

Introduction to Modern Physics Online

Course Information

Course Name Introduction to Modern Physics

Course Number Physics 3150W

Prerequisite Physics 2760 (University Physics II)

Course description: The course will provide an introduction to the special theory of relativity and quantum mechanics, including their applications to atomic, molecular, nuclear and solid state physics. The course is calculus based and relies heavily on problem solving and essay writing.

Instructor Information

Dr. Silvia Bompadre

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Office Location: 320 Physics Building

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Textbook

Modern Physics by Serway, Moses, and Moyer (Third Edition, Brooks/Cole, 2005).

Course learning goals

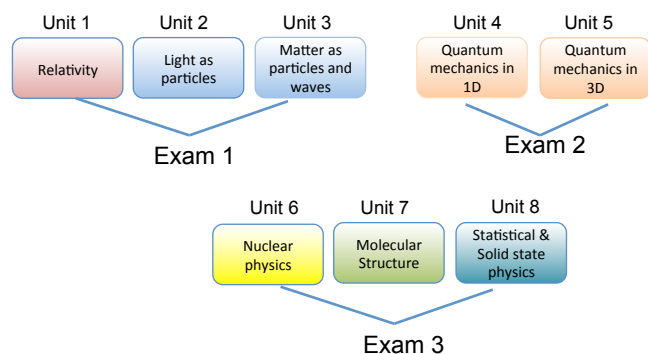
The student will gain an understanding of

- relativistic dynamics and energy;
- quantum theory of light and the particle nature of matter;
- basics of quantum mechanics: wavefunctions and Schrödinger equation, solution to Schrödinger equation for various potentials including the hydrogen atom;
- nuclear reactions and nuclear processes;
- molecular structure;
- basic laws of statistical physics for classical and quantum particles;
- application of quantum mechanical concepts in solid state physics;
- writing manuscripts similar to those submitted to scientific journals following a template.

Course Policies

The topics covered in this course are divided in 8 Units. In each Unit you will find the recorded lectures and lecture notes, the homework assignment corresponding to that unit, additional resources (simulations, videos or reading materials) and solved problems. There is also a

Discussion link where you can post questions, answer questions from other students and make comments about the unit's topics. Each unit may include one or more chapters of the book and so each unit will include a different number of lectures or homework problems. Take a look ahead so you can pace yourself appropriately.



Your performance and grade in this course will be assessed based on:

1) Writing Intensive Assignments: Physics 3150 is a Writing Intensive course. Your main writing assignments consist of two papers **worth 30 %** of your final grade. Each paper should address two different important discoveries in modern physics that: (i) are relevant to the course, and (ii) were awarded the Nobel Prize. The goals of these writing assignments are:

- Learn to write scientific papers
- Learn more about those discoveries than what we cover in class.

Pick your topics as soon as possible and communicate them to me for approval. Please refer to [Writing Intensive Assignments](#) for further details on the content, length, and format of the papers; and for instructions regarding the submission of the paper.

2) Homework: There will be weekly homework assignments to complete during the semester, one homework set per Unit (see calendar for due dates). The homework is **worth 20%** of your final grade. The homework assignments will be provided as a pdf file and consist of 3 to 7 problems. When you solve the problems show your work, or you will not receive points. You must upload your homework problems in Canvas by the due date. Please make sure that the document you upload is readable (good resolution, high contrast). Solutions will be posted after the due date. After that, no late homework will be accepted.

3) Exams: There will be 3 proctored exams during the semester and NO final exam. The 3 exams are **worth 50 %** of your final grade.

The exams will have problems similar to those in the homework assignments or those provided in the "Problems" section of each Unit. In each exam page you will find a sample exam from another semester and the solutions. The values of physical constants as well as a formula sheet

with hard to remember formulas will be provided with the exam. You can find the formula sheet in each exam page.

There is no final exam for the course. Make-up exams will be offered only for well-justified cases (clear documentation for why the exam was missed is required). If possible, requests must be made in advance of the exam.

4) Lectures: You are required to watch the recorded lectures. As an online student, it is especially important that you are self-motivated and able to commit to watching the video lecture recordings in a timely manner. While watching the lectures stop to think about questions posted before listening to the answer and also stop to solve problems before you watch the instructor solving them.

Problem solving is an important part of the course. You will find problems solved by the instructor in the lecture recordings and also in the "Problems" section of each Unit.

I strongly suggest that you read the material from your textbook prior to watching the lectures. This will help you better follow the lectures as well as identify what you understand or not from the material. You will have reading material assigned every lecture and it will be your responsibility to read it. Lecture notes are not meant to substitute the textbook or the lecture itself. Lecture notes are only supposed to give you an overview of the material covered.

Tegrity recordings are jointly copyrighted by the Curators of the University of Missouri and your instructor. Posting them, either in part or in full, to another website, including YouTube, Facebook, BlipTV, or any other site without express, written permission may result in disciplinary action and possible civil prosecution.

Grading Scheme

Course grades will be given on the plus/minus scale, based on the following point total:

Writing 30%
Homework 20%
Exams 50%

Independent work and academic honesty are expected in all exams and assignments.

For 0 – 500 points: F
For 501 - 600 points: D (±)
For 601 - 699 points: C (±)
For 700 - 849 points: B (±)
For 850 - 1000 points: A (±)

You fail the class automatically if you miss any exam or writing assignment!

Minimum Technology Requirements

To complete the course, you will need access to a computer with a modern Web browser, a working Internet connection, word processing software, and disk space to save your work.

Portions of this course may require Adobe Flash Player and Adobe Acrobat Reader to view pdf documents.

Students will be required to upload documents in Word format (.doc, .docx,) or Rich text format (.rtf). These documents can be created in Microsoft Word or another office suite that saves in the .doc, .docx, or .rtf format.

Online Netiquette

Your instructor and fellow students wish to foster a safe on-line learning environment. All opinions and experiences, no matter how different or controversial they may be perceived, must be respected in the tolerant spirit of academic discourse. You are encouraged to comment, question, or critique an idea but you are not to attack an individual.

Our differences, some of which are outlined in the University's nondiscrimination statement below, will add richness to this learning experience. Please consider that sarcasm and humor can be misconstrued in online interactions and generate unintended disruptions. Working as a community of learners, we can build a polite and respectful course ambience.

Students with Disabilities

If you anticipate barriers related to the format or requirements of this course, if you have emergency medical information to share with me, or if you need to make arrangements in case the building must be evacuated, please let me know as soon as possible.

If disability related accommodations are necessary (for example a note taker or extended time on exams), please register with the Disability Center (<http://disabilitycenter.missouri.edu>), S5 Memorial Union, (573) 882-4696, and then notify me of your eligibility for reasonable accommodations. For other MU resources for persons with disabilities, click on "Disability Resources" on the MU homepage.

University Policy on Academic Dishonesty

Academic honesty is fundamental to the activities and principles of a university. All members of the academic community must be confident that each person's work has been responsibly and honorably acquired, developed, and presented. Any effort to gain an advantage not given to all students is dishonest whether or not the effort is successful. The academic community regards academic dishonesty as an extremely serious matter, with serious consequences that range from

probation to expulsion. When in doubt about plagiarism, paraphrasing, quoting, or collaboration, consult the course instructor.

Academic Dishonesty includes but is not necessarily limited to the following:

- A. Cheating or knowingly assisting another student in committing an act of cheating or other academic dishonesty.
- B. Plagiarism which includes but is not necessarily limited to submitting examinations, themes, reports, drawings, laboratory notes, or other material as one's own work when such work has been prepared by another person or copied from another person.
- C. Unauthorized possession of examinations or reserve library materials, or laboratory materials or experiments, or any other similar actions.
- D. Unauthorized changing of grades or markings on an examination or in an instructor's grade book or such change of any grade report.

Academic Integrity Pledge:

Students are expected to adhere to this pledge on all graded work whether or not they are explicitly asked in advance to do so: "I strive to uphold the University values of respect, responsibility, discovery, and excellence. On my honor, I pledge that I have neither given nor received unauthorized assistance on this work."

The University has specific academic dishonesty administrative procedures. Although policy states that cases of academic dishonesty must be reported to the Office of the Provost for possible action, the instructor may assign a failing grade for the assignment or a failing grade for the course, or may adjust the grade as deemed appropriate. The instructor also may require the student to repeat the assignment or to perform additional assignments. In instances where academic integrity is in question, faculty, staff and students should refer to Article VI of the Faculty Handbook. Article VI is also available in the M-Book. Article VI provides further information regarding the process by which violations are handled and sets forth a standard of excellence in our community.

In the event of a suspected incident of misconduct, the instructor plans to use option B (M-book, page 16, <http://mizzoulife.missouri.edu/resources/m-book/>)

Intellectual Pluralism

The University community welcomes intellectual diversity and respects student rights. Students who have questions or concerns regarding the atmosphere in this class (including respect for diverse opinions) may contact the departmental chair or divisional director; the director of the [Office of Students Rights and Responsibilities \(Links to an external site.\)](#); the [MU Equity Office \(Links to an external site.\)](#), or equity@missouri.edu.

All students will have the opportunity to submit an anonymous evaluation of the instructor(s) at the end of the course.

Intellectual Property Notice

All course materials including but not limited to the syllabus, course assignments, study guides, learning guides, online lecture videos and content, and lab book (i.e. course pack) are property of the instructor and University and may not be shared online or distributed in any manner to others. Students are prohibited from posting course materials or notes online and from selling notes to or being paid for taking notes by any person or commercial firm without the express written permission of the professor teaching this course. Doing so will constitute both an academic integrity violation and a copyright violation. Violations of copyright laws could subject you to civil penalties and criminal liability. Violations of academic integrity may subject you to disciplinary action under University policies.