

Syllabus - MECH 306
Equation Solving Techniques



Instructor

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Office

OCNL 427, Office Phone: (530) 898-5976

Course Meeting Times

Lecture: T,R: 10:00-10:50AM, OCNL 124

Activity: F: 2:00-3:50PM, OCNL 124

3 Units Course Credit

Course Description

Numerical analysis, analytical methods, and equation solving techniques for mechanical engineering design. Structured problem formulation, parametric studies, introduction to programming concepts, and optimization for design.

Student Learning Objectives

1. To learn how to apply a range of numerical methods for solving algebraic and differential equations that occur in engineering analysis and design.
2. To use computer programming concepts and apply them to solve engineering problems.
3. To learn how to use equation-solving software to solve algebraic and differential equations.

Text/Requirements

Applied Numerical Methods with MATLAB for Engineers and Scientists, by Steven C. Chapra, 4th ed.

Prerequisites

MECH 208 and MATH 260

Office hours are tentatively set for the following days and times: M: 1:00-1:50PM, W: 2:00-3:50PM, R: 2-2:50PM. Other times/locations may be available upon request. Times/locations also subject to change, updates will be sent via Blackboard and email.

Homework

Homework assignments will be posted to Blackboard and will be due at the start of class on Thursday's, with exceptions for holidays. Homework will typically consist of take home computer and handwritten assignments. **Late homework will not be accepted!**

Exams

There will be 2 midterms and a comprehensive final exam. Both will take place in class at the regularly scheduled time. Final location will be announced. If extenuating circumstances prevent you from attending an exam, contact me as soon as possible for other arrangements to be made.

Final Exam:

TBD.

Grading

Homework	10%
Participation/Quizzes	15%
Activities	25%
Midterm 1	15%
Midterm 2	15%
Final Exam	20%

If you feel that there is an error in the grading, please submit to me in writing a short statement of why you think that you deserved more credit along with the original graded work. This must be done within a week of the assignment being returned, or will lose consideration.

Final grades will be given according to the following distribution after the weighting above has been performed for each category.

A	94-100%
A-	90-93%
B+	88-89%
B	83-87%
B-	80-82%
C+	78-79%
C	73-77%
C-	70-72%
D	60-69%
F	0-59%

Sometimes in class there will be in class activities. These will be programming activities focused on relevant manufacturing and automation applications and problem solving.

Resources

There are a number of resources available to assist you through this course. In addition to coming to one of my office hours or scheduling a meeting with me, there is free tutoring available from multiple student organizations. My availability will be posted on my office door, and additional meeting times can be scheduled in advance.

Academic Integrity

Read and understand the university policy (<http://www.csuchico.edu/sjd/integrity.shtml>). Examples of academic dishonesty include: a) copying the work/assignment of others, and b) allowing others to copy yours.

Americans with Disabilities Act

If you need course adaptations or accommodations because of a disability or chronic illness, 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. Please also contact Accessibility Resource Center (ARC) as they are the designated department responsible for approving and coordinating reasonable accommodations and services for students with disabilities. ARC will help you understand your rights and responsibilities under the Americans with Disabilities Act and provide you further assistance with requesting and arranging accommodations.

Accessibility Resource Center

(530)-898-5959
Student Services Center 170
arcdept@csuchico.edu

Note that modifications to the syllabus may be made throughout the semester. Please check back to Blackboard for the most current version.

Reminder: The CSU requires students to be fully vaccinated against COVID-19 by September 30, 2021, unless you have an approved exemption. Currently, Chico State is requiring everyone on campus to wear an approved face covering in all indoor campus spaces. Accordingly, all students are required to wear an appropriate face mask covering the nose and mouth in order to participate in this course. Policies and requirements regarding COVID-19 are subject to change pursuant to campus, local, state and/or federal guidelines.

Please note that dishonesty relating to the vaccination policy and/or your failure to comply with any other COVID-19 related safety policy or mandate, including the face covering requirement, may result in disciplinary action against you through the office of Student Conduct, Rights and Responsibilities, which can include suspension or expulsion from the California State University system. Individuals unable to wear a face covering due to a medical condition should contact the Accessibility Resource Center by phone at (530) 898-5959 or by email at arcdept@csuchico.edu

Schedule (Tentative)

Week	Topic	Chap.
1	Modeling, MATLAB	1-3
2	Matlab/Excel/Python Review	2, 3
3	Roundoff/Truncation Errors	4
4	Roots (Bracketing)	5
5	Roots (Open Method)	6
6	Optimization Exam 1	7
7	Linear Algebraic Eqn.	8
8	Spring Break	
9	Matrix Inverse	9,10
10	Iterative Methods	11,12
11	Linear Regression	14, 15
12	Numerical Integration, Exam 2	19,20
13	Numerical Differentiation	21
14	Ordinary Diff. Equation	21
15	Partial Diff. Equation	22, 23
16	TBD	—
17	Final's Week	—