Instructor: Dr. Davood Abdollahian
Class hours: T Th 12:00 – 1:15 PM
Class room: E-303
Course Code: 23837
Office hours: T Th 11:00 AM– 12:00 PM, 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: Math 133A, Grade C- or better in ME101 and ME113

Required Text: Bonded printed lecture notes on “Applied Engineering Analysis,” by Tai-Ran Hsu, San Jose State University, Fall 2015. (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 Greensheet, 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.
- 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.
- 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 and no texting. 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 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
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 quizzes 5%, two midterms 20% each, final exam 40%. 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 to²:

- 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.

Course Schedule

Week 1: Chapter 1: The basic principles of engineering analysis and its applications.

Week 2: Chapter 2: The principles of calculus, derivatives, orders of derivatives and mathematical modeling.


Week 4: Chapter 3: Application of first order ordinary differential equations in fluid mechanics, heat conduction in solids and kinematics of rigid body.

Week 5: Chapter 4: Solution of homogeneous, second-order linear differential equations with constant coefficients.

Week 6, 7: Chapter 4: Application of ordinary differential equations in mechanical vibration.

Week 7, 8: Chapter 5: Laplace transform and its physical meaning. Application of Laplace transform in solving differential equations relevant to engineering applications.

Week 9: Spring Break

Week 10: Chapter 6: Fourier series and its engineering applications.

Week 11, 12: Chapter 7: Introduction to partial differential equations.

Week 13: Chapter 8: Linear algebra and its application in engineering analysis.

Week 14-15: Chapter 10: Introduction to statistics and applications to manufacturing process and quality control.

NOTE: The above schedule may be modified as needed.

Final Exam: Friday, May 20, 2016; 9:45-12:00, E-303