

Numerical Analysis

COT 4501

Class Periods: M,W,F | Period 5 (11:45 AM - 12:35 PM)

Location: online

Academic Term: Fall 2020

Instructor:

Dr. A. Entezari

Office: 352-294-6648

Class Web site: on Canvas.

Office hours: TBA

Teaching Assistant/Peer Mentor/Supervised Teaching Student:

Please contact through the Canvas website

Course Description

COT 4501 Numerical Analysis-A Computational Approach. Credits: 3; Numerical integration, nonlinear equations, linear and nonlinear systems of equations, differential equations and interpolation.

Course Pre-Requisites / Co-Requisites

COP 3504 or COP 3503 and MAS 3114

Course Objectives

This course presents a broad overview of algorithms used for solving problems in continuous mathematics that are encountered in engineering and sciences.

Professional Component (ABET):

- (a) an ability to apply knowledge of mathematics, statistics, computer science, and electrical engineering as it applies to computer hardware and software.
- (b) an ability to design and conduct experiments, as well as to analyze and interpret data.
- (e) an ability to identify, formulate, and solve hardware and software computer engineering problems, accounting for the interaction between hardware and software.

Required Textbooks and Software

- “Scientific Computing, An Introductory Survey”, by M. Heath

Supplementary Materials

- “Introduction to Applied Linear Algebra”, by S. Boyd and L. Vandenberghe
- “Numerical Analysis”, by L. R. Scott

Course Outline

This is an introductory course to scientific computing with an emphasis on essential concepts and algorithms in numerical analysis. Tentative list of topics:

- Overview of scientific computing
- Linear systems
- Floating point systems, error analysis
- Linear least squares problems
- Nonlinear equations
- Optimization
- Interpolation
- Numerical integration and differentiation
- Numerical solutions to differential equations

As time permits, application of these concepts/algorithms to machine learning will be discussed.

Online Course Recording

Our class sessions may be audio visually recorded for students in the class to refer back and for enrolled students who are unable to attend live. Students who participate with their camera engaged or utilize a profile image are agreeing to have their video or image recorded. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who un-mute during class and participate orally are agreeing to have their voices recorded. If you are not willing to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively using the "chat" feature, which allows students to type questions and comments live. The chat will not be recorded or shared. As in all courses, unauthorized recording and unauthorized sharing of recorded materials is prohibited.

Attendance Policy, Class Expectations, and Make-Up Policy

As lectures are **very important** in this course, I expect regular and timely following of lectures videos and other material. Requirements for attendance and make-up exams, assignments, and other work in this course are consistent with university policies (<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>) and require appropriate documentation.

Evaluation of Grades

| Assignment | Percentage of Final Grade |
|-------------------|----------------------------------|
| Homework Sets | 60% |
| Midterm Exam | 10% |
| Project | 30% |
| | 100% |

Grading Policy

| Percent | Grade | Grade Points |
|----------------|--------------|---------------------|
| 90.0 - 100 | A | 4.00 |
| 86.7 - 89.9 | A- | 3.67 |
| 83.4 - 86.6 | B+ | 3.33 |
| 80.0 - 83.3 | B | 3.00 |
| 76.7 - 79.9 | B- | 2.67 |
| 73.4 - 76.6 | C+ | 2.33 |
| 70.0 - 73.3 | C | 2.00 |
| 66.7 - 69.9 | C- | 1.67 |
| 63.4 - 66.6 | D+ | 1.33 |
| 60.0 - 63.3 | D | 1.00 |
| 50.0 - 59.9 | D- | 0.67 |
| 0 - 49.9 | E | 0.00 |

Grades will be curved when necessary.

More information on UF grading policy may be found at:
<https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

Students Requiring Accommodations

Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center by visiting <https://disability.ufl.edu/students/get-started/>. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

Course Evaluation

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

University Honesty Policy

UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Honor Code (<https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Commitment to a Safe and Inclusive Learning Environment

The Herbert Wertheim College of Engineering values broad diversity within our community and is committed to individual and group empowerment, inclusion, and the elimination of discrimination. It is expected that every person in this class will treat one another with dignity and respect regardless of gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture.

If you feel like your performance in class is being impacted by discrimination or harassment of any kind, please contact your instructor or any of the following:

- Your academic advisor or Graduate Program Coordinator
- Robin Bielling, Director of Human Resources, 352-392-0903, rbielling@eng.ufl.edu
- Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, taylor@eng.ufl.edu
- Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, nishida@eng.ufl.edu

Software Use

All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

Student Privacy

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see: <https://registrar.ufl.edu/ferpa.html>

Campus Resources:

Health and Wellness

U Matter, We Care:

Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact umatter@ufl.edu so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing

staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

Counseling and Wellness Center: <http://www.counseling.ufl.edu/cwc>, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

Sexual Discrimination, Harassment, Assault, or Violence

If you or a friend has been subjected to sexual discrimination, sexual harassment, sexual assault, or violence contact the **Office of Title IX Compliance**, located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, title-ix@ufl.edu

Sexual Assault Recovery Services (SARS)

Student Health Care Center, 392-1161.

University Police Department at 392-1111 (or 9-1-1 for emergencies), or <http://www.police.ufl.edu/>.

Academic Resources

E-learning technical support, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu.
<https://lss.at.ufl.edu/help.shtml>.

Career Resource Center, Reitz Union, 392-1601. Career assistance and counseling. <https://www.crc.ufl.edu/>.

Library Support, <http://cms.uflib.ufl.edu/ask>. Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring.
<https://teachingcenter.ufl.edu/>.

Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers.
<https://writing.ufl.edu/writing-studio/>.

Student Complaints Campus: <https://care.dso.ufl.edu>.

On-Line Students Complaints: <http://www.distance.ufl.edu/student-complaint-process>.