Description
New product development is the ultimate interdisciplinary entrepreneurial art, combining marketing, technical, and managerial skills. A successful product lies at the intersection of the user’s need, a technical solution, and compelling execution. This class will bootstrap your experience in the art through exercises and team projects. We will examine products and services, consumer and industrial, simple and technologically complex. Case studies will feature primary sources and the instructor’s personal experiences as an inventor for a major consumer products company. Topics will span the product development cycle: identifying user needs, cool-hunting, brainstorming, industrial design, prototyping techniques, market research to validate new ideas, and project management – especially for managing virtual teams and foreign manufacturers. No audits.

Prerequisites
Principles of Marketing EN.660.250

Instructor
Michael Agronin, mlagronin@gmail.com, 410-207-0096
Office: 104 Whitehead (note that I work off-campus during the day.)
Office hours: By appointment only

Course Assistant
TBA
Office: 104 Whitehead
Office Hours:

Meetings
M 6:15-9:00 p.m., Hodson 311

Required Texts

Custom Coursepack downloadable from Harvard Business Publishing, at:

https://cb.hbsp.harvard.edu/cbmp/access/32883466
You will need to create an account to purchase and download the cases. This coursepack costs about $8 and contains the following:

- **Design Thinking and Innovation at Apple**, Thomke and Feinberg; 609066-PDF-ENG
- **Finding the Right Job for Your Product**, Christensen, Anthony, Berstell, and Nitterhouse; SMR240-PDF-ENG

**Course Objectives**
Students will learn the following business skills by experiencing the product development cycle:

- Determining articulated and unarticulated customer needs
- Brainstorming
- Survey design and analysis of results
- Project management
- Cost estimation
- Selling an idea
- Working as a team

**Course Topics**

- The Product Development Process
- Intellectual property law
- Sources for new product ideas
- Qualitative and quantitative user research
- Concept testing
- Product design and prototyping
- Building a business case
- Project management
- Pitching a product

**Course Expectations**
Product development is not an individual endeavor that can be learned by reading a book and taking a test; it must be experienced to be mastered. It’s a messy, holistic art. It is best practiced by an intimate team with a broad skill set. The marketplace is fickle, and the tools we use to understand the market are inexact. Success requires relentlessness, intuition, and not a small amount of luck.

This is a team-based and project-based course. Student teams will select a product category of their choice (something that would be purchased by your fellow students), then brainstorm a concept and work it through each step of the product development process. The course will culminate in a product pitch, similar to the TV show “Shark Tank.” My personal goal is for you to develop a product idea that’s good enough to commercialize in real life.
To absorb the experience, I expect you to:

- **Prepare.** Read the materials, do your assignments, do your research, practice your presentations.

- **Participate.** Show up on time, and share your perspectives with your team and with the class. Be generous with your ideas and constructive with your criticism. Collaborating with other teams and other students is strongly encouraged.

- **Be a good teammate.** In the real world, all work is teamwork, and we will emulate that practice in class. Teammates are expected to work together and pull their own weight. See Appendix A, best practices for effective teams.

- **Listen.** When you’re the next Steve Jobs, you can tell the world that glass is a good material to make phones out of and the world will buy it. Until then, you need to be humble and listen: to your teammates, to your classmates, and most of all, to your potential customers.

- **Communicate effectively.** Use a simple, straightforward writing style that gets to the point. No need to pad your reports in this class! Get your grammar and spelling right to maintain your credibility; you represent your team’s brand now. Use media appropriately; PowerPoint is good for visual information, written reports are good for textual information, and a bit of drama is good for eliciting an emotional response from your audience. Showmanship can be just as important as content.

### Deliverables

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Points</th>
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<tbody>
<tr>
<td><strong>Individual</strong></td>
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<tr>
<td>Remarkable Product Presentation</td>
<td>5</td>
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<tr>
<td>Intellectual Property assignment</td>
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<td>Project Management assignment</td>
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<td>Class Participation</td>
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<td>Teamwork Assessment</td>
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<td><strong>Team</strong></td>
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<tr>
<td>User Observation Report and Presentation</td>
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<tr>
<td>Product Brainstorm and Report</td>
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<td>Product Concept Test</td>
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<tr>
<td>Final - Product Pitch</td>
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<td><strong>Total:</strong></td>
<td>100</td>
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**Grading**

- **A** 90-100
- **B** 80-89
- **C** 70-79

Plusses and minuses will be used at the discretion of the instructor.
COURSE SCHEDULE

<table>
<thead>
<tr>
<th>Date</th>
<th>Topics</th>
<th>Reading Due</th>
<th>Assigned</th>
<th>Assignments Due</th>
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<tbody>
<tr>
<td>1</td>
<td>1/26 Introductions. A model for successful products. Overview of the NPD process. Teams assigned.</td>
<td>Select a product category for your team project.</td>
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<tr>
<td>2</td>
<td>2/2 The “Remarkable Product” model, Intellectual property</td>
<td>IP assignment</td>
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<tr>
<td>3</td>
<td>2/9 User needs and observational market research.</td>
<td>Finding the Right Job for your Product</td>
<td>User Observations</td>
<td>Product category for your team project - approved IP assignment 3 Remarkable Product Presentations</td>
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<tr>
<td>4</td>
<td>2/16 Where do product ideas come from? Human insights and trends</td>
<td>Complete most of Art of Innovation</td>
<td>3 Product Presentations</td>
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<tr>
<td>5</td>
<td>2/23 Class activity - Brainstormer</td>
<td>3 Product Presentations</td>
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<td>6</td>
<td>3/2 Team presentations - User Observations.</td>
<td>Project Brainstormer</td>
<td>Team presentations -- User Observations</td>
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<td>7</td>
<td>3/9 Concept Testing</td>
<td>Concept Test</td>
<td>3 Product Presentations</td>
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<td>8</td>
<td>3/16 Spring Break</td>
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<tr>
<td>9</td>
<td>3/23 Design and Prototyping</td>
<td>Design Thinking at Apple</td>
<td>3 Product Presentations</td>
<td>Product Brainstorm report Concept test report Concept test draft of survey</td>
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<td>11</td>
<td>4/6 Design review of each team’s product concept</td>
<td></td>
<td>3 Product Presentations</td>
<td>Concept test report Concept test report</td>
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<tr>
<td>12</td>
<td>4/13 Project Management: Stage-gate, GANTT charts</td>
<td>Project management assignment</td>
<td>3 Product Presentations</td>
<td></td>
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<tr>
<td>14</td>
<td>4/27 NPD Case Study. Teams work on their presentations</td>
<td></td>
<td>Project management assignment</td>
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<tr>
<td>15</td>
<td>5/11 Final Presentation -- The Product Pitch (6:15-9pm, same room)</td>
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<td>Product Pitch</td>
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Assignment Descriptions

**Remarkable Product Presentation**
This is an individual presentation to the class. Approximately three students will present each week at the beginning of class. Your presentation date will be pre-assigned. See Appendix B for detailed instructions.
Intellectual Property assignment
Instructions will be provided when this project is assigned.

Project Management assignment
Instructions will be provided when this project is assigned.

Class Participation
You are expected to attend class, share your ideas, ask questions, and build on other students’ ideas. Points are assigned for: Showing up, participating at all in any way, and participating in a way that adds to the quality of the class. You do not get points for speaking up continuously if what you have to say it pointless. You will lose points (and personal credibility) if I call on you and you are obviously unprepared for class. Your overall Participation grade is scaled from your weekly point score.

Teamwork Assessment
In order to enforce your accountability to your team, you will have the opportunity to grade, and be graded by your teammates. These team assessments will be confidential, between you and me. This class is not graded on a curve, so there is no incentive for your teammates to rat you out as long as you are contributing, in effort and results, to the best of your abilities. Your score will be based on the input of your teammates, and then filtered by me.

User Observation Presentation and Report
Your team will observe and interview users of a target product to help you determine the range of user needs and attitudes. The deliverables for this team project are a presentation, a written report, and a video. See Appendix C for detailed instructions.

Product Brainstorm and Report
This is a team project in which you will define the product that you will develop for the rest of the course. The deliverables are the results of your team’s brainstorming session, and a description of your selected product idea. See Appendix D for detailed instructions.

Product Concept Test
This is a team project to collect quantitative data predictive of your product’s success in the market. You will be using SurveyMonkey (www.surveymonkey.com). Your team will need to purchase a Select account, which costs $24/month. 

Wait for further instructions before signing up. A one-month account should be enough time for the assignment. See Appendix E for detailed instructions.

Final – Product Pitch
The final exam is a team presentation pitching your product – why should your employer or an investor fund your product? Deliverables are a 15 minute presentation, plus a written report. See Appendix F for detailed instructions.
Ethics
The strength of the university depends on academic and personal integrity. In this course, you must be honest and truthful. Ethical violations include cheating on exams, plagiarism, reuse of assignments, improper use of the Internet and electronic devices, unauthorized collaboration, alteration of graded assignments, forgery and falsification, lying, facilitating academic dishonesty, and unfair competition.
In addition, the specific ethics guidelines for this course are:
(1) Students are strongly encouraged to collaborate with classmates on team and individual assignments.
Report any violations you witness to the instructor.

You can find more information about university misconduct policies on the web at these sites:
- For undergraduates: http://e-catalog.jhu.edu/undergrad-students/student-life-policies/
- For graduate students: http://e-catalog.jhu.edu/grad-students/graduate-specific-policies/

Students with Disabilities
Any student with a disability who may need accommodations in this class must obtain an accommodation letter from Student Disability Services, 385 Garland, (410) 516-4720, studentdisabilityservices@jhu.edu.

Other Administrative Requirements
All written assignments must be submitted at the beginning of class on the due date. If you know you will not be in class on a day an assignment is due, it is your responsibility to contact me prior to class and arrange to email the homework prior to class or by a mutually agreed upon time. Assignments turned in late with no prior arrangements will receive a zero.

For extreme illness and other emergency situations: Students are required to obtain documentation from their College's Advising Office or the Health Center for submission to the instructor.

ABET Outcomes
- Ability to design and conduct experiments, analyze and interpret data (b).
- Ability to design a system, component, or process to meet desired needs (c).
- Ability to function on multidisciplinary teams (d).
- Understanding of professional and ethical responsibility (f).
- Ability to communicate effectively (g).
- The broad education necessary to understand the impact of engineering solutions in a global and societal context (h).
- Recognition of the need for and an ability to engage in life-long learning (i).
- Knowledge of contemporary issues (j).
Appendix A. Best Practices for Effective Teams

Adapted from The Five Dysfunctions of a Team by Patrick Lencioni

1. Establish Trust. There are two kinds of trust you need to establish – the kind where you know you’re looking out for each other, and the kind where you can count on each other to get a job done. So get to know each other. Share a meal or three. Share your backgrounds, your accomplishments, your aspirations, your strengths and weaknesses. Spend time together and bond.

2. Don’t Be Afraid of Conflict. Once you trust each other, you should feel free to share your true opinions without worrying that you’ll hurt someone’s feelings. To make good decisions, you need to have frank and open discussions. Don’t hold back! It’s OK to get mad. You and your team will get over it. (Right, guys?)

3. Commit to the Team’s Decisions. Your team will not go along with all of your ideas. But that’s OK, because you had the opportunity to make a passionate case, right? Now you need to be willing to commit fully to the team’s decision and make it work.

4. Hold Each Other Accountable. Everyone on the team has to pull his or her own weight. You might need to do some tasks outside of your comfort zone, and that’s OK – that’s what school is about. Don’t dump everything on “the PowerPoint guy” or “the artistic one” while the rest of you pick out the iTunes playlist for the presentation. It’s OK to call someone out for not doing his or her fair share.

5. Focus on the objective. You may be tempted to turn the projects in this course into your personal artistic outlet. There’s room for that, but make sure you stay focused on the objective – a product concept that your target market will crave. Your final concept will require a lot of editing and compromise. Be sure to put your customers’ needs before your own.
Appendix B. Instructions for the Remarkable Product Presentation

1. Identify a product (a good or a service) that is remarkable (in a good way or a bad way) relative to our model of a successful product:
   - It satisfies a practical need
   - It has an emotional hook
   - The product's purpose, features, or qualities are self-evident

2. Present this product to the class in **3 minutes or less**. The time limit will be strictly enforced. The presentation must explicitly evaluate the product relative to our model. If time permits, you will also answer questions from the class.

   Also – deliver a digital copy of your presentation to me on the night of the presentation.

3. The following products are **not** allowed:
   - Anything from Apple (iPhones, iMacs, software, accessories made by Apple)
   - Products you made up
   - Products that have been or will be discussed by the instructor: the Pet Rock, anything made by Black & Decker or DeWalt, anything coffee-related.

4. The following products are **allowed**:
   - 3rd-party accessories for Apple products (cases, bags, speakers, etc.)
   - Software
   - Web sites **if** the site provides an actual service (e.g., online banking.) You need to separate the services of the site (e.g. Amazon selling stuff) from products on the site (books, 3-Wolf-Moon T-shirts.) Purely informational sites (e.g., the New York Times) are **not** allowed.
   - Products from the past (real products that are no longer sold)
   - Fictional products from popular media (e.g., the Mr. Fusion generator from Back to the Future), as long as the source contains enough detail for you to compare the product to the model.

Advice

- **Practice!** 3 minutes goes quickly.
- Research the product thoroughly. How successful is it relative to competitors? Has it influenced the market place? Has it influenced user behavior?
- Use visual aids. PowerPoint is OK, but please no clichéd “3 bullet points per slide”-style presentations. Pictures, web sites, videos, or showing the actual product are all good.
- Visual aids, software, etc. must be set up and ready to go before the start of class. You are responsible for making sure all the AV equipment works,
- Points will be awarded for how well the product illustrates the model, and the overall quality of your presentation.
Appendix C. Instructions for the User Observation Presentation and Report

1. Select a category of product (a good or a service) that is used by the JHU community. Pick a category you and your teammates know about (or better yet, are passionate about), and where you believe there is an unmet need. You will ultimately develop a product in this category, so choose wisely! Do not pick a specific product!
   - Example of a product category (good): Products used while listening to music.
   - Example of a specific product (bad): Combination MP3-player/carpet-stain-remover

2. Observe and interview users
   - Write a short script for interviewing and observing subjects.
   - Find four to six interview subjects. These can be friends, friends of friends, or random strangers. They need to be legitimate users in your product category, and they need to be objective.
   - Your interview team should be no more than three people; one interviewer and one or two note-takers. You can split your team to share the load; everyone on the team must participate.
   - If possible, first video the subject using products in the category. Then video some or all of the interview. The interview should take no more than 20 minutes.

3. Review the interviews and compile an analysis of your subjects’ responses. Look for these issues:
   - Unarticulated needs
   - Needs common to all your subjects
   - Needs that are different for each subject. Why are they different? Could you link those differences to demographic or psychographic differences?
   - Lack of needs – users who are satisfied with existing solutions.

4. Write a report, 5 pages maximum, summarizing your findings. The report should include:
   - Your product category
   - How users were selected
   - A description of your interview procedure, including a copy of your script (not included as one of your 5 pages)
   - A summary of your findings
   - Your conclusions – a hypothesis of user needs related to your product category. Note: These conclusions are not statistically significant, so don’t bother with any statistical analysis. For a sample this small, you will gain insight into the range of user needs only. Quantitative research comes later.
   - A reflection on the observation experience itself. Did you learn anything? What went well/poorly? What would you do differently next time? Why?
   - An edited video of observation highlights, no longer than 10 minutes in length.
5. Present your findings to the class
   • 10 minutes max
   • This is a summary of your written report
   • At least 2 teammates must lead the presentation
   • Show no more than 5 minutes of your observation video

Advice
   • You will not be graded on the quality of your video. The video is intended only as a tool to record and share your observations. However, the quality has to be good enough to hear your interview questions and answers, otherwise what’s the point? Do a trial run before the real interviews to insure you have mastered basic camera placement.
   • Figure out portrait vs landscape camera orientation during your trial run.
   • Use of a smart phone and iMovie or MovieMaker should be more than sufficient for making your videos. Fancy titles, effects, soundtracks, etc. are not required. However, your videos should be edited to make your points without us having to watch all the boring parts.
   • Use best practices for interviewing (to be covered in class). Ask non-leading, open-ended questions. You want the voice of the customer, not the voice of the interviewer. Imagine yourself as a journalist, looking for a completely unbiased response.
   • Some of your users may offer no insights. That’s just the way it goes. However, if all your users are duds, you will need to find some more insightful people to observe. You are responsible for drawing appropriate conclusions from your observations. Your job is to pick up on important insights, and ignore invalid or unimportant points, both spoken and unspoken.
Appendix D. Instructions for the Product Brainstorm and Report

1. For your product category, identify two or three user needs based on your earlier observations that you want to address.

2. Hold a brainstormer. I encourage you to invite classmates, friends, category experts, and other ringers. More people is better, so plan ahead!

3. Follow best-practices discussed in class; have the participants experience the user need, show them your observations videos, incorporate individual and group ideation, build on the best ideas, and poll the group for their favorite ideas.

4. Document the results of your brainstormer to capture all the ideas. Photos are OK as long as everything is legible. Be sure to document who attended, in case you come up with something you want to pursue in real life! All inventors will need to get credit.

5. As a team, downselect the best ideas and further refine them into a single product concept.

6. Write a report of your results.
   - Describing your process – from running the brainstormer through arriving at a final product concept (no more than 1 page.)
   - Describe your product concept with words and diagrams (no more than 2 pages.)
   - Reflect on the brainstorming experience itself. What went well/poorly? What would you do differently next time? Why? (No more than 1 page.)
   - Include the documentation from your brainstormer.

Advice: Your product concept should be very well-defined at this point, with clear, understandable diagrams and a description of all the features. You will continue to revise the concept later, but the concept should be quite specific and understandable to an objective stranger. Or your mom.
Appendix E. Instructions for the Product Concept Test

1. Create a concept description, including images and feature call-outs, that will fit on a web page and will be used to describe your product idea to survey recipients. You may take advantage of outside artistic help if necessary.

2. Create a survey to assess the following, as a minimum:
   • Interest in your product
   • Purchase intent
   • Ideal price-point
   • Key demographic and psychographic information about the user, to use as a potential filter of your results.
   • Use best-practices for survey design; these will be discussed in class, and some resources are available on the SurveyMonkey web site.

3. Review the survey with the instructor.

4. Field the survey.
   • You may email the survey link to friends, friends of friends, family, Facebook friends, and so on.
   • You need about 100 responses per market segment for statistically-significant results.

5. Write a report, no longer than 5 pages, analyzing your results. The report should include:
   • A copy of your final survey (not included in the page count)
   • Your user sampling technique
   • Analysis of your results. Sophisticated statistical analysis is not necessary, however you should do more that just report the results of each question.
   • Your conclusions; expectations for the success of your product, and/or and tweaks to the concept.
   • A reflection of the concept test experience.
Appendix F. Instructions for the Final Product Pitch

1. Pitch your product concept to a potential investor. You need to make a convincing case that this product will succeed in the market. Your pitch must include:
   - A description of the user need, including evidence from your user observations
   - A demonstration of the product and how it satisfies user needs and other qualities of being remarkable, using a prototype, storyboards, or other audio-visual aids.
   - Quantitative evidence that your product is viewed favorably by your target market
   - An execution plan, including:
     - Who could design and manufacture your project
     - A project plan for design and manufacturing
     - An analysis of technical and execution risks
     - A high-level intellectual property analysis
   - A launch plan, including:
     - Prototype packaging
     - A description of initial sales channels
     - An overview of a marketing strategy
   - A financial projection, including:
     - Estimated costs for design and manufacturing
     - Planned sales price
     - Estimated market size
     - Estimated first-year profitability and break-even analysis

2. Write a report, no longer than 15 pages, covering the information in the presentation and including detailed backup information as necessary.

3. All team members must participate in the presentation.

4. The presentation is intended to be persuasive. Make it entertaining. Show the audience your passion for the product so they get excited about it too!