Computer Science Department

Course Syllabus

CS402 - Scientific Computing

Catalog Description: Fundamental issues of numerical computation for mathematics, science, and engineering. Use of numerical algorithms, accurately computing solutions in the presence of rounding errors. Discrete approximations of solutions. Error analysis, solution of linear and nonlinear equations, interpolation and numerical differentiation, approximation of integrals, solution of differential equations.

Credit Hours: **3 Credit hours:** **3** Lectures per week **0** Labs. per week **0** Recitation per week

Prerequisites: CS242

Course Learning Outcomes:
1. Help students understand why and how computers are used in different disciplines.
2. How to use computers to analyze errors and finding the solutions.
3. How to find solutions for differential equations.
4. Help students in approximate integrals.

Major Topics:
- Scientific, Symbolic and Graphical Computation
- Symbolic Computation
- Sets and Number Systems
- Vectors, Functions and Representations of Functions
- Polynomial Interpolations
- Computational Methods for Polynomial Evaluation
- Transforming Curves
- Problems with Interpolation
- Approximation and Sampling
- Introduction to Computational Integration
- Basic Numerical Quadrature
- Representations for the real numbers
- Polynomial series
- Non-Polynomial series
- Finding the series of a function

Text Books: An Introduction to Scientific, Symbolic, and Graphical Computation, Fiume, A K Peters Ltd, 1995.

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Grading:

- The grading scale for this course is:
  - . 95 - 100 A+ Passing
  - . 90 - 94 A Passing
  - . 85 - 89 B+ Passing
  - . 80 - 84 B Passing
  - . 75 - 79 C+ Passing
  - . 70 - 74 C Passing
  - . 65 - 69 D+ Passing
  - . 60 - 64 D Passing
  - . 0 - 59 F Failing

- Final grades will be determined based on the following components:
  - . 60% Semester Work
  - . 40% Final Exam

- Students may not do any additional work for extra credit nor resubmit any graded activity to raise a final grade.

- Late submissions will not be accepted for any graded activity for any reason.

- Studentshave one week to request the re-grading of any semester work.

Attendance Policy:

Students should attend 80% of the overall course hours taught in the semester as per the University regulations.

If a student fails to achieve this portion, he/she shall not be allowed to appear in the final exam and shall be awarded “DN” grade and repeat the course.

Cheating and Plagiarism Policy:

The instructor will use several manual and automated means to detect cheating and/or plagiarism in any work submitted by students for this course.

When a student is suspected of cheating or plagiarism, the instructor raises the issue to the disciplinary committee.

Communications:

Registered students will be given access to a section of the Blackboard Learning System for this course. Bb will used as the primary mechanism to disseminate course information, including announcements, lecture slides, assignments, and grades.

Communication with the instructor on issues relating to the individual student should be conducted using CIS email, via telephone, or in person.