

ENGPYHS 2CM4
Computational Multiphysics
Winter 2020
Course Outline

CALENDAR/COURSE DESCRIPTION

Mathematical modelling and computational multiphysics for engineering design synthesizing E&M, thermodynamics, statics, dynamics, and quantum mechanics.
Three one-hour lectures and one two-hour laboratory per week; second term

PRE-REQUISITES AND ANTI-REQUISITES

Prerequisite(s): Registration in Level II of an Engineering Physics program

INSTRUCTOR OFFICE HOURS AND CONTACT INFORMATION

Matt Minnick, minnick@mcmaster.ca, BSB/B106, Extension: 24546

	Monday	Tuesday	Wednesday	Thursday	Friday
08:30	Office Hour!	Office Hour!	Office Hour!	Office Hour!	Office Hour!
09:30	Office Hour!	2CM4 Prep	2CM4 Prep	Office Hour!	2CM4 Prep
10:30	Office Hour!	2CM4 BSB/B136	2CM4 BSB/B136	Office Hour!	2CM4 BSB/B136
11:30	Office Hour!	Office Hour!	Office Hour!	Office Hour!	Office Hour!
12:30	Office Hour!	Office Hour!	Office Hour!	Office Hour!	Office Hour!
13:30	Office Hour!	Office Hour!	Office Hour!	Office Hour!	Office Hour!
14:30	Office Hour!	4A06 BSB/B101	Office Hour!	Office Hour!	2CM4 BSB/106
15:30	Office Hour!	4A06 BSB/B101	Office Hour!	Office Hour!	2CM4 BSB/106
16:30	Office Hour!	4A06 BSB/B101	Office Hour!	Office Hour!	Office Hour!

Note: Office hour times are sometimes used by irregular meetings or course deliverables, so you can email me to make sure I'll be available and/or to reserve any "Office Hour!" time for you or your group (but feel free just drop by!)

TEACHING ASSISTANT OFFICE HOURS AND CONTACT INFORMATION

TBA

COURSE WEBSITE/ALTERNATE METHODS OF COMMUNICATION

The primary method of communication will be

1. Avenue To Learn (ATL, <http://avenue.mcmaster.ca/>) news postings for announcements - make sure to set your ATL email settings so it emails these to you.
2. Email for individual messages.

COURSE INTENDED LEARNING OUTCOMES

Upon successful completion of the course, you will be able to

1. look at any real world problem and tackle it using mathematical modelling (meaning that you understand how to apply the theory in your math & physics courses in a real-world context, and understand how to use modern tools to make the process more efficient than not mathematically modelling),

2. see the links between the physics content in mechanics, electromagnetics, heat transfer, fluid mechanics, quantum mechanics, and solid state physics in a way that lets you understand all areas more strongly, and
3. use scripting languages to automate computational tasks: e.g. setting up, running, and analyzing simulations.

MATERIALS AND FEES

LAPTOP COMPUTER:

Students should have a laptop capable of simultaneously running FlexPDE, Maple, and Microsoft Word (windows machines are recommended, price point of \$300 or up should be fine). You are required to use this for all tests and the final exam. Contact the course instructor for any concerns!

OTHER MATERIALS:

FlexPDE Student Version (free online), Maple (Version 15 or higher), a scripting language (i.e., Python), and MS Word (2007 or newer)

REFERENCE TEXTS:

- Physics for Scientists and Engineers, Brooks Cole, Serway & Jewett, 978-1133947271 (same as first year)
- Course notes (free on ATL)

COURSE SCHEDULE

See ATL for a colour schedule, list of suggested practice problems for each lecture topic, and other useful resources.

ASSESSMENT

Component	Weight
Lab Assignments	16% (2% each)
Lab Tests	32% (4% each)
Lecture Quizzes	Bonus: 2%
Design Project	26%
Final Exam	26%
Total	100%

ADDITIONAL DETAILS REGARDING COURSE MANAGEMENT AND ASSESSMENT

1. Class attendance mandatory. There is a strong correlation between class attendance and performance in the course.
2. The final exam spans the knowledge of the whole term. Sample exams are provided in ATL.
3. The design project is explained in a separate document on ATL, and gives you a chance to experience in-depth mathematical modelling of the engineering design process in an area of your interest.

ACCREDITATION LEARNING OUTCOMES

The Learning Outcomes defined in this section are measured for Accreditation purposes only, and will not be taken into consideration in determining a student's actual grade in the course.

Outcomes

04.3 - Proposes solutions to open-ended problems.

04.4 - Employs appropriate techniques for generation of creative ideas such as brainstorming and structured inventive thinking.

12.1 - Critically evaluates and applies knowledge, methods and skills procured through self directed and self identified sources, including those that lie outside the nominal course curriculum.

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.

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.

It is your responsibility to understand what constitutes academic dishonesty. For information on the various types of academic dishonesty please refer to the Academic Integrity Policy, located at <http://www.mcmaster.ca/academicintegrity>.

The following illustrates only three forms of academic dishonesty:

1. Plagiarism, e.g. the submission of work that is not one's own or for which other credit has been obtained.
2. Improper collaboration in group work.
3. Copying or using unauthorized aids in tests and examinations.

ACADEMIC ACCOMMODATIONS

Students who require academic accommodation must contact Student accessibility Services (SAS) to make arrangements with a Program Coordinator. Academic accommodations must be arranged for each term of study. Student Accessibility Services can be contact by phone at 905.525.9140 ext. 28652 or e-mail at sas@mcmaster.ca.

For further information, consult McMaster University's Policy for [Academic Accommodation of Students with Disabilities](#).

NOTIFICATION OF STUDENT ABSENCES AND SUBMISSION OF REQUEST FOR RELIEF FOR MISSED ACADEMIC WORK

From <http://mcmaster.ca/msaf/> :

1. This is a self-reporting tool for Undergraduate Students to report absences DUE TO MINOR MEDICAL SITUATIONS that last up to 3 days and provides the ability to request accommodation for any missed academic work. Please note, this tool cannot be used during any final examination period.

2. You may submit a maximum of 1 Academic Work Missed request per term. It is YOUR responsibility to follow up with your Instructor immediately (NORMALLY WITHIN TWO WORKING DAYS) regarding the nature of the accommodation.
3. If you are absent for reasons other than medical reasons, for more than 3 days, or exceed 1 request per term you MUST visit your Associate Dean's Office (Faculty Office). You may be required to provide supporting documentation.
4. This form must be submitted during the period of absence or the following day, and is only valid for academic work missed during this period of absence.
5. It is the prerogative of the instructor of the course to determine the appropriate relief for missed term work in his/her course.
6. You should expect to have academic commitments Monday through Saturday but not on Sunday or statutory holidays. If you require an accommodation to meet a religious obligation or to celebrate an important religious holiday, you may submit the Academic Accommodation for Religious, Indigenous and Spiritual Observances (RISO) Form to the Associate Dean's Office. You can find all paperwork needed here: <http://www.eng.mcmaster.ca/current/documents.html>

For Eng Phys 2CM4, any MSAF'd material will have its weight moved to the final exam except the design project. MSAFing the design project extends the deadline by 3 days.

NOTICE REGARDING POSSIBLE COURSE MODIFICATION

The instructor and university reserve the right to modify elements of the course during the term. The university may change the dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes. It is the responsibility of the student to check their McMaster email and course websites weekly during the term and to note any changes.

ON-LINE STATEMENT FOR COURSE REQUIRING ONLINE ACCESS OR WORK

In this course, we will be using Avenue to Learn. Students should be aware that, when they access the electronic components of this course, private information such as first and last names, user names 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 this course will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure, please discuss this with the course instructor.