

ENG M 401 Section A1 Fundamentals of Engineering Management

Lecture Outline

Location: ETLE1 – 017

Time: MWF, 9.00 AM - 9.50 AM

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Objectives

- To give fundamental knowledge of business which will help engineers to contribute better in their employment.
- To expose students to certain situations of business when engineers have to think like managers.
- To expose students to certain basic tools which will help them in evaluating a business.

Overall aim of this course is to equip engineers with fundamental knowledge of business which will help them in having a much more enjoyable time during their professional career.

Text

- **Textbook** - Peter Flynn's *Financial Management for Engineers*, Fourth Edition, 2009, Castle Rock Research Corporation (ISBN 1-77044-055-0). Available at the U of A bookstore.
- Overheads used in the class will be included in the class notes.
- Students should retain all problem solutions and treat them as part of the overall class notes, since exams will include concepts discussed in the analysis of assignment problems.
- Optional reference books:
 - Pierre G. Bergeron's *Finance for Non Financial Managers*, Updated Version, Nelson Canada (ISBN 0-17-603520-6). It is an alternate text and is available through Rutherford Library.
 - C. S. Park, R. Pelot, K. C. Porteous, and M. J. Zuo's *Contemporary Engineering Economics: A Canadian Perspective*, Pearson Education Canada Inc. (ISBN 0-201-61390-5). It is highly detailed classical treatment of investment analysis.
 - Newnan, Whittaker, Eschenbach and Lavelle's *Engineering Economic Analysis, Canadian Edition*, Oxford University Press (ISBN 0-19-541925-1). It is also a highly detailed classical treatment of investment analysis.

Website

- Important materials will be available on the 'eClass'.

<http://www.ualberta.ca/>

Once you are at the above website, click on the link '**eClass**' and choose ENG M 401 – Fundamentals of Engineering Management. You will be taken to the website from which you can download the course related material.

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Assignments and In-class Problems

- There will **9 assignments** in this course.
 - **Financial analysis (including investment analysis) is highly useful to engineers. It cannot be understood without completing assignments.** This is not a subject that can be mastered only by reading a book, assignments are a key part of the learning experience along with additional in-class problems. There is no benefit from blindly copying assignments, as it will detract you from learning.
 - Assignments are due at the beginning of the class on the scheduled due dates. See Table 1 (below) for the schedule of submission of assignments.
 - Assignments should be submitted in the beginning of the class on the due date. Late assignments will not be accepted.
 - Note that assignments will be graded.
 - Students may e mail the professor with questions (the replies to which will usually be sent to all class participants). Solutions will be distributed in class on the day marked assignments are returned. Many assignments will be discussed briefly in class on the day they are returned after grading.
 - You will need access to a spreadsheet program (e.g. Excel) to complete the assignments.
 - Assignments are checked by the TA, start first there if you have a question on your returned assignment. Apart from office hours, please book time by e-mail with either the professor or the TA's.
 - Assignments 1 to 7 are worth 2% each. Assignments 8 and 9 are worth 3% each.
- A significant number of **additional problems** will also be discussed in the class; please bring a calculator.
- Assignments and other important information are **discussed by e-mail** and e-mail addresses listed on the bear tracks will be used.

Quizzes and Exams

- This course includes **three in-class quizzes** worth 8% each. These quizzes will be open book. Each in-class quiz will of 20 minutes duration. See Table 1 (below) for the schedule of the quizzes.

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- This course includes **two in-class midterms**. The midterms exams will be open book. Each in-class midterm will be of 50 minutes duration. Because the material in the course falls into two distinct segments that do not overlap, there will be two non-cumulative mid-term exams, and no final. The first midterm exam in this course occurs relatively late, and the exam may not be marked before the deadline to drop classes. See Table 1 (below) for the schedule of the in-class midterms.

Marking Scheme

• Assignments –	20%
• First In Class Midterm –	28%
• Second In Class Midterm –	28%
• Three Quizzes @ 8% each –	<u>24%</u>
	100%

General Comments

- All notes and overheads for the course are subject to copyright; to reproduce these for distribution other than for your own personal use in the course is prohibited unless specific permission is granted. Recording is permitted only with the prior written consent of the professor or if recording is part of an approved accommodation plan.
- The University of Alberta is committed to the highest standards of academic integrity and honesty. Students are expected to be familiar with these standards regarding academic honesty and to uphold the policies of the University in this respect. Students are particularly urged to familiarize themselves with the provisions of the Code of Student Behaviour (online at: www.ualberta.ca/secretariat/appeals.htm) and avoid any behaviour which could potentially result in suspicions of cheating, plagiarism, misrepresentation of facts and/or participation in an offence. Academic dishonesty is a serious offence and can result in suspension or expulsion from the University.

Policy about course outlines can be found in [§23.4\(2\)](#) of the University Calendar.

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Table 1: ENG M 401 Section A1 – TENTATIVE (!) Lecture Outline

No.	Lecture Topic	Reading	Assignment	Due Class
1 Sept. 7	<ul style="list-style-type: none"> Course overview. Business and Engineering in society 	Textbook Chapter 1		
2 Sept. 9	<ul style="list-style-type: none"> Business and Engineering in society (cont'd) Skill set of a manager. 		1: Problems 1.1, 1.3, 1.6	Sept. 16
3 Sept. 12	<ul style="list-style-type: none"> Financial statements: an overview. Bookkeeping and the double entry. 	Textbook Chapter 2		
4 Sept. 14	<ul style="list-style-type: none"> Bookkeeping and the double entry (cont'd) An overview of the Income Statement 	Textbook Chapter 3		
5 Sept. 16	<ul style="list-style-type: none"> Income Statement: COGS, Contribution Margin, and SG&A, and the concept of measuring the creation of value. 			
6 Sept. 19	<ul style="list-style-type: none"> Income Statement (cont'd). 		2: Problems 3.1, 3.2, 3.4	Sept. 30
7 Sept. 21	<ul style="list-style-type: none"> Income Statement (cont'd). 			
8 Sept. 23	<ul style="list-style-type: none"> Depreciation of assets. Writedowns and gains and losses on sale of assets. 		3: Problems 3.5a, 3.5b, 3.6	Oct. 7
9 Sept. 26	<ul style="list-style-type: none"> Depreciation and tax. 			
10 Sept. 28	<ul style="list-style-type: none"> Cash vs. income. Operating income, other income, net income. 			
11 Sept. 30	<ul style="list-style-type: none"> Operating income, other income, net income (cont'd) 			
12 Oct. 3	<ul style="list-style-type: none"> Breakeven and the art of management. Quiz 1 – 20 minutes 		4: Problems 3.8, 3.11, 3.12	Oct. 14
13 Oct. 5	<ul style="list-style-type: none"> Wrap up on Income Statement: review of depreciation and operating income vs. net income. Statement of Retained Earnings. 			
14 Oct. 7	<ul style="list-style-type: none"> An overview of the Balance Sheet. The form and components of the Balance Sheet. 	Textbook Chapter 4		
Oct. 10	No Class – Thanksgiving Day			
15 Oct. 12	<ul style="list-style-type: none"> The form and components of the Balance Sheet (cont'd) 			
16 Oct. 14	<ul style="list-style-type: none"> Working with the Balance Sheet: how to liberate cash in a business. The concept of Working Capital. Working Capital deficiency. 		5: Problems 4.1, 4.3, 4.4	Oct. 21

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No.	Lecture Topic	Reading	Assignment	Due Class
17 Oct. 17	<ul style="list-style-type: none"> Sources and uses of funds. Correcting a working capital deficiency. Example problem 	Textbook Chapter 5		
18 Oct. 19	<ul style="list-style-type: none"> Concepts of the Statement of Cash Flow. 		6: Problems 5.1, 5.2	Oct. 28
19 Oct. 21	<ul style="list-style-type: none"> Quiz 2 – 20 minutes Statement of Cash Flow (cont'd). 			
20 Oct. 24	<ul style="list-style-type: none"> Financial vs. operational management revisited. The concept of ratio analysis: measuring management performance. The ratios. 	Textbook Chapter 6		
21 Oct. 26	<ul style="list-style-type: none"> The concepts of debt Leverage: using other people's money. 	Textbook Chapter 4	7: Problem 4.5	Nov. 4
22 Oct. 28	<ul style="list-style-type: none"> Investment analysis: why do people lend / invest, why do people borrow? The concept of the time value of money: the key formula. How do we use the time value of money? 	Textbook Chapter 7		
23 Oct. 31	<ul style="list-style-type: none"> Midterm Review 			
24 Nov. 2	<ul style="list-style-type: none"> In class Midterm exam: social vs. commercial values and working with financial statements. 			
25 Nov. 4	<ul style="list-style-type: none"> Time value of money (cont'd). 			
26 Nov. 7	<ul style="list-style-type: none"> Interest calculations Amortization concepts: mortgage and the tradeoff of capital vs. operating cost. 			
27 Nov. 9	<ul style="list-style-type: none"> Amortization concepts (cont'd) How we use PV and FV. 			
Nov. 11	No Class – Remembrance Day			
28 Nov. 14	<ul style="list-style-type: none"> Investment analysis: the role of cash flow. Cash flow for a major project and its use in NPV, IRR and payback calculations. 		8: Problems 7.1, 7.2, 7.5, 7.6	Nov. 25
29 Nov. 16	<ul style="list-style-type: none"> The concept of hurdle/MARR rate. 			
30 Nov. 18	<ul style="list-style-type: none"> Bonds 	In Class Slides		
31 Nov. 21	<ul style="list-style-type: none"> Discounted cash flow analysis Tax issues in cash flow. Quiz 3 – 20 minutes 			
32 Nov. 23	<ul style="list-style-type: none"> Tax issues in cash flow (cont'd). Discounted cash flow analysis (cont'd) 			

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No.	Lecture Topic	Reading	Assignment	Due Class
33 Nov. 25	<ul style="list-style-type: none"> • Incremental investment analysis. • Sensitivity analysis. • How investment decisions are made: the role of strategy. • When IRR does not work: payback for uncertainty and NPV for required investments. 	Textbook Chapter 7	9: Problems 7.7, 7.8, 7.9, 7.10	Dec. 2
34 Nov. 28	<ul style="list-style-type: none"> • Inflation • Other investment analysis techniques. 	In Class Slides		
35 Nov. 30	<ul style="list-style-type: none"> • Assessing and mitigating risk in projects. • Using financial statements to manage a company. 	Textbook Chapter 9		
36 Dec. 2	<ul style="list-style-type: none"> • Catch-up and review 			
37 Dec. 5	<ul style="list-style-type: none"> • Midterm review. 			
38 Dec. 7	<ul style="list-style-type: none"> • In Class Midterm exam: investment analysis. 			