

## New Course Proposal Template

*14-181a.  
UWUCC: AP 4/21/15  
Senate App 9/18/15*

**Steps to the approval process:**

1. Complete the applicable template(s) and email them to the departmental or program curriculum committee chair.
2. The curriculum chair emails the proposal to the curriculum committee, then to the department/program faculty for a vote and finally to the department/program chair.
3. The department/program chair emails the proposal to [curriculum-approval@iup.edu](mailto:curriculum-approval@iup.edu); this email will also serve as an electronic signature.
4. Curriculum committee staff will log the proposal, forward it to the appropriate dean's office(s) for review within 14 days and post it on the X Drive for review by all IUP faculty and administrators. Following the dean's review the proposal goes to the UWUCC/UWGC and the Senate.
5. Questions? Email [curriculum-approval@iup.edu](mailto:curriculum-approval@iup.edu).

Contact Person:	Charles Lake	Email Address:	lake@iup.edu
Proposing Depart/Unit:	Chemistry	Phone:	72398

Course Prefix/Number	<i>See the Registrar's list of Unavailable course numbers at <a href="http://www.iup.edu/WorkArea/linkit.aspx?LinkIdentifier=id&amp;ItemID=129323">http://www.iup.edu/WorkArea/linkit.aspx?LinkIdentifier=id&amp;ItemID=129323</a>.</i> CHEM 460/560
Course Title	<b>Chemistry and Physics of Materials</b>
Dual/Cross Listed	<i>Dual Listed = Courses listed at two levels, such as undergraduate and graduate, masters and doctoral, etc. Cross Listed = Course has more than one prefix such as GEOG/RGPL 233.</i> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No  If yes with: CHEM 460/560
Number of Credits	(UG) Class Hours - 3 (UG) Lab Hours - 0 Credits - 3cr
Prerequisite(s)	CHEM 112 or 114 and PHYS 112 or 132
Corequisite(s)	<i>This means that another course must be taken in the same semester as the proposed course</i> Click here to enter text.
Additional Information (Check all that apply. Note: Additional documentation will be required)	<input type="checkbox"/> Liberal Studies (please also complete Template C) <input type="checkbox"/> Teacher Education (Is it Step 1 a prerequisite or is it part of the Professional Education Sequence If so please also complete Template D) <input type="checkbox"/> Distance Education (Please also complete Template E)
Recommended Class Size (optional) (provide justification)	Are you recommending a class size: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No      Number: Click here to enter text.  If yes: (check one of the following reasons and provide a narrative explanation) <input type="checkbox"/> Pedagogical <input type="checkbox"/> Physical limitation of classroom <input type="checkbox"/> Accreditation body standards/recommendations <input type="checkbox"/> Other Explanation <i>(required)</i> : Click here to enter text.
Catalog Description	<i>Guidelines: Do not include pre/co-requisite information here. The registrar prefers a concise description of course content, beginning with an active verb.</i>

## Template A

	<p>Provides unified treatment of materials. Emphasizes physical and chemical origins of material properties. Multidisciplinary approach using chemistry, physics, and geoscience to study bonding and crystal chemistry. Provides an interdisciplinary approach to the study of material phenomena involving electronic devices, energy storage, second harmonic generation, superconductivity and others.</p>									
<p><b>Student Learning Outcomes</b></p> <p><i>(These should be measurable, appropriate to the course level, and phrased in terms of student achievement, not instructional or content outcomes)</i></p> <p><i>If dual listed, indicate additional learning objectives for the higher level course.</i></p>	<p>The student will be able to:</p> <ol style="list-style-type: none"> <li>1. Analyze covalent, metallic and ionic bonding in different solid state materials</li> <li>2. Evaluate phase diagrams</li> <li>3. Understand techniques in solid state synthesis</li> <li>4. Relate chemical structure and bonding to electrical, magnetic and optical properties.</li> <li>5. Give and defend a scientific poster presentation on any related topic.</li> </ol> <p>The graduate student will be able to:</p> <ol style="list-style-type: none"> <li>1. Fulfill the objectives above, but show a deeper level of analysis and understanding of chemical and physical processes/structure in their work</li> <li>2. Read and critique related scientific literature</li> <li>3. Give and defend a 20 minute oral presentation on any current topic in solid-state chemistry, applying course material.</li> </ol>									
<p><b>Brief Course Outline:</b></p> <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>	<ol style="list-style-type: none"> <li>(a) Introduction to Solid-State Chemistry, Point Symmetry</li> <li>(b) Translational and Space Symmetry,</li> <li>(c) Bonding in Solids, Covalent Bonding, Band Theory</li> <li>(d) Bonding in Solids; Ionic Bonding, Crystal Chemistry</li> <li>(e) Crystal Structures and Diffraction Science</li> <li>(f) Solid-state Synthesis and Crystal Growth.</li> <li>(g) Solid State Characterization Techniques, Phase Diagrams.</li> <li>(h) Crystal Defects, Solid Solutions,</li> <li>(i) Physical Properties of Materials.</li> <li>(j) Electrical Properties of Materials.</li> <li>(k) Magnetic Properties of Materials.</li> <li>(l) Optical Properties of Materials</li> <li>(m) Superconductivity and Liquid Crystals</li> </ol>									
<h3>Rationale for Proposal</h3>										
<p>Why is this course being proposed?</p>	<p>This course will enter the rotation list for electives in the Professional Science Masters-Chemistry</p>									
<p>How does it fit into the departmental curriculum? (Check all that apply)</p>	<table style="width: 100%; border: none;"> <tr> <td style="width: 33%;"><input type="checkbox"/> Major Requirement</td> <td style="width: 33%;"><input type="checkbox"/> Minor Requirement</td> <td style="width: 33%;"><input type="checkbox"/> Core Requirement <i>(Interdisciplinary core – e.g Business/Education)</i></td> </tr> <tr> <td><input checked="" type="checkbox"/> Required Elective</td> <td><input type="checkbox"/> Liberal Studies</td> <td><input type="checkbox"/> Open Elective</td> </tr> <tr> <td colspan="3"><input type="checkbox"/> Other - Course will be an elective for BS Chemistry majors, and an elective for Professional Science Masters Chemistry and Professional Science Masters Physics</td> </tr> </table>	<input type="checkbox"/> Major Requirement	<input type="checkbox"/> Minor Requirement	<input type="checkbox"/> Core Requirement <i>(Interdisciplinary core – e.g Business/Education)</i>	<input checked="" type="checkbox"/> Required Elective	<input type="checkbox"/> Liberal Studies	<input type="checkbox"/> Open Elective	<input type="checkbox"/> Other - Course will be an elective for BS Chemistry majors, and an elective for Professional Science Masters Chemistry and Professional Science Masters Physics		
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Template A

<p>Is a similar class offered in other departments?</p>	<p><input checked="" type="checkbox"/> Yes                  Please provide comment: PHYS 590 Solid State Physics has some minimal overlap with the study of crystal structures, but PHYS 590 focuses on quantum theory of the solid state. Conversations with PHYS indicate support of this course; it has been used in the Professional Science Masters-Physics when offered as a Special Topics course.  <input type="checkbox"/> No</p>
<p>Does it serve the college/university above and beyond the role it serves in the department?</p>	<p><input checked="" type="checkbox"/> Yes                  Please provide comment: May be used as an elective in the Professional Science Masters – Physics                  No</p>
<p>Who is the target audience for the course?</p>	<p><input checked="" type="checkbox"/> Course Designed for Majors ( <input type="checkbox"/> Required <input checked="" type="checkbox"/> Not Required)  <input type="checkbox"/> Course Designed for Minor <span style="float: right;"><input checked="" type="checkbox"/> Departmental Elective</span>  <input type="checkbox"/> Restricted to Majors/Minors <span style="float: right;"><input type="checkbox"/> Open to Any Student</span>  <input type="checkbox"/> Liberal Studies  <input checked="" type="checkbox"/> Other - Professional Science Masters CHEM and Professional Science Masters PHYS students</p>
<p>Implications for other departments</p>	<p>A. What are the implications for other departments (<i>For example: overlap of content with other disciplines, requirements for other programs</i>)?                  This course can be an elective in the Professional Science Masters-Physics                  B. How have you addressed this with other department(s) involved? What was the outcome of that attempt? (Attach documents as appropriate)                  (Yes, PHYS supports this course.)</p>
<p>Are the resources adequate (i.e. faculty, space, equipment, laboratory supplies, library materials, travel funds, etc.)?</p>	<p><input checked="" type="checkbox"/> Yes  <input type="checkbox"/> No                  Please provide comment: <a href="#">Click here to enter text.</a></p>
<p><b>For Dean's Review</b></p>	
<ul style="list-style-type: none"> <li>• Are resources available/sufficient for this course?    <input type="checkbox"/> Yes    <input type="checkbox"/> No    <input type="checkbox"/> NA</li> <li>• Is the proposal congruent with college mission?    <input type="checkbox"/> Yes    <input type="checkbox"/> No    <input type="checkbox"/> NA</li> <li>• Has the proposer attempted to resolve potential conflicts with other academic units?    <input type="checkbox"/> Yes    <input type="checkbox"/> No  <input type="checkbox"/> NA</li> </ul>	
<p>Comments: <a href="#">Click here to enter text.</a></p>	