CGS Agenda Item: 11-52
Effective: Spring 2013

Eastern Illinois University

NEW COURSE PROPOSAL

Please check one: __x_ New course ___ Revised course

PART I: CATALOG DESCRIPTION

1. **Course prefix and number, *such as ART 1000*:** PHY 5233
2. **Title (*may not exceed 30 characters, including spaces*):** Energy and the Environment
3. **Long title, if any (*may not exceed 100 characters, including spaces*):**
4. **Class hours per week, lab hours per week, and credit [*e.g., (3-0-3)*]:** 3-0-3
5. **Term(s) to be offered:** ___ Fall __x_ Spring ___ Summer ___ On demand
6. **Initial term of offering:** ___ Fall __x_ Spring ___ Summer **Year:** _2013_____
7. **Course description:** This course will delve into various forms of energy production for the modern world with emphasis given to the physical principles involved. The environmental consequences of energy use in its various forms will be studied. Renewable sources of energy will be considered as well as fossil fuels and nuclear fuels.

8. **Registration restrictions:**
   a. **Equivalent Courses**
      - **Identify any equivalent courses** (e.g., cross-listed course, non-honors version of an honors course).
      - Indicate whether coding should be added to Banner to restrict students from registering for the equivalent course(s) of this course. ___ Yes ___ No

   b. **Prerequisite(s)**
      - **Identify the prerequisite(s),** including required test scores, courses, grades in courses, and technical skills. Indicate whether any prerequisite course(s) MAY be taken concurrently with the proposed/revised course.

        Admission to the Multidisciplinary MS in Sustainable Energy Graduate Program or permission of Physics Department Chair

      - Indicate whether coding should be added to Banner to prevent students from registering for this course if they haven't successfully completed the prerequisite course(s). ___ Yes ___ No

        If yes, identify the minimum grade requirement and any equivalent courses for each prerequisite course:

   c. **Who can waive the prerequisite(s)?**
      ___ No one __x_ Chair ___ Instructor ___ Advisor ___ Other (Please specify)

   d. **Co-requisites** (course(s) which MUST be taken concurrently with this one):

   e. **Repeat status:** _x__ Course may not be repeated.

      ___ Course may be repeated once with credit.

      Please also specify the limit (if any) on hours which may be applied to a major or minor.

f. Degree, college, major(s), level, or class to which registration in the course is restricted, if any:
Degree seeking students in the MS in Sustainable Energy Program.

g. Degree, college, major(s), level, or class to be excluded from the course, if any:

9. Special course attributes [cultural diversity, general education (indicate component), honors, remedial, writing centered or writing intensive]

10. Grading methods (check all that apply): __**x**_ Standard letter ___ CR/NC ___ Audit ___ ABC/NC ("Standard letter"—i.e., ABCDF--is assumed to be the default grading method unless the course description indicates otherwise.)

Please check any special grading provision that applies to this course:

___ The grade for this course will not count in a student's grade point average.

___ The credit for this course will not count in hours towards graduation.

If the student already has credit for or is registered in an equivalent or mutually exclusive course, check any that apply:

___ The grade for this course will be removed from the student's grade point average if he/she already has credit for or is registered in _____ (insert course prefix and number).

___ Credit hours for this course will be removed from a student's hours towards graduation if he/she already has credit for or is registered in _____ (insert course prefix and number).

11. Instructional delivery method: (Check all that apply.)

__**x**_ lecture ___ lab ___ lecture/lab combined ___ independent study/research
___ internship ___ performance ___ practicum or clinical ___ study abroad
__x_ Internet ___ hybrid ___ other (Please specify)

PART II: ASSURANCE OF STUDENT LEARNING

1. List the student learning objectives of this course:

A. Discuss various forms of energy production.
B. Analyze thermodynamic variables and properties and solve related problems.
C. Interpret graphical representations of heat engines.
D. Identify techniques for optimal production of wind energy, solar energy, fossil fuel energy, geothermal energy, and nuclear energy.
E. Evaluate the impact of energy demand on the global environment.
F. Synthesize perspectives on global warming and the relationship to energy use.

a. If this is a general education course, indicate which objectives are designed to help students achieve one or more of the following goals of general education and university-wide assessment:

- **EIU graduates will write and speak effectively.**
- **EIU graduates will think critically.**
- **EIU graduates will function as responsible citizens.**

b. If this is a graduate-level course, indicate which objectives are designed to help students achieve established goals for learning at the graduate level:

- **Depth of content knowledge A,B,C,D,E**
- **Effective critical thinking and problem solving B,C,E**
- **Effective oral and written communication A, D, E, F**
- **Advanced scholarship through research or creative activity**

2. Identify the assignments/activities the instructor will use to determine how well students attained the learning objectives:

Learning Objectives	Homework assignments	Tests	Paper	Final Exam
Discuss various forms of energy production.	X	X	X	X
Analyze thermodynamic variables and properties and solve related problems.	X	X	X	X
Interpret graphical representations of heat engines.	X	X	X	X
Identify techniques for optimal production of wind energy, solar energy, fossil fuel energy, geothermal energy, and nuclear energy.	X	X	X	X
Evaluate the impact of energy demand on the global environment.	X	X	X	X
Synthesize perspectives on global warming and the relationship to energy use.	X	X	X	X

3. **Explain how the instructor will determine students' grades for the course:**

   The following grading scale will apply: 90-100% = A; 80-89% = B; 70-79% = C; 60-69% = D; 59% or less = F. The percentages could possibly be lowered (but not raised) based on a curve which takes into account exam difficulty.

Homework assignments 15 %

Tests and Quizzes 45 %

Paper 20%

Final Exam 20%

4. **For technology-delivered and other nontraditional-delivered courses/sections, address the following:**
   a. **Describe how the format/technology will be used to support and assess students' achievement of the specified learning objectives:** When taught online, this course will utilize course management software to administer quizzes, homework, and exams. There will be some synchronous discussions as well as a paper to assess depth of understanding. The paper will require research and analysis to study a related topic in depth.
   b. **Describe how the integrity of student work will be assured:** Assignments, tests, and quizzes can be accessed at certain dates and must be finished within precise time intervals (90, 120, or 150 minutes). The same assignments may present different problems to different students since some numerical questions were generated with different data sets and are offered to students on a random basis. Turnitin will be used to assure the integrity of work on the paper. The syllabus clearly states the academic integrity expectations.
   c. **Describe provisions for and requirements of instructor-student and student-student interaction, including the kinds of technologies that will be used to support the interaction (e.g., e-mail, web-based discussions, computer conferences, etc.):**
   When the course is offered online, the material will be organized in week long modules accompanied by power point notes, supplementary web links, and assignments. Instructor-student communication will be based on e-mail, telephone, and Elluminate contacts if necessary. There will be scheduled Elluminate sessions to involve all students in the discussions. The course announcements will be posted at the specifically designed "Information" link. A discussion board will be available to discuss any course curriculum topic. Students will be welcome to visit the instructor in their office.

5. **For courses numbered 4750-4999, specify additional or more stringent requirements for students enrolling for graduate credit. These include:**
   a. **course objectives;**
   b. **projects that require application and analysis of the course content; and**
   c. **separate methods of evaluation for undergraduate and graduate students.**

6. **If applicable, indicate whether this course is writing-active, writing-intensive, or writing-centered, and describe how the course satisfies the criteria for the type of writing course identified. (See Appendix *.)**

PART III: OUTLINE OF THE COURSE

Provide a week-by-week outline of the course's content. Specify units of time (e.g., for a 3-0-3 course, 45 fifty-minute class periods over 15 weeks) for each major topic in the outline. Provide clear and sufficient details about content and procedures so that possible questions of overlap with other courses can be addressed. For technology-delivered or other nontraditional-delivered courses/sections, explain how the course content "units" are sufficiently equivalent to the traditional on-campus semester hour units of time described above.

The online version will cover the same material as the on campus version of the same course. The following is a list of the topics to be covered on a week by week basis. The topics covered are sections and chapters in the textbook and so will be easily developed as units and will require sufficient study to be equivalent to the on-campus course.

Week 1: Course Introduction and Energy and the Environment
Week 2: Global Energy Use and Supply
Week 3: Thermodynamic Principles of Energy Conversion
Week 4: Thermodynamics of Fossil, Biomass, and Synthetic Fuels
Week 5: Electrical Energy Generation, Transmission, and Storage
Week 6: Fossil-Fueled Power Plants
Week 7: Nuclear-Fueled Power Plants
Week 8: Review and Midterm Exam
Week 9: Renewable Energy – Biomass Energy
Week 10: Renewable Energy – Solar Energy
Week 11: Renewable Energy – Wind Energy
Week 12: Renewable Energy – Other Alternative Energy Sources
Week 13: Global Warming and Climate Change
Week 14: Mitigating Global Warming
Week 15: Papers, Conclusions, Wrap-up

PART IV: PURPOSE AND NEED

1. **Explain the department's rationale for developing and proposing the course.**
   This course is designed to be the basic background in the Physical Science field related to Energy Production, Usage, Impacts, and Alternatives. This will serve graduate students in the Multidisciplinary MS in Sustainable Energy. It is designed to be offered either online or on-campus.
   a. **If this is a general education course, you also must indicate the segment of the general education program into which it will be placed, and describe how the course meets the requirements of that segment.**
   b. **If the course or some sections of the course may be technology delivered, explain why.** This course is designed to be technology delivered or standard lecture delivered. It will be delivered in the way that is most appropriate for the students within the constraints of the Physics Department resources. On-line delivery could possibly be very beneficial to the graduate students that wish to take the course because they may have several constraints on their time.

2. **Justify the level of the course and any course prerequisites, co-requisites, or registration restrictions.**
   The subject matter of this course is commensurate with the interdisciplinary graduate degree program that it is designed for. Students in this graduate program will need to understand and synthesize the material in

this course in order to be fully prepared for their future careers. The depth and breadth of material in this course is appropriate for this graduate program.

3. **If the course is similar to an existing course or courses, justify its development and offering.** This course is related to the topics covered in AET 3453 Alternative and Renewable Energy Systems and AET 4453 Sustainability Topics in Energy. The list of topics covered in this course is different than the AET courses. The focus of this course is also different than the AET courses. This course focuses on the physical principles of energy production as well as the environmental impact. Those courses focus on the types of energy and their production usages. So this course is not similar to an existing course.

    a. **If the contents substantially duplicate those of an existing course, the new proposal should be discussed with the appropriate chairpersons, deans, or curriculum committees and their responses noted in the proposal.** The Physics Department has discussed the proposal with Peter Liu (who is knowledgeable in the AET courses as well as organizer of the MS in Sustainable Energy Graduate Program) and sent a draft of the proposal to Dr. Woodley (chair of AET) and they have not expressed concern.
    b. **Cite course(s) to be deleted if the new course is approved. If no deletions are planned, note the exceptional need to be met or the curricular gap to be filled.** This course is needed to properly prepare the students in the new MS program to be conversant in the issues related to energy production.

4. **Impact on Program(s):**

    a. **For undergraduate programs, specify whether this course will be required for a major or minor or used as an approved elective.**
    b. **For graduate programs, specify whether this course will be a core requirement for all candidates in a degree or certificate program or an approved elective.** This course will be a core requirement for all candidates for the Multidisciplinary MS in Sustainable Energy program.

    If the proposed course changes a major, minor, or certificate program in or outside of the department, you must submit a separate proposal requesting that change along with the course proposal. Provide a copy of the existing program in the current catalog with the requested changes noted.

PART V: IMPLEMENTATION

1. **Faculty member(s) to whom the course may be assigned:** All Graduate Physics faculty with OCDI certification may be assigned to this course in the online version. All Graduate Physics faculty can be assigned to the on-campus version.

    If this is a graduate course and the department does not currently offer a graduate program, it must document that it employs faculty qualified to teach graduate courses.
    The Physics Department is a part of the MS in Natural Sciences Graduate Program.

2. **Additional costs to students:** No

    Include those for supplemental packets, hardware/software, or any other additional instructional, technical, or technological requirements. (Course fees must be approved by the President's Council.)

3. **Text and supplementary materials to be used (Include publication dates):** James A. Fay and Dan S. Golomb, "Energy and the Environment – Scientific and Technological Principles, 2nd Ed." Oxford University Press, 2012.

PART VI: COMMUNITY COLLEGE TRANSFER

If the proposed course is a 1000- or 2000-level course, state either, "A community college course may be judged equivalent to this course" OR "A community college course will not be judged equivalent to this course." A community college course will not be judged equivalent to a 3000- or 4000-level course but may be accepted as a substitute; however, upper-division credit will not be awarded.

PART VII: APPROVALS

Date approved by the department or school: December 5, 2011

Date approved by the college curriculum committee: December 9, 2011

Date approved by CGS:

*In **writing-active courses**, frequent, brief writing activities and assignments are required. Such activities -- some of which are to be graded – might include five-minute in-class writing assignments, journal keeping, lab reports, essay examinations, short papers, longer papers, or a variety of other writing-to-learn activities of the instructor's invention. Writing assignments and activities in writing-active courses are designed primarily to assist students in mastering course content, secondarily to strengthen students' writing skills. In **writing-intensive courses**, several writing assignments and writing activities are required. These assignments and activities, which are to be spread over the course of the semester, serve the dual purpose of strengthening writing skills and deepening understanding of course content. At least one writing assignment is to be revised by the student after it has been read and commented on by the instructor. In writing-intensive courses, students' writing should constitute no less than 35% of the final course grade. In **writing-centered courses** (English 1001G, English 1002G, and their honors equivalents), students learn the principles and the process of writing in all of its stages, from inception to completion. The quality of students' writing is the principal determinant of the course grade. The minimum writing requirement is 20 pages (5,000 words).

Student Success Center		Career Services	Disability Services
http://www.eiu.edu/~success/	http://www.eiu.edu/~counsctr/	http://www.eiu.edu/~careers/	http://www.eiu.edu/~disablty/
581-6696	**581-3413**	**581-2412**	**581-6583**