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| 1. Course: **PHY 100** | |
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| 2. Term/Year: **Fall 2014** | |  |  |  |  |  |
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| 3. CIP CODE/10 Digit Program Code: **4008010002** | |  |  |  |  |  |
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| 4. Short Course Title: **Physics in Society - Lecture** | |  |  |  |  |  |
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| 5. Prerequisites: | |  |  |  |  |  |
| **None** |
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| 6. College: **College of Science/Mathematics** | |  |  |  |  |  |
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| 7. Department Teaching Course: **Physics & Astronomy** | |  |  |  |  |  |
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| 8. Instruction Type: **Lecture** | |  |  |  |  |  |
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| 9. Credit Hours Maximum: **3** | |  |  |  |  |  |
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| Credit Hours Minimum: **3** | |  |  |  |  |  |
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| Maximum Hours counted toward degree: **3** | |  |  |  |  |  |
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| 10. Maximum contact hours each week Fall Semester: **2** | |  |  |  |  |  |
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| 11. May this course be taken more than one time each semester? **NO** | |  |  |  |  |  |
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| 12. Grade Type: **Standard: A-F** | |  |  |  |  |  |
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| 13. Will this course require additional library resources? **NO** | |  |  |  |  |  |
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| If YES, please explain: | |  |  |  |  |  |
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| 14. Does this course replace a course on the current/previously listed inventory? **NO** | |  |  |  |  |  |
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| If YES list the prefix and number; If not applicable enter N/A: | |  |  |  |  |  |
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| 15. What is the primary reason you are proposing this course? Describe the need this new course will fill or the problem it is designed to solve. | |  |  |  |  |  |
| **The primary reason for proposing this course is to give non-science majors an opportunity to learn about science by investigating how science plays a role in current events and in our everyday lives. This course addresses the fundamental physics that one should be familiar with in order to become a well-informed world citizen. This course give students an opportunity to take a lecture and lab course that would satisfy 3 of the 6 hours required for the life and physical sciences foundational component area of the new core.** |
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| 16. Describe the place of the proposed course within your current curriculum. (Will it be elective or required? Part of a major or a minor?) | |  |  |  |  |  |
| **The course has been accepted into the core under the Life and Physical Sciences Foundation Component Area. This course can be taken by students majoring in a department outside of the College of Sciences and Mathematics and will satisfy a 3 credit hour science requirement with both lecture and lab components.** |
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| 17. How does the proposed course differ from similar courses being offered at Stephen F. Austin? | |  |  |  |  |  |
| **This course focuses on current events and topics that are not covered in similar courses at SFA. This is also the only 3 credit hour physics course in the core.** |
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| 18. Syllabus: Course Learning Goals  List course objectives; describe what students who complete the course will now or be able to do. | |  |  |  |  |  |
| **This course focuses on explaining, predicting, and describing the nature and properties of matter and energy using the scientific method. Students will develop an understanding of the most interesting and important topics in physics of the twenty-first century such as medical imaging, alternative energy sources, radioactivity and its uses, nuclear power (and waste), nuclear weapons, ballistic missile defense, global warming, and natural disasters. In order to understand these topics, students will develop critical thinking skills in order to distinguish between fact and opinion using scientific principles. These skills will also allow the student to make inferences, identify assumptions, access the reliability of a source, and recognize bias and fallacy. The topics covered involve implications of scientific principles on the physical world (e.g. global warming) and on human experiences (e.g. medical imaging such as X-rays and CAT scans).** |
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| 19. Any Other Information. | |  |  |  |  |  |
| **Like similar science courses, there are 2 contact hours for lecture and 2 contact hours for lab. The integrated lecture/lab component (PHY100) carries all 3 credit hours and the PHY100L component is 0 credit hours as required by Banner.** |
| **----Course Syllabus----** **Must accurately reflect the course syllabus. (N/A is not acceptable response)** |
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| 20. Enter course description exactly as it will appear in the general/graduation bulletin: | |  |  |  |  |  |
| **This course covers the most interesting and important topics in physics of the twenty-first century and the use of scientific skills and critical thinking in science. The course stresses conceptual understanding with applications to current events. Topics may include Green Energy, Medical Physics, Nuclear Weapons, and Global Warming. This course does not meet graduation requirements for students majoring in the College of Sciences and Mathematics. This is a three credit hour course with two hours of lecture and two hours of lab per week. Co-requisite: PHY 100L.** |
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| 21. Program Learning Outcomes  List the program learning outcomes addressed in this course as identified in the course matrix for your degree program. If your department requires a listing of all Program Learning Outcomes (PLOs) on the syllabus, please identify those that are directly taught in this course. If this is a general education core curriculum course and no PLOs are taught in this course then insert the following statement under this heading:   *This is a general education core curriculum course and no specific program learning outcomes for this major are addressed in this course.* | |  |  |  |  |  |
| **This is a general education core curriculum course and no specific program learning outcomes for this major are addressed in this course.** |
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| 22. General Education Core Curriculum Objectives/Outcomes  List the Exemplary Educational Objectives (EEOs) for this course if the course is included in the general education core curriculum. If you have reworded the EEOs as outcomes for your course, please be sure that the original intent of the EEO is retained. | |  |  |  |  |  |
| **Critical Thinking: to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information, (CO 1).**  **Communication Skills: to include effective development, interpretation and expression of ideas through written, oral and visual communication, (CO 2).**  **Empirical and Quantitative Skills: to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions, (CO 3).**  **Teamwork: to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal, (CO 4).** |
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| 23. Student Learning Outcomes  List all student learning outcomes (SLOs) for this course including the course specific student learning outcomes that support the PLOs above. In general, SLOs in a course that support the PLOs are specific and include the exact knowledge, skill or behavior taught in the course that supports the more global PLOs. For additional information on meaningful and measurable learning outcomes see the assessment resource page [http://www.sfasu.edu/assessment/index](http://www.sfasu.edu/assessment/index.asp) | |  |  |  |  |  |
| **By the end of the course, successful students will be able to:**  **1. Recognize that the world in which they exist can be described by a few natural laws, (SLO 1).**  **2. Describe natural phenomena in a conceptual manner rather than mathematically, (SLO 2).**  **3. Demonstrate skills developed in critical thinking, communication (oral and visual), empirical and quantitative analysis, and teamwork, (SLO 3. Includes COs 1, 2, 3, 4).** |
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| 24. Syllabus: Proposed Textbook/Assigned Reading Materials. | |  |  |  |  |  |
| **The text for this course is Physics for Future Presidents: The Science Behind the Headlines by Richard A. Muller. PHY 100L, the Physics 100 Laboratory, is a co-requisite and the lab manual is Interactive Physics Activities (produced by the Department of Physics and Astronomy and sold only in local bookstores).** |
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| 25. Course Requirements  Describe the major course requirements, assignments, examinations, projects. | |  |  |  |  |  |
| **Students are required to study the following chapters from the course text: 1-3 (Exam 1), 4-6 (Exam 2), 7-9 (Exam 3), 10-13 (Final Exam). (SLOs 1-2 are supported here.) Students will complete 11 laboratory exercises in the co-requisite lab and take a final exam over them at the end of the semester. (SLOs 1-3 are supported here [SLO 3 includes COs 1-4]). Homework assignments will be given eight times during the semester with two due prior to a major exam. These assignments will reinforce the material to be covered on each exam. Students must also participate in class either through the use of electronic clickers or through oral communication. (SLOs 1-3 are supported here.) There will be four major tests including the final (50 multiple choice questions per exam). Each student must provide a SCANTRON form number 882-E in order to take each test including the final. Students should become familiar with the policies on cheating and plagiarism. The Global Warming and the Greenhouse Effect Project: This project is a specially designed experiment in the co-requisite lab that will allow students to demonstrate their mastery of critical thinking skills, communication skills, empirical and quantitative skills, and teamwork skills. Unlike other experiments performed during the semester, students will (1) design part of this experiment and will (2) be given two weeks to submit a formal, detailed oral report of the experiment. They will make use of word documents and spreadsheets to complete the project. Prior to this project students will be doing experiments in the lab as members of teams of no less than three students and no more than five. They will have experienced teamwork practice for at least 6-8 weeks prior to this project. These earlier experiments will allow students to also hone their skills in critical thinking, communication, and empirical and quantitative analyses. The Global Warming and the Greenhouse Effect Project will allow students to demonstrate their critical thinking skills through the design of a simple experiment (inquiry) to determine the level of light absorption by various gases, through the collection of relevant data, and through the drawing of conclusions (evaluation and synthesis) from the results. They will do this during their regular scheduled lab time which is one hour and fifty minutes in length. The formal lab oral report associated with this project will require each student to write results and draw conclusions (oral communications) based on data tables and graphs (visual communications) produced in the exercise. Students’ empirical and quantitative skills will be demonstrated by accuracy of measurements, manipulation and analysis of numerical data, needed calculations, error analyses and informed conclusions. This project involves an experiment where successful teamwork is required to set-up and conduct the experiment. Each team member must be willing to consider other’s points of view and to work effectively with other members of the team to develop a proper experimental procedure to accomplish their goal. Data will be collected as a team. Each team member must complete the take home part of this project independently of his/her teammates.** |
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| 26. Course Calendar  Create a tentative timeline for the course. At a minimum, list the topics that the course will cover and indicate the approximate amount of time to be devoted to each, either by percent of course time or number of weeks. The calendar should provide information for the maximum number of weeks scheduled for the course. | |  |  |  |  |  |
| **All text material covered relates to SLOs 1-3. COs are individually noted.**  **Week 1:**  **Course introduction.**  **Lecture and assigned reading on critical thinking in physics (CO 1).**  **Key Energy Surprises.**  **Instructor led discussion on critical thinking (CO 1).**  **Week 2:**  **Solar Power.**  **Homework Assignment 1 due.**  **Week 3:**  **The End of Oil.**  **Lecture and instructor led discussion on oral and visual communications (CO 2).**  **Week 4:**  **Sources of Energy (Review).**  **Homework Assignment 2 due.**  **Exam 1.**    **Week 5:**  **Radioactivity in Medicine.**  **Lecture and instructor led discussion on empirical and quantitative skills (CO 3).**  **Week 6:**  **Nuclear Weapons.**  **Lecture and assigned reading on teamwork (CO 4).**  **Instructor led discussion on teamwork (CO 4).**  **Homework Assignment 3 due.**  **Week 7:**  **Nuclear Power.**  **Week 8:**  **Applications of Radioactivity (Review).**  **Homework Assignment 4 due.**  **Exam 2.**  **Week 9:**  **Space and Satellites.**  **Week 10:**  **Gravity Applications.**  **Homework Assignment 5 due.**  **Week 11:**  **Humans in Space.**  **Week 12:**  **Gravity and Space (Review).**  **Homework Assignment 6 due.**  **Exam 3.**  **Week 13:**  **Climate Change.**  **The Global Warming and the Greenhouse Effect Project begins in lab (SLO 3 and COs 1, 2, 3, 4).**  **Week 14:**  **Spying with Invisible Light.**  **Homework Assignment 7 due.**  **Week 15:**  **New Technologies.**  **Homework Assignment 8 due.**  **Week 16:**  **Final Exam Week – Exam 4.**  **Please refer to the lab syllabus for more information.** |
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| 27. Grading Policy  Describe how the grade for the course is determined. | |  |  |  |  |  |
| **Each student’s grade is based on an 800 point scale. These points come from four major exams worth 150 points each for a total of 600 points. The lab experiment average is worth 100 points. (20% of these points will come from The Global Warming and the Greenhouse Effect Project.) The lab final (given with the lecture final) is worth 100 points. This gives a total of 800 points possible in the course. The homework, class attendance and participation combine for a total of about 40 bonus points. The grading scale is 720-800 – A, 640-719 – B, 560-639 – C, 480-559 – D, 0-479 – F.** |
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| 28. Attendance Policy  State your attendance policy. | |  |  |  |  |  |
| **Students are expected to attend all lectures and all laboratory exercises. In general, absences can be excused for reasons including illness, family emergency or participation in certain university-sponsored events. Absences from exams and laboratory exercises are the only absences that require documentation. Bonus points are used to encourage class attendance.** |
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| 29. Academic Integrity (A-9.1)  Academic integrity is a responsibility of all university faculty and students. Faculty members promote academic integrity in multiple ways including instruction on the components of academic honesty, as well as abiding by university policy on penalties for cheating and plagiarism.   Definition of Academic Dishonesty Academic dishonesty includes both cheating and plagiarism. Cheating includes but is not limited to (1) using or attempting to use unauthorized materials to aid in achieving a better grade on a component of a class; (2) the falsification or invention of any information, including citations, on an assigned exercise; and/or (3) helping or attempting to help another in an act of cheating or plagiarism. Plagiarism is presenting the words or ideas of another person as if they were your own. Examples of plagiarism are (1) submitting an assignment as if it were one's own work when, in fact, it is at least partly the work of another; (2) submitting a work that has been purchased or otherwise obtained from an Internet source or another source; and (3) incorporating the words or ideas of an author into one's paper without giving the author due credit.  Please read the complete policy at <http://www.sfasu.edu/policies/academic_integrity.asp> | |  |  |  |  |  |
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| 30. Withheld Grades Semester Grades Policy (A-54)  Ordinarily, at the discretion of the instructor of record and with the approval of the academic chair/director, a grade of WH will be assigned only if the student cannot complete the course work because of unavoidable circumstances. Students must complete the work within one calendar year from the end of the semester in which they receive a WH, or the grade automatically becomes an F. If students register for the same course in future terms the WH will automatically become an F and will be counted as a repeated course for the purpose of computing the grade point average. | |  |  |  |  |  |
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| 31. Students with Disabilities  To obtain disability related accommodations, alternate formats and/or auxiliary aids, students with disabilities must contact the Office of Disability Services (ODS), Human Services Building, and Room 325, 468-3004 / 468-1004 (TDD) as early as possible in the semester. Once verified, ODS will notify the course instructor and outline the accommodation and/or auxiliary aids to be provided. Failure to request services in a timely manner may delay your accommodations. For additional information, go to<http://www.sfasu.edu/disabilityservices>. | |  |  |  |  |  |
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