Customer-Driven Technical Innovation: Silicon Valley
GE2010-Summer 2020
College of Engineering
Northeastern University

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Class Hours: M, Tu, W, Th 9-11 am
Room: NU Campus at Silicon Valley (Online)
Office Hours: By appointment (Online)

Course Description:
Studies the role of engineering innovation in addressing customer needs in early start-ups and the need to conceive successful innovative engineering design as part of a commercialization strategy. Emphasizes understanding how engineering innovation can meet real technical market needs and how to gather the necessary, relevant technical information early in the innovation process to produce a successful engineering design. Uses a series of engineering design projects to demonstrate how students can assess the technical capabilities of the start-up in producing an innovative design, how to communicate with customers in an iterative engineering design process, and how to correspondingly design and innovate to meet customer technical requirements.

Course Overview:
This course is focused on analyzing common shortcoming of early technology startups and creating understanding for successful innovation design and commercialization strategy in Silicon Valley. The key to success is in correct identifying, understanding, and developing a good relationship with one’s customer. Particular emphasis is made on understanding real market needs, and how to gather relevant information to make the educated decision early on. This course will benefit students of all disciplines. The course will demonstrate through a series of projects how to assess your capabilities, find and communicate with your end users and clients and correspondently develop your product to fit their needs. Topics to be covered include: overview of technology transfer, innovation models, customer discovery, lean startup, open innovation and its implication, interview and analytical techniques, competitive intelligence and competitive advantage, value proposition, presentation skills and techniques. Field trips to various companies in the area.

Textbooks
There is no required textbook for this course. During the course there will be required readings which are mostly online or freely available. If you would like to get a reference for a specific topic there will be recommendations available. There is an expectation that students in this course will seek out their own information and tutorials on some topics.

Recommended Reference Books:
1. The Singularity is Near: When Humans Transcend Biology, by Ray Kurzweil
2. How to Create a Mind: The secret of Human Thought Revealed, by Ray Kurzweil
4. Jobs to be Done: Theory to Practice, Anthony W. Ulwick. IDEA BITE PRESS; 2016

Learning Outcomes:
- Develop an understanding of the market needs, customers and end user.
- Develop an understanding of basic principles of product design and value creation.
- Develop skills and understanding of the process of customer discovery, interactions and relationship.
- Acquire familiarity with various models of innovation and innovation strategy
- Learn interview and presentation skills
- Develop critical thinking and acquire skills for competitive intelligence
- Develop understanding of disruptive innovation theory and its practical implications.

Assignments:
There will be a total of four assignments during the course of the semester, approximately one every week. Two of the assignments/projects will require teamwork and others serve as preparation for these group projects.

Discussion and collaboration is strongly encouraged both in class and during assignment preparation. However in each case the individual author or the assigned team will take full responsibility for the final conclusions and presentation of the results. In most of the assignment, there will be no “right” or “wrong” answer.

Grading:
- Team projects, activities and homework assignments.
- Assignments and activities 50%
- Team projects 30%
- Participations and Attendance (20%)

Class Participation and Attendance:
Lectures in this course will be interactive and you are strongly encouraged to speak up when you have a question or would like to make a comment. You should also expect to be called on any time to answer questions. Making the arguable statement and being able to defend your position is more important than being “right” as far as the discussion is relevant to the subject.

Your attendance in class directly impacts your ability to participate and benefit from these discussions, especially because there is not a single textbook to follow. By signing up for this course, you express your interest in learning about product development, so it is up to you to show up for class on time and take full advantage of this learning and enrichment experience.
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<tr>
<th>Week</th>
<th>Topics</th>
<th>Assignments/Activities</th>
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| 1    | May 4-8 | Engineering and Entrepreneurship Intro  
Why we are here – career paths  
Entrepreneurship  
Failure and Success  
What’s missing – changing perspectives?  
Technology development life cycle  
Ideas without intent  
Valley of death  
Successes and Failures | A1: SV Companies and Products  
Consumers, Market size, product Improvements.  
Presentation/Discussion/Report  
Due: May 4, 2020 |
| 2    | May 11-15 | Innovation vs invention  
From idea to the product  
Technology transfer  
Commercialization  
Licensing, sales, and acquisition  
Service model of commercialization  
Defining market and market needs  
Marketing, sales  
Market analysis  
Market size  
Technology application and unsolved needs | A2: Failed and Successful Innovations  
Presentation/ Discussion/Report  
Due: May 11, 2020 |
| 3    | May 18-22 | End users, customers, client, and targets  
Talking to your customer  
Interview techniques, and analysis  
Innovation strategy  
Models of innovation (history and reality)  
Open Innovation and Disruptive Innovation  
Creative Destruction  
Disruptive Innovation | A3: Customer Needs and Solutions  
Whose needs, End user’s or clients, what is the jobs that needs to be done there?  
Presentation/ Discussion/Report  
Due: May 18, 2020 |
| 4    | May 25-29 | Value proposition and business plan  
Solving your customer needs  
Customer interviews as a tool for value proposition development  
Types of business plan  
Investor presentation  
Competition, Competitive intelligence and Competitive advantage  
Direct and indirect competitors  
Solving the need vs technical details  
Working with your competition  
Competitive advantage | A4: Questionnaire and Interviews  
Who are your customers, market consideration, talking to customers, interviews, analysis, feedbacks or clients, what is missing in the market?  
Presentation/ Discussion/Report  
Due: May 25, 2020 |
| 5    | June 1-5 | Formula of success and Overview  
Crossing the valley of death with knowledge and skills  
Know your end user  
Work with your customer  
Choose the right strategy  
Final presentation and report | A5: Silicon Valley Company Feedback:  
Experiential learning outcome based on these activities.  
Report Only  
Due: June 1, 2020  
FP: Presentation/Report  
Presentation Due: June 3, 2020  
Report Due: June 4, 2020 |