

## **Syllabus for Technology Management**

Fall 2011  
AP/ADMS4940 3.0 M  
York University  
Faculty of Liberal Arts and Professional Studies  
School of Administrative Studies

Day: Monday  
Time: 14:30 – 17:30 p.m.  
Location: TBD  
Instructor: Dr. David Maslach  
Email: dmaslach@yorku.ca  
Office Hours: by appointments, or one hour prior to class  
Start Date: September 12, 2011

### **Objectives:**

Technology. What is it? How do you management it? How can firms make it better? This course guides senior undergraduates through the technology development process, and is intended to appeal to those interested in evolution, managing technology-oriented firms, creating technology-driven startups, or consulting to such firms.

Students will understand how to better select technological opportunities and understand organizational challenges that prevent these technologies from being successful. The class consists of case studies, and story-telling among students. As such, students will be asked to view the firm as a whole and analyze the various functional areas of business and its external factors.

In the course, students will learn to:

1. Develop an awareness of the range, scope, and complexity of technological innovation, and the issues related to managing technological change.
2. Understand different approaches to managing innovation.
3. Clearly identify drivers and barriers to technological innovation within an organization.
4. Understand what it takes to manage technological innovation.

### **Prerequisites:**

For students in the Honours Program, 78 credits.

Students are personally responsible to ensure that they have the required prerequisites as stated in the course outline or in the course calendar. Students who do not have the prerequisites are at risk of being dropped from the course at any time during the course. The department will not be responsible for refunds resulting from students being dropped from a course due to a lack of the appropriate prerequisites.

### **Required Textbook and Materials:**

Schilling, Melissa A., Strategic Management of Technological Innovation, 3rd Ed, McGraw-Hill Irwin, 2010.

### **9 Assigned readings (see below) – available on e-Resources at York Library:**

- (1) Hill, C.W.L. (1997), "Establishing a standard: Competitive strategy and technological standards in winner-take-all industries." *Academy of Management Executive*, 11 (2), 7-25.
- (2) David P. A. (1985), "Clio and the Economics of QWERTY." *American Economic Review*, 75(2), 332-337.
- (3) Karsson, Trygg, and Elfstrom (2004). "Measuring R&D productivity: Complementing the picture by focusing on research activities." *Technovation*. 24, 179-186.
- (4) Florida, R. and J. Goodnight. (2005) "Managing for Creativity," *Harvard Business Review*, July 2005, 2-9.
- (5) Gladwell, Malcolm (2002). "Group Think." *New Yorker*, December 2, 2002. 102-107.
- (6) Denrell, J. 2005. "Should we be impressed with high performance?" *Journal of Management Inquiry*. 14, 292-298.
- (7) Schoemaker, P.J.H., R.E. Gunther. 2006. "The wisdom of deliberate mistakes." *Harvard Business Review*, June 2002.
- (8) SKIM - Griliches, Z. "Patent Statistics as Economic Indicators: A Survey." *Journal of Economic Literature*, 1990, 28(4), 1661-1707.
- (9) Porter, Michael (1998), "Clusters and the New Economics of Competition," *Harvard Business Review*, November, 1998, 77-90.

### **3 cases:**

*Case 1:* Launch of the Ford Fiesta diesel: The world's most efficient car. 2010. Case #9B10M040.

*Case 2:* Napster: Catalyst for a new industry or just another dot.com? 2001. Case #9B01M016.

*Case 3:* Sun Microsystems Inc. (A), HBS case 9-686-133.

### **Recommended readings:**

Fortune; Canadian Business; Harvard Business Review; Sloan Management Review; California Management Review; Globe and Mail; National Post; Bloomberg; Information Week.

### **Course Assignments:**

- Read, assess, and prepare for weeks readings, to aid the development and learning of classmates.

- A three-hour multi-choice and short-answer question mid-term (closed-book)
- A final report.
- A final exam (similar format has mid-term).
- Innovation Bonus Assignment (if choose too)

### **Grading Policy:**

Classroom participation.....	15%
Mid-term exam (Multiple Choice and Short Answer) .....	30%
Final Project.....	35%
Final Exam (Multiple Choice and Short Answer) .....	20%
Innovation Bonus Assignment .....	2%

### **Format of the Course**

Each session is three hours in duration. In the early stage of the course, the role of the instructor is to facilitate class discussions and the clarify points in the reading material. Students are expected to finish the readings prior to the class, as the readings are central to the class discussions. Moreover, this is a highly interactive course in which students are required to participate in ALL class activities and exercises.

### **Midterm (30%) and Final Exams (20%)**

The mid-term exam is weighted 30% of your final grade. It is a close-book, three-hour mid-term exam. The purpose is to bring together your knowledge regarding the course materials, and to aid in your development of the final project. The mid-term exam consists of two parts – multiple-choice questions and short essay questions.

The final exam is 20% of your final grade. It is a close-book, three-hour exam. The purpose is to examine your knowledge regarding the course materials. Like the mid-term, the exam consists of multiple-choice questions and short essay questions.

### **Class Participation (15%)**

Class participation is worth 15%, since group sharing and discussion is not only essential for classmate learning, but they are vital in the real business world. **Class participation is not about attendance, but rather your contribution to class discussion.** Thus, it is highly likely that students who attend the class each week without any participation record may have a below average grade in participation.

Input on the course materials is greatly appreciated. In order to actively participate in discussions, you are recommended to read the materials in advance. Students will also have opportunities to summarize the lecture materials and discussion at the end of each session. Simply summing up the day's discussion would be considered average participation, but providing clever insights about the discussion will be considered outstanding.

Class participation is evaluated after each session. The instructor will evaluate students' participation based on quantity and quality (ie. 0 – no attendance, 3 – attended but did not participate, 6 – average participation, 9 – outstanding participation). Good quality participation is one that can stimulate in-depth, meaningful discussion. On the other hand, a repetitive comment or simply summary of the materials would be considered as the modest participation. If students have any difficulty in participating in discussion, they should contact the instructor as soon as possible to discuss how to help them to engage in the class discussion.

### **Final Project and Report (35%)**

**Goal:** The goal of this project is to get you to think about 'real' innovation, and puts great emphasis on group work (35%). In this exercise, your group is required to find identify a technology/firm and to use the course materials to analyze the evolution of the technology/firm. The technology (or firm) is not limited to, but can be about something that is useful to you on campus, in your workplace, or around the world. Sample projects may focus on: (1) new internet software (ie. Mint.com), (2) new technologies you have seen in and around daily-life (ie. Dyson Hand-dryers), (3) a new manufacturing process (Pilkington float glass process), (4) a technology-based firm (Intuitive Surgical), etc. This project is worth 35% of your final mark.

If you choose to analyze a technology, then your analysis should be at the level of the technology to describe (1) how the technology emerged; (2) the innovation/evolution process of the technology; (3) how firms compete for the technology/how firms use the technology to enhance firm performance, not technology performance. If you choose to examine a firm, then your focus should be to mapping the firm's technology strategy into the course materials and to describe (1) the firm's business model; (2) the firm's technology strategy; (3) the recommendation for the firm's future technology strategy.

Accordingly, there are three purposes of this exercise: (1) to enhance your information search and organization ability since you are required to search information on your own; (2) to make sense of course materials since you are required to apply the materials to analyze the chosen technology/firm; and (3) to enhance your writing skills. As you have noticed, the scope of this exercise is not trivial but manageable. Yet, it is critical to start the work as early as possible and to have regular progress as the term goes. To make sure you will have some takeaways from this exercise (in other words, you will produce good quality of work), you are required to submit two progress reports (PRs) prior to the report.

PR1 (2.5%): The name of the chosen technology/firm and a brief rationale (1 page, due Week 4)

PR2 (2.5%): The evolution of the technology/firm (1-2 pages, due Week 8)

The PRs are to help you to make progress in your group work. The content in your PRs can be changed at any time prior to your final report.

**Grading:** You will be graded on the quality, completeness, and the clarity of your report. There is also a peer evaluation component. As to peer evaluations, each individual member will fill up the evaluation form, available on course website, to provide his/her evaluations to other members. 5% of the final project grade will be based on this peer evaluation, using the following criteria:

- 1) **Teamwork:** contributes to group/firm performance, and draws out the best from others.
- 2) **Initiative and dependability:** Fulfills responsibilities on time and according to expectations of group or evaluator.
- 3) **Quality of outputs:** Written products were of high quality and organization.
- 4) **Contribution to knowledge and learning:** Effectively understood, utilized, and demonstrated knowledge of course materials.

The peer evaluation component is made relative to the group average by subtracting the average. Here are a few examples:

Report Grade	Individual Peer Evaluation Grade	Group Average of Peer Evaluation	Peer Evaluation Component	Final Project Grade
75	5	2.5	$((5-2.5)/2.5)*2.5 = 2.5$	$75 + 2.5 = 77.5$
75	5	5	$((5-5)/5)*2.5 = 0$	$75 + 0 = 75$
75	0	5	$((0-5)/5)*2.5 = -2.5$	$75 - 2.5 = 72.5$

Note that students will be required to provide written rational for exceptionally high or low evaluations of their peers. If no rational is provided, the peer evaluation will not be considered.

Since peer evaluation significantly contributes to your individual grades, you should take it seriously. Moreover, you are required to submit your evaluation the day after your group report is handed in. **If you fail to submit your evaluation on time, you will receive 10 percent penalty on your final project.**

**Group Size and Page Constraints:** Like a real world innovation project, you will be responsible for your “organization.” You must have more than two members, but ideally, you should involve up to 5 members. The names of group members are to be submitted no later than Week 2.

Please be advised that each group member is responsible for the group process and dynamics. Instructor will be involved in group issues only if necessary. In addition, students are not allowed to switch groups after the groups are formed.

The ideal length of the report is 15 pages (double spaced, Times New Roman, 12 pt font, all inclusive), and reports longer than 17 pages will not be accepted.

**Content:** Your report should contain at least the following topics and apply course materials to analyze the chosen technology/firm:

- 1) A brief background/history of the chosen technology/firm.
- 2) Innovation/evolution of the technology/firm.
- 3) Analysis of how innovation/evolution came about.

- 4) How firms are going to compete (if you choose to study a technology) and critical issues about the technology/firm. You need to talk about how firms should consider their chosen technology and their competing technologies.
- 5) How the firm should compete in the future (if you choose to study a firm). You need to talk about how the firm should consider the actions of its rivals/competing technology.
- 6) Discuss how to monitor and measure performance metrics on this technology/firm.

### **Bonus Assignment (2% Bonus Marks to final grade)**

This assignment is for students wishing to get a 2% bonus on their grade. There are two options.

**Option 1)** The task is to write a one-page double spaced report on a technology project that is making headlines in the news. The technology could be from a start-up company, large organization, or a government project.

The report should identify some of the organizational problems, mistakes, and errors that you learnt in this class on the technological project. It can either detail what went wrong, or what you expect to go wrong with the technology.

The news article has to be attached to the one-page report. Articles should be from reputable sources, such as the Harvard Business Review, The Globe and Mail, The New York Times, etc.

**Option 2)** The task is to follow a CEO, CFO, or CTO on social media (Twitter, their blog, Four-Square, etc.) and to write a one-page double spaced report on what problems the Officer finds interesting.

The report should identify one problem that resonates with you and the Officer, and identifies what you would do based on the material you learnt in the class.

You can submit only one report. Thus, if you choose this exercise, choose your bonus report wisely and do a good job! Reports should be no more than one-page, double-spaced, 12 point Times New Roman, and 1" margins. Grading of the reports is either pass/fail. Note that I will provide either of the following rationale: (1) clear summary and interesting analysis, (2) unclear summary, or (3) poor analysis.

### **Timing of Assignments**

All reports are to be sent to me via email – they are to be sent by 2 pm on the day the reports are due. **Please note the instructor will send a confirmation email within 1-2 days of receiving reports. If you did not receive a confirmation email, it is the student's responsibility to follow-up.**

### **Course Outline**

Class	Objectives	Assignments
<b>Technologies and Products</b>		
1. Introduction	<ul style="list-style-type: none"> <li>Overview of class</li> </ul>	<u>Chapter 1: Introduction</u>

(Sept. 12)	<ul style="list-style-type: none"> <li>Understand the language of innovation management</li> </ul>	
2. What are technologies and what are innovations? (Sept. 19)	<ul style="list-style-type: none"> <li>Be familiar with radical, incremental, disruptive innovations, and the S-Curve</li> </ul>	<u>Chapter 2: Sources of Innovation</u> <u>Chapter 3: Types and Patterns of Innovation</u>  <b>Group formation</b>
3. The establishment of technologies (Sept. 26)	<ul style="list-style-type: none"> <li>Understand dominant designs, and how technologies become established</li> </ul>	<u>Chapter 4: Standards Battles and Design Dominance</u>  Readings: (1) Hill, C.W.L. (1997), "Establishing a standard: Competitive strategy and technological standards in winner-take-all industries." Academy of Management Executive, 11 (2), 7-25.  (2) David P. A. (1985), "Clio and the Economics of QWERTY." American Economic Review, 75(2), 332-337.
<b>Managing Innovation</b>		
4. Strategizing (Oct. 3)	<ul style="list-style-type: none"> <li>Be able to identify different aspects of timing and innovation strategies</li> </ul>	<u>Chapter 5: Timing of Entry</u> <u>Chapter 6: Defining the Organization's Strategic Direction</u>  <i>Case 1: Launch of the Ford Fiesta diesel: The world's most efficient car. 2010. #9B10M040.</i>  <b>PR 1 Due</b>
<b>5. Thanksgiving</b> <b>(Oct. 10)</b>	<ul style="list-style-type: none"> <li></li> </ul>	
6. Choosing and profiting from innovation (Oct. 17)	<ul style="list-style-type: none"> <li>Understand different ways to choose and measure the success of innovation.</li> </ul>	<u>Chapter 7: Choosing Innovation Projects</u> <u>Chapter 8: Collaboration Strategies</u>  Readings:  (3) Karsson, Trygg, and Elfstrom (2004). "Measuring R&D

		productivity: Complementing the picture by focusing on research activities.” <i>Technovation</i> . 24, 179-186.
<b>7. Midterm</b> (Oct. 24)		
8. Protecting innovation (Oct. 31)	<ul style="list-style-type: none"> <li>Understand advantages and disadvantages of intellectual property and patents</li> </ul>	<u>Chapter 9: Protecting Innovation</u>  <i>Case 2: Napster: Catalyst for a new industry or just another dot.com?</i> 2001. Case#9B01M016.
9. Humanizing innovation (Nov. 7)	<ul style="list-style-type: none"> <li>Describe how individual emotions, traits, and characteristics affect the innovation process</li> <li>Identify how to manage the human side in innovation.</li> </ul>	<u>Chapter 10: Organizing for Innovation</u>  In-class Marshmallow Challenge and Video  Readings:  (4) Florida, R. and J. Goodnight. (2005) “Managing for Creativity,” <i>Harvard Business Review</i> , July 2005, 2-9.  (5) Gladwell, Malcolm (2002). “Group Think.” <i>New Yorker</i> , December 2, 2002. 102-107.  <b>PR 2 Due</b>
10. The product development process (Nov. 14)	<ul style="list-style-type: none"> <li>Identify key aspects of the product development process.</li> </ul>	<u>Chapter 11: Managing the New Product Development Process</u> <u>Chapter 12: Managing New Product Development Teams</u>  <i>Case 3: Sun Microsystems Inc. (A)</i> , HBS case 9-686-133.
11. Innovation and failure (Nov. 21)	<ul style="list-style-type: none"> <li>Understand that innovation is about mistakes, errors, or failures.</li> <li>Think about how to learn from these failures.</li> </ul>	Readings:  (6) Denrell, J. 2005. “Should we be impressed with high performance?” <i>Journal of Management Inquiry</i> . 14, 292-298.  (7) Schoemaker, P.J.H., R.E. Gunther. 2006. “The wisdom of



		deliberate mistakes.” Harvard Business Review, June 2002.
<b>Special Topics</b>		
12. The environment (Nov. 28)	<ul style="list-style-type: none"> <li>Understanding the role of innovation in the macro environment</li> </ul>	<p>Readings:</p> <p>(8) SKIM - Griliches, Z. “Patent Statistics as Economic Indicators: A Survey.” Journal of Economic Literature, 1990, 28(4), 1661-1707.</p> <p>(9) Porter, Michael (1998), "Clusters and the New Economics of Competition," Harvard Business Review, November, 1998, 77-90.</p>
<b>13. Final Exam</b> (Dec. 5)	<u>Final exam in Class</u>	<i>Final projects are due one week after final exam.</i>

**NOTE: THIS IS A TENTATIVE OUTLINE. THE INSTRUCTOR RESERVES THE RIGHT TO CHANGE THE SEQUENCE OF TEXT MATERIALS AND COURSE EVALUATION COMPONENTS AND WEIGHTS.**