ChE 214: Introduction to Chemical Product Design

Department of Chemical & Petroleum Engineering, University of Pittsburgh

Spring 2014

Lecture: MWF 1:00 – 1:50 pm 309 Benedum Hall

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Office Hours: Tuesdays 9:30 – 11:30 am

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Recommended Text:

- S. Blank and B. Dorf, The Startup Owner's Manual, K & S Ranch Inc., 2012.
- A. Osterwalder and Y. Pigneur, Business Model Generation, John Wiley & Sons Inc., 2010.

Clickers:

The use of clickers will be required in this course as part of your participation grade (see Grading section below)

Course Description: Traditionally, chemical product design has focused on a set procedure for product development from conception to development and testing and finally the launching of the product. Unfortunately, this model which does not keep in mind the values or needs of the customer has resulted in a high number of failures for new product launches. What skills are thus needed in order to be entrepreneurial and succeed in the development of new chemical products within industry today? This course examines the initial stages on how to approach chemical product design from an innovation perspective complete with the provision of the necessary technical skills to get the job done while placing an emphasis on the business and entrepreneurial skills required to be successful in the chemical product design business.

Overall Learning Objectives

1. Students will be able to utilize different brainstorming techniques and then select the best idea for further study.
2. Students will be able to collect and analyze customer information in order to generate a customer value proposition.
3. Students will be able to perform a market analysis on a specific technology that identifies what they are looking for, where they found their data and the segmentation of the market.
4. Students will develop essential business skills that can be applied to future courses in the program and benefit them when starting their career.

Course Breakdown:

Grading: Marks will be assigned as follows:
     5% Participation (awarded through participation in class problems with clickers)
     10% World Without Oil Game Module Assignment
     20% Nephrotex Virtual Internship (10% individual design journal entries and 10% poster presentation)
     25% Homework Assignments (3D Game Lab)
     40% Product Design Project (see separate information sheet)

Overview of Course Organization:

This course will be split into 4 main sections with each section addressing multiple sub-topics. More details on course organization, readings required and assignment dates can be found in the Course Overview document.

1. Brainstorming
   a. Unstructured techniques
   b. Structured techniques
   c. Sorting and selection
2. Customer Needs and Desired Outcomes
   a. Introduction to Lean LaunchPad
   b. Ethnography
   c. Voice of the customer
   d. Ulwick's job mapping
   e. Role of internal consultants
   f. Supply chain and customers
   g. Customer value propositions
   h. Defining opportunity
3. Market Analysis
4. Business Essentials
   a. Communication to diverse audiences
   b. Team dynamics
   c. Finance
   d. Leadership
   e. Decision Making
   f. Project Management

Impact on Program Outcomes:

Through participation in this course it is expected that student will obtain the following ABET program outcomes:

- Program Outcome b: An ability to design and conduct experiments, as well as to analyze and interpret data. This will be accomplished through the customer needs and desired outcomes assignments as well as part of their product design project.

- Program Outcome c: An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability. This will be accomplished through the customer needs and desired outcomes assignments as well as part of their product design project.
- Program Outcome e: An ability to identify, formulate and solve engineering problems. This will be accomplished through gamelab homework.
- Program Outcome g: An ability to communicate effectively. This will be accomplished through the business essential course section with a particular focus on communication to diverse audiences. This will also be addressed through the Nephrotex project and product design project.

Course Policies:

Academic Integrity:
All students are expected to adhere to the standards of academic honesty. Any student engaged in cheating, plagiarism, or other acts of academic dishonesty would be subject to disciplinary action. Any student suspected of violating this obligation for any reason during the semester will be required to participate in the procedural process, initiated at the instructor level, as outlined in the University Guidelines on Academic Integrity http://www.provost.pitt.edu/info/ai1.html. This may include, but is not limited to the confiscation of the examination of any individual suspected of violating the University Policy.

Homework Assignments:
Although homework assignments can be completed while working in a group, it is the responsibility of each individual student to submit their own individual work for the assignment. It will be unacceptable for a student to submit a copy of another student's work.

All homework assignments will be completed using the 3D Game Lab portal and hence will be completed at the student's own pace. As soon as an XP of 1,750 is reached (Master status) and the student has completed a minimum of one quest in each learning category they will be considered to have gotten full credit for their homework assignments for the semester (25%) but may continue to complete quests at their discretion if interested.

Disability Services:
If you have a disability that requires special testing accommodations or other classroom modifications, you need to notify both the instructor and Disability Resources and Services no later than the second week of the term. You may be asked to provide documentation of your disability to determine the appropriateness of accommodations. To notify Disability Resources and Services, call (412) 648-7890 (Voice or TTD) to schedule an appointment. The Disability Resources and Services office is located in 140 William Pitt Union on the Oakland campus. DRS will verify your disability and determine reasonable accommodations for this course.

Counseling:

The University Counseling Center's staff is dedicated to assisting students in their pursuit of personal and academic growth, to helping students gain a better understanding and appreciation of themselves, and to supporting students as they make important decisions about their lives. If you are in need of counseling services, please contact the University Counseling Center at 334 William Pitt Union (412) 648-7930 Refer to www.counseling.pitt.edu for details.

Accessibility:

Blackboard is ADA Compliant and has fully implemented the final accessibility standards for electronic and information technology covered by Section 508 of the Rehabilitation Act Amendments of 1998. Please note that, due to the flexibility provided in this product, it is possible for some material to inadvertently fall outside of these guidelines.