

CHEM 630 Essentials of Structure and Reactivity for Industrial Organic Applications-CrsRvs-2018-09-12

- The workflow icon is no longer available. Please click on the Page Status after the orange circle icon near the page title. *

Form Information

 The page you originally access is the global template version. To access the template document that progresses through the workflow, please complete the following steps:

First Step: **ONLY** change the text in the [brackets] so it looks like this: **CRIM 101 Intro to Criminology-CrsRvs-2015-08-10**

- If DUAL LISTED list BOTH courses in the page title***

Second Step: Click "SAVE" on bottom right

- DO NOT TYPE ANYTHING INTO THE FIRST PAGE OTHER THAN THE TEXT IN BRACKETS***
- Please be sure to remove the Brackets while renaming the page***

Third Step: Make sure the word ***DRAFT*** is in yellow at the top of the proposal

Fourth Step: Click on "**EDIT CONTENTS**" (*not EDIT*) and start completing the template. When exiting or when done, click "**SAVE**" (*not Save Draft*) on bottom right

When ready to submit click on the workflow icon and hit approve. It will then move to the chair as the next step in the workflow.

**Indicates a required field*

| | | | |
|-----------------------------------|-------------|------------------------|---------------|
| Proposer* | Justin Fair | Proposer Email* | jfair@iup.edu |
| Contact Person* | Justin Fair | Contact Email* | jfair@iup.edu |
| Proposing Department/Unit* | Chemistry | Contact Phone* | 357-4477 |

| | |
|----------------------|----------------|
| Course Level* | graduate-level |
|----------------------|----------------|

Course Revisions

(Check all that apply; fill out categories below as specified; i.e. if only changing a course title, only complete Category A)

| | |
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| <p>Category A:</p> <p>catalog_desc_change course_title_change</p> | <p>Category B:</p> <p>distance-education</p> <p><i>* Teacher Education: Please complete the Teacher Education section of this form (below)</i></p> <p><i>* Liberal Studies: Please complete the Liberal Studies section of this form (below)</i></p> <p><i>* Distance Education: Please complete the Distance Education section of this form (below)</i></p> |
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Rationale for Proposed Changes (All Categories)

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| <p>(A) Why is the course being revised/deleted:*</p> <p><i>Please be specific - this should be have more detail than the Summary for the Senate.</i></p> | <p>The course is being revised to update the content for the Professional Science Masters degree in Applied and Industrial Chemistry. Much of the core content from the course will be kept (<i>i.e.</i> physical organic chemistry and study of mechanisms). However, this revision emphasizes topics seen in the chemical industry, specifically in the commodity and specialty sectors.</p> |
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| (B) University Senate Summary of Rationale* | <p><i>Please enter a single paragraph summary/rationale of changes or proposal for University Senate.</i></p> <p>The course is being revised to update the content for the Professional Science Masters degree in Applied and Industrial Chemistry. Much of the core content from the course will be kept (<i>i.e.</i> physical organic chemistry and study of mechanisms). However, this revision emphasizes topics seen in the chemical industry, specifically in the commodity and specialty sectors.</p> |
| (C) Implications of the change on the program, other programs and the Students:* | <p>Students who take this course will better understand how molecular structure affects the reactivity of chemical substrates, especially as applied in industrial settings. The Applied and Industrial PSM replaced the MS in Chemistry.</p> |

| Current Course Information* | |
|------------------------------------|--|
| Category A | |
| (D) Current Prefix* | CHEM |
| Proposed Prefix | CHEM |
| (E) Current Number* | 630 |
| Proposed Number | 630 |
| (F) Current Course Title* | Organic Chemistry |
| Proposed Course Title | Essentials of Structure and Reactivity for Industrial Organic Applications |

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| (G) Pre req uis ite (s) | None |
| Pr op os ed Pre req uis ite (s) | None |
| (H) Cu rre nt Cat alo g De scr ipti on | Principles of physical chemistry will be applied to the study of organic reaction mechanisms. Lecture—three hours. |
| Pr op os ed Cat alo g De scr ipti on | Examines the structure and reactivity relationships of organic substrates in key reactions. Emphasizes molecular structure, chemical bonding, mechanism characterization, and stereochemistry. Highlights the utility of structure and reactivity for reactions used in commodity and specialty sectors of the chemical industry. |
| <i>If changing Category A, no further action required.</i> | |
| Category B (if no change, leave blank) | |

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| <p>(I) Re pe ata ble Co urse</p> <p>This is for a cou rse tha t can be rep eat ed</p> <p>Mul tipl e tim es e. g. Int ern ship</p> | <p>NO</p> <p>If YES, please complete the following:</p> <p>Number of Credits that May be Repeated:</p> <p>Maximum Number of Credits Allowed to be Repeated:</p> |
| <p>Pr op os ed Re pe ata ble Co urse</p> | <p>NO</p> <p>If YES, please complete the following:</p> <p>Number of Credits that May be Repeated:</p> <p>Maximum Number of Credits Allowed to be Repeated:</p> |
| <p>(J) Nu mb er of Cr edi ts</p> | <p>Class Hours per week:3</p> <p>Lab Hours:0</p> <p>Credits:3</p> |
| <p>P rop os ed Nu mb er of Cr edi ts</p> | <p>Class Hours:3Lab Hours:0Credits:3</p> |

(K) Current Courses Student Learning Outcomes (SLOs)
 Not Available. This course has not been updated in over two decades.

(L) Proposed Courses Student Learning Outcomes (SLOs)
 Note that the text box in the table expands
 Please note: The SLOs have been written in the form of a DE course since we expect that all future course offerings will be offered DE.

| SLO # | Outcome | How outcome is assessed |
|-------|--|--|
| 1 | Appraise and determine key elements of molecular structure | Assigned readings from the text, supplemental materials, course videos will be used to provide context and showcase applications currently used in the chemical industry. Students will use online discussion boards to introduce and relate at least one application found in the chemical industry. Quizzes, located on the learning management system, will be used to help keep students on track with required reading and lectures. The take-home final exam will assess the material which will be scanned and turned in on the learning management software. The exam will include essay, long answer, and mechanistic questions, but may also include no more than 20% multiple choice. Students will write a short report that summarizes an advance level molecular structure example. Topics from this objective will be selected by students for their written report. Drafts will be due two weeks early to provide feedback on scientific writing as well as content. |
| 2 | Appraise and apply structural effects on substitution and elimination reactions | Assigned readings from the text, supplemental materials, course videos will be used to provide context and showcase applications currently used in the chemical industry. Students will use online discussion boards to introduce and relate at least one application found in the chemical industry. Quizzes, located on the learning management system, will be used to help keep students on track with required reading and lectures. The take-home final exam will assess the material which will be scanned and turned in on the learning management software. The exam will include essay, long answer, and mechanistic questions, but may also include no more than 20% multiple choice. Students will hand in a second report on structural effects on substitution, elimination, aromatic, or pericyclic reactions. |
| 3 | Appraise and apply structural effects on aromatic, pericyclic, and photochemical reactions | Assigned readings from the text, supplemental materials, course videos will be used to provide context and showcase applications currently used in the chemical industry. Students will use online discussion boards to introduce and relate at least one application found in the chemical industry. Quizzes, located on the learning management system, will be used to help keep students on track with required reading and lectures. The take-home final exam will assess the material which will be scanned and turned in on the learning management software. The exam will include essay, long answer, and mechanistic questions, but may also include no more than 20% multiple choice. |
| 4 | Analyze and describe advanced applications of structural effects on chemical reactions | Students will be required to complete a guided search of relevant literature that will serve as the basis of their two written reports that delve deeper into the applications of their bond formation reactions. In-depth feedback will be provided on the first assignment to provide guidance and assessment on their scientific writing ability. A software plagiarism program will be used. |

For each outcome, describe how the outcome will be achieved

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As outlined by the federal definition of a "credit hour", the following should be a consideration regarding student work - For every one hour of classroom or direct faculty instruction, there should be a minimum of two hours of out of class student work.

Not Available. This course has not been updated in over two decades.

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| <p>(N) Brief Course Outline</p> <p><i>(Give sufficient detail to communicate the content to faculty across campus. It is not necessary to include specific reactions, calculations or assignments)</i></p> | <p><i>As outlined by the federal definition of a "credit hour", the following should be a consideration regarding student work - For every one hour of classroom or direct faculty instruction, there should be a minimum of two hours of out of class student work.</i></p> <p>Molecular Structure</p> <ol style="list-style-type: none"> 1. Chemical bonding and structure 2. Principles of stereochemistry 3. Conformational, steric and stereoelectronic effects <p>Methods of Reaction Characterization</p> <ol style="list-style-type: none"> 1. Study and description of organic reaction mechanisms <p>Structural Effects on Substitution and Elimination Reactions</p> <ol style="list-style-type: none"> 1. Nucleophilic substitution 2. Polar addition and elimination reactions 3. Carbanions and other nucleophilic carbon species 4. Reactions of carbonyl compounds <p>Structural Effects on Aromatic, Pericyclic, and Photochemical Reactions</p> <ol style="list-style-type: none"> 1. Aromaticity 2. Aromatic substitution 3. Concerted pericyclic reaction 4. Photochemistry |
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Distance Education Section

- Complete this section only if adding Distance Education to a New or Existing Course

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| <p>If Completing this Section, Check the Box to the Right:</p> | <p>NOTE: you must check this box if the Course has previously been approved for Distance Education</p> <p>distance-education</p> |
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| Course Prefix /Number | CHEM |
| Course Title | 630 |
| Type of Proposal | <i>See CBA, Art. 42.D.1 for Definition</i> online |
| Brief Course Outline | <p><i>Give an outline of sufficient detail to communicate the course content to faculty across campus. It is not necessary to include specific readings, calendar or assignments</i></p> <p><i>As outlined by the federal definition of a "credit hour", the following should be a consideration regarding student work - For every one hour of classroom or direct faculty instruction, there should be a minimum of two hours of out of class student work.</i></p> <p>Molecular Structure</p> <ol style="list-style-type: none"> 1. Chemical bonding and structure 2. Principles of stereochemistry 3. Conformational, Steric and Stereoelectronic Effects <p>Methods of Reaction Characterization</p> <ol style="list-style-type: none"> 1. Study and Description of Organic Reaction Mechanisms <p>Structural Effects on Substitution and Elimination Reactions</p> <ol style="list-style-type: none"> 1. Nucleophilic Substitution 2. Polar Addition and Elimination Reactions 3. Carbanions and other nucleophilic carbon species 4. Reactions of Carbonyl Compounds <p>Structural Effects on Aromatic, Pericyclic, and Photochemical Reactions</p> <ol style="list-style-type: none"> 1. Aromaticity 2. Aromatic Substitution 3. Concerted Pericyclic Reactions 4. Photochemistry |
| Rationale for Proposal (Required Questions from CBA) | |
| How is/are the instructor (s) qualified in the Distance Education delivery method as well as the discipline? | <p>I have taught CHEM 105: The Forensic Chemistry of CSI via distance education for multiple years. I hold a PhD in Chemistry from the University of Connecticut and have been a professor in the Chemistry Department at IUP since 2009. My main teaching responsibilities include Organic Chemistry I and II, College Chemistry II, and Forensic Chemistry of CSI. My scholarship has a focus in organic synthesis with particular interest in a majority of the course topics.</p> <p>I have used many self-made multimedia to enhance my course offerings including adaptive quizzes in the LMS, YouTube videos, Camtasia, SCORM content, screen capture, enhanced mechanistic drawings, and video explanations.</p> |

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| <p>For each outcome in the course, describe how the outcome will be achieved using Distance Education technologies.</p> | <p>Objective #1 - Appraise and determine key elements of molecular structure.</p> <p>How objective #1 will be met: Assigned readings from the text, supplemental materials, course videos will be used to provide context and showcase applications currently used in the chemical industry. Students will use online discussion boards to introduce and relate at least one application found in the chemical industry. Quizzes, located on the learning management system, will be used to help keep students on track with required reading and lectures. The take-home final exam will assess the material which will be scanned and turned in on the learning management software. The exam will include essay, long answer, and mechanistic questions mainly, but may also include no more than 20% multiple choice. Students will write a short report that summarizes an advance level molecular structure example. Topics from this objective will be selected by students for their written report. Drafts will be due two weeks early to provide feedback on scientific writing as well as content.</p> <p><u>Objective #2 - Appraise and apply structural effects on substitution and elimination reactions.</u></p> <p><u>How objective #2 will be met:</u> Assigned readings from the text, supplemental materials, course videos will be used to provide context and showcase applications currently used in the chemical industry. Students will use online discussion boards to introduce and relate at least one application found in the chemical industry. Quizzes, located on the learning management system, will be used to help keep students on track with required reading and lectures. The take-home final exam will assess the material which will be scanned and turned in on the learning management software. The exam will include essay, long answer, and mechanistic questions mainly, but may also include no more than 20% multiple choice. Students will hand in a second report on topics on structural effects on substitution, elimination, aromatic, or pericyclic reactions.</p> <p><u>Objective #3 - Appraise and apply structural effects on aromatic, pericyclic, and photochemical reactions.</u></p> <p><u>How objective #3 will be met:</u> Assigned readings from the text, supplemental materials, course videos will be used to provide context and showcase applications currently used in the chemical industry. Students will use online discussion boards to introduce and relate at least one application found in the chemical industry. Quizzes, located on the learning management system, will be used to help keep students on track with required reading and lectures. The take-home final exam will assess the material which will be scanned and turned in on the learning management software. The exam will include essay, long answer, and mechanistic questions mainly, but may also include no more than 20% multiple choice.</p> <p><u>Objective #4 - Analyze and describe advances applications of structural effects on chemical reactions.</u></p> <p><u>How objective #4 will be met:</u> Students will be required to complete a guided search of relevant literature that will serve as the basis of their two written reports that delve deeper into the applications of their bond formation reactions. In-depth feedback will be provided on the first assignment to provide guidance and assessment on their scientific writing ability. Turnitin will be used.</p> |
| <p>How will the instructor-student and student-student interaction take place? (if applicable)</p> | <p>The learning management system provides multiple opportunities for students to interact with the instructor and with other students through an online class discussion board. Students will also interact with the instructor through completion of online tests and quizzes using email and will also have access to the instructor throughout the course for additional questions and assistance. Online office hours will be available. There will be an emphasis on the editing and review of the midsemester written report.</p> |
| <p>How will student achievement be evaluated?</p> | <p>The course is divided into one introductory plus four main units. Weekly quizzes will be given to encourage students to keep up with the material. These quizzes will include multiple choice, long answer and matching questions.</p> <p>After each main unit, tests will be administered. Due to the course management system's inability to accurately allow structural drawings and critical answers, exams will be supplied as a pdf that the students will download and print. Students will complete the exam, scan, and upload the exam before the deadline. Typically, 3 days will be given to complete the exam. Academic honesty statements will be included on each of the tests for students to sign.</p> <p>Students will write two research papers on an instructor-approved topic related to a course topic. The goal of the research paper is to develop an in-depth understanding of the particular topic while strengthening professional writing skills. Detailed rubrics will be provided to students and utilized by the instructor for all assignments.</p> |
| <p>How will academic honesty for tests and assignments be addressed?</p> | <p>The course syllabus will include the university academic integrity policy. The expectation for academic integrity and the penalty for dishonesty will be clearly stated. Quizzes will use timed tests, random selection of questions and limit on attempts. Feedback will be provided only after quizzes end. Written papers will be submitted through a plagiarism software. All of the above examples are methods the instructor can use to prevent academic dishonesty. Academic integrity will be described on the course syllabus as follows: Academic Honesty Policy: Shall be in accordance with the Indiana University of Pennsylvania Honesty Policy (IUP Student Handbook- Academic Integrity Policy and Procedures, see http://www.iup.edu/registrar/catalog/acapolicy).</p> |

Liberal Studies Section

- Complete this section only for a new Liberal Studies course or Liberal Studies course revision

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| If Completing this Section, Check the Box to the Right: | NOTE: you must check this box if the Course/Program has previously been approved for Liberal Studies |
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| Liberal Studies Course Designations (Check all that apply) | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---|--------------------------------|--------------|---|--|--|--|---|--|---|--|--|--|--|--|---------------------------------|--------------|--|--|--|--|---|--|--|--|
| Learning Skills: | | | | | | | | | | | | | | | | | | | | | | | | | |
| Knowledge Area: | | | | | | | | | | | | | | | | | | | | | | | | | |
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| Liberal Studies Elective | <i>Please mark the designation(s) that apply - must meet at least one</i> | | | | | | | | | | | | | | | | | | | | | | | | |
| Expected Undergraduate Student Learning Outcomes (EUSLOs) Map the Course Outcome to the EUSLO's | <p><i>Map each course outcome to the appropriate EUSLOs that apply. Fill in the course outcome number</i></p> <p><i>See https://www.iup.edu/liberal/faculty-and-staff/euslos/ for additional information regarding mapping EUSLOs</i></p> <table border="1" style="width: 100%;"> <thead> <tr> <th style="width: 75%;">Informed Learners demonstrate:</th> <th style="width: 25%;">Course SLO #</th> </tr> </thead> <tbody> <tr> <td>• the ways of modeling the natural, social and technical worlds</td> <td></td> </tr> <tr> <td>• The aesthetic facets of human experience</td> <td></td> </tr> <tr> <td>• the past and present from historical, philosophical and social perspectives</td> <td></td> </tr> <tr> <td>• the human imagination, expression and traditions of many cultures</td> <td></td> </tr> <tr> <td>• the interrelationships within and across cultures & global communities</td> <td></td> </tr> <tr> <td>• the interrelationships within and across disciplines</td> <td></td> </tr> <tr> <th>Empowered Learners demonstrate:</th> <th>Course SLO #</th> </tr> <tr> <td>• effective oral and written communication abilities</td> <td></td> </tr> <tr> <td>• ease with textual, visual and electronically-mediated literacies</td> <td></td> </tr> <tr> <td>• problem solving skills using a variety of methods and tools</td> <td></td> </tr> <tr> <td>• information literacy skills including the ability to access, evaluate, interpret and use information from a variety of sources</td> <td></td> </tr> </tbody> </table> | Informed Learners demonstrate: | Course SLO # | • the ways of modeling the natural, social and technical worlds | | • The aesthetic facets of human experience | | • the past and present from historical, philosophical and social perspectives | | • the human imagination, expression and traditions of many cultures | | • the interrelationships within and across cultures & global communities | | • the interrelationships within and across disciplines | | Empowered Learners demonstrate: | Course SLO # | • effective oral and written communication abilities | | • ease with textual, visual and electronically-mediated literacies | | • problem solving skills using a variety of methods and tools | | • information literacy skills including the ability to access, evaluate, interpret and use information from a variety of sources | |
| Informed Learners demonstrate: | Course SLO # | | | | | | | | | | | | | | | | | | | | | | | | |
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| • information literacy skills including the ability to access, evaluate, interpret and use information from a variety of sources | | | | | | | | | | | | | | | | | | | | | | | | | |

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| | <ul style="list-style-type: none"> the ability to transform information into knowledge and knowledge into judgement and action | |
| | <ul style="list-style-type: none"> the ability to work within complex systems and with diverse groups | |
| | <ul style="list-style-type: none"> critical thinking skills including analysis, application and evaluation | |
| | <ul style="list-style-type: none"> reflective thinking and the ability to synthesize information and ideas | |
| | Responsible Learners demonstrate: | Course SLO # |
| | <ul style="list-style-type: none"> intellectual honesty | |
| | <ul style="list-style-type: none"> concern for social justice | |
| | <ul style="list-style-type: none"> civic engagement | |
| | <ul style="list-style-type: none"> an understanding of the ethical and behavioral consequences of decisions and actions on themselves, on society, and on the physical world | |
| | <ul style="list-style-type: none"> an understanding of themselves and a respect for the identities, histories and cultures of others | |

| <p>How will each outcome be measured (note should mirror (L) Student Learning Outcomes* (SLO) from the course proposal</p> | <i>Narrative on how the course will address the Selected Category Content</i> | | | | | | | | |
|---|---|--------------|---|---|--|---|--|---|--|
| | <table border="1"> <thead> <tr> <th>Course SLO #</th> <th>Assessment Tool to be used to measure the outcome</th> </tr> </thead> <tbody> <tr> <td>1</td> <td></td> </tr> <tr> <td>2</td> <td></td> </tr> <tr> <td>3</td> <td></td> </tr> </tbody> </table> | Course SLO # | Assessment Tool to be used to measure the outcome | 1 | | 2 | | 3 | |
| Course SLO # | Assessment Tool to be used to measure the outcome | | | | | | | | |
| 1 | | | | | | | | | |
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**All Liberal Studies courses are required to include perspectives on cultures and have a supplemental reading.
Please answer the following questions.**

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| <p>Liberal Studies courses must include the perspectives and contributions of ethnic and racial minorities and of women whenever appropriate to the subject matter. Please explain how this course will meet this criterion.</p> | |
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| <p>Liberal Studies courses require the reading and use by students of at least one non-textbook work of fiction or non-fiction or a collection of related articles. Please describe how your course will meet this criterion.</p> | |
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Teacher Education Section

- Complete this section only for a new Teacher Education course or Teacher Education course revision

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| <p>If Completing this Section, Check the Box to the Right:</p> | <p>NOTE: you must check this box if the Course/Program has previously been approved for Teacher Education related items</p> |
| <p>Course Designations:</p> | |
| <p>Key Assessments</p> | |
| <p>Narrative Description of the Required Content</p> | <p>For both new and revised courses, please attach (see the program education coordinator):</p> <ul style="list-style-type: none"> • The Overall Program Assessment Matrix • The Key Assessment Guidelines • The Key Assessment Rubric <p style="text-align: center;">File Modified</p> <hr style="width: 20%; margin: auto;"/> <p>No files shared here yet.</p> <ul style="list-style-type: none"> • Drag and drop to upload or browse for files  |
| <p>Narrative Description of the Required Content</p> | <p><i>How the proposal relates to the Education Major</i></p> |

Please scroll to the top and click the Page Status if you are ready to take action on the workflow.
Please submit an ihelp if you have any questions <http://ihelp.iup.edu>