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

Instructor: Prof. Bala Maheswaran
E-mail: b.maheswaran@northeastern.edu
mahes@coe.neu.edu

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 completive 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
3. Competing Against Luck: The Story of Innovation and Customer Choice.by Clayton M. Christensen, Karen Dillon, Taddy Hall, David S. Duncan. HarperBusiness, 2016
4. Jobs to be Done: Theory to Practice, Anthony W. Ulwick. IDEA BITE PRESS; 2016
5. Made to Stick: Why Some Ideas Survive and Others Die, by Chip and Dan Heath. Random House; 1st edition (January 2, 2007)
6. The Startup Owner's Manual: The Step-by-Step Guide for Building a Great Company, by Steve Blank and Bob Dorf. K & S Ranch; 1 edition (March 1, 2012)
7. The Innovator's Dilemma: The Revolutionary Book That Will Change the Way You Do Business, by Clayton Christensen. HarperBusiness; Reprint edition (October 4, 2011)

8. Open Business Models: How to Thrive in the New Innovation Landscape, by Henry Chesbrough. Harvard Business Review Press; 1 edition (December 6, 2006).
9. The Wide Lens: A New Strategy for Innovation, by Ron Adner. Portfolio Hardcover (2012).

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.

SYLLABUS: Summer1-2020 (five weeks)

Week	Topics	Assignments/Activities
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 Assignment 3 presentation and Discussion	**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 Assignment 4 presentation and Discussion	**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