

Carleton University
Department of Systems and Computer Engineering
SYSC 4105 Engineering Management Fall 2005

Course Outline

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Course Description

Introduction to engineering management: management of new products, management of manufacturing processes, management of the linkages between new products and manufacturing processes. Current theories, concepts and techniques are stressed, using a combination of readings, cases and guest speakers.

Course Objective

The objective of this course is to examine issues relevant to growing technology businesses, developing products, improving processes, and leading technology based organizations.

Prerequisites

4th year registration; students who have not satisfied the prerequisites for this course must either

- a) withdraw from the course, or
- b) submit a prerequisite waiver online at <http://www.sce.carleton.ca/dept/us/academicsupport/forms>, or
- c) will be deregistered from the course after the last day to register for courses.

Assigned Reading

The assigned reading includes one book, three book chapters, ten articles, and one or more teaching cases. Students are expected to read each assigned selection prior to attending the class at which it will be discussed.

Textbook

Prior to the fifth lecture, students are encouraged to purchase the following book:

Christensen, C.M. & Raynor, M.E. (2003a), *The Innovator's Solution: Creating and Sustaining Successful Growth*, Harvard Business School Press.

The Innovator's Solution is stocked in the business section of most large bookstores, and is available with next day shipping from most on-line retailers. One copy is held on two-hour reserve at the Carleton University library (HD53.C493 RSV).

Book Chapters

The following assigned book chapters are collected in a course envelope held on two-hour reserve at the Carleton library (SYSC 4105/MUEGGE). The complete source texts are also on two-hour reserve.

Katz, Ralph (2003), "Management Technological Innovation in Business Organizations", in Larisa V. Shavinina (editor), *The International Handbook on Innovation*, Elsevier Science, 2003, pp. 775-789.

Wheelwright, S.C. & Clark, K.B. (1992), *Revolutionizing Product Development: Quantum Leaps in Speed, Efficiency, and Quality*, Free Press.

- Chapter 5: Structuring the Development Funnel (pp. 111-132)
- Chapter 8: Organizing and Leading Project Teams (pp. 188-217)

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Articles

The following articles are assigned. To access journal articles in electronic form, go to <http://catalogue.library.carleton.ca>, enter the name of the journal, select "Web resource" and click "Search". Click on the link, and then enter your barcode number and PIN.

1. Chesbrough, Henry W. (2003), "The Era of Open Innovation", *MIT Sloan Management Review*, Spring, pp. 35-41.
2. Cooper, R.G. (1999), "The Invisible Success Factors in Product Innovation", *Journal of Product Innovation Management*, 16, pp. 115-133.
3. Garvin, D.A. (2004), "What Every CEO Should Know About Creating New Businesses", *Harvard Business Review*, July-August, pp. 18-21
4. Hammer, M. (2002), "Process Management and the Future of Six Sigma", *MIT Sloan Management Review*, Winter, pp. 26-32.
5. Magretta, J. (2002), "Why Business Models Matter", *Harvard Business Review*, May, pp. 86-92.
6. Moore, G.A. (2004), "Darwin and the Demon: Innovating Within Established Enterprises", *Harvard Business Review*, July-August, pp. 86-92.
7. Olexa, R. (2003), "Driving Quality with Six Sigma", *Manufacturing Engineering*, Volume 130, No. 2 (February), pp. 61-67.
8. Schwegmann, Vinzenz (1999), *The Alchemy of Growth – What is the formula?*, McKinsey & Company.
<http://www.almaden.ibm.com/webfountain/resources/Alchemyofgrowth.pdf>
9. Zider, B. (1998), "How Venture Capital Works", *Harvard Business Review*, November-December, pp. 131-139.
10. Zook, C. & Allen, J. (2003), "Growth Outside the Core: Expanding into Adjacent Markets", *Harvard Business Review*, December, pp. 66-73.

Cases

One or more teaching cases may be assigned during the term to illustrate application of the course concepts to contemporary engineering management problems. Cases will be announced at least one week prior to the class in which they will be discussed.

Recommended Reading

The following articles provide additional background and further discussion on material that will be presented in class. These articles are recommended as good references for the term assignment.

1. Christensen, C.M. & Raynor, M.E. (2003b), "Why Hard-Nosed Executives Should Care About Management Theory", *Harvard Business Review*, September, pp. 66-74.
2. Cooper, R.G., Edgett, S.J. & Kleinschmidt (2004), "Benchmarking Best NPD Practices – II", *Research Technology Management*, May-June, pp. 50-59.
3. Friedman, Thomas L. (2005), "It's a Flat World, After All", *New York Times*, April 3, section 6, column 1, p. 33.
4. Koenig, J. (2004), "Seven Open Source Business Strategies for Competitive Advantage", *IT Manager's Journal*, May 14.
<http://management.itmanagersjournal.com/management/04/05/10/2052216.shtml?tid=85>
5. O'Reilly, C.A. III & Tushman, M.L. (2004), "The Ambidextrous Organization", *Harvard Business Review*, April, pp. 74-81.
6. Reichheld, F.F. (2003), "The One Number You Need to Grow", *Harvard Business Review*, December, pp. 46-54.
7. Spear, S. & Bowen, H.K. (1999), "Decoding the DNA of the Toyota Production System", *Harvard Business Review*, September-October, pp. 96-106.

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Grading Scheme

Each student is required to write a take-home final examination, work in groups to complete a term assignment, and write three in-class tests. To determine the course grade, these weights apply:

In-class tests (3 @ 10% each):	30%
Term assignment (group effort):	35%
Take-home exam (individual effort):	35%

The take-home exam is an individual effort. All written work is to be that of the individual student.

Term Assignment

The term assignment is a group project. As soon as possible, students should form into groups of 2-3 students.

1. Describe a technology company with which you are familiar or establish one if you don't know any. It could be a new venture, an established incumbent, or a business unit within a large firm.
2. Use the readings as a guide to prepare a growth plan for the company.
3. Show highlights of each stage of growth.

Style Guidelines

- 1 page executive summary
- 12 pages body (maximum), 12 point font, 1" margins, 1.5 spacing.
- You may include as many appendices as you like.
- The final report should be fully referenced with citations to all sources.

Students are required to submit the names of group members in week 3, provide a one-page status report in week 6, schedule and attend a brief status meeting with the instructor or a teaching assistant prior to week 9, and submit a final report in week 11.

To receive the same grade assigned to the group, your name must appear in the first page of the assignment. If your name does not appear in the first page of the assignment, you will receive a grade of zero. Groups are not to include the names of people who did not fulfill their commitments to the group.

Students with Disabilities

Students with disabilities who require academic accommodations in this course are encouraged to contact the Paul Menton Centre for Students with Disabilities (500 University Centre) to complete the necessary forms. After registering with the Centre, make an appointment to meet with me in order to discuss your needs at least *two weeks before the first in-class test or CUTV midterm exam*. This will allow for sufficient time to process your request. Please note the following deadlines for submitting completed forms to the PMC for formally scheduled exam accommodations: *November 7th, 2005* for fall and fall/winter term courses, and *March 10, 2006* for winter term courses.

Plagiarism

Plagiarism (copying and handing in for credit someone else's work) is a serious instructional offense that will not be tolerated. Please refer to the section on instructional offenses in the Undergraduate Calendar.

The following reference provides useful advice on recognizing and avoiding plagiarism:

<http://www.sce.carleton.ca/courses/94588/plagiarism.htm>

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Calendar

	Date	Topics	Reading		Deadlines / other notes
			Articles	Text	
	1 Sep 14	Management theory	Christensen & Raynor (2003b)		
Growth	2 Sep 21	Innovation	Katz (2003) Friedman (2005) Chesbrough (2003)		
	3 Sep 28	Markets and customers	Moore (2004) Zook & Allen (2003) Reichheld (2003)		Group composition is due.
	4 Oct 5	Business Models	Magretta (2003) Koenig (2004) Schwegmann (1999)		Guest speaker: Wes Nicol Business Plan Competition
	5 Oct 12	Disruptive innovation		Ch. 1-4	Quiz #1 Case discussion
	Engineering Organizations	6 Oct 19	Multi-product organizations	Wheelwright & Clark (1992) - chapter 8 O'Reilly & Tushman (2004)	
7 Oct 26		New ventures	Garvin (2004) Zider (1998)		Ch. 9 Guest speaker: entrepreneurship
New Product Development (NPD)	8 Nov 2	Success factors	Cooper (1999)		Ch. 8 Quiz #2
	9 Nov 9	NPD decisions		Ch. 5-6	Guest speaker: venture capital Case discussion
Process Improvement	10 Nov 16	NPD and portfolio management	Wheelwright & Clark (1992) - chapter 5 Cooper et al. (2004).		Ch. 10; Epilogue Quiz #3
	11 Nov 23	Engineering and business processes	Hammer (2002) Olexa (2003) Spear & Bowen (1999)		Term assignment is due. Term exam distributed.
	12 Nov 30				Term exam is due.

Guest speakers and case discussions are tentative.