Elective from list below)
MATSE 201(3) or MATSE 202(3) or EGEE 455(3) or BME 443/MATSE 403(3) (Sem: 5-8)

List of 400-level Chemical Engineering Electives (Select 6 credits in 400-level chemical engineering electives from list below)
CH E 423 Chemical Energy Technology (3)
CH E 432 (F SC 432) Petroleum Processing (3)
CH E 438 Bioprocess Engineering (3)
CH E 442 (MATSE 448) Polymer Processing Technology (3)
CH E 443 Introduction to Polymer Science (3)
CH E 446 Transport Phenomena (3)
CH E 449 Bioseparations (3)
CH E 450 Process Dynamics and Control (3)
CH E 494 Research Projects in Chemical Engineering (3)

List of Engineering Electives (Select 3 credits of approved engineering electives from list below)
B E 302 Transport Processes for Biological Systems (3)
B E 304 Engineering Properties of Food and Biological Materials (3)
B E 308 Engineering Elements of Biochemistry and Microbiology (3)
B E 464 Bioenergy Systems Engineering (3)
B E 465 Food and Biological Process Engineering (3)
B E 468 Microbiological Engineering (3)
B E 409 Biofluid Mechanics (3)
B E 419 Artificial Organs and Prosthetic Devices (3)
B E 423 Reaction Kinetics of Biological Systems (3)
BME 433 Drug Delivery (3)
BME 435 Micro/Nano-Scale Systems for Biomedical Engineering (3)
BME 445 Tissue Engineering: Concepts, Calculations and Applications (3)
BME 446 Polymers in Biomedical Engineering (3)
C E 370 Introduction to Environmental Engineering (3)
C E 371 Water and Wastewater Treatment
CMPSC 200 Programming for Engineers With Matlab (3)
CMPSC 201 Programming for Engineers With C++ (3)
CMPSC 202 Programming for Engineers With Fortran (3)
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<td>Engineering Applications of Wave, Particle, and Ensemble Concepts</td>
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<td>Introduction to Principles, Fabrication Methods, and Applications of Nanotechnology</td>
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<td>E SC 456</td>
<td>(EGEE 456, E E 456) Introduction to Neural Networks</td>
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<td>(M E) Introduction to Combustion</td>
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M E 403 Polymer Electrolyte Fuel Cell Engines (3)
M E 405 Indoor Air Quality Engineering (3)
M E 406 (NUC E) Introduction to Statistical Thermodynamics (3)
M E 433 Fundamentals of Air Pollution (3)
M E 491 Bioengineering Applications of Mechanical Engineering (3)
P N G 410 Applied Reservoir Engineering (3)
P N G 480 Production Process Engineering (3)
STAT 401 Experimental Methods

List of Professional Electives (Select 6 credits of approved professional electives from list below)

Eligible courses are any course above the 200 level that satisfies degree requirements with the exception of (a) courses required in the program; and (b) GA/GH/GS and GHA courses. Courses in the latter category may be petitioned if they are taken as part of a Minor.