

## **TTMG 5100: Communications Standards - Fall 2008**

### **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](mailto:tanev@sce.carleton.ca) (preferred).

### **OFFICE HOURS**

Meetings with students can be arranged by appointment at any time.

### **TIME AND PLACE**

ME 3165, Fall term, Thursday, 6pm - 9pm.

### **COURSE OBJECTIVES**

The objective of *TTMG 5100 - Communications Standards* is to examine the importance of global standards in telecommunications and information technology for product development and business by focusing on i) relevant public standards classified by type, ii) standards setting processes, iii) formulation and execution of standards setting strategies, iv) integrating the firm's standards program with engineering processes, product management, systems groups and marketing.

The course is designed for students enrolled in the M.A.Sc and M.Eng. options of the Technology Innovation Management.

### **TARGET AUDIENCE**

The course is designed predominantly for students registered in the M.A.Sc and M.Eng. option of Technology Innovation Management program: [www.carleton.ca/tim](http://www.carleton.ca/tim)

### **CLASS SESSIONS**

Class sessions will be conducted as a combination of lectures, interactive discussions and student presentations.

### **PAUL MENTON CENTRE**

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/midterm requiring accommodations. If you require accommodation for your formally scheduled exam(s) in this course, please submit your request for accommodation to PMC by November 7, 2008.

### **PLAGIARISM**

The Undergraduate Calendar defines plagiarism in the regulations on instructional offenses 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.

## RECOMMENDED BOOK READINGS

All the necessary class readings are based on materials that are openly available online through the Internet or through the CU library online catalogue. These are the recommended book readings:

1. Kai Jakobs, Ed., *Advanced Topics in Information Technology Standards and Standardization Research*, Vol. 1, IGI Publishing, 2006, (online access through CU library)
2. David Evans, Andrei Hagiu and Richard Schmalensee, *Invisible engines – How software platforms drive innovation and transform industries*, MIT Press, 2008:  
<http://mitpress.mit.edu/catalog/item/default.asp?ttype=2&tid=10937>
3. Shane Greenstein & Victor Stango, *Standards and Public Policy*, Cambridge University Press, 2007.
4. P. A. Dargan, *Open Systems and Standards for Software Product Development*, Boston: Artech House, 2005: [http://www.opensystems-book.com/wst\\_page2.html](http://www.opensystems-book.com/wst_page2.html)
5. Khurram Kazi, Ed., *Optical Networking Standards – A Comprehensive Guide for Professionals*, Springer, 2006
6. Hal Varian, Joseph Farrell and Carl Shapiro, *The Economics of Information Technology – an Introduction*, Cambridge University Press, 2004.
7. Gerd Wallenstein, *Setting Global Telecommunication Standards – the Stakes, the Players and the Process*, Artech House, 1990.

## CLASS SCHEDULE AND READINGS

- I. **Session # 1: Thursday, Sept. 4<sup>th</sup>, 2008 - Industry evolution and the need of standards**
  1. Ken Krechmer, "Standards mark the course of economic progress," International Center for Standards Research, <http://www.csrstds.com/fundeco.html>;  
"The Fundamental Nature of standards: technical perspective," International Center for Standards Research, <http://www.csrstds.com/fundtec.html>
  2. Melissa Schilling, "Standard battles and design dominance," Ch. 4 in *Strategic Management of Technological Innovation*, McGraw-Hill/Irwin, 2nd edition, 2006, pp. 63-81.
  3. Fernando F. Suarez, "Battles for technological dominance: an integrative framework," *Research Policy* 33, 2004, pp. 271–286
- II. **Session # 2: Thursday, Sept. 11<sup>th</sup>, 2008 - Dominant designs vs standards**
  1. Scott Gallagher, "The complementary role of dominant designs and industry standards," *IEEE Transactions on Engineering Management* 54, No. 2, 2007, pp. 371-379.
  2. Linda Tegraden, Donald Hatfield and Ann Echols, "Doomed from the start: what is the value of selecting a future dominant design?" *Strategic Management Journal* 20, 1999, pp. 495-518.
  3. Johann Murmann & Koen Frenken, "Towards a systematic framework for research on dominant designs, technological innovations, and industrial change," *Research Policy* 35, 2006, pp. 925-952.
  4. Raji Srinivasan, Gary Lilien & Arvind Rangaswamy, "The emergence of dominant designs," *Journal of Marketing* 70, 2006, pp. 1–17.
- III. **Session # 3: Thursday, Sept. 18<sup>th</sup>, 2008 – Student case study development workshop**
- IV. **Session # 4: Thursday, Sept. 25<sup>th</sup>, 2008 - Standards classification**
  1. Materials from instructor
  2. Henk J. de Vries, IT Standards Typology, Ch. 1 in Kai Jakobs, Ed., *Advanced Topics in Information Technology Standards and Standardization Research*, Vol. 1, IGI Publishing, 2006, (online access through CU library)

- V. Session # 5: Thursday, Oct. 2<sup>nd</sup>, 2008 -The economic realities of standards**
1. Victor Stango, "The economics of standard wars," *Review of Networks Economics* 3, 2004, pp. 1-19: [http://www.rnejournal.com/articles/stango\\_mar04.pdf](http://www.rnejournal.com/articles/stango_mar04.pdf)
  2. Neil Nadal, "Compatibility, standardization, and network effects: some policy implications," *Oxford Review of Economic Policy* 18, No. 1, pp. 80-91.
  3. Timothy Bresnahan & Pai-Ling Yin, "Economic and technical drivers of technology choice: browsers," HBS working paper: <http://www.hbs.edu/research/pdf/06-008.pdf>
- VI. Session # 6: Thursday, Oct. 9<sup>th</sup>, 2008 - Standard setting mechanisms and strategies**
1. Robert Axelord, Will Mitchel, Rober Thomas, D. Scott Bennett, Erhard Bruderer, Coalition formation in standard-setting organizations, *Management Science* 41, 1995, pp. 1493-1508.
  2. Éric Viardot, "Six Principles to Make a Technology Standard," *Business Strategy Review* 16, Issue 3, Fall2005, p23-28,
  3. Charles Hill, "Establishing a standard: competitive strategy and technological standards in winner-take-all industries," *Academy of Management Executive* 11, no.2, 1997, pp. 7-25.
  4. G. van de Kaa, H. J. de Vries, Eric van Heck, Jan van den Ende, "The emergence of standards," Proceedings of the 40<sup>th</sup> Hawaii International Conference on System Science, 2007.
- VII. Session # 7: Thursday, Oct. 16<sup>th</sup>, 2008 - Standard setting organization issues**
1. IV. Joseph Farrell and Tim Simcoe, Choosing the Rules for Formal Standardization, <http://www.rotman.utoronto.ca/timothy.simcoe/papers/formal.pdf>
  2. Tim Simcoe, Standard Setting Committees: [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=899595](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=899595)
  3. Raymund Werle & Eric J. Iversen, "Promoting Legitimacy in Technical Standardization," *Science, Technology & Innovation Studies* 2, March 2006, <http://eprints.utas.edu.au/1365/>
- VIII. Session # 8: Thursday, Oct. 23<sup>rd</sup>, 2008 -Open standards - I**
1. Joel West, "The economic realities of open standards: black, white and many shades of gray," in Shane Greenstein and Victor Stango, Eds., *Standards and Public Policy*, Cambridge: Cambridge University Press, 2007: <http://www.joelwest.org/Papers/West2006-WP.pdf>
  2. Ken Krechmer, Open standards requirements, *International Journal of IT Standards and Standardization Research* 4, No. 1, January - June 2006, also available as Ch. 2 in *Advanced Topics in Information Technology Standards and Standardization Research*, Vol. 1, Kai Jakobs, Ed., IGI Publishing, 2006, (online access through CU library): <http://www.csrstds.com/openstds.pdf>
  3. Michael Tiemann, "An objective definition of open standards," *Computer Standards & Interfaces* 28, 2006, pp. 495-507
- IX. Session # 9: Thursday, Oct. 29<sup>th</sup>, 2008 - Open standards - II**
1. Rajiv Shah & Jay P. Kesan, "An empirical examination of open standards development," Proceedings of the 41st Hawaii International Conference on System Sciences, 2008: [http://www.hicss.hawaii.edu/hicss\\_41/decisionbp/EGGOM01.pdf](http://www.hicss.hawaii.edu/hicss_41/decisionbp/EGGOM01.pdf)
  2. Tim Simcoe, "Open standards and intellectual property rights," Ch. 8, in *Open Innovation: Researching a New Paradigm*, Henry Chesbrough, Wim Vanhaverbeke and Joel West, Eds., Oxford University Press, 2006: [http://www.rotman.utoronto.ca/timothy.simcoe/papers/OpenStandards\\_IPR.pdf](http://www.rotman.utoronto.ca/timothy.simcoe/papers/OpenStandards_IPR.pdf)
  3. Tineke M. Egyedi, Ruben van Wendel de Joode, "Standardization and other coordination mechanisms in open source software," Ch. 4 in *Advanced Topics in Information Technology Standards and Standardization Research*, Vol. 1, Kai Jakobs, Ed., IGI Publishing, 2006, (online access through CU library)

- X. Session # 10: Thursday, Nov. 6<sup>th</sup>, 2008 - Product development strategies and standards**
1. Yikuan Lee & Gina O'Connor, "New product launch strategy for network effect products," *Journal of the Academy of Marketing Science* 31, No. 3, 2003, pp. 241-255
  2. Tony Bailetti & John Callahan, "Managing consistency between product development and public standard evolution," *Research Policy* 24, 1995, pp. 913-931.
  3. Harald Gruber, "The evolution of market structure in semiconductors: the role of product standards," *Research Policy* 29, 2000, pp. 725-740
  4. Mark Pruett, Hun Lee, Ji-Ren Lee, "How high-technology start-up firms may overcome direct and indirect network externalities," Ch. 16 in *Advanced Topics in Information Technology Standards and Standardization Research*, Vol. 1, Kai Jakobs, Ed., IGI Publishing, 2006, (online access through CU library)
- XI. Session # 11: Thursday, Nov. 13<sup>th</sup>, 2008 - Case studies**
1. M. H. Sherif, "Standards for Telecommunication Services," Ch. 11 in *Advanced Topics in Information Technology Standards and Standardization Research*, Vol. 1, Kai Jakobs, Ed., IGI Publishing, 2006, (online access through CU library)
  2. Dinesh Mohan, *Standards creation involvement in a large telecom product development company; a grounded theory*, TIM Thesis, Carleton University, 2005, available online through the CU library
  3. Dan Saugstrup & Anders Henten, "3G Standards: the battle between WCDMA and CDMA2000," *Info - Journal of Policy, Regulation and Strategy for Telecommunications, Information and Media* 8, No. 4, 2006, pp. 10-20.
  4. Jeffrey Funk & David Methe, "Market- and committee-based mechanisms in the creation and diffusion of global industry standards: the case of mobile communication," *Research Policy* 30, 2001, pp. 589-610.
- XII. Session # 12: Thursday, Nov. 20<sup>th</sup>, 2008 - Technological platforms and standards**
1. Guest speaker talk
  2. Michael Cusumano & Annabelle Gawer, "The elements of platform leadership," *MIT Sloan Management Review*, Spring 2002, pp. 51-58.
  3. Joel West, "How open is open enough: melding proprietary and open source platform strategies," *Research Policy* 32, 2003, pp. 1259-1285.
  4. Thomas Eisenmann, "Managing proprietary and shared platforms: a life cycle view," HBR Working Papers 07-105, 2007, <http://hbswk.hbs.edu/item/5724.html>
- XIII. Session # 13: Thursday, Nov. 27<sup>th</sup>, 2008 – Student presentations**

## STUDENT EVALUATION

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

- Class participation (25%)
- Bi-weekly lesson learned summaries (25%)
- Student presentation and report: technology management issues associated with a specific technology management standard (25%)
- Take home final exam (25%)

Final grade reports will follow Carleton University guidelines.

### 1. Class participation

Class participation will be evaluated on the basis on students' personal ability to clearly: i) understand and communicate to the rest of the class research insights from articles published in respected academic journals of management science, product and technology innovation management, ii) actively and insightfully participate in other students' presentation and interactive class discussions.

### 2. Bi-weekly lesson learned summaries

The objective of this activity is to capture and articulate on an ongoing basis the key lessons learned in every two previous class sessions. The minimum length of the "Lessons learned" documents is 2 pages (12 pt Times New Roman, double spacing).

#### Due dates and time

Beginning of class session on Sept. 18<sup>th</sup>, Oct. 9<sup>th</sup>, Oct. 23<sup>rd</sup>, Nov. 6<sup>th</sup>, Nov. 20<sup>th</sup>

### 3. Student presentation and report: technology management issues associated with a specific technology management standard

The objective of this assignment is to help student acquire the knowledge and the analytical skills to identify the various technology management dimensions associated with a technology standard associated with their own work. The dimensions will be collectively identified by the class before the end of session # 8 on Thursday, Oct. 23<sup>rd</sup>, 2008.

### 4. Take home final exam

Take home final exam will consist of 15 questions to be answered by students and sent by e-mail to the instructor before Saturday, December 13<sup>th</sup>, 2008. Questions will be based on material covered in class and will be provided to students at the last class session on Thursday, November 27<sup>th</sup>, 2008.

#### Length and format

The length of the final exam document is between 12 and 15 pages (12 pt Times New Roman, double spacing).