## 15.828 Updated Schedule
### New Product Development

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<table>
<thead>
<tr>
<th>Monday 1:05-2:25pm</th>
<th>Wednesday 1:05-2:25pm</th>
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<tbody>
<tr>
<td><strong>September 3</strong></td>
<td><strong>September 5</strong></td>
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<tr>
<td>Labor Day</td>
<td>NPD, Sweetwater</td>
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<td><strong>September 10</strong></td>
<td><strong>September 12</strong></td>
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<td>Polaroid</td>
<td>DFMA: Cost, Midwest Industries</td>
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<td><strong>September 17</strong></td>
<td><strong>September 19</strong></td>
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| No class meeting | Visitor: Jamie Boyer, IBM  
Listening to Customers |
| **September 24** | **September 26**    |
| Conjoint Analysis | Creating Value        |
| **October 1**    | **October 3**        |
| Disruptive Technologies | Visitor: Jay Ong, Microsoft  
Living on Internet Time |
| **October 2**    | **October 4**        |
| No class meeting | Visitor: Matt Haggerty, Prod. Genesis  
Concept Selection |
| **October 15**   | **October 16**       |
| Web-based Market Research | Visitor: Angela Liao, Microsoft  
Lead Users       |
| **October 22**   | **October 17**       |
| Visitor: Charles Mauro, MauroNewMedia | Creativity |
| **October 29**   | **October 18**       |
| Team New Zealand | Mass Customization    |
| **November 5**   | **November 19**      |
| Team New Zealand | EXAMINATION           |
| **November 12**  | **November 20**      |
| No class meeting | Review                |
| **November 19**  | **November 21**      |
| EXAMINATION      | Team meetings; No class meeting |
| **November 26**  | **November 22**      |
| Live Case or Guest Speaker | Visitor Rob Chess, CEO, Inhale Therapeutics |
| **December 3**   | **December 4**       |
| The Virtual Customer | Team Presentations |
| **December 10**  | **December 5**       |
| Team Presentations | Team Presentations    |
| **December 11**  | **December 6**       |
| Team Presentations | Team Presentations    |
| **December 12**  | **December 7**       |
| Team Presentations | Team Presentations    |
Module I: THE PRODUCT DEVELOPMENT PROCESS

Module II: VOICE OF THE MANUFACTURER

Module III: LISTENING TO CUSTOMERS

Module IV: CREATIVITY AND DESIGN

Module V: PROTOTYPING, TESTING, AND LAUNCH

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GRADING

1. Written Assignments: 25%
2. Examination: 25%
3. Project: 25%
4. Contributions to class discussion: 25%
WRITTEN ASSIGNMENTS

There will be several written assignments due during the semester, including:

- Due Wednesday, September 12: Team list and project description paragraph
- Due Wednesday, September 12: Midwest industries team assignment
- Due Monday, September 24: Conjoint homework
- Due Wednesday, October 31: Team project progress report, 1-2 pages
- Due Wednesday, November 7: Parallel & Sequential Prototyping Homework
- Due Wednesday, December 12: Team project final report
- Additional short assignments may be assigned during the semester

EXAMINATION

There will be an 80 minute, short answer and/or multiple-choice, in-class exam on Monday, November 19, beginning at 1:05pm. Students who have done the readings and attended all class sessions will have an advantage during this exam.

PROJECT

Objective: The project provides an opportunity for in-depth study or application of the techniques or concepts discussed in class. The project should be done in groups of four to five. A number of possible topics will be provided, but this list is by no means exhaustive and students are free to propose their own ideas. If you are having trouble selecting a project, or would like additional alternatives, please talk to Professor Dahan or the course TA.

Deliverables: A project outline will be due relatively early in the semester, followed by a mid-term progress report, and a final report (oral and written). Specifically:

Wed., Sept. 12, 2001: One-paragraph description of project is due along with team list.
Wed., Oct. 31, 2001: Mid-term project progress report is due, possible project review meeting.
Wed., Dec. 12, 2001: Written report is due. Also, each group is to give a 10 minute presentation summarizing the results of their project.

CLASS DISCUSSION CONTRIBUTIONS

A great deal of learning comes from hearing what your colleagues have to say and responding to it. You will be expected to have completed the readings prior to each class and prepared the assignment questions. You may be “cold-called.” Attendance at EVERY session is mandatory (please do not schedule travel or interviews during any class meeting). Absences will affect your grade adversely. Quantity and quality of participation are both important. The grading formula will be along the following lines:

\[ CDG = \sqrt{Qty \times Avg.\ Score} - Absence\ Penalty \]

where CDG is the class discussion grade, Qty is the number of significant contributions, and Avg. Score is the average quality over all of the contributions. If you are having any difficulty participating, please discuss this with Professor Dahan.
Contents of the course reader

“SweetWater.” HBS Case [9-695-026]


“Design for Manufacturability at Midwest Industries,” HBS case study.
“Benefits and Limitations of Structured Methodologies in Product Design.
“Control Tomorrow’s Costs Through Today’s Designs.” HBR. [96104]

“Note on Listening to the Customer: Part I”
“Spark Innovation Through Empathic Design.” HBR. [97606]

“Demographics or dartboards?” San Jose Mercury News. September 11, 1996.

“Note on Listening to the Customer: Part II”. pp. 1-7.

“Disruptive Technologies Catching the Wave.” Harvard Business Review. [95103]

“Living on Internet Time: Product Development at Netscape, Yahoo!™
NetDynamics, and Microsoft®” HBS. April 21, 1997. [9697052]

“Knowing a Winning Business Idea When You See One.” Harvard Business
“Concept Selection: A Method That Works” Creating Innovative Products Using
Total Design. 1996.
Contents of the course reader (continued)

“Innovation at 3M Corporation (A).” *HBS Case* [9-699-012]
“Note on Lead User Research.” *HBS Note* [9-699-014]

“Why No One Really Wants Creativity.” *Creative Action in Organizations*.
“Time to Listen to the Kinky Guys.” *Automotive Industries*. September, 1996.


“Team New Zealand (A).” *HBS Case* [9-697-040]


“The Virtual Customer: Communication, Conceptualization, and Computation.” Sloan working paper.
Module I: THE PRODUCT DEVELOPMENT PROCESS

Session 1
Wednesday, September 5, 2001
Introduction to New Product Development

We study the connections between product design, development, and manufacturing. These ideas are related to customer satisfaction, product cost, and manufacturing efficiency. Our goal is to show how advanced planning can improve products, processes and profits.

Readings (26 pages)
Course Outline (this document)
Case: “SweetWater.” HBS Case [9-695-026]

Assignment: Consider the following study questions for class discussion:

- What steps will Sandy Platter need to take in order to be successful? How would you proceed with these steps?
- How are the functions of product design and manufacturing connected? Is this important in terms of customer satisfaction? Time-to Market? Profits?
- What should drive product decisions made by firms? What does drive them?
- What role do suppliers and distributors play in determining product design?
- How much should Sandy charge for his product?

Session 2
Monday, September 10, 2001
Successfully Managing New Product Development

Readings (10 pages)

Assignment:
Prepare the following study questions for class discussion:

- What challenges did Polaroid face in developing PopShots?
- What would you have done if you were in Herchen’s position?
- What characterizes a successful new product development process?
- How can firms improve new product development?
Module II: VOICE OF THE MANUFACTURER (PRODUCT COST)

Session 3
Wednesday, September 12, 2001

Design for Manufacturability (DFM) / Target Costs

Decisions regarding product design must consider the specific capabilities of the manufacturing plant in which the product will ultimately be produced. A somewhat structured methodology, known as Design for Manufacturability (DFM), has been developed for this purpose.

DFM implementation will be discussed through analysis of a case study. An integral part of DFM is estimating product costs for alternate designs and configurations. We study how low cost can be designed into a product and the changing nature of manufacturing costs.

Readings:
“Design for Manufacturability at Midwest Industries,” HBS case study.
CONTROL TOMORROW'S COSTS THROUGH TODAY'S DESIGNS.” HBR. [96104]
“'97 Camry Cost Reduction.” Automotive Industries. September, 1996. p. 45
Eldridge, Earle. ‘Low Cost Drives...Assembly.” USA Today. Sept. 21, 1998. p. 3B

TWO Assignments:
Your team should turn in a list of “things done right” and “things done wrong” by Midwest in implementing DFM at each of the 3 sites to date. (Two pages maximum)

Turn in a list of your team members and a short project description

Read the case and articles and think about the following questions:
• How should design guidelines be used? Who should be on DFX teams?
• Why is product cost so important to firms like Toyota?
• Should a marketing manager care about cost?
• What determines the cost of each part in a product? What should determine it?
• How should target costs be set?
• What information would be most useful when setting them?
• How do DFM and Target Costing relate?
• Identify some characteristics of an organizational structure and culture that promotes the implementation of DFM.
• For those of you with industrial experience, how is DFM implemented in the organizations in which you work (or have worked)?
Do you concur with the concept that “Quality is free?”

Monday, September 17, 2001
No class meeting today

**Module III: LISTENING TO CUSTOMERS**

**Session 4**
**Wednesday, September 19, 2001**
**Listening to the Customer**

Guest Speaker: Jamie Boyer, Marketing Research Director, IBM Mobile Products

Capturing the “voice-of-the-customer” is critical to meeting customer needs and wants, but it is quite a challenge. We study tools and techniques to help.

**Readings (32 pages)**
“Spark Innovation Through Empathic Design.” HBR. [97606]
Lieber, Ronald B. “Storytelling: A New Way to Get close to Your Customer.”

**Assignment:**
Prepare the following study questions for class discussion:
- Who is a customer? How do we divide customers into market segments?
- Why is the customer’s voice important? What do we listen customers?
- What makes Zaltman’s storytelling technique work? When is it appropriate?
- When is the customer’s voice misleading?

**Keys:** Site visits, Surveys, Focus Groups, Benefit Chains, Conjoint Analysis, QFD

**Session 5**
**Monday, September 24, 2001**
**Conjoint Analysis**

Products can be described as a bundle of attributes such as price, function, aesthetics, etc. Conjoint analysis allows individual customers to indicate the degree to which each attribute matters to them.

**Readings (15 pages)**
Waxman, Sharon. “Demographics or dartboards?” San Jose Mercury News.
September 11, 1996. p. 3E.

**Assignment:**
Turn in the conjoint analysis homework assignment (handed out in the last class).

Prepare the following study questions for class discussion:
- How would you develop the 108 movie descriptions Waxman refers to?
- What are the primary benefits of conjoint analysis?
• What kind of attributes should be evaluated? Which should not? Why?
• How should a product’s price be set given conjoint data?
• How does a product’s cost enter the picture?

Keys: Conjoint Analysis, Fractional Factorial Design, Product Attributes, Utility

Session 6
Wednesday, September 26, 2001
Creating Value
After the tradeoffs between customer needs and firm capabilities have been made, detailed design of parts and processes soon follow. This session is devoted to the process of allocating cost to components of the final product. We consider the notion of product concept testing.

Readings (16 pages)

Assignment:
Prepare the following study questions for class discussion:
• How do you test whether your design is good or not? When do you know?
• How do the different types of customer needs raised by Kano, User Observation, Cultural Anthropology and Benefit Chains affect product design? Marketing? Manufacturing

Keys: Value Analysis, QFD, Kano, Kansei, User Observation, Cultural Anthropology, Benefit Chains

Session 7
Monday, October 1, 2001
Disruptive Technologies
Readings (22 pages)

Assignment:
Prepare the following study questions for class discussion:
• Why should firms sometimes ignore their customer?
• What, exactly, should be ignored? What should not be ignored?
• Have other industries followed the same path as the disk drive industry?
• How would you solve the problem of disruptive threats?
• What do you think about the threat to Intel? About Intel’s response?
Session 8  
Wednesday, October 3, 2001  
**Product Development on Internet Time**  
Guest Speaker: Jay Ong, Microsoft, Tablet PC Group  
**Readings (20 pages)**  
**Assignment:** Consider the following study questions for class discussion:  
- Contrast the development approaches followed by the four organizations.  
- How does fast clockspeed affect product development? Which elements of the product development approaches will survive as the Internet evolves?  
- What traditional marketing practices must adjust to fit this new reality?  

Monday, October 8, 2001  
**No class meeting today**  

Session 9  
Wednesday, October 10, 2001  
**No class meeting today**  
Please take this opportunity to have team meetings and to ask questions of the class TA.  

Session 10  
Monday, October 15, 2001  
**Web-based Market Research**  
**Assignment:** We will meet in the Sloan School Trading Lab to conduct several web-based market research experiments.
Session 11
Wednesday, October 17, 2001

Concept Selection
Guest Speaker: Matt Haggerty, President, Product Genesis

Once the customer’s voice has been captured, many product and process decisions need to be made. The choice of a particular product concept requires objective methods of comparing the alternatives and selecting the “best.”

Readings (20 pages)

Assignment: Prepare the following study questions for class discussion:
• Under what conditions does Pugh’s technique make sense to you?
• How has your team sorted out competing concepts?

Keys: Cross-Functional Teams, Pugh Concept Selection, TRIZ

Session 12
Monday, October 22, 2001

Lead Users
Guest Speaker: Angela Liao, Microsoft, Pocket PC Group

Reading (23 pages)
• Case: “Innovation at 3M Corporation (A).” HBS Case [9-699-012]
• Optional: “Note on Lead User Research.” HBS Note [9-699-014]

Assignment:
• How has 3M’s innovation process evolved since the firm’s founding?
• What characterizes an ideal lead user?
• How does the Lead User method compare with other market research methods?
• Has the Medical-Surgical team applied Lead User research appropriately?
• What should the Medical-Surgical team recommend to Dunlop: the three new product concepts or a new business strategy?
Session 13  
Monday, October 24, 2001  
Creativity, Ideation, Lateral Thinking I

Readings (18 pages)
Staw, Barry M. “Why No One Really Wants Creativity.” Creative Action in Organizations. pp. 161-166

Assignment:

Bring to team meeting with Professor Dahan, but no later than October 31, a 1-2 page report describing the progress your team has made on the course project (one per team). Submit BOTH an email version (to edahan@mit.edu) and a hardcopy version. The file name must be:

15.828 project name progress report.doc  
(e.g. 15.828 Laptop Bag 2 progress report.doc)

Prepare the following study questions for class discussion:

- Do firms need to take the risks inherent in “kinky” creativity? If so, why?
- How can you identify people with the ability to be creative?
- How can you create the proper environment for them to be productive?
- Where should new product ideas come from? Where do they come from?
- What are the pros and cons of platforms?
- How could you implement scenario planning for your team’s project?

Keys: Creativity, ideation, out-of-the-box thinking, product concepts, ideation, product concepts, scenario planning
Session 14
Monday, October 29, 2001
Industrial Design

Guest Speaker: Charles Mauro, President, MauroNewMedia

Our guest will be discussing research on user interfaces.

Readings (5 pages)


Assignment:
Prepare the following study questions for class discussion:

- What role does industrial design play in a product’s success?

Session 15
Wednesday, October 31, 2001 (Happy Halloween!)

Mass Customization

Previous sessions have covered techniques that enable a product design to be tailored to customer needs. We now explore the boundary between product design and manufacturing. Intuition regarding the behavior of manufacturing systems will be developed. We will also uncover lessons for the product developer that promote greater manufacturing system performance. We will explore the concept of flexibility, how to quantify it, and how to speed up design and manufacturing.

Readings: (18 pages)


Assignment: Please prepare these questions for class discussion.

- Why is product variety increasing?
- How has HP benefited from mass customization?
- How do Gilmore and Pine’s ideas relate to the internet?
- At what point in the design process should mass customization be considered? How does it affect the new product development process?
- How do you define flexibility? When is flexibility needed?
- What are the key elements of Dell’s strategy?
- How does direct distribution affect Dell’s product design and development?
- What are the advantages and disadvantages of Dell Direct distribution?
Session 16  
Monday, November 5, 2001  
Prototyping I  
Even after listening to customers and planning the design, cost, and engineering of a new product, some uncertainty about its future success remains. Prototyping new designs in physical and virtual ways reduces the uncertainty and improve results. Parallel prototyping, i.e. conducting multiple experiments aimed at solving the same problem, can produce even better results, but may pose challenges. We will also get an introduction to QFD.

Readings (14 pages):  
Case: “Team New Zealand (A).” HBS Case [9-697-040]  
Assignment:  
Prepare the following study questions for class discussion:  
- What do you think? Team New Zealand should build:  
  [ ] Two similar boats now  
  [ ] Two different boats now  
  [ ] One boat now, one boat later  
- How would you evaluate Team New Zealand’s use of simulation in the design process? What are its advantages and disadvantages?

Session 17  
Wednesday, November 7, 2001  
Parallel & Sequential Prototyping, Set-Based Design  
In today’s session we will continue discussing prototyping as a tool for resolving market and technical uncertainty in New Product Development, and in particular look at the notion of carrying multiple design options forward through set-based design and parallel or sequential prototyping.

Readings: (19 pages)  
Assignment:  
Turn in the Parallel & Sequential Prototyping homework assignment  
Prepare the following study questions for class discussion:  
- Why is Toyota developing more prototypes than its competitors?  
- What role does CAD play in prototyping? What effect will lower CAD and simulation costs have on new product development?
Monday, November 12, 2001: Veteran’s Day Holiday
No class meeting today

Assignment:
Email one or more GREAT exam question(s), in PowerPoint format as supplied to you, to edahan@mit.edu by 5pm on Monday, November 12, 2001

Session 18
Wednesday, November 14, 2001
Review for Exam
Readings: (4 pages)
Course Summary

Assignment:
Come to class prepared to discuss key course concepts and to answer typical exam questions.

Session 19
Monday, November 19, 2001
EXAMINATION
(Exam starts exactly at 1:05pm)

EXAMINATION (80 MINUTES)

Session 20
Wednesday, November 21, 2001
No class meeting today
Please take this opportunity to have team project meetings.

Have a very happy, healthy Thanksgiving Day holiday!

Session 21
Monday, November 26, 2001
Live Case or Guest Speaker to be announced

Session 22
Wednesday, November 28, 2001
Guest Speaker: Rob Chess, CEO, Inhale Therapeutics
Readings:
Please read the background material on Inhale Therapeutics and visit the company’s web site at http://www.inhale.com

Assignment: Submit your PowerPoint project presentations to Professor Dahan (edahan@mit.edu) at least one week prior to your scheduled presentation. The
first slide should show your project name and the team member names. 
The file name must be:  
15.828 project name.ppt (e.g. 15.828 Microsoft Tablet PC 2.ppt)

Session 23
Monday, December 3, 2001
The Virtual Customer

Readings: (19 pages)

Assignment:
Prepare the following study questions for class discussion:
• How can each of the methods described be integrated into the NPD process?
• What are the pros and cons of Web-based NPD research?

Session 24
Wednesday, December 5, 2001
Team Summary Presentations

Session 25
Monday, December 10, 2001
Team Summary Presentations

Session 26: LAST CLASS
Wednesday, December 12, 2001
Team Summary Presentations

Happy Holidays…Happy New Year…Have a Wonderful 2002!