

Course Outline

1. COURSE INFORMATION

Session Offered	Fall 2015		
Course Name	Mathematics III		
Course Code	ENG TECH 2MA3		
Date(s) and Time(s) of lectures	C01	Wed 08:30 – 10:20	JHE – 326H
		Fri 10:30 – 12:20	MARC – 266
	C02	Wed 16:30 – 18:20	ETB – 238
		Thu 09:30 – 11:20	PC – 155
	C03	Wed 15:30 – 17:20	JHE – 326H
		Thu 08:30 – 10:20	ETB – 238
Program Name	Automotive and Vehicle Technology / Biotechnology /Process Automation Technology		
Calendar Description	Advanced integration and applications; vector calculus; series and sequences; differential equations.		
Instructor(s)	Dr. Nasim Muhammad	Phone: (905) 525-9140 x 24425 E-Mail: nasimm@mcmaster.ca Location & Office Hours: ETB B110 - TBA	
	Dr. Yotka Rickard	Phone: (905) 525-9140 E-Mail: yotka@mcmaster.ca Location & Office Hours: TBA	

2. COURSE SPECIFICS

Course Description	First order ordinary differential equations, variable separable, exact and homogeneous differential equations, first order linear differential equations; applications of 1 st order and simple higher-order differential equations; second order ordinary differential equations with constant coefficients, the method of undetermined coefficients, the method of variation of parameters; initial value and boundary value problems, system of differential equations, partial differential equations.		
Instruction Type	Code	Type	Hours per term
	C	Classroom instruction	48
	L	Laboratory, workshop or fieldwork	0
	T	Tutorial	0
	DE	Distance education	0
	Total Hours		48
Resources	ISBN	Textbook Title & Edition	Author & Publisher
	ISBN: 1-269-83544-0	Custom Book: ENG TECH 2MA3	<i>Edwards & Penney; Nagle & Snider</i>
	Other Supplies	Source	
	Problem Sets/ Assignments	Course Web Site: http://avenue.mcmaster.ca	
Prerequisite(s)	ENG TECH 1MT3; and registration in level II of Automotive and Vehicle Technology, Biotechnology or Process Automation Technology.		
Corequisite(s)	None		
Antirequisite(s)	None		

Course Specific Policies	<ul style="list-style-type: none"> • Absolutely NO electronic devices will be permitted in tests and examinations, with the sole exception of approved calculators or the equivalent. • Three best term tests will be considered for final evaluation if a student attempts all four term tests with rest of the class. • In order to pass this course, you are required to obtain <ol style="list-style-type: none"> (1) combined average of at least 50% in tests and final exam (2) and overall average of at least 50% including all evaluation components. • All tests/assignments marks will be posted on Avenue. It is your responsibility to report any discrepancies to your instructor before the last day of classes. No errors will be corrected unless reported by this time. 	
Departmental Policies	<p>Students must maintain a GPA of 3.5/12 to continue in the program.</p> <p>In order to achieve the required learning objectives, on average, B.Tech. students can expect to do at least 3 hours of “out-of-class” work for every scheduled hour in class. “Out-of-class” work includes reading, research, assignments and preparation for tests and examinations.</p> <p>Where group work is indicated in the course outline, such collaborative work is mandatory.</p> <p>The use of cell phones, iPods, laptops and other personal electronic devices are prohibited from the classroom during the class time, unless the instructor makes an explicit exception.</p> <p>Announcements made in class or placed on Avenue are considered to have been communicated to all students including those individuals that are not in class.</p> <p>Instructor has the right to submit work to software to identify plagiarism.</p>	
3. SUB TOPIC(S)		
Week 1 (Sep 8 – 11)	<p><u>MODULE 01:</u></p> <ul style="list-style-type: none"> • Differential equations (DE): (Basic Concepts) Definition of a DE, solution of DE, ordinary differential equations (ODE), partial differential equations (PDE), order and degree of DE, initial and boundary value problems • Integrals as General and Particular Solutions • Initial value problems (IVP) • Variable separable differential equations (VSDE) 	
Week 2 (Sep 14 – 18)	<p><u>MODULE 02:</u></p> <ul style="list-style-type: none"> • First order linear differential equations (LDE) • First order homogeneous differential equations (HDE) • Bernoulli equation 	
Week 3 (Sep 21 – 25)	<ul style="list-style-type: none"> • Exact differential equations (EDE) • Reducible second order equations <p><u>MODULE 03:</u></p> <ul style="list-style-type: none"> • Applications involving Growth/Decay and radioactive disintegration • Applications involving Newton’s Law of Cooling 	Test 1 (TBA)
Week 4 (Sep 28 – Oct 02)	<ul style="list-style-type: none"> • Applications involving Torricelli's Law for a draining tank • Applications to chemistry and chemical mixtures 	
Week 5 (Oct 5 – 9)	<ul style="list-style-type: none"> • Application to rates of chemical reactions: the law of mass action • Applications to electric circuits 	
<i>Mid-term recess (Monday, October 12 to Saturday, October 17)</i>		

Week 6 (Oct 19 – 23)	<u>MODULE 04:</u> <ul style="list-style-type: none"> • Introduction to second order linear DE • General solution of linear homogeneous DE with constant coefficients • The Characteristic/Auxiliary equation (Distinct, Repeated and Complex roots) • Initial and boundary value problems • Euler's Equations 	Test 2 (TBA)
Week 7 (Oct 26 – 30)	<u>MODULE 05:</u> <ul style="list-style-type: none"> • Second order nonhomogeneous linear differential equations with constant coefficients; complementary and particular solution • The method of undetermined coefficients 	
Week 8 (Nov 2 – 6)	<ul style="list-style-type: none"> • (concluded) The method of undetermined coefficients • The method of variation of parameters 	
Week 9 (Nov 9 – 13)	<u>MODULE 06:</u> <ul style="list-style-type: none"> • Applications of linear differential equations with constant coefficients to mechanical systems • Applications of linear differential equations with constant coefficients to RLC series electrical circuits 	Test 3 (TBA)
Week 10 (Nov 16 – 20)	<u>MODULE 07:</u> <ul style="list-style-type: none"> • Solving Systems of Linear Differential Equations (Eigenvalue Method) 	
Week 11 (Nov 23 – 27)	<u>MODULE 08:</u> <ul style="list-style-type: none"> • Introduction to Partial differential equations (PDE) • Classification of linear second-order PDE • Heat Equation 	Test 4 (TBA)
Week 12 (Nov 30 – 04 Dec)	<ul style="list-style-type: none"> • Wave Equation • Laplace's Equation 	
Week 13 (Dec 7 – 8)	<ul style="list-style-type: none"> • Review, if time permits 	
Classes end – Tuesday December 8, 2015 Final examination period: Wednesday December, 9, 2015 to Tuesday, December 22, 2015 All examinations MUST BE written during the scheduled examination period.		
List of experiments		
Lab 1		
Lab 2		
Lab 3		
Lab 4		
Lab 5		
Lab 6		
<i>Mid-term recess (Monday, October 12 to Saturday, October 17)</i>		
Lab 7		
Lab 8		
Lab 9		
Lab 10		
Lab 11		
Lab 12		
Note that this structure represents a plan and is subject to adjustment term by term. The instructor and the 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.

4. ASSESSMENT OF LEARNING *including dates*	Weight
Term Tests (3 out of 4) [<i>check course specific policies</i>]	40%
Assignments/ Quizzes/Work Sheets	20%
Final Examination	40%
TOTAL	100%

Percentage grades will be converted to letter grades and grade points per the University calendar.

5. LEARNING OUTCOMES

1. Classify the differential equations (DE) in terms of order and degree of DE, linear or non-linear DE, and ordinary or partial DE.
2. Demonstrate the technique of separation of variables, integrating factor, exact and homogenous equations, and transformation of variables for solving first order ordinary differential equations.
3. Set up and solve physical problems related to first order ordinary differential equations.
4. Solve 2nd order linear differential equations with constant coefficients using the method of undetermined coefficients and variation of parameters.
5. Set up and solve problems related to second order ordinary differential equations.
6. Solve systems of linear differential equations.
7. Classify and solve partial differential equations (parabolic, elliptic and hyperbolic).

6. POLICIES

Anti-Discrimination

The Faculty of Engineering is concerned with ensuring an environment that is free of all discrimination. If there is a problem, individuals are reminded that they should contact the Department Chair, the Sexual Harassment Officer or the Human Rights Consultant, as soon as possible.

<http://www.mcmaster.ca/policy/General/HR/Anti-Discrimination%20policy.pdf>

Academic Integrity

You are required to exhibit honestly 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 kinds of academic dishonesty please refer to the Academic Integrity Policy, located at: <http://www.mcmaster.ca/policy/Students-AcademicStudies/AcademicIntegrity.pdf>.

The following illustrates only three forms of academic dishonesty:

1. Plagiarism. E.g. the submission of work that is not 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.

Requests for Relief for Missed Academic Term Work (Assignments, Mid-Terms, etc.)

The McMaster Student Absence Form is a self reporting tool for **Undergraduate Students** to report absences 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.

You may submit a maximum of 1 Academic Work Missed requests per term. It is YOUR responsibility to follow up with your Instructor immediately regarding the nature of the accommodation.

If you are absent 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.

This form should be filled out immediately when you are about to return to class after your absence.

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

E-Learning Policy

Consistent with the Bachelor of Technology's policy to utilize e-learning as a complement to traditional classroom instruction, students are expected to obtain appropriate passwords and accounts to access Avenue To Learn for this course. Materials will be posted by class for student download. It is expected that students will avail themselves of these materials prior to class. 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 account, and program affiliation may become apparent to all other students in the 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 this disclosure please discuss this with the course instructor. Avenue can be accessed via

<http://avenue.mcmaster.ca>.

Communications

It is the student's responsibility to:

- Maintain current contact information with the University, including address, phone numbers, and emergency contact information.
- Use the University provided e-mail address or maintain a valid forwarding e-mail address.
- Regularly check the official University communications channels. Official University communications are considered received if sent by postal mail, by fax, or by e-mail to the student's designated primary e-mail account via their @mcmaster.ca alias.
- Accept that forwarded e-mails may be lost and that e-mail is considered received if sent via the student's @mcmaster.ca alias.
- Check the McMaster/Avenue email and course websites on a regular basis during the term.

Turnitin (Optional)

This course will be using a web-based service (Turnitin.com) to reveal plagiarism. Students submit their assignment/work electronically to Turnitin.com where it is checked against the internet, published works and Turnitin's database for similar or identical work. If Turnitin finds similar or identical work that has not been properly cited, a report is sent to the instructor showing the student's work and the original source. The instructor reviews what Turnitin has found and then determines if he/she thinks there is a problem with the work. Students who do not wish to submit their work to Turnitin.com must still submit a copy to the instructor. No penalty will be assigned to a student who does not submit work to Turnitin.com. All submitted work is subject to normal verification that standards of academic integrity have been upheld (e.g., on-line search, etc.). To see the Turnitin.com Policy, please go to

<http://www.mcmaster.ca/academicintegrity/turnitin/students/>

Protection of Privacy Act (FIPPA)

The Freedom of Information and Protection of Privacy Act (FIPPA) applies to universities. Instructors should take care to protect student names, student numbers, grades and all other personal information at all times. For example, the submission and return of assignments and posting of grades must be done in a manner that ensures confidentiality.

<http://www.mcmaster.ca/univsec/fippa/fippa.cfm>

Academic Accommodation of Students with Disabilities Policy

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 contacted by phone 905-525-9140 ext. 28652 or e-mail sas@mcmaster.ca. For further information consult McMaster's policy for Academic Accommodation of Students with Disabilities

<http://www.mcmaster.ca/policy/Students-AcademicStudies/AcademicAccommodation-StudentsWithDisabilities.pdf>

Students must forward a copy of the SAS accommodation to the instructor of each course and to the

Program Administrator of the B.Tech. Program immediately upon receipt. If a student with a disability chooses NOT to take advantage of a SAS accommodation and chooses to sit for a regular exam, a petition for relief may not be filed after the examination is complete. <http://sas.mcmaster.ca>

Student Code of Conduct

The Student Code of Conduct (SCC) exists to promote the safety and security of all the students in the McMaster community and to encourage respect for others, their property and the laws of the land. McMaster University is a community which values mutual respect for the rights, responsibilities, dignity and well-being of others. The purpose of the Student Code of Conduct is to outline accepted standards of behavior that are harmonious with the goals and the well-being of the University community, and to define the procedures to be followed when students fail to meet the accepted standards of behavior. All students have the responsibility to familiarize themselves with the University regulations and the conduct expected of them while studying at McMaster University.

<http://judicialaffairs.mcmaster.ca/pdf/SCC.pdf>