

PHYS 4275: Physics Research Project
Course Syllabus for Fall 2019 R 11:00-11:55 am

Instructor: Dr. Wayne Keith 793-3874, keith.wayne@mcm.edu
Office Hours: S 110-C: TWRF 9-11, WR 2:30-5, and F 1-2
Web: <http://www.mcm.edu/~keith.wayne>
Text: *None*
Required: paper, pencil, access to a computer
Prerequisites: PHYS 4175

Course Description: This is a required course for physics majors and serves as the Capstone Experience. Using the project plan developed in PHYS 4175, students will use this course to carry out their research project. Weekly meetings and periodic assignments will be used to guide students through this process, with the result being a formal written paper and oral presentation of the student's research.

Grading: 15% Participation: Students are expected to be present and engaged in all group or individual meetings throughout the semester. Regular times to work on the research should be established so that progress is made throughout the semester.

15% Progress Reports: Students will submit informal memos (emails) to the instructor periodically (see schedule) as a written record of their progress. First report should include an updated project schedule and specific times the student plans to set aside for project work.

5% Paper Outline: This outline should contain the major and minor topics that will be addressed in the final report. Examples will be provided.

5% Paper Reference List: A list of planned references will be submitted for approval prior to turning in the first draft.

10% Paper Draft: A draft of the formal written report will be submitted for comment.

10% Presentation Draft: A draft of the oral presentation will be presented to the instructor for comment.

20% Final written report: This should be a well-polished document detailing the research conducted.

20% Final oral presentation: This presentation should be given in PowerPoint or similar format to an audience of science faculty and physics majors.

Classroom Rules: Students are expected to be present and on-time for all group and individual meetings as scheduled. Excessive absences (more than 3 consecutive unexcused) may result in the student being dropped from the course. Late work will **NOT** be accepted on bold items without prior written permission.

Final notes: Group meetings will be discussion dominated; there is no formal "lecture" component to this course. It is important to establish a regular schedule for conducting your work, or else risk getting behind schedule as you get busier during the semester. A project that is presented "incomplete" or as a "work-in-progress" **WILL NOT BE ACCEPTED** for credit.

PHYS 4275 Course Schedule

All dates are tentative and subject to change except **bold** dates.

| Date | Activity or Item Due |
|--------------|--|
| 8/29 | Research |
| 9/5 | Memo 1 (Schedule) Due |
| 9/12 | Research |
| 9/19 | Research |
| 9/26 | Memo 2 Due |
| 10/3 | Research |
| 10/10 | Research |
| 10/17 | Memo 3 Due |
| 10/24 | Research |
| 10/31 | Draft Project Report |
| 11/7 | Outline / Reference List Due |
| 11/14 | Project Report Draft Due |
| 11/21 | Draft Oral Presentations |
| 11/28 | Thanksgiving – NO CLASS |
| 12/5 | Project Report Due/Oral Presentations |
| 12/12 | Final Exams – NO CLASS |

PHYS 4275 Course Objectives

| Course objectives and goals | Linked to which departmental program goal(s) | Linked to which institutional goal(s)? | Types of evidence used to demonstrate student achievement of objectives & goals |
|--|--|--|---|
| Students will demonstrate the ability to employ the methods of science for inquiry. | - to prepare physics graduates for a wide range of career opportunities including not only graduate study in physics, engineering, pre-med, or other sciences; but also, science teaching and careers in industry and science-related business | 1,2,3,8 | Students will show the ability to carry out their chosen course of research, whether their chosen project is conceptual or a hands-on experiment. |
| Students will demonstrate the ability to formally communicate scientific findings and interpretations, both in writing and speaking, using formats appropriate to the audience and the discipline. | - to prepare physics graduates for a wide range of career opportunities including not only graduate study in physics, engineering, pre-med, or other sciences; but also, science teaching and careers in industry and science-related business | 1,2,3,8 | Students will demonstrate their ability to present their work formally in writing through the writing and revision of the project report. Students will demonstrate their ability for formal speaking during oral presentation of the project in front of an audience. |
| Students will demonstrate the ability to critically assess the validity of scientific findings and conclusions. | - to prepare physics graduates for a wide range of career opportunities including not only graduate study in physics, engineering, pre-med, or other sciences; but also, science teaching and careers in industry and science-related business | 1,2,3,4,8 | Students will demonstrate their ability to critically assess the validity of scientific findings and conclusions through the process of carrying out their research and compiling the project report. |