

Syllabus, 01/29/2016 version

FROM RESEARCH TO REVENUE
SPRING 2016 A TERM, FRIDAYS 9.00-12.15pm, Uris 331

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Engineering

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Course Description

The target audience for this course is MBA and Engineering students interested in creating (or investing in) companies that drive value from intellectual property. What makes this course different from many other innovation and entrepreneurship courses is the focus on turning academic research into intellectual property and then into business value.

As a world-class research institution, Columbia University is a prime producer of academic research. Every year Columbia researchers submit inventions on over 350 potential breakthroughs, which Columbia's office of Columbia Technology Ventures converts into over 100 licenses with industry, including 20+ new startup companies, which collectively have generated hundreds of millions of dollars in licensing revenue for Columbia and its researchers over the past decade. However, even with this track record, for every invention that reaches the market there are many more that never find a commercial partner to complete the journey.

Such resources, which are available only at a world-class research institution like Columbia University, may be turned into a source of competitive advantage by students interested in entrepreneurship. Indeed, one of the major ways in which companies (in particular technology-based startups) create barriers to entry is through their intellectual property, including patents and trade secrets. Collaboration with academia is a great way to create such barriers to entry.

This course trains students to identify and pursue innovation opportunities that rely on intellectual property coming out of academic research. It provides students with some basic understanding of how academia operates and how it connects to practice, some basic knowledge of research frontiers in relevant fields of knowledge, and trains them to connect and work with talented individuals with different backgrounds and skills.

Enrollment in this course is limited, and split evenly between the Engineering School and the Business School.

Project

Lectures are complemented with a hands-on project. Projects are proposed by teams of Columbia researchers (PhD students, Post Docs, and at least one faculty sponsor per project)

who have developed academic research with commercial potential, and have submitted that invention to Columbia Technology Ventures for an initial patentability and commercial analysis. Priority will be given to projects for which students could develop a tangible deliverable (prototype of Minimum Viable Product) within the time frame of the course. Teams of MBA and Engineering students work on these projects jointly with the researchers throughout the course.

Researchers will benefit from the business development and prototyping work of the student teams. Students will benefit from the opportunity to work on tangible early-stage business ideas, and experience the benefits of studying at a world-class research university. Interested students may leverage the many resources available at Columbia to pursue their projects further beyond this course (e.g., i.e@Columbia, Columbia Venture Competition, and the various entrepreneurship bootcamps offered throughout the campus).

Project deliverables:

- Some primary market research
- A demo
- A Business Model (based on a modified Business Model Canvas)
- A Go / No Go recommendation
- A pitch to investors (if recommendation is Go)

Evaluation Overview (for MBA students)

Class preparation (including watching two videos before Session 1)	10%
Class participation	20%
Project	70%

Evaluation Overview (for SEAS students)

Class participation	20%
Project	70%

(50% of the project grade is based on a written report which includes technical advantages over competitive technologies. The report should have sufficient technical depth such that specialists in the field can grasp the advantages over competitive technologies.)

Schedule

Session	Topics	Required Readings / Preparation
<p style="text-align: center;">1 01/29</p>	<p>Course introduction (0h30, Sia + Toubia)</p> <p>Project pitches (1h00, student inventors)</p> <p>Intellectual property issues (1h30, Orin Herskowitz, Executive Director of Columbia Technology Ventures)</p>	<p>Watch the following two videos (approx. 1 hour each):</p> <p>http://techventures.columbia.edu/news-events/videos/patenting-licensing-early-stage-university-technology</p> <p>http://techventures.columbia.edu/news-events/videos/patents-101</p> <p>Confirm that you have watched these videos on the following link:</p> <p>https://columbia.az1.qualtrics.com/SE/?SID=SV8uhDzXS7Cr0nN77</p>
<p style="text-align: center;">2 02/05</p>	<p>Opportunity identification / putting together a business model (1h30, Toubia)</p> <p>Market research (1h30, Toubia)</p>	<p>Blank, Steve (2013), "Why the Lean Start-Up Changes Everything," <i>Harvard Business Review</i>, May, 1-9.</p> <p>Kim, W. Chan, and Renée Mauborgne (2004), "Blue Ocean Strategy," <i>Harvard Business Review</i>.</p> <p>Christensen, Clayton M., Scott Cook, and Taddy Hall (2005), "Marketing Malpractice: The Cause and the Cure," <i>Harvard Business Review</i>.</p>
<p style="text-align: center;">3 02/12</p>	<p>Research frontiers in Energy and Sustainability (1h30, Vijay Modi, Professor of Mechanical Engineering, Columbia University)</p> <p>Product development (1h30, Sia)</p>	<p>Sia, Samuel K and Matthew P Owens (2015), "Share and Share Alike," <i>Nature Biotechnology</i>.</p>
<p style="text-align: center;">4 02/19</p>	<p>Research frontiers in Life Sciences (1h30, Sia)</p> <p>Designing complex products and services (1h30, Toubia)</p>	<p>Hauser, John (1993), "How Puritan Bennett used the House of Quality," <i>Sloan Management Review</i>, Vol. 34 Issue 3, p61.</p> <p>Toubia, Olivier, "Note on the Voice of the Customer."</p>
<p style="text-align: center;">5 02/26</p>	<p>Research frontiers in Data Sciences (1h30, Chris Wiggins, Associate Professor of Applied Physics and Applied Mathematics, Columbia University, and Chief Data Scientist, New York Times)</p> <p>Financing and team structuring (1h30, Puneet Shivam, Head of US Investment Banking, Avendus Capital)</p>	
<p style="text-align: center;">6 03/04</p>	<p>Final project presentations (2h30)</p> <p>Next steps and additional resources (0h30)</p>	