

University of Pennsylvania  
School of Engineering and Applied Science

Syllabus

**EAS 446/546 – ENGINEERING ENTREPRENEURSHIP II**

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**Course Description**

This course is the sequel to EAS 445/545 and focuses on the planning process for a new technology venture. Like its prerequisite, the course is designed expressly for students of engineering and applied science having a keen interest in technological innovation. Whereas EAS 445/545 investigates the sequential stages of engineering entrepreneurship from the initial idea through the early growth phase of a startup company, EAS 446/546 provides hands-on experience in developing a business plan for such a venture. Working in teams, students prepare and present a comprehensive business plan for a high-tech opportunity. The course expands on topics from EAS 445/545 with more in-depth attention to: industry and marketplace analysis; competitive strategies related to high-tech product/service positioning, marketing, development and operations; and preparation of sound financial plans. Effective written and verbal presentation skills are emphasized throughout the course. Ultimately, each team presents its plan to a distinguished panel of recognized entrepreneurs, investors and advisors from the high-tech industry.

**Prerequisite(s):**

Successful completion of EAS445/545 and Junior, Senior or Graduate standing is required.

**Course Materials:**

Reading Pack (required), to be purchased from the SEAS Copy Center. Availability to be announced in class.

Additional readings and notes are handed out in class or posted from time to time on the Blackboard course website.

**Blackboard Course Website:**

The Blackboard course website may be accessed at <http://courseweb.library.upenn.edu>. All course announcements and assignments are posted on this site. Supplementary readings may also be posted on this site from time to time.

## **Grading:**

Course grades are determined approximately as follows:

- Class attendance and participation: 15%
  - Weekly assignments: 15%
  - Classroom presentations: 15%
  - Final presentation to review panel:
    - Individual effectiveness: 10%
    - Team effectiveness: 10%
  - Final plan documents: 35%
- 100%

Excessive unexcused absences are penalized. Extra credit opportunities, which may enhance a course grade, may also be provided during the semester.

## **Attendance and Participation:**

Attendance at all class sessions is presumed. An unexcused absence results in an “F” participation grade for the missed class. Excessive, unexcused absences result in additional grade penalties and possible failure of the course. Late arrival for class may also result in a grade penalty.

In-class discussion is an important element of the course pedagogy. Substantive classroom participation, which enhances the intellectual level of discussion, results in an “A+” participation grade for that class. Thoughtful classroom participation, not simply “air time,” results in an “A” participation grade for that class. Inattentiveness results in a participation grade of “C” or lower.

As a common courtesy to other students and the instructor, use of cell phones, laptops and other distracting devices or activities are not permitted in the classroom.

## **Assignments:**

Written homework assignments must be submitted at the beginning of class on the due date. Late submittals generally will not be accepted. All work must be typed neatly and concisely on 8½ x 11 inch paper. Multiple pages must be stapled together.

## **Course Outline (Spring Term):**

The following course outline and schedule for a typical spring term is subject to change at the instructor’s discretion. Students are advised to check the Blackboard course website regularly for assignments and announcements.

## EAS446/546: ENGINEERING ENTREPRENEURSHIP II (SPRING TERM)

Class	Lecture Topic	Reading Assignment	Writing Assignment	Presentation Assignment
1	<ul style="list-style-type: none"> <li>Course Introduction: Preparing and Presenting a Successful Business Plan</li> </ul>			
2	<ul style="list-style-type: none"> <li>Concept Analysis</li> </ul>	<ul style="list-style-type: none"> <li>Morgan, N. "The Kinesthetic Speaker- Putting Action into Words."<sup>2</sup></li> </ul>	<ul style="list-style-type: none"> <li>Resume</li> <li>High-Tech Business Concept Proposal</li> </ul>	<ul style="list-style-type: none"> <li>High-Tech Business Concept Elevator Pitch</li> </ul>
3	<ul style="list-style-type: none"> <li>Kinesthetic Speaking</li> <li>Competitive Strategy IA: Industry Analysis and the Five Forces<sup>1</sup></li> </ul>	<ul style="list-style-type: none"> <li>Bhide, A. "The Questions Every Entrepreneur Must Answer."<sup>3</sup></li> <li>Step 1 – Concept Analysis<sup>4</sup></li> </ul>	<ul style="list-style-type: none"> <li>Concept Analysis Worksheets</li> </ul>	<ul style="list-style-type: none"> <li>Critique of Reading</li> <li>Summary of Concept Analysis</li> </ul>
4	<ul style="list-style-type: none"> <li>Competitive Strategy IB: Industry Analysis and the Five Forces<sup>1</sup></li> <li>The Mission Statement</li> </ul>	<ul style="list-style-type: none"> <li>Sahlman, W. "How to Write a Great Business Plan."<sup>3</sup></li> <li>Step 2 – Industry and Marketplace Analysis<sup>4</sup></li> </ul>	<ul style="list-style-type: none"> <li>Product Description</li> <li>Industry Analysis</li> <li>Marketplace Analysis</li> </ul>	<ul style="list-style-type: none"> <li>Critique of Reading</li> <li>Product Description</li> <li>Industry and Marketplace</li> </ul>
5	<ul style="list-style-type: none"> <li>Competitive Strategy II: Strategic Groups<sup>1</sup></li> </ul>	<ul style="list-style-type: none"> <li>Porter, M. "How Competitive Forces Shape Strategy."<sup>2</sup></li> <li>Kim, W. and R. Mauborgne, "Creating New Market Space."<sup>2</sup></li> <li>Step 3 – Marketing Plan<sup>4</sup></li> </ul>	<ul style="list-style-type: none"> <li>Mission Statement</li> <li>Customer Analysis</li> <li>Target Market</li> </ul>	<ul style="list-style-type: none"> <li>Critique of Reading Assignment</li> <li>Target Market</li> </ul>
6	<ul style="list-style-type: none"> <li>Competitive Strategy III: Determinants of Profitability<sup>1</sup></li> <li>Pricing Strategy</li> </ul>	<ul style="list-style-type: none"> <li>Hamermesh, r. et al. "Note on Business Model Analysis for the Entrepreneur."<sup>2</sup></li> <li>Dolan, R. "How Do You Know When the Price is Right?"<sup>2</sup></li> <li>Ayres, W. "High-Tech Ventures: Choice of Entity."<sup>2</sup></li> <li>"The Best Ownership Structure for Your Business."<sup>2</sup></li> <li>Step 4 – Operations Plan<sup>4</sup></li> </ul>	<ul style="list-style-type: none"> <li>Company Overview</li> <li>Competitor Analysis</li> <li>Product/Service Strategy (incl. product attribute mapping)</li> <li>Scope of Operations</li> </ul>	<ul style="list-style-type: none"> <li>Critique of Readings</li> <li>Product Strategy</li> <li>Operations Strategy</li> </ul>
7	<ul style="list-style-type: none"> <li>Competitive Strategy IV: Emerging Industries<sup>1</sup></li> </ul>	<ul style="list-style-type: none"> <li>Block, Z. and I. MacMillan, "Milestones for Successful Venture Planning."<sup>3</sup></li> <li>Step 5 – Development Plan<sup>4</sup></li> </ul>	<ul style="list-style-type: none"> <li>Development Timeline (Gantt, PERT or similar format)</li> <li>Development Strategy</li> <li>Pricing Strategy</li> <li>Distribution Strategy</li> <li>Company Organization</li> <li>Management Team</li> </ul>	<ul style="list-style-type: none"> <li>Critique of Reading</li> <li>Development Plan</li> </ul>
8	<ul style="list-style-type: none"> <li>Four P's of Market Strategy: Product, Place, Price and Promotion</li> <li>Financial Workbook: Financial Statements and Ratio Analysis</li> </ul>	<ul style="list-style-type: none"> <li>Rock, A. "Strategy vs. Tactics from a Venture Capitalist."<sup>3</sup></li> <li>Step 6 – Strategy Integration<sup>4</sup></li> </ul>	<ul style="list-style-type: none"> <li>Advertising and Sales Strategy</li> <li>Operations Strategy</li> <li>Development Strategy (rewrite)</li> </ul>	<ul style="list-style-type: none"> <li>Critique of Reading</li> <li>Marketing Plan</li> </ul>
SPRING BREAK				

Class	Lecture Topic	Reading Assignment	Writing Assignment	Presentation Assignment
9	<ul style="list-style-type: none"> <li>Self-Financeable and Sustainable Growth Rates</li> </ul>	<ul style="list-style-type: none"> <li>The Balance Sheet<sup>2</sup></li> <li>The Income Statement<sup>2</sup></li> <li>Assessing a Firm's Future Financial Health<sup>2</sup></li> <li>Step 7 – Revenue and Cost Forecasts<sup>4</sup></li> </ul>	<ul style="list-style-type: none"> <li>Financial Workbook: Industry Ratios</li> </ul>	<ul style="list-style-type: none"> <li>Financial Ratios Analysis</li> </ul>
10	<ul style="list-style-type: none"> <li>The Art of Persuasion</li> </ul>	<ul style="list-style-type: none"> <li>Step 8 – Financial Statements<sup>4</sup></li> </ul>	<ul style="list-style-type: none"> <li>Self-Financeable and Sustainable Growth Rates</li> <li>Revenue Forecasts</li> <li>Expense Forecasts</li> <li>Financial Assumptions</li> <li>Financial Workbook: Cash Flow</li> </ul>	<ul style="list-style-type: none"> <li>Critique of Reading Assignment</li> <li>Net Income Outlook</li> </ul>
11	<ul style="list-style-type: none"> <li>Meeting the Press</li> </ul>	<ul style="list-style-type: none"> <li>Stancill, J. “How Much Money Does Your New Venture Need?”<sup>3</sup></li> <li>Step 9 – Capital Requirements<sup>4</sup></li> </ul>	<ul style="list-style-type: none"> <li>Revise and Integrate: <ul style="list-style-type: none"> <li>Industry and Marketplace Analysis</li> <li>Marketing Plan</li> <li>Operations Plan</li> <li>Development Plan</li> </ul> </li> <li>Capital requirements</li> <li>Financial Risks</li> <li>Exit Strategies</li> <li>Complete and Submit Financial Workbook</li> </ul>	<ul style="list-style-type: none"> <li>Critique of Reading</li> <li>Capital Requirements, Financial Risks, Exit Strategies and Ratio Analysis</li> </ul>
12		<ul style="list-style-type: none"> <li>Shaw, G. et al. “Strategic Stories: How 3M is Rewriting Business Planning.”<sup>2</sup></li> <li>Step 10 – Business Valuation<sup>4</sup></li> </ul>	<ul style="list-style-type: none"> <li>Offer Statement</li> <li>Executive Summary Draft</li> <li>Media Copy Points</li> </ul>	<ul style="list-style-type: none"> <li>Critique of Reading</li> <li>Offer Statement</li> </ul>
13		<ul style="list-style-type: none"> <li>Step 11 – Publishing the Plan<sup>4</sup></li> </ul>	<ul style="list-style-type: none"> <li>Revised Executive Summary</li> <li>Business Plan Complete Draft for team review</li> </ul>	<ul style="list-style-type: none"> <li>Plan Presentation (Dry Run)</li> </ul>
14	<ul style="list-style-type: none"> <li>Review Panel Introduction</li> </ul>	<ul style="list-style-type: none"> <li>Step 12 – Presenting the Plan<sup>4</sup></li> </ul>	<ul style="list-style-type: none"> <li>Finalized Plan and Book of Academic Endnotes due next Monday</li> </ul>	<ul style="list-style-type: none"> <li>Plan Presentation to Review Panel</li> </ul>

<sup>1</sup> Based on Porter, M, *Competitive Strategy – Techniques for Analyzing Industries and Competitors*, The Free Press, New York, 1980.

<sup>2</sup> Required course reading pack or website posting.

<sup>3</sup> Required course textbook: *Harvard Business Review on Entrepreneurship*, Harvard Business School Press, Boston, 1999.

<sup>4</sup> Adapted from Lawrence, S. and F. Moyes, *Twelve Steps to a Successful Business Plan*, University of Colorado, 1999.