McMaster University | SCIENCE Department of Physics & Astronomy

We recognize and acknowledge that McMaster University meets and learns on the traditional territories of the Mississauga and Haudenosaunee nations, and within the lands protected by the "Dish With One Spoon" wampum, an agreement amongst all allied Nations to peaceably share and care for the resources around the Great Lakes.

PHYSICS 1E03 – Waves, Electricity and Magnetic Fields
2025 Winter Term

Instructor and Course Information

Instructor	Dr. Joey Rucska	Dr. Reza Nejat	Dr. An-Chang Shi
Contact Info	rucskajj@mcmaster.ca	nejatsm@mcmaster.ca	shi@mcmaster.ca
Office	ABB 258	ABB 235	ABB 426
Office Hours	TBA	TBA	TBA
Class Section & Schedule **	**C01**–Tu We Fr – 9:30 - 10:20AM	**C02**–Tu We Fr – 12:30PM – 1:20PM **C03**–Tu We Fr – 3:30PM - 4:20PM	**C04**–Tu Th Fr –11:30AM - 12:20PM
Location	**C01** – See Mosaic	**C02** – See Mosaic **C03** – See Mosaic	**C04** – See Mosaic
	**** Note** all lectures will be posted online. Class time will be used mainly for interactive discussion and lecture review sessions to solidify your learning. You are expected to come having viewed the lectures.		

Instructional Assistant (IA): Jephthah Iyaro | **E-mail:** iyaroo@mcmaster.ca | **Office:** ABB 147 | **Office Hours:** TBA

Lab Coordinator	Dr. Viktor Buntar
Contact Info	buntarv@mcmaster.ca
Office	BSB B117
Lab Schedule	See Mosaic or Avenue to learn
Location	BSB B116, BSB B220

Head TA: Erick Gillis | **E-mail:** gillie1@mcmaster.ca | **Office Hours:** TBA

Head TA: Claude Cournoyer-Cloutier | **E-mail:** cournoyc@mcmaster.ca | **Office Hours:** TBA

Course Description

Physics 1E03 is an introduction to electromagnetism and waves, designed for students in engineering programs. Topics include electrostatics, potential, circuit elements, direct current circuits, magnetic fields, and waves. There is also a lab component where students become familiar with handling and analyzing data as well as relating theory and experiment.

Prerequisites: Registration in Engineering I or a program in the Faculty of Engineering

Course Expectations

The course is organized as follows:

- Weekly video modules with main course content (these can be watched at any time that suits you) plus PDFs of PowerPoint slides for the lecture topics (e.g., Electric Charge and Force, Electric Fields, Gauss's Law, etc). These videos **should** be watched **before** the in-person lecture/discussion/problem-solving sessions to provide appropriate background and preparation for these sessions.
- three (3) in-person lecture sessions (lecture, discussion, problem solving) per week. These sessions will be held on Tuesdays, and Wednesday (C01, C02, C03), Thursdays (C04), and Fridays. Lecture times will depend on your scheduled lecture section.
- 4 labs in the term – alternating with tutorials.
- 5 tutorials in the term – alternating with labs.
- Weekly LONCAPA assignments, check the LONCAPA website for upcoming assignments.
- Two (2) term tests
- One (1) final exam

Class Schedule

C01 - Day(s): Tu We Fr | Time/Duration: 9:30 - 10:20AM | Location: See Mosaic

C02 - Day(s): Tu We Fr | Time/Duration: 12:30 - 1:20PM | Location: See Mosaic

C03 - Day(s): Tu We Fr | Time/Duration: 3:30 - 4:20PM | Location: See Mosaic

C04 - Day(s): Tu Th Fr | Time/Duration: 11:30AM - 12:20PM | Location: See Mosaic

Course Format

This course will follow a blended format, which includes both synchronous and asynchronous components. The synchronous components consist of three weekly in-person lecture, discussion and problem-solving sessions, and one alternating lab/tutorial session. The asynchronous components consist of pre-recorded video modules for each week's topics (that should be watched prior to in-person sessions), in-person session recordings, and PDF copies of PowerPoint slides.

In each lecture session we will be building upon, rather than repeating, what you have read and watched prior to the in-person session (lecture notes, related chapters of your textbook and the lecture videos). Therefore, it is very important to complete your weekly reading/viewing assignments before coming to class. Lecture sessions will include in-class quiz questions conducted using i-Clicker polling. The i-Clicker quiz questions are short comprehension tests based on the assigned readings and the material you watched in the pre-recorded video modules. They are meant to help you retain what you learn and to assess how well you comprehend the material. If you find you are not doing well on the i-Clicker quizzes, you should be asking more questions in our in-person sessions! All students are responsible for having i-Clicker in every in-person session.

Lab Schedule

Day(s): TBA – See Mosaic. There will be 4 labs this term. Labs will held be in-person during scheduled lab sessions. Labs and tutorials are every other week, alternating.

Time/Duration: You will complete each lab during your scheduled 3-hour timeslot and submit your report by the end of the lab session.

Location: See Avenue to Learn for details

Tutorial Schedule

Day(s): TBA – see Mosaic. There will be 5 tutorials this term. Tutorials will be held in-person during scheduled tutorial sessions. Labs and tutorials are every other week, alternating. **Time/Duration:** Tutorials are two hours and during the scheduled lab/tutorial time.

Location: See Avenue to Learn

Course Website – http://avenue.mcmaster.ca/

We will be using Avenue to Learn as the main location for information in this course. We will also use Microsoft Teams for discussion and virtual office hours.

Course and Learning Objectives

Learning Objectives

By the end of this course students will be able to

- Apply their understanding of electricity and magnetism including electrostatics, electric potential, circuit elements and direct current circuits, magnetic fields and waves to analyze conceptually and numerically both electric and magnetic scenarios.
- Interpret graphical data and be able to analyze qualitatively and/or quantitatively various phenomena.
- Estimate the experimental uncertainty of a set of measurements, propagate uncertainties when determining results, and then discuss the accuracy of these results as well as sources of error in an experiment.
- Evaluate experimental findings and connect conclusions to physical theories/laws

Materials & Fees

Required Materials/ Resources

Textbook (required): *Physics for Scientists and Engineers*, Tenth Edition, by Serway and Jewett, Published by Brooks/Cole Cengage Learning

Calculator (required): Casio fx-991MS or Casio fx-991MS Plus

iClicker (required): Reef Polling (online application – may be installed on your phone)

Course Overview and Assessment

Course Schedule - Physics 1E03 Winter 2024 - Approximate Timetablen

	Week	Topics	Text book: Serway 10th Ed. Chapters, Sections
1	Jan 06	Introduction, Electric Force and Field	22.1–22.6
2	Jan 13	Continuous Charge Distributions, Gauss's Law	23.1-23.3
3	Jan 20	Gauss's Law, Electric Potential	23.2–23.4; 24.1–24.3
4	Jan 27	Electric Potential; Capacitance	24.4–24.6; 25.1–25.2, 25.5
5	Feb 03	Capacitance; Current, Resistance, Electric Power; **Test 1 (Feb 6, 2025)**	25.3–25.5; 26.1– 26.2, 26.6
6	Feb 10	DC Circuits, RC Circuits	27.1–27.4
-	Feb 17	**Winter Recess**	**Recess**
7	Feb 24	Magnetic Fields	28.1–28.5
8	Mar 03	Magnetic Sources	29.1–29.5
9	Mar 10	Magnetic Sources; Induction	29.1–29.5; 30.1-30-3
10	Mar 17	Magnetic Induction, **Test 2 (Mar 20, 2025)**	30.1–30.3
11	Mar 24	Inductance	31.1–31.3
12	Mar 31	Waves,	16.1-16.4; 17.1-17.3
13	Apr 07	Last class Apr 8	Review

Evaluation

Assessment	Due Date	Weight
Engagement (In-class)		0-5%
Tutorials / Tutorial Quizzes	5 in term	10%
Labs	4 in term	15%
LONCAPA	10 in term	6%
Term Tests	Feb 6 and Mar 20, 2025	20%
Final Exam	TBA	44-49%*
TOTAL		100%

**The exam will be worth 49% if your engagement mark is zero. Otherwise, your engagement mark out of 5 will be added to your grade out of 100, and the weight of your exam will be reduced by that number of percentage points.*

Engagement

You are expected to take an active role in your learning in this course. We will be incorporating formative quizzing within the sessions. In-class engagement will be evaluated by I-clicker Polling. **Note** that the engagement marks are based on participation and effort, rather than answering specific questions correctly.

Tutorials / Tutorial Quizzes

Tutorial sessions develop skills for solving physics problems, and test students on the LONCAPA assignments they have completed.

Labs

There will be 4 labs this term. You will complete each lab during your scheduled 3-hour timeslot in the lab and submit your report by the end of the lab session (similar to Phys 1D03 Lab).

IMPORTANT NOTE: ***For each lab not completed before the end of term, your final grade will be reduced by 3 percentage points, and you will receive a mark of zero on the missed experiment.*** Note that an MSAF gives you the opportunity to do a makeup lab but does not excuse you from submitting a report.

Lab exemptions: There is **No** Lab exemption. If you are repeating the course, you are still required to complete **all four labs** for Phys 1E03.

LONCAPA

Individualized online homework problems will be due approximately every week via the LONCAPA system. These are good practice questions for making sure that you understand the material and for preparing you for larger assessments like the tests and exam.

LONCAPA should be accessed through Avenue: http://avenue.mcmaster.ca/ or the LONCAPA web page: https://loncapa.physics.mcmaster.ca. Although you are free to discuss the assignments with each other in general terms, your assignment MUST reflect your own individual understanding of the course material. **Technical** questions about LONCAPA should be directed to the LONCAPA webmasters at loncapa@mcmaster.ca

Term Tests

The two term tests will primarily cover topics from weeks 1-4 and 5-8, respectively. However, you should remember that many of the concepts in this course will build on one another, and you may be asked to draw upon earlier course material. The date, time and location of tests will be announced later in class and on Avenue to Learn.

Final Exam

The final exam in this course is cumulative (will contain material from the entire course). Details about the final exam will be posted prior to the exam.

The exam will be worth 45% if your engagement mark is zero. Otherwise, your engagement mark out of 5 will be added to your grade out of 100, and the weight of your exam will be reduced by that number of percentage points. For example, if your engagement mark is 4/5, your exam will count for 41%, and 4 marks will be added to this to get a mark out of 45 for (exam plus engagement).

Requests for Relief for Missed Academic Term Work

McMaster Student Absence Form (MSAF): In the event of an absence for medical or other reasons, students should review and follow the Academic Regulation in the Undergraduate Calendar "Requests for Relief for Missed Academic Term Work".

- For the Faculty of Science, please follow the guidelines located here.

Policy on Missed Work, Extensions and Late Penalties

1. It is the students' responsibility to regularly check the course webpage (Avenue to Learn) for updates and announcements.
2. For **one brief absence**, you may use the MSAF self-reporting system at *http://mcmaster.ca/msaf*. You may use this only once per term, and only for a brief absence. **Please put the Instructional Assistant (phys1e03@mcmaster.ca) as the contact person when filling out the MSAF for this course (for all sections).** In all other cases, you must take appropriate documentation to the Engineering I Academic Advisors.

Course Specific Policy Regarding Missed Work ***IMPORTANT***

1. The MSAF form **may Not** be used for missed class participation or LONCAPA.
2. The MSAF form **may** be used for a **tutorial** or **term test**. The weight of this missed work will be moved to the final exam.
3. The MSAF form **may** be used for a lab. There will be a makeup lab week at the end of the term. Details: TBA

Academic Accommodation of Students with Disabilities

Students with disabilities who require academic accommodation must contact Student Accessibility Services (SAS) at 905-525-9140 ext. 28652 or sas@mcmaster.ca to make arrangements with a Program Coordinator. For further information, consult McMaster University's *Academic Accommodation of Students with Disabilities* policy.

Physical and Mental Health

For a list of McMaster University's resources, please refer to the Student Wellness Centre.

Academic Accommodation for Religious, Indigenous Or Spiritual Observances (Riso)

Students requiring academic accommodation based on religious, indigenous or spiritual observances should follow the procedures set out in the RISO policy. Students should submit their request to their Faculty Office ***normally within 10 working days*** of the beginning of term in which they anticipate a need for accommodation or to the Registrar's Office prior to their examinations. Students should also contact their instructors as soon as possible to make alternative arrangements for classes, assignments, and tests.

Equity, Diversity, and Inclusion

Every registered student belongs in this course. Diversity of backgrounds and experiences is expected and welcome. You can expect your instructor to be respectful of this diversity in all aspects of the course, and the same is expected of you.

The Department of Physics & Astronomy is committed to creating an environment in which students of all genders, cultures, ethnicities, races, sexualities, abilities, and socioeconomic backgrounds have equal access to education and are welcomed and treated fairly. If you have any concerns regarding inclusion in our department, in particular if you or one of your peers is experiencing harassment or discrimination, you are encouraged to contact the Chair, Associate Chair of Undergrad Studies, Undergraduate Advisor (Level I), and/or Undergraduate Advisor (Levels II to IV) (contact details listed here) or to contact the Equity and Inclusion Office.

Courses with an online Element

Online Statement

McMaster is committed to an inclusive and respectful community. These principles and expectations extend to online activities including electronic chat groups, video calls and other learning platforms.

Some courses may use various online elements (e.g., e-mail, Avenue to Learn (A2L), LearnLink, LONCAPA, Microsoft Teams, etc.). Students should be aware that, when they access the electronic components of a course using these elements, private information such as first and last names, usernames for the McMaster e-mail accounts, and program affiliation may become apparent to all other students in the same course. The available information is dependent on the technology used. Continuation in a course that uses online elements will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure, please discuss this with the course coordinator, or your section instructor.

Online Proctoring

Some courses may use online proctoring software for tests and exams. This software may require students to turn on their video camera, present identification, monitor and record their computer activities, and/or lock/restrict their browser or other applications/software during tests or exams. This software may be required to be installed before the test/exam begins.

Inclusivity and Academic Integrity

The University values integrity, inclusiveness and teamwork, and strives to support the personal and collective growth of the McMaster student community.

These values are foundational to ensuring campus environments – both in-person and virtual –are conducive to personal wellbeing and academic success.

Academic Integrity

You are expected to exhibit honesty and use ethical behaviour in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity.

It is your responsibility to understand what constitutes academic dishonesty.

Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. This behaviour can result in serious consequences, e.g., the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: "Grade of F assigned for academic dishonesty"), and/or suspension or expulsion from the university. For information on the various types of academic dishonesty please refer to the *Academic Integrity Policy*, located at https://secretariat.mcmaster.ca/university-policies-procedures- guidelines/

The following illustrates only three forms of academic dishonesty:

- plagiarism, e.g., the submission of work that is not one's own or for which other credit has been obtained.
- improper collaboration in group work.
- copying or using unauthorized aids in tests and examinations.

Some helpful information can be found on the Student Support & Case Management website.

Authenticity / Plagiarism Detection

Some courses may use a web-based service (Turnitin.com) to reveal authenticity and ownership of student submitted work. For courses using such software, students will be expected to submit their work electronically either directly to Turnitin.com or via an online learning platform (e.g. A2L, etc.) using plagiarism detection (a service supported by Turnitin.com) so it can be checked for academic dishonesty. Students who do not wish their work to be submitted through the plagiarism detection software must inform the Instructor before the assignment is due. No penalty will be assigned to a student who does not submit work to the plagiarism detection software. **All submitted work is subject to normal verification**

that standards of academic integrity have been upheld (e.g., on-line search, other software, etc.). For more details about McMaster's use of Turnitin.com please go to the McMaster Office of Academic Integrity's website.

Conduct Expectations

As a McMaster student, you have the right to experience, and the responsibility to demonstrate, respectful and dignified interactions within all our living, learning and working communities. These expectations are described in the *Code of Student Rights & Responsibilities* (the "Code"). All students share the responsibility of maintaining a positive environment for the academic and personal growth of all McMaster community members, **whether in person or online**.

It is essential that students be mindful of their interactions online, as the Code remains in effect in virtual learning environments. The Code applies to any interactions that adversely affect, disrupt, or interfere with reasonable participation in University activities. Student disruptions or behaviours that interfere with university functions on online platforms (e.g. use of Avenue 2 Learn, WebEx or Zoom for delivery), will be taken very seriously and will be investigated. Outcomes may include restriction or removal of the involved students' access to these platforms.

- Additional information about the code and netiquette can found on the **Student Support and Case Management** website.

Copyright and Recording

Students are advised that lectures, demonstrations, performances, and any other course material provided by an instructor include copyright protected works. The Copyright Act and copyright law protect every original literary, dramatic, musical and artistic work, **including lectures** by University instructors. The recording of lectures, tutorials, or other methods of instruction may occur during a course. Recording may be done by either the instructor for the purpose of authorized distribution, or by a student for the purpose of personal study. Students should be aware that their voice and/or image may be recorded by others during the class. Please speak with the instructor if this is a concern for you.

Research Ethics -NA

Extreme Circumstances

The University reserves the right to change the dates and deadlines for any or all courses in extreme circumstances (e.g., severe weather, labour disruptions, etc.). Changes will be communicated through regular McMaster communication channels, such as McMaster Daily News, A2L and/or McMaster email.