I E 305 XW | Engineering Economic Analysis
3 credits. Online Course. Spring 2019

Prerequisites

MATH 166: Calculus II

It is the policy of the IMSE Department to require all students enrolled in this course to have satisfied all of the course’s prerequisite requirements. If it is discovered that a student has not met any applicable prerequisite requirements, he/she will be required to immediately drop the course. The failure to drop the course will result in a final course grade of ‘F’, regardless of course performance. Students who discover they have improperly enrolled in a course without meeting the applicable prerequisite requirements are strongly encouraged to meet with advising staff to promptly drop the course and make alternative scheduling arrangements or discuss if an official waiver of the prerequisite requirements may be applicable. Math 166 Calculus II is the prerequisite for this course.

Contact Information

Instructor: Dr. Cameron Mackenzie
E-mail: camacken@iastate.edu
Phone: 515-294-6283
Office: 3029 Black Engineering
Office Hours:
  o In-person: Tues and Thurs 9:30-10:30 am, Wed 3-4 pm, or by appointment
  o Online: Online office hours by appointment only

Teaching Assistant (TA): Kevin Korniejczuk
E-mail: kevink@iastate.edu
Office: 0010 Black Engineering
Office Hours: In person: Mon 2-3 pm, Wed noon-2 pm, or by appointment

Tech Support: Engineering-LAS Online Learning (ELO)
Tech Support E-mail: elotech@iastate.edu
For Canvas Support see the last page of the syllabus

Course Catalog Description

Economic analysis of engineering decisions under uncertainty. Financial engineering basics including time value of money, cash flow estimation, and asset evaluation. Make versus buy decisions. Comparison of project alternatives accounting for taxation, depreciation, inflation, and risk. Course Catalog Link.

Required Textbook

Contemporary Engineering Economics – 6th Edition by Chan S. Park (a version is placed on reserve in the library)
Course Format

This is an asynchronous online course. All content is delivered through Canvas LMS. Review the section “MyCanvas Student at ISU” to become familiar with ISU’s learning management system.

Required Technology

1. A reliable internet connection
2. Access to Iowa State University computer system and Canvas
3. Access to a computer with audio capability
4. Microsoft Office - Excel
5. SIPmath Modeler Tools. An add-in to Excel and will also be available in the computer labs in 0006, 0016/0020, and 0028 Black Engineering. This software can be downloaded for free for Windows and Macs at https://www.probabilitymanagement.org/tools-1/. More details about the software will be provided via Canvas through the lecture videos when need it.

Course Goal and Objectives

Course Goal

The overall goal of this course is for you to be able to apply economic principles to make better decisions. The course will cover much of the material in Chapters 3-12 from the textbook.

Course Objectives

After completing this course, the student will be able to:
- Understand the roles of engineers in a business environment
- Apply principles of time value of money in business, engineering, and personal economic decisions
- Compare projects and options using equivalence calculations and comparisons and rate of return analysis
- Model uncertainty and build simulations that explore the effect of multiple uncertainties
- Make better decisions with uncertainty and determine how risk impacts a project valuation

The relevant ABET student outcomes for this course are:
- An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
- An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts

Please note that one or more of the outcomes listed above may be assessed in this class.
Course Structure

You need to complete the activities in sequential order to have access to the following ones. There are due dates for each assignment. The course structure is as follow:

<table>
<thead>
<tr>
<th>Modules</th>
<th>Topics</th>
<th>Each topic’s learning activities and assignments</th>
<th>Assessments at the end of each module</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module 1</td>
<td>Topic 1 Topic 2</td>
<td>1. Reading quiz</td>
<td>Project 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Lecture videos</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Topic quiz (1st attempt)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. Additional resources</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. Topic quiz (2nd and following attempts)</td>
<td></td>
</tr>
<tr>
<td>Module 2</td>
<td>Topic 3 Topic 4</td>
<td>Project 2</td>
<td>Midterm exam (modules 1&amp;2)</td>
</tr>
<tr>
<td></td>
<td>Topic 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Module 3</td>
<td>Topic 6 Topic 7</td>
<td>Project 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Topic 8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Module 4</td>
<td>Topic 9 Topic 10</td>
<td>Project 4</td>
<td>Final exam (modules 3&amp;4)</td>
</tr>
</tbody>
</table>

Learning Activities, Assignments and Grading

Non-Graded Learning Activities

Videos
For each topic, there are several videos to support the knowledge acquired after the textbook reading. In some topics, the videos include non-graded learning activities in a multiple-selection format which will appear during the video and you need to select one or more options to continue. These questions will be related to the video content and textbook reading.

Discussion Forum
If you have a question that is appropriate for the entire class (e.g., questions about the topic quizzes or lectures), please post that question on Canvas in the discussion section, and either the TA or I will answer it there. There may be some discussion forum that you are not able access until after you have completed the reading quiz or topic quiz. If you have a question that is private, please email the TA or me. You can always ask us any type of question in person or via phone.

Resources
A content page with additional resources is provided for each topic after the first attempt of the corresponding topic quiz. There are videos and a Cybox folder with additional files.

Graded Assignments

Reading Quizzes
At the beginning of each topic, there is a reading quiz to assess the assigned reading task. The reading quizzes will have multiple-choice questions. You need to submit the reading quiz to be able to continue with the next learning activity. There is only one (1) attempt to answer it correctly, and it needs to be submitted before the due date in Canvas. You are not allowed to discuss the reading quiz with anybody before or while you are taking it. Each reading quiz will have a time limit.
**Topic Quizzes**
At the end of each topic, there is a quiz to assess your knowledge. The quizzes are designed to have multiple attempts and all the questions are calculation questions where you need to enter the number.

**After taking the topic quiz,** you can choose between these two options:
- watch those additional videos in the resource page, review the resources in the Cybox folder located in the same resource page, participate in the discussion forum, take the quiz more times to improve your score, or,
- you can continue to the next activity.
These quizzes may be retaken as many times as you wish before the due date in Canvas.

**Projects**
At the end of each module, there is a project that you need to submit before to the due date. There are a total of three (3) required projects during the semester and one (1) optional project. The optional project will be project 3. Each project can be worked on individually or in groups of 2 or 3 people. The deliverable for each project will be a memo outlining your recommended course of action.

**Exams**
There are two (2) exams during the semester. Each exam assesses your knowledge in the first and second half of the course respectively. The midterm exam covers the content of Module 1 and 2 (chapters 3-7). The final exam covers the content of Module 3 and 4 (chapters 8-12). These two exams are proctored, which means you will need to take them in a testing center or in a proctoring center if you are off-campus. More information about the exams will be announced during the course.

**Other Required Assignments**
In addition, there will be an additional assignment and an end-of-the-semester survey. Students who do not respond to the survey or complete the additional assignment will have their grade dropped by one mark (e.g., from a B+ to a B). The additional assignment will be announced near the middle of the semester. It will be required but not graded.

**Grade Distribution**
There are three (3) required projects and one (1) optional project. If you choose to only submit three projects—which means that you do not submit project 3—here is the following grade distribution.

<table>
<thead>
<tr>
<th>Assessments</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reading quizzes</td>
<td>11%</td>
</tr>
<tr>
<td>Topic quizzes</td>
<td>28%</td>
</tr>
<tr>
<td>Projects (3 in total)</td>
<td>33%</td>
</tr>
<tr>
<td>Exams (2 in total)</td>
<td>28%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>
If you choose to submit four projects, here is the following grade distribution.

<table>
<thead>
<tr>
<th>Assessments</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reading quizzes</td>
<td>10%</td>
</tr>
<tr>
<td>Topic quizzes</td>
<td>25%</td>
</tr>
<tr>
<td>Projects (4 in total)</td>
<td>40%</td>
</tr>
<tr>
<td>Exams (2 in total)</td>
<td>25%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>

Submitting project 3 can help to mitigate to some extent worse scores on the other projects and/or the exams. If submitting project 3 results in a worse semester grade than not submitting project 3, you will receive the semester grade corresponding to the better grade. Project 3 cannot be used as a substitute for the other three projects.

**Grading Scale**

<table>
<thead>
<tr>
<th>Letter grade</th>
<th>Range</th>
<th>Letter grade</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>93-100</td>
<td>A-</td>
<td>90-92</td>
</tr>
<tr>
<td>B+</td>
<td>87-89</td>
<td>B</td>
<td>83-86</td>
</tr>
<tr>
<td>B-</td>
<td>80-82</td>
<td>C+</td>
<td>77-79</td>
</tr>
<tr>
<td>C</td>
<td>74-76</td>
<td>C-</td>
<td>70-73</td>
</tr>
<tr>
<td>D+</td>
<td>67-69</td>
<td>D</td>
<td>64-66</td>
</tr>
<tr>
<td>D-</td>
<td>60-63</td>
<td>F</td>
<td>59 and below</td>
</tr>
</tbody>
</table>

**Course Policies**

**Late Assignments**

Late assignments will not be accepted for the reading quizzes or topic quizzes. The quizzes will automatically close on Canvas, and you will not be able to reopen them. Late projects will be accepted, but your grade will be deducted by 10% for each day late.

**Make-up Options**

There will be no make-up assignments or exams except for extraordinary circumstances. If you think you have an extraordinary circumstance, please contact the professor.

**Student Responsibilities in the Learning Process**

- **Take time to familiarize yourself** with the course structure and layout in the learning management system being used (Canvas) and other technology used in the course.
- **Read** the essential documents – course syllabus.
- **Identify and establish the communication channels provided** – Help Forums/Email/topics’ discussion
- **Confirm technical requirements** – so that you can access all the materials
o **Plan your time** – have a personal schedule, a consistent study time and stay organized. DO NOT WAIT UNTIL THE LAST MOMENT TO WORK ON YOUR DELIVERABLES. Resources to improve your learning study skills you can find in Lynda.com, you can sign in for free with your Net-ID through ISU.

o **Make connections** with fellow classmates and the instructor. If you want to participate in a group for the project, identify group project members early.

o **Ask questions** – Don’t wait. Ask questions regarding expectations/content/policies. Follow the mentioned protocols for the course.

o **Log-in to the course daily** to check the activity and to participate.

**Our Commitment to You**

The TA and I will make frequent announcements about due dates and your assignments. We will respond promptly to emails and questions on the discussion forum. We want to answer your questions and help you learn material with which you might be struggling. We will strive to grade projects and exams within two weeks.

**Grade Policies**

For more information about grading policies at ISU, follow [this link](#).

**University and Departmental Policies**

**Professionalism Statement**

The IMSE Department has an expectation that all students will behave in a professional manner during all interactions with fellow students, faculty, and staff. Treating others with respect and having constructive communications are examples of being professional. Please follow the recommended Internet Etiquette at ISU, [Netiquette at ISU](#).

**Academic Integrity**

The class will follow Iowa State University’s policy on academic dishonesty. Anyone suspected of academic dishonesty will be reported to the [Dean of Students Office](#). The Student Code of Conduct can be read in [https://www.policy.iastate.edu/policy/SDR](https://www.policy.iastate.edu/policy/SDR). Some examples of academic misconduct are:

**Plagiarism**

Plagiarism is the act of representing directly or indirectly another person’s work as your own. It can involve presenting someone’s speech, wholly or partially, as your; quoting without acknowledging the true source of the quoted material; copying and handing in another person’s work with your name on it; and similar infractions. Even indirect quotations, paraphrasing, etc., can be considered plagiarism unless sources are properly cited. Plagiarism will not be tolerated, and students could receive an F grade on the test/assignment or an F grade for the course. The Iowa State University policy for academic misconduct can be found in the Student Disciplinary Regulations.

**Obtaining Unauthorized Information**

Information is obtained dishonesty, for example, by copying graded homework assignments from another student, by working with another student on a take-home test or homework when not
specifically permitted to do so by the instructor, or by looking at your notes or other written work during an examination when not specifically permitted to do so.

**Tendering of Information**

Students may not give or sell their work to another person who plans to submit it as his or her own work. This includes giving their work to another student to be copied, giving someone answers to exam question during the exam, taking an exam and discussing its contents with students who will be taking the same exam, or giving or selling a term paper to another student.

**Misrepresentation**

Students misrepresent their work by handing in the work of someone else. The following are examples: purchasing a paper from a term paper service; reproducing another person’s paper (even with modifications) and submitting it as their own; having another student do their computer program or having someone else take their exam. Bribery: Offering money or any item or service to a faculty member or any other person to gain academic advantage for yourself or another is dishonest.

**Bribery**

Offering money or any item or service to a faculty member or any other person to gain academic advantage for yourself or another is dishonest.

**Accessibility Statement**

Iowa State University is committed to assuring that all educational activities are free from discrimination and harassment based on disability status. Students requesting accommodations for a documented disability are required to meet with staff in **Student Accessibility Services (SAS)** to establish eligibility and learn about related processes. Eligible students will be provided with a Notification Letter for each course and reasonable accommodations will be arranged after timely delivery of the Notification Letter to the instructor. Students are encouraged to deliver Notification Letters as early in the semester as possible.

SAS, a unit in the Dean of Students Office, is located in room 1076, Student Services Building or online at [https://sas.dso.iastate.edu/](https://sas.dso.iastate.edu/). Contact SAS by email at accessibility@iastate.edu or by phone at 515-294-7220 for additional information.

**Dead Week**

This class follows the Iowa State University Dead Week policy as noted in section 10.6.4 of the **Faculty Handbook**.

**Discrimination and Harassment**

Iowa State University strives to maintain our campus as a place of work and study for faculty, staff, and students that is free of all forms of prohibited discrimination and harassment. Inquiries regarding non-discrimination policies may be directed to **Office of Equal Opportunity**, 3410 Beardshear Hall, 515 Morrill Road, Ames, Iowa 50011, Tel. 515-294-7612, Hotline 515-294-1222, email eooffice@iastate.edu

**Religious Accommodation**

Iowa State University welcomes diversity of religious beliefs and practices, recognizing the contributions differing experiences and viewpoints can bring to the community. There may be times when an academic requirements conflicts with religious observances and practices. If that happens, students may request the reasonable accommodation for religious practices. In all cases, you must put your request in writing. The instructor will review the situation in an effort to provide a reasonable accommodation.
when possible to do so without fundamentally altering a course. For students, you should first discuss the conflict and your requested accommodation with your professor at the earliest possible time. You or your instructor may also seek assistance from the Dean of Students Office at 515-294-1020 or the Office of Equal Opportunity at 515-294-7612.

University Policies Contact Information

If you are experiencing, or have experienced, a problem with any of the above issues, email academicissues@iastate.edu

Important Academic Calendar Dates

Spring 2019 Calendar Dates:

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classwork begins</td>
<td>Monday, Jan. 14</td>
</tr>
<tr>
<td>University holiday, offices closed</td>
<td>Monday, Jan. 21</td>
</tr>
<tr>
<td>First half-semester courses end</td>
<td>Friday, Mar. 8</td>
</tr>
<tr>
<td>Spring break, classes recessed</td>
<td>Monday - Friday, March 18-22</td>
</tr>
<tr>
<td>Last day to withdraw without extenuating circumstances</td>
<td>Friday, Mar. 29</td>
</tr>
<tr>
<td>Final Week</td>
<td>Monday - Thursday, May 6-May 9</td>
</tr>
</tbody>
</table>

Canvas for Students at ISU

Getting Started

1. Be sure to have an ISU NetID. If you do not, please visit Passwords and Accounts (https://www.it.iastate.edu/services/accounts)
2. Login to Canvas with your ISU NetID and password and look for your course for this semester.

General Help with Canvas

In your Canvas course page, on the global navigation on the left panel, you will see a Help Tab. Clicking on that will take to various available options. Generally, you have:

- Chat with Canvas Support – 24*7 live chat with Canvas specialists
- MyCanvas Student at ISU – Orientation Resources to Canvas
- MyLibrary – Library Resources
- Canvas Guides – A repository of how-to-do
- Ask the Canvas Community-Online support forum for canvas users. Log in using ISU credentials.
- ISU Canvas Support Line: Call 515 294 4000, press 2 and then press 1. Hours of operation.
- Go to Lynda.com and log in with your ISU credentials. Search for the desired tutorial.

Basic Troubleshooting (if Canvas is not working)

- Username/Password not working?
Your Username (ISU NetID) and Password for Canvas are the same as those ISU email account.

For help with Username and Password, please contact Solution Center at 515-294-4000 or solution@iastate.edu.

- If you get an error message, check for Browser and Java Issues on your computer.
- If you are unable to access course content or learning activities (e.g., Tests, Discussions, Assignments, etc.), contact your instructor.
- Check general Technology Services for Students.