

Course Outline

Physics 3300A: Electromagnetic Theory I

Fall 2020

Subject to change: this version 31 August 2020

Prerequisites: Physics 2101a/b and 2102 a/b or the former Physics 201/202. *Note:* 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.

Instructor: Dr. Margaret Campbell-Brown

Office: 239 P&A Building

Office hours: M 1:30 – 2:30 pm by Zoom, or Zoom by appointment

[<https://westernuniversity.zoom.us/j/93458599068>]

Email: Margaret.Campbell@uwo.ca

Teaching Assistant:

Mohammed Chamma (mchamma@uwo.ca)

Course time: Lectures: Online (Zoom) Monday, 10:30am to 12:30pm;
[<https://westernuniversity.zoom.us/j/98607769586>]

In-person and Zoom (check schedule on OWL site): Wednesday, 10:30am to 11:30am

Location: WSC 55

Course Description:

A study of static electric and magnetic fields using vector calculus; time varying electric and magnetic fields, Maxwell's equations and solutions; radiation, wave propagation in continuous and discontinuous media, other topics as time permits

Learning Outcomes:

By the end of the course, students should be able to:

- Select an appropriate method to solve for electric potential or field in the vicinity of a static charge distribution in vacuum or linear media
- For certain types of symmetry, solve electrostatic problems using methods including Coulomb's Law, Gauss's Law, separation of variables, the method of images, and multipole expansion
- Apply the Biot-Savart Law and Ampere's Law to determine the magnetic field of static current distributions in vacuum and in linear media
- Show that the laws of geometric optics originate with Maxwell's equations at dielectric boundaries
- For certain types of symmetry, solve for induced electric and magnetic fields using Faraday's and Ampere's laws

Course Materials:

Text: [Introduction to Electrodynamics \(4th ed.\)](#), David J. Griffiths

Students will also need a non-graphing, non-wifi calculator for some exams.

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.

In order to participate in Zoom classes and office hours, students should have a stable internet connection capable of streaming video.

Lectures:

Monday lectures, and many Wednesday lectures, will be on Zoom [<https://westernuniversity.zoom.us/j/98607769586>]. You must join with your .uwo email or you will be denied entry. I encourage you to use your full [preferred] name as your screen name, but if you prefer to use a pseudonym you may do so, if you email me ahead of time and tell me what it is. The lectures will be recorded and posted to the OWL site within 48 hours of the lecture. You are encouraged to ask questions throughout the lecture: you may raise your hand and ask with audio and/or video, or you may post a question in the chat, either to the whole class or to me privately. If you send the question privately, I will read it to the class but I will not include your name. If you ask a question and do not wish your face or voice to be included in the lecture recording, I will edit you out of the video before posting it: you can let me know for specific lectures or give me your preference for the entire term. I will post public comments with the lecture video, but I will edit out private comments.

Wednesday lectures will sometimes be in-person. If you cannot or prefer not to attend in person, I will record and post video of the lectures within 48 hours of the class. I will arrange for the camera to be pointed exclusively at myself and at the board. If you ask a question in class and prefer not to have it included in the video, I will edit your voice out of the recording, though I will include my answer.

The purpose of posting the lecture recordings is to allow students who have a conflict to attend classes asynchronously. It is not to provide an archive of classes for studying. For this reason, **class recordings will be deleted after 10 days**. You are responsible for viewing missed lectures in a timely way, and for getting notes from a colleague if you are not able to view the lecture.

Method of Evaluation:

- Assignments: 30%
- Reading comments 5%
- OWL quizzes 15%
- Midterm Test 20%
- Final Exam: 30%

Assignments: approximately 1 assignment every 2 weeks (6 assignments total)

Each assignment will consist of three to six problems, plus four to eight short answer questions. The problems will be long answer, with most marks awarded for the method of problem solving. **Assignments are due by 4 pm on their due date.**

The due date will be given when the problems are assigned. Late assignments will be penalized 10% per day for up to four days: assignments will not be accepted more than four days past the due date.

Each student has 4 “late days” which they may use without notifying the professor, and without securing accommodation; no penalty will be applied to assignment grades for these days. These days will be automatically tallied as they are used, and may be used once for a single assignment, or spread over up to four assignments as needed. After the four late days have been used, the 10% per day penalty will be applied to any further late days.

Students may complete assignments on paper, scan them, and upload them, or they may complete them electronically (the LaTeX typesetting software is math-friendly; basic instructions and examples are supplied on the OWL site). In either case, the assignment must be submitted as a single pdf file (except where other files have been requested), and must be of good quality (not poorly lit, blurred, cut off, or including large borders with table tops etc). Pages must be in order in the pdf. If handwritten, writing must be clearly legible. Poorly formatted assignments will lose marks, and a grade of 0 may be assigned in particularly egregious cases. **Make sure that your name and the assignment number are in the file name and on the paper (e.g. “LeslieChen_Phys3300_A1.pdf”).**

Students may consult with one another when completing assignments, but every student must submit his or her own work. No peer consultation will be permitted on the exams.

Reading comments:

Each week, you will be assigned textbook sections and notes to read. You must then log on to Perusall through the “Readings” tab in OWL and leave comments on the course notes uploaded there. You will be graded by AI on how thoughtful your comments and questions are. You may answer other students’ questions and comment on their comments; at the moment, you will be anonymous to one another, but identified to me. You will receive full marks for the reading if you enter enough thoughtful comments, and will receive 0 if you do not meet the threshold. Aim for at least 10 comments. Your lowest two grades for readings will be dropped, but try not to miss a week. I will use the comments to direct the lectures, focusing on material which is the greatest source of confusion. Note that to log on to Perusall, you must enter your Western user ID (the first part of your email without the @uwo.ca) so that you will receive credit.

Bi-Weekly Quizzes:

There will be 6 quizzes through the term, of which the best 5 will count toward your grade. Quizzes are not collaborative: you should not consult with your colleagues when completing them. They will be available on OWL for 24 hours, and you will have 30 minutes to complete them (it should take less time than this). If you have an accommodation which allows you more time for tests, I will arrange for your quiz to be open longer. You need not obtain accommodation for missing a quiz, since you need only complete 5 quizzes to get full marks. If you do complete all the quizzes, your lowest grade will be dropped.

Midterm test:

There will be **one midterm**, held during class time, on October 28. A formula sheet will be provided, and will be available before the test for studying. A non-graphing, non-wi-fi enabled calculator is permitted. No other aids are permitted, including extra sheets, computers, cell phones, smart watches, PDAs, advanced calculators or other electronic devices.

Final Exam:

The final exam is cumulative, and will consist of approximately 5 problems plus 10 short answer questions. A formula sheet will be provided. A non-graphing, non-wi-fi enabled calculator is permitted. No other aids.

Important dates:

9 Sept: first class (WSC 55)
15-16 Sept: Quiz 1
21 Sept: Assignment 1 due
29-30 Sept: Quiz 2
5 Oct: Assignment 2 due
12 Oct: Thanksgiving Monday (no class)
13-14 Oct: Quiz 3
19 Oct: Assignment 3 due
26 Oct: Quiz 4
28 Oct: Midterm (WSC 55)
2-8 Nov: Fall reading week (no class)
9 Nov: Assignment 4 due
17-18 Nov: Quiz 5
23 Nov: Assignment 5 due
1-2 Dec: Quiz 6
7 Dec: Assignment 6 due
9 Dec: Final class
Final exam date TBA

Grade policy:

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

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

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).

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 Academic Calendar for details (under [Special Examinations](#)).

If students exceed 4 late days and need accommodation for missed or late assignments, they must seek accommodation from the Dean's Office. Note that, since assignments are normally available two weeks before their due date, accommodation must cover a significant part of that time interval.

Students who miss the midterm with academic accommodation from the Dean's Office may write a makeup test.

If you miss the 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).

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.

Contingency plan for an in-person class pivoting to 100% online learning

In the event of a COVID-19 resurgence during the course that necessitates the course delivery moving away from face-to-face interaction, all remaining course content will be delivered entirely online, either synchronously (i.e., at the times indicated in the timetable) or asynchronously (e.g., posted on OWL for students to view at their convenience). The grading scheme will **not** change. Any remaining assessments will also be conducted online as determined by the course instructor.

All of the remote learning sessions for this course will be recorded. The data captured during these recordings may include your image, voice recordings, chat logs and personal identifiers (name displayed on the screen). The recordings will be used for educational purposes related to this course, including evaluations. The recordings may be disclosed to other individuals participating in the course for their private or group study purposes. Please contact the instructor if you have any concerns related to session recordings.

Participants in this course are not permitted to record the sessions, except where recording

is an approved accommodation, or the participant has the prior written permission of the instructor.

Only non-graphing, non-wifi enabled calculators will be permitted during midterm tests and the final exam. No other aids or electronic devices are permitted.

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.

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>.