COURSE DESCRIPTION

This course focuses on creating streams of new products or services in established firms by leveraging science and technology. The course is designed for high levels of class participation and discussion and requires in depth preparation for each class, in addition to weekly brief writing assignments.

Commercially successful new products are the life-blood of almost all businesses, because technology advancements, changing customer needs, and globalization quickly render existing products non-competitive. More than 50% of sales in leading corporations come from new products, and the single strongest predictor of investment value is the degree of innovativeness in the company. This course develops the management of technological innovation as the new normal for enterprise management. Technology is not just a thing or an idea: it is a complex system of scientific and engineering knowledge, techniques, processes, and networks of operating and organizational subsystems. The whole system and its various interactions need to be managed over time because technology is expensive and risky: long term but ambiguous investments must be made, and innovations often fail. The failure to invest in technology and innovation guarantees failure in many industries.

COURSE MATERIALS:

1. TEXT: Schilling, Melissa A. (2013) Strategic Management of Technological Innovation 4th ED, McGraw-Hill Irwin 13-9780077499204; you may also purchase a used copy of the 3rd edition, but note that some cases are different so check with prof for any assignments! A copy is on reserve in Kilmer Library
2. A packet of readings from HBR and other sources
3. PowerPoint slides for the lectures will be placed in the Course Documents section of blackboard
4. Other materials relevant for a class will also be in the Course Documents section.

COURSE OBJECTIVES:

We focus on managing strategic technology development, managing R&D and new product development, multiple innovation teams, and organizing for innovation. The main objectives are:

- To understand the “state of the art” in the management of science and technology for product innovation (including technology evolution, technology/science strategies, managing platforms and portfolios, patents and trade secrets).
- To understand and practice how to organize and strategize for long term technological innovation.
- To understand the importance of and basic procedures for managing product/service innovation projects (including developing and selecting viable ideas, managing multi-functional teams, using phase review procedures, and assessing technology and market feasibility);
EVALUATION AND GRADING:

- Quiz 1 20%
- Quiz 2 15%
- Case write-ups 10%
- Case Presentation 15%
- Team Technology Innovation Strategy Project 25%
- Class Participation 15%
- Attendance: make-ups required for no more than 2 missed classes; more than 2 no grade without discussion with me
- Peer Reviews (up to minus) 10%

Grading Items and Assignments:

Quizzes:
2 as noted in syllabus: @ 20% and 15% of your term grade. Each quiz will contain 50 multiple choice questions and fill in the blanks from lectures, book, other assigned readings and in-class work. An examination grade of zero points will be assigned to any student who is absent without a legitimate excuse on the date of a regularly scheduled test.

Case Analyses: Ten (10) cases from the eighteen (18) assigned (225-300 words) OR find a short video (3-9 mins) and present to class.

Each student is to submit ten (10) case analyses, either at the beginning of the class in which that case is to be discussed, OR emailed prior to the class. No summary will be accepted after the class discussion of that case. Case analyses ensure that every student reads each case and can participate in the case discussion led by the designated students. Each case summary/video is worth one (1) point. Case summaries must be between 225 and 300 words. In each summary make 2 to 3 key points about the case, and express what you think is important in the case and relevant to the chapter that it comes from. For paper summaries, identify what you think is the key point and explain how the paper extends the book content. For videos, just show them and explain relevance. ONLY ONE video per class so please sign up ahead of time.

Case/Paper Presentation (15%)

You will work with a partner to present one of the 18 cases or papers to the class and lead the case discussion. Each case/paper provides an opportunity to apply the concepts in the chapter in which the case is contained. If questions are provided at the end of the case, be sure to answer the questions during your presentation. The grading rubric below, Case/Paper Appraisal Sheet, will be used by the instructor to evaluate the student’s case presentation to assign points. You will have 25 minutes to present the case and lead the discussion. A printed copy of your PowerPoint slides should be handed to professor at the start of your presentation.

Team Technology Innovation Strategy (25%)

Each team will select a company business unit, and a technology area in that business unit to explore in depth, and analyze how this kind of technology and its trajectory may be developed by the company to support future innovations. I prefer that you select one of the companies in the class case list, but if you have a strong preference for another case, discuss that with me. The team will develop a Technology Innovation Strategy that will support both the technology capability and new product plans, and a product portfolio that can leverage this technology. The final product will be a technology innovation strategy for that company in written form. You will need to do solid research on these topics using internet, library resources and data bases. The document should be 15 min to 20 max pages for the body of the paper, typed, 12 pt font, double spaced, 1 inch margins. The instructor will be checking for grammar, flow, and good writing. This is a research paper so references to information sources other than our text are required.
and must be documented via footnotes. See the grading rubric below on page 6 for those components the instructor will use to assign a grade to your team’s paper.

**Class Participation**

In organizations where more innovation is done by teams and through networking, an important part of a person’s contribution is the way he or she interacts with others. Speech acts such as presenting, commenting, inquiring, and persuading require understanding the issues as well as having effective skills. Participation concerns both **quality** and **quantity**. Following is a description how your class participation will be evaluated.

- **Good Contributor.** Contributions in class and group discussions reflect thorough preparation. Ideas offered are substantive, providing good insights and direction for the discussion. Arguments, when presented, are well substantiated and persuasive. If this person were not a member, the quality of the discussions would be diminished considerably. Obvious that person has read the assignments.
- **Adequate Contributor.** Contributions in class and group discussions reflect satisfactory preparation. Ideas offered are sometimes substantive, provide generally useful insights, but do not offer a new direction for the discussion. Arguments are sometimes presented, and are fairly well substantiated and sometimes persuasive. If this person were not a member, the quality of the discussions would be diminished somewhat. Obvious that person has read the assignments.
- **Unsatisfactory Contributor.** This person seldom participates in class and group discussions or his/her contributions reflect inadequate preparation. Ideas offered are seldom substantive, providing few, if any, insights, and not in a constructive direction for the discussion. Integrative comments and effective arguments are absent. If this person were not a member, the quality of the discussions would not be affected.

**Peer Reviews**

At the end of the course, students will evaluate their team members using form posted on Blackboard. I assume that everyone will participate actively and in an engaged manner on his or her team project. However, to prevent poor participation, I will assure that anyone who does not work hard and effectively on his or her team will receive a significantly reduced grade for the entire course – failing to carry out one’s responsibilities to the team is unacceptable. Depending upon any negative feedback received, a student’s course grade can be dropped by up to 10%, which is an entire grade level.

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**CLASS RULES: Please!!**

- Be on time
- do not walk in and out of the room
- do not use your phone or other device
- do not use your computer (unless assigned)

**Cheating:** The penalties for cheating are severe. There is a university wide policy on academic integrity, which I will follow. It is not worth the risk of suspension from the university to cheat. I expect every student to abide by the following pledge:

“I pledge, on my honor, that I have neither received nor given any unauthorized assistance on this examination (assignment).”  
(\url{http://academicintegrity.rutgers.edu/integrity.shtml})
<table>
<thead>
<tr>
<th>week</th>
<th>date</th>
<th>chap</th>
<th>Topic</th>
<th>Submit 10 analyses</th>
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<tbody>
<tr>
<td>1</td>
<td>9/02</td>
<td>1</td>
<td><strong>Introduction to technology management</strong>: course organization; sign up for cases and video presentations; begin team formation; <strong>Overview of managing technological innovation</strong>, new product development; discuss project team topics from book cases; assign cases</td>
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| 2    | 9/09 | 2    | **Sources of Innovation**:  
**Case 1**: Given Imaging; **CASE PRESENTATION**  
Form project teams | Case write#1 |
| 3    | 9/16 | 3    | **Types and Patterns of Innovation**  
**Case 2**: Tata Motors; **CASE PRESENTATION**  
Finish project teams;  
**Case 3**: Segment Zero **CASE PRESENTATION** | Case write#2, #3 |
| 4    | 9/23 | 4    | **Standards Battles**  
**Case 4**: Blue Ray vs. DVD **CASE PRESENTATION**  
**Case 5**: Rise of Microsoft **CASE PRESENTATION** | Case write#4; 5 |
| 5    | 9/30 | 5    | **Timing of Entry**  
**Case 6**: Facebook **CASE PRESENTATION**;  
**In class discussion**: where is your technology on S curve, what are relevant patterns and standards, what are possible problems and how to fix? Be ready to summarize for class. | Case write#6 |
| 6.   | 10/7 | 6    | **Defining Strategic Direction**  
**Case 7**: Genzyme **CASE PRESENTATION**;  
Discuss your project’s core competencies and balanced score card;  
**Case 8, paper PRESENTATION**: EVERYONE READ:  
HBR Jan 2008: Innovation Killers; C. Christensen, S. Kaufman, W. Shih | Case write#7, 8 |
| 7    | 10/14| 7    | **Choosing Innovation Projects**  
**case 9 paper PRESENTATION**: EVERYONE READ:  
**In class**: Discuss your project’s aggregate project plan | Case write#9 |
| 8    | 10/21|      | QUIZ  
After quiz, in-class team project work |  |
| 9.   | 10/28| 8    | **Collaboration Strategies**  
**Case 10**: Dyesol **CASE PRESENTATION**  
**Open Innovation**  
**Case/Paper #11 PRESENTATION**: EVERYONE READ  
Fiat: Open innovation in a Downturn | Case write#10, 11 |
| 10.  | 11/04| 9    | **Protecting Innovation**  
**Case 12**: The digital music distribution revolution, **CASE PRESENTATION**  
**Case 13**: Sun Microsystems and Java **CASE PRESENTATION** | Case write#12, 13 |
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<th>No.</th>
<th>Date 1</th>
<th>Date 2</th>
<th>Date 3</th>
<th>Topic</th>
<th>Notes</th>
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| 11  | 11/11  | 10     |        | **Organizing for Innovation** (skim chapter) Video in class  
**Case 14:** paper PRESENTATION; EVERYONE READ:  
*Organizing for Innovation* Google  
**Case 15:** Shifting Structures at 3M | Case write #14, 15 |
| 12  | 11/18  | 11     |        | **Managing New Product Development Process**  
**Case 16:** Frog Design **CASE PRESENTATION**  
Discuss lead users, stage gates, QFD  
**Case 17** paper PRESENTATION; EVERYONE READ  
*The development of Zantac* | Case write #16, 17  
**Take home quiz due 4/22** |
| 13  | 11/25  | 12, 13 |        | **Managing New Product Teams**  
**Case 18:** Skullcandy **CASE PRESENTATION**  
Crafting a Deployment Strategy | Case write #18 |
| 14  | 12/02  |        |        | **Team presentations**                                                                      | Final paper due |
### Case/Paper Presentation Appraisal Sheet: Managing Technological Innovation:

**Student________________________   Date ______________   Points Achieved: ____________**

<table>
<thead>
<tr>
<th>For Case:</th>
<th>For paper</th>
<th>points</th>
<th>comments</th>
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<tbody>
<tr>
<td>Summary of case: identify key insights</td>
<td>For paper, what is the big idea and what do you think of it?</td>
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<tr>
<td><strong>10 points</strong></td>
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<td>Application of course material for <strong>the chapter(s) relevant to the case</strong> and answers to case questions if provided in case</td>
<td>For paper: relevance of paper to chapter, how does paper enhance, or add to the material in the chapter and book in general?</td>
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<td><strong>30 points</strong></td>
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<td>Extend the case: where is the company now, and what does its evolution tell us about the chapter ideas?</td>
<td>Look up related ideas that substantiate or conflict with the paper, and tell us what this suggests regarding the ideas in the paper.</td>
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<td><strong>25 points</strong></td>
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<td>Class participation? Ability to engage class in discussion</td>
<td>Connect paper ideas to other material students have read, and generate discussion</td>
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<td><strong>20 points</strong></td>
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<td>Good communication skills including the use of Visual aids</td>
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<td><strong>15 points</strong></td>
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<td>Grading Rubric</td>
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<td><strong>Report format, organization and writing style (15 points)</strong></td>
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<td>• Typed, double spaced, 1” margins; Body of Paper 15 min to 20 max pages</td>
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<tr>
<td>• Grammar, spelling, formatting</td>
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<tr>
<td>• Sections and transitions clear</td>
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<tr>
<td>• No redundancy, material integrated</td>
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<td><strong>Body of Paper 15-20 pages (85 points)</strong></td>
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Summary: Describe strategic technology thesis for your company: What your strategic intent for the company to achieve in technology innovation area you have chosen and how will your plan help the company’s achievement? (5 points)

**Technology (25 points):** describe your technology in plain English: what does it do, how does it work, what is the current state of that technology and where does it need to go to become more valuable? Using the first 5 chapters, identify and discuss the key dimensions of your technology that will affect your strategy and how you compete, and choose the most relevant ideas in these chapters: (e.g., sources of innovation you need to deal with; the key dimensions from chapter 3, including where your technology is on its “S” curve and what are the current glitches/problems that you need to deal with; is there or will there be a dominant design and why (using learning curve effects); what are the key timing of entry issues that you will deal with. Part of this analysis will include how the industry is now using the technology, how you envision the technology will be used. *Use at least 3 additional sources from the library data base.*

**Strategy (20 points):** Develop a strategy for how your company (business unit) will develop and apply the technology over the next few years in its products or services and how your company will develop a competitive advantage in the technology area. Provide external and internal analyses and identify your existing core competencies and capabilities. Identify additional competencies and capabilities you will need including how you will acquire from either internal development or external sources and any collaboration strategies will you pursue. Describe how you will protect your innovation. *Use at least 3 additional sources, NOT including the company’s own material*

**Product portfolio plan (10 points)*** (e.g., aggregate project plan, pp. 146-48) for this technology including a portfolio map. Justify your choices.

**Organizing (20 points):** Describe how you will organize for innovation and the benefits your organization choices will provide to your company’s ability to innovate. Include a description of how you will manage the new product development process including how you will manage your new product development teams.

**Put it all together (5 points).** Describe how your choices in each of the components of the plan will work together with your choices in the other components to move your company in the strategic technological direction you are aiming for.

**Penalty for late submittal (-5 points for each day after due date)**