

## **Course Description & Policies for Applied Engineering Economy (MECH408); 11/18/2020**

### **Overview**

How do individuals make personal decisions in everyday life (e.g., do I buy or rent)? How do firms make decisions about capital-intensive engineering efforts that maximize their profit (e.g., buy a fleet of electric vehicles)? How do government agencies justify policy decisions in the face of non-tangible future benefits (e.g., limiting greenhouse gas emissions)? In this course, students will learn and apply engineering economics principles to understand how individuals, firms and governments evaluate, justify and make decisions, with case examples in the arena of energy and the environment. Engineering economics employs mathematical techniques to evaluate the economic outcomes from a host of possible choices thereby providing a basis for rational decision-making. While the course title has the word “engineering” in it, the principles covered in this course comprise a toolset applicable to personal and public policy choices as well as engineering ones.

### **Instructor**

- Shantanu Jathar, Assistant Professor in Mechanical Engineering
- Phone: 970-491-8653; Email: [shantanu.jathar@colostate.edu](mailto:shantanu.jathar@colostate.edu)
- Please use the colostate.edu email address for communication. Avoid email client in Canvas.

### **Timing (online)**

- Monday, Wednesday, Friday; 2:00-2:50 pm; Microsoft Teams (link TBD)

### **Textbook**

The primary textbook for the course will be the 2<sup>nd</sup> edition of Fundamentals of Engineering Economic Analysis by White, Grasman, Case, and Needy (John Wiley and Sons). When students register for the class, they should automatically get access to the electronic version of the textbook through Canvas. A physical copy of the textbook will not be made available.

### **Week-by-week Schedule**

See other document.

### **Objectives**

- Master and apply concepts of engineering economics
- Conduct quantitative analysis of engineering decisions
- Learn to deal with estimation, variability, and uncertainty in decision making
- Learn visualization and communication techniques from economic analyses
- Develop solutions to real-world energy and environmental problems

### **Grading**

+/- style

- Reading quizzes (10) – 5%
  - *~10 reading quizzes; each worth 0.5% of the grade for 5% total*
- In-class worksheets (10) – 5%

- *~10 worksheets to be done in class; each worth 0.5% of the grade for 5% total*
- Homework sets (10) – 20%
  - *~10 homework assignments; each worth 2% of the grade for 20% total*
- Midterms (2) – 15% x 2 = 30%
  - *2 midterm examinations; each worth 15% of the grade for 30% total*
- Case studies (3) – 20%
  - *3 group-based case studies worth 5%, 5%, and 10% of the grade*
- Final – 20%
  - *1 final examination worth 20% of the grade*

**Student Effort** The expected level of student effort for this course is ~6 hours outside of class per week.

### **Reading Quizzes and Homework**

All readings quizzes and homework will need to be completed on the WileyPLUS platform (see grading scheme above for details). The WileyPLUS platform can be accessed through Canvas. Students are expected to read the textbook chapters and complete the reading quizzes before or while the relevant chapter is being taught in class. The readings and reading quizzes are meant to better prepare the students for class and will facilitate enhanced learning in the classroom. Homework will be based on a single chapter from the textbook and will be roughly due a week after the chapter is completed in class. Given the relatively large size of the class (>60 students), all homework will be done electronically and will be automatically graded on WileyPLUS. Solutions can be accessed after the due date for the reading quizzes and homework. Late completions will not be graded. The lowest grade on the reading quizzes, in-class worksheets, and homework will be dropped.

### **In-class Worksheets**

Approximately once a week, students will solve worksheet problems during the class lecture to better prepare the students to solve the homework. Completed templates will need to be uploaded as a pdf to Canvas before the beginning of the next class.

### **Case Studies**

Case studies will be distributed in class and later posted on Canvas. All case studies will be expected to be done in project groups and submitted as a single report. Groups comprising of 3 to 4 students will be formed before the first case study and the same groups will be used throughout the semester. The report will always need to include a short summary of the solution and/or recommendation followed by a description of the methods used to solve the problem and the results and their explanation. Figures, tables and visuals need to be clear and easy to read. When printing, ensure that you print on both sides of the paper. The instructor will spend some time in class discussing expectations for report writing and also post model solutions from previous years. All case study solutions will need to be uploaded as a pdf. Case studies need to be typed up in a word processing software and printed. Late submissions will not be graded. All case study grades will be considered for the final grade.

### **Exams**

There will be two midterm exams in this course in the ~5<sup>th</sup> and ~12<sup>th</sup> week of the semester. The midterm exams will be 50 minutes long and will be open book, timed exams, administered as a quiz on Canvas. The final exam will be two hours long and will be an open book, timed exam. The student needs to notify the instructor two weeks before the exam if he or she cannot make the exam for a legitimate reason.

### **Guest Lectures**

Depending on how we move through the course content, there will be between 1 and 3 guest lectures during the semester. These will be delivered by subject matter experts and will be closely related to the elements taught in class. Attendance is required during guest lectures and will count towards one of the 'in-class worksheet' assignments.

### **Policies**

Students can work on the homework and case study problems by themselves, together with classmates, or with students who took the course in previous years. If students have difficulty with any of these problems, please feel free to come discuss them with the instructor. Historically, the amount the student learns in this course will relate directly to his or her ability to work problems. If students do the homework problems and understand them, they will be well prepared for the exams. Students who work too few problems often do poorly in this course.

### **Academic Policies**

All students are expected to be familiar with Colorado State University's statement of Student Rights (<http://catalog.colostate.edu/general-catalog/policies/students-rights/>) and Responsibilities (<http://catalog.colostate.edu/general-catalog/policies/students-responsibilities/>), especially in regard to matters of academic integrity. Violations of academic integrity, at the instructor's discretion, will result in grading penalties and a failing grade in the course. Some examples of serious offenses are possession and use of the instructor's manual and receiving or giving help on an exam or case study. Students may help each other to understand general principles involved in learning concepts needed for an individual assignment but utilizing even parts of another student's work will be considered a violation of academic integrity on the part of both students.