MORAVIAN COLLEGE

PHYS 109 Intro to Physics

Instructor*:	TBD	**Term:**	Summer, 2019
Institution:		**Meeting Times:**	M, T, W, Th
Email:		**Contact Hours:**	48
Office Hours:	TBD and by appointment	**Awarded Credits:**	3.0

* *The instructor will be a fully-qualified, experienced professor with a Terminal Degree and a demonstrated record of academic rigor, scholarly publications, and pedagogical excellence.*

* ***Moravian Study Abroad***
This five-week course is offered in Moravian College's Summer 2018 China study abroad progra m. To enroll, please contact admissions@moravian.edu.

I. Course Description:

This is an introductory physics course for non-science majors. This course focuses on basic physics concepts and connections to everyday life. Course topics include Newtonian mechanics, fluids, heat, vibrations, electricity and magnetism, light and sound, quantum phenomenon, relativity, and cosmology.

II. Student Objectives

Our course covers Newtonian mechanics, Electricity and Magnetism, Relativity, and Quantum mechanics. We will learn to apply the concepts to simple physical systems. While advanced mathematics is not required for this course, basic math with some trigonometry and simple algebra is utilized. Proportional reasoning, estimating, and graphing skills are emphasized throughout the course. Overall goals of this course include knowledge about how science is done, an understanding of the major physical principles that explain the functioning of the world, improved problem solving and reasoning skills, and improved scientific literacy.

III. Required Textbook and Course Materials:

Title: Physics Concepts and Connections

Edition: 5th or later
Author: Art Hobson
ISBN: 978-0-321-66177-7

IV. Language of Instruction:

This course is taught entirely in English, including lectures, homework, assignments and examinations. Teaching assistants will be fluent in both English and Mandarin.

V. Course Prerequisites:

None.

University Policies

Attendance

Summer courses are very intensive and in order to be successful, students need to attend every class. Attendance is required for all lectures and in class activities. If you need to miss a day of class, make sure you speak with the course instructor first. Otherwise the absence will be unexcused. If you need to miss class due to illness, please bring a doctor's note.

Unexcused absences will negatively impact your grade, and university policy states that students with three or more unexcused absences will be referred to the Dean's office and face automatic failure of this course.

Academic Dishonesty

All cases of academic dishonesty will be diligently pursued. Academic dishonesty includes representing the work of another as one's own work or cheating by any means. Academic dishonesty also includes aiding, abetting, concealing or attempting such activity. The penalty is automatic failure of the course and possible suspension from the university.

Examination Guidelines

Only the following items are permitted in the examination room:

- the examination

- a one page helper sheet (at instructor's discretion)
- approved calculator
- pencils
- water
- All other items must be placed well outside of students' reach and closed. Cell phones especially should be collected and held at the front of the room.

Grading Scale

Student grades will be determined using the following grading scale:

Grading Scale (%)

97-100	A+	77-79	C+
93-96	A	73-76	C
90-92	A-	70-72	C-
87-89	B+	67-69	D+
83-86	B	63-66	D
80-82	B-	60-62	D-
		0-59	F

Instructor Policies

Conceptual Outline

The first section of the course deals with the scientific method and the some of the history of important scientific ideas. We move onto Newtonian mechanics, the study of how to explain motion using concepts of mass and forces. Many aspects of forces are not intuitive, and we must to careful to avoid common misconceptions. In addition to learning to properly reason with forces, there are also some higher-level, derived concepts that are powerful aids in problem solving. Topics like energy and momentum thus form the third section of the course. These are useful in part due to conservation laws; even in the absence of conservation, focusing on the flow of these quantities is often a powerful technique. We then transition to the study of light and electromagnetism. The course concludes with sections on modern physics, with particular focus on the special and general theories of relativity, and on quantum theory.

Assignments

Reading

Reading the sections of the textbook corresponding to the class lectures and assigned homework exercises is considered part of the homework assignment; you will be responsible for material in the assigned sections *regardless of whether it is discussed in lecture*. You are expected to read the assigned material in advance of the lecture.

Homework

The daily homework assignments must be turned in to your instructor at the beginning of each class meeting. You are encouraged to discuss general problem solving methods with other students, but the solutions you hand in must be uniquely your own. Do not copy your colleague's work because you will not learn the material if you do.

In-Class Quizzes

You should expect a quiz every week, based on the current reading assignment or on examples from the previous lectures. The quizzes are designed to ensure that you are keeping up with the readings and homework.

In-Class Exams

There will be four one-hour exams during the semester. Exams are designed to test your understanding of the physics principles you have been taught, not your ability to remember formulas or reproduce homework problems that you have already solved. Most problems on the exams will be variations and elaborations of your homework, designed to test whether you can apply physics principles to other situations.

How to Study in This Course:

Learning is a collaborative activity involving you, your fellow students, and the staff. Treating each other with mutual courtesy and respect is important to develop the environment we need for a successful experience. You are encouraged to collaborate with other students while thinking about how to solve problems, since talking about physics is one of the best ways to learn physics. Of course you need to write down solutions to problems on your own, since this is the way to solidify your understanding and to develop the analytical skills you need.

Diligent attendance is very important; experience shows that active participation in the classes leads to better performance. Come to class prepared! This means read the chapters ahead of time,

and look over and try to solve the assigned problems. The purpose of the lectures is to: inspire you, explain the tougher issues in the book, make you think rigorously about what is going on, stimulate you to go off and learn the material yourself, and show you some demonstrations to illustrate the physics you are learning. The purpose of the lectures is not to: introduce you to new and unexpected material, cover everything you are expected to learn, or dwell on problem solving.

Tentative Course Schedule

Week 1:	**The Scientific Method**
Sections 2-1 thru 2-8	Atoms
Week 2:	**The Newtonian Universe**
Sections 3-1 thru 3-5	How things move
Sections 4-1 thru 4-6	Why things move
Sections 5-1 thru 5-2; 5-5 thru 5-6	Newton's universe
Week 3	**Energy**
Sections 6-1 thru 6-7	Work, Energy & Power
Sections 7-1 thru 7-3; 7-7	2nd Law of Thermodynamics
Week 3:	**Light and Electromagnetism**
Sections 8-1 thru 8-8	Waves, Electricity, Magnetism, Atoms
Sections 9-1 thru 9.4	Electromagnetic Wave Theory
Weeks 4 and 5:	**Modern Physics**
Sections 10-1 thru 10.8	Special Relativity
Sections 11-1 thru 11.7	General Relativity
Sections 13-1 thru 13-6	The Quantum Idea