

DES INV 190-2 – Global Product Development

2019 spring

Teaching Team

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Classroom and Meeting Schedule

210 Jacobs | Tuesday, 11-2pm

Course Description

Global Product Development is a project-based course which aims to educate students about the process of translating a functional prototype into a commercial, consumer-ready product. Rather than going into great depth on any one aspect of this process, this course will provide a high-level overview of the many important aspects of product commercialization, including design for manufacturing, supply chain and logistics, intellectual property and regulatory certification, and more. Each class meeting will be divided between lecture, often featuring guest lectures with real-world experience, and project work time.

Students enrolling in this course should already be familiar with a human-centered design process, and have gone through at least one full iteration of that process, in courses such as DES INV 15, CS 160, ME 110, or the Design DeCal. In this course, students will work through a condensed version of that design process, while lectures will focus more on the latter stages of design and commercialization of a product.

Course Objectives

This project-based course has the following primary objectives:

- Provide a comprehensive overview of the process to take a product from functional prototype to commercial product, including the range of skillsets and knowledge areas required, and possible pitfalls.
- Give students firsthand experience with the global manufacturing ecosystem
- Connect students with entrepreneurship teams in different stages of their development to learn from their journey and experience

Learning Outcomes

- Create innovative solutions to address consumer product problems as well as considering DFX (Design For X, X=Manufacturing, Assembly, Environment, and Sustainability)
- Understand needs from stakeholders and design products and services to cater users' needs

- Acquire knowledge on the latter stages of design and commercialization of a product
- Combine creative and analytical approaches by collaborating across disciplines.
- Understand the global manufacturing ecosystem
- Establish networking with professionals to support new product development

Expectations

This is a three-unit course. We have structured the work to be done inside, and outside the class accordingly. We expect that each of you will prepare for and attend class and will participate fully with your teammates in in-class exercises (so called "workshop"). You are required to be present for class both because class will involve numerous exercises that allow you to apply the learning, and because your team members will depend on your contribution to each exercise for their learning as well. According to University policy, the class is structured to expect two hours of work outside class for each hour in class (i.e., 6 hours per week of work outside class).

Grading

Your course grade will be determined as follows:

- Attendance, Discussion & Participation: 10%
- End-of-class Reflection: 5%
- A Mini-lecture OR an Article for Jacobs Institute's Medium publication: 5%
- Assignments and Project Deliverables: 30%
- Project Progress Reports and Presentations: 30%
- Final project presentation and demonstration with external judges: 20%

Attendance, Discussion and Participation (10%)

- You are expected to have 100% attendance
- Please be punctual for every class (class starts at 11:10am).
- You are not allowed to leave the class early (class is ended at 2:00pm), unless you have any special reason informed to the instructor in advance.
- You are not allowed to use electronic devices for gaming, any personal texting and communication during the class.
- You will have workshop (related to your project) in most class meetings. All workshop deliverables are expected to be completed during the class.
- Time management: Workshops will be given limited time to complete. A timer will be displayed in front of the class during a workshop. You have to strictly follow instructions to complete the task within the given time. Feeling of time pressure is normal for workshops. A smooth rundown for each class relies on everyone's effort and cooperation!
- Discussion
 - Online discussion: You will be asked to respond to the discussion topic. You have to posted your own thoughts, react and respond to at least two of your classmates' posts (by Monday, 23:59).
 - Discussion during guest lecture: You are highly encouraged to ask questions to our guests during the guest lecture, so points will be given for asking questions or providing comments.

End-of-class Reflection (5%)

- “We do not learn from experience... we learn from reflecting on experience” (by John Dewey). Reflection is a mental process of thinking and learning often used in everyday life.
- An end-of-class reflection will be a routine for every class. Since the purpose of the end-of-class reflection is to reflect what you learnt during the class, the submission will not be considered if you are absent from class.

A Mini-lecture OR an Article for Jacobs Institute’s Medium publication (5%)

Option 1: A Mini-lecture

- Since each of you come from different backgrounds and bring projects at different stages, you likely have experiences that would be valuable to share with your peers. For the topics that you implemented in a project in the past and you feel comfortable to share your experience with your peer. You will be invited to give a mini-lecture around 15 minutes using a case study format:
 - What was the problem?
 - How did you approach the problem?
 - What was the problem-solving process?
 - What was the outcome?
 - What did you learn in the process?
 - What is your advice and suggestion to other students?

Option 2: An Article for Jacobs Institute’s Medium publication

- Your blog posts will be published on the Jacobs Institute’s Medium publication (<https://medium.com/jacobs-institute-for-design-innovation>), allowing fellow students and broader audiences to learn about your work in the course.
- Each team (1-2 students) should sign up for one submission date.
- Blog posts should be roughly 500-700 words, include images, and be drafted on Medium.
- Your post should offer a snapshot of your team’s experience. How you approach this is up to you, but your post is suggested to cover
 - what your team’s project is?
 - where you currently are in your project process?
 - what’s happening in the course (such as insights from a guest speaker, themes from a class discussion, or a recap of a field trip)?
 - your reflections on what you’re learning and working on.

Assignments & Project Deliverables (30%)

- You will have weekly assignment
- Peer Evaluations: Three peer evaluations will be conducted at the end of each of 3 stages of the project (tentatively: week 4, week 9 and week 15). **Your grades will be adjusted based on your contribution reported by your teammates.** So, you are suggested to evenly distribute the project workload during planning and execution.
- Final project deliverables (The submission of the following deliverables will be scheduled in different weekly assignments):

- Project website and Online design portfolio
- 3-minutes video journal
- 1-minute pitch
- Final functional prototype
- Packaging prototype
- Poster
- Manufacturing / supply chain plan
- BOM
- Business plan

Project Progress Reports and Presentations (30%)

- You will have project presentations with critique during the course.
- You will have 6 meetings with academic mentors and industry mentors. You are required to submit 6 progress reports with meeting agenda and meeting summary with action items after each mentor meeting. The details of project progress report will be given in the bCourses assignment.

Final Project Presentation and Demonstration with External Judges (20%)

- There is NO final written examination.
- Final project presentation will be conducted in the last class, Apr 30.
- You are required to attend Jacobs Design Showcase (during reading/review week, Exactly Schedule will be confirmed later of the semester) to present and demonstrate your product to the external judges.

Late Submission Policy

- End-of-class reflection and all assignments have to submit to bCourses before the submission deadlines. Late submission is not encouraged. In order to make it fair for every student in the class, for any reason of late submission, the teaching team will follow the late submission policy:
 - End-of-class reflection and workshop deliverable (it is normally due on Tue 23:59) - 50% deduction/day
 - Any submission fall into Wed 00:00 - 23:59 will have 50% reduction
 - The submission link will be closed at Wed 23:59 (i.e. NO submission will be accepted after Wed 23:59)
 - Weekly Assignments (it is normally due on Mon 23:59) - 33% deduction/day
 - Any submission fall into Tue 00:00 - 23:59 will have 33% reduction
 - Any submission fall into Wed 00:00 - 23:59 will have 66% reduction
 - The submission link will be closed at Wed 23:59 (i.e. NO submission will be accepted after Wed 23:59)

Reading Materials

All reading materials for the course will be provided on bCourses

Weekly Schedule

Week	Date	Lecture Topic	In-class Activity	Assignment
0	Before class			Project presentation Survey (mini-lecture topics and mentor preference)
<p>Part 1: Concept revisit</p> <p>This course will start with your design ideas and you will revisit the foundation of these ideas. You will learn how to create a product architecture to facilitate mass customization, supply chain management and future product development. By the end of this stage, you will have a proven concept for iterative design</p>				
1	1/22	Course Introduction; Project presentation	Project idea Presentation Workshop: team contract	House of Quality; Project website
2	1/29	Product Architecture and Mass Customization	Workshop: Product Architecture	Product Architecture; Updated House of Quality
3	2/5	Concept testing; Product Testing and Reliability Simulation; Design of Experiment (DOE);	Student mini-lecture (x 6)	Test Plan
4	2/12	Business Modeling	Student mini-lecture (x 2) Workshop: Business Model Canvas	Business Model Canvas; Project Plan
<p>Part 2: Iterative Design</p> <p>You will learn some structured design methodology, e.g., Design for Manufacturing (DFM), Design for Assembly (DFA), and Design for Sustainability (DFS). Your design concepts and prototypes are expected to be improved from iteration to iteration by collecting feedback from users and your peers. By the end of this stage, your product concept will be ready for the product launch preparation.</p>				
5	2/19	Guest lecture 1: Crowdsourcing and Open Innovation	Project Discussion 1	Patent search (Review last year's guest lecture on IP) Prototyping updates
6	2/26	Design for X (DFX), Design for Manufacturing (DFM), Design for Assembly (DFA) Guest lecture 2: DFMA	Student mini-lecture (x 4)	BOM (version 1) Prototyping updates
7	3/5	Guest lecture 3: DFS	Student mini-lecture (x 2) Workshop: Sustainable Minds	BOM (version 2) Prototyping updates
8	3/12	Supply Chain management	Guest lecture 4: Public Speaking	1-min Video Clip; Online-design Portfolio
9	3/19	Guest lecture 5: Export/import laws / Regulatory certification	Project Presentation	(Prepare for the field trip)

Part 3: New Product Launch

You will explore the boundary between product design and manufacturing. A field trip to Hong Kong and China will provide you with a closer look at the supply chain capabilities of the greater China region. In order to prepare for the product launch, you will learn about product lifecycle management, and how to compose a business plan and financial plan for a new product. Finally, your product will be presented and demonstrated at the end-of-semester Jacobs Institute Design Showcase.

Break	3/23-3/29	UCB visit to Hong Kong and China 3/24-3/29. Proposed project presentation by UCB students to HKUST students.		
10	4/2	Packaging Design	Project Discussion 2	Field Trip Report Package Design
11	4/9	Guest lecture 6: Product Launch	Mini-showcase	3-min Video Clip (pre-final version)
12	4/16	Guest lecture 7: Business Plan & Venture Capital	Workshop: Business Plan	Business Plan; Poster Design
13	4/23	Business Pitch	Project Discussion 3	Final Presentation materials; 3-min Video Clip; Online design Portfolio
14	4/30	Final Presentation		
15	5/8	Design Show		