ENGINEERING 3424: Engineering Mathematics

Instructor	**Dr. Glyn George**	**Teaching Assistants**
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Phone	**709-864-8946**	
Office Location	**CSF 4120**	
Office Hours	**Mondays 15:00-16:00, Tuesdays 09:30-10:30 & 15:00-16:00***	
	Fridays 11:00-12:00	(* except Sep. 10, Oct. 08 and Nov. 12)
Website	www.engr.mun.ca/~ggeorge/3424/	
	- however, most materials are on the Brightspace site	
Communication	by e-mail (**not** the Brightspace 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.

CR: the former ENGI 2422
LC: 4
OR: tutorial 1 hour per week
PR: Mathematics 1001, Mathematics 2050

COURSE TYPE: compulsory

ACCREDITATION UNITS:

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

CONTENT CATEGORIES: (expressed as %, no category can be 0 < c < 25)

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 https://www.mun.ca/student/student-supports-and-services/respectful-campus-community/student-code-of-conduct/.

SCHEDULE: Visit the course Brightspace/D2L site frequently for any changes in this schedule

LECTURE:	(all majors)	Mon/Tue/Thu/Fri 13:00-13:50 in EN 2006
TUTORIAL:	Electrical major:	Monday 10:00-10:50 in EN 2007
	Computer major:	Monday 11:00-11:50 in EN 2007
	Process major:	Monday 14:00-14:50 in EN 1000
	Mechatronics major:	Monday 17:00-17:50 in EN 2006
	Mechanical major:	Tuesday 11:00-11:50 in EN 2006

COURSE OUTLINE (Major Topics):

1. First Order Ordinary Differential Equations (weeks 1 – 3)
2. Second Order Linear Ordinary Differential Equations (weeks 3 & 4)
3. Laplace Transforms (weeks 5 – 7)
4. Partial Differentiation (weeks 7 – 9)
5. Series (weeks 10-12)

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 https://www.mun.ca/engineering/media/production/memorial/academic/faculty-of-engineering/faculty-of-engineering-and-applied-science/media-library/facultystaff/forms/Graduate-Attributes.pdf for definitions on the 12 Graduate Attributes and the Content Instructional Levels.

More detailed learning outcomes are on the Brightspace site.

RESOURCES:

TEXT BOOK

- The lecture notes will be available in the University Bookstore and can also be downloaded as PDF files from the Brightspace site: "Lecture Notes for ENGI 3424 Engineering Mathematics", by G.H. George.
  You will need to bring these notes to *every* class. The cost is less than $20.

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 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. 19, Oct. 03, Oct. 17, Oct. 31 & Nov. 14
Mid Term Test	25%	Oct. 10
Final exam	50%	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 are posted on the Brightspace site only. The solutions will be unlocked on the Brightspace site shortly after the relevant tutorial.

The five **quizzes** will take place during the last 15 minutes of lectures on alternate Thursdays, on Sep. 19, Oct. 03, Oct. 17, Oct. 31 & Nov. 14. The University follows the Tuesday teaching schedule on Thu. Oct. 17. In the event that a lecture is cancelled on any of these days, the quiz will take place during the next available lecture period of this course. No deferred quizzes will be offered.

The **mid term test** is scheduled for Thursday October 10. Due to a lack of suitable rooms during the regular lecture times, it will be necessary to conduct the mid term test on that **evening** (7 to 8 p.m.). The locations for the mid term test will be announced later. No deferred tests will be offered, (except where a student can show good cause for not being able to attend a test held outside regular lecture times).

Marked quizzes and tests will be returned in lecture or tutorial periods.

You may need a **calculator** for all quizzes, the test and the final examination. Simple scientific calculators may be best (no capability for text storage, programs, graphics, symbolic algebra or calculus). Your calculator must not be able to communicate with other devices. More details are on the Brightspace site.

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. *No formula sheets are permitted in any quiz*.

The **final examination** will cover 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 50%. *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 "https://www.mun.ca/engineering/undergraduate/undergraduate-policies/".

ADDITIONAL INFORMATION:

In the Brightspace site for ENGI 3424, the tab "Course Content" includes week-by-week lists of material to be covered and resources such as supplementary material for tutorials.

The Brightspace site also includes pre-recorded lectures from the 2021 Fall semester. They are offered as a supplement to the in-person lectures this semester, in case you wish to review concepts at your own pace (or if you are absent from a lecture). Most pre-recorded lectures are split into shorter videos. Each pre-recorded lecture will be unlocked just after the corresponding in-person lecture has taken place. Please **ignore any announcements** in those videos about quizzes and tests – those announcements were relevant to the 2021 semester only.