

Course Outline

1. COURSE INFORMATION			
Session Offered	Winter 2017		
Course Name	Engineering Economics		
Course Code	GEN TECH 2EE3		
Date(s) and Time(s) of lectures	C01: Monday 11:30am-1:20pm, Wednesday 12:30pm-1:20pm C02: Monday 2:30pm-4:20pm, Wednesday 2:30pm-3:20pm C03: Monday 9:30am-11:20am, Wednesday 10:30am-11:20am C04: Friday 12:30pm-1:20pm, Wednesday 2:30pm-4:20pm		
Program Name	One of the following: Automotive and Vehicle Technology / Biotechnology / Process Automation Technology		
Calendar Description	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.		
Instructor(s)	Michael D. Justason Sections: C01, C02	E-Mail: justaso@mcmaster.ca Phone: 905.525.9140 ext. 21452 Office Hours & Location: ETB/215, by appointment	
	Aadil Merali Juma Sections: C03, C04	E-Mail: merali@mcmaster.ca Phone: 905.525.9140 ext. 26102 Office Hours & Location: ETB/217, by appointment	
2. COURSE SPECIFICS			
Course Description	The purpose of this course is to equip students with the basic concepts of engineering economics through the understanding of theoretical and conceptual financial analysis. Applications of the following types of engineering economic decisions will be explored: capital, cash flow, and the time value of money concepts; nominal and effective interest rates when considering loans, mortgages, and bonds. The application of present worth analysis, annual equivalent analysis and rate of return analysis in evaluating independent projects, comparing mutually exclusive projects, and making decisions. After-tax financial analysis requiring an understanding of capital cost allowance (depreciation) and corporate income tax. Break-even, sensitivity and risk analysis, and decision making in the public sector.		
Instruction Type	Code	Type	Hours per term
	C	Classroom instruction	39
	L	Laboratory, workshop or fieldwork	
	T	Tutorial	
	DE	Distance education	
	Total Hours		39
Resources	ISBN	Textbook Title & Edition	Author & Publisher
	<i>*Any of the textbooks listed here are acceptable for this course. These texts are 'strongly suggested'</i> ISBN: 9780199029280	Engineering Economic Analysis 3 rd Canadian Ed. (Loose-leaf version)	Newnan, Whittaker, Eschenbach, Lavelle (Oxford)
	9780195447545	Engineering Economic Analysis, 3 rd Canadian Ed. (Hardcover)	Newnan, Whittaker, Eschenbach, Lavelle (Oxford)

<i>but are not 'required'. Some previous editions are also acceptable – please consult the instructors with specific questions regarding the course text.</i>	9780133405538	Engineering Economics: Financial Decision Making for Engineers, Sixth Edition	<i>Fraser, Jewkes, Pirnia (Pearson)</i>
	Other Supplies	Source	
	Course Resources	Additional course resources will be available on (A2L)	
Prerequisite(s)	Registration in Level 2 of Automotive and Vehicle Technology, Biotechnology, or Process Automation Technology		
Corequisite(s)	N/A		
Antirequisite(s)	GEN TECH 1EE3; GEN TECH 3EE3		
Course Specific Policies	<p>Students are expected to attend and actively participate during class sessions offering insight, comments, reinforcement, contrary views, and underscoring examples. It is expected that students read some of the course material that is coming under discussion prior to class.</p> <p>Switching Classes: You are required to attend the class days/times for the section in which you are registered. It is possible to attend another class day/time occasionally for specific conflicts that are both urgent and important in nature, such as a coop job interview – <u>however you must get prior approval from the instructor.</u></p> <p>Quizzes: This course will have 5 Quizzes. The dates of the Quizzes will be announced.</p> <p>The lowest quiz score will be excluded from the calculation of your final grade, leaving 4 quizzes worth 5% each (total of 20%). <u>If you use an MSAF for one of the 5 quizzes, your final grade will be calculated as follows:</u></p> <ul style="list-style-type: none"> • Each of the remaining 4 quizzes will be worth 4% each for a total of 16% (NOTE: the lowest score is not dropped – all 4 of the remaining Quizzes 'count') • The Midterm will be worth 30% (unchanged). • Your Final Exam will be worth 54% (4% added). <p>Midterm Exam: The midterm will be a common exam written by all sections outside of regular class time tentatively scheduled for Friday, March 3rd, 6:30-8:30pm (location TBA). The midterm exam format will include multiple-choice questions and application-focused problems covering course material from weeks 1-7.</p> <ul style="list-style-type: none"> • 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 (i.e. a missed midterm exam will result in the cumulative final examination being weighted at 80% of the final grade). • <u>MSAF is not permissible for weights on evaluations (i.e. midterm, final exam) that are greater than or equal to 25%.</u> 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. <p>Final Exam: The cumulative final exam will be written during the scheduled examination period. The final exam format will include multiple-choice questions and application-focused problems.</p>		

	<p>Passing the Course: Students must have a 'combined' passing grade on the Midterm Exam and Final Exam to pass the course. The Midterm grade will be converted to a grade out of 30, the Final Exam to a grade out of 50, and the 'combined' grade will be out of 80. Students must achieve at least 40/80 to pass the course.</p>	
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	Engineering Economics and Decision Making, Ethics, Estimating Costs, Dealing with Abstractions, Cash Flow Diagrams, Time Value of Money, Equivalence, Single-Payment Compound Interest Formulas, Nominal and Effective Interest	Oxford-Chapters 1,2&3 Pearson-Chapters 1&2
Week 2	Repeated Cash Flows, Uniform Series of Payments, Arithmetic and Geometric Gradients	Oxford-Chapter 4 Pearson-Chapter 3
Week 3	Repeated Cash Flows, Uniform Series of Payments, Arithmetic and Geometric Gradients (continued)	Oxford-Chapter 4 Pearson-Chapter 3
Week 4	Present Worth Analysis, Bonds	Oxford-Chapter 5 Pearson-Chapter 4
Week 5	Annual Worth Analysis, Annual Cash Flow Analysis, Mortgages and Loans	Oxford-Chapter 6 Pearson-Chapter 4
Week 6	Rate of Return Analysis, IRR, Net-Present-Worth, Incremental Analysis	Oxford-Chapter 7 Pearson-Chapter 5
Week 7	Course Recap, 'Catch-up' (if required) and Midterm Exam Review	Midterm Exam tentatively scheduled for Saturday, February 18 th , location TBA
Mid-term Recess: Monday, February 20 to Sunday, February 26, 2017		
Week 8	Rate of Return Analysis (continued), Choosing the Best Alternative, Graphical Solutions, Spreadsheets and GOAL SEEK, Future Worth Analysis, Payback Period, Sensitivity & Break-Even Analysis	Oxford-Chapters 8&9 Pearson-Chapter 4&5
Week 9	Income, Depreciation, and Cash Flow, Depreciation Methods, Capital Cost Allowance, Basic Elements of Financial Accounting	Oxford-Chapter 11 Pearson-Chapters 2&6
Week 10	After-Tax Cash Flows, Acquiring and Disposing of Assets, Capital Tax Factors, Working Capital, Minimum Attractive Rate of Return, Replacement Analysis	Oxford-Chapter 12&13 Pearson-Chapter 7&8
Week 11	Inflation, Price Indices, Constant Dollars versus Then-Current Dollars, Effect of Inflation on After-Tax Calculations	Oxford-Chapter 14 Pearson-Chapter 9

Week 12	Economic Analysis in the Public Sector and Accounting and Engineering Economics	Oxford-Chapter 16 Pearson-Chapter 10
Week 13	Course Catch-up/Recap and Exam Review	
<p>Classes end: Thursday, April 6, 2017</p> <p>Final examination period: Tuesday, April 11 to Thursday, April 27, 2017</p> <p>All examinations MUST be written during the scheduled examination period.</p>		
<p>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.</p>		
4. ASSESSMENT OF LEARNING *including dates*		Weight
Quizzes (5 total throughout the term – dates to be announced)		20%
Mid-term test (tentatively scheduled for February 18 th)		30%
Final examination (tests cumulative knowledge)		50%
TOTAL		100%
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 the 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. POLICIES		
Anti-Discrimination		
<p>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.</p> <p>http://www.mcmaster.ca/policy/General/HR/Discrimination_Harassment_Sexual_Harassment-Prevention&Response.pdf</p>		
Academic Integrity		
<p>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.</p> <p>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.</p> <p>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.</p> <p>The following illustrates only three forms of academic dishonesty:</p>		
<ol style="list-style-type: none"> 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 an on-line self-reporting tool for Undergraduate Students to report		

absences for:

- 1) Relief for missed academic work worth less than 25% of the final grade resulting from medical or personal situations lasting up to three calendar days:
 - Students may submit a maximum of one academic work missed request per term. It is the responsibility of the student to follow up with instructors immediately (within the 3 day period that is specified in the MSAF) regarding the nature of the accommodation. All work due in that time period however can be covered by one MSAF.
 - MSAF cannot be used to meet religious obligation or celebration of an important religious holiday, for that has already been completed or attempted or to apply for relief for any final examination or its equivalent.
- 2) For medical or personal situations lasting more than three calendar days, and/or for missed academic work worth 25% or more of the final grade, and/or for any request for relief in a term where the MSAF has not been used previously in that term:
 - Students must visit their Associate Dean's Office (Faculty Office) and provide supporting documentation.

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://studentconduct.mcmaster.ca/student_code_of_conduct.html