PURDUE UNIVERSITY
REQUEST FOR ADDITION, EXPIRATION,
OR REVISION OF AN UNDERGRADUATE COURSE
(10000-40000 LEVEL)

DEPARTMENT: Biology
EFFECTIVE SESSION: Fall 2014

INSTRUCTIONS: Please check the items below which describe the purpose of this request.

1. New course with supporting documents
2. Add existing course offered at another campus
3. Expire a course
4. Change in course number
5. Change in course title
6. Change in course credit/Type
7. Change in course attributes (department head signature only)
8. Change in instructional hours
9. Change in course description
10. Change in course prerequisites
11. Change in semesters offered (department head signature only)
12. Transfer from one department to another

PROPOSED:

Subject Abbreviation: BIOL
Course Number: 49100

Long Title: Senior Biology Seminar
Short Title: Senior Biology Seminar

EXISTING:

Subject Abbreviation: BIOL
Course Number: 49100

Long Title: Senior Biology Seminar
Short Title: Senior Biology Seminar

TERMS OFFERED:

Check All That Apply:
- Fall
- Spring
- Summer

CAMPUS(ES) INVOLVED:
- Calumet
- Ft. Wayne
- Indianapolis
- N. Central
- Tech Statewide
- W. Lafayette

CREDIT TYPE:

1. Fixed Credit: Cr. Hrs. [ ]
2. Variable Credit Range: (Check One)
   - Minimum Cr. Hrs. To [ ]
   - Maximum Cr. Hrs. [ ]
3. Equivalent Credit: Yes [ ] No [ ]

COURSE ATTRIBUTES:

6. Registration Approval Type
   - Department [ ] Instructor [ ]
7. Variable Title [ ]
8. Honors [ ]
9. Full Time Privilege [ ]
10. Off Campus Experience [ ]

SCHEDULE TYPE:

Lecture [ ]
Recitation [ ]
Presentation [ ]
Laboratory [ ]
Lab Prep [ ]
Studio [ ]
Distance [ ]
Clinic [ ]
Experiential [ ]
Research [ ]
Ind. Study [ ]
Pract/Observe [ ]

Cross-Listed Courses:

COURSE DESCRIPTION (INCLUDE REQUISITES/RESTRICTIONS):

Students conduct an in-depth research project on a biological topic of their choice, and present upon their findings in both written and oral formats. Students will learn about scientific inquiry and communication techniques, and also critique and discuss seminar presentations. Open only to senior biology majors. Number of credits depends on student's bulletin year.

P: BIOL 21700, 21800, or 21900

COURSE LEARNING OUTCOMES:

- Produce an original work involving the creation or application of knowledge
- Report the results of original work through a discipline-appropriate product
- Demonstrate a high level of personal integrity and professional ethics by understanding the ethical responsibilities associated with the subject of the project
- Demonstrate critical-thinking abilities and familiarity with quantitative and/or qualitative reasoning

Calumet Department Head: [Signature] Date: [Fecha]
Calumet School Dean: [Signature] Date: [Fecha]

Ft. Wayne Department Head: [Signature] Date: [Fecha]
Ft. Wayne School Dean: [Signature] Date: [Fecha]

Indianapolis Department Head: [Signature] Date: [Fecha]
Indianapolis School Dean: [Signature] Date: [Fecha]

North Central Faculty Senate Chair: [Signature] Date: [Fecha]
Vice Chancellor for Academic Affairs: [Signature] Date: [Fecha]

West Lafayette Department Head: [Signature] Date: [Fecha]
West Lafayette College/School Dean: [Signature] Date: [Fecha]
West Lafayette Registrar: [Signature] Date: [Fecha]
Indiana University-Purdue University Fort Wayne
Senior Biology Seminar - BIOL 49100
Friday 12:00-2:45 pm

OVERVIEW

The purpose of this course is to give you a “capstone” experience during your education at IPFW, using and refining core skills that will serve you well into the future. The intent is to have you experience and practice several critical elements of being a biologist: critical review of the works of others on a topic of contemporary biology, novel research and integration of your findings into our existing understanding of the topic, and then oral and written presentation which demonstrate your comprehension and that educates your audience. Additionally, you will be asked to review and critique the work of others in order to become a more effective listener, writer, and presenter.

Course Objectives

- Conduct a novel research project in the field of biology that involves the acquisition, application, and synthesis of scientific knowledge
- Deepen knowledge on a biological topic of interest
- Enhance skill in critically evaluating the scientific literature
- Improve oral and written presentation skills
- Demonstrate personal integrity and ethical use of the work of others by appropriately referencing and documenting sources

General Education - Learning Outcomes for Category C (8): Capstone

This course is designed to fulfill the Capstone requirement for General Education at IPFW. In addition to the 30 credit transfer core, all IPFW Bachelor’s Degree candidates are expected to complete an approved three credit capstone course at the 300 level or higher. The Capstone course reflects the faculty commitment to the acquisition and application of knowledge as fundamental to the baccalaureate degree, and allows flexibility and innovation in Capstone course creation.

All capstone projects will involve the acquisition or application of knowledge. This should be broadly construed and may include the exploration of any discipline-specific scholarship including the scholarly activities typically associated with the professional schools, service professions, engineering and the performing arts. A capstone may center on any aspect of university life as long as its primary focus is on the acquisition or application of knowledge. The project may involve a formal service learning experience, or a formal international study experience as its primary focus.
All capstone projects, including those in the performing arts, shall produce a significant product in a discipline-appropriate format, demonstrating the scholarly methods, techniques and conventions associated with the discipline.

*Upon completion of the Capstone, students will be able to:*

8.1. Produce an original work involving the creation or application of knowledge, performance or service.

8.2. Report the results of original work through a discipline-appropriate product.

8.3. Demonstrate a high level of personal integrity and professional ethics by understanding the ethical responsibilities related to the profession associated with the subject of the capstone project.

8.4. Demonstrate critical-thinking abilities and familiarity with quantitative and/or qualitative reasoning.

**PROJECTS**

Your project may be your own original research, or may be based on the work of others — synthetic research based on the available literature. Either way, you are conducting an investigation that goes beyond an informational report. It should include a clear statement of your hypothesis or question to be addressed, and the results of your investigation should clearly relate to resolving that hypothesis or question. When selecting a topic, choose a biological concept to investigate, avoiding clinical studies as the central focus of your work. You should also avoid a “my favorite disease” or “favorite animal” type of topic.

Your project idea will need the support of your mentor. To get that and document it, return the topic sheet provided on Blackboard with the title, one paragraph abstract, and faculty signature by the third Friday of the semester.

You must demonstrate a familiarity with your topic, in part expressed by literature review. How much literature you review will be influenced by your topic and how you approach it. However, to pass you **minimally must have at least twenty sources from the primary literature**, while the remainder may be from other sources, such as reviews. Clinical references may be included, but only as background rather than as focus. Web sites are not primary literature, although you may use electronic journals if they are peer-reviewed. Papers published in journals that are not available at Helmke Library may be obtained through Document Delivery services (see library website). Make sure you allow ample time to acquire your resources.
ROLES OF MENTORS

You must work with a mentor to receive credit for the course. You cannot pass the course without doing so. Inadequate interaction with your mentor may also result in a lower grade. Those students who present their own research will have their research advisor serve as their Senior Seminar mentor. For those of you who have not done your own research projects, a list of faculty members and their broad fields of interest is attached to help you select someone. Ensure that you obtain a signature on the Mentor Approval Form and provide them with the Mentor Evaluation Form.

A faculty member is not required to serve as your mentor. Some individuals may be too overloaded with mentoring requests or other tasks in a given semester to accommodate everyone. If that is the case, the faculty member may help suggest other possible mentors appropriate to your interests.

Your mentor may provide some guidance about selection of papers to use as references or how to search for them. In addition, your mentors may be able to help with interpretation of papers, especially for questions relating to methodology and experimental design. When you have prepared your talk, your mentor may be willing to view a practice session and make suggestions about your communication, content, organization, legibility of tables, and other issues. Some mentors may be willing review your term papers to answer broad questions. Ultimately, presentation and paper are your responsibility, not the mentor’s.

ASSIGNMENTS

Final Paper

You will write a synthetic paper on your research project. The paper will likely be up to 20 pages perhaps more, typed, double-spaced pages of narrative text, plus a reference section and any figures or tables. This is not a strict page minimum, but it is less likely that a shorter paper will sufficiently cover the topic. On the other side of things, long does not equal good. Keep things concise and focused.

You will receive feedback from your peers and instructor on a draft of your paper several weeks before the due date.

Presentation

In addition to the final paper, you will present your research project in venues typical of the field. A main goal of your presentation is to provide the basis for an understanding of the main issues, evidence and conclusions for biologists who are not experts in the specific field of your presentation. Thus, your presentation should be aimed at an audience consisting of professors and upper class biology majors who are not experts in the subject of your presentation.
GRADING

<table>
<thead>
<tr>
<th>Evaluation</th>
<th>Point Value</th>
<th>Total</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary literature analysis</td>
<td>1 x 20</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td>Oral presentation</td>
<td>1 x 20</td>
<td>20</td>
<td>10</td>
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<tr>
<td>Poster presentation</td>
<td>1 x 60</td>
<td>60</td>
<td>30</td>
</tr>
<tr>
<td>Draft of final paper</td>
<td>1 x 20</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td>Final paper</td>
<td>1 x 60</td>
<td>60</td>
<td>30</td>
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<tr>
<td>Peer review of literature analysis</td>
<td>2 x 5</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>Peer review of paper draft</td>
<td>2 x 5</td>
<td>10</td>
<td>5</td>
</tr>
</tbody>
</table>

| Grand total                   | 200         | 100   |

Grades will be based on a percentage scale.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A, A-</td>
<td>&gt;92, 90-91</td>
</tr>
<tr>
<td>B+, B, B-</td>
<td>87-89, 83-86, 80-82</td>
</tr>
<tr>
<td>C+, C, C-</td>
<td>77-79, 73-76, 70-72</td>
</tr>
<tr>
<td>D+, D, D-</td>
<td>67-69, 63-66, 60-62</td>
</tr>
<tr>
<td>F</td>
<td>&lt;60</td>
</tr>
<tr>
<td>Week</td>
<td>Topic/Activity</td>
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<tr>
<td>------</td>
<td>----------------------------------------------------</td>
</tr>
<tr>
<td>1</td>
<td>Introductions and Expectations</td>
</tr>
<tr>
<td>2</td>
<td>Topic selection</td>
</tr>
<tr>
<td>3</td>
<td>Scientific literature – searching and types</td>
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<td></td>
<td>Academic integrity and avoiding plagiarism</td>
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<tr>
<td>4</td>
<td>Reading and analyzing primary sources</td>
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<td></td>
<td>Oral presentation guidance</td>
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<td>5</td>
<td>Developing rhetorical goals</td>
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<td></td>
<td>Constructive peer review – oral presentation</td>
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<td>6</td>
<td>Reading to write – Analysis of primary literature</td>
</tr>
<tr>
<td>7</td>
<td>Reading to write – Analysis of primary literature</td>
</tr>
<tr>
<td>8</td>
<td>Reading to write – Analysis of primary literature</td>
</tr>
<tr>
<td>9</td>
<td>Content organization</td>
</tr>
<tr>
<td>10</td>
<td>Poster presentation format</td>
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<tr>
<td></td>
<td>Constructive peer review – written presentation</td>
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<tr>
<td></td>
<td><strong>Draft Paper Due</strong></td>
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<tr>
<td>11</td>
<td>Oral presentations of final projects</td>
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<tr>
<td>12</td>
<td>Oral presentations of final projects</td>
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<tr>
<td>13</td>
<td>Oral presentations of final projects</td>
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<tr>
<td>14</td>
<td>Final discussion</td>
</tr>
<tr>
<td>15</td>
<td><strong>Formal Poster Presentations</strong></td>
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<tr>
<td></td>
<td><strong>Final Paper Due</strong></td>
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</tbody>
</table>
BIOL 49100 – Senior Biology Seminar
IPFW General Education – Category C (8): Capstone

IPFW Student Learning Outcomes: 8.1-8.4

8.1. Produce an original work involving the creation or application of knowledge, performance or service.

8.2. Report the results of original work through a discipline-appropriate product.

These two learning outcomes are inter-related and will be assessed together.

Course Learning Activities: Students will produce an original work by conducting a research project based on: 1) novel data collected in a laboratory or field investigation or 2) a synthesis of primary literature to address a biological question of interest. The results of the project will be presented in oral and written form following the professional conventions of the discipline. Through discussion, oral presentation, written drafts and peer review students will further develop their skill in biological research.

Assessment Activities and Strategies: The research projects will be evaluated for content and style in the student’s written and oral presentation. Rubrics will be used that assess the development of a coherent question or hypothesis, critical analysis of the quality of evidence, and effective presentation and synthesis of relevant evidence. Student work will also be evaluated on adherence to discipline standards in oral and written presentation, and proper citation and referencing of scientific literature.

Evidence of Student Learning and Improvement Plan: Written and oral presentations will be evaluated by multiple raters to prevent bias in assessment. Rubric scores will be averaged per student and compiled for the class. Scores will be evaluated for rubric categories and overall for both the written and oral presentation. Class scores below 70% in categories will trigger reform of learning activities.

8.3. Demonstrate a high level of personal integrity and professional ethics by understanding the ethical responsibilities related to the profession associated with the subject of the capstone project.

Course Learning Activities: The project paper and presentation are expected to meet university and professional standards for academic honesty. Avoidance of plagiarism and the proper citation and referencing of the work of others will be emphasized in the development of the project. Students will complete an assignment that explores different forms of plagiarism, and use discipline standards for references and citations in their oral and written presentations.
Assessment Activities and Strategies: Use of references and citations will be evaluated in written paper and oral presentation.

Evidence of Student Learning and Improvement Plan: Elements of the rubric tied to proper referencing and citation will be assessed following the protocol described for learning outcomes 8.1 and 8.2.

8.4. Demonstrate critical-thinking abilities and familiarity with quantitative and/or qualitative reasoning.

Course Learning Activities: Critical thinking is fundamental to the development and completion of the research project. Students will use critical thinking in assessing the quality of research results in the primary literature, relating studies with one another, and constructing an argument to address their question or hypothesis. Both quantitative and qualitative reasoning are inherent in scientific research and will be employed in carrying out the project.

Assessment Activities and Strategies: Students will be evaluated in critical thinking through the project tasks described above and the relevant aspects of the rubric used for learning outcomes 8.1 and 8.2. Critical thinking will also be assessed through presentation of a detailed analysis of a scientific paper and peer evaluation.

Evidence of Student Learning and Improvement Plan: Elements of the rubric tied to critical thinking will assessed following the protocol described for learning outcomes 8.1 and 8.2.
## Evaluation Rubric: Senior Seminar Paper

<table>
<thead>
<tr>
<th>Points possible</th>
<th>Learning Outcomes</th>
<th>Paper contents and characteristics</th>
<th>Excellent</th>
<th>Good</th>
<th>Weak</th>
<th>Incomplete</th>
<th>Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>8.1 Title and Abstract</td>
<td>Describes paper content concisely, adequately, appropriately effectively</td>
<td>5</td>
<td>3-4</td>
<td>2</td>
<td>0-1</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>8.1 Introduction</td>
<td>Explains why this topic is of interest, effectively defines the research problem and states the research question/hypothesis to be tested</td>
<td>9-10</td>
<td>6-8</td>
<td>3-5</td>
<td>0-2</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>8.1 Body</td>
<td>Major sections are organized in a logical pattern, builds a logical argument of relevance to the research question, graphical representation of data in the form of graphs and tables that test the hypothesis examined</td>
<td>13-15</td>
<td>9-12</td>
<td>6-8</td>
<td>0-5</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>8.1 Conclusion</td>
<td>Links answer of research question to solution of problem, convincingly describes what has been learned in the study, summarizes major points that support the conclusion concerning the hypothesis tested</td>
<td>5</td>
<td>3-4</td>
<td>2</td>
<td>0-1</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>8.3 Citations and references</td>
<td>Appropriate documentation of ideas and content from the primary sources, proper format is adhered to in citation and listing of references</td>
<td>9-10</td>
<td>6-8</td>
<td>3-5</td>
<td>0-2</td>
<td></td>
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<tr>
<td>5</td>
<td>8.2 Presentation</td>
<td>Paper is written in scientific style: clear and to the point, grammar and spelling are correct</td>
<td>5</td>
<td>3-4</td>
<td>2</td>
<td>0-1</td>
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<tr>
<td>15</td>
<td>8.4 Overall aims of the paper: the student...</td>
<td>Demonstrates the development of a thoughtful question and synthetic analysis, demonstrates critical evaluation of primary literature with respect to question and hypothesis tested</td>
<td>13-15</td>
<td>9-12</td>
<td>6-8</td>
<td>0-5</td>
<td></td>
</tr>
</tbody>
</table>

**Total**