

RECEIVED

MAY 16 2013

OFFICE OF THE
SENATE COUNCIL

1. General Information

1a. Submitted by the College of: ARTS & SCIENCES

Date Submitted: 5/17/2013

1b. Department/Division: Physics And Astronomy

1c. Contact Person

Name: Kwok-Wai Ng

Email: kwng@uky.edu

Phone: 7-1782

Responsible Faculty ID (if different from Contact)

Name:

Email:

Phone:

1d. Requested Effective Date: Semester following approval

1e. Should this course be a UK Core Course? Yes

Inquiry - Nat/Math/Phys Sci

2. Designation and Description of Proposed Course

2a. Will this course also be offered through Distance Learning?: No

2b. Prefix and Number: PHY 130

2c. Full Title: Science and Technology for the Future

2d. Transcript Title:

2e. Cross-listing:

2f. Meeting Patterns

LECTURE: 3

2g. Grading System: Letter (A, B, C, etc.)

2h. Number of credit hours: 3

2i. Is this course repeatable for additional credit? No

If Yes: Maximum number of credit hours:

If Yes: Will this course allow multiple registrations during the same semester?

2j. Course Description for Bulletin: This course will explore the energy issues of today and tomorrow, including where the energy of the future will come from, energy independence, global warming, nuclear power, the potential of renewable energy sources, and the future of coal, showing how these are affected by history, geography, politics, technology, and the laws of physics and economics.

2k. Prerequisites, if any:

2l. Supplementary Teaching Component:

3. Will this course taught off campus? **No**

If YES, enter the off campus address:

4. Frequency of Course Offering: **Spring,**

Will the course be offered every year?: **Yes**

If No, explain:

5. Are facilities and personnel necessary for the proposed new course available?: **Yes**

If No, explain:

6. What enrollment (per section per semester) may reasonably be expected?: **30**

7. Anticipated Student Demand

Will this course serve students primarily within the degree program?: **No**

Will it be of interest to a significant number of students outside the degree pgm?: **Yes**

If Yes, explain: **[var7InterestExplain]**

8. Check the category most applicable to this course: **Relatively New – Now Being Widely Established,**

If No, explain:

9. Course Relationship to Program(s).

a. Is this course part of a proposed new program?: **No**

If YES, name the proposed new program:

b. Will this course be a new requirement for ANY program?: **No**

If YES, list affected programs:

10. Information to be Placed on Syllabus.

a. Is the course 400G or 500?: **No**

b. The syllabus, including course description, student learning outcomes, and grading policies (and 400G-/500-level grading differentiation if applicable, from **10.a** above) are attached: **Yes**

Distance Learning Form

Instructor Name:

Instructor Email:

Internet/Web-based: No

Interactive Video: No

Hybrid: No

1. How does this course provide for timely and appropriate interaction between students and faculty and among students? Does the course syllabus conform to University Senate Syllabus Guidelines, specifically the Distance Learning Considerations?

2. How do you ensure that the experience for a DL student is comparable to that of a classroom-based student's experience? Aspects to explore: textbooks, course goals, assessment of student learning outcomes, etc.

3. How is the integrity of student work ensured? Please speak to aspects such as password-protected course portals, proctors for exams at interactive video sites; academic offense policy; etc.

4. Will offering this course via DL result in at least 25% or at least 50% (based on total credit hours required for completion) of a degree program being offered via any form of DL, as defined above?

If yes, which percentage, and which program(s)?

5. How are students taking the course via DL assured of equivalent access to student services, similar to that of a student taking the class in a traditional classroom setting?

6. How do course requirements ensure that students make appropriate use of learning resources?

7. Please explain specifically how access is provided to laboratories, facilities, and equipment appropriate to the course or program.

8. How are students informed of procedures for resolving technical complaints? Does the syllabus list the entities available to offer technical help with the delivery and/or receipt of the course, such as the Information Technology Customer Service Center (<http://www.uky.edu/UKIT/>)?

9. Will the course be delivered via services available through the Distance Learning Program (DLP) and the Academic Technology Group (ATL)? NO

If no, explain how student enrolled in DL courses are able to use the technology employed, as well as how students will be provided with assistance in using said technology.

10. Does the syllabus contain all the required components? NO

11. I, the instructor of record, have read and understood all of the university-level statements regarding DL.

Instructor Name:

SIGNATURE|MJCAVA1|Michael J Cavagnero|Dept approval for ZCOURSE_NEW PHY 130|20120918

SIGNATURE|RHANSON|Roxanna D Hanson|College approval for ZCOURSE_NEW PHY 130|20120918

SIGNATURE|RHANSON|Roxanna D Hanson|Subworkflow for GenEd Expert review|20121025

SIGNATURE|REBEAT1|Ruth E Beattie|UKCEC Expert review ZCOURSE_NEW PHY 130|20121025

SIGNATURE|REBEAT1|Ruth E Beattie|UKCore approval for ZCOURSE_NEW PHY 130|20130502

SIGNATURE|JMETT2|Joanie Ett-Mims|Undergrad Council approval for ZCOURSE_NEW PHY 130|20130502

General Education Course Approval Cover Sheet

Date of Submission 8/18/2012

1. Check which area(s) this course applies to

- | | | | |
|----------------------------------|-------------------------------------|--|--------------------------|
| Inquiry – Arts & Creativity | <input type="checkbox"/> | Composition & Communications - II | <input type="checkbox"/> |
| Inquiry – Humanities | <input type="checkbox"/> | Quantitative Foundations | <input type="checkbox"/> |
| Inquiry – Nat/Math/Phys Sci | <input checked="" type="checkbox"/> | Statistical Inferential Reasoning | <input type="checkbox"/> |
| Inquiry – Social Sciences | <input type="checkbox"/> | U.S. Citizenship, Community, Diversity | <input type="checkbox"/> |
| Composition & Communications - I | <input type="checkbox"/> | Global Dynamics | <input type="checkbox"/> |

2. Provide Course and Department Information.

Department: PHYSics and Astoronomy

Course Prefix and Number: PHY130 Credit hours: 3

Course Title: Physics of Energy

Expected # of Students per Calendar Yr: 30 Course Required for Majors in your Program (check one)? Yes No

Prerequisite(s) for Course? 221

This request is for (check one) A New Course An Existing Course

Departmental Contact Information

Name: Kwok-Wai Ng Email: kwng@uky.edu

Office Address: CP 171 Phone: 7-17582

3. In addition to this form, the following must be submitted for consideration:

- A syllabus that conforms to the Senate Syllabi Guidelines, including a mapping of the stated learning outcomes to those presented on the corresponding Course Template.
- A completed Course Review Form. See the Gen Ed website <http://www.uky.edu/gened/forms.html> for these forms. Proposals prepared prior to September 15th, 2010 are allowed to use a narrative instead of the Course Review Form.
- If applicable, a major course change form for revision of an existing course, or a new course form for a new course.

4. Signatures

Department Chair: _____ Date: _____

Dean: _____ Date: _____

All proposals are to be submitted from the College Dean's Office
Submission is by way of the General Education website <http://www.uky.edu/gened>

**Course Review Form
Inquiry in the Natural/Mathematical/Physical Sciences**

Reviewer Recommendation

Accept Revisions Needed

Course: PHY 130 Science and Technology for the Future

Using the course syllabus as a reference, identify when and how the following learning outcomes are addressed in the course. Since learning outcomes will likely be addressed multiple ways within the same syllabus, please identify a representative example (or examples) for each outcome.

Course activities that enable students to demonstrate an understanding of methods of inquiry that lead to scientific knowledge and distinguish scientific fact from pseudoscience.

Example(s) from syllabus:

This course will discuss the theory of global warming, the safety of nuclear power, the future of coal, the claim that we have used up half of the world's oil, and alternative energy schemes that include perpetual motion machines.

Brief Description:

One of the major goals for the course is to explain to the students not just what we know but how we know it, in contexts in which there is ongoing dispute over the science. There are dozens of web sites that claim that the global warming issue is pseudoscience or even a hoax; I plan to have the students read a selection of the criticisms. There are many issues where scientists disagree, and it's useful to look at these to see how observation turns into consensus (or even "scientific fact").

Course activities that enable students to demonstrate an understanding of the fundamental principles in a branch of science.

Example(s) from syllabus:

Pervasive throughout the course

Brief Description:

The First and Second Laws of Thermodynamics are truly fundamental, globally relevant principles, and arguably something that every college graduate should know about. It is impossible to discuss the energy issues without understanding these, because they place fundamental constraints on what can be done. The First Law says that energy is conserved (so there should be no energy problem) but the Second Law says that there is a one-way process of turning useful, concentrated energy into heat (useless energy, in random form and diluted throughout a system).

Course activities that enable students to demonstrate the application of fundamental principles to interpret and make predictions in that branch of science.

Example(s) from syllabus:

Pervasive throughout

Brief Description:

The concept of this course is to teach enough of the fundamental principles to make the many energy issues comprehensible, and then discuss them. The application/interpretation/prediction cycle will be ever-present. One of the assignments is to do a web search to describe and evaluate some way of storing energy – batteries, capacitors, flywheels, caves full of compressed air, and pumping water up mountains were mentioned by one student or another. Interpretation and prediction are at the heart of many of the energy issues.

Course activities that enable students to demonstrate their ability to discuss how at least one scientific discovery changed the way scientists understand the world.

Example(s) from syllabus:

The issues discussed in this course are not just changing the way scientists understand the world, they are changing the world itself. Imagine a world without electric power (which we had, just 120 years ago)! The headlines are about the implications of the global warming theory for the future of coal, and about the wisdom of building nuclear power plants.

Brief Description:

The laws of thermodynamics fit this description; the theory of the atmospheric "greenhouse" effect is another. The segment on nuclear power contains a lecture on nuclear physics, which (along with the atomic hypothesis and Mendeleev's Periodic Table) is a cornerstone of our understanding of what matter is.

Course activities that enable students to demonstrate their ability to discuss the interaction of science with society.

Example(s) from syllabus:

Pervasive throughout the syllabus

Brief Description:

*The regulations being imposed on coal mining have their bases in trying to prevent pollution and improve safety and health. There is a "science" basis for what is being done. According to some members of society, this is a "war on coal." This interaction of science and society will definitely be discussed.

*The course will discuss biofuels. Twenty percent of last year's US corn crop was used to make a gasoline substitute. Some people claim this caused food shortages in the third world. Others claim that the amount of fuel produced was hardly greater than the amount of oil used to grow the corn.

*Science meets society: nuclear power!

A hands-on student project is required. This project enables students to demonstrate their ability to conduct a scientific project using scientific methods that include design, data collection, analysis, summary of the results, conclusions, alternative approaches, and future studies. Describe the required student product (paper/ laboratory report) based on the hands-on project.

I have the students design and perform a measurement that determines the amount of solar power arriving at a square meter of ground in Lexington. There are many ways to do this – determining how rapidly the sun warms something, or how fast it melts ice, or comparing the brightness of sunlight to a known light source, or measuring the solar power collected by a photovoltaic device. There are many variants of the methods. The student picks the general approach, and the design is perfected in an dialog in which I ask questions about the design (this is where the "alternative approaches" get discussed). I provide the needed equipment. The focus is not on getting The Right Answer, but on thinking through what is involved in making a meaningful measurement.

Course activities that demonstrate the integration of information literacy into the course.

Example(s) from syllabus:

Many of the homework assignments will be web searches, or involve finding a relevant discussion of a current issue.

Brief Description:

This is a subject which changes very rapidly. The course was offered (as USP 100) in spring 2010 and spring 2011. Near the end of the first offering the Deepwater Horizon sank; during the second offering we had the Japanese nuclear power plant event. Energy topics are in the news all the time, and frequent topics of op-eds. The result is that a lot of the information is only available on the internet, implying in turn that the students will have to know (or be shown) how to find it and interpret it.

Reviewer's Comments

Courses	Request Tracking
----------------	-------------------------

New Course Form

https://myuk.uky.edu/sap/bc/soap/rfc?services=

[Open in full window to print or save](#)

Generate R

Attachments:

Upload File

	ID	Attachment
Delete	792	About this new course proposal.pdf
Delete	793	General Education Course Approval Cover Sheet.pdf
Delete	794	GenEd - Intellectual Inquiry Natural Physical Math

Select saved project to retrieve... Get New

(*denotes required fields)

1. General Information

- a. * Submitted by the College of: ARTS & SCIENCES Today's Date: 5/17/2013
- b. * Department/Division: Physics And Astronomy
- c.
 - * Contact Person Name: Kwok-Wai Ng Email: kwng@uky.edu Phone: 7-1782
 - * Responsible Faculty ID (if different from Contact) Email: Phone:
- d. * Requested Effective Date: Semester following approval OR Specific Term/Year ¹
- e. Should this course be a UK Core Course? Yes No
 If YES, check the areas that apply:
 - Inquiry - Arts & Creativity Composition & Communications - II
 - Inquiry - Humanities Quantitative Foundations
 - Inquiry - Nat/Math/Phys Sci Statistical Inferential Reasoning
 - Inquiry - Social Sciences U.S. Citizenship, Community, Diversity
 - Composition & Communications - I Global Dynamics

2. Designation and Description of Proposed Course.

- a. * Will this course also be offered through Distance Learning? Yes ¹ No
- b. * Prefix and Number: PHY 130
- c. * Full Title: Science and Technology for the Future
- d. Transcript Title (if full title is more than 40 characters):
- e. To be Cross-Listed ² with (Prefix and Number):
- f. * Courses must be described by at least one of the meeting patterns below. Include number of actual contact hours ³ for each meeting pattern type.

<input type="text" value="3"/> Lecture	<input type="text"/> Laboratory ⁴	<input type="text"/> Recitation	<input type="text"/> Discussion
<input type="text"/> Indep. Study	<input type="text"/> Clinical	<input type="text"/> Colloquium	<input type="text"/> Practicum
<input type="text"/> Research	<input type="text"/> Residency	<input type="text"/> Seminar	<input type="text"/> Studio
<input type="text"/> Other If Other, Please explain:			
- g. * Identify a grading system: Letter (A, B, C, etc.) Pass/Fail Graduate School Grade Scale
- h. * Number of credits:
- i. * Is this course repeatable for additional credit? Yes No
 If YES: Maximum number of credit hours:
 If YES: Will this course allow multiple registrations during the same semester? Yes No

j. * Course Description for Bulletin:

This course will explore the energy issues of today and tomorrow, including where the energy of the future will come from, energy independence, global warming, nuclear power, the potential of renewable energy sources, and the future of coal, showing how these are affected by history, geography, politics, technology, and the laws of physics and economics.

k. Prerequisites, if any:

l. Supplementary teaching component, if any: Community-Based Experience Service Learning Both

3. * Will this course be taught off campus? Yes No

If YES, enter the off campus address:

4. Frequency of Course Offering.

a. * Course will be offered (check all that apply): Fall Spring Summer Winter

b. * Will the course be offered every year? Yes No

If No, explain:

5. * Are facilities and personnel necessary for the proposed new course available? Yes No

If No, explain:

6. * What enrollment (per section per semester) may reasonably be expected? 30

7. Anticipated Student Demand.

a. * Will this course serve students primarily within the degree program? Yes No

b. * Will it be of interest to a significant number of students outside the degree pgm? Yes No

If YES, explain:

This is a GenEd course targets at non-physics major students. The topic and contents related to technology and social issues should be interesting to this student body.

8. * Check the category most applicable to this course:

Traditional – Offered in Corresponding Departments at Universities Elsewhere

Relatively New – Now Being Widely Established

Not Yet Found in Many (or Any) Other Universities

9. Course Relationship to Program(s).

a. * Is this course part of a proposed new program? Yes No

If YES, name the proposed new program:

b. * Will this course be a new requirement ^sfor ANY program? Yes No

If YES ^s, list affected programs::

10. Information to be Placed on Syllabus.

a. * Is the course 400G or 500? Yes No

If YES, the *differentiation for undergraduate and graduate students must be included* in the information required in 10.b. You must include: (i) identify additional assignments by the graduate students; and/or (ii) establishment of different grading criteria in the course for graduate students. (See SR

b. * The syllabus, including course description, student learning outcomes, and grading policies (and 400G-/500-level grading differentiation if applicable above) are attached.

- Courses are typically made effective for the semester following approval. No course will be made effective until all approvals are received.
- The chair of the cross-listing department must sign off on the Signature Routing Log.
- In general, undergraduate courses are developed on the principle that one semester hour of credit represents one hour of classroom meeting per week for a semester, exclusive of any laboratory meeting. Laboratory meeting, generally, represents two hours per week for a semester for one credit hour. (from SR 5.2.1)
- You must also submit the Distance Learning Form in order for the proposed course to be considered for DL delivery.
- In order to change a program, a program change form must also be submitted.

Rev 8/09

[Submit as New Proposal](#) [Save Current Changes](#)

About this new course proposal:

The Physics and Astronomy Department is planning to offer three 100 level GenEd courses, with enrollment of about 30 students for each course. This proposed new course – PHY130 Physics of Energy – is one of the courses in this plan. This course mostly addresses physics and its relationship with modern technologies and current social issues.

Professor has conducted this GenEd course as a trial for two or three times as an A&S100 and USP100 course. The UPCC proposed this new course after thorough discussion and the proposal was approved by the general faculty in a faculty meeting on April 2, 2012.