



**Graduate
School of Management**
St. Petersburg State University

MASTER PROGRAMS
Fall Semester 2008

COURSE SYLLABUS

TECHNOLOGY MANAGEMENT

Instructors:

Marko Torkkeli, Professor, Dr. Sc. (Tech.), Lappeenranta University of Technology

Sergey Yablonsky, Associate Professor, Dr. Sc. (Tech.), GSOM at St. Petersburg State University

Organization of the course

Program	Master in International Business
Year	1st year
Course status	Core
Workload	6 ECTS, 45 hours of classes
Grading	Final exam – 60% Group work – 20% Midterm examination test – 20%
Teaching methods	Lectures, exercises and seminars explore many aspects of technology and IT management with emphasis on the relationship between theoretical knowledge and its practical application using cases and examples. The seminars format combines case exercises, discussion of readings, and team work projects. The final written test allows the students to demonstrate knowledge and analytical skills acquired via the course.

Course objectives

The aim of the course is to provide students with the understanding of methods of technology management boosted with information technology in the global context, that is:

- to introduce methods of technology management in theory and practice in international companies
- to give examples on innovation management best practices and corporate venturing examples
- to provide a practical understanding of the opportunities to create business value from IT
- to offer a series of frameworks to help understand how to generate business value from IT
- to train students to apply practical tools for new product development
- to develop their skills as future global managers.

Course content

Part I. Introduction and key theoretical concepts (8 hrs)

Topic 1. Technology management in principle and industrial innovation trends (2 hrs)

Topic 2. Information technology for competitive advantage (2 hrs)

Topic 3. Tools for business development from technology perspective (2 hrs)

Topic 4. Real options in uncertainty management (2 hrs)

Part II. Cases on technology management (8 hrs)

Topic 5. Open Innovation: theory and cases (6 hrs)

Topic 6. Research surplus management: case Nokia (2 hrs)

Part III. Examples of technology management from academic literature (6 hrs)

Topic 7. Presentations of literature and discussion on articles (6 hrs)

Part IV. IT Management. Information technologies in the Organization (12 hrs)

Topic 8. Digital Economy and Information Technologies (4 hrs)

Topic 9. Presentations: case studies, personal sites and web groups (2 hrs)

Topic 10. Data management. Database Management Systems and Data Warehouses (4 hrs)

Topic 11. Working with the organizational database (2 hrs)

Part V. Migrating to e-Business Models. Networking and Web (6 hrs)

Topic 12. Electronic and mobile business. Major models of e-business and m-business (4 hrs).

Topic 13. Web tools for search, customized delivery, communications and e-business (2 hrs)

Part VI. Thinking Globally (6 hrs)

Topic 14. Functional, Enterprise, Interorganizational and Global Systems (2 hrs).

Topic 15. Decision Support, Business Intelligence and Corporate Performance Management (2hrs)

Topic 16. Presentations: case studies and discussion (2 hrs)

Part VII. Implementing and managing IT (2 hrs)

Topic 17. IT strategy and Planning (2 hrs)

Part VIII. Information Technology Economics (4 hrs)

Topic 18. Framework of IT Application Acquisition (2 hrs)

Topic 19. Presentations: case studies and discussion (2 hr)

Plan of classes

Part I. Introduction and key theoretical concepts

Topic 1. Technology management in principle and industrial innovation trends (2 hrs)

Class 1.	
13.10.2008 9.00-10.30 Auditorium 410	<p>Key points:</p> <ul style="list-style-type: none">• innovation and technology management• history of technology development• new product development and growth• links to general management• recent trends on technology management <p>Learning outcomes:</p> <ul style="list-style-type: none">• Understanding of the importance of innovation and technology management, principles and growth aspects• how to build a winning team for ventures <p>Assignments for class 1:</p> <p># Reading:</p> <ul style="list-style-type: none">• Nagel Arie P., Vanhaverbeke Wim and Torkkeli Marko; Towards a more innovative company – creating options for the future. In: Competitiveness, Social Responsibility and Economic Growth, edited by Prašnikar Janez, 2006, ISBN 1-59454-811-0, Growth Nova Science Publishers• Drucker Peter (1985) The discipline of innovation, Harvard Business Review,

Topic 2. Information technology for competitive advantage (2 hrs)

Class 2.	
13.10.2008 10.45-12.15 Auditorium 410	<p>Key points:</p> <ul style="list-style-type: none">• how to develop new ventures with IT.• IT supported business.• theory of IT based new business opportunities. <p>Learning outcomes:</p> <ul style="list-style-type: none">• “entrepreneurial mindset”• IT in business development, discuss on advantages and disadvantages

Topic 3. Tools for business development from technology perspective (2 hrs)

Class 3.	
13.10.2008 13.00-14.30 Auditorium 410	<p>Key points:</p> <ul style="list-style-type: none">• Practical tools on opportunity identification, opportunity register, value chain management, defining of your offering, key attributes of a product, market-busting positioning <p>Learning outcomes:</p>

	<ul style="list-style-type: none"> • Understanding of basic tools in new technology-based business development • Capability to identify opportunities available in current global business environment • understanding of your ability to make assumptions in the age of uncertainty
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Topic 4. Real options in uncertainty management (2 hrs)

Class 4.	
13.10.2008 14.45-16.15 Auditorium 410	<p>Key points:</p> <ul style="list-style-type: none"> • Real options thinking in venturing • Uncertain aspects of technology ventures • Genetic code of a technology • A method for management of uncertain technology projects <p>Learning outcomes:</p> <ul style="list-style-type: none"> • Understanding of uncertainty in technology ventures • A method on dealing with uncertain technology projects • Knowledge of current trends in cross-cultural research • Capability to reflect on cultural biases of the student's own master thesis research <p>Assignments for class 4:</p> <p># Reading:</p> <ul style="list-style-type: none"> • MacMillan, Ian C. and McGrath, Rita G. 2002. "Crafting R&D project portfolios". Research Technology Management, 45, 5, 48-60. • McGrath, Rita G. and MacMillan, Ian C. 2000. "Assessing technology projects using real options reasoning". Research Technology Management, 43, 4: 35-50.

Part II. Cases on technology management.

Topic 5. Open Innovation: theory and cases: (6 hrs)

Class 5.	
14.10.2008 9.00-14.30 Auditorium 410	<p>Key points:</p> <ul style="list-style-type: none"> • Open innovation in theory • Open innovation in practice in case companies Cisco Systems, DuPont, IBM, Intel, Procter & Gamble, Philips, Sun Microsystems and Nokia. <p>Learning outcomes:</p> <ul style="list-style-type: none"> • Understanding of the open innovation principles and how to implement it in companies <p>Assignments for class 5:</p> <p># Reading available on http://kouvola.lut.fi/fi/julkaisu/teknologiajohtamisen:</p> <ul style="list-style-type: none"> • Viskari Sari, Salmi Pekka and Torkkeli Marko, Implementation of open innovation paradigm: Cases: Cisco Systems, DuPont, IBM, Intel, Lucent, P&G, Philips and Sun Microsystems. 60 p., 978-952-214-478-2, 189, Research

	<p>Report, Lappeenranta 2007</p> <ul style="list-style-type: none"> • Kock, Carl J. and Torkkeli, Marko T., "Open Innovation: A 'Swingers' Club' or 'Going Steady'?" IE Business School Working Paper WP08-11. Madrid, Spain. • Huurinainen Jarno, Torkkeli Marko, Viskari Sari and Salmi Pekka (2006), Motives, Circumstances and Driving Forces for Open Innovation: Using Open Source to run profitable business. Lappeenranta University of Technology, 60 p., 952 -214-281-8, 174, Research Report, Lappeenranta 2006 • Hilmola Olli-Pekka, Torkkeli Marko, Viskari Sari, Riding with the economic long-wave: Why Open Innovation index and performance of leading manufacturing industries intervened? <i>International Journal of Technology Intelligence and Planning</i> (2007, Vol. 3, No. 2, pp. 174-192.)
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Topic 6. Research surplus management: case Nokia (2 hrs)

Class 6.	
14.10.2008 14.45-16.15 Auditorium 410	<p>Key points:</p> <ul style="list-style-type: none"> • Research surplus management (RSP) in principle • how to manage RSP • aspects of open approach • tools for management of RSP <p>Learning outcomes:</p> <ul style="list-style-type: none"> • business potential in research surplus • how corporate venturing works <p>Assignments for class 6:</p> <p># Reading available on http://kouvola.lut.fi/fi/julkaisuja/teknologiajohtamisen:</p> <ul style="list-style-type: none"> • Viskari, Sari (2006). Managing Technologies in Research Organization: Framework for Research Surplus Portfolio, Lappeenranta University of Technology, Department of Industrial Engineering and Management. Research Report 176.

Part III. Examples of technology management from academic literature (6 hrs)

Topic 7. Presentations of literature and discussion on articles (6 hrs)

Class 7.	
20.010.2008 9.00-14.30 Auditorium 410	<p>Key points:</p> <ul style="list-style-type: none"> • Several aspect on technology management based on articles provided <p>Learning outcomes:</p> <ul style="list-style-type: none"> • Technology management theories and practices <p>Assignments for class 7:</p> <p># Reading:</p> <ul style="list-style-type: none"> • Leonard-Barton Dorothy, (1992) Core capabilities and core

	<p>rigidities: A paradox in managing new product development, Strategic Management Journal, Volume 13, Issue S1, Pages 111 - 125</p> <ul style="list-style-type: none"> • Wheelwright Steven C., Clark Kim B.(1992) Creating product plans to focus product development, Harvard Business Review, March-April, 70-82 • Bowler Joseph L. and Christiansen Clayton M. (1995) Disruptive Technologies: Catching the Wave, Harvard Business Review, January-February, pages 43-53 • Cooper Arnold and Smith Clayton, (1992) How established firms respond to threatening technologies.” Academy of Management Executive • Amabile T. A., 1998, How to kill creativity?, Harvard Business Review, Sep-Oct;76(5):76-87, • Arthur W. Brian (1996) Increasing Returns and the New World of Business, Harvard Business Review, July-August, 100-109 • Von Hippel Eric, (1986) Lead Users: a source of novel product concepts, Management Science Vol.32, No. 7, • Mitchell, Graham R. & Hamilton, William F. (1988) Managing R&D As a Strategic Option, Research-Technology Management, Volume 31, Number 3, May-June, pp. 15-22 • Anderson, Philip & Tushman, Michael L. 1991. Managing Through Cycles of Technological Change. Research Technology Management. May/Jun. 34. 3. • Lynn, Gary S; Morone, Joseph G & Paulson, Albert S, (1996), Marketing and discontinuous innovation: The probe and learn process, California Management Review; Spring 1996; 38, 3; • Cooper Robert G; Edgett Scott J & Kleinschmidt Elko J (2002), Optimizing the stage-gate process: What best-practice companies do-I, Research Technology Management; Sep/Oct 2002; 45, 5; • Cooper Robert G; Edgett Scott J & Kleinschmidt Elko J (2002), Optimizing the stage-gate process: What best-practice companies do-II, Research Technology Management; Nov/Dec 2002; 45, 6; • Eisenhardt K M & Brown S L (1998) Time Pacing: Competing in markets that won’t stand still, Harvard Business Review, March-April, 59-69
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Part IV. IT Management. Information technologies in the Organization (10 hrs)

Topic 8. Digital Economy and Information Technologies (4 hrs)

Class 8.	
Date: October, 29 Time: 13-16.15 Auditorium: 315	<p>Key points:</p> <ul style="list-style-type: none">• Information Technology Development and Trends• IT: Concepts and Management <p>Learning objectives:</p> <ul style="list-style-type: none">• Digital economy and digital enterprises• Relationship between performance, organizational pressures, and responses and technology• Digital Business and Digital Age Business Models• Business Pressure. Market Pressures. Technology Pressures. Societal Pressures• Information System : Concepts and Definitions• Data Management.• Network.• People.• Social, Ethical & Managerial Issues <p>Learning outcomes:</p> <p>Students should be able to understand</p> <ul style="list-style-type: none">• the concept of the digital economy,• the impact business pressures play on the organization and their responses to these pressures,• the role information technology plays both within and outside of the organization.• IT tools for innovation <p>Assignments for Class 9:</p> <ul style="list-style-type: none"># Reading: Ch.1, Ch.2 [4]# Reading: Ch.2 [4] Group Assignments and Projects# Mini-Case study: Minicase 1- [4], pp. 32-33 Minicase 2- [4], pp. 33-34# Case study:<ol style="list-style-type: none">1. The World's Most Innovative Companies http://www.businessweek.com/magazine/content/06_17/b3981401.htm2. Google<ol style="list-style-type: none">a. http://www.google.com/corporate/ [Google Corporate Overview, At a Glance, Our Philosophy]b. http://investor.google.com/documents/20080630_10-Q.html [The latest company announcement]c. http://www.google.com/press/podium.html [The latest announcements of Google strategy]3. Yahoo!<ol style="list-style-type: none">a. http://yhoo.client.shareholder.com/press/overview.cfmb. http://yhoo.client.shareholder.com/annuals.cfm4. Flickr<ol style="list-style-type: none">a. http://www.flickr.com/about.gne

	<p>b. http://news.cnet.com/Shedding-light-on-Flickr/2100-1025_3-5997943.html</p> <p>c. http://news.cnet.com/Tagging-gives-Web-a-human-meaning/2009-1025_3-5944502.html</p> <p>5. Apple</p> <p>a. http://www.wired.com/techbiz/it/magazine/16-04/bz_apple [How Apple Got Everything Right By Doing Everything Wrong]</p> <p>Question to consider:</p> <ol style="list-style-type: none"> 1. What kind of business model(s) do Google/Yahoo/Flickr/Apple use? 2. What is the core tenet of Google's strategy to dominate the field of search engines? 3. How is Google different from other major search engines? 4. What is PageRank? Why might it produce more effective results from searching a large index? What are the limitations of this approach? 5. How does an online photo service like Flickr open new opportunities in the business for consumer photography? 6. What is the Flickr "tag" system and why is it important to the success of the service? 7. What kind of services do you see evolving in the future as digital photography increases in popularity? <p># Cloud computing case study:</p> <ul style="list-style-type: none"> • http://www.microsoft.com/azure/default.aspx • http://en.wikipedia.org/wiki/Cloud_computing • http://www.davidchappell.com/CloudPlatforms--Chappell.pdf
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Topic 9. Presentations: case studies, personal sites and web groups (2 hrs)

Class 9.	
<p>Date: November, 5</p> <p>Time: 13-14.30</p> <p>Computer class</p>	<p>Key points:</p> <ul style="list-style-type: none"> • Group Assignments: how to create a personal website. • “What is ‘new’ about Information Technology and the business environment?” <p>Learning objectives and outcomes:</p> <ul style="list-style-type: none"> • Google groups. Create rich, custom pages. Customize your look and graphics. Share files and member information. Learn more about each other. • Using IT to become a more successful manager. Google Advertising Programs. iGoogle.Advance Search. Advance Search Tips. Topic-specific search engines from Google. Language tools.

Topic 10. Data management. Database Management Systems and Data Warehouses (4 hrs)

Class 10.	
Date: November, 5 Time: 14.45-16.15 Auditorium: 315	<p>Key points:</p> <ul style="list-style-type: none"> • Main functions of Data Management • Networking <p>Learning objectives:</p> <ul style="list-style-type: none"> • Database Management System • Data Models • SQL language <p>Learning outcomes:</p> <ul style="list-style-type: none"> • how to manage data to make various decisions. • a strategy of sharing the data all across the enterprise. • various issues and benefits of using various approaches to data management. <p>Assignments for Class 11-12:</p> <ul style="list-style-type: none"> # Reading: Ch.3, Ch.4 [4] # Reading: p.113 [4] Exercises and Projects # Mini-Case study Ch.3 [4] # Case study Database: <ul style="list-style-type: none"> • Classification of Databases http://www.greenplum.com/pdf/MQ/GartnerMQ2007.pdf • The Oracle Database Sample Schemas are a set of interlinked schemas. This set of schemas provides: <ul style="list-style-type: none"> ○ schema Human Resources (HR) is useful for introducing basic topics. ○ schema Order Entry (OE) ○ Online Catalog (OC) subschema ○ Product Media (PM) schema is dedicated to multimedia data types http://download.oracle.com/docs/cd/B28359_01/server.111/b28328.pdf

Class 11.	
Date: November, 12 Time: 13.00 - 14.30 Auditorium: 315	<p>Key points:</p> <ul style="list-style-type: none"> • Data Management <p>Learning objectives:</p> <ul style="list-style-type: none"> • SQL language • Warehouse data models • Data Security Management • Data Quality Management • Reference and Master Data Management • Data Warehousing & Business Intelligence • Document, Record & Content Management • Metadata management <p>Learning outcomes:</p> <ul style="list-style-type: none"> • various methods of data warehousing, data mining, knowledge management, and online analysis processing. • various issues and benefits of using various approaches to data management.

	Assignments for Class 12: # Reading: Ch.3, Ch.4 [4] # Reading: p.113 [4] Exercises and Projects # Mini-Case study Ch.4 [4] # Exercises and Projects Ch.4 [4] p.156 # Group Assignments and Projects, Internet Exercises Ch.4 [4] p.156
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Topic 11. Working with the organizational database (2 hrs)

Class 12.	
Date: November, 12 Time: 14.45 - 16.15 Computer class	Working with the organizational database Presentations: case studies, Exercises and Projects

Class 13.	
Date: November, 19 Time: 13.00 - 14.30 Auditorium: 315	Midterm examination test – 20%

Part V. Migrating to e-Business Models. Networking and Web (6 hrs)

Topic 12. Electronic and mobile business. Major models of e-business and m-business (4 hrs).

Class 14.	
Date: November, 26 Time: 13.00 - 16.15 Auditorium: 315	Key points: <ul style="list-style-type: none"> • focus on electronic commerce (EC) in its various manifestations, including B2B, B2C, and C2C. Learning objectives and outcomes: <ul style="list-style-type: none"> • Major EC Mechanisms • Business-to-Consumer Applications • Online Advertising • B2B Applications • Intrabusiness and Business-to-Employees • E-Government and Consumer-to-Consumer • Failures and Strategies for Success Assignments for Class 15: <ul style="list-style-type: none"> # Reading: Ch.5 [4] # Exercises and Projects p.204 [4] # Questions for Discussion p.204 [4] # Group Assignments and Projects p.204 [4] # Mini-Case study Ch.5 [4]

Topic 13. Web tools for search, customized delivery, communications and e-business (2 hrs)

Class 15.

Date: November, 26 Time: 13.00 - 14.30 Computer class	Practice: working with Web tools Presentations: case studies, exercises and projects
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Part VI. Thinking Globally (6 hrs)

Topic 14. Functional, Enterprise, Interorganizational and Global Systems (2 hrs).

Class 16.	
Date: December, 5 Time: 14.45 - 16.15 Auditorium: 315	<p>Key points:</p> <ul style="list-style-type: none"> • Perspectives on IT impacts • IT is eliminating the barriers of space and distance <p>Learning objectives and outcomes:</p> <ul style="list-style-type: none"> • Re-examination of the value system • Essentials of Enterprise Systems and Supply Chains • Business Value of Enterprise Systems • Enterprise Resource Planning Systems • Business Process Management • Product Lifecycle Management • Customer Relationship Management • Interorganizational Information Systems Integration • Interorganizational Information Systems and Virtual Corporations • Global Information Systems <p>Assignments for Class:</p> <ul style="list-style-type: none"> # Reading: Ch.7-9 [4] # Exercises and Projects p.294, 295, 339, 340, 375, 376 [4] # Questions for Discussion Ch.7-9 [4] # Group Assignments and Projects Ch.7-9 [4] # Mini-Case study Ch.7-9 [4]

Topic 15. Decision Support, Business Intelligence and Corporate Performance Management (2hrs)

Class 17.	
Date: December, 10 Time: 13.00 - 14.45 Auditorium: 315	<p>Key points:</p> <ul style="list-style-type: none"> • concepts of knowledge and knowledge-based systems, business intelligence and Data, Text and Web Mining <p>Learning objectives and outcomes:</p> <ul style="list-style-type: none"> • Organizational Learning and Memory • Approaches to Knowledge Management • Information Technology in Knowledge Management • Business Intelligence: Concepts and Benefits • Data, Text and Web Mining and Predictive Analytics • Decision Support Systems <p>Assignments for Class:</p> <ul style="list-style-type: none"> # Reading: Ch.10-12 [4] # Exercises and Group Assignments p.420, 421, 469, 470, 510-512 [4] # Questions for Discussion Ch.10-12 [4]

	# Mini-Case study Ch.10-12 [4]
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Topic 16. Presentations: case studies and discussion (2 hrs)

Class 18.	
Date: December, 10 Time: 13.00 - 14.45 Auditorium: 315	Presentations: case studies and discussion

Part VII. Implementing and managing IT (2 hrs)

Topic 17. IT strategy and Planning (2 hrs)

Class 19.	
Date: December, 10 Time: 14.45 - 16.15 Auditorium: 315	<p>Key points:</p> <ul style="list-style-type: none"> • ability for Information System to work as a coordinating function <p>Learning objectives and outcomes:</p> <ul style="list-style-type: none"> • IT Strategic Alignment • Interorganizational and International IT Planning • Managing the IS Department <p>Assignments for Class:</p> <ul style="list-style-type: none"> # Reading: Ch.13 [4] # Exercises and Group Assignments p.552 [4] # Questions for Discussion p.551 [4] # Mini-Case study Ch.13 [4]

Part VIII. Information Technology Economics (4 hrs)

Topic 18. Framework of IT Application Acquisition (2 hrs)

Class 20.	
Date: December, 17 Time: 13.00 - 14.30 Auditorium: 315	<p>Key points:</p> <ul style="list-style-type: none"> • focus on information systems <i>acquisition</i>. <p>Learning objectives and outcomes:</p> <ul style="list-style-type: none"> • The Landscape and Framework of IT Application Acquisition • Identifying, Justifying, and Planning Information System Applications • Acquiring IT Applications: Available Options • Outsourcing and Application Service Providers • Vendor and Software Selection and Other Implementation Issues • Connecting to Databases, Enterprise Systems and Business Partners • Business Process Redesign <p>Assignments for Class:</p> <ul style="list-style-type: none"> # Reading: Ch.15 [4] # Exercises and Projects p.617 [4] # Questions for Discussion p.616 [4] # Group Assignments and Projects p.617 [4]

	# Mini-Case study Ch.15 [4]
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Topic 19. Presentations: case studies and discussion (2 hr)

Class 21.	
Date: December, 17 Time: 14.45 - 16.15 Auditorium: 315	Presentations: case studies and discussion

Office hours for individual consultations:

Marko Torkkeli, individual consultations by email marko.torkkeli@lut.fi , face-to-face consultations – by prior appointment
Sergey Yablonsky, Wednesday, 16.30-18.00, Auditorium: 315 and/or at the course web site and/or by email yablonsky.serge@gmail.com

Calendar plan of current and final evaluation

Mid-term exam (test etc):	November 19, 13.00-14.30, Auditorium: 315
Announcement of mid-term exam	November 26, 13.00, Auditorium: 315
Announcement of coursework results	December 23, 16.30, Auditorium: 315 (results of coursework: class and home assignments, projects, exercises)
Pre-exam consultation:	<i>Date, time, place</i>
Exam:	<i>Date, time, place</i>
Announcement of exam results:	<i>Date, time, place</i>
Deadlines for projects, home assignments etc.	See class assignments

Evaluation system

- # Forms of current evaluation (mid-term exam, work-in-progress report on group project assignment plus class and home assignments and exercises; grading is done on “passed/failed” basis.)
- # Form of final evaluation (*exam*)
- # Grading policy (Final exam – 60%, Group work – 20%, Midterm examination test – 20%)

Required textbooks

1. George S. Day, Paul J. H. Schoemaker (Eds.): *Wharton on Managing Emerging Technologies*, Publisher: Wiley; New Ed edition, 2004, ISBN-10: 0471689394.
2. Bringing Technology and Innovation into the Boardroom Strategy, Innovation & Competences for Business Value. Publisher: Palgrave Macmillan, 2004, ISBN-10: 0333994590.
3. Carol V Brown, Daniel W. DeHayes, Jeffrey A. Hoffer, and Wainright E. Martin *Managing Information Technology* (6th Edition). 2008. Publisher: Prentice Hall; 6 edition, 2008, ISBN: 0131789546.
4. Efraim Turban, Dorothy Leidner, Ephraim McLean, James Wetherbe *Information Technology for Management: Transforming Organizations in the Digital Economy*. Publisher: Wiley; 6th Edition. 2007. ISBN: 978-0-471-78712-9.

Other required reading

**St. Petersburg State University
Graduate School of Management**

Date: «_____» _____2008