



Course Syllabus
Industrial and System Engineering (ISE)
Engineering Project Management (ISE 515)

Note: Due to administrative processes, this syllabus is subject to change. It is the student's responsibility to verify with the instructor regarding any updates.

Semester:	Spring 2025
Course Sections:	31505D - In Person 31705D - DEN
Lecture Date and Time:	Monday, 4:00 – 9:50 PM
Location:	OHE 100D – In Person DEN@Viterbi - DEN
Instructor Name:	Dr. Alex M. Azmi
Contact:	Email: azmi@usc.edu
Instructor Office:	<ul style="list-style-type: none">• In-person Meetings: By appointment 1:45-3:45 PM prior to any scheduled session days.• Phone Meetings: Will set up a time and number with meeting details.• **For <u>emergencies</u> only: 310-800-1725**• Other options can normally be accommodated with advance notice.
Course Producers (CP/TA/CP):	<ul style="list-style-type: none">• TBD• TBD• Please <u>text Class Producers for urgent matters only</u>. Otherwise, please use email or the Discussion Board.
	Hours: By Appointment
Course Producers Office:	<ul style="list-style-type: none">• Use email for personal issues (i.e. leave) and assignment grade questions.• Response to emails within 24 hours.



Engineering Project Management (ISE 515)



Required Textbooks:

- *Siegel, N. G. (2024). Engineering project management: A hands-on guide for successful engineering projects (2nd ed.) [Kindle Edition]. Wiley.*
- *Project Management Institute. (2017). Agile practice guide [Kindle Edition]. Project Management Institute.*

Note: Additional required online articles will be provided during the course. Please note that access to some articles may involve a fee.

Recommended Textbooks:

- *Nicholas, J. M., & Steyn, H. (2020). Project management for engineering, business and technology (6th ed.) [Kindle Edition]. Routledge.*

Course Readings:

This course will rely primarily on lecture materials. Assigned readings and additional documents will be provided through the class website or through the USC electronic library system.

Prerequisites and Other Requirements:

- No prior courses.
- Capable of preparing professional papers and presentations in the English language using proper citations (APA format).
- Ability to produce documents in MS Word and MS PowerPoint.
- Access to a computer with a web camera, microphone, and speakers or headphones.
- Students are responsible for understanding materials/subjects covered in class and meeting all due dates.
- Some of the in-class work and some of the homework will require using a scheduling tool. Microsoft® project copies are free to current USC students and faculty or on the Viterbi virtual desktop. However, students are free to use different scheduling tools (Smartsheet, Jira, Asana, Wrike, etc.).
-

Course Description

Methods, processes, and tools for managing projects to create engineered systems. Project management, engineering economics, risk management. Industry-drawn large-scale engineering case studies. Team project presentations.

Expanded Course Description

This course is designed for engineering graduate students interested in managing engineering projects. Society today depends on many engineered systems – complex ensembles of capability, interconnected to



provide some benefit not achievable by the individual components. Examples include air traffic control and scheduling, medical systems that optimize care and cost, the power grid that integrates many sources of energy to provide continuous electric service (even in the presence of disruptions and failures of components), systems that coordinate the supply chain of businesses to ensure constant availability of desired products while also reducing waste, and so forth. It is not an exaggeration to say that society as we know and expect it could not exist without such systems, which provide safety, reliability, and affordability for many critical products and services.

Such systems are among the most complex artifacts humans have created. Each such project needs a **project manager** to lead it to a successful conclusion. Of course, there are also many smaller projects of varying sizes and degrees of complexity. They all need project managers, too.

This course provides an introduction to becoming an engineering project manager. Students will learn a set of guidelines, objectives, techniques, practices, and tools that can help them understand how to perform this role. However, this course is **not** intended to prepare the student for any project management certification exam.

Learning Objectives

By the end of the course, students will be able to:

- Describe the engineering project management value proposition, including the special needs of engineering projects and the contribution of engineering project management to society;
- Identify the complete *system life-cycle* (requirements, design, implementation, test, deployment, operations, maintenance, and disposal) used in developing engineering projects, and also learn about key leverage points and key lessons learned from actual large projects;
- Identify the methodologies, tools, representations, and analysis methods used in engineering project management to tackle and solve problems;
- Interpret a set of facts and methods about risk/opportunity management, engineering economics, and how those economic factors impact projects
- Demonstrate how to effectively create engineering teams, including how to motivate employees, communicate to them and to the stakeholders, recognize and resolve conflicts, and cope with change;
- Assemble an engineering project from start to end; account for the time, prepare schedule and cost estimates, and assess the role of audits;
- Acquire a definition of ethics for the specific situation of engineering projects and identify key factors that can drive engineering projects into situations of ethical lapse.

Course Notes

Outside study and homework include reading assignments, short written summaries of those readings, individual study to master the lecture materials, completion of projects started during the weekly facilitated lab sessions, and a semester-long team assignment.

The professor will hold a minimum of 2 hours of scheduled office hours per week for students of this class, will also offer specifically scheduled one-on-one or group meetings, and will also be available for consultation via email and telephone.

Lecture slides will be posted on Brightspace.



Description and Assessment of Assignments

The class will include individual and team assignments, two team projects, and two exams. Below is a description of each item.

Assignments (40%):

There will be a total of 10 assignments consisting of chapter reviews and case study analyses. Each assignment will be worth 4 points, for a total of 40 points.

Some of this work will be accomplished during the lab sessions themselves; you will likely also need to spend some time outside of the classroom hours to finish these assignments. Your products from these assignments will be counted towards your grade.

Team Projects (25%):

In addition, there will be two team projects, each worth 12.5% of the final grade.

Team Project #1 (12.5%): Students will be assigned to teams to complete the planning for an engineering project. The choice of project will be determined by each team and approved by the professor. During Team Project #1, each team will develop a portion of the project plan using principles discussed in class that week, such as scope management, cost estimation, and risk analysis. Each team will submit a project plan (a written report and presentation) by session # [insert session number here].

During some of the facilitated lab sessions, we will work on elements of the team project, which will allow the professor to ensure that everyone understands each aspect of the team assignment and is keeping up with the flow of work; you should, however, expect that you will need to work with your team outside of classroom hours to complete the team project.

Elements of the Team Project #1 are indicated in the matrix below (“Course Schedule: A weekly breakdown”) and summarized here:

- Introduction to your project, including a description of the problem and your proposed solution
- The customer’s coordinate system of value. Operational Performance Metrics (OPM) and Technical Performance Metrics (TPM).
- Proposals and proposal-creation guidance
- Risk and opportunity management
- Project start-up
- The social aspects of the engineering project management role: staffing profile, people assignments, team-building plan, identify your principal stakeholders; create 3 OPMs that reflect their system of values, and 2 TPMs that relate to each OPM. Describe your boss’s coordinate system of value for this project.
- Deliverables list and a deliverables plan
- Responsibility assignment plan
- Resources required (including customer-furnished items), and resource management



- Plan for project control and monitoring
- Software development plan
- Plan for project close-out
- Summary, conclusions, and recommendations

Team Project #2 (12.5%): Each team will identify an engineering project management topic, research it, and prepare a report and presentation on the selected topic. The research should include an in-depth analysis of the topic, its application to engineering projects, its benefits, and its current and future trends. Each team will submit the research paper (a written report and presentation) by session #10.

The outline and content of Team Project #2 will vary by topic. The outline will be submitted by each team after the selection of the research topic and approved by the professor. The outline should follow the general themes and format of Team Project #1.

The grading criteria for the Team Projects #1 and #2 are as follows:

Category	Scoring Criteria	Total Points	Score
Organization	Information is presented in a logical sequence.	2	
Content	Introduction is attention-getting, lays out the problem well, and establishes a framework for the rest of the presentation.	0.5	
	Technical terms are well-defined in language appropriate for the target audience.	0.5	
	All parts of the project plan or research paper must be included. Each part should be clear, well-developed, and connected to the others. The presentation should show a solid understanding of the topic, cover all key points, and end with a strong, logical conclusion that ties everything together	4	
	Appropriate amount of material is prepared, and points made reflect well their relative importance.	0.5	
	There is an obvious conclusion summarizing the presentation.	0.5	
Presentation	Speaker(s) maintain(s) good eye contact with the audience and is appropriately animated (e.g., gestures, moving around, etc.).	0.5	
	Speaker uses a clear, audible voice.	0.5	
	Delivery is poised, controlled, and smooth.	0.5	
	Visual aids are well-prepared, informative, effective, and not distracting. Every team member will present at least one chart.	2	
	Length of presentation is within the assigned time limits.	0.5	
	Each person is to introduce the person who comes after them: their name, and what they will present.	0.5	
Score	Total Points	12.5	

A more detailed description of the requirements for the team project paper and presentation charts will be provided via Brightspace.

The specific homework assignments, due dates, and point value toward your grade for this course are summarized in the matrix provided in the section “Course Schedule: A Weekly Breakdown” below. All



assignments should be turned in through Brightspace. Only one person from each team should turn in the team assignment; each team will need to coordinate in advance with the TA/CP regarding that person's name.

Participation (5%)

Participation is an important part of your course grade. Students are expected to take part in class discussions, share meaningful comments, and join discussions on the board. Adding thoughtful questions or insights about the course topics is encouraged and can help improve grades, especially for students close to the next grade level.

Examinations

There will be two written examinations as a part of the course:

- Mid-term examination – during the class session for week 8 (15 points). The nominal time allotted for the mid-term examination is 90 minutes. It is taken during a regular class session.
- Final examination – during finals week, you will be notified of the specific date, time, and location well before the examination (15points). The nominal time allotted for the final examination is 90 minutes. It is taken during the designated time slot during finals week.

Grading Breakdown

- Assignments — 40% (10 Assignments, 4 points each)
- Team Project #1 – 12.5%
- Team Project #2 – 12.5%
- Class participation 5%
- Mid-term examination – 15%
- Final examination – 15%

During the course, all of your examination and homework scores will be posted on Brightspace.

Course Schedule: A Weekly Breakdown

Course reading assignment titles will be abbreviated as:

- **EPM** for title: **Engineering Project Management**
- **APG** for title: **Agile Practice Guide**

Week	• 1 st half of each weekly class session	• 2 nd half of each weekly class session	• Homework assigned	• Homework due • (before the start of the weekly class session)
Week 1	<ul style="list-style-type: none"> • Motivation • Introduction to the topic 	<ul style="list-style-type: none"> • Exercises about motivations for engineering projects, and their 	<ul style="list-style-type: none"> • EPM. Read chapter 1; write a 1-page summary 	<ul style="list-style-type: none"> • (no homework due this week)



Week	• 1 st half of each weekly class session	• 2 nd half of each weekly class session	• Homework assigned	• Homework due (before the start of the weekly class session)
	<ul style="list-style-type: none"> Course overview, expectations, texts The distinction between project management, and <i>engineering</i> project management The distinction between projects and processes Definition of the quadruple constraint 	<ul style="list-style-type: none"> contribution to the world 	<ul style="list-style-type: none"> of your key learnings 	
Week 2	<ul style="list-style-type: none"> The project development cycle – how do engineering projects get built? (part 1) 	<ul style="list-style-type: none"> The project development cycle – how do engineering projects get built? (part 2) 	<ul style="list-style-type: none"> EPM. Read chapter 2 & 3; write a 1-page summary of your key learnings from the two chapters. 	<ul style="list-style-type: none"> HW 1: 1-page written summary of key points learned from chapter 1 Short bio (include this in the same file as the 1-page written summary of chapter 1)
Week 3	Your users and your other stakeholders	Team exercise: the customer’s coordinate system of value, OPMS, TPMS	EPM. Read chapter 4; no written summary is required	HW 2: 1-page written summary of key points learned from chapters 2 & 3
Week 4	Where do engineering projects come from? Creating winning proposals. Project selection.	Team exercise: proposals, the Heilmeier questions, win themes	EPM. Read chapter 5; no written summary is required	HW 3: Case Study: Henry Tam & the MGI Team (Team Dynamics) Team Proposal for Team Project.
Week 5	Project Scope Management. Work breakdown structure, organizing a project, planning	Team exercise: work-breakdown structure	EPM. Read chapter 6; write a 1-page summary of your key learnings	HW 4: 1-page written summary of key points learned from chapter 5
Week 6	Project Time Management, The activity network: creating credible predictions for schedule and cost. Resource leveling. Project Cost Management	Introduction to the concept of an <i>activity network</i> as the primary schedule-management artifact	EPM. Read chapter 7; write a 1-page summary of your key learnings	HW 5: 1-page written summary of key points learned from chapter 6



Week	• 1 st half of each weekly class session	• 2 nd half of each weekly class session	• Homework assigned	• Homework due • (before the start of the weekly class session)
Week 7	Risk and opportunity management Project Communication Management	Team exercise: risk management A review of the course-to-date by the professor (for use by the students in advance of the mid-term exam) is available on Brightspace	EPM. Read chapter 9; no written summary is required	HW 6: 1-page written summary of key points learned from chapter 7
Week 8	Project Quality Management Using statistics to reach valid conclusions. Decision-making.	Mid-term examination	EPM. Read chapter 8; no written summary is required	(no homework due this week)
Week 9	Team Presentations	Team Presentations		Team reports for project #1 are due this week Presentation charts for each team are also due this week
Week 10	Engineering economics, part I. Assessing earned value.	Team exercise: earned value and variance calculations.	EPM. Read chapter 10; the written summary of your key learnings will be combined with that for chapter 11	(no homework due this week)
Week 11	Engineering economics, part II. Financial measures of interest to your company, including NPV, IRR, payback and return on investment [ROI]. Financial metrics for projects. Break-even, sensitivity, and financial risk analysis.	Team exercise: Financial Calculations.	EPM. Read chapter 11; write a 1-page summary of your key learnings Handout	HW 7: Case Study: American Constructors case study, part 1
Week 12	Agile Project Management	Team exercise: Agile Project Management	APG: Read Chapters 1, 2, and 3. write a 1-page summary of your key learnings from the three chapters	HW 8: 1-page written summary of key points learned from chapters 10 and 11
Week 13	Special topics: (a) launching your project (b) ending your	Team exercise: launching your project	APG: Read Chapters 4 & 5. write a 1-page summary of your key	HW 9: 1-page written summary of key points



Week	• 1 st half of each weekly class session	• 2 nd half of each weekly class session	• Homework assigned	• Homework due • (<i>before the start of the weekly class session</i>)
	engineering project (c) Social aspects of the engineering project-management.		learnings from the two chapters EPM. Read chapters 12	learned from chapters 1, 2, and 3 (APG)
Week 14	Achieving <i>quality</i> on an engineering project. The role of audits. Ethics in engineering project management.	Review of the course by the professor	EPM. Read chapters 13 & 14; no written summary is required	HW 10: 1-page written summary of key points learned from chapters 4 & 5 (APG)
Week 15	Team presentations		EPM. Read chapter 15; No written summary is required	Team reports for project #2 are due this week Presentation charts for each team are also due this week
Finals week	• Final examination			

Additional Policies

Late homework assignments are usually marked down 10% for every day they are late. In general, **no** homework assignments will be accepted more than three **days after the due date**. The professor reserves the discretion to deduct a lesser amount if, in the professor's view, conditions warrant such a smaller deduction. The professor will try to accommodate legitimate personal crises.

The professor will always endeavor to treat his students with respect and dignity; he expects that you will do the same, both to him and to the other students in the class. He invites questions and discussion but reserves the right to structure the course and class time as he sees fit, including the right to request that a student take a line of discussion "off-line" to office hours if the professor believes that this line of discussion is not of general interest to the class or not contributing to the established teaching objectives for this course.

To quote from a USC guidebook: "Behavior that persistently or grossly interferes with classroom activities is considered disruptive behavior and may be subject to disciplinary action. Such behavior inhibits other students' ability to learn and a professor's ability to teach. A student responsible for disruptive behavior may be required to leave class pending discussion and resolution of the problem and may be reported to the Office of Student Judicial Affairs for disciplinary action."

The following is the USC Viterbi School honor code:

Engineering enables and empowers our ambitions and is integral to our identities. In the Viterbi community, accountability is reflected in all our endeavors.



- Engineering+ Integrity.
- Engineering+ Responsibility.
- Engineering+ Community.
- Think good. Do better. Be great.

These are the pillars we stand upon as we address the challenges of society and enrich lives.

This honor code was developed by Viterbi students.

In your written homework, please be sure to cite any referenced sources appropriately. We will not look kindly on plagiarism or cheating; we will hold you to the highest standards in this regard, and you will receive a grade of zero for the assignment if you are caught cheating or plagiarizing, which will result in a lowered or failing grade for the class. You will also be reported to the appropriate University office for plagiarizing, which could result in further sanctions, including suspension or expulsion from school. Don't do it.

The same, of course, applies to the examinations; you are expected to do your own work during the examination. The only legitimate sources of information about what to expect on the examinations are the professor and the TA/CP currently assigned to the course.

Academic Integrity

The University of Southern California is a learning community committed to developing successful scholars and researchers dedicated to the pursuit of knowledge and the dissemination of ideas. Academic misconduct, which includes any act of dishonesty in the production or submission of academic work, comprises the integrity of the person who commits the act and can impugn the perceived integrity of the entire university community. It stands in opposition to the university's mission to research, educate, and contribute productively to our community and the world.

All students are expected to submit assignments that represent their own original work, and that have been prepared specifically for the course or section for which they have been submitted. You may not submit work written by others or "recycle" work prepared for other courses without obtaining written permission from the professor(s).

Other violations of academic integrity include, but are not limited to, cheating, plagiarism, fabrication (e.g., falsifying data), collusion, knowingly assisting others in acts of academic dishonesty, and any act that gains or is intended to gain an unfair academic advantage.

The impact of academic dishonesty is far-reaching and is considered a serious offense against the university. All incidences of academic misconduct will be reported to the Office of Academic Integrity and could result in outcomes such as failure on the assignment, failure in the course, suspension, or even expulsion from the university.

For more information about academic integrity see [the student handbook](#) or the [Office of Academic Integrity's website](#), and university policies on [Research and Scholarship Misconduct](#).



Please ask your professor if you are unsure what constitutes unauthorized assistance on an exam or assignment or what information requires citation and/or attribution.

Students and Disability Accommodations:

USC welcomes students with disabilities into all of the University's educational programs. The Office of Student Accessibility Services (OSAS) is responsible for the determination of appropriate accommodations for students who encounter disability-related barriers. Once a student has completed the OSAS process (registration, initial appointment, and submitted documentation) and accommodations are determined to be reasonable and appropriate, a Letter of Accommodation (LOA) will be available to generate for each course. The LOA must be given to each course professor by the student and followed up with a discussion. This should be done as early in the semester as possible as accommodations are not retroactive. More information can be found at osas.usc.edu. You may contact OSAS at (213) 740-0776 or via email at osasfrontdesk@usc.edu.

Support Systems:

[Counseling and Mental Health](#) - (213) 740-9355 – 24/7 on call

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

[988 Suicide and Crisis Lifeline](#) - 988 for both calls and text messages – 24/7 on call

The 988 Suicide and Crisis Lifeline (formerly known as the National Suicide Prevention Lifeline) provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week, across the United States. The Lifeline is comprised of a national network of over 200 local crisis centers, combining custom local care and resources with national standards and best practices. The new, shorter phone number makes it easier for people to remember and access mental health crisis services (though the previous 1 (800) 273-8255 number will continue to function indefinitely) and represents a continued commitment to those in crisis.

[Relationship and Sexual Violence Prevention Services \(RSVP\)](#) - (213) 740-9355(WELL) – 24/7 on call

Free and confidential therapy services, workshops, and training for situations related to gender- and power-based harm (including sexual assault, intimate partner violence, and stalking).

[Office for Equity, Equal Opportunity, and Title IX \(EEO-TIX\)](#) - (213) 740-5086

Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants.

[Reporting Incidents of Bias or Harassment](#) - (213) 740-5086 or (213) 821-8298

Avenue to report incidents of bias, hate crimes, and microaggressions to the Office for Equity, Equal Opportunity, and Title for appropriate investigation, supportive measures, and response.

[The Office of Student Accessibility Services \(OSAS\)](#) - (213) 740-0776

OSAS ensures equal access for students with disabilities through providing academic accommodations and auxiliary aids in accordance with federal laws and university policy.

[USC Campus Support and Intervention](#) - (213) 740-0411

Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.



[Diversity, Equity and Inclusion](#) - (213) 740-2101

Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

[USC Emergency](#) - UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call

Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

[USC Department of Public Safety](#) - UPC: (213) 740-6000, HSC: (323) 442-1200 – 24/7 on call

Non-emergency assistance or information.

[Office of the Ombuds](#) - (213) 821-9556 (UPC) / (323-442-0382 (HSC)

A safe and confidential place to share your USC-related issues with a University Ombuds who will work with you to explore options or paths to manage your concern.

[Occupational Therapy Faculty Practice](#) - (323) 442-2850 or otfp@med.usc.edu

Confidential Lifestyle Redesign services for USC students to support health-promoting habits and routines that enhance quality of life and academic performance.