

Physics 3300 A: Electromagnetic Theory I

Fall 2026 (Version 1.0, August 18, 2026)

Course Information: Physics 3300A, Electromagnetic Theory I, Three lecture hours per week, Tuesdays 10:30am-12:30pm and Thursdays 11:30am-12:30pm, in PAB 117

Prerequisites: Physics 2101A/B; Physics 2104A/B (or the former Physics 2102A/B); Calculus 2302A/B or Calculus 2502A/B (or Numerical and Math Methods 2276A/B or Numerical and Math Methods 2277A/B or the former Applied Math 2276A/B or the former Applied Math 2277A/B).

→ Physics 3300 requires a good command of multivariable vector calculus ←

Instructor: Prof. Aaron Sigut, PAB 124, asigut@uwo.ca, (519) 679-2111 x86718. My office hours will be set via a Brightspace poll during the second week of class.

Learning Objectives: Topics include: electrostatics; electric fields in matter; magnetostatics; magnetic fields in matter; electromagnetic induction; Maxwell's equations.

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

1. Select an appropriate method to solve for the electric potential and electric field given a static charge distribution in a vacuum or linear material.
2. Solve electrostatic problems using methods including Coulomb's law, Gauss's Law, the method of images, the multiple expansion, and Laplace's equation.
3. Apply the Biot-Savart Law and Ampere's Law to determine the magnetic field of steady current distributions in a vacuum or linear material.
4. Solve for induced induced electric and magnetic fields using Faraday's and Ampere's laws.
5. Show that Maxwell's equations imply the conservation of electric charge and predict the existence of electromagnetic waves.
6. Confidently use the tools of multivariable vector calculus implied above.

Text: *Introduction to Electrodynamics, Fifth Edition*, David J. Griffiths, (2024, Cambridge University Press). The fourth edition is very similar to the fifth and could be used; however, all class references to the text will be for the fifth edition. The text is available from the Western Bookstore at a cost of \$83 (ebook) or \$84.65 (paperback). Note that Griffiths also serves as the textbook for Electromagnetic Theory II, Physics 4351B.

Evaluation: Three assignments, three tests, and a final exam will determine your grade (Table 1).

Component	Date	Weight
Assignment 1	Tuesday, September 22	5.0%
Test 1	Tuesday, September 29	15.0%
Assignment 2	Tuesday, October 20	5.0%
Test 2	Tuesday, October 27	15.0%
Test 3	Tuesday, November 24	15.0%
Assignment 3	Tuesday, December 1	5.0%
Final Exam	TBD (December 11-22)	40.0%

Please review the following test and assignment policies carefully. Substantial changes to these policies have been made by the Faculty of Science for the 2026 academic year.

Tests: There are three course tests subject to the following:

- Tests are optional, but at least one test must be completed to be allowed to write the final exam. You do not need to seek academic accommodation to miss a test.
- The weight of any test you choose not to write is redistributed to your final exam. For example, if you decide to write test one but not tests two and three, an extra 30% is placed on your final exam.
- All tests are closed-book. A formula sheet will be provided which includes the inside front and back covers of the text (Vector derivatives; Fundamental theorems; Basic equations of electrodynamics; Fundamental constants; Spherical and cylindrical coordinates). No other notes or aids are permitted.
- A Sharp EL-5xx series calculator, or other calculator without text capacity, is permitted during the tests. No other electronic devices are permitted.

Assignments: There are three course assignments subject to the following:

- Assignments are optional. You do not need to seek academic accommodation for a missed assignment.
- The weight of any assignment you choose not to submit is redistributed to the final exam. For example, if you decide to submit assignment one but not two and three, an extra 10% is placed on your final exam.
- The use of Generative AI Tools in the completion of assignments is prohibited.
- Problem sets must be handwritten, either with pen and paper or an electronic device with a stylus.
- Assignment marking follows a submit-revise-resubmit model.
 1. Initial Submission: Submit your attempted solutions by 11:59pm on the due-date. Although not marked, your submission is reviewed. Trivial submissions (such as empty/blank documents or those stating only that “I did not know how to do this problem,” ...) will not be eligible for revision.
 2. Solutions Posted / New Due-Date: Assignment solutions will then be posted on the course Brightspace page. A due-date for the assignment revision will be set (typically one week later).
 3. Revision Submission: Submit your revision, corrected for errors and omissions, by 11:59pm on the step 2 due-date. This submission will be reviewed for completeness. If your revision is complete, you will receive the assignment marks.

- The purpose of this model is to eliminate any disadvantage to attempting the assignment problems yourself. In this format, there is no advantage to the student who (by committing an academic offense) uses generative AI tools, or other means, to obtain solutions.
- You must make an initial assignment submission (step 1) for your revision (step 3) to be marked. If you do not make an initial submission, the assignment is treated as skipped and the weight transfers to the final exam.
- Submissions must be scanned to a single file and uploaded to the Brightspace course site by the due date. The filename of the problem set must be of the form westernid_PSNv1.pdf for the initial submission or westernid_PSNv2.pdf for the revision. Your westernid is the first part of your UWO email address. For example if I was submitting the initial attempt at assignment one, I would submit the file asigut.PS1v1.pdf. **Submissions that fail to adhere to this naming convention will be penalized 1 mark out of the 5 mark weight.**
- Assignments submitted up to 48 hours late are still accepted at full credit. Assignments more than 48 hours late are not accepted.

Final Exam There is a course final exam subject to the following:

- **In order to write the final exam, you must have taken at least one test. Students who do not satisfy this requirement cannot write the final exam and are retroactively withdrawn from the course.**
- The final exam is a three-hour, problem-based test scheduled by the University in the December Final Exam Period (Dec.11 through Dec.22). The final exam is cumulative and covers the entire course with no special emphasis.
- The final exam is closed-book. A formula sheet will be provided which includes the inside front and back covers of the text (Vector derivatives; Fundamental theorems; Basic equations of electrodynamics; Fundamental constants; Spherical and cylindrical coordinates). No other notes or aids are permitted.
- Although the weight of the final exam is nominally 40% (Table 1), this requires that you complete all tests and assignments. A student who meets only the minimum requirement to be allowed to write the final exam (one test) will be writing an 85% final exam.
- If your grade on the final exam exceeds that calculated for your tests+final using the weights in Table 1, your final exam grade is adopted as the grade for your tests+final component grade.
→ Example: you get 65% on tests one, two, and three, and 80% on the final. According to Table 1, you earned 61.25 out of the 85 available marks or 72%; however, as your final exam performance was better, you are assigned 68 marks out of 85 or 80% for the tests+final component grade.
- Missed Final Exam: Documentation must be provided to an academic counselor in your home faculty in order for you to receive permission to write a make-up. If you miss the make-up, documentation must be again provided, and you will write the exam at the next sitting of this course's final exam (typically one year later).

Accommodated Exams If you write your tests at Accommodated Exams, please schedule only tests that you intend to write. Once you schedule a test, I am required to provide the test considerably in advance of the test date. It is very frustrating for me to have done this when the student does not show up.

Final Mark Distribution: In rare cases, the Department of Physics and Astronomy may adjust the final course marks in order to conform to Departmental policy.

Support Services: Please visit the Science & Basic Medical Sciences Academic Advising webpage for information on adding/dropping courses, academic considerations for absences, requests for relief, exam conflicts, and many other academic-related matters:

<https://www.uwo.ca/sci/counselling/>

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.

Religious Accommodation: When conflicts arise with a religious holiday that requires an absence from the University or prohibits certain activities, students should request an accommodation for their absence in writing to the course instructor and/or the Academic Advising office of their Faculty of Registration. This notice should be made as early as possible, but not later than two weeks prior to the writing of the examination (or one week prior to the writing of the test). Please visit the Diversity Calendars posted on our university's EDID website for the recognized religious holidays - <https://www.edi.uwo.ca>

Accessibility: 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.

Scholastic Offenses: Scholarly offenses are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offense, in the following pdf documents:

https://uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_offences.pdf

https://uwo.ca/univsec/pdf/academic_policies/appeals/undergrad_scholastic_offence_procedure.pdf