Massachusetts Institute of Technology
Sloan School of Management

15.564   **Spring 2007**

IT Essentials II: Advanced Technologies for Digital Business in the Knowledge Economy

Prof. Benjamin Grosof
TA Kian Hwa Tan

Meets MW 1-2:30 in E51-057

Syllabus
**** (VERSION of 1/31/2007) ****

Course Goals and Intended Audience – the "Sales Pitch":

Note: This is **a largely new course**, revised this year to a major extent from previous years in its material, organization, and length.

The course is motivated by two phenomena:
1. "Business is increasingly *digital* business." In the future, even more than today, most business will be either digital or depend critically on aspects that are digital.
2. The global economy is increasingly a *knowledge* economy. In the future, even more than today, products and services will be developed and delivered, competition won or lost, and jobs defined, by knowledge – its creation, organization, and communication.

This course is for students who want a strategic edge: to understand how the advanced information technologies that are emerging today will impact business in the near to medium term future, and to acquire skills in how to "ride the tiger" -- as the wave of continuing IT innovation rolls on, to best manage and exploit the business opportunities and challenges that wave creates.

This course will equip you with an understanding of the key information technologies central to the knowledge economy, their current and prospective business uses, and lifelong skills in how to think about business uses of these technologies -- to identify, critically analyze, and evaluate them.

MIT is the right place to learn about IT and innovation for business – it's the <u>cutting edge</u> not only in engineering but also in management of IT – ranked year after year #1 in the leading surveys of graduate programs in both these areas.   15.564 is the most advanced course offered at MIT on information technologies *together with* their business uses.

Technology focus areas of the course will include:
1. New generation knowledge management and web technologies, including web services, semantic (i.e., knowledge-based) web, and their convergence – semantic web services.
   - Just as the assembly line revolutionized business processes at the start of the 20th century, the Semantic, or knowledge-based, Web has the potential to revolutionize business and government processes for the 21st century.
2. The "process" technology of effectively managing software/system development and innovation.
   - Knowledge of this is perhaps the single most critical skill looked for (and usually not found) by employers of IT-capable students fresh out of school.

Applications focus areas of the course will include:
1. e-commerce
   - including: supply chain management and procurement, customer relationship management, advertising/marketing, e-contracting, business process automation and monitoring
2. financial reporting and financial services
3. trust, security, privacy
4. health care, biomedical
5. mobile
6. generally: knowledge management, and business communication, intra- and inter-enterprise

Strategy and skill focus areas of the course will include:
1. strategic impacts, industry standards, and <u>entrepreneurial opportunities</u>
2. analysis and critical evaluation of emerging technologies, standards, companies, and business applications.
   - Sift hype from reality, opportunities from mess, and dangers from excitement.

This course is for students who want to *become key players* in the coming economy by *combining* substantial understanding of the technology side *with* substantial understanding of the business side – applications and strategy.

What's suitable background for students who should take it?
The course is masters level, good for advanced undergrads and doctoral students too.
It's very suitable for both Sloan and non-Sloan (e.g., Engineering) students.
It requires some, but not a very large amount, of previous background in IT (see below in "Course Description" for details.)

Mechanics of registering: Note that Sloan courses have a prioritization process involving bidding; bidding starts Dec. 1 for Sloan students and starts approximately Dec. 22 for non-Sloan

students. See http://sloanbid.mit.edu for details on the bidding process. After that, just come to the class and contact Prof. Grosof by email.

For more info: In addition to the remainder of this document, for an overview you can see:
1. The Sloan CourseFest site -- http://mitsloan.mit.edu/coursefest -- which includes an **overview video** from the instructor and accompanying powerpoint slides.
2. The instructor's webpage – http://ebusiness.mit.edu/bgrosof/#Teaching

Course Description cf. MIT Subject Listings / Catalog entry:

(Graduate, H-Level, Spring)
Prerequisite: 15.561 or permission of instructor
Units: 3-0-6
 You must pre-register and participate in Sloan's Prioritization process
  to take this subject.
 Lecture: MW 1-2:30 in E51-057

Technologies and concepts for next generation knowledge management and
web e-business, including semantic web and web services.
Business applications for use in the next 2 to 7 years, including:
e-commerce, marketing, finance, trust/security, health/biomedical, mobile.
Strategic impacts and entrepreneurial opportunities.
Core skills for identifying and evaluating technologies and their business
potential, and for managing innovative IT-dependent projects.
Overall emphasis on business process automation and e-services.
Prerequisite can be met by previous IT work/course experience
equivalent to 15.561.

Additional Details: (overlaps some with the above catalog entry)

Covers advanced information technologies for digital business in the
era of the knowledge economy, combining depth and breadth. Topics
include both particular technologies and their central underlying
concepts, along with discussion of their functional
applications. Technologies emphasis is on second generation of
fundamental knowledge management and Web technologies -- including
XML, services, and automated knowledge bases such as semantic web.
Applications emphasis is on intra- and inter- enterprise business
process automation across numerous areas of business and management,
including B2B, supply chain, finance, security, marketing, and
customer/partner relationships. Considers strategic impacts, industry
standards, and entrepreneurial opportunities. Draws upon artificial
intelligence and distributed systems theory. Prerequisite can be met
by any of a variety of previous coursework or work experience that
provide rough equivalence to 15.561.

Further Course Overview Description:

Class session format:
- Roughly half lecture, half discussion.
    - Micro-cases and application examples as part of discussion.
- Special Guests: Two or three.
    - (E.g., in past one was Tim Berners-Lee, inventor of the Web, who spoke about Semantic Web applications. Another was Prof. Stuart Madnick, who spoke about RFID and its business impact.)

Assignments: 3 short assignments plus a term project done in teams; see later section of this syllabus (towards the end) for details.

Readings: Various articles and web links, and parts of a required textbook.   Overall course workload amount of reading is medium- to light- level, with higher reading workload earlier in the course and less reading workload later in the course. The required textbook is:
- "Electronic Commerce 2006: A Managerial Perspective" by Efraim Turban, David King, Dennis Viehland, and Jae Lee. Pearson Prentice Hall, 2006.

Exam: In-class final exam on Wed. May 16.

Grading: 25% participation, 50% assignments, 25% final exam. Participation includes contributions to class discussions, attendance, and contributions to class readings.

Office Hours Availability: Regular scheduled weekly office hours held by the instructor (once or twice a week) and by the TA (twice a week). Additional office hours by individual appointment. Also, usually a good time to talk to Prof. Grosof is right before class, or right after 15.568 which meets in E51-361 MW 2:30-4. In the first week of class, Prof. Grosof will be available the half-hour before each class (MW 12:30-1) as well as the half-hour after 15.568 (MW 4-4:30). Kian Hwa Tan's TA office hours will usually be on two other days of the week, probably at lunchtime or late afternoon, in E51 2nd floor, announced week-by-week.

Being a recently redeveloped course that is still being refined and developed, this year's students will have the opportunity to help develop and shape it in its offering this year and especially for future years.

Course Staff:

Instructor: Prof. Benjamin Grosof
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- bgrosof@mit.edu, Room E53-317, (617) 253-8694

Teaching Assistant: Kian Hwa Tan
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Course Assistant: Yubettys Baez
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Class Sessions:

(Note: This is the current version. There will probably be some further shuffling and tweaking, later. In particular, much of the readings for later sessions will be added, including handouts from sources other the Turban textbook. The guests (lecturers/visitors) listed below are from 2006, as a representative indication; this year's guests will be announced during the course.)

1. W 2/7 Course Introduction and Overview

2. M 2/12 Intro to Next Generation Web, B2B/EAI and XML I
    Reading: Turban chapter 1.
    Assignment #1 OUT: Brainstorm on Advertising, Mergers (Short assignment)
    Term Project Team Assignment OUT: Identify and Analyze a Trend in IT

3. W 2/14 B2B/EAI and XML II
    Reading: Turban chapter 2.1-2.6.
    Assignment #1 DUE
    Mini-Assignment #1OUT: Bio to share with class
    Assignment #2 OUT: Analyze an XML Technology

 (M 2/19   NO CLASS: President's Day – Holiday.
            Monday classes will be held on Tuesday 2/21 instead.)

4. Tues. 2/20 Discussion of Targeted E-Mail Advertising; Discussion of IT in Mergers
    Reading: Turban chapter 3.1-3.3, 4.3-4.4, 4.6-4.8, 8.6
    Optional reading: Turban chapter 4.9.
    Mini-Assignment #1 DUE

5. W 2/21 B2B/EAI and XML III, incl. CRM overview
    Reading: Turban chapter 4.10, 5.1-5.2, 5.9, 13.4
    Optional reading: Turban chapter 5.3, 13.5-13.7
    Reading: Lecture Notes on Abstract Graphs, Agents
    Optional reading: XML Bible

6. M 2/26 Semantic Web, Web Services, Semantic Web Services: Overview
    Reading: Scientific American article on Semantic Web (handout)
    Optional reading: Turban chapter 5.4
    Optional reading: more in XML Bible

7. W 2/28 Semantic Web Rules and RuleML
     Assignment #2 DUE

Assignment #3 OUT: Analyze a SWS Area of Business Use
        Reading: Turban chapter 5.5, 5.7-5.8

8. M 3/5 Supply Chain Procurement and E-Contracting; Lifecycle aspects
        Reading: Turban chapter 6.1, 7.1-7.2, 7.6, 13.1-13.3
        Optional reading: Turban rest of chapters 5, 6 and 7

9. W 3/7 Trust Management, Security, and Privacy I
        Term Project Team Formation DUE
        Reading: selections from Turban chapter 11

10. M 3/12 Financial Reporting and Financial Services

11. W 3/14 Roadmapping I: Early Adopter Areas for Semantic Web Services
        Assignment #3 DUE
        Reading: Turban chapter 10.1-10.2

  (M 3/19 and W 3/21 NO CLASS: Sloan Innovation Period held.)

  (M 3/26 and W 3/28 NO CLASS: Spring Vacation Week)

12. M 4/2 Trust Management, Security, and Privacy II
        Reading: selections from Turban chapter 12

13. W 4/3 Enterprise Systems and Cross Enterprise Systems I
            - incl.: Intranet and Extranet, E-Commerce
        Term Project Team Topic DUE

14. M 4/9 Cross Enterprise Systems and E-Commerce II

15. W 4/11 Additional Directions in Web Technology; Search and Knowledge Management;
        Roadmapping II: Early Adopter Areas for Semantic Web Services

        Reading: Turban chapter 8.5, 8.7

  (M 4/17   NO CLASS: Patriot's Day -- Vacation)

16. W 4/19 Managing Software Engineering and Systems Development I

17. M 4/24 Mobile, AutoID/RFID, Info Integration, and Business Processes
                Guest Lecture by Prof. Stuart Madnick (MIT Sloan IT group)
        Reading: "Radio Frequency Identification RFID: A Basic Primer",
                The Association of the Automatic Identification and Data Capture Industry,
                Aug. 23 2001, pp. 3-13.
                (http://www.aimglobal.org/technologies/rfid/resources/RFIDPrimer.pdf)
        Reading: S. Tu, S. Madnick, and L. Wu. "Improving UccNet-Compliant B2B Supply
            Chain Applications Using a Context Interchange Framework", Proc. on International

Workshop on Business and Information, Taipei, Taiwan, Mar. 26-27, 2004, pp. 4-14.
(http://papers.ssrn.com/sol3/papers.cfm?abstract_id=529702)
Reading: Turban chapter 2.7, 9.1-9.3, 9.5, 9.9-9.11, 10.9

18. W 4/25 Managing Software Engineering and Systems Development II
Reading: "Mythical Man-Month" by Frederick Brooks, from book of same title, 1975.
Reading: Randolph, W.A. & Posner, B.Z., "What Every Manager Needs to Know About Project Management". SMR, Vol 29, No. 4, Summer 1988, pp 65-73
Reading: De Meyer, A., Loch, C.H., & Pich, M.T., "Managing project uncertainty: from variation to chaos" SMR 43, 2, winter 2002, 60-67, reprint 4326

19. M 4/30 Cool New Things in Semantic Web and Semantic Web Services
Guest Lecture by Sir Tim Berners-Lee (W3C and MIT EECS)

20. W 5/2 Managing Software Engineering and Systems Development III

Term Project Paper DUE

Optional Reading: Cyrus F. Gibson, "IT-Enabled business change: an approach to understanding and managing risk" MIS Quarterly Executive Vol2 No.2 / September 2003
Optional Reading: Keil, Mark & Montealegr, Ramiro "Cutting your losses: extricating your organization when a big project goes awry" MIT Sloan Management Review, Spring 2000 Vol 41 pp 55-68

21. M 5/7 Term Project Presentations I; Guidance on Preparing for the Exam

Term Project Presentation DUE

22. W 5/9 Term Project Presentations II

23. M 5/14 Course Wrap-up and Review

24. W 5/16 In-class Final Exam (NB: this is the last class)

  (NO EXAM during FINAL EXAM WEEK)

Additional Notes:

There may be some moderate changes in the sequence and time allocation of the topics covered during the sessions as listed above.

The exam will address mainly what is covered in the lecture notes, other content covered during class time, and required readings. It will be closed book.

Assignments due in first part of the course:

Three relatively short assignments, due approximately biweekly during the first 5 weeks of the class. Each 2-3 pages, a "think piece" of exploring/analyzing.

Assignment 1: Brainstorm on targeted advertising and, similarly, on mergers. Due Feb. 14.
Assignment 2: Explore an XML technology. Due Feb. 28.
Assignment 3: Analyze business uses of Semantic Web Services. Due Mar. 14.

In addition: there will be occasional short <u>mini-</u>assignments, each taking an hour or two to complete.   Plus there's the …

Term Project Team Assignment due in the last part of the course:

Identify and analyze a technology/company/product/standard that is likely to have significant business impact. Critically evaluate it, analyze its opportunities, limitations and challenges. Team size: 3-4 students. Form team by Mar. 7, formulate topic by Apr. 4. 12-page paper due May 2. 15-minute slideset presentation due on May 7, presented in class on May 7 or May 9 with class Q&A discussion.