SAN JOSE STATE UNIVERSITY
Department of Mechanical Engineering

ME130 - Applied Engineering Analysis – Section 2 Fall 2018

Instructor: Dr. Davood Abdollahian
Class hours: T Th 4:30 – 5:45 PM
Class room: E-192
Course Code: 51304
Office hours: T Th 10:30 – 11:30 AM, or by appointment
Office: E-348 Phone: (408) 888-7314 e-mail: davooda.sjsu@gmail.com

Course Description

Development of analytical models for engineering processes and systems in fluid mechanics, heat transfer, solid mechanics and mechanical vibrations. Practical interpretations of analytical and approximate solutions for steady state and non-steady state problems. Introduction to linear algebra, statistics, and their application in engineering analyses. 3 units.

Prerequisites: Grade C- or better in Math 133A and ME101. ME113 is a co-requisite
Please turn in an unofficial transcript with the prerequisites highlighted by the second class period, or you will be dropped from the class. If you have taken the prerequisites in another university or college, please attach the equivalency form.

Required Text: Bonded printed lecture notes on "Applied Engineering Analysis,"
by Tai-Ran Hsu, San Jose State University, Spring 2018.
(Sold at the Spartan Book Store)

Reference: CRC Standard Mathematical Tables, CRC Press, Inc. or other mathematical handbook, and those listed in the bonded printed notes.

Online Course Resources: Electronic copies of the course material including syllabus, homework assignments, and presentation slides will be posted on my ME130 course shell in Canvas. The course material may be updated during the semester.

Classroom Protocol:

- Please arrive in class on time.
- Homework assignments submitted past the due date will not be accepted.
- Please turn your cell phones off or place them on vibrate. Do not answer your cell phones during class. During exams, all cell phones must be put away out of sight.
- Use of internet devices in the classroom are discouraged. Students should sit in the first two rows if they want to use laptops for taking notes.
- Students are encouraged to ask questions in the classroom and during the office hours. Special arrangements can also be made for consultation with the instructor.
- Students should exhibit a respectful and professional attitude towards everyone in the class.

Dropping and Adding

Students are responsible for understanding the policies and procedures about add/drop, grade forgiveness, etc. Refer to the current semester's Catalog Policies section at http://info.sjsu.edu/static/catalog/policies.html. Add/drop deadlines can be found on the current academic calendar web page located at http://www.sjsu.edu/calendars/. The Late Drop Policy is available at http://www.sjsu.edu/aars/policies/latedrops/policy/**.** Students should be aware of the current deadlines and penalties for dropping classes.

Assignments and Grading Policy

Homework: Homework problems will be assigned at least one week before the due date. No late homeworks are accepted.

Grading: Homework 15%, two midterm exams 25% each, final exam 35%. Letter grades will be assigned based on overall class performance, with Grade C+ or B- to be the median of the overall class grade distribution.

Exam Policy: All students are expected to complete the exams in class as scheduled. There will be no make-up exams except for students with extenuating circumstances. Supporting documentation such as a medical doctor's note or jury summons is required to support such request. Make-up exam requests under such conditions must be sent to the instructor for approval by three days before or one day after the scheduled exam date.

- This is an engineering course. As such, students are expected to be *precise* in answers to problems in examinations. Partial credits will be given for incorrect answers only if correct method is used in solution procedure.
- All the assumptions for the calculations or the basis for applicability of an equation should be clearly stated.
- Students are encouraged to use pocket electronic calculators in midterms and final examination. However, they must show the proper procedures used in solutions. Use of lap-top computers is not allowed during exams. Also, students are not allowed to share calculators and written materials with others during the examinations.

Alternative accommodations or extended time will be considered only in partnership with the Disability Resource Center (http://www.drc.sjsu.edu/).

Academic Integrity

Students in this course are expected to maintain high ethical standards in all matters pertaining to the course, including, but not limited to, examinations, homework, course assignments, presentations, writing, laboratory work, team work, treatment of class members, and behavior in class. Cheating and plagiarism are violations of the SJSU Policy on Academic Dishonesty (S98-1) and will not be tolerated in the class.

Students are expected to have read the Policy, which is available at:

http://www2.sjsu.edu/senate/S04-12.pdf

Plagiarism is defined as, *the use of another person's original (not common-knowledge) work without acknowledging its source*.[1] Thus plagiarism includes, but is not limited to[2]:

- copying in whole or in part, a picture, diagram, graph, figure, etc. and using it in your work without citing its source
- using exact words or unique phrases from somewhere without acknowledgement
- putting your name on a report, homework, or other assignment that was done by someone else

Students are expected to familiarize themselves with how to avoid plagiarism. Several helpful resources can be found at:
http://www.stanford.edu/dept/vpsa/judicialaffairs/students/plagiarism.sources.htm

Compliance with the American Disabilities Act

If you need course adaptations or accommodations because of a disability, or if you need to make special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. Presidential Directive 97-03 requires that students with disabilities requesting accommodations must register with the Disability Resource Center (DRC) at http://www.drc.sjsu.edu/ to establish a record of their disability.

Course Goals

1. To learn the relationships between engineering and mathematics.
2. To learn how to derive mathematical (analytical) models for the solution of engineering problems.
3. To learn how to solve the mathematical models of mechanical engineering problems utilizing calculus and differential equations, Laplace transform, and Fourier Series.
4. To learn how to interpret mathematical solutions into engineering terms.

Student Learning Objectives

1. To fully understand the physical (engineering) interpretations of mathematical terms such as variables, functions, differentiation and derivatives, integration, differential equations, etc.
2. To acquire experience and skill in basic methodologies of differentiation, integration and solving ordinary and partial linear differential equations.
3. To be able to relate special tools such as Laplace transform and Fourier series for modeling engineering phenomena and facilitate the mathematical solutions
4. To be able to develop the mathematical models, such as differential equations and appropriate boundary and initial conditions, for fundamental mechanical engineering problems in fluid mechanics, vibration and heat conduction in solids and to find ways to solve these equations.
5. To be proficient in differentiation and finding solutions of integrals from "tools" such as mathematical handbooks, spreadsheets and computer software such as Mathcad and Matlab.
6. To learn the basic principles of linear algebra and its application in engineering analysis.
7. To understand the basic principles of statistics and its application in quality control.

---

[1] Definition adapted from "Defining and Avoiding Plagiarism: The WPA Statement on Best Practices," http://www.ilstu.edu/~ddhesse/wpa/positions/WPAplagiarism.pdf; and "What is Plagiarism?," http://www.stanford.edu/dept/vpsa/judicialaffairs/students/plagiarism.sources.htm.

[2] Adapted from, "Avoiding Plagiarism," http://owl.english.purdue.edu/handouts/research/r_plagiar.html.

Course Schedule

Aug 21 Aug 23	-	
Aug 28 Aug 30	Review of Syllabus, Basic principles of engineering analysis and its applications Introduction to statistics and applications to manufacturing process and quality control	Chapter 1 Chapter 10
Sep 4 Sep 6	Introduction to statistics and applications to manufacturing process and quality control	Chapter 10
Sep 11 Sep 13	The principles of calculus, derivatives, integration and applications of integration	Chapter 2
Sep 18 Sep 20	Solution of first order ordinary differential equations and application in heat conduction and kinematics of rigid body	Chapter 3
Sep 25 Sep 27	Solution of homogeneous, second-order linear differential equations with constant coefficients	Chapter 4
Oct 2 Oct 4	Solution of homogeneous, second-order linear differential equations with constant coefficients	Chapter 4
Oct 9 Oct 11	Review of Chapters 2, 3 and 10 **Midterm 1 – Chapters 2, 3 and 10**	
Oct 16 Oct 18	Application of Laplace transform	Chapter 5
Oct 23 Oct 25	Fourier series and its engineering applications	Chapter 6
Oct 30 Nov 1	Introduction to partial differential equations	Chapter 7
Nov 6 Nov 8	Introduction to partial differential equations	Chapter 7
Nov 13 Nov 15	Review of Chapters 4 to 6 **Midterm 2 – Chapters 4 to 6**	
Nov 20 Nov 22	Application of partial differential equations Thanksgiving Holiday	Chapter 7
Nov 27 Nov 29	Linear algebra and its application in engineering analysis	Chapter 8
Dec 4 Dec 6	Linear algebra and its application in engineering analysis Final Review	Chapter 8
Dec 14	**Final Exam 14:45-17:00, E-192**	

NOTE: The above schedule may be modified as needed.