

IE 343 – Engineering Economics, Fall 2023

Section 002 – Mondays, Wednesdays, and Fridays, 8:30am - 9:20am, @Forney Hall G140

Course Overview

This course introduces engineering economics concepts including cash value analysis, project evaluation, and replacement analysis, and allow students to apply their knowledge in a case study project. Credit hours: 3.

Instructor

Zhuoli Yin, Graduate instructor

Email: yin195@purdue.edu

Office Hours (online): **Thursdays** 10:30am-11:30am

Zoom link for office hours: <https://purdue-edu.zoom.us/j/5210379054>

Office Location: Grissom Hall 324D (by appointment)

Teaching Assistants

Carlos A. S. Oliveira, Ph.D. student in Industrial Engineering

Email: csousade@purdue.edu

Office Hours (online): **Tuesdays** 4:30pm-5:30pm, **Fridays** 4:30pm-5:30pm

Zoom link for office hours: <https://purdue-edu.zoom.us/j/94419593158?pwd=RUJHNDErYkFxb0VUa1M5eUV5NS9NZz09>

Srinjoy Chatterjee, Ph.D. student in Industrial Engineering

Email: chatte62@purdue.edu

Office Hours (online): **Mondays** 12:00-1:00pm, **Wednesdays** 12:00-1:00pm

Zoom link for office hours: <https://purdue-edu.zoom.us/j/2194202035>

**Notes about office hours:*

- *All office hours are based on U.S. EST time.*
- *All office hours will be conducted online via Zoom. Please note that the links for different office hour sessions are different.*
- *In-person office hours shall be requested by appointment. Please email the instructional team to make an appointment.*

Course format

This course will be conducted face-to-face. This is an IMPACT course and is taught with a partially flipped style. We will be meeting in-person on Wednesdays and Fridays. We will be meeting in the classroom on the first Monday (8/21) in the classroom but most of Monday class time has been left to you to review the course pre-session contents for Wednesdays and Fridays. A select few Mondays will be reserved for exam reviews and supplement topics. Please see the course schedule at the end of this syllabus for more information.

Contact the instructional team

- If your question is content related (e.g., clarifications on concept, how to approach a homework problem, exam policies etc.), please ask them on the Piazza (The link to Piazza will also be provided on Brightspace). Posting your questions there can help benefit other students who may have the same question. You can also help answer each other's questions on Piazza and earn extra credits from being a peer tutor.
- If your question is more personal, please send us an email and include "IE 343" in the subject line (so your email can receive prioritized attentions). **Please include the entire instructional team (both the instructor and TAs) in the email so you can hear back from us sooner.** Please use your @purdue.edu email account to avoid your email being filtered into the spam folder.
- Emails will be responded in 48 hours. Emails sent over the weekend will be processed on the following Monday or Tuesday. Do **NOT** wait until the last day for any assignment or any excuse-related questions.
- Your feedback is welcomed at any time during the semester. We are here to help your learning. Please help us to better help you!

Textbook

(Recommended but not mandatory)

Sullivan, W.G., Elin Wicks, and Patrick Koelling (2019). Engineering Economy (17th edition). Pearson Education, Inc. ISBN: 978-0134870069. The readings associated with each session is listed in the course schedule.

Website

Brightspace (<https://purdue.brightspace.com/d2l/home/837867>). All applicable course material, any course announcements and access to other platforms will be found on the course website. *Check Brightspace regularly for updates and announcements!* Materials for each week will be available every **Monday**.

Learning Outcomes

After taking this course, you should be able to:

1. Evaluate the worth of a cash flow series using the concept of time value of money;
2. Compare the feasible alternatives for a project and select the best option from the economics perspective;
3. Analyze the impact of taxes and foreign exchange rates in project evaluation;
4. Apply the principles of engineering economy to analyze projects and understand strengths and weaknesses.

Assignments and Evaluation

- **Pre-session Assignments:** Before attending each session, you are required to watch the pre-session videos and complete the pre-session quiz (sessions without pre-session

assignments will be clearly marked as so) on **Brightspace**. *It is important that you come to class prepared!* You can retake the pre-session quiz for an **unlimited** number of times during its open time (but the question will change with each attempt). The highest grade will be used. The pre-session quiz closes half an hour before the session's start time, at noon.

- **Homework:** Individual homework help you practice the contents you learned from each session in a more integrated way. Homework is due weekly and there are a total of 11 homework assignments on **Variate**. Homework assignments are due on **Mondays** and are breakdown into sessions to make it easier for you to complete the homework problem after each session. To help you learn from your mistakes, **five attempts** are allowed for homework problems. The correct answers will be available after the assignments are due.
- **Case Study:** Group case study help you put together the different pieces of knowledge you learned throughout the course to evaluate a more complex real-world problem. A case study report and group presentation are required, presenting the analysis, results, and recommendations. The groups are self-formed with up to **five** students. If you need help to form a group, please let Zhuoli know.
- **Exams:** This course has three in-person exams. The exams are not cumulative but the content itself is (e.g., Exam 2 will not specifically test you about contents covered in Exam 1. But to solve problems in Exam 2, you will need to use the knowledge you have learned in the material covered by Exam 1). Each exam takes one hour. **DRC students** who need alternative exam window should communicate with the instructor and schedule the alternative exam window as close to the class time as possible. The exam is **open book**. But considering the limited time, it is recommended that you prepare *one double-sided A-4 size crib sheet for each exam*. Your exam papers will be scanned and uploaded to **Gradescope** by the instructional team for grading and review.

There will be an artificial intelligence based tutoring system ("Arthur") available to you, where you can practice problems for each exam, and receive immediate feedback from Arthur. More guidance will be provided when the exam week is approaching.

- **Extra credit:** 5% of the total earned extra points will be added to your overall grade by participating in different activities listed below. Please do not wait until the last week of the classes to join in the activities. The extra credit activities are:
 1. Human tutor for AI: We are in the era of AI, but AI is not as perfect as we envision; its responses might be prone to errors or 'hallucinations.' There are multiple opportunities for you to play a role as a tutor, correcting the answers provided by AI systems (e.g., ChatGPT) when solving practice problems. As a future engineer or scientist, you can seize this chance to personally learn about the strengths and

limitations of AI. Each of your verified tutoring is 0.5% extra points towards your final grade.

2. Endorsed contribution on Piazza: Answers of high quality to your peers' posts on Piazza will be endorsed by the instructor. Each endorsed answer will earn you an additional 0.3% toward your final grade. Please contribute to discussions on Piazza throughout the semester and avoid waiting until the last week.
 3. In-class quiz: There will be random in-class quizzes during the class. You can earn 0.3% extra points towards final grade for each of correct submission.
 4. Course Evaluation Participation: There will be an end-of-semester course evaluation. If the over participation rate hits 90%, every student will receive 0.5% bonus.
- **Regrade policy**: If you believe there was a mistake in the grading of exam, you may request a regrade through Gradescope. All regrade requests must be made within **three** days of when the graded work is first available. Any regrade request after the regrade dates will NOT be considered. You can only question your grade regarding accuracy. Accuracy problems include such things as missing grades and incorrect grades, but not "but I really tried hard and turned everything in."
 - **Late submission and Make-up policy**: we do not accept late submission for pre-session quizzes and homework. No extension for assignment submission or make-up exams will be granted, except in the event of excused absences regulated by Purdue's academic regulations regarding attendance (see the Attendance Policy section). These all require documentation, and you should contact the Office of the Dean of Students.

Grade Breakdown

Assignment	Quantity	Weight
Pre-session Quiz	27, each of equal weight, drop the lowest grade	15%
Homework	11, each covers two sessions, each of equal weight, each homework problem has five attempts. drop the lowest grade	30%
Case Study	1, 5% for the presentation and 10% for the report	15%
Exam 1	1	10%
Exam 2	1	15%
Exam 3	1	15%
Extra Credit	n, extra credits by doing different activities	5%

* No final exam for IE 343-002 during the final week.

Grade Scale

A+: >=98	A: [94,98)	A-: [90, 94)	
B+: [88,90)	B: [84, 88)	B-: [80,84)	
C+: [78,80)	C: [74,78)	C-: [70,74)	
D+: [68,70)	D: [64-68)	D-: [60-64)	F: <60

** No grading scale curving or round-up will be implemented in this course. Please work hard from Day 1 to obtain your desired grades.*

Attendance Policy

There will not be any attendance points for this course. Lecture attendance is NOT mandatory, but *it is highly recommended*. There will be random bonus opportunities (in-class quiz) during the class time that you can take towards 5% of extra credits.

Artificial Intelligence Usage Policy

It is imperative that students view artificial intelligence (AI), such as ChatGPT, as a tool to assist in their academic experience rather than a shortcut to finish the assignments and achieve grades. Students should uphold the highest standards of academic integrity and should be responsible for their deliverables.

Calculator Policy

A one-line or a two-line basic scientific calculator is allowed. Any calculator with programmability, large memory capacity, wireless communication, graphing features, etc. is **NOT** allowed. Students who violate this policy are subject to sanctions from the instructor, up to and including a “0” grade on the exam or even an “F” grade in the course.

Accessibility

Purdue University is committed to making learning experiences accessible. If you anticipate or experience physical or academic barriers based on disability, you are welcome to let me know so that we can discuss options. You are also encouraged to contact the Disability Resource Center at: drc@purdue.edu or by phone: at 765- 494-1247.

If you need an accommodation such as Extended time or Distraction Reduced Exam Environment, please request ALL scheduled tests with DRC Testing. I highly recommend you discuss any accommodation needed with me in the first week of the semester so we can work on your accommodation.

Academic Integrity

Academic integrity is one of the highest values that Purdue University holds. Individuals are encouraged to alert university officials to potential breaches of this value by either emailing integrity@purdue.edu or by calling 765- 494-8778. While the information may be submitted anonymously, the more information is submitted the greater the opportunity for the university to investigate the concern. More details are available on our course Brightspace under University Policies and Statements.

Incidents of academic misconduct in this course will be addressed by the course instructor and referred to the Office of Student Rights and Responsibilities (OSRR) for review at the university level. Any violation of course policies as it relates to academic integrity will result minimally in a failing or zero grade for that particular assignment, and at the instructor’s discretion may result in a failing grade for the course. In addition, all incidents of academic misconduct will be

forwarded to OSRR, where university penalties, including removal from the university, may be considered. In addition, be aware that you as students can report issues of academic integrity that you observe, and may do so anonymously, through the OSRR by calling 765-494-8778 or emailing integrity@purdue.edu

Copyright

See the University Policies and Statements section of Brightspace for guidance on the Use of Copyrighted Materials. Effective learning environments provide opportunities for students to reflect, explore new ideas, post opinions openly, and have the freedom to change those opinions over time. Students and instructors are the authors of the works they create in the learning environment. As authors, they own the copyright in their works subject only to the university's right to use those works for educational purposes. Students may not copy, reproduce, or post to any other outlet (e.g., YouTube, Facebook, or other open media sources or websites) any work in which they are not the sole or joint author or have not obtained the permission of the author(s).

The material of the course (slides, handouts, quizzes, homework, and exams, etc.) is protected by copyright. You are not allowed to share any class material with others outside the class or post it online anywhere. This will be considered a failing ethic, and as a consequence, getting an "F" for the course.

Nondiscrimination Statement

A hyperlink to Purdue's full Nondiscrimination Policy Statement is included in our course Brightspace under University Policies and Statements.

Mental Health/Wellness Statement

If you find yourself beginning to feel some stress, anxiety and/or feeling slightly overwhelmed, try WellTrack. Sign in and find information and tools at your fingertips, available to you at any time.

If you need support and information about options and resources, please contact or see the Office of the Dean of Students. Call 765-494-1747. Hours of operation are M-F, 8 am- 5 pm.

If you find yourself struggling to find a healthy balance between academics, social life, stress, etc., sign up for free one-on-one virtual or in-person sessions with a Purdue Wellness Coach at RecWell. Student coaches can help you navigate through barriers and challenges toward your goals throughout the semester. Sign-up is free and can be done on BoilerConnect.

If you're struggling and need mental health services: Purdue University is committed to advancing the mental health and well-being of its students. If you or someone you know is feeling overwhelmed, depressed, and/or in need of mental health support, services are available. For help, such individuals should contact Counseling and Psychological Services (CAPS) at 765-494-6995 during and after hours, on weekends and holidays, or by going to the CAPS

office on the second floor of the Purdue University Student Health Center (PUSH) during business hours. The CAPS website also offers resources specific to situations such as COVID-19.

Basic Needs Security

Any student who faces challenges securing their food or housing and believes this may affect their performance in the course is urged to contact the Dean of Students for support. There is no appointment needed and Student Support Services is available to serve students 8 a.m.-5 p.m. Monday through Friday.

Emergency Preparation

In the event of a major campus emergency, course requirements, deadlines, and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances beyond the instructor's control. Relevant changes to this course will be posted on the course website or can be obtained by contacting the instructors or TAs via email or phone. You are expected to read your @purdue.edu email frequently.

***This syllabus is subject to change. You will be notified of any changes as far in advance as possible via an announcement on Brightspace. Monitor your Purdue email daily for updates.**

Fall 2023 Schedule

This course is an IMPACT course that has been partially flipped for active learning. Before each session, please watch the pre-session videos and take the pre-session quiz to learn the basic concepts. During each session, we will spend the class time applying the equations for problem solving. After each session, please complete the post-session quizzes to test your knowledge on the covered contents. The homework assignments require you to apply contents from different sessions to analyze and solve more complex problems. To account for the pre-session work you need to do, the class will not meet on Mondays. The exam review sessions listed on Mondays will be pre-recorded and delivered online.

Week	Date	Day	Lecture topic	Readings	Remarks
1	8/21	Monday	S0: Introduction and Course Admin		
	8/23	Wednesday	S1: Time Value	4.1-4.3	
	8/25	Friday	S2: Cash Value Analysis I	4.1-4.3	
2	8/28	Monday	Study time, class not meet		HW1 Due
	8/30	Wednesday	S3: Cash Value Analysis II	4.4-4.9	
	9/1	Friday	S4: Cash Value Analysis III	4.11-4.12	
3	9/4	Monday	(No class)		Labor day, HW2 Due
	9/6	Wednesday	S5: Cash Value Analysis IV	4.11-4.12	
	9/8	Friday	S6: Effective Interest I	4.14-4.15	
4	9/11	Monday	Study time, class not meet		HW3 Due
	9/13	Wednesday	S7: Effective Interest II	4.14-4.15	
	9/15	Friday	S8: Cost Estimation	2.1, 3.3-3.4	

5	9/18	Monday	S9: Exam 1 Review		HW4 Due
	9/20	Wednesday	(No class)		<u>Exam 1</u>
	9/22	Friday	S10: Principles	1.1-1.3	
6	9/25	Monday	S: Loan amortization		
	9/27	Wednesday	S11: Project Evaluation I	5.1-5.5	
	9/29	Friday	S12: Project Evaluation II	5.6	
7	10/2	Monday	Study time, class not meet		HW5 Due
	10/4	Wednesday	S13: Project Evaluation III	5.7-5.8	
	10/6	Friday	S14: Comparing Alternatives I	6.1-6.5	
8	10/9	Monday	(No class)		October break, HW6 Due
	10/11	Wednesday	S15: Comparing Alternatives II	6.5	
	10/13	Friday	S16: Depreciation I	7.1-7.5	
9	10/16	Monday	Study time, class not meet		HW7 Due
	10/18	Wednesday	(No class)		Zhuoli will be traveling for a conference
	10/20	Friday	S17: Depreciation II	7.4-7.5	
10	10/23	Monday	Study time, class not meet		
	10/25	Wednesday	S18: Tax and ATCF	7.6-7.11	
	10/27	Friday	S20: Tax and ATCF	7.6-7.11 (practice)	
11	10/30	Monday	S19: Exam 2 Review		HW 8 Due
	11/1	Wednesday	(No class)		<u>Exam 2</u>
	11/3	Friday	S21: Price Changes	8.1-8.6	
12	11/6	Monday	S22: Price Changes	8.1-8.7	
	11/8	Wednesday	S23: Replacement Analysis I	9.1-9.10	
	11/10	Friday	S24: Replacement Analysis II	9.7-9.10	HW9 Due
13	11/13	Monday	Study time, class not meet		HW10 Due
	11/15	Wednesday	S25: Benefit-Cost Ratio	10.1-10.10	
	11/17	Friday	S27: Exam 3 Review		
14	11/20	Monday	(No class)		<u>Exam 3</u> , HW11 Due
	11/22	Wednesday	(No class)		Thanksgiving vacation

	11/24	Friday	(No class)		Thanksgiving vacation
15	11/27	Monday	S26: Breakeven and Sensitivity (Online); S28: Case study explanation	11.1-11.3	
	11/29	Wednesday	Case study working time		
	12/1	Friday	Case study working time		
16	12/4	Monday	Case study working time		
	12/6	Wednesday	Case study working time		
	12/8	Friday	Case study working time		Case study report due