

Introduction to Numerical Methods

CS3010

Numerical Methods

Dr. Lajpat Rai Raheja

Instructor Information

- Name: Dr. Lajpat Rai Raheja
- Email: Iraheja@cpp.edu
- Zoom office hour ID: 9397678450 (only during scheduled office hour and exams)
- Office hours: Monday, Tuesday 9am-11am

Basic Course Details

- CPP Canvas Course Website (Please visit and navigate)
- Course will have asynchronous and synchronous aspects.
- My Recorded lectures for each section will be upload to Canvas for every week (asynchronous part)
- Slides kindly provided by Dr. Amar Raheja will also be made available on Canvas
- Please listen to lectures at your own time during the week and work on the class exercises
- Submission of class exercises is required (10% of grade) to get practice for doing well on exams
- Please upload class exercises to Canvas by due date.
 - Late submissions will not be accepted because solutions to the class exercises will be posted after the due date.

Syllabus Topics

- Errors: absolute and relative
- Taylor Series
- Number Representation and Error Analysis
- System of Linear Equations
 - Gaussian Elimination
 - GE with Scaled Partial Pivoting
 - Iterative Solutions of Linear Systems
- Roots of Equations (Non-Linear)
 - Bisection, Newtons and Secant Method
- Polynomial Interpolation
- Numerical Integration
 - Trapezoid rule, Romberg Algorithm
 - Adaptive Simpsons Scheme
- Linear Algebra: Matrices and Vectors
- Matrix Factorization
- Eigenvalues and Eigenvectors
- Least Squares

Textbooks

- Required Text
 - Numerical Mathematics and Computing (7th edition)
 - Authors: Ward Cheney and David Kincaid
 - Publisher: Thomson (Brooks/Cole Co.), 2013
 - ISBN-10 1-133-10371-5
- Problems will be assigned from textbook, so please do get one (older edition is fine but check problem numbers)
- Reference Text:
 - Numerical Methods for Engineers (5th edition)
 - Authors: Steven C. Chapra & Raymond Canale
 - Publisher: McGraw Hill
 - ISBN: 0-07-291873-X

Basic Course Details

- All recorded lectures and lecture slides for the lecture will also be put up on Canvas under Modules
- Learning Units under Course Content represent each week of lecture material.
- Assignments and Programming Projects and other announcements will also be posted on the website under Assignments (Course Content Area)
 - Late submission is accepted but with penalty of 5% for each day it is late
- Announcements will be sent out when an assignment or project is posted

Basic Course Details

- Exams: Synchronous Part
- Every Exam will be held during Class time on the scheduled day.
- You will download the Exam on Canvas (in PDF format) and work on the exam and upload it back to Canvas at the end of the class time.
- If you are having trouble uploading it, please email it to me (lraheja@cpp.edu) right away.
- Feedback will be given to you via Canvas for all assignments, projects and exams

Grading Distribution

- Class Exercises 10%
- Assignments (2) 10% (5% each)
- Programming Projects (5) 30% (6% each)
- Exams (1 and 3) 20% (10% each)
- Exams (2 and 4) 30% (12+18%)
- Exam 2 and 4 are equivalent to Midterm and Final Exam

Tentative Course Schedule

(Dates Subject to Change, Follow Announcements/Dates in Canvas)

Week/Module	Topic	Activity/Assignment	Assessment	Approx. Due Date
Week 1, Day 1 Monday, August 23	Introduction to NM Course Overview Section 1.1			
Week 1, Day 2 Wednesday, August 25	Section 1.1	Assignment 1		Sept. 1
Week 2, Day 1 Monday, Aug. 30	Section 1.2			
Week 2, Day 2 Wednesday, Sept. 1	Section 1.2			
Week 3, Day 1 Monday, Sept. 6	Section 1.3	Assignment 2		Sept. 14
Week 3, Day 2 Wednesday, Sept. 8	Section 2.1			
Week 4, Day 1 Monday, Sept. 13	Section 2.2	Programming project 1 Gaussian Elimination with SPP		Sept. 21

General Course Policies

- Assignments: Submit Hand-written or typed assignments in pdf or word format
- Programming Projects: Choose C/C++ or Java for your projects. Upload code and report (which will include snapshots of the execution of your code) to Canvas
- Exams: Each exam tests a set of topics thoroughly. Sections included in exam will be announced before the exam. Exams will be available under Quizzes in Canvas
- Curving: very generous
 - (100-"highest weighted score") is added to your weighted total to determine your grade
 - You are being graded relative to your classmates
- Warning: Please do not copy projects in any way
 - If I determine that two projects are similar, then both students get an F in the class.
 - Submit an unfinished project and I will still give you at least 50% for your honest effort. Mention the errors or reasons for an incomplete project in your report.
- Any Questions or Comments ?