

**San José State University
Mechanical Engineering
Department**

ME 130: Advanced Engineering Analysis – Section 3, Spring 2019

Course and Contact Information

Instructor:	Prof. Abdie Tabrizi
Office Location:	ENG 348
Telephone:	408-924-3852 (please use email given below)
Email:	Abdie.Tabrizi@evc.edu
Office Hours:	Tuesday/Thursday 8:30-9:00 AM (or via email)
Class Days/Time:	Tuesdays & Thursdays, 9:00-10:15 AM
Classroom:	ENG 340
Prerequisites:	Math 133A, ME101 with a C- or better
Co-Requisite:	ME113
Course Website:	Canvas
Course Format	Weekly, TTR, in-class meetings

Canvas

All lectures will be delivered in class via written notes, discussion, and PowerPoint. The presentations in electronic format will be posted to Canvas regularly, along with the syllabus, announcements, and other useful information. Communications will be done via my office hours, email, and appointments, if possible. You are responsible for checking the class page regularly to keep up to date on the coursework. To use Canvas, go to <http://my.sjsu.edu>, click “Canvas,” and log in with your 9-digit SJSU ID and password. If you have any questions about using Canvas, please see me or visit http://www.sjsu.edu/at/ec/canvas/student_resources/index.html.

All homework should be submitted in paper form (hardcopy). Homework are graded with attention given to format, mathematical detail, using appropriate formulas and detail of derivations. Some problems may require solutions obtained using MatLab or Excel. If you do not have access to MatLab, a free version, called FreeMat, could be download via internet. If you require special accommodation(s), please contact me ASAP at the start of the semester.

Course Description

Analytic models for physical systems in mechanical engineering. Practical interpretations of analytical solutions. Introduction to linear algebra and statistics. Prerequisite: MATH 133A and ME 101 (with a grade of 'C-' or better in both). Allowed Declared Majors: Mechanical Engineering. Pre/Corequisite: ME 113

Course Learning Outcomes (CLO)

Upon completion of this course, the student should be able

- To fully understand the physical (engineering) interpretations of fundamentals of mathematical terms such as variables, functions, differentiation and derivatives, integration, differential equations
- To acquire experience and skill in basic methodologies in differentiation, integration and solving ordinary and partial linear differential equations
- To relate special tools such as Laplace transform and Fourier series for modeling engineering phenomena and facilitate mathematical solutions
- To establish mathematical models, such as differential equations and appropriate boundary and initial conditions for fundamental mechanical engineering problems in fluid mechanics, vibration and heat conduction of solids and find ways to solve these equations
- To be proficient in finding solutions of integrals and related information from “tools” such as mathematical handbooks, spreadsheets and computer software such as Mathcad and MatLAB
- To learn and practice application of the basic principles of linear algebra and statistics in engineering design analysis and manufacturing

Required Texts/Readings

Textbook

The textbook for this course is

Applied Engineering Analysis,”

by Tai-Ran Hsu, San Jose State

University, Spring 2018, ISBN:

9781119071204. (sold at the Spartan Book Store)

Other Materials

You will use Canvas to access instructor supplied supplemental material.

Course Requirements and Assignments

Expected Time Commitment

SJSU classes are designed such that in order to be successful, it is expected that students will spend a minimum of forty-five hours for each unit of credit (normally three hours per unit per week), including preparing for class, participating in course activities, completing assignments, and so on. More details about student workload can be found at <http://www.sjsu.edu/senate/docs/S12-3.pdf>.

Effort and course performance are strongly correlated. I don't give A's for effort, but putting the time and energy into this class will give you a much better chance of performing well. You should plan to spend 2-3 hours outside of class for every hour of class; for a 3-credit class such as this one, you should expect to spend 6-9 hours outside of class every week. Some students may spend more or less time than this, but this is a good guideline. This will also depend on your level of mathematical knowledge! How you spend this time is dependent on how you best learn, but I would suggest reviewing your notes, reading pertinent sections of the book, doing or redoing homework problems.

Class Attendance

NOTE that University policy F69-24 at <http://www.sjsu.edu/senate/docs/F69-24.pdf> states that “Students should attend all meetings of their classes, not only because they are responsible for material discussed therein, but because active participation is frequently essential to ensure maximum benefit for all members of the class. Attendance per se shall not be used as a criterion for grading.” However, class participation earns recognition. **Extra credit opportunities, if any, are only available to those without absences.**

Make up for any missed activity in class, such as a quiz, will only be given for a substantiated excuse.

Homework

There will be chapter assignments throughout the semester. Homework are assigned from every chapter, and it will be due on published (announced) dates. All homework are submitted on paper, i.e. no email or electronic copies are permitted. Homework are graded with attention given to format, mathematical detail, using appropriate formulas and detail of derivations. Some problems may require solutions obtained using MatLab or Excel.

Homework sets should include the following:

- List your name, date, and homework assignment number on a cover page.
- Write each problem statement. Then provide step-by-step solutions
- Drawing a figure, diagram, or some kind of graphics is required for most problems.
- List all assumptions.
- Write down all equations in the symbolic form first, before plugging in numbers. Must include derivations for the models etc.
- Write units next to all values! This will keep you from making mistakes. If you learn nothing else from this class, please learn to keep track of your units!

No late homework will be accepted without a university-authorized excuse.

Copying any portion of your assignment from another student or from a book or website without appropriate citations **constitutes plagiarism and will result in a grade of 0 for the assignment.**

Quizzes

Four quizzes will be given in class. Some of them may be open book, so remember to bring your textbooks to class! If you use an e-book, please let me know ASAP so that we can figure out a workaround. The best way to study for these quizzes is to do the assigned homework and make sure that you understand it completely, including all physical concepts and definitions.

Grading Information

General (Quizzes, Midterms, Final Exam)

In engineering, getting the right answer is obviously important, however, while mastering the material, it is important to learn the process of solving problems and paying closer attention to the details of things. To that end, in grading your work, I will look at the following:

- Getting the correct answer
- Using the correct units
- Using the correct equations in the correct way

If you attempt a problem, I will try my best to give you partial credit. The more clearly you write your solution, the easier it is for me to do this. The required contents for each solution are:

- A figure depicting the system, with boundaries indicated where appropriate
- A list of assumptions
- Derivation of mathematical models
- All equations are written in the symbolic form first, before plugging in numbers
- Units included whenever applicable
- The final answer indicated clearly

Grading Policy

		A	93.0-100	A-	90.0-92.9
B+	87.0-89.9	B	84.0-86.9	B-	80.0-83.9
C+	77.0-79.9	C	74.0-76.9	C-	70.0-73.9
		D	60.0-69.9		

Homework	25%	(Strict grading guidelines & one set dropped)
Quizzes (2)	8%	
Midterms (2)	37%	
Final Exam	30%	
Bonus (projects)	6%	

Classroom Protocol

Please place your cellphones on silent and refrain from using them during class. If you absolutely must take an emergency phone call, please leave the room quietly to do so. Exams and quizzes will be given at the beginning of class, so please be punctual. **All cell phones must be put on the instructor's table during each exam and quiz. Only one short restroom break is allowed during the exam. No restroom break is allowed during the quizzes. You are not allowed to take your cell phone with you on restroom break.**

Students will be given a grade of "F" if he/she is caught cheating. There may also be additional penalties such as dismissal from the college.

University Policies

Per University Policy S16-9, university-wide policy information relevant to all courses, such as academic integrity, accommodations, etc. will be available on Office of Graduate and Undergraduate Programs' Syllabus Information web page at <http://www.sjsu.edu/gup/syllabusinfo/>.

"SOS!"

Sometimes, life happens. If you are really struggling with the course material, and/or if something is going on outside of class that may significantly disrupt your studies (financial concerns, upheaval in your home life, physical or mental health issues, etc.), I will do everything I can to help you succeed. If I am personally unable to help you, I will direct you to the appropriate resource. If you aren't comfortable talking to me about a personal issue, that's fine, too! I will maintain a list on Canvas of all the resources available to you as an SJSU student. The earlier you ask for help with a problem, the easier it is to solve.

ME 130: Advanced Engineering Analysis -Section 03, S 2019

Tentative Course Schedule

Focus on: Linkage of math and physics (engineering):

Week 1: Sections 1.3, 1.4, 2.2.3, 2.2.4, 2.3, 2.4

Focus on: Vectors, Vector calculus and application of vector calculus

Week 2: Sections 3.4, 3.5, 3.6

Focus on: Tools for solving problems with matrices, Fourier series and Laplace transforms

Week 3: Sections 4.2.2, 4.3 to 4.6

Week 4: Sections 4.7, 5.3-5.5

Week 5: Sections 6.2-6.4

Week 6: Sections 6.5, 6.6, 7.3, 7.4

Focus on: Applications of 1st and 2nd-order ordinary differential equations in fluid mechanics and heat transfer

Week 7: Sections 7.5, 7.6

Week 8: Sections 8.2 to 8.4

Week 9: Sections 8.5 to 8.6

Week 10: Sections 8.7-8.9

Focus on: Applications of partial differential equations in heat conduction and cable vibrations

Week 11: Sections 9.1, 9.3.1, 9.4

Week 12: Sections 9.5.1, 9.6.1, 9.7

Week 13: Sections 10.2 to 10.4.1, 10.4.2

Focus on: Numerical analysis techniques, principles of finite element method and statistics for quality assurance in engineering analysis

Week 14: Sections 11.2-11.4

Week 15: Sections 11.6, 12.1-12.6, 12.8-12.10

**The above schedule may be modified as needed

Important Dates

Last day to drop (without notation)	2/5
Census day	2/20
Spring Break	4/1-5
Last day of class	5/9
Final exam	5/17 (7:15 AM to 9:30 AM)