COURSE SYLLABUS, FALL 2017
University 103
First-Year Inquiry Seminar:
A Physics Major Freshman Seminar, 3 credits
Seminars in Physics
MILLERSVILLE UNIVERSITY

Instructor: Tariq H. Gilani  
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Phone: 717-871-7449  
E-mail: tariq.gilani@millersville.edu  
Location: Roddy 247  

Office Hours:  
Posted in front of my office or by appointment

Class Time: Tuesday and Thursday 9:25 to 10:40 AM

Text: None

Required:
- Physics Department Student Handbook (also available on physics website).
- A bound Notebook, quad ruled, (9.75” x 7.5”).

Reference Books:

www.physicsweb.org,

Purpose: The intent of the course is to introduce the incoming physics majors to the university’s key factors for transformation and student success: critical thinking, intellectual curiosity, personal desire, self-awareness, deep learning and productive contributions. The seminar format will allow students to discuss, investigate, and take ownership in learning process. Students will actively participate in discussions, in class and out of class activities (for example as part of physics demo team in Society of Physics Students, SPS). Students are expected to read physics journal articles, reflect on their presentations and research reports. Students will acquire the knowledge of computation and technology and make presentations on relevant and important physics topics based on library research. The seminar will introduce multiple perspectives related to understanding and resolution of physical problems. The course will encourage the process of critical thinking in the student. The course will also function to support students’ transition into the college experience as physics majors academically and socially.

This seminar is intended to present an overview of physics to incoming physics majors and prepare them for coming years. The broad treatment will cover the fundamental ideas of physics, relating them to the philosophy, the historical development and the contemporary applications of the concepts. The course is also intended to provide the students with an appreciation of the relationship of physics concepts to mathematical concepts and to relate physics to their career objectives.
**Broad Course Objectives**

- Be familiar with academic requirements for the major and General Education.
- Be familiar with physics faculty and their research interests, particularly their advisor.
- Recognize and develop an understanding of potential career paths and educational options within the field of physics.
- Be aware of SPS, Physics Demo Team and Sigma Pi Sigma.
- Be able to assemble physics demonstrations, explain principles involved, and present to elementary/middle/high school students.
- Be able to serve as ushers, guides, lab aides, in the university’s science outreach programs.
- Be able to identify leadership qualities and be willing to assume greater responsibilities in Millersville Physics Club in the future.

**Students should**

- Be aware of the history of developments in physics.
- Compare the difference in basic approach to physics among pre Newtonian, Newtonian and Modern physics.
- Be aware of the intersection of physics with society at large.
- Be aware of current trends in physics.
- Be able to effectively research, organize and present scientific information.
- Develop an appreciation for the role and application of physics in other fields and recognize the importance of fundamental physics for impacting society at large.
- Be able to critically analyze and discuss the ideas from the assigned readings and activities.

**Course Policies:**

- Attendance: Class attendance is required.
- Participation: Course projects/assignments and the information presented in class are intended to benefit the students and are expected to actively participate in class discussions relating to these assignments.
- Academic Honesty: Students are expected to complete all course work in an ethical manner without plagiarizing.
- Millersville University and its faculty are committed to assuring a safe and productive educational environment for all students. In order to meet this commitment, comply with Title IX of the Education Amendments of 1972, 20 U.S.C. §1681, et seq., and act in accordance with guidance from the Office for Civil Rights, the University requires faculty members to report to the University’s Title IX Coordinator incidents of sexual violence shared by students. The only exceptions to the faculty member’s reporting obligation are when incidents of sexual violence are communicated by a student during a classroom discussion, in a writing assignment for a class, or as part of a University-approved research project. Faculty members are obligated to report to the person designated in the University Protection of Minors policy incidents of sexual violence or any other abuse of a student who was, or is, a child (a person under 18 years of age) when the abuse allegedly occurred. Information regarding the reporting of sexual violence, and the resources that are available to victims of sexual violence, is available at [http://www.millersville.edu/socialeq/title-ix-sexual-misconduct/index.php](http://www.millersville.edu/socialeq/title-ix-sexual-misconduct/index.php).
**Major Evaluation Components**

- **Written Paper/Research project Reports (20%)**: All students will be required to submit written papers in a professional manner on different topics assigned in the class. These reports will be graded on quality, style, and contents.

- **Oral Presentations (20%)**: At least once (or in some cases twice) during the semester, every student will make a presentation on a topic assigned. The presentation grade will be based on clarity of thought, detail of description, and overall content. The grades will not be based on students’ correctness.

- **Quizzes/Exams (20%)**: Quizzes and exams as determined by the instructor.

- **Homework/Problem Set (10%)**: Students will be assigned homework/problem set regularly throughout the course. These homework assignments will be graded based on completeness and thoroughness.

- **Class Attendance (10%)**: All students will be required to participate in the discussions in the class.

- **Volunteer Work (10%)**: Students are required to participate/volunteer in at least one of the following events:
  - MU Students at the Resident Assistant Program (in the dorms).
  - Campus-wide organization events (Ville After Dark).
  - Local elementary/middle/high school students in their schools.
  - Lab aides/guides at the Science lectureship and Science Olympiad.
  - Judge for elementary school science fairs.
  - Physics Demo Team.
  - SPS activities, etc.

- **Seminar Attendance (10%)**: Physics Department seminars are held Wednesday at 4:00 pm in Roddy 149 (it is not on every Wednesday. Seminars are advertised). Each student will attend at least five of these seminars. One seminar can be fulfilled by attending another scientific seminar or lecture on campus and writing a brief summary. Students with classes that conflict with the Physics seminars must contact the instructor immediately to identify appropriate alternatives.

### Guaranteed letter Grade (Grade Pt %)

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<th>Grade</th>
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<tbody>
<tr>
<td>A</td>
<td>93.0-100</td>
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<tr>
<td>A-</td>
<td>90.0-92.9</td>
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<tr>
<td>B+</td>
<td>87.0-89.9</td>
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<tr>
<td>B</td>
<td>83.0-86.9</td>
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<tr>
<td>B-</td>
<td>80.0-82.9</td>
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<tr>
<td>C+</td>
<td>77.0-79.9</td>
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<td>C</td>
<td>73.0-76.9</td>
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<tr>
<td>C-</td>
<td>70.0-72.9</td>
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<td>D+</td>
<td>67.0-69.9</td>
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<td>63.0-66.9</td>
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<td>60.0-62.9</td>
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<td>F</td>
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Note: I am the instructor of record for this class. Only the instructor of record can properly grade coursework and issue grades.
Course Content/Topics
Note: Content will not necessarily occur in the order prescribed. This is a sample illustration of the material upon which the course is built.

Physics at Millersville
General Introduction
Meet the Chair
Meet the physics faculty members/research
Finding Relevant and Reliable Information – Meet the Science Librarian
Academic planning (planning for the major classes)
Time and money management
Safety, etc.
Opportunities at MU

Scope of Physics
Careers in Physics
Graduate School Opportunities
Research Experience for Undergraduates
Introduction to SPS and their activities
Physics demos

Ethics in Science,
Scientific report style (American Physics Society Guide), Writing a science article;
Critical Reading Skills, Test taking skills
Preparation for oral presentation

Basic ideas, Philosophy and short History of Physics
Greek’s physics
Galileo and Newton
Some critical concept
Comparison of pre-Newton and Newton Physics philosophy
Newton changed the world
Newton’s world and some critical concept
Limitations of Newtonian Physics, Critical thinking

Modern Physics
Einstein Special Theory of Relativity -- Basic
General Theory of relativity -- Basic
Quantum Physics –Basic
Our understanding of the universe
Astronomy

Current Trends/Advanced Physics
Nuclear Energy
Nuclear Weapons
Alternate Energy Resources
Solar energy
Wind energy
More Current Trends in Physics, for example --- Nano technology, Physics Education etc.

Note: We will have several guest speakers throughout the semester on various topics.

All schedules and timelines are tentative and are subject to change.