WAVES, ELECTRICITY AND MAGNETISM WINTER 2022

PHYS 122

Published Jan 05, 2022

CLASS SCHEDULE

Section	Location	Time	Instructor(s)
PHYS 122 001 *[LEC]*	DC 1350	Mondays & Wednesdays 10 a.m. - 11:20 a.m.	Karen Cummings karenc@uwaterloo.ca
PHYS 122 002 *[LEC]*		Mondays & Wednesdays 8:30 a.m. - 9:50 a.m.	
PHYS 122 101 *[TUT]*	B1 271	Tuesdays 5:30 p.m. - 7:20 p.m.	
PHYS 122 102 *[TUT]*	OPT 347	Tuesdays 10:30 a.m. - 12:20 p.m.	
PHYS 122 103 *[TUT]*	MC 2066	Tuesdays 5:30 p.m. - 7:20 p.m.	
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INSTRUCTOR / TA INFORMATION

Name	Role	Contact Info
Owen Lambert	On-line Learning Assistant (OLA) **Contact person for all course related questions and/or concerns.**	**PHYS122@uwaterloo.ca**
Karen Cummings	Instructor	karenc@uwaterloo.ca
Learn Help	Help with LEARN and TEAMS	learnhelp@uwaterloo.ca
MasteringPhysics Help	Help with Mastering and e-texts	https://support.pearson.com/getsupport/s/

All correspondence related to PHYS122 MUST go to PHYS122@uwaterloo.ca
(mailto:PHYS122@uwaterloo.ca)

Messages will be read regularly and directed to the appropriate person for follow-up. Typically, someone (Owen, a TA or an instructor) will reply within 1 business day. Feel free to follow-up if you have not heard back from us in three business days.

COURSE DESCRIPTION

> *Calendar Description for PHYS 122*
>
> Simple harmonic motion, resonance, damped harmonic motion, complex numbers, wave motion and sound, electrostatic force and potential, electric current and power, capacitors, DC circuits, LRC circuits, introduction to magnetic fields Lorentz Force. [Offered: W, S; also offered online: S]
>
> Prereq: One of PHYS 111 (minimum grade 70%), 115, 121, ECE 105. Coreq: One of MATH 127, 137, 147. Antireq: PHYS 112, 125

Overview

This course will be taught as six two-week modules. Students will practice problem solving using an on-line homework system called MasteringPhysics which is available from the commercial publisher, Pearson. Students will also work in synchronous on-line groups ONCE per week during time slots scheduled for tutorial. Groupwork will be evaluated in three ways: TA "check-outs" , submission of an individual learning artifact and peer ratings. There will be tightly-timed quizzes every two-weeks and a final exam. These will be held on-line on CrowdMark.

LEARNING OUTCOMES

No explicit learning outcomes defined for this course.

TENTATIVE COURSE SCHEDULE

Module # week #s (Lecturer)	Topic(s)	Dates:	Chapter in *University Physics*
Module 1 Week 1 & 2	1. Mathematical review: derivatives and integrals of polynomials and trigonometric functions, dot- and cross-products, solving multiple equations with multiple unknowns 2. Mathematical and physical representations of simple harmonic motion including energy considerations with examples from springs and pendula. Mastering Due: Jan. 14 at midnight. Quiz: Jan. 17 at 8 PM	Jan. 5-14	Math Review Chapter 14

Module 2 Week 3&4	3. Mathematical and physical representations of waves, wave speed and energy considerations, waves on strings, normal modes. 4. Sound, interference, doppler shifting. Mastering Due: Jan. 28 at midnight. Quiz: Jan. 31 at 8 PM	Jan. 15-28	Chapters 15 and 16
Module 3 Week 5&6	5. Charge, electrostatic force, electric fields, electric dipoles. 6. Electric flux, Gauss's law, the nature of charge on conductors. Mastering Due: Feb. 11 at midnight. Quiz: Feb. 14 at 8 PM	Jan. 29- Feb. 11	Chapters 21 and 22
Module 4 Week 7&8	7.Electric potential and potential energy, equipotential surfaces, potential gradients. 8.Capacitance, capacitors in series and parallel, energy and charge in capacitors, dielectrics. Mastering Due: March 4 at midnight. Quiz: March 7 at 8 PM	Feb. 12-March 4 Reading Week Feb. 21-25	Chapters 23 and 24
Module 5 Week 9&10	9. Current, voltage, emf, resistance and resistivity, conduction, energy and power in electric circuits. 10. DC circuits, resistors in series and parallel, Kirchhoff's Laws, R-C circuits, electrical measurements and power distribution. Mastering Due: March 18 at midnight. Quiz: March 21 at 8 PM	March 5 -18	Chapters 25 and 26
Module 6 Week 11&12	11. Magnets, magnetic field, field lines, flux, moving charge in a magnetic field, force on current-carrying wires, current loops, motors, Hall effect. 12. Magnetic field for moving charge, current element, current-carrying wire. Force between wires, Ampere's law, magnetic materials. Mastering Due: April 1 at midnight. Quiz: April 4 at 8 PM	March 19- April 4 Last day of classes	Chapters 27 and 28

TEXTS / MATERIALS

Title / Name	Notes / Comments	Required
University Physics by Young and Freedman 14th Ed.	May purchase printed text or e-text. Previous editions or alternative texts are fine.	Yes
MasteringPhysics	On-line homework system.	Yes

Please register for MasteringPhysics on the first day of class and get started on the first homework. If you paid for an e-text and/or MasteringPhysics last term, the code should carryover to both PHYS122 and PHYS124. You do not need to pay again.

If you did not purchase a code last term, there is a 14-day free trial period on MasteringPhysics. If you are taking both PHYS122 and PHYS124 you only need to purchase an e-text and access code for MasteringPhysics once. The code and/or text will work in both courses. Just register fully in MasteringPhysics with your code for either course. When you then register for the second course (let's say PHYS 124) Mastering will not prompt you for a new access code as it will recognize that you have already purchased access and will automatically grant you Mastering access in the second course. The same goes for e-text access. You do not need to pay twice.

For more information on MasteringPhysics pricing and registration please see materials posted on LEARN.

STUDENT ASSESSMENT

Component	Value
Mastering Physics	25%
Quizzes every other week (drop the lowest)	25%
Final exam	25%
TA Check-out at end of group meetings	5%
Peer Rating of group work	10%
Learning Artifact from group work	5%
Lecture Participation	5%

Additional Information

Final Exam (25%)
There will be an individual, tightly-timed final exam during the final exam period. More information will be provided later in the term.

Mastering Physics (25%)
There will be a MasteringPhysics assignment due for each Module (every two-weeks). The assignments will each contain about 25 required questions that should take approximately 4 hours to complete. In addition, there will be bonus questions that can be completed if desired. Answering these bonus questions can make-up for points missed

elsewhere on the assignment, or can result in a score for MasteringPhysics that is greater than 100%. Scores over 100% "roll-over" into the other categories. No points for the required questions will be dropped. Assignments are due on Friday the week the Module ends, at midnight. Your score is reduced by 2% for every hour after this. You get 5 submissions (chances) for each question. **The first assignment is due on January 14.** See the course calendar above for additional dates.

Quizzes (25%)

There will be an individual quiz on each Module. All quizzes will be taken on-line on CrowdMark. The quiz will take place the Monday following the MasteringPhysics assignment due date at 8 pm. **The first quiz will be January 17**. See the course calendar above for additional dates. If you have a conflict with this quiz time you must get permission to take the quiz at the alternative time, which is Tuesday at 8 AM. You must request permission at least 3 days ahead of time unless there is an emergency.

Each quiz will have several multiple choice questions and two long answer questions on it. You will have 60 minutes to do your work and an additional 15 minutes to upload your work. **All work submitted must be hand-written**. This can be either on paper (that is then scanned and sent back) or on a tablet (eg an iPad) and then sent as a PDF file. What is not acceptable is typed material, copied graphics, or anything else you did not write yourself.

Your lowest quiz grade will be dropped.

Group Work and Participation (25%)

Group Activities: You will meet in groups once per week. Due to Covid, all group work this term will likely be on-line. There are currently no plans for in person tutorials. Groups will meet on TEAMS as we did in PHYS 121. Group work will consist of various activities but often we will do either a conceptual tutorial or a Mastering Physics problem discussion.

Group Structure: You will be placed into learning groups of 4 people which will be changed every 4 weeks.

Preparation and Learning Artifacts: (5%) Before each meeting you will prepare for about 45 minutes. Group meetings should last about an hour. After your group meeting, you will submit your preparation work, and your notes from your group meeting, as a "learning artifact. Artifacts are submitted to a dropbox on LEARN. You are not allowed to collect the work of a group member and submit this as part of your artifact. You only submit your own work and notes. If you miss a meeting you can still submit your preparation work as your artifact for credit. **Artifacts are due each Friday at midnight**. One artifact score will be dropped.

TA Check-outs: Students should not leave their group meeting without having seen a TA for (at least) attendance. (5%) Group members who are absent receive a score of zero for the check-out. There are no make-ups. One TA check-out grade will be dropped.

Important Note Regarding TA check-out: For students who are present at the meeting, these "check-outs" will be scored as a group on a scale of 1,2,3,4 out of 4. The default score will be a 3 out of 4 or 75%. Most groups in PHYS122 will be quite good and will still get this score of 75%. Only the very best groups (top 10%) each session will get a 4 out of 4 or 100%.Groups who are not collaborating effectively will be reduced in score to a 2 or even a 1 in some cases. Please try to be collaborative and productive in your groups.

Peer Ratings: (10%) Every week following your group meeting you will rate your group members on preparedness and level of collaboration.

An absent group member must be rated 0 in both categories for the meeting they missed. You are not permitted to make other arrangements.

Ratings are submitted via a quiz on LEARN. You will need your "group member number" to be rated. (See below). These are new numbers, not the same number you had in PHYS 121. In fairness to your peers, it is very important that

you follow the guidance on ratings that is provided on LEARN. **If you do not submit this quiz you will receive a score of zero for both rating criteria for the week** unless you email PHYS122@uwaterloo.ca (mailto:PHYS122@uwaterloo.ca) to request an extension within one week. Two rating scores will be dropped.

Lecture Participation (5%) Recorded lectures from last term covering all material will be posted. During our lecture time on Monday and Wednesday we will meet for short review lectures and group problem solving practice. (This will occur live on TEAMs if we are on-line and will NOT be recorded. This will occur live and in our classroom if we are allowed to meet in person.) We will take attendance at each lecture. If you achieve a score of 75% on the attendance for the term you will receive the 5%. Otherwise, you will not. If you know that you have an on-going conflict that prevents you from attending one or both lectures each week, you must contact PHYS122@uwaterloo.ca in the first month of the term to request an exemption. If a conflict develops during the term you have 14 days to report the conflict to PHYS122@uwaterloo.ca and request an exemption.

Academic Integrity: Your handwritten answers to all assignments, quizzes, or tests must be your own work.Your answers will be scrutinized for comparison to answers that others have handed in and to what is available on the internet. The following policies will be employed:

1) Any work not handwritten will be rejected and given a grade of 0.
2) Any work handed in that is deemed to be too similar to anything we can find online will be flagged, the assignment given 0, and the student handing it in will be reported to the Dean's Office immediately, and possibly investigated under policy 71 (student discipline) of the University of Waterloo.
3) If any answers handed in appear to be too similar to work handed in by one or more other people, all such work will be flagged, all such assignments/tests given 0, and all students involved will be will be reported to the Dean's Office immediately, and possibly investigated under policy 71 (student discipline) of the University of Waterloo.

Additional information on the CROWDMARK system and the honor code for quizzes will be available around the time of the first quiz.

ASSIGNMENT SCREENING

No assignment screening will be used in this course.

ADMINISTRATIVE POLICY

You will be given a Group Member Number. Your group members will use this number to rate you on the Rating Quizzes. You will also use this number to know which problem you are assigned for MasteringPhysics Discussion meetings. To get your Group Member Number, go to LEARN and look under GRADES.

Territorial Acknowledgement: The University of Waterloo acknowledges that much of our work takes place on the traditional territory of the Neutral, Anishinaabeg and Haudenosaunee peoples. Our main campus is situated on the Haldimand Tract, the land granted in a legally binding treaty to the Six Nations that includes six miles on each side of the Grand River. Our active work toward reconciliation takes place across our campuses through research, learning, teaching, and community building, and is centralized within our Indigenous Initiatives Office (https://uwaterloo.ca/indigenous) .

UNIVERSITY POLICY

Academic integrity: In order to maintain a culture of academic integrity, members of the University of Waterloo community are expected to promote honesty, trust, fairness, respect and responsibility. [Check the Office of Academic Integrity (https://uwaterloo.ca/academic-integrity/) for more information.]

Grievance: A student who believes that a decision affecting some aspect of their university life has been unfair or unreasonable may have grounds for initiating a grievance. Read Policy 70, Student Petitions and Grievances, Section 4 (https://uwaterloo.ca/secretariat/policies-procedures-guidelines/policy-70) . When in doubt, please be certain to contact the department's administrative assistant who will provide further assistance.

Discipline: A student is expected to know what constitutes academic integrity to avoid committing an academic offence, and to take responsibility for their actions. [Check the Office of Academic Integrity (https://uwaterloo.ca/academic-integrity/) for more information.] A student who is unsure whether an action constitutes an offence, or who needs help in learning how to avoid offences (e.g., plagiarism, cheating) or about "rules" for group work/collaboration should seek guidance from the course instructor, academic advisor, or the undergraduate associate dean. For information on categories of offences and types of penalties, students should refer to Policy 71, Student Discipline (https://uwaterloo.ca/secretariat/policies-procedures-guidelines/policy-71) . For typical penalties, check Guidelines for the Assessment of Penalties (https://uwaterloo.ca/secretariat/guidelines/guidelines-assessment-penalties) .

Appeals: A decision made or penalty imposed under Policy 70, Student Petitions and Grievances (https://uwaterloo.ca/secretariat/policies-procedures-guidelines/policy-70) (other than a petition) or Policy 71, Student Discipline (https://uwaterloo.ca/secretariat/policies-procedures-guidelines/policy-71) may be appealed if there is a ground. A student who believes they have a ground for an appeal should refer to Policy 72, Student Appeals (https://uwaterloo.ca/secretariat/policies-procedures-guidelines/policy-72) .

Note for students with disabilities: AccessAbility Services (https://uwaterloo.ca/accessability-services/) , located in Needles Hall, Room 1401, collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with AccessAbility Services at the beginning of each academic term.

Turnitin.com: Text matching software (Turnitin®) may be used to screen assignments in this course. Turnitin® is used to verify that all materials and sources in assignments are documented. Students' submissions are stored on a U.S. server, therefore students must be given an alternative (e.g., scaffolded assignment or annotated bibliography), if they are concerned about their privacy and/or security. Students will be given due notice, in the first week of the term and/or at the time assignment details are provided, about arrangements and alternatives for the use of Turnitin in this course.

It is the responsibility of the student to notify the instructor if they, in the first week of term or at the time assignment details are provided, wish to submit alternate assignment.