Taking Products to Market: The Next Step in Chemical Product Design

ChE 314

Fall Semester, 2016

Benedum 309, [Mon/Wed/Fri 12-1]

Instructor: Chris Wilmer
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Course Website: www.wilmerlab.com (see "Teaching" section)

Teaching (Super) Assistants:
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Office Hours: Tuesdays 4-5pm
Wednesdays 1-2pm
(Additional meetings can be made by appointment!)

Course Textbook: None

Course Overview:

This course is designed to introduce chemical engineering undergraduates to product design concepts, with particular relevance to so-called 'chemical" products. By the end of the semester, it is expected that student groups will demonstrate the ability to create a viable product concept based on interaction with appropriate customer segments and successfully pitch the concept in a professional manner. Topics to be covered include:

I. Opportunity

a. Markets
b. Competition
c. Customer Discovery and desired outcomes

II. Concept

a. Concepts versus designs
b. Ideation, structured & unstructured

III. Design

a. From features to specifications to fundamentals
b. Molecular design heuristics
c. Formulation Design
d. Trade-offs, and tools for dealing with them during design

IV. Case Competition

V. Launching the business I

a. Intellectual property
b. Key partners and key resources

VI. Innocentive Challenge

a. Overview, examples
b. Designing a chemical problem solution
c. Writing a winning solution

VII. Launching the business II

a. Fund-raising, costing, planning
b. Revenue streams and cost structures
c. channels

VIII. Green Design and the Chemical Industry

a. Toxicology basics, modern alternatives analysis
b. Life cycle thinking and green design

IX. Oral Pitches

Assignments & Grading Structure:

All grades will be assigned to groups of 3-4 students (no individual grades). The four graded components of the class are listed below:

- Trello (evidence of group organization) 10%
- Case competition 25%
- Innocentive challenge 25%
- Final project 40%
  - Oral pitch 20%
  - Written report 20%

For all assignments there will be no unique "correct" solution and grading will be partly based on aspects that are inherently subjective (e.g., creativity of product solution). This reflects how products/ideas are assessed in the real world. The best strategy to get the highest grade is to (a) make a compelling case as to why your idea is the best (most creative/effective, etc.) and (b) to get early feedback from many people and iteratively refine your solution.