

**SYLLABUS**  
**COURSE: SPECIAL TOPICS IN ELECTRICAL ENGINEERING**  
**ENTREPRENEURSHIP FOR SCIENTISTS AND ENGINEERS**  
**FALL 2020**

Dates: August 24 – December 03  
Time: Tuesday – Thursday. 7:30 pm - 8:50 am  
Class: EE4395-005. CRN: 19582  
EE5390- 006. CRN: 19583  
Classroom: ON-LINE ONLY – Via ZOOM  
Instructor: Alberto M. Correa, Ph. D.  
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**Description**

The course will introduce science and engineering students to understand how science, technology and innovation are the key to entrepreneurial activity, providing a blueprint for the ideas and strategies to build a successful venture.

The value of entrepreneurial education is discussed as a key element in developing and commercializing **intellectual capital**. An innovative product may be an achievement of engineering, but that does not automatically turn it into a commercial success. What makes success in the lab and success in the marketplace is the **business model**. The business model incorporates the product or service to the customer's needs, and is in fact the economic mechanism that will enable meeting profitability and growth objectives. And the tool to develop the business model is the **Business Plan**.

The key to successful innovation is understanding consumers' needs:

- Where there is a problem, there is a consumer's need.
- Where there is a consumer's need, there is a market opportunity.
- Where there is a market opportunity, there is potential for a new venture and making profit.

The best and most innovative ideas will never see the light unless they are **funded**. Therefore, effective product innovation relies on clearly defined **financial models** as part of the business plan.

The concept of **Corporate Entrepreneurship** will also be discussed. Most organizations find that their ability to identify and exploit innovative opportunities, and to discover the key to success in a highly competitive and dynamic environment, is to adopt an **entrepreneurial strategy**, seeking **competitive advantages** through **continuous innovation**, to effectively **exploit** identified **opportunities** for a **sustainable growth**.

## Prerequisites

Senior-level undergraduate student, or graduate students status.

## Objectives

The course will present to science and engineering students, the value of entrepreneurial education in the world of science and engineering, demonstrating how the entrepreneurial activity when related to science and technology, will turn **inventions into innovation**, by providing a path to build a successful venture. In addition, it will describe how the **intellectual capital** generated by university research, and the resulting new scientific and technological discoveries, can be utilized to produce better goods and services for the society. Students will work hands-on in teams to identify opportunities derived from scientific and technological research, and will develop a profile of a technology venture by writing a business plan.

1. Introduce the student to the socioeconomic and cultural and social nature of entrepreneurship in the global community, and the entrepreneurial mind set: critical thinking, problem solving, can-do attitude, planning and implementation.
2. Introduce the relationship between technology innovation and entrepreneurship.
3. Introduce the relationship between university research, intellectual capital generation and technology commercialization.
4. Introduce Corporate Entrepreneurship, where companies need to adopt an entrepreneurial strategy to seek competitive advantages through continuous innovation, to effectively exploit opportunities for sustainable growth.
5. Develop the concept of **how the business model incorporates products and services to customers' needs satisfaction**, writing the business plan as an accepted business practice for planning and critical thinking.
6. Create in the student the working-team and hands-on spirit, by working in teams and orienting their work to accomplish the course's team assignments.

## Requirements

Successful completion of this course demands active participation. Students are expected to complete:

1. Reading the textbook and other materials as assigned.
2. Participating in class discussions.
3. Contributing to the team project and presentations.
4. Complete the assignments.
5. Submitting a team project's business plan on a technology venture based on opportunities identified by each team.

## Grades

|   |      |
|---|------|
| Summarize the assignments provided by the instructor.   | 40 % |
| Team project: <ul style="list-style-type: none"><li>• Identify a technology/innovation project.</li></ul> | 60 % |

|   |  |
|---|--|
| <ul style="list-style-type: none"> <li>• Write a technology venture business plan.</li> <li>• Develop the elevator pitch for the new venture</li> <li>• Present the business plan in the final oral team exam</li> <li>• Participate in the Business Plan Team Contest where prizes will be awarded to the best job.</li> </ul> |  |
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**Textbook**

*Launching New Ventures. An Entrepreneurial Approach.* by Kathleen R. Allen. Seventh Edition. 2016. South-Western CENGAGE Learning. ISBN-13: 978-1-305-10250-7

**References**

- *Entrepreneurship for Scientists and Engineers.* Kathleen R. Allen. Prentice Hall , 2015. ISBN-13: 978-0132357272

**Class Participation**

Class participation will be essential for accomplishing this course since over 40 % of the time will be team work and oral presentation of written assignments. Students will be encouraged to discuss their ideas, their assignments, and their team projects in class in order to keep them aware that successful entrepreneurs are characterized by their communication skills.

The instructor reserves the right to raise or lower a student’s grade one letter based on the quality and quantity of the student’s participation in class.

**Team Project. Identify a technology and organize and write a technology venture/business plan**

Senior and graduate Science and Engineering students are much aware and capable to understand the research and development projects in different fields. Students will be asked to form teams to analyze the research that is being done in a group of universities (including UTEP). The research projects selected will be analyzed in terms of the competitiveness of the product/technology that could result out of the research project, and the opportunities they might present for future commercialization.

Once the research project is evaluated in terms of its competitiveness and potential for commercialization, the teams will organize a technology venture, a company, by following the process described in class, the textbook and the bibliography, and will write the corresponding business plan. The final report will be orally presented to the full group, and potentially to a group of external individuals that will act as judges for the Business Plan Writing Contest. It is not expected to write a full detailed business plan, because there is no enough time during the course, but a *business profile* on how successful that product/technology selected would be if commercialized. The course will provide the basis for establishing such business profile.

## Course Content

| WEEK                 | TOPIC   |
|----------------------|---|
| <b>1</b><br>Aug. 24  | The relationship between Science/Engineering and Entrepreneurship and its role in a technology-based world economy. Homework. Read Textbook's Chapters 1 and 2. Write a two-page summary for each chapter. Due date: Monday Aug. 31.  |
| <b>2</b><br>Aug. 31  | Creating opportunity. Planning a new technology-based venture. Steps in the business planning process. Strategies. Reasons to write a business plan. Contents of the business model and the business plan. Mission statement. Forming your teams.<br>Homework: Read Chapter 3. Write a two-page summary. Due date: Sept. 7.                   |
| <b>3</b><br>Sept. 7  | Feasibility Analysis. Identifying opportunities and potential for new technology ventures. Positioning of the new technology-based product. Market niches analysis and trends. Identification of technical competitiveness of the new product/technology. The demand. Homework: Read Chapter 4. Write a two-page summary. Due date: Sept. 14. |
| <b>4</b><br>Sept. 14 | The competition. The offer. Identification of market competitiveness. Importance of statistical analysis in forecasting market evolution. Homework: Read Chapter 5. Write a two-page summary. Due date: Sept. 21.   |
| <b>5</b><br>Sept. 21 | Business Strategies and Positioning. Identification of competitive advantages of the new product/technology. Risks and Contingencies. Homework: Read Chapter 6. Write a two-page summary. Due date: Sept. 28.   |
| <b>6</b><br>Sept. 28 | The Market approach in a Technology Company. Intrinsic value. Pricing. Programs. Homework: Read Chapter 7. Write a two-page summary. Due date: Oct. 5.  |
| <b>7</b><br>Oct. 5   | Sales in a Technology Company. The difference between marketing and sales. The importance of customer technical support in a technology-based business. Homework: Read Chapter 8. Write a two-page summary. Due date: Oct. 12.  |
| <b>8</b><br>Oct. 12  | The company's operation. The role of the entrepreneur vs. the scientist/engineer in the daily operation of the business. Homework: Read Chapter 9. Write a two-page summary. Due date: Oct. 19.   |
| <b>9</b><br>Oct. 19  | Innovation: the crucial aspect in a technology-based business. Legal and Intellectual Property Issues. General aspects concerning protecting your ideas. Homework: Read Chapter 10. Write a two-page summary. Due date: Oct. 26.  |
| <b>10</b><br>Oct. 26 | Organizing and managing the business. Departmental structures. Types of organization structures. Social responsibilities. The ethical behavior of a business. Homework: Read Chapter 11. Write a two-page summary. Due date: Nov. 2.  |
| <b>11</b><br>Nov. 2  | The finances of the business. Financial statements. Homework: Read Chapter 13. Write a two-page summary. Due date: Nov. 9.  |
| <b>12</b><br>Nov. 9  | Financial controls and forecasting. Principles of Accounting. The financial plan. Homework: Read Chapter 14. Write a two-page summary. Due date: Nov. 16.   |
| <b>13</b><br>Nov. 16 | Funding a technology-based business vs. a non-technology-based business. Types of funding. Sources of capital. The technology valuation. The use of funds.  |

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| <b>14</b><br>Nov. 23 | Writing the business plan. Prepare elevator Pitch for the new venture.<br>Thanksgiving week. University closed Nov. 26-27.                                 |
| <b>15</b><br>Nov. 30 | Finish writing and reviewing the Business Plan. Dec 4, last day of classes.<br>Preparation for final exam: oral 30-min max PPT business plan presentation. |
| <b>16</b><br>Dec 7   | Dec. 8. Final Exam. Oral 30 - min max per team. PPT business plan presentation.  |

### Guest speakers

Speakers will be invited to participate in the course. Speakers will be selected from the industrial / business / managerial community, preferentially those involved in technology-based businesses. In their talks, these individuals will be asked to share with the students their experiences when dealing with a technology-based company and the way of managing and projecting the company in the real world. Their participation will be announced in advance and outside guests will be welcome in these occasions.

### Final presentation

In the final presentation, every team will present their project's elevator pitch and the resulting business plan. This is a contest. An external jury formed by local business women and men will attend the presentations, grading the work done. Since this is a contest, the first, second and third places will be selected by the jury. A price will be given to the first place.

### Policy Information

1. **Attendance/lateness policy.** Since class attendance and participation amounts to 20% of the final grade, it will be recorded each class and graded at the end of the semester. Lateness allowed will be 5 minutes after the class starts.
2. **Policy for late work.** Homework is scheduled for the next week. Late work will be accepted with one class delay.
3. **Policy for extra credit.** No extra credits.
4. **Copyright Statement.** Some of the materials in this course are copyrighted. Violation of US copyright law can result in civil damages up to \$100,000 for each work copied. Copying of textbooks is not "fair use" under the Copyright Act. The "fair use doctrine" only permits non-commercial copying of part (in general, not more than 10%) of a copyrighted work. Do not bring a copied textbook to this class. Your cooperation is expected
5. **Student Conduct:** [From the Handbook of Operating Procedures: Student Affairs]
  - a. Each student is responsible for notice of and compliance with the provisions of the Regents Rules and Regulations, which are available for inspection electronically at <http://www.utsystem.edu/bor/rules/homepage.htm>.
6. **Scholastic Dishonesty:** [From the Handbook of Operating Procedures: Student Affairs]
  - a. It is the official policy of the University that all suspected cases or acts of alleged scholastic dishonesty must be referred to the Dean of Students for investigation and appropriate disposition. It is contrary to University policy for a faculty member to assign a disciplinary grade such as an "F" or zero to an assignment, test, examination, or other course work as a sanction for admitted or suspected scholastic dishonesty in lieu of normally charging the student through the Dean of

Students. Similarly, students are prohibited from proposing and/or entering into an arrangement with a faculty member to receive a grade of "F" or any reduced grade in lieu of being charged with scholastic dishonesty. Any student who commits an act of scholastic dishonesty is subject to discipline. Scholastic dishonesty includes, but is not limited to cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts.

7. **Plagiarism:** [From the Handbook of Operating Procedures: Student Affairs]
  - a. "Plagiarism" means the appropriation, buying, receiving as a gift, or obtaining by any means another's work and the unacknowledged submission or incorporation of it in one's own academic work offered for credit, or using work in a paper or assignment for which the student had received credit in another course without direct permission of all involved instructors.
8. **Students with Disabilities Policy** [Disabled Student Services Office]:
  - a. If you have a disability and need classroom accommodations, please contact The Center for Accommodations and Support Services (CASS) at (915) 747-5148, or by email to [cass@utep.edu](mailto:cass@utep.edu), or visit their office located in UTEP Union East, Room 106. For additional information, please visit the CASS website at <https://www.utep.edu/student-affairs/cass/>.
9. **Syllabus Change Policy:** [Suggested language]
  - a. Except for changes that substantially affect the evaluation (grading) statement, this syllabus is a guide for the course and is subject to changes with advanced notice.

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