PHYS 215: Introductory Quantum Physics
January - April 2023

Instructor: Prof. Michel Lefebvre
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Office Hours: See Brightspace site.
Course Webpage: Brightspace

This course will be conducted in a synchronous teaching model. This means there will be fixed time commitments for face-to-face lectures; recorded lectures will be available shortly after each lecture.

Lectures: 08:30 - 09:50, Mondays and Thursdays in Elliott 060
First lecture: Monday 9 January 2023

Required courses

Prerequisites:	PHYS 110 and 111; or PHYS 120 and 130
Pre- or co-requisites:	MATH 204

Required for the course

- Textbook: *Modern Physics for Scientists and Engineers*, **4th edition or 5th edition**, S.T. Thornton and A. Rex. Older editions are also acceptable, but there are a few differences between the texts.
- Ability to produce one easily readable PDF file from multi-page handwritten work.
- An internet connection with enough bandwidth to support the conduct of an online courses or exams if needed.

Topics covered

The course covers the experimental basis of quantum mechanics, the atomic structure and wave properties of matter, the time-independent Schrödinger equation, wave functions and probability, and an introduction to the Hydrogen atom. The topics covered correspond to Chapter 1, a brief review of relativistic energy and momentum from Chapter 2, Chapters 3, 4, 5, 6, and part of Chapter 7:

Chapter 1: The Birth of Modern Physics
Chapter 2: Selected topics on Review of Relativistic Kinematics
Chapter 3: The Experimental Basis of Quantum Theory
Chapter 4: Structure of the Atom
Chapter 5: Wave Properties of Matter and Quantum Mechanics I
Chapter 6: Quantum Mechanics II
Chapter 7: Selected topics on The Hydrogen Atom

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Midterm Exams
There will be two 50-minute midterm exams held during class time:
Midterm Exam 1: Thu 16 Feb 2023
Midterm Exam 2: Mon 27 Mar 2023

Final Exam
The final exam will be held during the April exam period. The date is centrally scheduled, and normally finalized in late February. **You must write the final exam to obtain credit for this course.**

Note on Midterm and Final Exams
If exams are face-to-face: you will be allowed to bring one letter size piece of paper with any handwritten notes on it, both sides.
If exams are required to be online: exams will be "open book", which means you can use your textbook (including e-book), all your notes, and all the course material available on Brightspace. You will not be allowed to communicate with anyone during the exams, and you will not be allowed to share any information about the exam with others.

Remote proctoring of exams (if needed)
If exams must be online, for the midterm and final exams you will be required to log into a Zoom session. You will be required to share a webcam image: your camera must be pointed horizontally at you -- in such a way that others cannot see your actual work, but so that invigilators can see you and your hands (this situation is similar to that of a normal in-person exam). If you are not visible, your exam will not be accepted.
• You are expected to use a device which is capable of doing this;
• You are expected to have a connection with enough bandwidth to support this requirement.
You are expected to write your answers by hand on paper. When finished (anytime during the exam), you will need to scan your answers into ONE clearly readable PDF file, and to upload this file on Brightspace before leaving the Zoom meeting.

Labs
Labs start the week of 9 January with an Introduction. Actual Labs are scheduled to start the week of 16 January.
To obtain credit for the course, you must receive an overall passing grade in the lab component.
The due dates for the lab reports will be at the end of the lab period for the one week labs and the end of the second lab period for the two week labs. There is no requirement to complete previous labs before doing a lab.
Your instructors for the PHYS215 labs are assigned as follows:
Section B01: Elliott 139 Mondays 14:30-17:30 Alex Schmid <aschmid@uvic.ca>.
Section B02: Elliott 139 Tuesdays 14:30-17:30 Rob Rempel <drempel@uvic.ca>.
Section B03: Elliott 139 Thursdays 16:30-19:30 Alex Schmid <aschmid@uvic.ca>.
Please do not hesitate to contact your lab instructor if you have any issues with the labs.

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Assignments

There will be approximatively 6 assignments, typically due one to two weeks after the issue date. Assignments will be administered though Brightspace, which means you will have to upload a PDF document clearly showing your work.

Assignment Policy:

- you are allowed to collaborate on assignments, so long as your work and your solutions are your own;
- you are expected to treat your assignments with respect. Assignments that are disorganized or difficult to read will receive reduced marks at the marker's discretion;
- late assignments are not accepted. If you miss an assignment for a valid reason, then this assignment will not count toward your final assignments grades.

Marking and Grades

Your final grade is obtained from the following marking scheme:

Assignments	20%	approximately 6 assignments
Labs	20%	must be passed
Midterm 1	15%	50-minute exam 16 Feb 2023 during class time
Midterm 2	15%	50-minute exam 27 Mar 2023 during class time
Final exam	30%	3-hour exam, April Exam Period

If the application of this scheme would result in grades that are judged by the instructor to be inconsistent with the University's grading descriptions, then the instructor will assign percentages consistent with them.

Notwithstanding the weighting and procedure explained above:

- If you do not write the final exam you will be assigned an "N";
- If you exhibit inadequate performance on the labs you will be assign an "F".
- If you obtain less than 50% on both midterms and on the final exam, you will be assigned an "F".
- A maximum course grade of 49% will be assigned to "N" and "F" grades.

Accommodation

Arrangement for reasonable accommodations for customarily accommodated issues will be considered, however this is contingent on your active participation: If you miss a course requirement, you are expected to contact the instructor as soon as reasonably possible, and you are expected to give the instructor advance warning of issues that you could have reasonably foreseen.

Conduct

Attendance of live lectures is not required, but strongly recommended. In Physics, a discipline norm is that **mastery** combines very good comprehension with the ability to demonstrate that comprehension under time pressure, such as in a timed exam situation. Full engagement with course activities includes attending live lectures, submitting all lab reports, and submitting essentially all assignments.

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Lectures Tentative Schedule

Date	Lecture Title	Text Reference
Jan 9	The Birth of Modern Physics	1.
Jan 12	Review of Relativistic Kinematics	2.11-13
Jan 16	The Experimental Basis of Quantum Theory	3.
Jan 19	The Experimental Basis of Quantum Theory	3.
Jan 23	The Experimental Basis of Quantum Theory	3.
Jan 26	The Experimental Basis of Quantum Theory	3.
Jan 30	Structure of the Atom	4.
Feb 2	Structure of the Atom	4.
Feb 6	Structure of the Atom	4.
Feb 9	Structure of the Atom	4.
Feb 13	Wave Properties of Matter and Quantum Mechanics I	5.
Feb 16	MIDTERM EXAM 1 during class time	
Feb 21-25	Reading Break	
Feb 28	Wave Properties of Matter and Quantum Mechanics I	5.
Mar 2	Wave Properties of Matter and Quantum Mechanics I	5.
Mar 6	Wave Properties of Matter and Quantum Mechanics I	5.
Mar 9	Quantum Mechanics II	6.
Mar 13	Quantum Mechanics II	6.
Mar 16	Quantum Mechanics II	6.
Mar 20	Quantum Mechanics II	6.
Mar 23	Quantum Mechanics II	6.
Mar 27	MIDTERM EXAM 2 during class time	
Mar 30	The Hydrogen Atom	7.
Apr 3	The Hydrogen Atom	7.
Apr 6	The Hydrogen Atom	7.

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University Regulations on Academic Integrity
Cheating, plagiarism, and other form of academic fraud are taken very seriously by the University and by the instructor. Please familiarize yourself with the University Policy on Academic Integrity and with the Student Code of Conduct.

Academic integrity requires commitment to the values of honesty, trust, fairness, respect, and responsibility. Any action that contravenes this standard, including misrepresentation, falsification or deception, undermines the intention and worth of scholarly work and violates the fundamental academic rights of members of our community.
Several types of academic integrity violations are covered in brief below.

Plagiarism
A student commits plagiarism when he or she:
- submits the work of another person as original work;
- gives inadequate attribution to an author or creator whose work is incorporated into the student's work, including failing to indicate clearly the inclusion of another individual's work;
- paraphrases material from a source without sufficient acknowledgement as described above.

Students who are in doubt as to what constitutes plagiarism in a particular instance should consult their course instructor.

Falsifying Material Subject to Academic Evaluation
Falsifying materials subject to academic evaluation includes, but is not limited to:
- fraudulently manipulating laboratory processes, electronic data or research data in order to achieve desired results;
- using work prepared by someone else (e.g., commercially prepared essays) and submitting it as one's own;
- citing a source from which material was not obtained;
- using a quoted reference from a non-original source while implying reference to the original source;
- submitting false records, information or data, in writing or orally;

Cheating on Assignments, Tests/Quizzes and Examinations
Cheating includes, but is not limited to:
- copying the answers or other work of another person;
- sharing information or answers when doing take-home assignments, tests and examinations except where the instructor has authorized collaborative work;
- having in an examination or test any materials or equipment other than those authorized by the examiners impersonating a candidate on an examination or test, or being assigned the results of such impersonation;
- assisting others to engage in conduct that is considered cheating.