This course addresses selected management challenges and opportunities presented by technology. It moves beyond the nuts and bolts of technology to get at the social, cultural, and political issues that make managing technology more than a “technical” job. Management of all sorts is a process of deciding what to do next when faced with complex situations and limited time. This class helps students to decide what to do next in technology-intensive environments by helping them see the connections between technology, organizations, and people; to learn theories that help them critically evaluate a situation to reduce the complexity by focusing only on the critical features; and to practice management skills.

Topics in this course include technology and organizational design, technological development processes, cross-organizational technology communities, management of employee involvement and dispersed teams, work spaces for technology workers, and the politics of information infrastructures. Part of the class is discussing accidents in technological systems to explore the role of organizations, management, and technology. These disasters reveal how a system works by exposing its underlying operations. These examples are then used to understand similar processes and issues in normal, day-to-day technology organizations.

Students will read articles from scholarly journals and popular press, engage in case discussions, participate in class exercises, write short executive summary documents, work on group projects, and make presentations. Consequently, this course’s experiential learning requires students to do preparatory work prior to class, or else they will waste these opportunities to improve their skills and understanding.

**Required Texts**

Reading packet of articles and cases.
Course Requirements

Executive summaries (3@50 pts each=150 points): The assignment is to write three executive summaries. Each will be a maximum of 1 ½ pages in size (375 words maximum). These memos are due on the 2nd, 3rd and 5th class meeting. The exact format for these memos is attached. Each memo describes a real-world problem in your work (preferably current, but also in the past) and how the theory for that week applies to that problem. The memo should have a specific problem and a specific action to solve the problem.

Class Participation (100 points): The class discussion is an important chance to learn, so participation is taken seriously. In class you can learn from your fellow students and practice the verbal skills of communication and dialogue.

If you are absent from a class without an excuse (see policy below), your participation grade for the day will be zero. You need to participate actively. If you attend every class but are not engaged, you grade will be a “C”. An “A” or a “B” will be earned by activity in the classroom.

I will cold call (ask you to speak even if you have not volunteered). BE PREPARED FOR DISCUSSION EVERY CLASS.

Listen to what other students are saying and respond to them directly.

Be civil, courteous, and professional at all times. Disagreement is helpful when discussing a complex issue, but keep the conflict at a professional, not personal, level.

Pay attention to the discussion. Part of participation is making an active audience for others.

Participation grades will be reduced for unprofessional comments, lack of attention, or ignoring your fellow students’ comments.

Space Design Project (100 points): A short paper (2-4 pages) with two diagrams with suggestions on how to change the work space at your organization (see description in the course outline). This project is worth a great deal, as it requires you to do the extra work of actually drawing out a superior design.

Group Project (150 points): The group project is an analysis of a managerial issue dealing with technology in a real world setting. It has two parts. The first part of the project will be a written analysis of 10-12 pages. The second part of the project will be a presentation and in-class exercises.

The task for the project is to identify a management opportunity or problem that requires action, analyze the possibilities, and then recommend actions to take. The management issue you analyze should be one with an important technology component, so that it involves changing current technology or implementing a new technology. The emphasis on this project is management, not technology. The issue should be about management within a technological context. The problem or opportunity should be interesting and comprehensible to any manager.

You must turn in a short description of your final group project by the 7th class meeting. The instructor will review these descriptions to ensure that your group is addressing a suitably small topic for such a short paper. The tendency is for students to take on problems or opportunities that are too large for this assignment.
**Group Project Grading**: Each member of the group will be asked to evaluate every other group member anonymously on the last day of class on the following dimensions: attendance at group meetings, effort, meeting deadlines, and quality of work. If any student receives unsatisfactory ratings from the rest of their group, their grade will be marked down accordingly.

**Grading Conversions**: Grades will be on percentage scale of A+ (98% and above), A (93% and above), A- (90% and above)....failing (64% and below).

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**Class Policies**

**Absences**
Attendance is necessary for participation, and participation is critical to your learning, so the class participation for any missed class is zero. There is no way to make-up participation, as it requires being in class. Please attend all classes.

Given that there are extenuating circumstances in life, a student is allowed one (1) absence without penalty, with the exception of the final group project presentations. There will be no excused absences other than those defined by University policy. Absences that will not be excused include (but are not limited to) work schedules, business trips, interviews, non-emergency events (such as weddings, anniversaries, family vacations, etc.) and airline or other travel delays due to anything other than severe and unpredictable conditions.

**Late Class Assignments**
Papers are due at the beginning of class. Case paper analyses cannot be accepted late because a student would have the advantage of class discussion in doing their analysis. Technical problems are not a sufficient excuse to take a paper late. The final group project will also not be accepted late because there will be class discussion of those projects the final day of class as well that require the paper to be finished.

If you have a foreseeable excused absence, any excused late papers must still be prepared BEFORE the class discussion of those topics to be turned in for a grade. In the rare cases where you have an excused and unforeseen absence, you will be required to do an independent, makeup assignment of equal difficulty.

**Late Final Group Projects and Missing the Final Class Day**
Any final group project turned in late will be immediately marked down. This will be dealt with on a case-by-case basis, but at the very least, any late project will be marked down a full letter grade.

If anyone misses the discussion and presentation of final group projects, that person will receive a zero for that portion of the grade if it is an unexcused absence. In the rare case it is an excused absence, then the student will have to schedule a make-up time for a presentation to the instructor.

**Collaboration, Helping, Cheating, and Dishonesty**
One of the goals of this course is to encourage students to communicate with each other, and to help each other learn. Learning management is a process of communication, debate, and argument, not a set of isolated exercises to be performed in private. The limitation to collaboration and helping, however, is when a student is no longer carrying the burden of learning. Some students are particularly adept at using the guise of collaboration and helping as a means to merely exploit others, and not do their own work. You may discuss case analyses, but you cannot copy from another's analyses, or use their written analyses as a basis for your own
paper. This subverts the meaning of education, and the potential value it has for improving our minds and our community discussions.

Academic honesty is very important. The instructor will energetically investigate any failure to follow the academic honesty standards of the University.

Particularly important is the issue of misrepresentation or plagiarism. In the era of Internet information it takes discipline to document one’s sources for written work. Students are reminded that they must be particularly scrupulous in this regard.

**Written Assignment Requirements and Format**

Papers are turned in as hardcopy; no emails.

Use a 12-point font, DOUBLE SPACED, 1” margins all around. Always have page numbers. Staple papers only; no binding, folders, clips, or anything other than plain paper that will weigh down the instructor even further than usual.

Always put your name on the front page. A title sheet is only necessary for the final paper (which will not count towards the page limits). DO NOT put your social security number on your paper or any other information that is confidential. Your papers are not treated as confidential information.

Do not exceed stated lengths; writing beyond those lengths will not be graded. Exhibits (graphs, tables, pictures, etc.) are not counted against the page length (within reason).

Exhibits, or any numerical analyses, should always have a clear title explaining the exhibit, and footnotes stating clearly any assumptions or additional data created for the exhibit. Any references or other material that is not the author’s should be clearly cited in a bibliography that follows a widely accepted format. The bibliography does not count towards page limits.

**Accommodations for Students with Disabilities**

There will be accommodations made for students with disabilities, in accord with university guidelines.
## Overview of Topics

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<td><em>Group paper and presentations</em>  &lt;br&gt;<em>Problems and solutions</em></td>
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**Topic 1: Executive nuts and bolts**


Rothfeder, Jeffrey; Lisa Driscoll. 1990. CIO is starting to stand for “career is over”. *Business Week*, v. 3147, February 26, p. 78.


**Questions**

What is the future of the CIO job in the next 10 years? Why?

Is it harder to be a CIO than a CFO? Easier? Why? What would Mintzberg say is the harder job? The more valuable? Why?

**Topic 2: Organizing roughnecks and Yoda**

*Normal Accidents*, Introduction and Chapters 1-3.


**Questions**

Name one part of Lucas’ technology for movie making that could enhance Altman’s process of movie making, and one part that would destroy it, and why.

Give one example of how adopting Lucas’ process innovations changes the content of films beyond special effects – the plots, genres, characters, etc., and why.

Which role in film making is most important in Altman’s process? Lucas’ process?
**Topic 3: Silver bullets and CPM**

Peopleware, Part 1 (sections 1-6), p 1-34.


Cox, Brad J. 1990. State of the art: There is a silver bullet --- A software industrial revolution based on reusable and interchangeable parts will alter the software universe. *BYTE*, October 1, 15(10), p. 209.


Questions
What is PERT and CPM? (Note: not in readings, not part of writing assignment).

Stereotypically, what do software developers think is silly, irrational, or just wrong about the way hardware is developed, and vice versa?

Consider a manufacturing industry you are familiar with that makes material goods – houses, bridges, disk drives, airplane airframes, the little tiny umbrellas that come in your drinks. (Aside: which movie is that from?) What are the major differences between the organization that makes goods, and software development organizations? Are these differences due to technology, or some other force such as culture or tradition? Is there anything one organization could learn from the other?

**Topic 4: Firing up the experts**


**Questions**
What were the major cultural reasons that the armed forces only calculated blast damage and ignored fire damage? What were the major cultural reasons Route 128 in New England failed to adapt to the new changes in technology and fell behind Silicon Valley? Are there any similarities?

Technology centers (like Palo Alto or Boston or Hollywood) are very difficult places to run a business. Wages are higher, real estate costs are higher, your employees can move to your competitors down the street, and it is difficult to keep products and processes secret. Yet businesses locate in clusters. What are the three most important problems or disadvantages for a technology firm located outside of the cluster of similar technology firms? Are there any solutions to these three problems other than moving into the cluster?

**Topic 5: Best laid plans of airplanes and emails**


**Questions**
Considering Perrow's analysis, what should be done to improve aviation safety? Given Weick's analysis, what should be done? Why are these different? Are they contradictory or complementary?

Using Perrow's theory of normal accidents or Weick's analysis of the causes of Tenerife, try to suggest one way that communication between dispersed teams could be improved that is not already suggested in the other articles about dispersed teams. If you cannot, explain how either Perrow or Weick's work could have helped predict any of the major problems discussed in the articles about dispersed teams.

**Topic 6: Automatons or associates?**

on theories of how formal structure is good and bad; p. 67 starting with “In striking parallel...” to
the end of p. 69; read paragraph at top of p. 70 to find out what are the features that distinguish
coercive from enabling technologies; skim to the end).


Edwards, Paul; Collinson, Margaret; Rees, Chris. 1998. The determinants of employee
(Note: Read only: Abstract, p. 451-453 to understanding four perspectives on TQM programs, p.
466-470 to read the case stories of how TQM worked in reality).

Questions
Pick a formally defined and accepted technology that either you or someone else uses everyday
at your workplace (not a copier, please). Using the four features described by Adler and Borys: is
the technology enabling or coercive? (A material technology may be easier to analyze, but the
principles apply to software as well).

How could you redesign your chosen workplace technology to make it the opposite – make a
coercive technology enabling or an enabling technology coercive?

Would these changes in design be easy or hard to implement within your current workplace? Why
or why not?

**Topic 7: What counts?**


consequences. Cambridge, MA: MIT Press. p 1-32 (‘To classify is human’), p 231-237 (‘Nursing
interventions classification’).

Questions
If you were able to design a new (or the current) enterprise software system in your organization
what subtle changes would you make to the data collected in the reporting and control system to
make you look like a star performer? Pick another department in your organization that you often
are in conflict with. How would you make subtle changes so that department would be less likely
to be a seen as a star performer? Remember, subtle is the key word here – the changes
shouldn’t be obviously good or bad to others.

**Topic 8: Umm..yeah.. we’re going to need you to move over there....**


**Assignment**
Design a better physical layout of your current or former workplace. Think about the kind of work
you do and should do. Let your design be based on that understanding of the work. Use the
principles from the readings, and DRAW A PICTURE as well as a written analysis of 2-4 pages; a part of the paper should describe the work of people in the office.

Pictures can be handwritten as long as they are legible. Do both a “before” and “after” drawing.

**Topic 9: And for third place – you’re fired.**


**Questions**
What are three ways that the film industry could move ahead with digital projection technology and replace the standard film technology?

**Topic 10: Problems and solutions**

In-class presentations by groups. Project papers are due at beginning of class.
Appendix A
Format for Executive Memos

From: Student’s Name
To: Name and title of executive who would care or who can do something about it
Re: One line teaser

First paragraph(s): Problem definition
One or two paragraphs. Describes real-world problem at your place of work (current or past).

First line of paragraph: Start with “We have a problem with...”, “We have yet to recognize the problem of...”, “The (insert topic here) is a problem because...” or similar declarative, specific statement.

BE SPECIFIC. Do not say: “We have a problem with quality of software”; do say: “We have a problem with the quality dropping from last year in our software customization group for Client A; the client has doubled its complaints about missing schedules”.

Second section: Theory
One or two paragraphs. Use concepts or examples from the class that a) justifies why this is a problem if not readily apparent b) suggests a general approach solving the problem or c) both a and b. DO NOT SUMMARIZE WHAT THE THEORY OR IDEA IS IN DETAIL – just reference it in applying it. Assume the audience has read about it at least once.

Good use of theory: “A private office both lowers errors and increases speed for knowledge workers by removing cognitive disruptions from interruptions”

Bad use of theory: “Research cited by DeMarco and Lister in their book talks about the importance of flow in programming, with flow taking fifteen minutes on average to achieve. Interruptions thus lose at least 15 min. to get back to flow. Consequently, it has been shown in studies of speed programming that a private office, without disruptions, increases the time within productive flow and thus decreases errors and increases speed of competitors.”

Third section: Solution(s)
Each solution should have a separate paragraph.

First line of paragraph: “We can solve the problem of _______ by (some verb her)...........” or similar direct, active phrase such as “reduce the impact of”, or “prevent from occurring”. But the first sentence must have a direct action to solve the problem.

Following lines in the paragraph should specifically tell why this is a good solution, the only solution, a necessary preventative measure, etc. It is an argument, not a discussion of facts.

General advice
There will be no space for unnecessary words in this memo. It is a summary that should compel a manager to look deeper into the problem and its solution.

Do not exceed the word limit. This limit will require you to communicate directly and sharpen your writing. A short paper is harder to write than a long one and so a single draft is unlikely to be successful. Follow the typographical format described in the syllabus (especially double spacing the paragraphs). Also, be particularly scrupulous in citing any exact quotes or important sources. It is too easy to commit plagiarism in the day of the internet.