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

STS 5610
Knowledge Entrepreneurship

Fall 2018

Instructors:
W. Bernard Carlson, Professor and Chair, wc4p@virginia.edu
Elizabeth P. Pyle, Associate Director of Technology Entrepreneurship, epyle@virginia.edu

Format: Seven weeks with two 75-minute sessions each week
Credit: 1

Overview

This course introduces new graduate students to engineering research providing them with an intellectual framework which will help them to succeed as innovators and leaders. Students will understand the process and skills needed to successfully launch their research, develop their communication skills and map out their education and long-term career goals.

Background: As undergraduates, students are ***passive consumers*** of engineering knowledge who master the material in textbooks, lectures, and laboratory exercises; when they become graduate students, we must teach them how to be ***active producers*** of knowledge, to have the skills to not only generate new ideas and designs but to be able to implement these solutions in society.

To become active producers of engineering knowledge, our students need to acquire some of the habits of traditional **entrepreneurs:**

- They must identify a challenge or problem out there in the world and frame it as a question that can be answered. ***Problem definition*** often means engaging with multiple stakeholders—customers, funding agencies, and fellow professionals—to understand each group's needs.

- Once they understand the problem, Knowledge Entrepreneurs mobilize a ***network*** of people and resources needed to answer that question, a network that includes faculty advisors, lab support personnel, equipment and space, and data. To build an effective network, Knowledge Entrepreneurs appreciate that ***teamwork*** **and** ***cooperation*** are essential to modern engineering and science. They also know that solutions are frequently found through ***cross-disciplinary collaboration.***

- With the help of their advisors, the Knowledge Entrepreneur not only write funding proposals but ***strategically identify the most promising products***—papers in key journals, presentations at conferences, patents, elevator pitches, popular articles, blogs, and websites—that ensure that their ideas and designs are accessible and interesting to multiple audiences.

Overall, the course seeks to help students launch their research, develop their communication skills [both writing and speaking], and map out their education and long-term career goals.

The **key deliverable** of the course will be a research proposal that the students can submit for external grants or fellowships.

Learning Objectives

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

- Acquire a entrepreneurial mindset that helps integrate intellectual, personal, and career goals
- Understand how to access and mobilize resources to further their research
- Strengthen their written and verbal communication skills
- Learn how to write an effective grant proposal

Readings and Course Materials

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

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

Stuart Read and Saras Sarasvathy, *Effectual Entrepreneurship.* Available on Collab.

Herbert B. Michaelson, *How to Write and Publish Engineering Papers and Reports,* 3 ed. [Phoenix: Oryx Press, 1990]. Available on Collab.

Sigma Xi, "Honor in Science," 1984.https://www.sigmaxi.org/docs/default-source/Programs-Documents/Ethics-and-Research/free-pdf.pdf?sfvrsn=2
Sigma Xi, "The Responsible Researcher: Paths and Pitfalls, 1999. https://www.sigmaxi.org/docs/default-source/Programs-Documents/Ethics-and-Research/responsible-researcher.pdf?sfvrsn=2

In addition to these readings, we may use several videos in this course, and we will provide links to them via Collab.

Assignments

Your performance in this course will be based on

several written papers, including a technical description as well as personal and research statements;
several short oral presentations
regular and thoughtful participation in class discussions.

Topics to be Covered

A schedule showing the sequence of topics, readings, and assignment due dates will be distributed on the first day of class. We expect to cover the following topics:

Thinking like an Entrepreneur;
Assessing your strengths and talents

What happens in a Laboratory? [Flow model of Innovation]
How is research funded?

What makes a good research problem?

Mapping your research network
Interviewing and listening skills

Publications and other outlets for research

Intellectual property

The art of proposal writing
Searching for fellowship opportunities

Teamwork and collaboration

Revising and editing

Commercializing new technology

Research ethics and professional conduct