Course Description

ENGR 2200 Evaluating Innovation: Fixtures, Fads, and Flops: 3 credit hours
This course introduces foundational theories used to critically analyze the success of consumer products and other technological innovations. Case studies are utilized to exhibit the interactions between innovation and society. Critical thinking skills are emphasized.

Course Meeting Times and Instructor Information

<table>
<thead>
<tr>
<th>Section</th>
<th>Day</th>
<th>Time</th>
<th>Room</th>
<th>Instructor</th>
<th>Email</th>
<th>Office</th>
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<tbody>
<tr>
<td>116</td>
<td>M W F</td>
<td>1:25 - 2:15 pm</td>
<td>Lever 014</td>
<td>Dr. Sarah Grigg</td>
<td><a href="mailto:sarahg@clemson.edu">sarahg@clemson.edu</a></td>
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<tr>
<td>117</td>
<td>M W F</td>
<td>2:30 - 3:25 pm</td>
<td>Lever 014</td>
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Important Course Dates

A full academic calendar is available at the following link, but important dates for Fall are summarized below:

⇒ First day of class ................................................................. Wednesday, January 10
⇒ Martin Luther King Jr. holiday- No class ........................................ Monday, January 15
⇒ Last day to add a course ............................................................. Wednesday, January 17
⇒ Last day to drop a course without receiving a W on your academic record .......... Wednesday, January 24
⇒ Exam 1 .............................................................................. Friday, February 16
⇒ Midterm grades ........................................................................ Friday, March 2
⇒ Last day to withdraw from course ......................................................... Friday, March 16
⇒ No class Spring Break ................................................................. Monday, March 19 – Friday, March 23
⇒ Exam 2 ................................................................................. Friday, March 30
⇒ Last day of class for courses ............................................................. Friday, December 8
⇒ Final Exam ............................................................................. Friday, May 4

Office Hours

I will be available in Lever 111 drop-in office hours:

   Wednesdays from 9:30 am – 10:30 am          Thursdays from 1:30 pm - 3:30 pm

If these times do not work with your schedule, please email me for a one-on-one appointment. In general, I have an open door policy. If I am in my office and available, I'll be happy to help if you stop by.

Updated 12/10/2017  Information subject to change. Students will be notified of any changes through an announcement on Canvas.
ENGR 2200  Course Specific Syllabus: GRIGG  Spring 2018

Course Content

Distribution of content coverage in this class include:

- **Critical Thinking – 20%**
  - Elements of reasoning
  - Intellectual standards
  - Heuristics and decision making

- **Innovation Mindset – 20%**
  - Human-centered design thinking
  - Product development process
  - Innovation (change) style

- **Evaluating Innovation Success – 20%**
  - Product Life Cycle
  - Market/Situation Analysis
  - Technology Adoption / Diffusion of innovation

- **Societal Factors and Implications – 20%**
  - Disruptive Innovations
  - Hierarchy of human needs
  - Environmental impact

- **Professional Communication – 10%**
  - Critical analysis of innovation and innovative technologies (written and presented)
  - Objectively engage in group discussions

- **Course Mechanics and Assessment – 10%**
  - California Critical Thinking Tests (2)
  - Module Quizzes (10)
  - Exams (3)

Course Requirements (Textbooks and Materials)

- **Required Textbook:**

- **Laptop**
  - Windows: Microsoft Office 2013 (Word, PowerPoint, Excel)

Evaluation Plan/Grade Distribution

This course uses a point system for assessment purposes. The total number of possible points in the class is 1000 points. The distribution of points* is shown below. Your percentage score is simply your points earned / points possible.

- **Assignments (50%)**
  - Posts: Innovation Discussion Boards 10 points (100)
  - Readings: Module Quizzes 10 points (100)
  - Exercises: Critical Thinking Activities 15 points (150)
  - Posts: Disruptive Innovation Discussion Boards 10 points (100)
  - Digital Storytelling Project 50 points (50)

- **Exams (50%)**
  - First Exam 150 points
  - Second Exam 150 points
  - Final exam 200 points

**Late Policy:** Late work will not be accepted.

A=900-1020  B=800-900  C=700-800  D=600-700  F=0-600

Assignments will serve as artifacts exhibiting critical thinking and will be used in the evaluation of the CT² program and may be evaluated for Critical Thinking Research initiatives. If you do not want your work included in the data set used for research, contact your instructor in writing at sarahg@clemson.edu.

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General Education Competencies

This course is designed to address two general education competencies.

F. Science and Technology in Society
Demonstrate an understanding of issues created by the complex interactions among science, technology, and society.

H. Critical Thinking
Demonstrate the ability to assemble information relevant to a significant, complex issue, evaluate the quality and utility of the information, and use the outcome of the analysis to reach a logical conclusion about the issue.

Critical Thinking Seminar Overview

This is a Critical Thinking Seminar (CT²) that is designed to actively engage students in thinking deeply about the relationships between innovation and society. CT² seminars are part of the Clemson University’s Quality Enhancement Plan – more information can be found here: [http://www.clemson.edu/assessment/thinks2/](http://www.clemson.edu/assessment/thinks2/)

Critical thinking is a process of thinking in a clear and systematic way in order to gain a deeper understanding of a system and make informed, unbiased judgments. To do so requires engaging in metacognition to reflect on your own biases and assumptions, and considering how you create knowledge. Critical thinking does not come naturally to most people; but through this course, we will work to improve your critical thinking skills which is instrumental to becoming successful entrepreneurs.

A significant portion of the course will be peer-lead discussions of various products or companies that have made a lasting impression on society. Special focus will be on scientific, technological, and engineering innovations and how societal factors impacted the success or failure of these innovations.

Student submissions of assignments will be collected and used to evaluate the effectiveness of this course and the Clemson Thinks² program in promoting critical thinking skills. These assignments will consist of critical analyses of case studies to evaluate the source in terms of intellectual standards and to determine the factors contributing to the success of an innovation using elements of critical thinking.

As part of this research effort, students are asked to complete the California Critical Thinking Skills Test (CCTST) twice during the semester, once at the beginning of the course and once at the end of the course. Students who do not want their work included in the research study should inform me at sarahg@clemson.edu by the end of the semester.

Documented Disabilities

Reasonable accommodations will be made for students with verifiable disabilities. You must present the official paperwork to the instructor at least one week prior to any activity for which accommodations are required.

Students should make an appointment with Disability Services to discuss their specific needs. Student Disability Services is located in the Academic Success Center building; phone: 864.656.6848. Please be aware accommodations do not carry over from semester to semester, and new Accommodation Letters must be presented each semester.
This course will progress through 10 modules. You must complete all activities within one module, before proceeding to the next module.

Module 0: Getting Started! Expectations and Baseline Assessments
Module 1: Perspectives on Innovation
Module 2: Evaluating the Impact of Innovation
Module 3: Critical Thinking in Engineering Design
Module 4: Challenging Orthodoxies
Module 5: Harnessing Trends
Module 6: Leveraging Resources
Module 7: Understanding Needs
Module 8: Building Innovation
Module 9: Tackling the Grand Challenges
Module 10: Final Assessments

The goals of this class are to improve critical thinking skills and understanding of how societal factors and innovation influence each other so that we can predict future trends.

Problem Solving: Identify, formulate, and solve basic engineering problems using fundamental engineering principles and graphical analysis.

P1 Understand foundational theories of innovation and product development
P2 Analyze innovations based on theoretical models.
P3 Consider alternative solutions to challenges addressed by scientific or technological innovations

Critical Thinking: Conduct analysis and evaluation of an issue to form unbiased conclusions

T1 Develop and employ critical thinking skills.
T2 Employ critical thinking elements to formulate judgments of innovation
T3 Use intellectual standards of reasoning to evaluate sources of biases

Communication: communicate technical information in graphical and written form while complying with engineering conventions and standards.

C1 Effectively communicate your perspective on an issue concerning scientific, technological, or engineering innovation.
C2 Engage an audience in an electronic presentation of technical information.
C3 Understand the roles and ethical responsibilities of design engineers and how to communicate concerns with team members.

Science, Technology, & Society: evaluate the complex interactions between science, technology, and society.

S1 Research past and present scientific or technological innovations
S2 Recognize disruptive technologies and their impact on society
S3 Evaluate the impact of society and culture on product success or failure
S4 Extrapolate information from case studies to make predictions for emerging technologies
This course is designed to satisfy the following ABET Competencies. For more information, please refer to http://www.abet.org.

Engineering programs must demonstrate that their graduates have:

(a) an ability to apply knowledge of mathematics, science, and engineering
(b) an ability to design and conduct experiments, as well as to analyze and interpret data
(c) an ability to design a system, component, or process to meet desired needs
(d) an ability to function on multi-disciplinary teams
(e) an ability to identify, formulate, and solve engineering problems
(f) an understanding of professional and ethical responsibility
(g) an ability to communicate effectively
(h) the broad education necessary to understand impact of engineering solutions in global and societal context
(i) a recognition of the need for, and an ability to engage in life-long learning
(j) a knowledge of contemporary issues
(k) an ability to use techniques, skills, and modern engineering tools necessary for engineering practice