

Welcome to

ME 130 Applied Engineering Analysis Class

Instructor:

Tai-Ran Hsu

San Jose State University
Department of Mechanical and Aerospace Engineering
ME 130 Applied Engineering Analysis

Semester: Fall 2009
Class Number: 40995

Prerequisites: **Math 133A, Grade C- or better in ME 101 and ME 113**

Class Hours: MW 09:00 – 10:15 AM
Class Room: E341, Engineering Building

Instructor: Dr. Tai-Ran Hsu, E117B, Tel: 924-3905,
E-mail: tai-ran.hsu@sjsu.edu

Office Hours: M 01:00 – 4:00 PM;
W 01:00 - 03:00 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.

SO, THIS IS AN ENGINEERING COURSE –
NOT ANOTHER MATH COURSE

Textbook: Bonded printed lecture notes on “**Applied Engineering Analysis**,” by Tai-Ran Hsu, San Jose State University, August 2009.
(Sold at the 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:

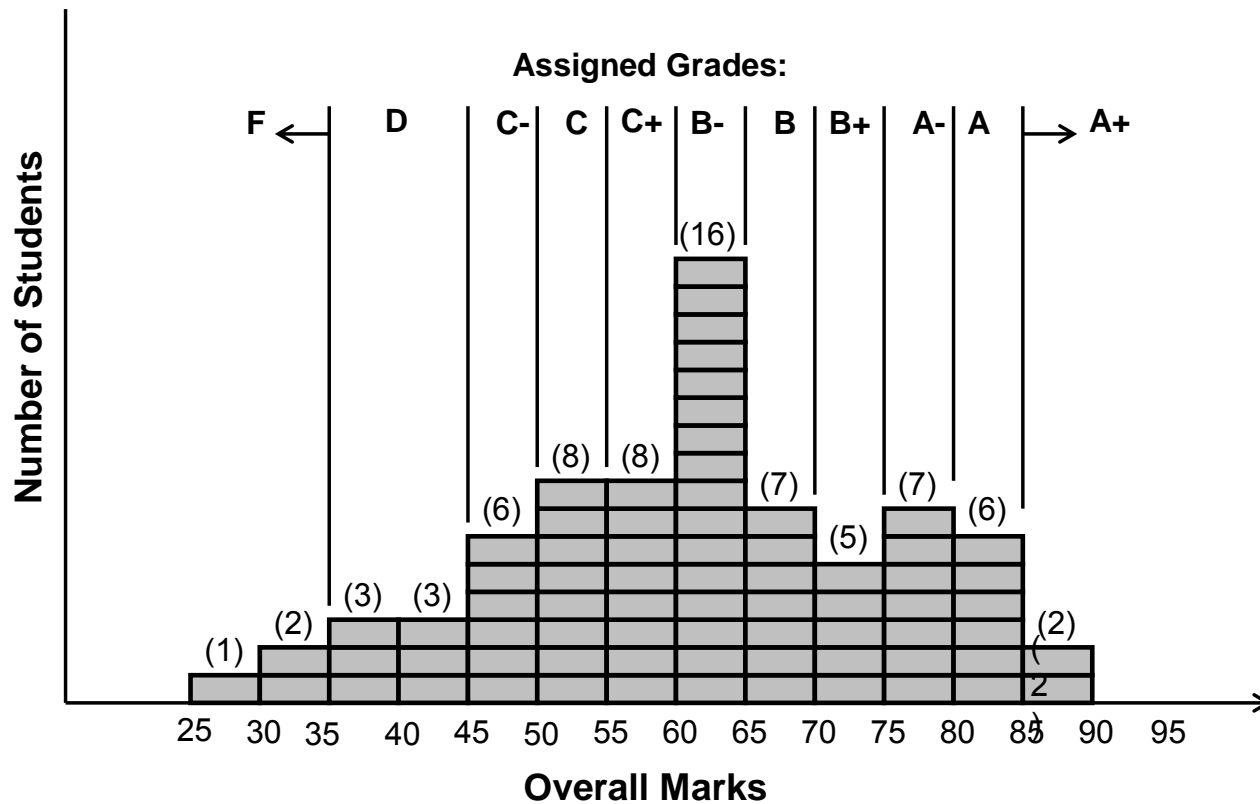
Homework:	20% (best of 5 from 6 sets)
Quiz 1:	20% (Wednesday, September 23, 2009)
Quiz 2:	20% (Wednesday, November 4, 2009)
Final examination:	40% (Monday, December 14, 2009 , 07:15-09:30 AM)

NOTE: All quizzes and the final exam will take place in the Engineering Auditorium, **Room 189**, Engineering Building

Letter grades will be assigned based on overall class performance, with Grade C+ or B- to be the median of the overall mark distribution of the class.

See the example below:

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



Total number of students: 74

Important NOTE to the class:

- (1) There will be no make-up quiz or final examination, except for students with serious medical reasons. A medical doctor's certificate is required to support such request.
- (2) **All open-book quizzes and exam.** Only **calculators** and **written materials** are allowed in quizzes and examination but **NOT** notebook computers.
- (3) ***Late submission of homework past due dates will not be accepted.***
- (4) Students are encouraged to ask questions at all times in the classroom and during the assigned office hours.
It will be your responsibility to let the Instructor know that he did not answer your question to your satisfaction.
- (5) Students are expected to be precise in answers to problems in quizzes and examinations. **Some** partial marks will be given to quizzes and final examination with incorrect answers only if correct method is used in solution procedure.
- (6) **Partial marks** will be given to incorrect answers with uniform criteria to everyone with reasons. Please refrain yourself from arguing for more generous allowance from the instructor.

Academic Integrity – with **Absolute ZERO TOLERANCE**

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

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

Course Goals

- To learn the relationships between **engineering** (the “master”) and **mathematics** (the “servant”)
- To learn how to **derive mathematical (analytical) models** for the **solution of engineering problems**
- To learn how to **formulate mathematical models**, e.g. calculus and differential equations for **mechanical engineering problems involving various sub-disciplines**
- To learn how to **interpret mathematical solutions** into **engineering terms and senses**

Student Learning Objectives

- 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 be able to relate **special tools** such as **Laplace transform** and **Fourier series** for modeling engineering phenomena and facilitate the mathematical solutions
- 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
- 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 the **basic principles of linear algebra and statistics** and their **applications** in engineering design analysis and productions

Instruction Schedule

- Week 1:** Chapter 1: The basic principles of engineering analysis and its applications
- Week 2:** Chapter 2: The principles and terms in mathematical modeling
- Week 3:** Chapter 3: Derivation and solutions of first order ordinary differential equations
- 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
- Week 6, 7:** Chapter 4: Application of ordinary differential equations in mechanical vibration
- Week 7, 8:** Chapter 5: Laplace transform and its physical meaning, and 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

“It is my passion, as well as duty to educate you the best I can,

but it is your responsibility to try hard to learn from me.”

- If you**
- Attend all classes, and listen attentively to what the Instructor says in the lectures
 - Do not hesitate to ask questions in the classes
Never pretend that you understand what is being said in the lecture
 - Do all homework problems if possible, and understand how they are done
 - Make sure to let the Instructor know your problems in learning whenever they occur
 - Make use of Instructor’s office hours for questions and advice
 - Above all; take a proactive attitude of ENJOYING what you are learning from this course

◆ You will be successful if you do all the above!