San Jose State University  
Department of Mechanical Engineering  

Course: ME 130 Applied Engineering Analysis-1  
Semester: Fall 2016  
Class Number: 40242  
Prerequisites: Math 133A, Grade C- or better in ME 101 and ME 113  
Class Hours: MW 09:00 – 10:15 AM  
Class Room: E331, Engineering Building  
Instructor: Dr. Tai-Ran Hsu, E117B, Tel: 924-3905, E-mail: tai-ran.hsu@sjsu.edu  
Office Hours: Monday 01:30 – 4:00 PM, or by appointment.  

Course Description  

Analytic models for engineering processes and systems in fluid mechanics, heat transfer, solid mechanics, and machine design. Practical interpretations of analytic and approximate solutions for steady and non-steady state problems. Introduction to linear algebra and statistics and their applications in engineering analyses.

Textbook: Bonded printed lecture notes on “Applied Engineering Analysis,” by Tai-Ran Hsu, San Jose State University, Fall 2016. (Sold at the SJSU Spartan Book Store)

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

Grading Scheme:

- Homework: 25% (best of 5 of the 6 assigned home works)
- Mid-term exam: 30% (Wednesday, October 26, 2016) Room 331
- Final examination 45% (Thursday, December 15, 2016, 07:15-09:30 AM) in Room 331

☐ Letter grades will be assigned for the course. Grading will be based on class performance with student’s overall marks, with Grade C+ or B- to be the median of the overall mark distribution of the class. See the attached example for a typical letter grading scheme.

☐ Students are encouraged to use pocket electronic calculators and handbooks for solutions to problems in both mid-term and final examinations. But they must show the proper procedures used in solutions, and specify the sources of the information from which they obtained the solution of the problems.

☐ This is an engineering course. As such, students are expected to be precise in answers to problems in examinations. Some partial marks will be given to examinations with incorrect answers only if correct method is used in the solution procedure.

NOTE: (1) There will be NO make-up examination, except for students with serious medical reasons such as immobility, high fever, etc. A medical doctor’s certificate is required to support such request. Requests for rescheduling examinations with supporting documents must be submitted to the instructor 48 hours prior to, or one day after the originally scheduled examination.
(2) Calculators and written materials are allowed in all examinations but NOT notebook (laptop) computers or any wireless devices. Students are not allowed to share these devices and written materials with others in examinations.

(3) Late submission of homework past due time and dates WILL NOT be accepted.

(4) Students are encouraged to ask questions at all times in the classroom and during the posted office hours. Special arrangements can be made for consultation with the instructor at mutually convenient times.

University Policies

Per University Policy S16-9, university-wide policy information relevant to this course, 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/”

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 formulate mathematical models, e.g. calculus and differential equations for mechanical engineering problems involving various sub-disciplines.
4. To learn how to interpret mathematical solutions into engineering terms and senses.

Student Learning Objectives

1. To fully understand the physical (engineering) interpretations of fundamentals of mathematical terms such as variables, functions, differentiation and derivatives, integration, differential equations, etc.
2. To acquire experience and skill in basic methodologies in 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 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.
5. 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.
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 controls in manufacturing processes.

Instruction 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: Chapter 6: Fourier series and its engineering applications.

Week 10: Chapter 7: Introduction to partial differential equations.

Week 11, 12: Chapter 8: Linear algebra and its application in engineering analysis.

Week 13-15: Chapter 10: Introduction to statistics and applications to manufacturing process and quality control.

NOTE: The above schedule may be modified as needed.

Typical Grade Assignment on Class Performance

Mark Distribution of Class ME 130 Applied Engineering Analysis – Spring 2006

Total number of students: 74

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