Syllabus for TECH 914: Enterprise Technology for General Managers

Kellogg School of Management, Northwestern University

Last update: July 14, 2004

Professor

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Course Info Web Site
All electronic readings and assignments. Login linked to the Kellogg serial and Mark Jeffery's faculty web page under courses.

Student Projects
http://www.kellogg.nwu.edu/IT/TECH914

Office Hours
If you have any questions about the material please call or come and see me. I am very happy to talk with you. My schedule is in meeting maker, but you can also email, phone, or just stop by.

Course Description:
As a Kellogg MBA graduate practically all of the initiatives you will manage or interact with will have a significant enterprise technology component. This course is designed to provide a sound foundation in essential enterprise technology and management issues. Topics covered include risk and rewards of implementing new technologies, ERP deployment best practices, CRM selection, technology project and product management, and strategies for working with IT. Class lectures are complemented by six case discussions on strategic and management issues of enterprise technology. In addition, the course has a significant hands-on component: Students take apart computers, visit technology companies in the Chicago area, and tour the server room at Kellogg. The final group project requires student teams to build a Web site explaining a complex technology and management issue of their choice. Senior executive Fortune 1000 CIO and CTO speakers complement the class lectures, cases, and activities. TECH914 is the core requirement for the Technology Industry Management major. Students with exceptional enterprise technology experience may request a waiver by emailing their resume and a brief statement of experience to mjeffery@kellogg.northwestern.edu.

Frequently Asked Questions:

Q: Does TECH914 count as the required course for the TECH major? A YES
Q: Are there any prerequisites for the class? A: No.
Q: Do I need technology industry experience to take this class? A: No.
### Course Outline

| Week 1 | Introduction: Why learn enterprise technology and management oversight?  
The linkage between information technology and enterprise competitive advantage  
The Information Paradox  
What do you need to know as a Kellogg MBA?  
Case Discussion: IT Challenges at Great Pains Bank and Trust |
|---|---|
| Week 2 | Computing Core Concepts  
Hardware and software. Take apart computers.  
Case Discussion: Transmeta – risks and rewards of new technology |
| Week 3 | Network Technology  
Understand local and wide area networks and internet technology concepts  
Broadband: Personal technology and management issues  
Tour of the Kellogg network and server room  
Case Discussion: SUN Microsystems and the N-Tier Architecture - TCO |
| Week 4 | Enterprise Systems  
Understanding ERP and data storage basics  
Cost and management issues: 5 9’s, uptime tradeoffs, and storage costs  
CRM Basics  
Case Discussion: Cisco Systems - Implementing ERP |
| Week 5 | Infrastructure for e-business: scalability, modern N-tiered architectures, application servers, integration, and cost issues. Enterprise Application Integration  
Extending the Enterprise  
Enabling Technologies: XML and the importance of standards  
Web services: the ASP model and applications across industry verticals |
| Week 6 | IT Management Decisions  
Case Discussion: Asera – Strategic Positioning for Success  
Green field vs. established firm: Platform selection, cost, and infrastructure issues.  
Build vs. buy vs. outsource decision making  
Strategies for non-technology managers working with IT  
Midterm Exam |
| Week 7 | Guest Speaker: Technology Management from the CIO Perspective (Tentative) |
| Week 8 | Network Security  
Technology and management issues, key industry players  
Field Trip |
| Week 9 | Project Management and Product Development  
Guest Speaker: Senior Consultant on Project Management (Tentative)  
Case Discussion: Living on Internet Time - Product Development at Netscape, Microsoft, Yahoo!, and NetDynamics |
| Week 10 | Advanced Topics  
Data warehouse technology: enabling business intelligence and analytic CRM  
Course Wrap up  
Web projects are due and final team presentations |
Course Genesis

The Technology Concepts class started as a series of workshops given by Mark Jeffery in the Winter and Spring of 2000. The demand for the workshops was high, and over 360 Kellogg students attended the first workshops. Winter 2001 was the first time TECH 914 was offered as a 10 week class at Kellogg. The class expanded upon the original workshop content and combines expert speakers, cases, and class projects designed to give students a strong foundation of technology knowledge and management decision making.

During the Fall 2000 quarter, 7 first year Kellogg student volunteers worked with Mark Jeffery to design the new technology concepts class, arrange speakers, and coordinate the first field trip. In addition, Professors Mohan Sawhney, Anthony Paoni, and James Conley all gave significant and valuable input on the curriculum design. The collaborative effort is reflected throughout this syllabus – TECH914 is ultimately designed by Kellogg students for Kellogg students with significant faculty input. Special thanks should be extended to Dean Dipak Jain, Dean Edmund Wilson, and Dean Cathy Grimsted for their support.

Definition of 'Technology' for TECH914

'Technology' can have several definitions. In Tech 914 when we talk about Technology we will mainly refer to information and communications technology. Enterprise Technology for General Managers therefore refers to information and communications technology concepts and related applications for managers across large enterprises. Class time is limited and we will unfortunately not have time to discuss exciting developments in bio technology.

Course Goals

(1) Learn essential enterprise technology concepts and be able to effectively communicate with a CIO, CTO, or technology expert
(2) Understand future enterprise technology trends
(3) Develop strategies for life-long learning in a rapidly evolving global technology environment.
(4) Understand technology management decision-making strategies and how to apply them in your career

Curriculum Design Matched to Goals

Each class will be comprised of approximately two components: technology concepts and management concepts. Class discussion of cases and readings will be used to reinforce technology concepts and develop management decision-making strategies. Guest speakers will provide invaluable insight into real world technology decision-making. Discussion of student research projects, group web presentations, and the student web projects database will add to the collective knowledge of the class.
**TECH 914 Student Deliverables**

See the 'TECH914 Grading Rubrics' and 'TECH914 Important Dates' posted on Course Info for additional information on each of the following deliverables:

### Individual Web Page

At a minimum, the web page should contain your picture, contact information, resume, and a place where you can link your Individual Technology Executive Abstract. Need help learning web authoring?  
KIS online web authoring help: [http://www.kellogg.nwu.edu/kis/webresources/](http://www.kellogg.nwu.edu/kis/webresources/)  
TEK Class Schedule: [http://www.kellogg.nwu.edu/kis/training/tekcamp/ongoing/schedulebydate.htm](http://www.kellogg.nwu.edu/kis/training/tekcamp/ongoing/schedulebydate.htm)  
KIS has scheduled web-authoring workshops coordinated with the assignments for the class.

### Individual Technology Executive Abstract

A 2-page executive abstract, with references, on a technology concept of your choice. References and exhibits are in addition to the 2 pages of text, but no more than 2 exhibits. You are expected to research a topic different from your group project. The abstract should describe both the technology concepts and related information for managerial decision making related to this technology. Write the abstract so someone without a detailed technology background can understand it. A detailed grading rubric is given on the course info web site.

### Web Surveys and Peer Evaluation

Your feedback on the class is important and you will be required to complete a web survey for the midterm evaluation. In addition, you are required to give feedback on your team mates performance using TeamNet at the end of the semester: [https://www1.kellogg.nwu.edu/teamnet/teamnetcover.asp](https://www1.kellogg.nwu.edu/teamnet/teamnetcover.asp). In addition to TeamNet, as part of your final group project you are required to submit team member peer evaluations in a word document to your drop box on the course info web site.

### Midterm Exam

Closed book take-home midterm exam posted to the course info Web site.

### Final Group Web Project

Groups of 5-6 will work on the final project web site. The project consists of 2 components: (1) Technology Concepts, and (2) Management Concepts. Your team is expected to analyze a technology from the perspective of a management team making a recommendation and potential purchasing or build decision. The technology should have some complexity and should require a serious evaluation of competitors for a purchasing decision. **Technology Concepts:** Explain the technical aspects of the technology then compare and contrast with competing technologies or products. **Management Concepts:** Apply course learning to technology management decisions re purchasing and implementing the technology. The final deliverable is a web site for your project. For examples of previous class projects see: [http://www.kellogg.nwu.edu/IT/techconcepts](http://www.kellogg.nwu.edu/IT/techconcepts)

### Final Group Presentation

Your team will present the final web project during the last week of class. A group size of 5 = 5 groups. The format will be 15 min conference presentations: 12 min presentation + 3 min Q & A. Allow 20 min for each group. We will extend the last class for the mini conference. Pizza will be provided for the afternoon/evening class; Bagels and muffins will be provided for the morning class.
Final Group Project Ideas

Your team may select a project of your choice with the approval of the instructor. Please see the projects of previous classes and attempt to choose a topic not done before. See www.kellogg.northwestern.edu/IT/techconcepts and click on ‘projects’.

Following are some project ideas:

Outsourcing
Who are the big players in technology outsourcing? What are the options domestically and globally? How do you structure an outsourcing contract? You might apply the learnings to a few good case examples.

Enterprise Architectures
How should a CIO define the enterprise architecture of a large company? What does the architecture look like, and how does the corporate strategy affect the architecture? What are the benefits, risks, and potential costs? You might apply the learnings to a few good case examples.

The ‘Real Time’ Enterprise
Enterprise Application Integration, XML and Enterprise Data Warehousing enable ‘the real time enterprise’. What does this mean and how should an executive manager think strategically and operationally about the enterprise architecture? What are the organizational, cost and implementation issues? You might apply the learnings to a few good case examples.

Software
- Standards Microsoft XML standards vs others. Who sets standards and what are the rules that govern standards? Why are they critically important?

Infrastructure
Understand the main components of the data center - Server, Storage, Backup (tape), and Network. Who are the players (EMC, HP, IBM, SUN)? How do they compare with their products and how does that strategy compete against SAN technology. In the world of high availability, how are these large IS expenditures justified? These questions apply to the following:
- Servers HP vs SUN, IBM. (Unix and Windows 2000)
- Storage Discussion of Enterprise Storage.
- Networks Optical switching vs. conventional ATM switches
- Backup STK, EMC, and IBM.

Key Resources for Information
Computer World, Information Week and CIO Magazine - each week have case histories on companies and how they use Information Technology. All are available on-line.
Sun, HP, Microsoft, EMC, and Other Technology Provider Websites - all have detailed information on their products. You can also contact their sales departments and request detailed information, pricing, and case write-ups.
Grading Details

All assignments must be completed. None are optional. Course grading will comprise of the following:

<table>
<thead>
<tr>
<th>% total grade</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>15%</td>
<td>Class participation and attendance.</td>
</tr>
<tr>
<td>5%</td>
<td>Individual web page.</td>
</tr>
<tr>
<td>10%</td>
<td>2-page individual executive abstract on a technology concept of your choice with references and posted to your personal web site. See the Course Info page for the detailed abstract grading rubric.</td>
</tr>
<tr>
<td>35%</td>
<td>Closed book take-home exam completed individually.</td>
</tr>
<tr>
<td>35%</td>
<td>Group project web page loaded on the class server and linked to the class web site, group presentation, and peer evaluations.</td>
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</tbody>
</table>

Where possible, all assignments will be graded blind. Group assignments should have all team member names on the first page, and a group name of your choice.

While not graded, you are obligated to participate in TeamNet for peer evaluations and the Individual Web surveys.

For a detailed explanation of the grading rubric for each assignment, see the TECH914 Grading Rubrics document posted under Course Information on the Course Info Web Site.

Peer Evaluations

As a last assignment, you are required to complete a peer evaluation of your final project team members and a self-evaluation of your class participation. This evaluation is helpful for determining grades of students who are on the borderline between an A, B, or a C, and for assigning your class participation grade. Note that the peer evaluation is not anonymous. These evaluations are confidential, will not be shared with anyone, and will only be used by the professor for grading purposes. You may request to see your individual peer evaluations in the professor’s office. All team member names will be deleted so you can see anonymous peer rating numerical scores and any comments pertaining to you.

Important Note: All those who do not submit group peer evaluations to their Course Info drop box by 12:00 PM on the day of the final presentation will be penalized 10% of their grade.
**Other Important Information**

**Waivers**  
Students with exceptional enterprise technology experience may request a waiver TECH914 as the TECH major core requirement by emailing their resume and a brief statement of experience to mjeffery@kellogg.northwestern.edu.

**Text**  
There is no assigned textbook for the class. The course pack should be available in the bookstore by the second week of the class, and the first two weeks reading assignments are all available on the course info web site. The case pack in the bookstore contains only copyrighted articles that are not available electronically. Most of the readings are available on the web or in pdf file format, and links to all these articles are posted on the Course Info Web Site.

**Attendance Policy**  
Students are expected to attend all classes. There is no formal attendance sheet for each class, however on occasion an attendance sheet may be circulated to spot-check attendance. Please let Prof. Jeffery know in advance if you will miss class for any reason. It is most important that students attend classes with guest speakers, since the speakers are senior executives who are graciously donating their time to visit Kellogg.

**Auditing Policy**  
Kellogg students, spouses, significant others, and friends of the Kellogg community may audit this class providing there are seats. Auditing students must attend the class on time, and may not enter a class late or leave early. Depending on the number of students officially enrolled, auditing students may not be able to attend the field trip and server room tour. Auditing students may not participate in class discussions or ask questions.

**Classroom Etiquette**  
Come prepared to ask and answer questions. **Please be on time.** Beverages and small food (bagels, muffins, etc.) are OK, but please be considerate of your classmates and refrain from consuming food that has noisy plastic wrappers, odors, etc. **Absolutely no laptops connected to the Internet.**

**Midterm Evaluations**  
The format of the midterm course evaluation is an anonymous web survey and all students are encouraged to participate. Your constructive feedback is important and is appreciated. Note that your anonymous comments may be shared with the class when we review the feedback.

**Class Field Trip**  
For day students, a class field trip will take place on Wednesday in the eighth week of class. We will visit 3 companies in the Chicago land area. The trip typically runs 8:00 AM – 6:00 PM. For the TMP section we will visit 2 or 3 companies in the afternoon and during the evening class time of the eighth week of the term.
Your Questions
You are not expected to know the material in the general lectures introducing concepts such as how a computer works, networking, ERP, XML, Web services etc. In these lectures please ask questions. If there is not enough time to answer your question in the class, please stop by my office, call me, or send me an email.

Cold Calls
Expect cold calls on all cases. Case questions are posted under Assignments on Course Info.

The first cold call question will most likely ask you to summarize the case and the important points – this provides a platform for further discussion and ensures the class is on the same page. Secondary questions will focus on case questions (if the reading is a case) and synthesizing the case/reading with other readings and frameworks developed in the class. You may prepare the cases individually or in groups, and may have prepared a short written summary for your personal use if you feel more comfortable reading this in a cold call situation.

Please don’t get overwhelmed by the technical details – focus on what is important from a manager’s perspective.
Tech 914: Enterprise Technology for General Managers Reading List

Many of the articles are available electronically. For those available on the web, just click on the links in this syllabus. All others readings are either posted in pdf files on the Course Info page or are in the course packet. Due to copyright issues, all HBS cases, HBS and SMR readings and book chapter readings are in the course packet.

*Denotes articles that must be read before class in order to participate in class discussions. Students are responsible for all readings for the exam.

For your reference: A glossary of network and computer terms is provided as the first reading in the course packet. You can also look up terms online at www.whatis.com

[C] = In case packet
[CI] = On course info
[L] = Link to internet

Week 1
Course Introduction and Motivation
*Read this Course Syllabus

Class 1
*The Digital Age Storms the Corner Office, Eric Wahlgren, Business Week, September 6, 2001
http://www.businessweek.com/print/technology/content/sep2001/tc2001096_253.htm?mainwindow [L]

http://www.business2.com/b2/subscribers/articles/print/0,17925,514472,00.html [L]

The E-Biz Surprise, T. J. Mullaney, with H Green, M Arndt, R. Hof and L Himelstein, BusinessWeek, MAY 12, 2003 http://www.businessweek.com/print/magazine/content/03_19/b3832601.htm?tc&sub=0319ebiz [L]

*Beyond the Productivity Paradox, Erik Brynjolfsson and Lorin Hitt, Communications of the ACM, Vol. 41, No. 8, August 1998. pp49-55. (A good review of the information paradox and related research results) [C]

Paradox Lost? Firm-Level Evidence on the Returns to Information Systems Spending, Erik Brynjolfsson and Lorin Hitt, Management Science, Volume 42, Issue 4, April 1996 pp541-558. (Posted to Course Info). (A technical article with the latest research data on the information paradox – just skim for the class) [C]

Class 2
Case Discussion:
*IT Challenges at Great Plains Bank and Trust, Mark Jeffery and Scott Abbott, 2002. Case questions at the end of the case. [C]

*Tech Comes Out Swinging, Steve Hamm, Steve Rosenbush, and Cliff Edwards, BusinessWeek JUNE 23, 2003 http://www.businessweek.com/print/magazine/content/03_25/b3838603.htm?tc&sub=it100 [L]

Week 2
Computing Core Concepts

Class 1


*Chips on Monster Wafers*, By Otis Port, with Irene M. Kunii, Bruce Einhorn, and Andrew Park, BusinessWeek, November 4, 2002. [http://www.businessweek.com/print/magazine/content/02_44/b3806110.htm?tc] [L]

Class 2
Case Discussion

*Big Bet Behind Intel Comeback: In Chips, Speed Isn't Everything*, Don Clark, WSJ, Front page, November 18, 2003. [CP]

*Innovation, Lego-Style*, Peter Burrows, BusinessWeek, JUNE 23, 2003 [L] [http://www.businessweek.com/print/magazine/content/03_25/b3838611.htm?tc&sub=it100] [L]

Week 3
Network Technology

Class 1
*The Worldwide Web and Internet Technology*, Technology Note, HBS 9-198-020, Nov. 5, 1998. *(This is intended to supplement the lecture and may be best to read after the class)* [C]

*Ethernet's Winning Ways*, Gadi Kaplan, IEEE Spectrum, January 2001. [C] [CI]

Class 2
Case Discussion:

*The Linux Uprising*, J. Kerstetter, with S. Hamm and S. and J. Greene, BusinessWeek, March 3, 2003. [http://www.businessweek.com/print/magazine/content/03_09/b3822601_tc102.htm?tc&sub=03linux] [L]

*Big Blue’s Unlikely Revolutionary*, Stephanie Clifford, Business 2.0, October 2002 [http://www.business2.com/b2/subscribers/articles/print/0,17925,515060,00.html] [L]
Week 4

Enterprise Systems

Class 1

*Broadband and Main, By Roger O. Crockett, BusinessWeek, October 2001.  
http://www.businessweek.com/print/magazine/content/01_41/b3752047.htm?mainwindow [L]

*Plugging In, Peter Grant and Bruce Orwall, Wall Street Journal, 8 January 2003 [CI][C]


Enterprise Resource Planning (ERP). Escalle, Cotteleer, and Austin. HBS Technology Note 9-699-020 [C]
(A good intro to ERP software – you may read after the class, but a must to read before the Cisco case)

Class 2

Case Discussion


A Crash Course in Customer Relationship Management, Harvard Management Update, Article Reprint No. U0003B.  [C]


Week 5

Class 1

*Don't Just Relate – Collaborate, Mohan Sawhney, MIT Sloan Management Review, Spring 2002.  [C]


Intranets and Middleware, M. Ledbetter, R. Nolan, and S. Gallagher. Technology Note, HBS 9-397-118, May 29, 1997. (This is a difficult article to read and is a supplement to the lecture)  [C]

J2EE white paper from the SUN web page. [CI] (This may also be difficult to read and is a supplement to the lecture).
Class 2
Extending the Enterprise
*To Sell Goods to Wal-Mart, Get on the Net, Ann Zimmerman, WSJ, B1, November 21, 2003 [CP]


*Real Time, John Foley, InformationWeek, Sept. 16, 2002
http://www.informationweek.com/shared/printableArticle.jhtml?articleID=6503502 [L]

Week 6
IT Management Decisions

Class 1
Case Discussion
*Asera, Case and questions posted to Course Info. [C] [CI]

*Analyzing the Outsourcers, Robin Gareiss, InformationWeek, Nov. 18, 2002.
http://www.informationweek.com/shared/printableArticle.jhtml?articleID=6504105 [L]

Class 2
*Six Decisions Your IT People Shouldn’t Make, Jeanne Ross and Peter Weill, HBR, November 2002, pp85-91. [C]


Midterm Exam Posted After Class and Due on Sunday of the Sixth Week by 11:59 PM.

Week 7
Class 1: No class on Monday

Class 2
Guest Speaker: Technology Management from the CIO Perspective

No readings – please come to the speaker!
Week 8

Class 1

Network Security

*The man who bought the Internet*, Fred Vogelstein, Fortune, June 21, 2001. [C]

*Inside Internet Security, What Hackers Don't Want You to Know*, Jeff Crume, Addison-Wesley, 2000, Chapter 10 and Appendix A & B. [C]


Field Trip: Wednesday 8:00 AM – 4:00 PM

Class 2: No Class on Thursday

Week 9

Project Management and Product Development

Class 1

Guest Speaker – Senior Executive on Project Management


Class 2

Case Discussion


Week 10

Class 1

Data Warehousing and Analytic CRM


*Data Warehousing: Clearing the Confusion*. A White Paper By: Rob Armstrong, NCR Corporation, 2001 [CI]

Class 2

Final Project Presentations and Course Wrap Up
Books on various topics covered in this course

I am often asked by students to recommend a book so they can learn more. Unfortunately, I have not seen any good book that covers the breadth of subjects in this class, or that is designed to be accessible for a non-technical management audience. The following are some of the books on my bookshelf that relate to this class. I don’t recommend buying any of them unless you have a burning desire to delve deeper than we cover in class. FYI I have added some comments that may help.


Inside the PC, Peter Norton, 6th Edition, SAMS Publishing, 1995 (there is a new edition by now). Norton is a true PC technology expert, and this is a good book for anyone interested in looking under the hood of their computer.

Teach Yourself Networking in 24 Hours, Matt Hyden, SAMS Publishing, 1998. This is a good book to learn about networking. It’s a little technical but well written.

Java 1.2 How-To, Steve Potts, SAMS Publishing, 1998. One of the books I used to learn Java 1.2 – for programmers with some good examples in the later chapters on how to write applications that communicate over the Internet. For techies only.


XML by Example, Benoit Marchel, QUE, 2000. This book gets into the meat of how to use and program in XML. For techies only.

Architecting Web Services, William Oellermann, Apress, 2001. A technical book on Web services – however the first few and the last couple of chapters are very readable by the non-technical. The last chapter on the future directions of web services is pretty good.