

## Course Outline

### 1. COURSE INFORMATION

<b>Session Offered</b>	Winter 2024	
<b>Course Name</b>	Engineering Economics (On-line)	
<b>Course Code</b>	GENTECH 3EE3	
<b>Date(s) and Time(s) of lectures</b>	Wednesday 6:30-9:30 PM	
<b>Program Name</b>	One of the following: Civil Engineering Infrastructure Technology / Software Engineering Technology / Energy Engineering Technologies / Manufacturing Engineering Technology	
<b>Calendar Description</b>	Costing methods of engineering designs and processes; minimum acceptable rate of return, return sensitivities, time value of money, internal rate of return, pay-back period, amortization of equipment and capital cost allowance structures.	
<b>Instructor(s)</b>	John D'Alessio	E-Mail: <a href="mailto:dalessi@mcmaster.ca">dalessi@mcmaster.ca</a> Office Hours & Location: request for appointment

### 2. COURSE SPECIFICS

<b>Course Description</b>			
<b>Instruction Type</b>	<b>Code</b>	<b>Type</b>	<b>Hours per term</b>
	C	Classroom instruction	39
	L	Laboratory, workshop or fieldwork	
	T	Tutorial	
	DE	Distance education	
	<b>Total Hours</b>		39
<b>Resources</b>	<b>ISBN</b>	<b>Textbook Title &amp; Edition</b>	<b>Author &amp; Publisher</b>
	9780135728826 (required)	Engineering Economics, Financial Decision Making for Engineers, MyLab with 7Ce edition	Niall M. Fraser, Elizabeth M. Jewkes, and Mehrdad Pirnia. Published by Pearson Education Canada
	9780133405538 (optional)	Engineering Economics, Financial Decision Making for Engineers, 6 th edition	Niall M. Fraser, Elizabeth M. Jewkes, and Mehrdad Pirnia. Published by Pearson Education Canada
	9780199029280 (optional)	Engineering Economic Analysis 3rd Canadian Ed. (Loose-leaf version)	Newnan, Whittaker, Eschenbach, Lavelle (Oxford)
	9780195447545 (optional)	Engineering Economic Analysis, 3rd Canadian Ed. (Hardcover)	Newnan, Whittaker, Eschenbach, Lavelle (Oxford)
<b>Other Supplies</b>		<b>Source</b>	

	Course Resources	Additional course resources will be available on (A2L)
<b>Prerequisite(s)</b>	Registration in Civil Engineering Infrastructure Technology, Computing and Information Technology, Energy Engineering Technologies or Manufacturing Engineering Technologies.	
<b>Corequisite(s)</b>	N/A	
<b>Antirequisite(s)</b>	GENTECH 1EE3, 2EE3	
<b>Course Specific Policies</b>	<p>It is expected that students review all posted resources on A2L for the week topic(s) under discussion prior to class. Students are expected to attend and actively participate during the live weekly synchronized lectures offering insight, comments, reinforcement, contrary views, and underscoring examples. You are required to participate and provide questions and/or concerns in the online asynchronous group case study activities and general forums, respectively.</p> <p><b>Quizzes:</b>            This course will have 5 online quizzes with 3 attempts permitted for each quiz. The dates and times are announced on the Course Outline with specifics on A2L.</p> <p>The highest quiz score of the 3 attempts for each quiz AND the lowest quiz score will be excluded from the calculation of your final grade, leaving 4 quizzes worth 5% each (total of 20%). If you use an MSAF for one of the 5 quizzes, your final grade will be calculated as follows:</p> <ul style="list-style-type: none"> <li>• Each of the remaining 4 quizzes will be worth 4% each for a total of 16%.</li> <li>• The Midterm will be worth 30% (unchanged).</li> <li>• Your Final Exam will be worth 54%.</li> </ul> <p><b>Midterm Exam:</b>            The midterm will be a common exam written online scheduled in Week 8 on <b>Wednesday, February 28<sup>th</sup>, 7:00 – 9:00 PM (Online A2L)</b>. The midterm exam format will include multiple-choice questions and application-focused problems covering course material from weeks 1-5.</p> <ul style="list-style-type: none"> <li>• Please note that there <u>are no deferred mid-term examinations</u> in this course. If, for any reason a student misses a mid-term examination, the value of that examination will be applied to the cumulative final examination (<b>i.e. a missed midterm exam will result in the cumulative final examination being weighted at 80% of the final grade</b>).</li> <li>• <u>MSAF is not permissible for weights on evaluations (i.e. midterm, final exam) that are greater than or equal to 25%.</u> <b>Any attempt to submit a falsified MSAF for this course for a missed midterm exam constitutes academic dishonesty and charges may be filed with the Office of Academic Integrity.</b></li> </ul> <p><b>Final Exam:</b>            The Final exam <b>MUST</b> be written online during the Final Examination Period as scheduled by the Registrar Office.            The Final exam format will include multiple-choice questions and application-focused problems.</p> <p><b>Grading Scheme:</b></p> <ul style="list-style-type: none"> <li>• To pass the course students must achieve 50% or higher on overall grade.</li> </ul>	

<b>Departmental Policies</b>	<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>	
<b>3. SUB TOPIC(S)</b>		
Week 1	Engineering Economics and Decision Making, Time Value of Money, Interest Rates, and Cash Flow Diagrams	Chapters 1 & 2
Week 2	Compounding for Single Payments and Uniform Annuities	Chapter 3
Week 3	Uniform Annuities, Continuous Compounding, Mortgages and Loans, Bonds and Excel Functions, <b>Online Quiz 1</b>	Chapter 3
Week 4	Non-Uniform Annuities (Arithmetic and Geometric Gradients) and Perpetuities, <b>Online Quiz 2</b>	Chapter 3
Week 5	Case Study 1 – Financial Planning, Present Worth, Annual Worth, Payback Period and Midterm Exam Review	Chapter 4
Week 6	Mid-term Review	Chapters 1-4
Week 7	Mid-term Recess: Monday, February 19 to Sunday, February 25	
Week 8	<b>Midterm</b> – Scheduled for Wednesday, February 28 <sup>th</sup> 7:00 - 9:00 PM (Online)	Chapters 1-4
Week 9	Analyses Rate of Return Analysis, IRR, ERR and Incremental Analysis, <b>Online Quiz 3</b>	Chapter 5
Week 10	Chapter 5 Practice Problems, Case Study 2 – Break-Even Analysis, Depreciation and Financial Accounting (Income Statements, Balance Sheets, and Financial Ratio Analysis)	Chapters 2, 5 & 6
Week 11	Asset Replacement Decisions, Economic Life, Equivalent Annual Cost (EAC) of Capital, Operating & Maintenance, Chapter 7 Practice Problems, <b>Online Quiz 4</b>	Chapter 7
Week 12	Income versus Corporate Tax Rates, After-Tax Cash Flows, IRR Tax Calculations, Capital Cost Allowance, and Specific Tax Rules in Canada, Case Study 3 – After-Tax Cash Flow, <b>Online Quiz 5</b>	Chapter 8
Week 13	Inflation, Price Indices, Inflation Rates, Converting Between Real and Current Dollars, Project Evaluation Methods with Inflation Economic Analysis in the Public Sector and Benefit-Cost Ratios, Final Exam Format	Chapters 9 & 10
Week 14	Final Exam Review	Chapters 1-10
<p>Mid-term Recess: Monday, February 19 to Sunday, February 25</p> <p>Classes end: Wednesday, April 10</p>		

Final examination period: Friday, April 12 to Thursday, April 25  
 All examinations MUST be written during the scheduled examination period

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.

<b>4. ASSESSMENT OF LEARNING *including dates*</b>	<b>Weight</b>
Quizzes (5 total, best of 3 attempts per quiz, best 4 of 5 for final grade)	<b>20%</b>
Midterm Exam (scheduled for Wednesday, February 28 <sup>th</sup> – online A2L)	<b>30%</b>
Final Examination (tests cumulative knowledge – online A2L)	<b>50%</b>
<b>TOTAL</b>	<b>100%</b>

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

**5. LEARNING OUTCOMES**

1. Explain the effect of time on the value of money and apply it to engineering/financial decisions.
2. Apply appropriate comparison techniques in the evaluation of competing alternatives from an economic perspective.
3. Apply the concept of Minimum Acceptable Rate of Return and Internal Rate of Return for purpose of evaluating projects.
4. Calculate the value of an asset from an accounting perspective using the concept of depreciation.
5. Calculate the Equivalent Annual Cost of an asset for use in replacement decisions
6. Calculate the effect of Tax on engineering/financial decisions
7. Calculate the effect of inflation on the Minimum Acceptable Rate of Return and the Internal Rate of Return

**6. COURSE OUTLINE – APPROVED ADVISORY STATEMENTS**

**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/Discrimination\\_Harassment\\_Sexual\\_Harassment-Prevention&Response.pdf](http://www.mcmaster.ca/policy/General/HR/Discrimination_Harassment_Sexual_Harassment-Prevention&Response.pdf)

**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: 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.

### **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 [www.mcmaster.ca/academicintegrity](http://www.mcmaster.ca/academicintegrity).

### **COURSES WITH AN ON-LINE ELEMENT**

Some courses may use on-line elements (e.g. e-mail, Avenue to Learn (A2L), LearnLink, web pages, capa, Moodle, ThinkingCap, 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, 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 a course that uses on-line elements will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure please discuss this with the course 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.

### **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.

### **CONDUCT EXPECTATIONS**

As a McMaster student, you have the right to experience, and the responsibility to demonstrate, respectful and dignified interactions within all of 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.

### **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](mailto:sas@mcmaster.ca) to make arrangements with a Program Coordinator. For further information, consult McMaster University’s Academic Accommodation of Students with Disabilities policy.

### **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”.

### **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. <http://www.mcmaster.ca/policy/Students-AcademicStudies/Studentcode.pdf>

### **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.

### **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.