Agenda Item #13-15
Effective Summer 2013

Eastern Illinois University
New Course Proposal
PHY 1010G, Sustainable Energy

Please check one: _X_ New course ___ Revised course

PART I: CATALOG DESCRIPTION

1. **Course prefix and number, *such as ART 1000*:** PHY 1010G
2. **Title (*may not exceed 30 characters, including spaces*):** Sustainable Energy
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:** _X_ Fall _X_ Spring _X_ Summer ___ On demand
6. **Initial term of offering:** ___ Fall ___ Spring _X_ Summer **Year:** _2013_
7. **Course description:** The course gives an overview of the science related to world energy needs with particular attention to those of the United States. The main methods of energy generation in modern industrial society and their impact on the environment and the economy are discussed within a scientific framework.

8. **Registration restrictions:**
   a. **Equivalent Courses**
      - **Identify any equivalent courses** (e.g., cross-listed course, non-honors version of an honors course).
        none
      - Indicate whether coding should be added to Banner to restrict students from registering for the equivalent course(s) of this course. ___ Yes _X_ 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.
        There are no prerequisites to this course.
      - 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 _X_ 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 ___ Chair ___ Instructor ___ Advisor ___ Other (Please specify)

   d. **Co-requisites** (course(s) which MUST be taken concurrently with this one):
      There are no corequisites to this course.

   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:

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] General education, Scientific Awareness – Physical Science

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:

Upon successfully completing this course, students will be able to:

1. define the energy problem of modern society in scientific terms.
2. scientifically assess & evaluate information regarding the production, efficiency, and sustainability of energy generation methods.
3. explain quantitative relationships between variables that are graphically presented or related by quantitative equations.
4. both construct and appreciate logical arguments that scientifically support the use of various methods of energy generation.
5. use the theoretical concepts of energy conservation and the laws of thermodynamics in addressing energy generation and usage.
6. calculate many physical quantities that are common to the problem of energy generation.

7. apply methods of critical thinking to make decisions regarding the responsible use and generation of energy, both on an individual basis and a societal basis.

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.** Objective 3
- **EIU graduates will think critically.** Objectives 2, 3, 4, 5, 6, 7
- **EIU graduates will function as responsible citizens.** Objectives 1, 2, 4, 7

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**
- **Effective critical thinking and problem solving**
- **Effective oral and written communication**
- **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	Final Exam
1. define the energy problem of modern society in scientific terms.	X	X	X
2. scientifically assess & evaluate information regarding the production, efficiency, and sustainability of energy generation methods	X	X	X
3. explain quantitative relationships between variables that are graphically presented or related by quantitative equations	X	X	X
4. both construct and appreciate logical arguments that scientifically support the use of various methods of energy generation	X	X	X
5. use the theoretical concepts of energy conservation and the laws of thermodynamics in addressing energy generation and usage within society	X	X	X

6. calculate many physical quantities that are common to the problem of energy generation	X	X	X
7. apply methods of critical thinking to make decisions regarding the responsible use and generation of energy, both on an individual basis and a societal basis	X	X	X

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

The following grading scale will apply: 86-100% = A; 70-85% = B; 60-69% = C; 50-59% = D; 49% or less = F.

Homework assignments: 40 %
Tests 40%
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:

The course student assessments will be based on seven homework assignments, four tests and a final exam. The students will be encouraged to actively engage in online discussions.

b. Describe how the integrity of student work will be assured:

Assignments will be accessed at certain dates and must be finished within precise time intervals (90, 120, or 150 minutes). The same assignments will present different problems to different students since some numerical questions will be generated with different data sets and will be offered to students on a random basis. Some questions will require longer written answers and comments. The syllabus will clearly cite 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.):

In addition to the traditional in-class version, the course will be offered in an online version. The material will be organized into two-week long modules accompanied by power point notes, supplementary web links, and assignments. Instructors of the traditional in-class, lecture version of the course will hold regular office hours. Online instructor-student communication will be based on email, telephone, and Skype or Elluminate contacts if necessary. The course announcements will be posted at the specifically designed "Information" link. An online discussion board will be available to discuss any course curriculum topic. On campus (or close to campus) students will be more than welcome to visit the instructor in his or her office during office hours.

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.

Weeks 1 and 2:	Energy and the Environment: Science, Technology, and Limits Work, Energy, and Power Homework 1
Weeks 3 and 4:	Consumption of Energy: Projection and Exponential Growth Efficiency of Energy Generation and Thermodynamics Homework 2 Test 1
Weeks 5 and 6:	Production and Distribution of Electricity Fossil Fuel Resources Homework 3
Weeks 7 and 8:	Environmental Effects of Utility Generating Facilities Pollution from Fossil Fuels Homework 4 Test 2
Weeks 9 and 10:	Weather and Climate Climate Change and Human Activity Homework 5
Weeks 11 and 12:	Energy from Nuclear Reactors Safety and Nuclear Energy Homework 6 Test 3

Weeks 13 and 14:	Solar, Wind, Hydro Energy Biomass Energy Homework 7
Week 15:	Energy Storage and Energy Alternatives Test 4
Week 16:	Final Exam

PART IV: PURPOSE AND NEED

1. **Explain the department's rationale for developing and proposing the course.**

   In order to increase public awareness of the necessary development of sustainable energy resources, it is beneficial for this kind of multidisciplinary course to be taught. Energy needs of modern society, as well as environmental, health, and financial issues related to energy generation will be discussed. This course is a suitable example of an Integrative Learning course.

   A technology-delivered course section provides us with the ability to reach a much wider (off campus) audience than a regular traditional in-class offering. It accommodates needs of nontraditional students (such as those already in a workplace). Use of technology for course delivery does not undermine rigorousness and integrity of our educational practice.

   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.**

   Scientific Awareness – This course will demystify the basics of science and technology of sustainable energy; it will also have sections that cover the economic, social, political, and ethical implications of energy related science and technology; finally, it will help students learn how to confront dilemmas that science and technology create.

   b. **If the course or some sections of the course may be technology delivered, explain why.**

   This course is designed to reach a wider general audience. Nontraditional students and off-campus students are the primary target audience.

2. **Justify the level of the course and any course prerequisites, co-requisites, or registration restrictions.**

   This course requires no prior knowledge of physics. It requires mathematics only at the level of simple algebra, and is therefore a freshman level course. There are no prerequisites.

3. **If the course is similar to an existing course or courses, justify its development and offering.**

   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.**

There are several courses in the catalog that address the topic of energy and sustainability:
AET 3253 Energy Technology
AET 3453, Alternative and Renewable Energy Systems
AET 4453, Sustainability Topics in Energy
AET 4873, Current Trends in Energy Technology
These courses address this material at the level appropriate for upper-division majors in the AET department, while this course is a freshman-level general education course. The Chair of the AET Department has been consulted and agrees that the proposed course is not equivalent

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 will fill a need for public awareness of the issues related to sustainable energy. Our students will find it interesting and current and it will help to keep scientific awareness alive and vital in our curriculum.

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.

This course is not required for any major.

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.

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: Nenad Ilic and other Physics Department faculty

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.

2. Additional costs to students:

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.)

There are no additional costs to students.

3. **Text and supplementary materials to be used (Include publication dates):**

Textbook:

G.J. Aubrecht, "Energy Physical, Environmental, and Social Impact", Pearson 2006, ISBN 0-13-093222-1.

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.

A community college course may be judged equivalent to this course.

PART VII: APPROVALS

Date approved by the department or school: January 8, 2013

Date approved by the college curriculum committee: January 18, 2013

Date approved by CAA: January 31, 2013

*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).