

SIE567 – Financial Modeling for Innovation (3 Units)
Fall 2023, Tue & Thr 9:30am – 10:45am
Aerospace & Mechanical Engineering (AME), Rm S212

Instructor: Hongyue Jin, Assistant Professor, Systems & Industrial Engineering, University of Arizona

Email: hjin@arizona.edu

Office Hours: Tue 11am-12pm & Thr 1:30pm – 2:30pm or by appointment

Office: ENGR 263A

Teaching Assistant: Mohammad Mahdi Ahmadi, Systems & Industrial Engineering, U of Arizona

Email: ahmadi@arizona.edu

Office Hours: Mon & Wed 9-10am or by appointment

Office: TBD

Description: This is a graduate level course on economic analysis of technology/business development for commercialization. Topics include Pro Forma financial statements, time value of money, valuation approaches, and entrepreneurship.

Course Objectives: By the end of this course, you will be able to

1. Utilize the concepts related to the time value of money (e.g., loan financing, present value, future value).
2. Create Pro Forma Income Statements, Cash Flow Statements and Balance Sheets.
3. Interpret financial statements to evaluate the economic potential and business value.
4. Determine investments required, financing required, and ownership outcomes of new ventures.

Prerequisites: Graduate Student Status in Engineering or Science. No prior knowledge of engineering economics required. You are expected to be reasonably proficient with Microsoft Excel.

References: (1) Contemporary Engineering Economics, 7th Edition, by Chan S. Park. The earlier edition textbooks are OK as well as any international editions. (2) Financial Statements, Third Edition: A Step-by-Step Guide to Understanding and Creating Financial Reports, by Thomas R. Ittelson, Career Press, 2020. These books are not required.

Equipment & Software Requirements: For this class, you will need daily access to the following hardware: laptop or web-enabled device with webcam and microphone; regular access to reliable internet signal; ability to download and run the following software: Microsoft Excel, Word, and Adobe Acrobat.

D2L Course: This class will use web-based D2L (Desire to Learn) as the means of distributing class materials including class assignments. You will need a UA Net ID to access D2L at the following site: <http://d2l.arizona.edu/>. Help on D2L can be found at <https://help.d2l.arizona.edu/student/student-home>. You are encouraged to ask questions and leave comments in the D2L “Discussions” section.

Course Modality: This is an in-person class for main campus students and asynchronous online for online students.

Join the lecture live online:

Option 1: Sign in to D2L → Select SIE567 → Click on “Upcoming events” on the appropriate date.

Option 2: Join the zoom meeting by xxx

All the lectures will be recorded. U of A has decided that class recordings are a part of students’ academic record. Accordingly, if you would like to not be recorded, you are welcome to turn off your video and

change your name during the synchronous lectures. See the following links for how to change name and profile:

- <https://www.techjunkie.com/zoom-change-name>
- <https://support.zoom.us/hc/en-us/articles/201363203-Customizing-your-Profile>

Watch the lecture video after class:

Sign in to D2L → Select SIE567 → Click “UA Tools” → Select Panopto

For lecture recordings, which are used at the discretion of the instructor, students must access content in D2L only. Students may not modify content or re-use content for any purpose other than personal educational reasons. All recordings are subject to government and university regulations. Therefore, students accessing unauthorized recordings or using them in a manner inconsistent with UArizona values and educational policies are subject to suspension or civil action.

Join office hour hosted by the instructor:

Option 1: Sign in to D2L → Select SIE567 → Click on “Upcoming events” on the appropriate date.

Option 2: Join the zoom meeting by xxx

Join office hour hosted by the TA:

Option 1: Sign in to D2L → Select SIE567 → Click on “Upcoming events” on the appropriate date.

Option 2: Join the zoom meeting by xxx

Tentative Lecture Schedule:

Lecture	Date	Topics
1	8/22	Course Overview & Introduction
2	8/24	Financial Statement Templates (homework 1 announced)
3	8/29	Financial Statement with Inventory and Backlog
4	8/31	Account Receivables and Payables (homework 2 announced)
5	9/5	Time Value of Money
6	9/7	Nominal and Effective Interest Rates
7	9/12	Loan (homework 3 announced)
8	9/14	Depreciation and Amortization
9	9/19	Depreciation and Amortization Continued (homework 4 announced)
10	9/21	Taxes
11	9/26	Payroll and Expenses (homework 5 announced)
12	9/28	Overhead Rate (project 1 announced)
13	10/3	Valuation
14	10/5	Valuation Continued
15	10/10	Inflation
16	10/12	Project Risk and Uncertainty (project 1 due) (project 2 announced)
17	10/17	No Class (INFORMS Annual Meeting)
18	10/19	Project 2 (explained)
19	10/24	Monte Carlo Simulation with @Risk
20	10/26	Replacement Analysis
21	10/31	Replacement Analysis Continued
22	11/2	Ownership (project 2 due)
23	11/7	Project 3 (announced)
24	11/9	Decision Tree
25	11/14	Cost Estimation
26	11/16	Guest Lecture on Cost Estimation

27	11/21	Case Study (announced) (project 3 due)
28	11/23	No Class (Thanksgiving)
29	11/28	Design Economics
30	11/30	Guest Lecture on Financial Modeling for Process Optimization
31	12/5	Review, Q&A (case study due)

The above topics and schedule are subject to change. Revisions in the syllabus may occur as the semester progresses.

Working groups: To help learning the course materials and fostering discussions, you will be organized into small working groups to do in-class or on-line short quizzes (grading information is shown below). You have the option to join the group, so you can bounce ideas off of each other and learn from each other. You may choose to join different groups during the semester or work individually as well.

Grading: The grade for this course will be determined as follows:

10% - Class participation (6 pop quizzes, 2 points each, max 10 points in total). Short quizzes will be designed to help you review the day's class materials and check your understanding of a particular topic or topics covered in that day. Upload solution to D2L "Quizzes" section within 46 hours from the time when the quiz is given. You are encouraged to work in groups of up to 5 people (see **Working groups** above) and submit one answer sheet per group. Please only include the student names in your answer sheet who actually participated in the discussions. For students submitting two different solutions (i.e., one solution from individual work and the other from group work), grading will be based on the individual work.

20% - Homework

- 4% - Financial Statement Templates
- 4% - Inventory and Backlog & Receivables and Payables
- 4% - Loans
- 4% - Depreciation & Taxes
- 4% - Payroll and Expenses

Each homework is built on the previous homework and may take 1-2 hours to complete. By completing the homework, you will be able to utilize the concepts related to the time value of money and create simple Pro Forma Income Statements, Cash Flow Statements and Balance Sheets. Homework will be assigned approximately one week before it is due. Homework should be prepared and submitted individually.

70% - Term projects

- 20% - 1st Year Financial Model
- 20% - 5 and 10 Year Financial Models
- 20% - Business Valuation and Ownership
- 10% - Case Study

Project 1 is built on the last homework — homework 5, and projects 2 and 3 are built on projects 1 and 2, respectively. Case study is a stand-alone project, aiming at planning personal financials, utilizing multiple topics and tools covered throughout the class. Each project may take ~15 hours to complete. By completing the term projects, you will be able to create more complex financial statements, interpret financial statements to evaluate the economic potential and business value, and determine investments required, financing required, and ownership outcomes of new ventures. Projects will be assigned approximately two weeks before they are due. You may discuss the projects with peers, but projects should be prepared and submitted individually.

Plagiarism on homework and term projects will receive no credit (0 point).

No late submission will be accepted for the quizzes. All homework and term projects are expected to be uploaded into D2L on or before the deadline. Penalty will be given to late submissions:

- 1) Submission delayed by 24 hours: -15% (15% of assignment score will be taken off).
- 2) Submission delayed by 48 hours: -30%
- 3) Submission delayed by more than 48 hours: -100%

Grading will be based on a percentage of the total points possible with the following minimums required for each grade: A = 90%, B = 80%, C = 70%, and D = 60%.

Dispute of Grade Policy: Students disputing a grade on any assignment must do so within a week of the graded work being returned. Note: unexcused absences will not extend this deadline.

Classroom attendance:

- If you feel sick or may have been in contact with someone who is infectious, stay home. Except for seeking medical care, avoid contact with others and do not travel.
- Non-attendance for any reason does not guarantee an automatic extension of due date or rescheduling of examinations/assessments.
- Please communicate and coordinate any request directly with your instructor.
- If you must miss the equivalent of more than one week of class, you should contact the Dean of Students Office DOS-deanofstudents@email.arizona.edu to share documentation about the challenges you are facing.
- Voluntary, free, and convenient [COVID-19 testing](#) is available for students on Main Campus.
- COVID-19 vaccine is available for all students at [Campus Health](#). Please call (520) 621-9202 before you visit in person.
- Visit the [UArizona COVID-19](#) page for regular updates.

University Policies:

The university policies on absence and class participation, threatening behavior, accessibility and accommodations, academic integrity, and non-discrimination and anti-harassment may be found at <https://academicaffairs.arizona.edu/syllabus-policies>. They are also copied below.

Absence and Class Participation Policy: Participating in the course and attending lectures and other course events are vital to the learning process. To request a disability-related accommodation, please contact the Disability Resource Center at (520) 621-3268 or drc-info@email.arizona.edu. If you are experiencing unexpected barriers to your success in your courses, the Dean of Students Office is a central support resource for all students and may be helpful. The Dean of Students Office is located in the Robert L. Nugent Building, room 100, or call 520-621-7057.

The UA's policy concerning Class Attendance, Participation, and Administrative Drops is available at: <http://catalog.arizona.edu/policy/class-attendance-participation-and-administrative-drop>. The UA policy regarding absences for any sincerely held religious belief, observance or practice will be accommodated where reasonable, see: <http://policy.arizona.edu/human-resources/religious-accommodation-policy>. Absences pre-approved by the UA Dean of Students (or Dean Designee) will be honored. See: <http://policy.arizona.edu/employmenthuman-resources/attendance>.

Classroom Behavior Policy: To foster a positive learning environment, students and instructors have a shared responsibility. We want a safe, welcoming, and inclusive environment where all of us feel comfortable with each other and where we can challenge ourselves to succeed. Students are asked to refrain from disruptive conversations with people around them during lecture. Students observed engaging in disruptive activity will be asked to cease this behavior. Those who continue to disrupt the class will be asked to leave lecture or discussion and may be reported to the Dean of Students.

Threatening Behavior Policy: The UA Threatening Behavior by Students Policy prohibits threats of physical harm to any member of the University community, including to oneself. See: <http://policy.arizona.edu/education-and-student-affairs/threatening-behavior-students>.

Accessibility and Accommodations: At the University of Arizona, we strive to make learning experiences as accessible as possible. If you anticipate or experience barriers based on disability or pregnancy, please contact the Disability Resource Center (520-621-3268, <https://drc.arizona.edu>) to establish reasonable accommodations.

Academic advising: If you have questions about your academic progress this semester, or your chosen degree program, please note that advisors at the Advising Resource Center can guide you toward university resources to help you succeed.

Life challenges: If you are experiencing unexpected barriers to your success in your courses, please note the Dean of Students Office is a central support resource for all students and may be helpful. The Dean of Students Office can be reached at 520-621-2057 or DOS-deanofstudents@email.arizona.edu.

Safety on Campus and in the Classroom: For a list of emergency procedures for all types of incidents, please visit the website of the Critical Incident Response Team (CIRT): <https://cirt.arizona.edu/case-emergency/overview>

Also watch the video available at https://arizona.sabacloud.com/Saba/Web_spf/NA7P1PRD161/common/learningeventdetail/crtfy000000000003560

Physical and mental-health challenges: If you are facing physical or mental health challenges this semester, please note that Campus Health provides quality medical and mental health care. For medical appointments, call 520-621-9202. For After Hours care, call (520) 570-7898. For the Counseling & Psych Services (CAPS) 24/7 hotline, call (520) 621-3334.

Code of Academic Integrity: Students are encouraged to share intellectual views and discuss freely the principles and applications of course materials. However, graded work/exercises must be the product of independent effort unless otherwise instructed. Students are expected to adhere to the UA Code of Academic Integrity as described in the UA General Catalog. See: <http://deanofstudents.arizona.edu/academic-integrity/students/academic-integrity>. The University Libraries have some excellent tips for avoiding plagiarism, available at <http://new.library.arizona.edu/research/citing/plagiarism>.

Selling class notes and/or other course materials to other students or to a third party for resale is not permitted without the instructor's express written consent. Violations to this and other course rules are subject to the Code of Academic Integrity and may result in course sanctions. Additionally, students who use D2L or UA e-mail to sell or buy these copyrighted materials are subject to Code of Conduct Violations for misuse of student e-mail addresses. This conduct may also constitute copyright infringement.

Instructor and/or TA will carefully exam all of your homework and reports to prevent plagiarism. For example, no copy of other people's homework or project is allowed. In grading your homework and project, TA will exam all of your work carefully and catch anyone who is copying other people's work.

UA Nondiscrimination and Anti-harassment Policy: The University is committed to creating and maintaining an environment free of discrimination; see <http://policy.arizona.edu/human-resources/nondiscrimination-and-anti-harassment-policy>. Our classroom is a place where everyone is encouraged to express well-formed opinions and their reasons for those opinions. We also want to create a tolerant and open environment where such opinions can be expressed without resorting to bullying or discrimination of others.

Requests for incomplete (I) or withdrawal (W) must be made in accordance with University policies, which are available at <http://catalog.arizona.edu/policy/grades-and-grading-system#incomplete> and <http://catalog.arizona.edu/policy/grades-and-grading-system#Withdrawal> respectively.

Additional Resources for Students: UA Academic policies and procedures are available at <http://catalog.arizona.edu/policies>

Student Assistance and Advocacy information is available at <http://deanofstudents.arizona.edu/student-assistance/students/student-assistance>

Graduate Student Resources: University of Arizona's Basic Needs Resources page: <http://basicneeds.arizona.edu/index.html>

Subject to Change Statement: Information contained in the course syllabus, other than the grade and absence policy, may be subject to change with advance notice, as deemed appropriate by the instructor.