

Syllabus

Course: CSCI 2150-2150L (Introduction to Computational Science)

Semester: Fall, 2021

Prerequisite: Math 1113 or Permission of Department

Instructor: Bill Hollingsworth

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This is the general syllabus for CSCI 2150 for Fall, 2021. The following guidelines give a general description of the course and related policies.

You may email me. When sending me an email, put the course number and section number in the subject and supply your full name in the FROM field. Without this information, your email may not get a direct reply.

Class materials

You will need a copy of Matlab. and a Grafstate account (<https://grafstate.com>). Grafstate is a program that I wrote and we will use it for lessons and assignments. You should bring a tablet or laptop to class when you come. You can get a free license for Matlab from EITS.

Brief Description

There is no textbook for this course. Below is a list of recommended books and Matlab Materials:

- i) Numerical Mathematics and Computing by E. Ward Cheney and David R. Kincaid, 7th. Edition, ISBN-10: 1133103715, Publisher: Cengage Learning.
- ii) http:
www.mathworks.com/academia/student_enter/tutorials.html
- iii) MATLAB Guide, Second Edition by Desmond J. Higham and Nicholas J. Higham, SIAM, 2005. xxiii+382 pages, hardcover, ISBN 0-89871-578-4.
- iv) http:
www.ma.man.ac.uk/~higham/mg/
- v) https:
www.amazon.com/MATLAB-Guide-Desmond-J-Higham/dp/0898715784
- vi) Insight Through Computing: A MATLAB Introduction to Computational Science and Engineering by Charles F. Van Loan and K.-Y. Daisy Fan
- vii) Learning MATLAB by Tobin A. Driscoll
- viii) Numerical Computing with MATLAB, Revised Reprint, Cleve Moler 2004 / xii + 336 pages / Softcover / ISBN: 978-0-898716-60-3

Topics covered

This course is computationally oriented. Topics include:

1. Introduction to scientific computing.
2. Introduction to Matlab and other available software packages for numerical simulations.
3. Number systems and computer arithmetic.
4. Solution of linear systems of equations.
5. Root finding.
6. Interpolation and curve fitting
7. Differentiation and integration.
8. Numerical solutions of ODEs

Course objectives

This course is designed for students in Science and Engineering. It will offer students a basic but solid background in numerical simulation for solving scientific problems. Students will learn to use MATLAB and/or other available symbolic and numerical computation software throughout the course. The course will cover essentially the main topics mentioned above.

Learning outcomes

This course presents topics in mathematics that are most relevant to students studying science and engineering. At the end of the semester, students should be able to do the following:

1. Use matlab for manipulating matrices.
2. Use matlab/maple for symbolic computation, such as finding the Taylor series of a function and evaluate its value at a certain point.
3. Distinguish the difference between the representation of floating point and integer numbers in the computer memory.
4. Distinguish between single and double precision representations of floating point numbers and compute errors when floating point operations are involved.
5. Compare between numerical and exact solution and validate the results.
6. Solve linear system of equations using Gaussian elimination and available software.
7. Find the roots of a nonlinear function and examine its correctness.
8. Interpolate a table of values by using polynomials.

Class policies

Grades will be posted on eLC. eLC will also be used for assignments, announcements, and course materials. You are responsible for any announcements about the class that are made in class or posted to eLC.

You are NOT allowed to post any solutions to homework or worksheets on eLC, Piazza, or any other website.

I encourage group study when it is appropriate. During group study, you are permitted to discuss in detail any homework problems. However, you must write up your homework assignments on your own. When taking a test (i.e., an exam) do not look at another student's test, and do not facilitate another student's seeing your test.

You should be able to reproduce any solution you hand in. If you have any questions about whether a certain behavior is or is not cheating, feel free to ask me.

You are never to share your work in any way on a test. Clearly, you are not permitted to look at anyone else's paper while taking a test in class. In addition, if I give you a take home test, you are never permitted to discuss the test in any way with anyone other than me. Even sharing whether you think an exam is hard or easy may give some students an unfair advantage.

Office hours: Online office hours will be offered via Zoom. In-person meetings will be available by appointment; these will be outside or in a classroom and will require some notice.

Online Behavior: Students are expected to be courteous and respectful in all online interaction with other members of the class.

Assignments

Assignments should be typed using the Grafstate Shell. Instructions for working with Grafstate are available from the Grafstate website. Development is ongoing and I try to respond to needs and issues that arise in class or with assignments. If you discover a bug in the software, then please email me and tell me how to encounter the bug. If you have suggestions or feedback, then please tell me.

There will be 2 midterms and a final exam this semester.

Makeup tests will not be given. However, if the midterm exam is missed due to an extreme and verified emergency, then it might be excused by the instructor. To be considered for an excused exam absence, students must bring detailed documentation explaining the circumstances to the instructor during office hours no more than 7 days after an exam is missed. Student must leave a copy of their documentation with the instructor. If the absence is excused, then the final exam score will be counted for the missed exam. If the absence is not excused, then a grade of 0 will be given.

Grades

Students may request a reevaluation of graded materials. In order to be considered, students must send a regrade request within 7 days after the grade was posted on eLC for grades posted to eLC before reading day. For grades posted on or after reading day, students must send a regrade request within 3 days after the grade was posted on eLC. All regrade requests must be emailed to the instructor from your UGA email account with a subject that contains *cs2670 regrade request for X*", where *X* is the name of the assignment. If a rubric is posted for an assignment, then the regrade request must include which parts of the grading rubric were incorrectly graded. Regrade requests may result in a lower grade.

Grades will be weighted as follows: 2 Midterm Exams (20% each), Final Exam (20%), Lecture assignments (10%), Lab (30%)

Academic Honesty

As a University of Georgia student, you have agreed to abide by the University's academic honesty policy, *A Culture of Honesty*, and the Student Honor Code. All academic work must meet the standards described in *A Culture of Honesty* found at: <http://honesty.uga.edu>. Lack of knowledge of the academic honesty policy is not a reasonable explanation for a violation. Questions related to course assignments and the academic honesty policy should be directed to the instructor.

In addition, students are expected to abide by the CS Academic Honesty policies below:

Computer Science Departmental Policy Statement, Academic Honesty:

All academic work must meet the standards contained in "A Culture of Honesty." Students are responsible for informing themselves about those standards before performing any academic work.

The Computer Science Department recognizes honesty and integrity as necessary to the academic function of the University. Therefore all students are reminded that the CS faculty requires compliance with the conduct regulations found in the University of Georgia Student Handbook. Academic honesty means that any work you submit is your own work.

Common forms of academic dishonesty against which students should guard are:

1. Copying from another student's test paper or laboratory report, or allowing another student to copy from you;
2. Fabricating data (computer, statistical) for an assignment;

3. Helping another student to write a laboratory report or computer software code that the student will present as her or his own work, or accepting such help and presenting the work as your own;
4. Turning in material from a public source such as a book or the Internet as your own work.

Steps to help prevent academic dishonesty are:

1. Familiarize yourself with the regulations.
2. If you have any doubt about what constitutes academic dishonesty, ask your instructor or a staff member at the Office of the Vice President for Instruction.
3. Refuse to assist students who want to cheat.
4. Do not allow anyone to copy any of your work, and report anyone who tries to copy from you to the instructor or TA as soon as possible.

Selling, posting, or giving away course content such as slides, notes, or any information about exams, homeworks, projects, or lectures is considered an act of academic dishonesty (unauthorized assistance) unless you have written permission from the instructor. The instructor has the right to run programs to detect evidence of unauthorized assistance (usually in the form of copying from another person or unauthorized source) in any assignment submitted by a student in this semester, previous semesters, or future semesters. Also, the instructor has the right to record exams for academic honesty purposes. All faculty, staff, and students are encouraged to report all suspected cases of academic dishonesty. All cases of suspected academic dishonesty will be referred to the Office of the Vice President for Instruction. Penalties imposed by the Office of the Vice President for Instruction may include a failing grade in the course and a notation on the student's transcript. Repeated violations are punishable by expulsion from the University. For further information please refer to the UGA Code of Conduct, available at the URL below:

<http://conduct.uga.edu/code-of-conduct>

CORONAVIRUS INFORMATION FOR STUDENTS FOR FALL 2021 CLASSES

Face coverings:

Following guidance from the University System of Georgia, face coverings are recommended for all individuals while inside campus facilities.

How can I obtain the COVID-19 vaccine?

University Health Center is scheduling appointments for students through the UHC Patient Portal (https://patientportal.uhs.uga.edu/login_dualauthentication.aspx). Learn more here - <https://www.uhs.uga.edu/healthtopics/covid-vaccine>.

The Georgia Department of Health, pharmacy chains and local providers also offer the COVID-19 vaccine at no cost to you. To find a COVID-19 vaccination location near you, please go to: <https://georgia.gov/covid-vaccine>.

In addition, the University System of Georgia has made COVID-19 vaccines available at 15 campuses statewide and you can locate one here: <https://www.usg.edu/vaccination>

What do I do if I have COVID-19 symptoms?

Students showing COVID-19 symptoms should self-isolate and schedule an appointment with the University Health Center by calling 706-542-1162 (Monday-Friday, 8 a.m.-5p.m.). Please DO NOT walk-in. For emergencies and after-hours care, see, <https://www.uhs.uga.edu/info/emergencies>.

What do I do if I test positive for COVID-19?

If you test positive for COVID-19 at any time, you are required to report it through the DawgCheck Test Reporting Survey. We encourage you to stay at home if you become ill or until you have excluded COVID-19 as the cause of your symptoms. UGA adheres to current Georgia Department of Public Health (DPH) quarantine and isolation guidance and requires that it be followed. Follow the instructions provided to you when you report your positive test result in DawgCheck.

Guidelines for COVID-19 Quarantine Period (As of 8/1/21; follow DawgCheck or see DPH website for most up-to-date recommendations)

Students who are fully vaccinated **do not** need to quarantine upon exposure unless they have symptoms of COVID-19 themselves. All others should follow the Georgia Department of Public Health (DPH) recommendations:

Students who are not fully vaccinated and have been directly exposed to COVID-19 but are not showing symptoms **should self-quarantine for 10 days**. Those quarantining for 10 days must have been symptom-free throughout the monitoring period and continue self-monitoring for COVID-19 symptoms for a total of 14 days. You should report the need to quarantine on DawgCheck (<https://dawgcheck.uga.edu/>), and communicate directly with your faculty to coordinate your coursework while in quarantine. If you need additional help, reach out to Student Care and Outreach (sco@uga.edu) for assistance.

Students, faculty and staff who have been in close contact with someone who has COVID-19 are no longer required to quarantine if they have been fully vaccinated against the disease and show no symptoms.

Well-being, Mental Health, and Student Support

If you or someone you know needs assistance, you are encouraged to contact Student Care & Outreach in the Division of Student Affairs at 706-542-7774 or visit <https://sco.uga.edu/>. They will help you navigate any difficult circumstances you may be facing by connecting you with the appropriate resources or services.

UGA has several resources to support your well-being and mental health: <https://wellbeing.uga.edu/>

Counseling and Psychiatric Services (CAPS) is your go-to, on-campus resource for emotional, social and behavioral-health support: <https://caps.uga.edu/>, TAO Online Support (<https://caps.uga.edu/tao/>), 24/7 support at 706-542-2273. For crisis support: <https://healthcenter.uga.edu/emergencies/>.

The University Health Center offers FREE workshops, classes, mentoring and health coaching led by licensed clinicians or health educators: <https://healthcenter.uga.edu/bewelluga/>

Monitoring conditions:

Note that the guidance referenced in this syllabus is subject to change based on recommendations from the Georgia Department of Public Health, the University System of Georgia, or the Governor's Office or. For the latest on UGA policy, you can visit coronavirus.uga.edu.

Other information

Class Accommodation

Students with a disability or health-related issue who need a class accommodation should make an appointment to speak with the instructor as soon as possible. Students who require such an accommodation for an exam must contact the instructor at least two weeks before the exam is scheduled.

Syllabus Policy

Students are responsible for learning and following all policies stated in this syllabus. This course syllabus is a general plan for the course; deviations announced to the class by the instructor may be necessary. In such a case, the instructor will revise the syllabus and post the revised syllabus on ELC.

Mental Health and Wellness Resources

If you or someone you know needs assistance, you are encouraged to contact Student Care and Outreach in the Division of Student Affairs at 706-542-7774 or visit <https://sco.uga.edu/>. They will help you navigate any difficult circumstances you may be facing by connecting you with the appropriate resources or services.

UGA has several resources for a student seeking mental health services (<https://www.uhs.uga.edu/bewelluga/bewelluga>) or crisis support (<https://www.uhs.uga.edu/info/emergencies>).

If you need help managing stress anxiety, relationships, etc., please visit BeWellUGA (<https://www.uhs.uga.edu/bewelluga/bewelluga>) for a list of FREE workshops, classes, mentoring, and health coaching led by licensed clinicians and health educators in the University Health Center.

Additional resources can be accessed through the UGA App.