

Physics 1402B - Introductory Physics II

Course Information: Winter 2021

1. Course Information

Course Information

Physics 1402B (0.5 course), Introductory Physics II, Winter 2021, on-line.

List of Prerequisites

One of Physics 1301A/B or 1401A/B or 1501A/B, or a minimum mark of 70% in Physics 1028A/B, or permission of the Department.

Antirequisite(s): Physics 1021, Physics 1029A/B, Physics 1302A/B, Physics 1502A/B, the former Physics 1020, 1024, 1026

Unless you have either the requisites for this course or written special permission from your Dean 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.

2. Instructor Information

Prof. Stanimir Metchev

Office: PAB 201 (not occupied during Covid-19)

Live office hours and help sessions:

- Prof. Metchev: Mon 3–4pm ([Mon Zoom link](#)) and Thu 2–3pm ([Thu Zoom link](#)).
- TAs (Mark Suffak, Dakota Cecil): Wed 4–5pm ([Zoom link](#))
- PASA Help Centre: Tue 2–3pm ([Tue Zoom link](#)) and Thu 2–3pm ([Thu Zoom link](#)).

For course-related issues, please contact the Course Administrator, Dr. Maryam Tabeshian, via e-mail at phys1402@uwo.ca.

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

3. Course Syllabus, Schedule, Delivery Mode

A calculus-based laboratory course in physics covering the principles of electric fields and potential, capacitance, DC circuits, magnetic fields, electromagnetic induction, oscillations and waves.

Course delivery includes *Perusall* reading and annotation, lecture videos, Mastering Physics simulation learning tools, demonstration videos, Mastering Physics problem solving videos, Mastering Physics *Dynamic Study Modules*, quizzes, and a laboratory component with 4 labs. **As of January 20, 2021 all labs will be done entirely online. There is no need to change your lab section.**

Course-level Learning:

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:

- 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 periodic functions to quantify the displacement, velocity, acceleration, and energy in simple harmonic oscillations and waves.
- 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 physical 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.

This course is a "semi-asynchronous" on-line course, which means that there will be no class meetings as a group at any particular time. Instead, every student will determine his/her own schedule and rhythm for working through the course activities and materials week by week so that the course's deadlines are met. There will be no tutorials, but an on-line Help Center and live problem-solving sessions with TAs and live office hours with the instructor. All four labs will be done on-line.

Course Schedule (tentative):

Week	Y&F Sections	Topics	Perusall/Quiz/Lab
1. January 11	21.1, 21.2, 21.3	Electric Charge; Coulomb's Law	Course Outline Quiz open; Perusall #1 open
2. January 18	21.4, 21.5, 21.6, 21.7	Electric Force and Field; Charge Distributions	Perusall #1 due by end of Tue
3. January 25	23.1, 23.2, 23.3	Matter in Electric Fields; Electric Potential Energy; Electric Potential.	Perusall #2 open; Quiz #1 due by end of Fri
4. February 1	23.4, 23.5	Equipotential Surfaces; Potential Gradient	Perusall #2 due by end of Tue
5. February 8	24.1, 24.2, 24.3, 24.4, 24.5	Capacitors and Capacitance; Capacitors in Series and Parallel; Energy Storage in Capacitors and Electric Field Energy; Dielectrics	Perusall #3 open; Quiz #2 due by end of Fri
<i>February 15</i>		<i>No classes (Reading Week)</i>	<i>No classes (Reading Week)</i>
6. February 22	25.1, 25.2, 25.3, 25.4, 25.5	Electric Current; Resistance and Ohm's Law; Electrical Power; Electromotive Force; Safety.	Perusall #3 due by end of Tue; Lab #1 by end of Fri
Sun Feb 28		Midterm	Midterm
7. March 1	26.1, 26.2, 26.3, 26.4	Electric Circuits; Kirchhoff's Rules; Electrical Measurements; RC Circuits	Perusall #4 open; Lab #2 by end of Fri
8. March 8	27.1, 27.2, 27.4, 27.5	Magnetic Force & Magnetic Field; Motions of Charged Particles in a Magnetic Field	Perusall #4 due by end of Tue
9. March 15	27.6, 27.7, 27.8, 27.9, 28.1, 28.2, 28.3, 28.4	Magnetic Force on current-carrying wires; Magnetic Field of current-carrying wires; forces between wires.	Perusall #5 open; Quiz #3 due by end of Fri
10. March 22	28.5, 28.6, 28.7, 28.8, 29.1, 29.2, 29.3	Magnetic Materials; Ampère's Law; Magnetic Induction; Faraday's Law; Lenz's Law	Perusall #5 due by end of Tue; Lab #3 by end of Fri
11. March 29	29.4, 29.6 14.1, 14.2, 14.4, 14.5, 14.6	Motional EMF; Eddy Currents Simple Harmonic Motion	Perusall #6 open; Quiz #4 due by end of Fri
12. April 5	14.3 15.1, 15.2, 15.3, 15.4, 15.5, 15.6, 15.7, 15.8	Energy in SHM Properties of Waves Interference, Standing Waves	Perusall #6 due by end of Tue; Lab #4 by end of Fri

4. Labs

In order to pass the course, you must pass the laboratory component!

There are four labs this semester. All will be completed online to accommodate pandemic restrictions.

The lab component of the course is under the responsibility of Dr. Shailesh Nene. Any questions about the labs should be addressed to him (e-mail: physlab1@uwo.ca). For each Lab, please go through the Lab Checklist. You are supposed to first read and review all the information about the lab, e.g., in the Lab Manual on *Perusall*, and then do the pre-lab quiz. You need 75% to pass the pre-lab quiz and are allowed unlimited attempts. Failure to meet the 75% pre-lab quiz requirement will lead to zero on the Lab.

Lab work should be completed on the lab worksheets, and then submitted through Gradescope. You can download the worksheet for each lab from the “lab activities” section in the corresponding lab on OWL. You will need to pass the pre-lab quiz to access the worksheet. The worksheets can be completed electronically, or alternatively, printed, completed and scanned (or photographed) for submission to Gradescope. The lab worksheets will be graded as pass/fail. Therefore, if you complete the pre-lab quiz (minimum of 75%) and complete your lab worksheet in an acceptable manner and upload it to Gradescope, you will get the full 2.5% for that lab towards your final grade.

The lab data (provided for you) are also available for the respective labs on OWL. The deadlines for lab submission are included in the Course Schedule above, and will be given on the OWL calendar.

Lab contact information: Dr. Shailesh Nene, Lab Coordinator
Material Science Addition M 2203
e-mail: physlab1@uwo.ca
phone 519-661-2111, ext. 80541

Direct all laboratory related questions to Dr. Shailesh Nene, not to the course instructor.

5. Course Materials

Textbook: University Physics, Young & Freedman, 15th edition, Pearson, 2020 in combination with Mastering Physics from Pearson and with *Perusall*.
These are the same materials as for PHY 1401. You do not need a new textbook or a new Mastering Physics access code if you have already purchased these.

Mastering Physics: An access code for Mastering Physics, the accompanying on-line learning resources, and access to *Perusall* is included in the textbook package. The access code can also be bought separately, in case you bought a used textbook. There is no need to buy separate codes if you already purchased them for PHY1401. Sign into your existing Mastering Physics account at www.pearson.com/mastering. Once you are in your Pearson account ('My Courses' appears near the top left), simply look near the top right for the blue 'Enroll in a course' button. Select that and then paste in the new

courseID: **metchev91831**. the system will recognize you were already in MasteringPhysics in the Fall and permit you to join our new Mastering course without additional payment or access code!

Do not register with any other e-mail accounts such as GMail, Yahoo, etc. because if you do, **your grades may be lost** when transferring grades from the Pearson site to Western's OWL site. OWL recognizes only the e-mail addresses ending with @uwo.ca.

Lab Manual: Physics Laboratory Manual 2020-2021 for Physics 1402B/1502B. This Lab Manual will be available for purchase on *Perusall*, or [directly](#) from the Western Bookstore. You need to purchase the second-semester lab manual separately; the first-semester code will not work.

You need a Gradescope account (www.gradescope.ca) to submit your lab worksheets. Gradescope entry code: **9ZPZ69**.

Calculator: Sharp EL-510RNB or EL-510RN or Sharp EL-510RTB scientific calculator (non-programmable). This is the only calculator allowed in any quiz or exam.

OWL: The course OWL site contains a link to *Perusall* for reading and annotation; a link to Mastering Physics with Mastering Physics simulation learning tools, demonstration videos, Mastering Physics problem solving videos, Mastering Physics *Dynamic Study Modules*, and quizzes. The OWL site also contains lecture videos and links to the labs.

A calendar with course deadlines, lecture notes, access to interim grades, announcements, etc. is available from the course OWL site. To access this site, you will need to go to <https://owl.uwo.ca/> and log in using your UWO username and password. **Access to the course materials needs to be unlocked by obtaining a perfect grade on the Course Outline Quiz** on OWL about the content of this document.

Students should check OWL (<http://owl.uwo.ca>) on a regular basis for news and updates. This is the primary method by which information will be disseminated to all students in the class. Students are responsible for checking OWL on a regular basis. If students need assistance with OWL, they can seek support on the OWL Help page. Alternatively, they can contact the Western Technology Services Helpdesk. They can be contacted by phone at 519-661-3800 or ext. 83800.

Technical Requirements:

stable internet connection

computer with working microphone and webcam

Sharp EL-510RNB or EL-510RN or Sharp EL-510RTB scientific calculator

6. Methods of Evaluation

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

- 6 Perusall Reading and Annotation assignments, **every other week**, 5 annotations per assignment. Assignments open Mondays at 0:01am on odd-numbered weeks and close at 11:59pm (midnight) on Tuesday of the following week. Example: Perusall assignment #1 will be open at the start and due by midnight on Tuesday (Jan 19, 2021). Perusall assignment #2 will open at 0:01am on Monday on Jan 25 and will be due by midnight on Feb 2. The scoring in the Perusall: Reading and Annotation 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.

- 8 Dynamic Study Modules on Mastering Physics: all open at the start of the course. These should be completed as you progress to the material. Each Dynamic Study Module is worth 1.5% of your mark, for a maximum of 9% among the 8 Modules.
- 4 Quizzes, at the ends of weeks 3, 5, 9, and 11. Quizzes will open Thursday 8:00am and close Friday 11:59pm on these weeks with a duration of 90 min.
- Midterm (Feb 28) and Final Exam (TBA) under ProctorTrack. Additional information and exam timing (e.g., start, duration) will be announced in "Announcements" on OWL. These exams are scheduled by the university. The midterm exam will cover the material covered until the midterm. The final exam will cover all material of the entire course but with an emphasis of the material covered after the midterm.
- 4 labs. To receive credit for each lab:
 - ensure that your pre-lab quiz score under Tests & Quizzes is > 75%
 - ensure that your lab worksheet score on Gradescope is > 50%
 - if both of the above are true, your lab score on OWL will be 100%
 - iff at least one of the above is not true, your lab score on OWL will be 0.

The overall course grade will be calculated as listed below:

Bi-weekly <i>Perusall</i> assignments (best 5 out of 6)	10%
Mastering Physics Dynamic Study Modules (best 6 out of 8)	9%
Quizzes (best 3 out of 4)	12%
Midterm Exam (Feb 28)	25%
Final Exam (scheduled by Registrar's Office)	34%
Laboratory	10%

Important: In order to pass Physics 1402, a student must obtain:

- (1) a passing mark in the laboratory component and
(2) a mark of 50% or greater in the weighted average of the exam marks (midterm and final).
Students failing the lab component of the course and/or the exam component will be assigned a final course mark of no more than 48%.

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

Accommodated Evaluations

(1) Midterm Examinations (make-up): There will be one make-up exam for the Midterm that may be written only with the permission of the Academic Counselling office of your home Faculty. The time and date for the Midterm make-up exam will be announced on the course OWL site.

(2) Final Examination (make-up): In accordance with Senate Policy, a Special Examination will be held within thirty days of the regular final examination for students who are unable to write the regular final examination for medical or other documented reasons. To schedule a make-up final exam, please contact your faculty's Academic Counselling Office as soon as you are able to do so. They will assess your eligibility to write the Special Exam (the name given by the university to a makeup Final Exam) and inform your course instructor.

You may also be eligible to write the Special Exam if you are in a "Multiple Exam Situation".
http://www.registrar.uwo.ca/examinations/exam_schedule.html

(3) Perusall Reading and Annotation: No make-up for *Perusall* Reading and Annotation as this is a group activity! The best 5 out of the 6 will count towards the mark.

(4) Dynamic Study Modules: No make-up for Dynamic Study Modules! The best 6 out of the 8 will count towards the mark.

(5) Quizzes: No make-up for Quizzes! The best 3 out of the 4 will count towards the mark. You are advised to complete the online quizzes without waiting until the last moment in order to avoid internet problems or any other unforeseen situations. It is your responsibility to use a reliable internet service and a device for these quizzes. Do not forget to click the "Submit" button on completion.

(6) Absences from the Laboratory, Lab exemption: a missed lab will be assigned a mark of zero unless you have been granted academic consideration through either an academic counsellor at the Dean's office of your home faculty or self-reporting of absence. Incomplete lab write-ups will be assigned zero marks and counted towards your final lab grade. Students seeking academic consideration for missed labs on medical grounds or other serious circumstances must provide valid documentation to the Academic Counselling office of their home Faculty.

Any student who has taken the physics course previously and seeking lab exemption, please contact us as soon as possible (physlab1@uwo.ca). We advise you not to miss any of your lab until you receive an e-mail confirming laboratory exemption.

Any work missed without approved accommodation from academic counseling will be assigned a zero mark.

7. Accommodation and Accessibility

Accommodation Policies

Students with disabilities work with Accessible Education (formerly SSD) which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing. The Academic Accommodation for Students with Disabilities policy can be found at: https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic_Accommodation_disabilities.pdf

Students with disabilities will be individually accommodated according to the Accessible Education recommendations for the End of Week Quizzes, the Midterms and the Final, but not on the Dynamic Study Modules or the *Perusall* assignments.

Academic Consideration for Student Absence

Students will have up to two (2) opportunities during the regular academic year to use an on-line portal to self-report an absence during the semester, provided the following conditions are met: the absence is no more than 48 hours in duration, and the assessment for which consideration is being sought is worth 30% or less of the student's final grade. Students are expected to contact their instructors within 24 hours of the end of the period of the self-reported absence, unless noted on the syllabus. Students are not able to use the self-reporting option in the following circumstances:

- for exams scheduled by the Office of the Registrar (e.g., December and April exams)
- absence of a duration greater than 48 hours,
- assessments worth more than 30% of the student's final grade,
- if a student has already used the self-reporting portal twice during the academic year

If the conditions for a Self-reported Absence are *not* met, students will need to provide a Student Medical Certificate if the absence is medical, or provide appropriate documentation if there are compassionate grounds for the absence in question. Students are encouraged to contact their Faculty academic counselling office to obtain more information about the relevant documentation.

Students should also note that individual instructors are not permitted to receive documentation directly from a student, whether in support of an application for consideration on medical grounds, or for other reasons. **All documentation required for absences that are not covered by the Self-Reported Absence Policy must be submitted to the Academic Counselling office of a student's Home Faculty.**

For policy on Academic Consideration for Student Absences - Undergraduate Students in First Entry Programs, see:

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

and for the Student Medical Certificate (SMC), see:

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

Religious Accommodation

Students should consult the University's list of recognized religious holidays, and should give reasonable notice in writing, prior to the holiday, to the Instructor and an Academic Counsellor if their course requirements will be affected by a religious observance. Additional information is given in the Western Multicultural Calendar:

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

You may also be eligible to write the Special Exam if you are in a "Multiple Exam Situation" (see http://www.registrar.uwo.ca/examinations/exam_schedule.html).

8. Academic Policies

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

In accordance with policy, <http://www.uwo.ca/its/identity/activatenonstudent.html>, 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 his/her official university address is attended to in a timely manner.

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.

Remote Proctoring

Midterm and Final examinations in this course will be conducted using a remote proctoring service, such as *ProctorTrack*. 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 sessions will be **recorded**. More information about this remote proctoring service is available in the Online Proctoring Guidelines at the following link:

<https://www.uwo.ca/univsec/pdf/onlineproctorguidelines.pdf>

You will be required to keep your camera and your microphone on for the entire session, and to share your screen with the invigilator if asked to do so at any time during the exam.

Completion of this course will require you to have a reliable internet connection and a device that meets the technical requirements for this service. Information about the technical requirements are available at the following link:

<https://www.proctortrack.com/tech-requirements/>

Before the Midterm is done, an "Instruction about OWL and *ProctorTrack*" will be available on OWL in "Resources" under "Info for Exams". On *ProctorTrack* an "Onboard Test" will be conducted to make sure no technical problems arise. For this you will need a pass code which will be announced prior to the "Onboard Quiz" on OWL. Anybody having technical problems with log-on into *ProctorTrack* at the Midterm who did not practice the log-on into *ProctorTrack* via the "Onboard Quiz" will not be accommodated!

At the beginning of the *ProctorTrack* Exams you will need to show your ID, your calculator, both sides of the Equation Sheet and the empty pages of the scratch paper you will be doing your calculations on. Please keep your work on the scratch paper of the exam until the end of the term as your course instructor might want to see them via Zoom or Skype!

9. Support Services

Please visit the Science & Basic Medical Sciences Academic Counselling webpage for information on add/drop courses, academic considerations for absences, appeals, exam conflicts, and many other academic related matters: <https://www.uwo.ca/sci/counselling/>

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 Student Accessibility Services (SAS) at (519) 661-2147 if you have any questions regarding accommodations.

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/>.

Learning-skills counsellors at the Student Development Centre (<http://www.sdc.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.

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

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

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