ENGINEERING 3424: Engineering Mathematics

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Office Hours **Mondays 14:00-15:50, Tuesdays 15:00-15:40, or contact the instructor by e-mail**
Website **www.engr.mun.ca/~ggeorge/3424**
Communication *by e-mail - include your name and student number in your e-mails!*

CALENDAR ENTRY:

ENGI 3424 Engineering Mathematics includes ordinary differential equations of first order and first degree; linear ordinary differential equations of higher order, methods of undetermined coefficients and variation of parameters; applications to electric circuits and mass-spring systems; Laplace transforms; partial differentiation; convergence of series; Taylor and binomial series; remainder term; and an introduction to Fourier series.
CH: 4
CR: the former ENGI 2422
LC: 4
OR: tutorial 1 hour per week

ACCREDITATION UNITS:
Contact hours/week on average over 12 weeks (Lecture/Lab/Tutorial): (4/0/1)

CONTENT CATEGORIES:

Math	Natural science	Complementary Studies	Engineering Science	Engineering Design
100%				

ACADEMIC INTEGRITY AND PROFESSIONAL CONDUCT:

Students are expected to conduct themselves in all aspects of the course at the highest level of academic integrity. Any student found to commit academic misconduct will be dealt with according to the Faculty and University practices. More information is available at http://www.mun.ca/engineering/undergrad/academicintegrity.php.

Students are encouraged to consult the Faculty of Engineering and Applied Science Student Code of Conduct at http://www.mun.ca/engineering/undergrad/academicintegrity.php and Memorial University's Code of Student Conduct at http://www.mun.ca/student/conduct.

SCHEDULE: Visit the course web site and Brightspace/D2L frequently for any changes.
Note: during the pandemic **lectures are offered by remote delivery only**, on Brightspace / D2L

LECTURES: Asynchronous; (you may access these lectures on the Brightspace site at any time). The nominal lecture times are Mon/Tue/Thu/Fri 13:00-13:50

TUTORIAL (starting Sep. 13, but **not** in the week of the mid term test):
Computer majors: Mondays 11:00-11:50 in EN 1054
Electrical majors: Wednesdays 14:00-14:50 in EN 1000
Process majors: Wednesdays 16:00-16:50 in EN 1000.
Mechanical majors: Tuesdays 11:00-11:50 in EN 2006 (**or** Mondays 17:00-17:50 in EN 2043 if there is a schedule conflict with a laboratory class in another course).

Following campus-wide policy, masks are required for all students in our classrooms. Should other health directives or the overall situation connected to COVID-19 change over the course of the term, a back-up plan for remote delivery of tutorials is in place to ensure that the tutorials will continue and to minimize disruption to the student experience.

COURSE TYPE: Compulsory

COURSE OUTLINE (Major Topics):

1. First Order Ordinary Differential Equations
2. Second Order Linear Ordinary Differential Equations
3. Laplace Transforms
4. Partial Differentiation
5. Series

LEARNING OUTCOMES:

Course Level Graduate Attribute Focus: KB-D, PA-D
Upon successful completion of this course, the student will be able to:

	LEARNING OUTCOMES	GRADUATE ATTRIBUTES. LEVEL*	Methods of Assessment
1	Solve first order ordinary differential equations (separable and linear)	KB.1-D, PA.1-D	quiz, test, exam
2	Solve second order linear ordinary differential equations (constant coefficients)	KB.1-D, PA.1-D	quiz, test, exam
3	Use Laplace transforms to solve linear ODEs (constant coefficients)	KB.1-D, PA.1-D	quiz, exam
4	Solve arithmetic problems in complex numbers	KB.1-D, PA.1-D	exam
5	Apply partial differentiation to optimization problems	KB.1-D, PA.1-D	quiz, exam
6	Test for convergence of series; find series solutions to ODEs	KB.1-D, PA.1-D	exam

*Each Graduate Attribute for each learning outcome is rated at a Content Instructional Level of I=Introduced, D=Developed, or A=Applied.

See www.mun.ca/engineering/undergrad/graduateattributes.pdf for definitions on the 12 Graduate Attributes and the Content Instructional Levels.

More detailed learning outcomes are at the web site
http://www.engr.mun.ca/~ggeorge/3424/handout/outcomes.pdf

RESOURCES:

TEXT BOOK

- The lecture notes for ENGI 3424 are available as PDF files from the Lecture Notes section of the course web site www.engr.mun.ca/~ggeorge/3424/handout/ : "Lecture Notes for ENGI 3424 Engineering Mathematics" by G.H. George **and** as a paper copy from the University Bookstore.
  You will need to bring these notes to *every* class.

REFERENCES

- No one commercial textbook is required for this course. You may wish to invest in a reference text that bears the title "Advanced Engineering Mathematics" (such as the textbook by P.V. O'Neil or D.G. Zill) or in cheaper "outline series" books (such as the Schaum's outline series). These books can be used again in a future course such as ENGI 4430.

INCLUSION AND EQUITY:

Students who require accommodations are encouraged to contact the Glenn Roy Blundon Centre, http://www.mun.ca/blundon/about/index.php. The mission of the Blundon Centre is to provide and co-ordinate programs and services that enable students with disabilities to maximize their educational potential and to increase awareness of inclusive values among all members of the university community.

The university experience is enriched by the diversity of viewpoints, values, and backgrounds that each class participant possesses. In order for this course to encourage as much insightful and comprehensive discussion among class participants as possible, there is an expectation that dialogue will be collegial and respectful across disciplinary, cultural, and personal boundaries.

STUDENT ASSISTANCE: Student Affairs and Services offers help and support in a variety of areas, both academic and personal. More information can be found at www.mun.ca/student.

ASSESSMENT:		**Approximate Dates**
Quizzes (best 4 of 5, @6.25%)	25%	Sep. 23, Oct. 07, Oct. 21, Nov. 04 & Nov. 18
Mid Term Test	30%	Oct. 13 (evening)
Final exam	45%	to be announced

The **problem sets** give you some much needed practice in the methods of calculus. They enhance your chances of success in quizzes, the test and the final examination, so *it is important that you attempt all problem sets yourself*. The questions will be posted on the web site only. The solutions will be posted on the web site shortly after the relevant tutorial.

The five **quizzes** will each be a single question, taking 15 minutes during a lecture period on alternate Thursdays, on Sep. 23, Oct. 07, Oct. 21, Nov. 04 and Nov. 18. Quizzes take place on the Brightspace site. The university has published minimum computer requirements which you can review. No deferred quizzes will be offered.

The **mid term test** is scheduled for Wednesday October 13 (the University follows the Monday timetable on that day). Due to a lack of sufficient space in EN 2006, the mid term test will take place in the **evening, 19:00-20:00** (7 pm to 8pm) in locations to be announced. Questions for the mid term test may be drawn from Chapters 1 or 2 (problem sets 1-4).
No deferred tests will be offered.

Marked quizzes will be returned through Brightspace and marked tests in a tutorial.

You may need a **calculator** for all quizzes, the test and the final examination. Only simple scientific calculators with no capability for text storage, programs, graphics, symbolic algebra, calculus or communications with other devices are permitted. More details are on the course web site, at http://www.engr.mun.ca/~ggeorge/3424/calculators.html .

One 8½" × 11" **formula sheet** of your own design (with writing and/or printing on both sides) will be allowed for the mid term test and two such sheets will be allowed in the final examination. You may also construct a formula sheet for each quiz. However, *during any quiz, test or examination, do **not** consult with any other person and do **not** use any internet resources.*

Questions in the **final examination** may be drawn from any part of the entire course. Where it is in an individual student's favour, the weighting of the final examination for that student *may* be increased beyond 45%. *It is the student's responsibility to locate the time and place of the final examination*. The Faculty's examination policies are available from links at
"www.mun.ca/engineering/undergrad/policies/Exam_Policies.pdf".

You are reminded of the commitment to uphold the highest standards of academic integrity. When you submit any quiz, test or exam,
you unequivocally state that all work is entirely your own and does not violate Memorial University's Academic Integrity policy.

ADDITIONAL INFORMATION

Various resources are available on the Web page
http://www.engr.mun.ca/~ggeorge/3424/ .

Visit the web site often! It is organized into seven main sections:

outline.html - course outline and detailed syllabus;
eval.html - evaluation scheme and textbook;
assigns/ - problem set, test and examination questions (in pdf format);
solution/ - problem set, test and examination solutions (in pdf format);
demos/ - demonstration files (Maple, Excel, etc.);
handout/ - pdf files for the gapped lecture notes;
thebook/ - pdf files for the complete [non-gapped] version of the lecture notes.

LECTURE RECORDINGS

All lecture classes for this course are pre-recorded (asynchronous) and will be available on the Brightspace (D2L) site for this course for viewing at any time. The PDF files of the completed version of the lecture notes will be available on the web site for the course after all of the relevant lectures for that week have taken place.

Comments and questions by those present in a tutorial may be captured in the audio of a recording.

ABSENCES

To protect yourself and those around you, it is important to stay home if you feel unwell or if you are under quarantine, because you have potentially been exposed to the virus. Please keep me informed so we can work together to allow you to keep up with the course materials, should you need to miss evaluations. You will not be penalized if you need to stay home for quarantine. Memorial University has recognized the importance of academic leniency as we work to keep our campus safe for all. For this semester, medical notes are not required for absences due to illness. You are encouraged to seek appropriate medical attention from the Student Wellness and Counselling Centre.