

Physics 1202B – Physics for the Sciences II Course Outline

1. Course Information

Course Information

An introductory laboratory-based course in physics covering the principles of oscillations and waves, fluids, electric fields and potential, capacitance, DC circuits, magnetic fields, and electromagnetic induction. Fundamental physics concepts are introduced with examples in physical, biological, and medical processes to develop students' problem-solving skills.

Together with Physics 1201A, this course is a suitable prerequisite for modules having an introductory physics requirement (including modules in the Faculty of Science, modules offered by the basic Medical Science departments, and professional schools requiring a calculus-based laboratory course in physics).

Pre- or co-requisites

One of Physics 1201A or 1401A or 1501A, or a minimum mark of 80% in Physics 1101A. Calculus 1000A/B or 1500A/B or Numerical and Mathematical Methods 1412 A/B.

Anti-requisites: Physics 1402B, 1502B, the former Physics 1102B, 1029B, 1302B.

Unless you have either the prerequisites for this course or written special permission from the Department of Physics & Astronomy and your Program's Counsellors to enroll in it, you may be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

Lectures:

Labs: four 3-hour labs approximately every two weeks.

2. Instructor Information

Instructors	Contact	Office	Phone	Office Hours
Prof. Stanimir Metchev	phys1202@uwo.ca or via JIRA ticket		x88438	Mon, 1–2pm
Labs: Dr. Shailesh Nene	via JIRA ticket			
Dr. Isabelle Cyr (Coordinator)	via JIRA ticket			
TAs – Physics Help Centre	phys1202@uwo.ca			TBA

Additional help beyond Instructor office hours and TA-run Physics Help Centre:

- 3rd-year MedSci student help (Sarah Malik, Jason Lu): TBA
- PASA Help Centre: TBA.
- [Peer-Assisted Learning Centre](#)
- OWL Forum

For any course-related issues or questions, please see Prof. Metchev after class, email phys1202@uwo.ca, or create a JIRA ticket at <https://help.sci.uwo.ca/service desk/customer/portal/8>. Please, allow 48 h for a response. Instructors will not be able to respond to direct email. See Section 4 for information on Labs and the lab instructor.

Students must use their Western (@uwo.ca) email addresses when communicating with their instructors.

3. Course Syllabus, Schedule, Delivery Mode

Course delivery and assessment includes three weekly in-person lectures and demonstrations, in-class *iClicker* quizzes, on-line *Perusall* reading and annotation, on-line *Mastering Physics Dynamic Study Modules*, and an in-person laboratory component with 4 three-hour labs. Please, see the “Lab Info for Physics 1202B” document under the Syllabus tab on OWL.

Course-level learning outcomes:

The aim of this course is not only to gain a thorough understanding of the physics topics covered in class, but also to learn how to *think like a physicist* when describing phenomena or solving problems. Thus, by the end of this course, students should be able to:

- use periodic functions to quantify the displacement, velocity, acceleration, and energy in simple harmonic oscillations and waves;
- acquire an intuitive understanding of fundamental physics concepts with examples in fluids;
- provide a coherent microscopic description of electric and magnetic phenomena and use these to generate macroscopic laws;
- extend and apply Newton’s Laws of Motion and the principle of conservation of energy to electromagnetic and wave phenomena;
- use a step-by-step problem-solving strategy underpinned with conceptual understanding to logically work through complex problems;
- reason through conceptual physics problems using clear, concise writing and diagrams;
- use knowledge and/or intuition to evaluate whether the answer to a problem makes sense;
- perform appropriate experimental set-up, data collection and analysis to investigate a physical relationship;
- apply research skills such as measurement taking, uncertainty propagation, graphical analysis, and written discussion of results in the lab;
- Engage in critical analysis of a problem individually and through team effort effectively communicating your approach to others through labs, group projects and in-class activities.

Course Schedule (approximate):

Week	Y&F Sections	Topics	Perusall / DSM / Lab
1. Jan 8-12	14.1–14.3, 14.5, 14.6; 15.1, 15.2	Simple harmonic motion; energy in SHM, pendulums; Properties of waves	Perusall 1
2. Jan 15-19	15.3–15.8; 16.1, 16.2	Energy transport by waves, interference, string instruments; Properties of sound waves	Perusall 2 DSM 16
3. Jan 22-26	16.3, 16.4, 16.6, 16.7; 12.1, 12.2	Standing waves, interference, beats; Pressure, fluid flow	Perusall 3 DSM 17
4. Jan 29-Feb 2	12.3–12.6; 21.1–21.3	Continuity equation, Bernoulli's equation, turbulent flows; Electric charge, Coulomb's law	Perusall 4 Lab 1
5. Feb 5-9	21.4–21.7	Electric charge, Coulomb's law electric force and field, charge distributions, matter in electric fields	Perusall 5 DSM 21
<i>Fri, Feb 9, 4pm</i>		<i>Midterm 1 (Weeks 1 – 5)</i>	<i>Midterm 1</i>
6. Feb 12-16	22.1–22.5; 23.1–23.3	Electric flux, Gauss' law, charges on conductors; Electric potential energy and electric potential	Perusall 6 DSM 22 Lab 2
<i>Feb 19-23</i>		<i>No classes (Reading Week)</i>	<i>No classes</i>
7. Feb 26-Mar 1	23.4, 23.5; 24.1, 24.3–24.5	Equipotential surfaces, electric potential gradient; Capacitance, energy storage in capacitors, dielectrics	Perusall 7 DSM 23
8. Mar 4-8	25.1–25.5; 24.2	Current, resistance and Ohm's law, electrical power, electromotive force, safety; capacitors in circuits;	Perusall 8 Lab 3
9. Mar 11-15	26.1 – 26.4	Electric circuits, Kirchhoff's rules, electrical measurements; R-C circuits	Perusall 9 DSM 24
<i>Fri, Mar 15, 6pm</i>		<i>Midterm 2 (Weeks 6–9)</i>	<i>Midterm 2</i>
10. Mar 18-22	27.1–27.8	Magnetic force & field, magnetic flux, motion of charged particles in a magnetic field, magnetic force on current wires and loops, DC motor	Perusall 10 DSM 26 Lab 4
11. Mar 25-27	28.1–28.7	Magnetic field of moving charges/conductors/solenoids, Ampère's law	Perusall 11 DSM 28
12. Apr 1-8	29.1–29.4	Magnetic induction, Faraday's law, Lenz's law, generators, motional EMF	Perusall 12 DSM 29
<i>Apr 11-30</i>		<i>Final Exam Period</i>	<i>Final Exam</i>

4. Course Materials

- OWL:** The course OWL site is the home base and launching platform for all learning components. This is the primary method by which information will be disseminated to all students in the class outside of in-person lectures. The course OWL site will also contain additional information on suggested practice questions, links to pre-recorded lecture and problem-solving videos. A calendar with course deadlines, lecture notes, access to interim grades, announcements, etc., is also available from the course OWL site.
- Textbook:** The course textbook is hosted on *Perusall* with assigned reading/comment posts. It is a selection of chapters from two Pearson Physics textbooks by Young & Adams and Young & Freedman. These are the same materials as for PHY 1201A. You do not need a new textbook if you have already purchased this. The textbook can be accessed through the *Perusall* tab on the OWL course site.
- Mastering Physics:** Access to Pearson's *Mastering Physics*, the accompanying on-line learning resources and *Dynamic Study Modules*, is included with the textbook package. There is no need to buy a separate access code. The *Mastering Physics* materials, which include the *Dynamic Study Modules* assignments, instructional videos, and practice problems, are accessed via the *Pearson* tab on the OWL course site.
- iClicker:** In-class quizzes will be administered through the iClicker app. Make sure that you have an account in the iClicker student app with your UWO email address. *You will need the iClicker app to get credit for the in-class quizzes.* iClicker can be accessed from the iClicker tab on the OWL course site.
- Lab Manual:** Physics Laboratory Manual 2023-2024 for Physics 1202B. This Lab Manual is available for purchase on *Perusall*, or [directly](#) from the Western Bookstore. You need to purchase the second-semester lab manual separately; it is different from the first-semester lab manual. The lab manual can be accessed through the *Perusall* tab on the OWL course site.

Technical Requirements

A laptop computer or a smartphone with a wireless internet or data connection that runs the iClicker app for in-class quizzes. A calculator for the Midterm and Final exams.

5. Methods of Evaluation

Student performance will be evaluated regularly throughout the term with the following assignments:

- **12 *Perusall* Reading and Annotation assignments**, one every week, 6 annotations per assignment. All *Perusall* assignments are open at the beginning of the semester, and sequentially close on Fridays each week, after the respective material is covered. The best 10 out of 12 count toward your grade, each worth 1%. The scoring is carried out as following:
 - Contributing thoughtful questions and comments to the class discussion, spread throughout the entire reading
 - Starting the reading early
 - Breaking the reading into chunks (instead of trying to do it all at once)
 - Reading all the way to the end of the assigned reading
 - Posing thoughtful questions and comments that elicit responses from classmates
 - Answering questions from others
 - Up-voting thoughtful questions and helpful answers

Note: The annotations on *Perusall* can be seen from all students within the study group and are supposed to be strictly on the reading material and on previous annotations of peer students of the study group. *Perusall* annotations can for instance be questions or a helpful response to a question. No personal or disrespectful comments or reactions are allowed. In case of inappropriate online behaviour, the responsible student will be removed from the *Perusall* study group and will receive a mark of zero for the entire *Perusall* component of the course.

- **9 *Dynamic Study Modules on Mastering Physics***: all open at the start of the course. These should be completed as you progress through the material. Best 7 out of 9 count toward your grade, each worth 1%.
- **12 iClicker in-class quizzes**, administered approximately once a week, on any day of the week without advance notice. Best 10 of 12 count toward your grade, each worth 1%.
- **4 labs**, each worth 2.5% (0.5% pre-lab quiz and 2.0% lab report). To receive full credit:
 - complete and pass with $\geq 75\%$ mark your pre-lab quiz under Tests & Quizzes;
 - ensure that your lab worksheet score on *Gradescope* is $\geq 50\%$;
 - if both are true above, your lab score on OWL will be 100%.
- **Two Midterms**, 15% each, location and seating to be announced via OWL / PostEm:
 - Midterm 1, material from Weeks 1–5: Feb 9, 4 pm;
 - Make-up: Feb 15, 4pm;
 - Midterm 2, material from Weeks 6–9; Mar 15, 6 pm;
 - Make-up: Mar 21, 6pm.
- **Final Exam, 33%**. Cumulative, scheduled by the Registrar.

The overall course grade will be calculated as listed below:

Weekly <i>Perusall</i> assignments (best 10 out of 12)	10%
<i>Mastering Physics Dynamic Study Modules</i> (best 7 out of 9)	7%
iClicker in-class quizzes (best 10 out of 12)	10%
Laboratory exercises (4 total, 2.5% each)	10%
Midterm Exams, 15% each	30%
Final Exam (scheduled by Registrar's Office)	33%

The Department of Physics & Astronomy may, in exceptional cases, adjust the final course marks to conform to Departmental policy.

6. Student Absences

If you are unable to meet a course requirement due to illness or other serious circumstances, please follow the procedures below.

Assessments worth less than 10% of the overall course grade:

- **Perusall Reading and Annotation, Mastering Physics Dynamic Study Modules, iClicker quizzes (1% each).** No accommodations or make-up are offered; we drop the lowest two in each case. Start the online assignments ahead of the deadlines, and keep up-to-date with the *Perusall* readings. Deadlines will not be extended.
- **Absence from a Lab (2.5% each).** Please, refer to the Lab Information document.

Assessments worth 10% or more of the overall course grade:

For work totalling 10% or more of the final course grade, you must provide valid medical or supporting documentation to the Academic Counselling Office of your Faculty of Registration as soon as possible. For further information, please consult the University's medical illness policy at

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_medical.pdf.

The Student Medical Certificate is available at

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf.

- **Midterm Examinations (15% each):** There will be one make-up exam for each Midterm. That may be written with the permission of the Academic Counselling office of your home Faculty. If you missed both a midterm and its make-up and with academic counselling approval, then your midterm grade weight will be shifted to the final exam.

Absences from Final Examinations

If you miss the Final Exam, please contact the Academic Counselling office of your Faculty of Registration as soon as you can do so. They will assess your eligibility to write the Special Examination (the name given by the University to a makeup Final Exam).

You may also be eligible to write the Special Examination if you are in a "Multiple Exam Situation" (e.g., more than 2 exams in 23-hour period, more than 3 exams in a 47-hour period).

If a student fails to write a scheduled Special Examination, the date of the next Special Examination (if granted) normally will be the scheduled date for the final exam the next time this course is offered. The maximum course load for that term will be reduced by the credit of the course(s) for which the final examination has been deferred. See the Academic Calendar for details (under [Special Examination](#)).

Note: missed work can *only* be excused through one of the mechanisms above. Being asked not to attend an in-person course requirement due to potential COVID-19 symptoms is **not** sufficient on its own.

7. Accommodation and Accessibility

Religious Accommodation

When a course requirement conflicts with a religious holiday that requires an absence from the University or prohibits certain activities, students should request accommodation for their absence in writing at least two weeks prior to the holiday to the course instructor and/or the Academic Counselling office of their Faculty of Registration. Please consult University's list of recognized religious holidays (updated annually) at

<https://multiculturalcalendar.com/ecal/index.php?s=c-univwo>.

Accommodation Policies

Students with disabilities are encouraged to contact Accessible Education, which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing. The policy on Academic Accommodation for Students with Disabilities can be found at:

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic_Accommodation_disabilities.pdf.

8. Academic Policies

The website for Registrarial Services is <http://www.registrar.uwo.ca>.

In accordance with policy,

https://www.uwo.ca/univsec/pdf/policies_procedures/section1/mapp113.pdf,

the centrally administered e-mail account provided to students will be considered the individual's official university e-mail address. It is the responsibility of the account holder to ensure that e-mail received from the University at their official university address is attended to in a timely manner.

There are no restrictions on calculators. However, any "smart" devices with ethernet connectivity are not allowed.

Scholastic offences are taken seriously, and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site:

http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf.

Computer-marked multiple-choice tests and exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating.

Remote Proctoring Software may be used in this course, including in the event of health lock-down. By taking this course, you are consenting to the use of this software and acknowledge that you will be required to provide **personal information** (including some biometric data) and the session will be **recorded**. Completion of this course will require you to have a reliable internet connection and a device that meets the technical requirements for this service. More information about this remote proctoring service, including technical requirements, is available on Western's Remote Proctoring website at:

<https://remoteproctoring.uwo.ca>.

9. Support Services

Please visit the Western Engineering Academic Counselling webpage for information on add/drop courses, academic considerations for absences, appeals, exam conflicts, and many other academic related matters: <https://www.eng.uwo.ca/undergraduate/academic-support-and-accommodations/academic-counselling.html>

Students who are in emotional/mental distress should refer to Mental Health@Western (<https://uwo.ca/health/>) for a complete list of options about how to obtain help.

Western is committed to reducing incidents of gender-based and sexual violence and providing compassionate support to anyone who has gone through these traumatic events. If you have experienced sexual or gender-based violence (either recently or in the past), you will find information about support services for survivors, including emergency contacts at

https://www.uwo.ca/health/student_support/survivor_support/get-help.html.

To connect with a case manager or set up an appointment, please contact support@uwo.ca.

Please contact the course instructor if you require lecture or printed material in an alternate format or if any other arrangements can make this course more accessible to you. You may also wish to contact Accessible Education at

http://academicsupport.uwo.ca/accessible_education/index.html

if you have any questions regarding accommodations.

Learning-skills counsellors at the Student Development Centre (<https://learning.uwo.ca>) are ready to help you improve your learning skills. They offer presentations on strategies for improving time management, multiple-choice exam preparation/writing, textbook reading, and more. Individual support is offered throughout the Fall/Winter terms in the drop-in Learning Help Centre, and year-round through individual counselling.

Western University is committed to a thriving campus as we deliver our courses in the mixed model of both virtual and face-to-face formats. We encourage you to check out the Digital Student Experience website to manage your academics and well-being: <https://www.uwo.ca/se/digital/>.

Additional student-run support services are offered by the USC, <https://westernusc.ca/services/>.

This course is supported by the Science Student Donation Fund. If you are a BSc or BMSc student registered in the Faculty of Science or Schulich School of Medicine and Dentistry, you pay the Science Student Donation Fee. This fee contributes to the Science Student Donation Fund, which is administered by the Science Students' Council (SSC). One or more grants from the Fund have allowed for the purchase of equipment integral to teaching this course. You may opt out of the Fee by the end of September of each academic year by completing the online form linked from the Faculty of Science's Academic Counselling site. For further information on the process of awarding grants from the Fund or how these grants have benefitted undergraduate education in this course, consult the Chair of the Department or email the Science Students' Council at <mailto:ssc@uwo.ca>.