

Modern Physics
01:750:313
Fall 2020

Instructor: Professor Jolie Cizewski

Summary: This is a one-semester course providing an introduction to modern physics. Includes a introduction to the special theory of relativity and quantum mechanics, and topics in several of the main areas of current physics research, including atomic physics, condensed matter physics, nuclear physics, elementary particle physics and cosmology.

This course is recommended for students in the General Option or those minoring in physics. Students in the Professional, Applied, and Astrophysics options should take 01:750:361.

Pre-requisites: 1:750:202 or 1:750:204 or 1:750:228 and 01:640:136 or 01:640:152 (CALC2)

Co-requisites: None

This course is recommended for students in the General Option or those minoring in physics. Students in the Professional, Applied, and Astrophysics options should take 01:750:361.

Meeting times: Two 80-minute lectures per week.

Lecture: M-W 6 (5:00-6:20 pm)

Recitations: None

Text (recommended): **Modern Physics**, Fourth Edition, Kenneth S. Krane, John Wiley & Sons, Inc.

LMS: Canvas

Remote Instruction:

Lectures will be pre-recorded and offered asynchronously. Lectures will be supplemented with simulations of physics concepts and videos of demonstrations, for asynchronous viewing.

Worksheets from group problem solving activities and homework will be uploaded into Canvas asynchronously.

Interactive recitations would be hosted during the lecture time. The primary activity would be small groups of students working in parallel to solve problems that could be part of a homework assignment. The instructor would also answer questions by the students on the lectures (previously posted) or homework and would solve in real time the quiz problems associated with a previous lecture. Students are also encouraged to ask questions about the lectures, homework, and/or quizzes during this time.

For synchronous activities during lecture time, students can request via e-mail to the Instructor to be excused from participation points because of technology or other challenges. Students will be reminded at least weekly by the instructor about this option.

Worksheets from group problem solving and weekly homework will be uploaded to Canvas. Photos of handwritten materials are acceptable. Term paper will be uploaded to Canvas via Turnitin.

At least weekly quizzes will be hosted on Canvas. Students will have at least 24 hours to take the quiz, but a finite amount of time to complete the quiz once started. No exams will be hosted during RI. A term paper is required, due at the end of the semester. It would be uploaded to Canvas via Turnitin. The instructor would host at least 2 office hours/week as a Canvas Conference; one may be at 5:00 PM on Tuesday or Thursday to accommodate part-time students. Office hours can also be requested by appointment at time(s) convenient to both instructor and student.

Technology requirements:

Group problem solving will be hosted via BigBlueButton Conferences on Canvas. Minimal technology is the ability to text and/or audio participate once in Canvas Conference. Ability to draw (e.g. with a tablet) is not required, but desired.

Worksheets from group problem solving and homework can be written by hand with image uploaded to Canvas.

Term paper should be written with a word processor, with .pdf uploaded into Turnitin. Handwritten term papers are not acceptable.

Provisional Grading Plans

Class participation: 20%

Weekly Quizzes: 20%

Homework (including in-class worksheets): 40%

Term Paper: 20%

Lowest 20% of weekly assignments would be dropped.

Schedule (provisional):

Week	Topic
1	Failures of Classical Physics
2	Special theory of relativity
3	Particle like properties of EM radiation
4	Wave like properties of particles
5	The Schroedinger equation
6	The Rutherford-Bohr model of the atom
7	The hydrogen atom in wave mechanics
8	Many electron atoms
9	Molecular structure
10	Statistical physics
11	Nuclear structure and radioactivity
12	Nuclear reactions
13	Elementary particles
14	Solid state physics, cosmology

Academic Integrity:

Students are expected to maintain the highest level of academic integrity. You should be familiar with the university policy on academic integrity: <http://academicintegrity.rutgers.edu/academic-integrity-policy/> Violations will be reported and enforced according to this policy.

Use of external sources to obtain solutions to homework assignments or exams is cheating and is a violation of the University Academic Integrity policy. Cheating in the course may result in penalties ranging from a zero on an assignment to an F for the course to expulsion from the University. Posting of homework assignments, exams, recorded lectures, or other lecture materials to external sites without the permission of the instructor is a violation of copyright and constitutes a facilitation of dishonesty, which may result in the same penalties as explicit cheating.

Not only does the use of such sites violate the University's policy on Academic Integrity, using such sites interferes with your achievement of the learning you are paying tuition for. Assignments, quizzes, and exams are given not simply to assign grades, but to promote the active learning that occurs through completing assignments on your own. Getting the right answer is much less important than learning how to get the right answer. This learning is critical to your success in subsequent courses and your careers.

Student wellness Services

Student Counseling, ADAP & Psychiatric Services (CAPS) wellness for non-emergency psychological health issues services (848) 932-7884, 17 Senior Street, New Brunswick, NJ 08901
<http://health.rutgers.edu/medical-counseling-services/counseling/>

Violence Prevention & Victim Assistance (VPVA), (848) 932-1181, 3 Bartlett Street, New Brunswick, NJ 08901, <http://www.vpva.rutgers.edu/>

Office of Disability Services (848) 445-6800, Lucy Stone Hall, Suite A145, Livingston, 54 Joyce Kilmer Avenue, Piscataway, NJ 08854, <https://ods.rutgers.edu/>

Scarlet Listeners for confidential peer counseling and referral hotline, (732) 247-5555,
<http://www.scarletlisteners.com>