DSC 495 Course Syllabus

DSC 495 – Scientific Programming with Python

Section 014, Fall 2022, 1 Credit Hour

Course Description

Welcome to an NCSU Data Science Academy Course! In July 2021, the university-wide and interdisciplinary Data Science Academy (DSA) was launched to meet the growing needs of data science research, education and expertise in North Carolina and beyond. At NC State, Data Science is for Everyone. Data Science Academy Courses are designed to make sure that each student can pursue appropriate level challenges through opportunities to make choices and pursue projects of interest. DSA courses will highlight the work of a diverse group of data scientists, bring attention to ethical issues, teach design for accessibility, and explore current issues in data science research and practice. The DSA will develop courses that attract and serve students from all ten NCSU colleges and beyond. Whether you have never thought about data science before or bring experience and expertise, we welcome you. Our goal is that after each DSA class you want to learn more! To make sure that we are providing an appropriate collection of courses with a variety of challenge levels within each course, we will be collecting data to help us build a practice of continuous improvement. The purpose of the data is to evaluate the DSA and how well we are serving our students. We hope to be able to share what we learn with other universities and researchers - we will ask your permission at the beginning of the course to be able to share your de-identified data when we communicate about the work of the DSA.

This course provides an introduction to the use of Python in scientific computation. This includes exposure to tools in three different areas: 1) general software development tools, including terminal commands and version control, 2) Python programming basics, including syntax, object-oriented structures, modules and exception handling, and 3) Scientific computing in Python, including numpy, scipy, matplotlib and pandas. These tools will then be used by the students in a summative final project.

Learning Outcomes

1. Provide exposure to tools needed for software development, such as shell scripts and version control

2. Provide an introduction to Python programming language syntax, including basic control structures (conditionals, loops, data structures)

3. Provide an introduction to more advanced software concepts as implemented in Python, such as object-oriented programming, modules, and exception handling

4. Introduce scientific computing in Python, by introducing the use of numpy, scipy, matplotlib, and pandas, to conduct numerical computations and visualize their outcomes

5. Give students an opportunity to apply these skills together in a summative project.

Course Structure

Our course will be structured around weekly lectures with a homework due each week. The course will culminate with a comprehensive course project due at the end of the semester.

Course Policies

Electronics: I encourage you to use a laptop to follow along with the course materials, but please be respectful to me and your fellow students.

Instructors

Arvind K. Saibaba (asaibab) - *Instructor*
Email: asaibab@ncsu.edu
Web Page: https://asaibab.math.ncsu.edu/
Phone: 919-513-2299
Office Location: SAS 3118
Office Hours: Monday 2:45-3:30 (SAS Hall), Thursday 9-10 (Zoom)

Course Meetings

Lecture

Days: M
Time: 1:55PM - 2:45PM
Campus: Main
Location: 00243 111 Lampe Drive
This meeting is required.

Course Materials

Textbooks

None.

Materials

Class website on github:
https://github.ncsu.edu/asaibab/dsc495_014_fall2022

Transportation

This course will not require students to provide their own transportation.

Safety & Risk Assumptions

None.

Grading

Grade Components

Letter Grades

This Course uses Standard NCSU Letter Grading:

97 ≤ A+ ≤100	87 ≤ B+ < 90	77 ≤ C+ < 80	67 ≤ D+ < 70
93 ≤ A < 100	83 ≤ B < 87	73 ≤ C < 77	63 ≤ D < 67
90 ≤ A- < 93	80 ≤ B- < 83	70 ≤ C- < 73	60 ≤ D- < 63
F < 60			

Requirements for Credit-Only (S/U) Grading

In order to receive a grade of S, students are required to take all exams and quizzes, complete all assignments, and earn a grade of C- or better. Conversion from letter grading to credit only (S/U) grading is subject to university deadlines. Refer to the Registration and Records calendar for deadlines related to grading. For more details refer to http://policies.ncsu.edu/regulation/reg-02-20-15.

Requirements for Auditors (AU)

Information about and requirements for auditing a course can be found at http://policies.ncsu.edu/regulation/reg-02-20-04.

The policy of DSA is to discourage auditing.

Policies on Incomplete Grades

If an extended deadline is not authorized by the instructor or department, an unfinished incomplete grade will automatically change to an F after either (a) the end of the next regular semester in which the student is enrolled (not including summer sessions), or (b) the end of 12 months if the student is not enrolled, whichever is shorter. Incompletes that change to F will count as an attempted course on transcripts. The burden of fulfilling an incomplete grade is the responsibility of the student. The university policy on incomplete grades is located at http://policies.ncsu.edu/regulation/reg-02-50-3.

Late Assignments

Late work will not be accepted unless there is a valid emergency. The lowest homework grade will be dropped.

Attendance Policy

For complete attendance and excused absence policies, please see http://policies.ncsu.edu/regulation/reg-02-20-03

Attendance Policy

Attendance is required.

Academic Integrity

Academic Integrity

Students are required to comply with the university policy on academic integrity found in the Code of Student Conduct found at http://policies.ncsu.edu/policy/pol-11-35-01

Students are allowed and encouraged to work in small groups to discuss homework but the work that you submit should ultimately be your own. Students are required to comply with the university policy on academic

integrity found in the Code of Student Conduct found at http://policies.ncsu.edu/policy/pol-11-35-01. Violations of academic integrity will be handled in accordance with the Student Discipline Procedures (NCSU REG 11.35.02).

Honor Pledge

Your signature on any test or assignment indicates "I have neither given nor received unauthorized aid on this test or assignment."

Digital Course Components

Students may be required to disclose personally identifiable information to other students in the course, via digital tools, such as email or web-postings, where relevant to the course. Examples include online discussions of class topics, and posting of student coursework. All students are expected to respect the privacy of each other by not sharing or using such information outside the course.

Digital Course Components: This course will use moodle (not accessible to the public) but will use a GitHub page (accessible to all of NC state). You will be asked to create a GitHub page that will only be accessible to the instructor.

Accommodations for Disabilities

Reasonable accommodations will be made for students with verifiable disabilities. In order to take advantage of available accommodations, students must register with the Disability Resource Office at Holmes Hall, Suite 304, Campus Box 7509, 919-515-7653. For more information on NC State's policy on working with students with disabilities, please see the Academic Accommodations for Students with Disabilities Regulation (REG02.20.01) (https://policies.ncsu.edu/regulation/reg-02-20-01/).

Non-Discrimination Policy

NC State provides equal opportunity and affirmative action efforts, and prohibits all forms of unlawful discrimination, harassment, and retaliation ("Prohibited Conduct") that are based upon a person's race, color, religion, sex (including pregnancy), national origin, age (40 or older), disability, gender identity, genetic information, sexual orientation, or veteran status (individually and collectively, "Protected Status"). Additional information as to each Protected Status is included in NCSU REG 04.25.02 (Discrimination, Harassment and Retaliation Complaint Procedure). NC State's policies and regulations covering discrimination, harassment, and retaliation may be accessed at http://policies.ncsu.edu/policy/pol-04-25-05 or https://oied.ncsu.edu/divweb/. Any person who feels that he or she has been the subject of prohibited discrimination, harassment, or retaliation should contact the Office for Equal Opportunity (OEO) at 919-515-3148.

Course Schedule

A tentative schedule has been posted on the class github page.