Assignments on the following pages are solid for the following dates:  
- Wednesday, September 3  
- Monday, September 8  
- Wednesday, September 10  
- Monday, September 15  
- Wednesday, September 17  
- Monday, September 22  
- Wednesday, September 24  
- Friday, September 26. This is the due date of the first written assignment.

Assignments beyond these dates should be considered preliminary and subject to change. Due dates of papers are unlikely to change.
Study Questions:

These questions are intended to help you get the most out of the assignment. They do not usually have a unique answer. You can probably think of other issues that merit discussion, and you are encouraged to do so.

**Wednesday, September 3, 2008 (Session 1)**

**What Do You Need to Know?**

I have in my hand a binder containing the description of a new product. I would like you to invest in my product. But the word *invest* may have several meanings. You could provide money. You could come to work for me. You could be an early customer. In each case, you provide something of value and you assume a certain amount of risk.

Your task in today’s class will be to determine what information you require before you decide to invest. The questions you develop today will frame discussion throughout the rest of the course.

1. What do you need to know? What questions will you ask?
2. Are your questions the same for a financial investor, an employee, and a customer? This entire assignment may be easier if you assume one of these roles and then attempt to answer from that perspective.
3. Do your questions fall into a small number of categories or areas of inquiry? If so, what are those categories or areas?
4. What is the shortest list that provides the information that you need? Can you make the list generic?

**Monday, September 8, 2008 (Session 2)**

**The Product Management Task & the Project Management Task**

**Hewlett-Packard Company Sally Project**

This case, written over thirty years ago by a senior at MIT, describes his observations of a real-life new product development. At the end of class discussion I will share information on how the development turned out.

1. Put yourself in the shoes of a product manager at HP in the first quarter of 1975 (the situation at the bottom of page 5). What would you want know before proceeding with the newly-conceived-of analyzer? [A short list, please.] Be aware that I may use a document camera to show your hand-written or printed list to the class. If your list is chosen, I’ll ask you to speak briefly about your answers.

2. In this case, how would many types of management tasks do you see? Does it make sense to draw a distinction between product management tasks and project management tasks? What’s the difference? (Of course you may have arrived at other categories, in which case, be prepared to describe them.)

3. In what ways is Sally new? Does the newness matter, that is, what are the implications of the newness?
**Wednesday, September 10, 2008 (Session 3)**

**Creating Project Plans to Focus Product Development (92210)**

Read today’s article carefully. It will support a lecture and discussion of the ways in which a product may be *new*.

1. Wheelwright and Clark write from a perspective of planning for and managing product development. What are *their* principal dimensions for describing newness in a product?
2. Are there other ways of characterizing *newness*?
3. Why does newness matter? Are there times or ways in which newness is a benefit, and are there times and ways in which newness is a hindrance?

**Monday, September 15, 2008 (Session 4)**

**The Product Life Cycle (Capon)**

**Exploit the Product Life Cycle (Levitt)**

The Product Life Cycle is one of the most common and most useful frameworks for thinking about product management. I have provided two readings, a 1985 article by Noel Capon, and a 1965 article by Theodore Levitt.

1. First read the Capon article in its entirety. Note that in addition to defining the stages of the life cycle, the article also touches on the definition of product, consumer classifications, and market entry strategies.
2. Can you find products, or product families, where the life cycle concept seems not to apply?
3. Are there any areas in which you challenge the Capon article’s assertions?
4. Next read just the section of the Levitt article titled “Preplanning Importance.”
5. The course supplemental materials contain a Product Lifecycle Spreadsheet. Bring it to class. As part of the discussion, we’ll look at what we can say about the center of activity at each stage of the lifecycle.

**Wednesday, September 17, 2008 (Session 5)**

**What makes a new product new?**

**Aspect Medical Systems (9-600-076)**

1. Would you invest your own money in the bi-spectral analyzer product?
2. In what important ways is Aspect’s bi-spectral analyzer product new?
3. In what important ways is the product not new?
4. What barriers, if any, do you see to the product’s rapid adoption?
Monday, September 22, 2008 (Session 6)
Reading: How Competitive Forces Shape Strategy (79208)
Reading: Counting on Wal-Mart

This is the only article that appears in both MN580 and MN583. I apologize to those who have already read it. For twenty years Michael Porter has been the leading writer on competitive strategy. His article *How Competitive Forces Shape Strategy* is a classic treatment of many of his major themes. We will discuss Porter’s notion that all strategies are either minimum-cost strategies or product-differentiation strategies.

1. Find examples that illustrate the interplay of competitive forces that Porter describes.
2. What are the implications of inexpensive transportation and reliable telecommunications for the ability of firms to maintain competitive advantage?
3. This article is now 30 years old, and some of the examples are dated. Pay attention to places where the example no longer works, or where the company cited might better illustrate a difference principle.

Wednesday, September 24, 2008 (Session 7)
• Cytyc Corporation
• Note on the FDA Review Process (9-796-063)

This reading is essential background material for today’s lecture.

Cytyc Annual Report (Year 2000):
1. This reading is background material for today’s lecture. This annual report is long, and the same information is sometimes repeated several times. Your task is to read the report *selectively* – looking for answers to the questions we developed in the first class.
2. Pay attention to the report’s discussion of risks.
3. (Optional) You can find out what has happened to Cytyc since the year 2000 by looking at their website [http://www.cytyc.com](http://www.cytyc.com). If you choose to look at this site, then the question is how Cytyc today is different from Cytyc in year 2000.

Friday, September 26, 2008 at 5:00 pm (Virtual Session 7a)
BioPure Corporation (9-598-150)
Written Case Due at my office
Paper accepted, electronic submission preferred

The time is February 1998, as described in the case. Ted Jacobs, vice president for Human Clinical Trials, and Andy Wright, vice president for Veterinary Products, have a fundamental disagreement on strategy. Based on your careful analysis of the facts as described in the case, and your general knowledge of manufacturing and markets, how would you advise the BioPure Company to proceed? I will give you a copy of a paper written by other students on the same topic. You may use it as a starting point, that is, you may agree with its analysis, you may disagree with its analysis, or you may agree with reservations. You may ignore it altogether. How you
proceed is your choice. You may not simply quote the paper or change a few words here and there. The analysis must be your own original work.

Your recommendations should follow logically from your analysis. Keep in mind that I am familiar with the facts of the case, so use case evidence to back up your analysis and reasoning, not merely to describe the case situation.

Your paper should be no more than 1500 words in length, exclusive of charts, tables or similar exhibits. I encourage you to use exhibits in preference to extended text. You may collaborate with other students in analysis of the case, but the paper must represent your own work. If you share spreadsheets or graphics with other students, be sure to indicate that you have done so.

Monday, September 29, 2008  Zoll Medical Corporation (9-795-053) (Session 8)
Zoll Medical Corporation (9-795-053)

This case consists of four sections: A, B, C, and D. Bring the B, C, and D cases to class, but do not read B, C, and D before class. The exercise we will do works only if you do NOT read B, C, and D.

At the end of this case, Rolf Stutz asks himself the question, “Should he go ahead with a solution that just matched Physio’s, or should he send the team back to the drawing board to come up with a better design.”

1. Based on your analysis of the facts and circumstances in the case, what would you recommend that Stutz do?

2. What are the critical issues that Stutz must consider? [This is the key question in the assignment.]

Wednesday, October 1, 2008 (Session 9)
Nissan Motor Company, Ltd.: Target Costing System (9-194-040)

1. This case is taken from the section of the Harvard Business School Publishing catalog that deals with accounting, but in this course our interest in the case is not primarily on the target costing system. So don’t get too concerned about the details of the accounting method. We’re more interested in how Nissan categories the various market segments.

2. In preparation for class discussion, make two lists: (1) a list of the benefits that consumers derive from owning cars, and (2) a list of uses that consumers make of cars.

---

1 Simply repeating the story told in the case is the most common error that students make. I tend to deduct heavily for this mistake.
As an example of benefits, economical transportation to work. As an example of uses, private telephone booth.

3. In what types of products / markets / industries is the planning approach described in this case most likely to succeed or to fail? Recognize, of course, that this case is now quite old, and Nissan is no longer the company described in the case.

**MONDAY, October 6, 2008 (Session 10)**

**BioPure Corporation Case Discussion**

On this day you should already have received your graded paper. We will discuss the BioPure case, and I will share my general observations on the papers.

**Wednesday, October 08, 2008 (Session 11)**

**Documentum (9-502-026)**

Documentum is not a ‘trip to the zoo’, but it is different in important ways from any company we have examined so far. This case combines elements of a “plant tour” with elements of an “issue case.” We begin by applying our standard set of six questions.

1. Think hard about how our standard set of questions applies in this case. Where are your concerns?

2. How is this company’s situation different from that of any company we have looked at so far?

3. On page 10 in the case, Rob Reid asks the question, “When we do brochures, should we orient them vertically or horizontally?” What’s he talking about? Why is vertical or horizontal orientation important for this company?

**Tuesday, October 15, 2008 (Session 12)**

**Graded Class Exercise**

1. I will pick two of our standard six questions and ask you to illustrate their meaning, in writing, by reference to specific examples from cases, readings, and lectures we have done to this point in the course.

2. In class I will distribute a short newspaper or magazine article, or a one-page case. You will discuss the questions (from our list) or perspectives that can be seen or illustrated in that article.
**Wednesday, October 15, 2008 (Session 13)**

- Loose Ends and
- Ungraded In-Class Exercise

**Friday, October 17, 2008 at 5:00 pm (Virtual Session 13a)**

**Case To Be Determined**

**Written Case Due at my office**

Paper accepted, electronic submission preferred

**Monday, October 20, 2008 (Session 14)**

**Silicon Graphics (A) (9-695-061)**

You will be able to go online and find what has happened to Silicon Graphics since the time of this case. If you choose to look them up, I suggest you formulate your own answers to the following questions before you do so. There are more questions here than you’re likely to get through in your preparation. The earlier questions are more important for what we’ll want to do in class.

1. Who are Silicon Graphics’ customers? What would be relevant ways in which to characterize them, to segment them?
2. How does the customer derive value by using Silicon Graphics’s product? (What’s the value proposition? Remember that the value the customer derives may depend on who the customer is.)
3. Who [what] is Silicon Graphics’s competition?
4. In several places, SGI in effect answers the question, “Who Are We?” How well does SGI’s answer to that question align with SGI’s strategy?
5. Is SGI “customer focused?” If so, is that a good thing?
6. Do you see places where SGI’s answer to “Who are we?” is a strong advantage, a strong disadvantage?
7. Are your answers to questions 1, 2, and 3 different from Silicon Graphic’s answers to the same questions?
8. What are the greatest vulnerabilities in SGI’s product strategy?
9. In what ways is time important in this case?
10. How would you characterize SGI’s approach to project management (as opposed to product management)?
Wednesday, October 22, 2008 (Session 15)
Market Entry, Customer Value, Reaping Value
Kone, The MonoSpace Launch (9-501-070)

This assignment requires preparation in writing. Everyone should answer question #1 (not to be handed in), and everyone should prepare the matrix described in question No. 4 (to be handed in). Students whose BU ID is an even number should answer question #2; students whose BU ID is an odd number should answer question #3. Question 5 will be worked on as a group exercise in class.

At the time of this case, the Kone company is preparing to introduce their new-technology elevator into the German market. The decision to launch has already been made, and technological feasibility has been established by installations in France and the Netherlands; however, several decisions still remain. In particular, Kone must decide how much to charge for the product, and how to direct the marketing effort (which messages, to whom, and in what forum). In preparation for class discussion, please undertake the following exercises.

1. [all students, not to be handed in] We have seen the idea that products are created to achieve various strategic purposes: to create new market segments, to enter existing market segments, to preserve share in current market segments, or to preserve share in current market segments. How would you characterize the purpose of the MonoSpace elevator? What is your definition of the relevant market segment(s)?

2. [students with even BU ID numbers, not to be handed in] Assume for the moment that you have been given product management responsibility for the MonoSpace elevator. Rank order the most important competitors to your product. (You get to choose the competitors and the criteria to be used in ranking.)

3. [students with odd BU ID numbers, not to be handed in] What competitive response do you anticipate from Otis, Thyssen, or Schindler?

4. [all students, to be handed in] It is said that designers think in terms of features. Customers make choices based on benefits. Often there is a close connection between a particular feature and a particular benefit, but different customers derive benefit from different features. Consider the Decision Making Unit for elevators, which may involve the architect, the elevator consultant, the construction contractor, the property developer, the building owner, and major tenants. Prepare a matrix showing on one axis the features or benefits of the MonoSpace product, and on the other axis the various customer groups. Indicate at the intersections the features or benefits you would emphasize for the different groups. You get to choose the features (or benefits) and the customer groups. Indicate with an “e” economic benefits that are easily quantified and that can be assigned easily to specific customers, with an “e2” benefits are that are more difficult to quantify or to assign, and with an “n” those that either are non-economic or are quite difficult to quantify.2

<table>
<thead>
<tr>
<th>Feature or Benefit 1</th>
<th>Owner</th>
<th>Architect</th>
<th>Group 3</th>
<th>Group 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>e1</td>
<td></td>
<td>e1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2 The Energy consumption numbers show in Exhibit 7 cannot be correct. 7,200, 5,000, and 3,000 kWy are too large by a factor of about 1000.
5.  **[to be worked on in class as a group exercise]** Assume, for the moment, that the MonoSpace elevator is no more costly for Kone to manufacture than hydraulic elevators of similar capacity (I don’t know whether this is true.). Consider average prices as shown in the last paragraph of page 4. Where would you set the price for MonoSpace? What are the reasons for your choice?

### Monday, October 27, 2008 (Session 16)
**Guest Speaker Slot**

### Wednesday, October 29, 2008 (Session 17)
**Written Case Discussion: Case To Be Determined**

### Monday, November 3, 2008 (Session 18)
**Case: mi adidas Mass Customization Initiative (IMD159)**
Rolf Reinschmidt must decide whether to withdraw from, maintain, or expand the mi adidas initiative.

1. Upon what basis should Rolf Reinschmidt decide?
   a. Are there particular dimensions of the problem that he needs to focus on? Any basic strategic considerations?
   b. Is any information missing that he needs?
   c. Are there questions he should ask his staff?

2. What should he do?

3. In terms of our standard six questions (plus one), where’s the juice?

4. This case contains, in William Hauser’s opinion, discussions and exhibits that are irrelevant to the issues to be decided. As a matter of simple efficiency in reading a case, it’s useful to be able to spot such material so that you can skip over it, or defer it to last. What, if anything, have you concluded you didn’t need to know and didn’t need to read?

5. Which of the exhibits, if any, did you decide were relevant to Reinschmidt’s decision?

### Wednesday, November 5, 2008 (Session 19)
**Case: Cumberland Metal Industries (9-580-104)**
This case is very much about pricing – how much to charge for a new and improved product. Obviously, above some price you will not be able to sell, and below some price you will not be able to sell profitably. There is sufficient information for you to develop a range of feasible prices, i.e., a minimum price and a maximum price. As preparation for the discussion, come to class with at least one of these price points worked out. Be prepared to show your numbers to the class, and be prepared to share your thinking with the class.

- If your BU ID ends in an even digit, be sure to prepare at least an upper limit.
- If your BU ID ends in an odd digit, be sure to prepare at least a lower limit.
In-class discussion will revolve around the following questions, for which the previous two questions are preparation.

- What is your recommended price, and how do you arrive at it?
- What conditions will work against Cumberland being able to achieve a high profit on this new product?
- What can Cumberland do to improve its ability to make money with the product?

Monday, November 10, 2008 (Session 20)
Profit Opportunities in Maturity and Decline
http://www.goatec.com/
or
http://www.sec.gov/edgar/searchedgar/companysearch.html

The objectives for this assignment are several:

- Exposure to the U.S. Securities and Exchange Commission website. Almost all publicly-traded companies doing business in the United States are required to file a Form 10-K with the SEC. The difference between the Form 10-K and the annual report is sometimes no more than a few introductory pages.
- Exposure to the business of remanufacturing
- Extracting pertinent information about the Aftermarket Technologies Company from its Annual Report (or Form 10-K).
- Further efficiency in reading company information. It’s up to you to pull what you need from the report without reading the whole thing.

Study Questions:

These questions are progressively more difficult.

1. What business(es) is Aftermarket Technologies engaged in? We’re looking only for the main categories, not all the details. [Hint: the Form 10-K contains a section called Business.]
2. Annual reports (Form 10-K) contain a section that discusses risk. Sometimes this section is called “Factors that may affect future results.” For Aftermarket Technologies, this section is called “Certain Factors Affecting the Company.” What do you identify as the top two areas of exposure to risk? (Don’t worry about getting the right answer. Approach the problem as though you were an investor. Which two issues would cause you the most concern?)
3. Is remanufacturing a good business for ATC? (You should immediately ask, “Good compared to what?”) What do you use to judge whether a business is good?
4. How would you characterize the state of competition in this industry? Think in terms of Porter’s five-forces model.
5. Can you identify one direct competitor to Aftermarket Technologies? How about two? Anyone want to try for three?
**Wednesday, November 12, 2008 (Session 21)**

**Portfolio Management**

**Reading: Note on the Boston Consulting Group Concept of Competitive Analysis (9-175-175)**

There will be an in-class exercise to be worked on as a group. The exercise requires you to choose which of two candidate products to add to the product line of a major food processing company.

**Monday, November 17, 2008 (Session 22)**

**Third Written Case Due and To Be Discussed**

**Case To Be Determined**

**Wednesday, November 19, 2008 (Session 23)**

**Aqualisa Quartz: Simply A Better Shower (9-502-030)**

This case provides an opportunity for the integration of concepts.

1. Who would we define as Aqualisa Quartz’s customers?
2. What is the value proposition to each of the customer groups you defined in question 1?
3. Can you assign a number to how much Aqualisa is worth to any of the potential customers.
4. Why is the Quartz shower not selling?
5. Aqualisa currently has three brands: Aqualisa, Gainsborough, and ShowerMax. Would you recommend any changes to this brand mix? If so, how?
6. What, if anything, can Rawlinson do to radically improve the sales picture? (I don’t know how to answer this question, so I’ll be interested in your responses.)

**Monday, November 24, 2008 (Session 24)**

**Case To Be Determined**

**Monday, December 1, 2008 (Session 25)**

**The Boeing 767: From Concept to Production (A) (9-688-040)**

This case has many aspects of a plant tour, that is, it provides considerable opportunity for insight into the development process for commercial aircraft. One “standard” approach to the case asks the question which of the two methods proposed should Boeing use to convert its partially completed airplanes from three-person to two-person cockpits. It’s an interesting question, and we’ll spend some time on it, but I’d like to direct your attention to the consideration of risk. The case states that building commercial aircraft is a high-stakes game. So why is it risky? That is, what are the dimensions that characterize the risk, and what approach does Boeing take to mitigating the risks. So the study questions are

1. Make a list of the domains in which Boeing is exposed to identifiable non-trivial risk. For example, Boeing is exposed to technological risks (of more than one kind, in fact).
2. Of the risks you identify in question 1, which do you consider the most serious, that is, the ones it is hardest to protect against?
3. For each domain of risk that you identify in question 1, what techniques (dare we say strategies?) does Boeing employ to protect against the risk?

4. Note that we can think of risk as the product of two variables (i) the probability that an untoward event will occur, and (ii) the consequences of that event should it occur. [This is the expected value, to use the language of probability.] So risk management may take the form of strategies to reduce the likelihood of undesirable outcomes or strategies to reduce the consequences of undesirable outcomes. In each of the domains that you identify, which of these approaches is Boeing taking? (“Both” is an acceptable answer.)

5. Why is expertise in project management so vital in Boeing’s business? What benefits does it provide?

6. Finally, if we can get to it, we’d like to ask the question of how Boeing’s two proposals for modifying partially-built aircraft impact the risk calculus. We’ll barely touch on this in class. If you’re interested, I’ll give you the answer.

Wednesday, December 03, 2008 (Session 26)
The Airbus A3XX: Developing the World’s Largest Commercial Jet (A)
Today’s case is in many ways a continuation of the Boeing Aircraft discussion. Since the Airbus A380 is an evolving story, I expect to provide supplemental material close to the date when we discuss the case. The preliminary assignment consists of reading the case and being alert for the following issues:
1. Be prepared to discuss how Porter’s five-forces model plays out in the part of the industry where Boeing and Airbus compete.
2. What risks are common to both Boeing and Airbus?
3. What risks are peculiar to Airbus’s A3XX project?
4. What factors act to moderate the risks that airframe makers face in their business?
5. To what extent can we apply our now-familiar set of questions to understand this case?

Monday, December 08, 2008 (Session 27)
Case To Be Determined

Wednesday, December 10, 2008 (Session 28)
Today’s class will be an abbreviated summary and feedback session in which I invite you to provide input to future offerings of the course. There are fundamentally only four questions:
1. What would you suggest we do more of?
2. What would you suggest we do less of?
3. What would you suggest be retained more or less as it?
4. What would you suggest be changed?

The debriefing will conclude in a venue to be determined.

ASSIGNMENT SHEET VERSION HISTORY

<table>
<thead>
<tr>
<th>Version</th>
<th>Date</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>09/03/08</td>
<td>Initial release.</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
ENG ME 583 PRODUCT MANAGEMENT
Fall Semester 2008

2008-2009 Catalog Data: ENG ME 583 Product Management

Taught principally by in-class discussion, plus guest lectures. 4 cr, [1st sem.]

Status in the Curriculum: This course is a Manufacturing Elective.

Textbooks: Reading packet consisting, primarily, of Harvard Business School cases.

Coordinator: William Hauser, Adjunct Assistant Professor of Manufacturing Engineering

Goals: Provide students with a contemporary perspective on project management for the introduction of new products and processes. Contrast classical stage-gate techniques with new approaches that facilitate faster design convergence in dynamic high-risk environments. Examine critical issues of cost estimation, risk management, status measurement, and the balance of team empowerment and management control. Management of the product over its life cycle.

Prerequisites by topic: Graduate standing or consent of the instructor. An understanding of manufacturing costing principles and operating statements as taught in EK 409, Engineering Economy.

Computer Usage: Not an objective of this course.

ABET category content as estimated by the faculty member who prepared this course description:

Engineering science: 0 credits or 0%
Engineering design: 0 credits or 0%
Topics in Case Assignments:

1. Project Genesis – The Fuzzy Front End
2. Assessing Risk, Estimating Product and Project Cost, Coordination with the Strategic Business Plan
3. Classical Investment Analysis, Financial Perspectives
4. Customers and Vendors as Project Partners
5. Understanding how competitive forces in the marketplace affect product development decisions
6. Project Review and Project Status Assessment – Stage Gate Processes and Alternatives
7. Product Portfolio Analysis
8. Product Life Cycles – Maturity and Beyond

Course Outcomes:

As an outcome of completing this course, students will:

i. Gain an understanding of contemporary perspectives on management of the product portfolio, including development and introduction of new products
ii. Gain an understanding of how financial, technical, and competitive concerns affect the realization of new products in a variety of industries and organizational settings.
iii. Gain experience and confidence in oral defense of technical and business proposals.
iv. Gain facility in producing concise, fact-filled, and clear reports.

Course Outcomes mapped onto Program Outcomes:

<table>
<thead>
<tr>
<th>COURSE OUTCOME</th>
<th>PROGRAM OUTCOME</th>
<th>HOW IMPLEMENTED</th>
<th>HOW ASSESSED</th>
</tr>
</thead>
<tbody>
<tr>
<td>i</td>
<td>2a;3a; 3b, 3c</td>
<td>Class discussion and individual written assignments</td>
<td>graded by instructor</td>
</tr>
<tr>
<td>ii</td>
<td>2a;3a; 3b, 3c</td>
<td>Class discussion and individual written assignments</td>
<td>graded by instructor</td>
</tr>
<tr>
<td>iii</td>
<td>3a; 3b, 3c</td>
<td>Class discussion and individual written assignments</td>
<td>graded by instructor</td>
</tr>
<tr>
<td>iv</td>
<td>3a; 3b</td>
<td>Class discussion and individual written assignments</td>
<td>graded by instructor</td>
</tr>
</tbody>
</table>

Prepared by: Professor William Hauser Date: 13 December 2002
Revised: 7 September 2004

Status of Continuous Improvement Review of this Course:

Date Last Reviewed: Not yet reviewed UG Committee Chair: Professor Stormy Attaway
Data Used in Last Review: N/A
Major Improvement Item from Review: N/A