Numerical Analysis

Fall Semester

LECTURER **Professor Nir Sochen**

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COURSE DESCRIPTION

This course intend to introduce the student to the practical world of solving common mathematical problems numerically in a fast and reliable way. It emphasizes approximations and the control of errors in the numerical solution. It is of utmost importance in the information age to giants like Google, in many companies that use signal and image processing and in various start-ups. The information revolution brings a constant and growing need for good numerical solvers for complex and complicated problems. The problems that are treated in this course are from calculus and from Linear algebra. The course includes an introduction to the solution of differential equations as well.

COURSE TOPICS

Week 1-2: Floating point analysis, Polynomial Interpolation
Week 3-4: Solution of non-linear equation and fixed point schemes
Week 5-6-7: Numerical linear algebra,
Week 8-9-10: Numerical differentiation & Integration
Week 11-12: Least square methods
Week 13-14: Orthogonal polynomials & Introduction to numerical solutions of ordinary differential equations with boundary conditions.

ASSIGNMENTS

75% of all homework assignments must be handed in for evaluation

MIDTERM COURSE POLICY

A midterm exam will be scheduled in the beginning of the semester. During an examination, student shall not use books, papers, or other materials not authorized by the instructor. The midterm will count for 15% of the total course grade.

FINAL COURSE POLICY

The final exam will cover the entire course material and will count for 85% of the total course grade. The duration will be 3 hours. During an examination, student shall not use books, papers, or other materials not authorized by the instructor.
Students will have a first exam, Moed A. If the student does not pass, they can retake the exam, Moed B. The last exam taken will be the student's final grade for the exam.

REQUIRED READING

S. D. Conte and C. de Boor, Elementary Numerical Analysis 1972