

Winona State University

Office of the Provost Interoffice Memo

To: Andrew Ferstl, Department Chairperson

From: Pat Rogers, Provost & Vice President for Academic Affairs



Re: Undergraduate Course

Date: 11/13/2013

cc: Charla Miertschin, Dean
Lori Beseler, Registrar's Office
Darrel Downs, IFO Union President
Timothy Comes, Student Senate President
Kristi Ziegler, University Center Rochester
Pat Paulson, A2C2 Chair
Rita Raho-Gilchrest, GEP Program Director

This is to inform you I have approved the following:

DEPARTMENT: **Physics**

COURSE NUMBER: 141

COURSE: **Physics For Future Presidents**

APPROVED FOR: Undergraduate Course

Notes: 3 credit hours. Grade Only. Offered each semester. Starts Fall 2014.

09461102

WINONA STATE UNIVERSITY
NEW AND REVISED COURSE AND PROGRAM APPROVAL FORM

Routing form for new and revised courses and programs.

Course or Program Physics 141

Department Recommendation

Andrew S Ferstl
Department Chair

2013-09-25
Date

aferstl@winona.edu
e-mail address

Dean's Recommendation ☒ Yes ☐ No*

Charles Smitschke
Dean of College

10/1/13
Date

*The dean shall forward their recommendation to the chair of the department, the chair of A2C2, and the Vice President for Academic Affairs.

A2C2 Recommendation ☒ Approved ☐ Disapproved

[Signature]
Chair of A2C2

10/23/13
Date

Graduate Council Recommendation ☐ Approved ☐ Disapproved
(if applicable)

Chair of Graduate Council Date

Director of Graduate Studies Date

Faculty Senate Recommendation ☒ Approved ☐ Disapproved

[Signature]
President of Faculty Senate

11/12/13
Date

Academic Vice President Recommendation ☒ Approved ☐ Disapproved

[Signature]
Academic Vice President

11-15-13
Date

Decision of President ☐ Approved ☐ Disapproved

President Date

Please forward to Registrar.

Registrar _____
Date entered

Please notify department chair via e-mail that curricular change has been recorded.

5/17/13 C 823 10/16/13

WINONA STATE UNIVERSITY

PROPOSAL FOR A NEW COURSE

This form is to be used to submit a proposal for a new undergraduate or graduate course. Every item on this form must be completed prior to submission to A2C2. The department proposing a new course must include a **Financial and Staffing Data Sheet** and a **New and Revised Course and Program Approval Form** with the department chairperson's and Dean's signatures. Refer to Regulation 3-4, **Policy for Changing the Curriculum**, for complete information on submitting proposals for curricular changes.

Department Physics

Date 2013-09-25

141
Course No.

Physics For Future Presidents
Course Title

03
Credits*

This proposal is for a(n): ☒ Undergraduate Course ☐ Graduate Course

Is this course for USP? ☐ Yes** ☐ No Is this course for GEP? ☒ Yes** ☐ No

List all Major Codes to which this proposal applies as a required course:

None

List all Major Codes to which this proposal applies as an elective course:

None

List all Minor Codes to which this proposal applies as a required course:

None

List all Minor Codes to which this proposal applies as an elective course:

None

Prerequisites None

Grading method ☐ Grade only ☐ P/NC only ☒ Grade and P/NC Option

Frequency of offering Each Semester

What semester do you anticipate that will this course be offered for the first time? Fall 2014

Note: The approval process for a new course typically takes at least four to six weeks

* If this course will change the number of credits for any major or minor, the form **Proposal for a Revised Program** must also be submitted and approved according to the instructions on that form.

For General Education Program (GEP) or University Studies (USP) course approval, the form **Proposal for General Education Courses or **Proposal for University Studies Courses** must also be completed and submitted according to the instructions on that form.

Please provide all of the following information:

(Note: a syllabus or other documentation may not substitute for this)

A. Course Description

1. Description of the course as it will appear in the WSU catalog, including the credit hours, any prerequisites, and the grading method. If the course can be repeated, indicate the maximum number of credit hours for which this can be done.

This course focuses on the current physics and technology that shape our world today so that classroom participants can make informed economic, social, and political decisions in areas such as energy, terrorism, climate change, technology, and other relevant topics. Even if you are not a future president, this course is still for you.

2. Course outline of the major topics, themes, subtopics, etc., to be covered in the course. This outline should be, at a minimum, a two-level outline, i.e., consisting of topics and subtopics. This information will be submitted to MnSCU by the WSU Registrar's office.

1. Energy and Power and the Physics of Explosions
 - a. Types of Energy
 - b. Units of Energy

- c. Sources of Energy, Overview
- d. Explosions and Energy
- e. Power
- 2. Atoms and Heat
 - a. Atoms and Molecules and the Meaning of Heat
 - b. Temperature and absolute zero
 - c. Law of Expansion
 - d. Laws of Thermodynamics
 - e. Efficiency
- 3. Gravity, Force, and Space
 - a. The Force of Gravity
 - b. Newton's 3rd Law
 - c. Orbiting Earth and Weightlessness
 - d. Escape to Infinity
 - e. Air Resistance and Fuel Efficiency
 - f. Momentum
 - g. Rockets
 - h. Airplanes, Helicopters, and Fans
 - i. Convection – Thunderstorms and Heaters
- 4. Nuclei and Radioactivity
 - a. Types of Radiation
 - b. Medical radiation
 - c. Fission
 - d. Fusion
- 5. Chain Reactions, Nuclear Reactors, and Atomic Bombs
 - a. Chain Reactions
 - b. Nuclear Weapons Basics
 - c. Nuclear Reactors
 - d. Nuclear Waste
- 6. Electricity and Magnetism
 - a. What is Electricity? What is Magnetism?
 - b. Electric Power
 - c. Electric and Magnetic Fields
 - d. Electromagnets
 - e. Electric Motors
 - f. Electric Generators
 - g. Transformers
 - h. Magnetic Levitation
 - i. AC versus DC
- 7. Waves and UFOs
 - a. What are waves
 - b. Sound
 - c. Longitudinal and Transverse waves
 - d. Waves used for communication and detection
 - e. Earthquakes
 - f. Reflection and refraction
- 8. Light
 - a. What is light
 - b. Light and technology
 - c. Color
 - d. Images
 - e. Mirrors
 - f. Lenses
 - g. Eyes
 - h. Telescopes and Microscopes
 - i. Spreading light – Diffraction
 - j. Holograms
 - k. Polarization
- 9. Invisible Light
 - a. Infrared Radiation and technology
 - b. UV – "black lights"
 - c. The Ozone Layer

- d. Electromagnetic Radiation and Spectrum
- e. Medical Imaging
- 10. Climate Change
 - a. Earth's temperature history
 - b. The greenhouse effect and greenhouse gases
 - c. Alternative energy solutions and conservation
- 11. Quantum Physics
 - a. Electron waves
 - b. Lasers
 - c. The Photoelectric Effect
 - d. Semiconductors and technology
 - e. Superconductors
 - f. Electron Microscope
 - g. Quantum Computers

3.a Instructional delivery methods utilized: (Please check all that apply).

Auditorium/Classroom: X	ITV	Online	Web Enhanced	Web Supplemented X
Laboratory:	Service Learning	Travel Study	Internship/Practicum	
Other: (Please indicate) Demonstrations and web based simulations				

3.b. MnSCU Course media codes: (Please check all that apply).

None:	3. Internet	6. Independent Study	9. Web Enhanced
1. Satellite	4. ITV Sending	7. Taped	10. Web Supplemented X
2. CD Rom	5. Broadcast TV	8. ITV Receiving	

4. Course requirements (papers, lab work, projects, etc.) and means of evaluation.

Weekly homework and textbook reading. Students are also expected to find and read one article per week on physics and technology (based on suggested sources) and submit a brief summary. There will be occasional group projects. Assessment will include attendance, the weekly homework, midterms and a final exam.

5. Course materials (textbook(s), articles, etc.).

Physics and Technology for Future Presidents by Richard A Muller. Princeton University Press, 2010. ISBN-10 0691135045. (note that this course is based on the course that Dr. Muller created and has been successfully duplicated across the nation.)

Other possible resources include but are not limited to: the science section of the New York Times, Science News, Popular Science, Scientific American, Discover, New Scientist, the Economist (www.Economist.com), and physorg.com.

6. List the student learning outcomes for this course and how each outcome will be assessed.

Learning Outcome	Assessment Method
Demonstrate understanding of scientific theories	Exam
Communicate their experimental findings, analyses, and interpretations	Project report
Evaluate societal issues from a natural science perspective, ask questions about the evidence presented, and make informed judgments about science-related topics and policies	Weekly Homework and Exams
Discern patterns and interrelationships of bio-physical and socio-cultural systems	Weekly Homework
Evaluate critically environmental and natural resource issues in light of understandings about interrelationships, ecosystems, and institutions	Project report and Exams
Articulate and defend the actions they would take on various environmental issues	Project report and Exams
Propose and assess alternative solutions to	Weekly Homework

B. Rationale

Provide a rationale for the new course. The rationale should include the following items.

1. A statement of the major focus of the course.

This course focuses on the current physics and technology that shape our world today so that classroom participants can make informed economic, social, and political decisions in areas such as energy, terrorism, climate change, technology, and other relevant topics.

2. A statement of how this course will contribute to the departmental curriculum.

This course will not be a requirement for any major or minor. It will be similar to Physics 140: Energy. Currently we offer 4 sections of Physics 140 every semester. This course will be used to replace some of those sections based on demand and instructor preference.

3. A statement of why this course is to be offered at this level (i.e. 100-, 200-, 300-, 400-, or 500-level)

This is a general education course and is intended for students of many different academic backgrounds.

4. Identification of any courses which may be dropped, if any, if this course is implemented.

As suggested in note 2 above, this course would be used to replace some of the sections of Physics 140 as required by the department.

C. Impact of This Course on Other Departments, Programs, Majors, and Minors

Provide a statement of the impact of this course on other departments, programs, majors, and minors.

1. Clearly state the impact of this course on courses taught in other departments. Does this course duplicate the content of any other course? Is there any effect on prerequisites for this or any other courses?

There are no prerequisites for this course. No other courses exist that are similar to it except for Physics 140 in which there is some overlap in topics. The physics department does not believe that this course will have an impact on courses taught in other departments.

2. Would approval of this course change the total number of credits required by any major or minor of any department? If so, explain the effects which this course would have.

This course is not required for any major or minor.

3. If this course has an impact on the major or minor of any other department or program, it is the responsibility of the department submitting the course proposal to send written notification to the department(s) or program(s) affected. State clearly which other programs are affected by this proposal and whether the other departments have been notified and/or consulted. Attach letter(s) of understanding from impacted department(s).

N/A.

D. Attach to This Proposal a Completed

1. *Financial and Staffing Data Sheet*
2. *New and Revised Course and Program Approval Form*

E. Department Contact Person for this Proposal:

Andrew Ferstl
Name (please print)

457-5863
Phone

aferstl@winona.edu
e-mail address

F. Review by Department A2C2 Representative

I have reviewed this proposal and certify that it is complete


Signature of A2C2 representative

Definitions for codes in 3a and 3b:

01-Satellite:

02- CD ROM:

03- Internet: Predominately = where all, or nearly all, course activity occurs in an online environment. One to two activities may occur face-to-face in a classroom, with the maximum being two activities.

04 - ITV Sending: a course in which students are in the classroom with the instructor, other students join via interactive television technology from other geographically separate locations

05 - Broadcast TV:

06 - Independent Study: a course in which the teacher develops specialized curriculum for the student(s) based on department guidelines in the University course catalog

07 - Taped: a course in which the teacher records the lessons for playback at a later date

08 - ITV Receiving: a course in which students are not in the classroom with the teacher, other students join via interactive television technology from other geographically separate locations

09 - Web Enhanced- Limited Seat Time: For a course in which students are geographically separate from the teacher and other students for a majority of required activities. However, some on-site attendance is required. The course includes synchronous and/or asynchronous instruction.

10 - Web Supplemented- No Reduced Seat Time: For a course utilizing the web for instructional activities. Use of this code may assist your college/university in tracking courses for "smart classrooms" and/or facility usage.

WINONA STATE UNIVERSITY

FINANCIAL AND STAFFING DATA SHEET

Course or Program Physics 141

Include a Financial and Staffing Data Sheet with any proposal for a new course, new program, or revised program.

Please answer the following questions completely. Provide supporting data.

1. Would this course or program be taught with existing staff or with new or additional staff? If this course would be taught by adjunct faculty, include a rationale.

The course would be taught with existing staff. The course would be used to replace some sections of Physics 140 based on demand and instructor preference. Note that Physics 140 and 141 will be expected to have very similar enrollments and they will both satisfy Goal Areas 3 and 10 of the GEP (if approved). So, for example, currently we offer four sections of Physics 140 (Energy) every semester. If this course is approved, then in some semesters, we may offer three sections of Physics 140 and one section of Physics 141 so that the total will be the same. (or two of 140 and two of 141).

2. What impact would approval of this course/program have on current course offerings? Please discuss number of sections of current offerings, dropping of courses, etc.

See answer to last question. Physics 140 (Energy) may not be offered as much. Note that Energy is not a required course for any major or minor.

3. What effect would approval of this course/program have on the department supplies? Include data to support expenditures for staffing, equipment, supplies, instructional resources, etc.

No effect on department supplies or staffing are expected since the course is very similar to Physics 140 and will be taught in place of some of those sections.