PHYS 1410: General Physics I
Course Syllabus for Fall 2021, TR 9:30-10:50 am

Instructor: Dr. Wayne Keith: 793-3874, keith.wayne@mcm.edu
Office Hours: S 110-C: MWF 9-11, TR 8:30-9:30, and MR 2:30-4:30
Web: http://www.mcm.edu/~keith.wayne
Text: *Physics (10th)*, by Cutnell & Johnson
Required: scientific calculator, paper, pen/pencil
Prerequisites: MATH 1311 (College Algebra) and a working knowledge of trigonometry.
Category: This course is designated within the General Education curriculum and supports fulfilling the Natural Sciences requirement.

Course Description: General Physics I is the first part of a quantitative algebra-based science course revealing the workings of our physical environment through the study of mechanics: different types of macroscopic motion. The objective for the student is to develop the skills necessary to analyze the behavior of mechanical systems based on Newtonian Laws of Motion and Conservation Laws and learning to solve basic physics problems from different areas of mechanics. Physics is a subject suitable for all students preparing for careers in science/engineering as well as for those working in other fields. This is because physics involves seeking out and trying to understand the basic laws of nature of the surrounding world. Many professions require the ability to make realistic assessments of physical systems. You can also use knowledge of physics in every-day life. Specific tools that are designed to achieve this objective allow you to become proficient in the methods of science. These tools include: reading the text and working through sample problems; lectures, consisting of explanations, demonstrations, discussions, solving sample problems; homework exercises on physics concepts and problem solving; discussions with peers about physical principles and solving context rich problems in peer groups; laboratory, where you can see how physics works in practice and will engage in the process of scientific communication; and finally tests on concepts and problem solving.

Course Goals: The objective of the student is to develop the skills necessary to analyze the behavior of physical systems, primarily the classical mechanical systems, based on Newtonian laws of motion and conservation laws and to learn how to solve basic physics problems from different areas of mechanics.

Grading: 20% Daily grades: Moodle-based reading quizzes, pre-lab activities and worksheets.
15% Homework: Moodle-based online homework.
40% Laboratory: Written lab reports must be submitted.
15% exams: Five in-class mini-exams.
10% Final exam: Comprehensive final.

You will receive a during-term grade for this course by the 5th week of classes and after midterm. You can access your grades though Moodle or MyMcM. If your during-term grade is below a C-, you will receive a message from the Mindset for Success Office regarding your academic underperformance in this course. This email will contain information about several resources that can help you.

Attendance/Make up policy: Attendance is required. In-class activities may only be made up for excused absences. Make-up exams will be given for excused absences only at the discretion of the instructor. Contacting the instructor via email or phone prior to missing class for any reason is strongly encouraged, even if it is for a school sponsored event. Students are responsible for keeping up with the due dates of course material whether or not they are in class. **Students may attend remotely ONLY if officially excused from in-person attendance by the University.**

Classroom Rules: Students are expected to be present and on time for all class meetings. Excessive absences (more than 4) may result in the student being dropped from the course. Ringing cell phones and

other disruptions during class may result in a loss of daily grade points or other penalties. Tablet PC's may only be open when needed for class activities. Late work requires permission from the instructor.

ADA Policy: If you have a documented disability that may impact your performance in this class and for which you may require accommodations, you must be registered with and provide documentation of your disability to the Disability Services Office, President Hall, 793-4880. Details available via Moodle links.

Final notes: Class discussion is strongly encouraged; please feel free to ask questions, during class or outside of class, about anything that is not clear. Properly preparing for class by reading the textbook and keeping up with the homework is the most important factor in doing well in this course.

Course Objectives:

The following course objectives support the university competency of Critical Thinking:

Students will demonstrate their ability to employ the methods of science for inquiry. Students will show the ability to formulate rational approaches to problem-solving both as conceptual situations (HOMEWORK PROBLEMS) and in hands-on experiments (DESIGN OF LABORATORY EXPERIMENTS). Students will be successful, working on discovery-based classroom assignments and discovery-based lab exercises.

Students will demonstrate an acceptable level of skill in using the tools of science. Students will show the proper use of laboratory equipment, though supervised lab experience. Students will be able to explain the precision involved in any measurement and the use of uncertainty in calculations of their results. (LABORATORY REPORTS) Students will be able to use the mathematical and logical tools of science as it can be seen through their success on in-class and homework assignments. (HOMEWORK PROBLEMS).

Students will demonstrate an acceptable level of understanding of the major principles of a scientific discipline. Students will show this ability through their success on the EXAM QUESTIONS that pertain to the major principles of the field.

Students will demonstrate the ability to critically assess the validity of scientific findings and conclusions. Students will demonstrate their ability to critically assess validity of scientific findings and conclusions through the process of PEER REVIEW of the lab reports.

The following course objective supports the university competency of written and oral communication:

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. Students will demonstrate their ability to present their work formally through writing and revision of the LABORATORY REPORTS. Students will demonstrate their ability for formal speaking during the FORMAL ORAL PRESENTATION in the laboratory.

Special Note for Pandemic: During the Coronavirus pandemic, special University policies related to Personal Protective Equipment, cleaning, and social distancing have been put into place. All University policies WILL be followed in this class, including properly worn face coverings. **Each student will get ONE WARNING regarding improper or missing face covering, after which the student will be EJECTED FROM CLASS and marked absent. Repeat offenders will be dropped from the course**. Please also note that attending class or lab remotely is ONLY available for students with a documented reason such as illness or quarantine. At least 50% of labs must be performed in person in order to complete the course. Students who are unable to meet this requirement will receive and Incomplete until such time as the lab exercises can be finished.

PHYS 1410 Course Schedule

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

Module	Date	Primary Topic	Reading	Assignment
1	8/24	1.1: Intro, Sylabus, Measurments, Units	1.1, 1.2	Worksheet
	8/24-25	**Lab 1.2**: Volume and Uncertainty	Lab Manual	Worksheet/Report
	8/26	1.3: Units, Dimensional Analysis, Estimations	1.3, 1.4	Reading Quiz
	8/31	Worksheet 1.4: Solving Problems		Worksheet
	8/31-9/1	**Lab 1.5:** Using MS-Excel	Lab Manual	Worksheet
2	9/2	2.1: 1D Kinematics: disp., vel., acc.	1.5, 2.1-2.3	Reading Quiz
	9/7	2.2: 1D Kinematics: constant acceleration	2.4-2.7	Reading Quiz
	9/7-8	**Lab 2.3:** Acceleration of Gravity	Lab Manual	Worksheet/Report
	9/9	2.4: Peer Review / 1D Kinematics Discussion		Worksheet
	9/14	Module 2 Exam		Exam
3	9/14-15	3.1: Vectors, Adding Vectors **Lab 3.1:** Orienteering	1.6-1.9 Lab Manual	Reading Quiz Lab Report
	9/16	3.2: 2d Kinematics/Projectile Motion	3.1-3.3	Reading Quiz
	9/21	3.3: Kinematics of Rotation	5.1-5.2, 8.1-8.5	Reading Quiz
	9/21-22	Worksheet 3.4		Worksheet
	9/23	Module 3 Exam		Exam
4	9/28	4.1: Newton's Laws	4.1-4.5	Reading Quiz
	9/28-29	4.2: Newton's 2nd Law, Forces	4.6-4.10	Reading Quiz
	9/30	4.3: Newton's 2nd Law, Applications	4.11-4.12	Reading Quiz
	10/5	Worksheet 4.4: Newton's 2nd Law	4.13	Worksheet
	10/5-6	**Lab 4.5:** Friction	Lab Manual	Lab Report
	10/7	4.6: Newton's 2nd Law: Circular Motion	5.3-5.7	Reading Quiz
	10/12	Worksheet 4.7: Centripetal Force		Worksheet
	10/12-13	Module 4 Exam		Exam
5	10/14	5.1: Work and Energy	6.1-6.4,6.9, 10.3	Reading Quiz
	10/19	5.2: Conservation of Energy	6.5-6.8	Reading Quiz
	10/19-20	**Lab 5.3:** Energy Experiments	Lab Manual	Worksheet
	10/21	Worksheet 5.4: Work and Energy	6.10	Worksheet
6	10/26	6.1: Conservation of Momentum/Collisions	7.1-7.5	Reading Quiz
	10/26-27	**Lab 6.2:** Ballistic Pendulum	Lab Manual	Lab Report
	10/28	Worksheet 6.3: Momentum/Collisions		Worksheet
7	11/2	7.1: Torque / Statics	9.1-9.3	Reading Quiz
	11/2-11/3	**Lab 7.2:** Pendulums and Springs	Lab Manual	Lab Report
	11/4	7.3: Rotational Dynamics	9.4	Reading Quiz
	11/9	7.4 Rotational Energy and Angular Momentum	9.5-9.6	Reading Quiz
	11/9-10	**Lab 7.5** Oral Presentations	Lab Manual	Oral Presentation
	11/11	Worksheet 7.6: Dynamics of Rotation		Worksheet
	11/16	Module 7 Exam		Exam
8	11/16-17	8.1: Elasticity **Lab 8.1:** Young's Modulus	10.7-10.8 Lab Manual	Reading Quiz Lab Report
	11/18	8.2: Oscillations	10.1-10.4	Reading Quiz
	11/23	8.3: Damped Oscillations / Worksheet	10.5-10.6, 10.9	RQ/WS
	11/23-24	**No Lab This Week**		
	11/25	**No Class – Thanksgiving**		
	11/30	8.4: Hydrostatics	11.1-11.6	Reading Quiz
	11/30-12/1	8.5: Hydrodynamics	11.7-11.10	Reading Quiz
	12/2	8.6: Final Review Worksheet	11.12, 16.12	Worksheet
	12/7	**FINAL EXAM (10:30 am – 12:30 pm)**		

PHYS 1410 Learning Outcomes

Upon successful completion of this course students will be able to:		
Departmental program goal	**Course Student Learning Outcome**	**Methods of Assessment**
-To enhance non-physics science majors' understanding of science through physics applications of the scientific method into disciplines of their interests, thereby providing a richer understanding of the interconnectedness of their discipline to other fields -To prepare graduates who will possess sufficient breadth and depth of knowledge that will allow for a wide range of career opportunities including graduate study in physics, engineering, pre-med, or other sciences; as well as science teaching and careers in industry, engineering practice, and science-related business	Students will demonstrate their ability to employ the methods of science for inquiry.	Students will show the ability to formulate rational approaches to problem-solving both as conceptual situations (Homework Problems) and in hands-on experiments (Design of Laboratory Experiments). Students will be successful, working on discovery-based classroom assignments and discovery-based lab exercises.
-To enhance non-physics science majors' understanding of science through physics applications of the scientific method into disciplines of their interests, thereby providing a richer understanding of the interconnectedness of their discipline to other fields -To prepare graduates who will possess sufficient breadth and depth of knowledge that will allow for a wide range of career opportunities including graduate study in physics, engineering, pre-med, or other sciences; as well as science teaching and careers in industry, engineering practice, and science-related business	Students will demonstrate an acceptable level of skill in using the tools of science.	Students will show the proper use of laboratory equipment, though supervised lab experience. Students will be able to explain the precision involved in any measurement and the use of uncertainty in calculations of their results. (Laboratory Reports) Students will be able to use the mathematical and logical tools of science as it can be seen through their success on in-class and homework assignments. (Homework Problems)
-To enhance non-physics science majors' understanding of science through physics applications of the scientific method into disciplines of their interests, thereby providing a richer understanding of the interconnectedness of their discipline to other fields -To prepare graduates who will possess sufficient breadth and depth of knowledge that will allow for a wide range of career opportunities including graduate study in physics, engineering, pre-med, or other sciences; as well as science teaching and careers in industry, engineering practice, and science-related business	Students will demonstrate an acceptable level of understanding of the major principles of a scientific discipline.	Students will show this ability through their success on the exams questions that pertain to the major principles of the field.
-To enhance non-physics science majors' understanding of science through physics applications of the scientific method into disciplines of their interests, thereby providing a richer understanding of the interconnectedness of their discipline to other fields -To prepare graduates who will possess sufficient breadth and depth of knowledge that will allow for a wide range of career opportunities including graduate study in physics, engineering, pre-med, or other sciences; as well as science teaching and careers in industry, engineering practice, and science-related business	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.	Students will demonstrate their ability to present their work formally through writing and revision of the laboratory reports. Students will demonstrate their ability for formal speaking during the formal oral presentation in the laboratory.