

Department of Engineering and Society
School of Engineering and Applied Science
University of Virginia

STS 6610
Technology Innovation:
From Discovery to Product Concept

Fall 2017

Instructors:

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Location and Time: Rice 011, Tuesdays and Thursdays, 11-12:15

Credits: 3

Overview

This course introduces the fundamentals of innovation to engineers and managers. It focuses on the unique aspects of what economists call “supply-push” innovation—namely the process by which individuals convert new discoveries and knowledge into products. This sort of innovation involves both an awareness of how scientists and engineers create new knowledge as well as a willingness to listen and learn from customers.

To put these concepts into practice, students will give several presentations and will work in teams to develop a product using Business Model Canvas. They will be introduced to techniques for listening to customers. Student teams will also prepare several written assignments that culminate in a final report laying out a business concept for their product. Wherever possible, the lecture topics listed below will be taught using business cases in which students learn by discussion and debate. Students will be expected to do background work to introduce visiting speakers and to moderate the Q&A portion for each visitor. Overall, the course will provide an overview of the “nuts and bolts” of technology innovation.

Learning Objectives

By the end of the class, students will be able to:

- Evaluate the commercial potential of a new technology and determine the best way to bring that technology to market;

- Understand how innovation involves integrating technical, business, and social factors;
- Be able to undertake a basic patent search to evaluate the novelty and commercial potential of a new idea;
- Know how to talk to customers and discover their interests and needs;
- Use Business Model Canvas to articulate a business strategy for a new product;

Format

Most weeks will have one lecture and one session devoted to a practical exercise. Guest speakers will be invited to speak on specific topics.

Readings

Along with a number of reports and articles available on Collab, we will be drawing on the following books:

W. Bernard Carlson, *Tesla: Inventor of the Electrical Age* (Princeton University Press, 2013). Available on Collab.

Giff Constable, *Talking to Humans: Success starts with understanding your customers* (Published by the author, 2014). Download at <http://www.talkingtohumans.com/download>

Alexander Osterwalder et al., *Value Proposition Design* (Hoboken, NJ: John Wiley, 2014). Download at https://s3.amazonaws.com/media.loft.io/attachments/Value_proposition_design_q0QhaWy.pdf

Videos

To learn about the process of customer discovery, you will be expected to review the following videos over the course of the semester:

Pre-Planning Customer Discovery

[Pre-Planning Part 1](#) (4:55)

Customer Discovery Interviews

[Interviews Part 1](#) (5:40)

[Interviews Part 2](#) (3:49)

Outside the Building

[Asking the Right Questions](#) (2:37)

[Death by Demo Part 1](#) (2:18)

[Death by Demo Part 2](#) (1:45)

[Assuming You Know What the Customer Wants](#) (1:56)

[Death by PowerPoint](#) (1:42)
[Understanding the Problem the Right Way](#) (3:22)
[Customers Lie](#) (2:37)
[The Distracted Customer](#) (3:12)
[Engaging the Customer](#) (3:37)
[Customer Empathy](#) (2:25)
[The User, the Buyer, and the Saboteur](#) (2:24)
[The Multi-Person Interview](#) (2:03)
[B to B to C](#) (2:15)
[Public Interviews](#) (2:11)

Assignments and Grading

Grades will be based on the following scheme:

Individual

Class participation	20%
Idea Notebook	10
Rocket Pitch	10

Group

Customer discovery presentation	15
Patent Search presentation	15
Business Concept Presentation	10
 Final Business Concept Report	 20

Most assignments will have instructions distributed as a handout or posted on the course webpage on Collab under Resources in the Assignments Folder. We will discuss each assignment in depth on the days indicated on the schedule below. All written assignments must be submitted in class or delivered to the instructors' mailboxes in Thornton A237. We will not accept assignments as email attachments or uploaded to Collab.

The due date for each assignment is listed in bold. All assignments are due either at class time or by 5 PM on the due date. Any late assignments will lose a **full letter grade** for each day that they are late.

Notebook Assignment

We believe that budding innovators should develop tools that help them identify ideas and refine ideas into opportunities. Toward that end, you will need to keep an idea notebook throughout the semester and **make one or two entries in it every day**. We anticipate that by the end of the semester you will have **100-120 entries**, with half of these entries related to technology or engineering. Instructions for keeping such a

notebook can be found on the course's Collab web page under Resources in the Assignments Folder.

Ground Rules

Communications throughout the course generally involve **emails** sent to all the students. Any official message about the course will have “STS 6610” at the start of the subject line.

Written assignments should be typed on one side of the paper. Assignments should be double-spaced, using a **12-point Cambria font** and one-inch margins (this document is in the Cambria font). In assignments involving illustrations and visual materials, you will be permitted more flexibility in terms of layout, though you will need to make sure that you make effective use of white space [a topic which will be discussed in lab]. All diagrams, charts, and tables must be appropriately labeled. Your name, course number, date, and name of the assignment should appear on each paper. Please **number the pages**.

All papers must be carefully **proofread**. You may use a spell-checker on your papers, provided that the program does not automatically change misspelled words. Please be sure to read your papers over prior to submission to make sure that you have the right word in the right place; spell-checkers often correct words, but they cannot tell whether you are using the proper word. **Any paper with more than three misspelled words will receive one point off for each subsequent misspelling.**

All work submitted for a grade must be pledged according to the [Honor Code Guidelines for STS Courses](#); a web link to these guidelines will be provided. **Papers that are not pledged will not be graded and will be returned to the student for pledging.**

To protect yourself from computer crashes, **always make and keep a hard copy of each assignment.**

With regard to **reading assignments**, we assume that you will read the articles or pages listed for a particular week **prior** to your lab section.

In the unlikely situation that we are delayed in coming to lecture or the lab sessions, we ask that you wait a full **20 minutes** before leaving the classroom.

The schedule below shows the order in which we will take up various topics and tasks, but it is subject to change based on our assessment of how the majority of students are doing in the class. On some occasions, we may change the due date of some assignments, but if we do so, we will give the class ample notice.

Laptop and Cell Phone Policy

Most sessions will be **screen-free**; this means no laptop computers, cell phones, iPhones, or other electronic devices. All devices should be stowed in your backpack or handbag during class. The reason for this policy is that during sessions you should focus on listening and discussing the issues with your classmates. You should plan on taking notes in a paper notebook. Depending on the work scheduled, laptops may be required for some sessions.

Class Attendance

We expect students to behave like professionals. Consequently, we assume you will make every effort to attend all of the sessions. However, we also know that you have other professional and personal obligations that may prevent you from attending every class. Recognizing this, you are permitted to miss **one session** during the semester, and you will not be required to explain this absence. If you need to be absent more than once, then you need to give us a note explaining any absence. We will penalize students who have an unreasonable number of absences.