MAD 4401 Introduction to Numerical Analysis (Class Number 15386, Section 3132)
Spring 2020
http://people.clas.ufl.edu/kees/files/MAD4401Fall2019.jpeg

Instructor: James Keesling kees@ufl.edu **Office Hours:** MW 6th Period
LIT 424 (352) 294-2312

Meeting Time and Place: MWF 5th Period, 11:45 am - 12:35 pm, FAC 127

Textbook: No Text. A **TI-Nspire CX CAS** or **TI-Nspire CX II CAS** calculator is required. No other calculator is acceptable. The manual is at http://education.ti.com/en/us/guidebook/search/ti-nspire.

Goal: The student will become familiar with the techniques of using the computer to solve mathematical problems and be able to solve problems using the techniques.

Syllabus: This course is an introduction to the basic techniques of numerical analysis. A major theme in the course is using the computer to solve mathematical problems. A significant topic will be the analysis of error. This is a course in mathematics. So, special attention will be paid to the mathematical theory behind the methods used.

No textbook is required. Class notes will be available online. The TI-Nspire CX CAS will be used in class to investigate examples to clarify the theory. It will also be required for the tests. The tests and final will include examples to be calculated and explained.

Topics to be covered will include: the bisection method of solving equations, Newton-Raphson method of solving equations, Lagrange polynomial interpolation, Newton-Cotes quadrature, Gaussian quadrature, Romberg quadrature, Taylor method of solving differential equations, Picard method of solving differential equations, Runga-Kutta method of solving differential equations, adaptive step-size solutions of differential equations, Richardson extrapolation, queueing theory and simulation, Monte-Carlo integration, and splines and curve-fitting methods.

Week 1-3	Solving equations, Iteration and Chaos
Week 4	Polynomial approximation
Week 5-7	Estimating integrals
Week 8-9	Estimating derivatives
Week 10-11	Computer solution of differential equations
Week 12	Chaos
Week 13-14	Queueing and stochastic simulation
Week 15	Splines and curve-fitting
Week 16	Review

Tests and Grading: There will be two in-class tests and a final exam. The grades will be determined by averaging the tests and final exam scores: 95-100 = A, 90-94 = A-, 87-89 = B+, 83-86 = B, 80-82 = B-, 76-79 = C+, 70-75 = C, 65-69 = D+, 60-64 = D, 0-59 = E.

Final Exam: Thurs, Apr 30, 10 am – 12 pm, FAC 127

Policy for Make-Up Exams: If a student has a known conflict for an exam, the student has the responsibility to make arrangements for a make-up before the exam is given. If a student misses an exam due to an emergency, arrangements must be made as soon as possible for a make-up.

Students with Disabilities: Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, www.dso.ufl.edu/drc/) by providing appropriate documentation. Once registered, students will receive an accommodation letter that must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.