TATIANA STANTCHEVA

PHY 243 OUTLINE

Course Outline

Modern Physics is the third and last semester of the General University Physics sequence taught at NOVA. Lecture 3 hours. Laboratory 2 hours. Total 5 hours per week. 4 Credits.

The class is intended for students who plan to major in physics, engineering, chemistry, or computer science. If your major is different from those mentioned above, or you are not sure whether the class is for you, please, contact the physics department.

Prerequisites.

Successful completion of PHY 232 or Division Approval.

Additional Requirements.

- Students are required to have a computer access with fast internet connection.
- Students are expected to have working knowledge of some form of Editing Software, such as Microsoft Office, Open Office, Google Documents, etc.
- Students may be required to participate in virtual classes through Blackboard Collaborate.

Course Objectives and Learning Outcomes.

- Course Content Summary and Objectives as published on the NVCC web site.
- Topics Included in the course are:
  - Light and Particle Nature
  - Quantum Mechanics
  - Atomic and Molecular Structure
  - Condensed Matter

- Nuclear Physics
- Special Theory of Relativity
- Particle and Astrophysics.

Course Objectives and Learning Outcomes

- Course Content Summary and Objectives as published on the NVCC web site.
- Upon completion of the course, students should be able to:
  - Understand and apply the basic principles of modern physics.
  - Obtain analytical results to physics problems by using advanced mathematics.
  - Independently research topics on modern physics.
  - Analyse experimental results using established laboratory statistical techniques.
  - Communicate effectively on the course-related topics.

Textbooks

- University Physics with Modern Physics by Young and Freedman.

Laboratory Safety Rules

- Only students officially enrolled in the class are allowed in the physics laboratory.
- Open-toe shoes such as sandals and flip-flops are prohibited in the laboratory. All shoes must provide adequate foot protection.
- All students must be acquainted and abide by the safety rules as published on the Physics Laboratory Webpage.
- Students in violation of the safety rules will be asked to leave the laboratory.

General Course Organization and Policies

Assignments, Grading, and Make-up Policy

The course grade is comprised of labs and lab assignments, weekly homework, class tests and a final exam. For more details, contact directly the course instructor.

Grading Scale: A: 90-100% B: 80-89% C: 70-79% D: 60-69% F: <60%

One lab will be dropped from the lab grade. The lowest test score will be dropped from the exam grade. No lab or test make-ups are allowed.

Attendance

Students are expected to attend all scheduled classes. If an online meeting is scheduled, due to an emergency or other reason, student participation in those meetings counts towards their attendance

Students are responsible to know all the material covered in class regardless of whether they have attended class or not.

Withdrawal/Incomplete/Audit

Last day to drop the class with Tuition Refund is Census Date. No Audit will be permitted after the Census Date. Students who have not attended class by the Census Date will be administratively withdrawn from the class.

No withdrawals will be permitted after the Last Day to Withdraw Without Grade Penalty. Students are responsible for withdrawing themselves from the class.

Incomplete Grade may be given only to students who have earned already 70% of the class grade and have documented special circumstances that preclude them from finishing the class in time. In such cases, they must complete the class by the end of the following semester, or their grade will automatically revert to the earned grade.

Academic Dishonesty

Students are expected to abide by the College's Rules on Academic Dishonesty. Be advised that:

- Cheating will not be tolerated in any form. Copying and using someone else's work to obtain credit, as well as letting someone else copy your work, is considered cheating.
  Any cheating incident will be reported to the Dean of Students and may then become part of your official student record.
- Cheating on any assignment will result in failing that assignment. A second instance of cheating will result in automatic failing of the class!
- All assignments are individual unless otherwise specified.

The use of unauthorized electronic devices during an exam is considered cheating.

Students who show a discrepancy greater than a full letter grade between their performance on two separate class assignments (in-class or outside class), may be required to take an additional exam. In that case, the instructor will decide how the additional exam grade will be factored into the overall course grade.

Disability Accommodations

No disability accommodations will be provided unless a Disability Data Sheet is provided to the instructor. Those seeking accommodations based on disabilities should obtain a Disability Data Sheet through the Counselor for Special Needs.

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PHY 243 GRADING

Grading Scale:

A: 90% or above; B: 80 – 89%; C: 70-79%; D: 60- 69%. Total of 100 points.

Course Grade

Total of 100 points. The course grade is comprised of Exams (60%), Homework (20%), Laboratory (12%), and a Research Project (8%).

Exams

Total 60 pts. There will seven exams each worth 10 pts. The lowest exam grade will be dropped from the course grade. The remaining six exam grades will count towards the total exam grade.

On exam days, students will be allowed to bring a 3×5 one-sided annotated card to serve as their formula sheet.

No late or make-up exams will be given regardless of the circumstances. For students who know in advance that they will not be able to take an exam at the scheduled time, an arrangement may be made for that exam to be taken at **EARLIER** time.

Homework

Total 20 pts. The homework will be in the form of weekly online quizzes due 11:59 pm either on Tuesday or Friday. The quizzes will be posted on Blackboard.

No more than 20 pts will count toward the Quiz grade.

No late quizzes will be accepted. The most current quiz deadlines will always be posted on Blackboard. It is the student's responsibility
to know when each quiz is due.

Lab Grade

Total 12 pts. All labs and assignments are 1 pts each. For students who have missed a lab, there will be one extra lab experiment assigned at the end of the semester to make up for any missed lab work. There will be no lab make-ups.

Students who do not adhere to the lab policies will be required to leave the physics lab room.

Research Projects

Total 8 pts. Each student will select an instrument based on modern physics and will research on how it works. Students will then present their findings in class during the last week of classes.

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PHY 243 SCHEDULE 14W

Module 1 Photons: Waves behaving like particles

	Jan. 27	Feb. 3
Thu 11:59 pm		Problem Quiz 38 Lab Photoelectric Effect*
Fri 10 – 12 pm	Introduction Review	Ch. 38 Problem Solving Review for Ch. 39
Fri 12 – 2 pm	Ch. 38 Photons	Lab Photoelectric Effect
Mon 11:59 pm	Conceptual Quiz 38	

Module 2 Wave Nature of Particles

	Feb. 10	Feb. 17
Thu 11:59 pm		Problem Quiz 39 Lab Atomic Spectra*
Fri 10 – 12 pm	**Test Ch. 38**	Ch. 39 Problem Solving Review for Ch. 40
Fri 12 – 2 pm	Ch. 39 Wave Nature	Lab Analysis of Light
Mon 11:59 pm	Conceptual Quiz 39	

Module 3 Quantum Mechanics

	Feb. 24	Mar. 3
Thu 11:59 pm		Problem Quiz 40

		Lab QM Waves*
Fri 10 – 12 pm	**Test Ch. 39**	Ch. 40 Problem Solving Review for Ch. 41
Fri 12 – 2 pm	Ch. 40 Quantum Mechanics	Lab Spectral Analysis
Mon 11:59 pm	Conceptual Quiz 40	

Module 4 Atoms, Molecules, Solids

	Mar. 17	**Mar. 24**
Thu 11:59 pm		Problem Quiz 41 Lab Bound States*
Fri 10 – 12 pm	**Test Ch. 40**	Ch. 41 Problem Solving Ch. 42 Molecules Review for Ch. 43
Fri 12 – 2 pm	Ch. 41 Atomic Structure	Lab Bragg Diffraction
Mon 11:59 pm	Conceptual Quiz 41	**Presentation Topics**

Module 5 Nuclear Physics and Radioactivity

	Mar. 31	**Apr. 7**
Thu 11:59 pm		Problem Quiz 43 Lab NMR*
Fri 10 – 12 pm	**Test Ch. 41**	Ch. 43 Problem Solving Review for Ch. 37
Fri 12 – 2 pm	Ch. 43 Nuclear Physics	Lab NMR Lab Half-life
Mon 11:59 pm	Conceptual Quiz 43	Lab Radioactive Dating*

Module 6 Special Theory and Research Projects

	Apr. 14	**Apr. 21**
Thu 11:59 pm		Problem Quiz 37
Fri 10 – 12 pm	**Test Ch. 43**	Ch. 37 Problem Solving
Fri 12 – 2 pm	Ch. 37 Special Theory of Relativity	Lab Speed of Light

Mon 11:59 pm	Conceptual Quiz 37	**Presentation Outline**

Module 7 Contemporary Topics: Condensed Matter, Particles, Astrophysics

	Apr. 28	May 5
Thu 11:59 pm		
Fri 10 – 12 pm	**Test Ch. 37**	**Final Exam**
Fri 12 – 2 pm	Particles/Astrophysics	**Presentations**
Mon 11:59 pm		

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