

**Carleton University**  
**Department of Systems and Computer Engineering**  
**SYSC 4105 Engineering Management Fall 2008**

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## Course Outline

**Time and Location:** Monday and Wednesday, 7:30 pm – 9:00 pm, Southam Hall 520

**Instructor:** Professor Steven Muegge      **Office:** ME 4446      **e-mail:** smuegge@sce.carleton.ca  
**Office hours:** Friday (2 pm to 3 pm) in ME4446; Monday and Wednesday after class.

### 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

4<sup>th</sup> 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 the department website – <http://www.sce.carleton.ca/ughelp>
- c) be deregistered from the course after the last day to register for courses.

### Assigned Reading

The assigned reading includes one book and an assortment of articles. Students are expected to read and understand the central arguments of each assigned selection prior to attending the class at which it will be discussed.

#### Textbook

Christensen, C.M., & Raynor, M.E. 2003a. *The innovator's solution: creating and sustaining successful growth*. Boston, MA: Harvard Business School Press.

*The Innovator's Solution* is available from the Carleton University bookstore. It is also 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).

#### Articles

The following articles are assigned. Unless otherwise specified, each article is available for download from the Carleton library website using the Internet and any standard web browser.

Chesbrough, H. 2003. The era of open innovation. *MIT Sloan Management Review*, Spring: 35-41.

Christensen, C.M., & Raynor, M.E. 2003b. Why hard-nosed executives should care about management theory. *Harvard Business Review*, September: 66-74.

Christensen, C.M., King, S., Verlinden, M., & Yang, W. 2008. The new economics of semiconductor manufacturing. *IEEE Spectrum*, May: 25- 29.

Clark, K.B., & Wheelwright, S.C. 1992. Organizing and leading 'heavyweight' development teams. *California Management Review*, Spring: 9-28.

Cooper, R.G. 1999. The invisible success factors in product innovation. *Journal of Product Innovation Management*, 16: 115-133.

Friedman, T.L. 2005. It's a flat world, after all. *New York Times*, April 3, section 6, column 1: 33.

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- Garvin, D.A. 2004. What every CEO should know about creating new businesses. *Harvard Business Review*, July-August: 18-21.
- Hammer, M. 2002. Process management and the future of Six Sigma. *MIT Sloan Management Review*, Winter: 26-32.
- Katz, R. 2003. Managing technological innovation in business organizations. In L.V. Shavinina (Ed.), *The international handbook on innovation*: 775-798. Elsevier Science.  
[This article is posted to the course website.]
- Koenig, J. 2004. Seven open source business strategies for competitive advantage. *IT Manager's Journal*. <http://www.riseforth.com/pdfs/Seven-Open-Source-Business-Strategies-JCK.pdf>, May.
- Levitt, T. 2004. Marketing myopia. *Harvard Business Review*, July-August: 138-149. [First published in 1960, "Marketing Myopia" is the most widely cited article in the history of HBR.]
- Magretta, J. 2002. Why business models matter. *Harvard Business Review*, May: 86-92.
- Moore, G.A. 2004. Darwin and the demon: Innovating within established enterprises. *Harvard Business Review*, July-August: 86-92.
- Perens, B. 2005. *The emerging economic paradigm of open source*. <http://perens.com/works/articles/Economic.html>, February 16.
- Pfeffer, J., & Sutton, R.I. 2006. Evidence-based management. *Harvard Business Review*, January: 62-74.
- Raymond, E.S. 2000. *The cathedral and the bazaar*. <http://catb.org/~esr/writings/cathedral-bazaar/>
- Reichheld, F.F. 2003. The one number you need to grow. *Harvard Business Review*, December: 46-54.
- Schwegmann, V. 1999. *The alchemy of growth – What is the formula?* McKinsey & Company.  
[This article is posted to the course website.]
- Zider, B. 1998. How venture capital works. *Harvard Business Review*, November-December: 131-139.
- Zook, C. & Allen, J. 2003. Growth outside the core: expanding into adjacent markets. *Harvard Business Review*, December: 66-73.

To access journal articles in electronic form, go to the website for the Carleton University Library Catalogue (<http://catalogue.library.carleton.ca>). Type the title of the journal (not the article) into the search field, select "Web resource" from the pull down menu to the right, and click the "Search" button. The catalogue record for the journal will appear on your screen. Click on one of the links below the "Connect to Web Resource" heading. You may be asked to enter your Patron barcode number and PIN. You will then be connected to a database containing all the articles published in that particular journal. Browse the journal contents or use the database search tools to locate the particular article of interest.

### Grading Scheme

Each student is required to write a take-home final examination, work in groups to complete a term project and one assignment, and write two in-class tests. The course grade is weighted as follows:

|   |     |
|---|-----|
| In-class tests (2 @ 10% each):            | 20% |
| Take-home assignment (group effort):      | 10% |
| Term project presentation (group effort): | 10% |
| Term project (group effort):              | 30% |
| Take-home exam (individual effort):       | 30% |

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

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### **Term Project**

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

### Requirements

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. Describe the current situation, the goal to be achieved, and the highlights of each stage of growth.

### Style Guidelines

- 1 page executive summary
- 12 pages body (maximum), 12 point font, 1" margins, 1.5 spacing.
- Pages should be numbered at the bottom of each page.
- Use figures and tables appropriately. Include a diagram or table that provides a visual roadmap to guide the reader from your starting point to your goal.
- You may include as many appendices as you like.
- The final report should be fully referenced with citations to all sources.

### Deadlines

Students are required to submit the names of group members in the fifth class (September 22), provide a two-page status report in the tenth class (October 8), schedule and attend a brief status meeting with the instructor or a teaching assistant outside of class time prior to the seventeenth class (November 3), deliver a concise oral presentation during class eighteen or nineteen (November 5 or November 10), and submit a final report in the twenty-third class (November 24).

### Grading

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

### **Attribution of Sources**

Two formats for references and in-text citations are used within this course.

- 1) The *Academy of Management* style is well suited to assignments, papers and exams. For a style guide, see pages 314-316 of the following document: <http://www.aom.pace.edu/amr/AMRstyleguide.pdf>
- 2) The *endnotes* style is well suited to reports for managers (such as the term project). The course text provides examples of effective endnotes.

### **Plagiarism**

Plagiarism (copying and handing in for credit someone else's work) is a serious instructional offence that will not be tolerated. Please refer to the section on instructional offences in the Undergraduate Calendar. The following reference provides useful advice on recognizing and avoiding plagiarism:

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

### **Students with Disabilities**

Students with disabilities requiring academic accommodations in this course must register with the Paul Menton Centre for Students with Disabilities for a formal evaluation of disability-related needs. Registered PMC students are required to contact the centre, 613-520-6608, every term to ensure that I receive your letter of accommodation, no later than two weeks before the first assignment is due or the first in-class test requiring accommodations. If you require accommodation for your formally scheduled December exam, please submit your request for accommodation to PMC by November 7, 2008.

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**Calendar (tentative)** – changes may be announced during the term

|    | <b>Date</b> | <b>Topic</b>                                    | <b>Assigned Reading</b>   | <b>Notes</b>   |
|----|-------------|---|---|--|
| 1  | Mon Sep 8   | Intro and expectations                          |   |  |
| 2  | Wed Sep 10  | Management theory;<br>evidence-based mgmt.      | Christensen & Raynor (2003b);<br>Pfeffer & Sutton (2006)                |  |
| 3  | Mon Sep 15  | Patterns of innovation<br>and dominant designs  | Katz (2003)   | Guest speaker (innovation)                                 |
| 4  | Wed Sep 17  | Open environments;<br>stages of growth          | Friedman (2005);<br>Chesbrough (2003); Garvin (2004)                    | Guest speaker (business plan<br>competitions)              |
| 5  | Mon Sep 22  | Growth strategies and<br>tools                  | Schwegmann (1999);<br>Zook & Allen (2003)                               | Guest speaker (growth)<br><b>Group composition is due.</b> |
| 6  | Wed Sep 24  | Anchors and<br>infrastructure                   | Levitt (2004/1960);<br>Reichheld (2003)                                 | Guest speaker (growth)                                     |
| 7  | Mon Sep 29  | Market segmentation<br>and business models      | Magretta (2003);<br>Moore (2004)  |  |
| 8  | Wed Oct 1   | <b>Quiz #1 / term project workshop</b>          |   |  |
| 9  | Mon Oct 6   | Entrepreneurship                                |   | Guest speaker<br>(entrepreneurship)                        |
| 10 | Wed Oct 8   | Disruptive Innovation                           | <i>The Innovator's Solution</i> (ch. 1-4)                               | <b>Status report is due.</b>                               |
| 11 | Mon Oct 13  | Product architecture                            | <i>The Innovator's Solution</i> (ch. 5-6)                               |  |
| 12 | Wed Oct 15  | Case discussion                                 | Links posted to course website.   |  |
| 13 | Mon Oct 20  | Open source software                            | Raymond (1999); Koenig (2004);<br>Perens (2005)                         | Guest speaker (OSS)  |
| 14 | Wed Oct 22  | Organizing for growth                           | <i>The Innovator's Solution</i> (ch. 7-8);<br>Cooper (1999)             | <b>Assignment is due.</b>                                  |
| 15 | Mon Oct 27  | Financing innovation                            | Zider (1998);<br><i>The Innovator's Solution</i> (ch. 9)                | Guest speaker (financing)                                  |
| 16 | Wed Oct 29  | Intellectual property                           |   | Guest speaker (IP)   |
| 17 | Mon Nov 3   | <b>Quiz #2 / presentation skills workshop</b>   |   |  |
| 18 | Wed Nov 5   | <b>Project Presentations</b>                    |   |  |
| 19 | Mon Nov 10  | <b>Project Presentations</b>                    |   |  |
| 20 | Wed Nov 12  | Effective leadership                            | Clark & Wheelwright (1992);<br><i>The Innovator's Solution</i> (ch. 10) |  |
| 21 | Mon Nov 17  | Process management                              | Hammer (2002)   |  |
| 22 | Wed Nov 19  | Process management                              | Christensen et al. (2008)   |  |
| 23 | Mon Nov 24  | <b>Term project due; final exam distributed</b> |   |  |
| 24 | Wed Nov 26  | No class  |   |  |
| 25 | Mon Dec 1   | <b>Final exam due.</b>                          |   |  |