

TTMG 5103: Advanced Topics in Telecommunications Technology Management - Summer 2009

(Technology and Innovation Management)

INSTRUCTOR

The instructor for the course is Dr. Stoyan Tanev. Dr. Tanev teaches in Department of Systems and Computer Engineering. His office is ME 4444. He can be reached via phone (520-2600 x1894) or email: tanev@sce.carleton.ca.

OFFICE HOURS

Office hours can be arranged by appointment at any time.

TIME AND PLACE

ME 4359 ([campus map](#)), Spring term, Tuesday and Friday, 6pm - 9pm.

COURSE OBJECTIVES

The objective of the course is to provide an in-depth exploration of a specific advanced topic in the field of technology management. A different topic is covered each semester. The Summer 2009 focus of the course will be on *innovation management*.

The specific objectives of the course are to:

- provide you with a practical framework for making innovation predictable & sustainable through knowledge about processes, tools and mechanisms that are critical for making innovation happen at different stages of the product/service/technology adoption life cycle
- help you learn how to dramatically improve the innovation capacity of technology-driven businesses by mobilizing the imagination of employees, customers and business partners
- enable you to apply your knowledge to real life innovation projects to develop the skills necessary for innovators to succeed in a given technology business context
- provide you with a platform for sharing your own and evaluating others' best innovation practices, tools, techniques & methodologies

The topics covered are relevant for technology management professionals, engineers and computer scientists who manage or who could potentially manage the innovation processes associated with the development of new ICT systems, products & services.

TARGET AUDIENCE

The course is designed predominantly for students registered in the M.A.Sc. and M.Eng. programs in Technology Innovation Management (TIM) at Carleton University.

CLASS SESSIONS

Class sessions will be conducted as a combination of lectures, student presentations and interactive discussions. Students from both thesis and project options are expected to be physically present in the classroom. Project option students who are not living in the Ottawa area will participate online by logging into conference room 85005 with password "student" at <http://present.sce.carleton.ca>. The online access to class sessions will be also possible as an exception for students who are on business travel or having other specific circumstances restricting them from participation in class. Please see detailed instructions on joining an online classroom at (except that our conference room is 85005):

<http://www.carleton.ca/tim/blindside.html>

PAUL MENTON CENTRE

Students with disabilities requiring academic accommodations in this course are encouraged to contact a coordinator at the Paul Menton Centre (PMC) for Students with Disabilities to complete the necessary letters of accommodation. After registering with PMC, make an appointment to meet and discuss your needs with your instructor at least two weeks prior to any exam.

PLAGIARISM

Plagiarism is defined as “to use and pass off as one’s own idea or product work of another without expressly giving credit to another.” Click [here](#) for a detailed description and discussion of plagiarism.

READINGS

The readings associated with this course will include one book and a number of selected articles and book chapters as listed in the course schedule provided below. All the selected articles and book chapters are available from the CU library online catalog or on the Internet. Some of the course materials will be made available on the Moodle learning content management system at <http://cms.sce.carleton.ca>.

Course text

D. Silverstein, P. Samuel, N. DeCarlo, *The Innovator’s Toolkit: 50+ Techniques for Predictable and Sustainable Organic Growth*, Wiley, 2008

Other recommended readings

1. Melissa Schilling, *Strategic Management of Technological Innovation*, 2nd edition, McGraw-Hill, 2008
2. S. Anthony, M. Johnson, J. Sinfield, E. Altman, *Innovator’s Guide to Growth: Putting Disruptive Innovation to Work*, Harvard Business School Press, 2008
3. R. Burgelman, C. Christensen and S. Wheelwright, *Strategic Management of Technology and Innovation*, New York: McGraw-Hill, 2009
4. C. K. Prahalad and M. S. Krishnan, *The New Age of Innovation*, New York: McGraw Hill, 2008
5. H. Chesbrough, *Open Business Models: How to Thrive in the New Innovation Landscape*, Harvard Business School Press, 2006
6. E. von Hippel, *Democratizing Innovation*, Boston: MIT Press, 2005
7. G. Moore, *Dealing with Darwin, Dealing with Darwin: How Great Companies Innovate at Every Phase of Their Evolution*, Portfolio Trade Publishing, 2008
8. Robert Grant, *Contemporary Strategy Analysis: Concepts, Techniques, Applications*, 6th Edition, Wiley, 2007

COURSE SCHEDULE

Session 1: Friday, May 8: Course introduction

- Discussion of course outline, readings, student deliverables and evaluation
- Technology innovation management within a business context
- Readings:

1a. *The Innovator's Toolkit*, Introduction

1b. "Should You Reinvent Your Business Model?," Online video interview of C. Christensen:

http://discussionleader.hbsp.com/hbreditors/2008/11/should_you_reinvent.html

Session 2: Tuesday, May 12: Innovation and strategy of small and large firms

Readings:

2a. Jens Christensen, 2002, "Corporate strategy and the management of innovation and technology," *Industrial and Corporate Change*, Vol. 11, No. 2, pp. 263-288

2b. J. S. Gans, D. Hus and S. Stern, 2003, "The product market and the 'market for ideas': Commercialization strategies for technology entrepreneurs," *Research Policy*, Vol. 32, No. 2, pp. 333-350

2c. Watch and Listen: Clay Christensen Explains Disruptive Innovation:

<http://harvardbusiness.org/web/tools/2008/12/disruptive-innovation-model-explained>

Session 3: Friday, May 15: *The Innovator's Toolkit* - Techniques and tools for identifying high-potential innovation projects:

D1. Jobs to be done - Determine the human need you are trying to fulfill

D2. Outcome expectations - Give customers more of what they desire

D3. Value quotient - Identify opportunity gaps in the marketplace

D4. Ethnography - Observe your customers to uncover unarticulated needs

D7: Job scoping – Broaden or narrow your innovation focus

- Readings:

3a. C. Christensen, S. Anthony, G. Berstell & D. Nitterhouse, "Finding the right job for your product," *MIT Sloan Management Review*, Spring 2007, p. 2

3b. A. Ulwick & L. Bettencourt, "Giving customers a fair hearing," *MIT Sloan Management Review*, Spring 2008, p. 62

3c. A. Ulwick, "Turn customer input into innovation," *Harvard Business Review*, Vol. 80, No. 1, 2002, p. 91

Session 4: Tuesday, May 19: *The Innovator's Toolkit* - Techniques and tools for managing people, projects & innovation ROI:

D8. Stakeholder Management - Get key influencers involved and on your side

D9. Cognitive Style - Leverage the diversity of your exploiters and explorers

D10. Project Charter - Keep your innovation team focused and on track

D11. Innovation Financial Management - Constantly improve your assumption-to-knowledge ratio

- Invited speaker: Dr. Velko Tzolov, vice-president, Palladium7 Inc., Ottawa, discussing the insights from Christensen, S. Kaufman & W. Shih, "Innovation killers – How financial tools destroy your capacity to do new things," *Harvard Business Review*, January 2008, p. 98

Session 5: Friday, May 22: *The Innovator's Toolkit* – Techniques and tools for refining innovation opportunities:

D12. Resource Optimization - Make sure you use all available resources

D13. Functional Analysis - Scrutinize your system for innovation

D14. Trend Prediction - Learn from evolution's genetic code

D15. Creative Challenge - Sacrifice the sacred cows

Week of May 25-29: Classes are suspended (a national conference taking place at CU)

Session 6: Tuesday, June 2: Open discussion on innovation management topics suggested by students – agenda to be determined during previous class sessions.

Session 7: Friday, June 5: Innovation Workshop - Discussing student innovation management projects

Session 8: Tuesday, June 9: *The Innovator's Toolkit* – Techniques and Tools for exploring all human knowledge and nature:

D23. Structured Abstraction - Guide your innovation using 40 proven principles

D24. Separation Principles - Split your innovation problem in four ways

D25. 76 Standard Solutions - Learn how substances interact with fields to form solutions

D26. Biomimicry - Seek nature's eons of experience to find answers

- Readings:

7a. Ellen Domb, "The 39 features of Altshuller's Contradiction Matrix," *The TRIZ Journal*, Nov, 1998:

<http://www.triz-journal.com/archives/1998/11/d/index.htm>

7b. Rea, K.C., TRIZ and software 40 principles analogies, Part 1&2. *The TRIZ Journal*,

Sep, 2001: <http://www.triz-journal.com/archives/2001/09/e/index.htm>

Nov, 2001: <http://www.triz-journal.com/archives/2001/11/e/>

Session 9: Friday, June 12: *The Innovator's Toolkit* – Techniques and tools for formulating an initial design:

D30. Performance and Perception Expectations - Identify what customers want in your solution

D31. Axiomatic Design - Transform what customers want into the best products and services

D32. Function Structure - Identify how the solution functions in its whole and its parts

D33. Morphological Matrix - Generate solution concepts by combining design alternatives

Session 10: Tuesday, June 16: *The Innovator's Toolkit* – Techniques and tools for optimizing and finalizing designs:

D37. Process Capability - Guide your innovation using 40 proven principles

D38. Robust Design - Split your innovation problem in four ways

D39. Design Scorecard - Learn how substances interact with fields to form solutions

D41. Discrete Event Simulation

D42. Rapid Prototyping

Session 11: Friday, June 19: *The Innovator's Toolkit* – Techniques and tools for i) evaluating how new products/services perform prior to their release, and ii) mapping new product and service delivery processes:

D43. Prototyping - Build a fully functioning model of your new product to test & perfect it

D44. Piloting - Build a fully functioning model of your new service to test & perfect it

D45. SIPOC Map - Identify the key inputs and outputs of your processes

D46. Process Map/Value Stream Maps - Flesh out the details of your process

- Readings:

Benner, M. & Tushman, M., "Process management and technological innovation: A longitudinal study of the photography and paint industries," *Administrative Science Quarterly*, Vol. 47, 2002, p. 676

Session 12: Tuesday, June 23: *The Innovator's Toolkit* – Techniques and Tools for problem diagnosis and improvement prior to commercialization:

D52. Process Behavior Charts - Monitor process performance to keep the new solution in control

D53. Cause & Effect Diagram - Investigate the root causes of performance problems

D54. Cause & Effect Matrix - Identify the key input-output relationships in need of attention

D55. Control Plan - Ensure that your new solution becomes commercialized as planned

Session 13: Friday, June 26: Student group presentations of innovation management projects

EVALUATION

Course grades will be determined on the basis of the following scheme:

- Class participation - 20%
- Group ppt presentations of 1 or 2 class topics - 30% (details to be announced based on class size)
- Final presentation of group innovation management project - 20%
- Take home final exam – 30%

Final grade reports will follow Carleton University guidelines.

Class participation

Class participation will be evaluated on the basis on students' personal ability to i) understand, ii) discuss insights, and iii) suggest examples associated the innovation management topics discussed in class.

Group ppt presentations

Students will be divided in groups of 2 or 3. Each group will be assigned 1 or 2 class topics and provided the reading materials to: i) appropriate in advance all relevant innovation management insights, ii) prepare a ~45 slide ppt presentation based on the reading materials and cooperate with the instructor to refine them, iii) make a presentation to the rest of the class to articulate the lessons learnt, iii) collect useful feedback from class participants and cooperate with the instructor to improve the content and the quality of the presentation slides, iv) deliver the final version of the slides to an open TIM repository dedicated to innovation management. The slides should have the following structure:

1. Title and agenda
 2. Managerial challenges addressed by the innovation management module
 3. Objective
 - a) What will be learnt
 - b) What can be done with the knowledge
 4. Topic # 1
 - Moment of truth related to topic # 1: Examples discussed by all class attendants

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 - x. Topic # N
 - Moment of truth related to topic # N: Examples discussed by all class attendants
- (x+1). Lessons learned
(x+2). References

Final presentations of group innovation management projects

Each group of students will need to define a new or select an existing innovation project and demonstrate how the innovation techniques and tools discussed in class can be used to make this innovation project happen. The initial innovation projects will be discussed at the Innovation Workshop class on June 2, 2009. A ppt presentation will be delivered at the last class on Friday, June 26th.

Take home final exam

Material to be covered and the due date will be discussed towards the end of the course.