INLS 570
Fundamentals of Programming Information Applications
Spring 2021

Class Format: **Remote, synchronous class meetings via Zoom (attendance expected)**

Class Sessions: Mondays and Wednesdays, 11:15am – 12:30pm

Zoom link: available in Sakai

Instructor: Dr. Robert Capra
Office: virtual
Office Hours: see Sakai site for Zoom links to "drop-in" office hours
also, by appointment
Email: r<lastname> at unc dot edu

Teaching Assistant: Yuyu Yang <firstname>18 at live dot unc dot edu

Prerequisite(s): COMP110, INLS 560, or equivalent

Texts/Resources:

INTPY: *How to Think Like a Computer Scientist, interactive edition 2.0*: https://runestone.academy/runestone/static/thinkcspy/index.html

TPY: Think Python: How to Think Like a Computer Scientist, 2nd ed. Downey, A. http://www.greenteapress.com/thinkpython2/

PDA: *Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython, 2nd edition.* McKinney, W.

Course Webpage: UNC Sakai web site for INLS 570

Grade Weighting:

In-class participation	10%
Exercises	15%
Programming Assignments	45%
Midterm exam	15%
Final exam	15%

1. Welcome and Notes

As we start this semester, the coronavirus pandemic is affecting many aspects of our lives. This class will be taught using the remote + synchronous format using Zoom for our class meetings. My goal for this semester is for us to have a rich, supportive, interactive learning community. It will not be exactly like a face-to-face class, but Zoom provides us with some interesting (and I hope fun!) options for interactive learning. I also want us to get to know each other as a class, so we will do some activities designed to help us not only learn about databases, but also to build learning relationships.

I understand that this is a challenging time for many people – I have designed the class to allow for flexibility and adjustment as needed. If you face personal challenges this semester, I encourage you to be in contact with me and I will be happy to talk through options (e.g., for turning in an assignment late, etc.).

I'm looking forward to this semester with you all. Wear a mask, stay safe and stay healthy!

2. Class format – Remote + Synchronous

The class format for this section is remote + synchronous. The idea of the remote + synchronous mode is to provide the benefits of a "live" class while we participate at a distance. As such, **attendance and participation in the class Zoom sessions is an expected part of this course**. To help foster interactivity and community building aspects of class, I also expect that most of the time, most students will participate with their **video on**. You will need a UNC Zoom account and access to a high-speed Internet connection to participate in this course.

3. Recording

This semester, I am not *planning* to make any recordings of our class sessions. However, should this change, I will let the class know in advance.

I understand that there may be times that you must miss class or that your Internet may be out. You should handle these situations similar to how you would if you missed an in-person class – contact the instructor, ask classmates for missed notes, etc.

Important information about recording class sessions from the UNC "Keep Teaching" website Jan 19, 2021 (https://keepteaching.unc.edu/wp-content/uploads/sites/1160/2020/10/Recording-Classes-Best-Practices_ForInstructors.docx):

> *The course instructor may record meetings of this class for educational purposes. These recordings will be shared only with students enrolled in the course for purposes of academic instruction only. Your instructor will communicate to you how you may access any available recordings.*
>
> *Any use of a class recording by a student shall be for educational purposes only. Students may not record a class on their own, in any format, without prior express authorization from the University and may not copy, reproduce or distribute any recording that they access. Students requesting the use of assistive technology as an accommodation should contact Accessibility Resources & Service.*

4. Course Description and Prerequisites

This course provides fundamental skills needed to design, implement, and maintain computer applications focused on information processing, management, retrieval, and presentation. Students will learn object-oriented programming, data structures, algorithm analysis, and data processing techniques in the context of information science topics such as metadata harvesting, information retrieval, text analysis, and user interfaces. The course combines conceptual understanding of data structures and algorithms with practical techniques for implementation and debugging. Course concepts are taught using the Python programming language. Pre-requisite: COMP 110, INLS 560, Introduction to Programming, or the equivalent.

5. Course Objectives

- Develop skills to design and implement information processing applications.
- Gain experience with object-oriented programming in Python.
- Learn practical and theoretical concepts about data structures.
- Understand and be able to apply principles of algorithm analysis.
- Gain experience with recursion and recursive algorithms.
- Gain experience writing information processing applications.
- Learn to use advanced Python data structures and modules for data analysis.

6. Computing Requirements

- **Development environment(s)**: For the programming assignments in this course, we will use **Python 3**. Python and the IDLE development environment are available for free for a variety of platforms (Win/Mac/Linux) at: (http://www.python.org/download/). During the course, we may also use the Anaconda Python distribution and development environment Instructions about how to download and install it will be given later in the semester. We may also use the Amazon AWS environment.
- **Zoom + high-speed Internet connection:** Due to the coronavirus, this section of INLS 523 is being conducted using the remote + synchronous format using the Zoom conferencing system. To participate in class, you will need a UNC Zoom account and a high-speed Internet connection.
- **UNC VPN:** To access the UNC network, you may need to install UNC's VPN client. See help.unc.edu for details.
- **In-class exercises**: We will do in-class exercises that will require computer use.

7. Amazon Web Services

This course may use Amazon Web Services (AWS) for some of its underlying technology.

By remaining enrolled in this course, students acknowledge and consent to the following:

1. Students may be required to use an AWS environment to complete required course assignments and/or exercises.
2. Students must agree not to upload or publish any sensitive data in this specific AWS environment.

8. Grades

Your overall course grade will be computed based on the weighted items as shown in the "Grade Weighting" table on the first page of this document.

- **Participation**: Participation is especially important in a remote + synchronous class using Zoom.
  - Students are expected to regularly attend and actively participate in the "live" class.
  - Your participation grade will be based on regular class attendance, being prepared for class, being fully and actively engaged during class, and courteous behavior in class. Specifically:
    - Turn your video on (unless it negatively impacts your internet connection). Having our video on helps us get to know one another and helps create a sense of community. I understand that not everyone may be able to have their video on 100% of the time, but please aim for being on video as much as possible.
    - Asking questions – this can be done in several ways: typing a question into the Zoom chat, using the Zoom "Raise Hand" feature, or unmuting yourself and asking a question verbally.
    - Responding to questions asked by the instructor – depending on the question, this may involve: using the Zoom thumbs-up/down or polling feature, typing a response in the Zoom chat, or unmuting yourself to give a verbal response.
    - Actively engaging in class activities and exercises. Many of class exercises will involve working in small groups in Zoom breakout rooms.

- **Exercises**: During many class periods, there will be one or more in-class exercises to give you hands-on experience applying concepts we discuss in class. You will often work on these exercises in pairs or small groups in Zoom breakout rooms. In-class exercises will often include a component that will be turned in via Sakai.

- **Programming Assignments**: There will be programming assignments designed to give you in-depth, "hands-on" experience with the concepts and programming techniques that are covered in this course. The assignments will involve planning, design, implementation and debugging. These may require a significant amount of time – students are advised to start working on the programming assignments early.

  NOTE: For some assignments and exercises, we may do "peer reviews" in which students submit their code to Sakai and then review the code of one to three other students. There are several benefits to this. First, reviewing other students' code is a good way to solidify your understanding of programming techniques. Second, doing code reviews is a good way to improve your ability to understand code that someone else has written (like reading someone else's essay in a writing class). And finally, you may learn new programming techniques by having your code reviewed and critiqued by your peers!

- **Exams**: There will be a mid-term exam and a comprehensive final exam.

9. Grading Policies

The following grade scale will be used AS A GUIDELINE (subject to any curve) for **undergraduate** students:

Grade Range	Definition*
A 90-100%	Mastery of course content at the highest level of attainment that can reasonably be expected of students at a given stage of development. The A grade states clearly that the students have shown such outstanding promise in the aspect of the discipline under study that he/she may be strongly encouraged to continue.
B 80-89.9%	Strong performance demonstrating a high level of attainment for a student at a given stage of development. The B grade states that the student has shown solid promise in the aspect of the discipline under study.
C 70-79.9%	A totally acceptable performance demonstrating an adequate level of attainment for a student at a given stage of development. The C grade states that, while not yet showing unusual promise, the student may continue to study in the discipline with reasonable hope of intellectual development.
D 60-69.9%	A marginal performance in the required exercises demonstrating a minimal passing level of attainment. A student has given no evidence of prospective growth in the discipline; an accumulation of D grades should be taken to mean that the student would be well advised not to continue in the academic field.
F 0-59.9%	For whatever reason, an unacceptable performance. The F grade indicates that the student's performance in the required exercises has revealed almost no understanding of the course content. A grade of F should warrant an advisor's questioning whether the student may suitably register for further study in the discipline before remedial work is undertaken.

* Definitions are from: http://registrar.unc.edu/academic-services/grades/explanation-of-grading-system/ (underlining is my emphasis)

For Spring 2021, the following grade scale will be used AS A GUIDELINE (subject to any curve) for **graduate** students:

Grade Range	Definition*
P 100-75%	Pass
F 0-74.9%	Fail

These scales will be used as a GUIDELINE ONLY. The final grade scale may differ.

Due Dates and Late Work

Each assignment will have a due date and time and will include instructions for submission. A late penalty of 10% per day may be applied **unless prior arrangements have been made with the instructor**. Assignments submitted more than 5 days after the due date may receive no credit and may not be graded.

Requests for Extensions and Absences

Any request for an extension must be made, preferably by email, at least 24 hours prior to the due date. Written documentation is required for illness. If a serious illness prevents you from taking any of the tests, send your instructor an e-mail message, or a friend with a note, describing your condition before the scheduled test.

Statute of Limitations
Any questions or complaints regarding the grading of an assignment or test must be raised within one week after the score or graded assignment is made available (not when you pick it up).

10.Web Site and Course Communication (Sakai)

Sakai
All enrolled students should have access to the UNC Sakai site for this course:

http://sakai.unc.edu/

We will use Sakai for administrative aspects of the course. For example, the Sakai site will contain the course syllabus, schedule, reading assignments, lecture slides, exercises, homework assignments, and other useful information.

- **Course Announcements**: I will often use the Sakai messaging feature to send announcements to the class. Usually these messages will also be sent via email to each student's email address of record. However, it is the responsibility of every student to check the Sakai site regularly for announcements and messages. The Sakai site is a reliable source for announcements and messages from the instructor. If something the instructor says in class conflicts with information posted by the instructor on Sakai, then the information posted on by the instructor on Sakai takes precedence. Verbal instructions are easily mis-interpreted, and they do not leave a documentation trail.
- **Assignments**: In order for you to receive credit for an assignment, it must be submitted using the Sakai "Assignments" section. In my experience, Sakai is a reliable method to submit assignments. It is the responsibility of each student to make sure they have access to Sakai and can submit assignments when they are due. You should also verify that each assignment you submit has uploaded correctly.
  If for some reason you are unable to submit an assignment to Sakai, as a last resort you may email it to the instructor along with a note about the problem you encountered. **Then, as soon as you are able to, it is your responsibility to submit the exact same assignment to Saka**i. The email serves as a record that you tried to submit the assignment on time, but to receive credit, your assignment must be uploaded to Sakai.
- **Grades**: I will use the Sakai "Gradebook" to record your course grades.

Email
Email can be an effective means for you to contact me regarding quick and simple class-related communication. If you have a detailed question about an assignment or class concept, I encourage you meet with me during either my Zoom drop-in office hours or to set up an appointment to meet with me via Zoom. Note that I receive a large amount of email and while I try to reply to student emails within 24 hours, there are times that it may take me a few days to reply to email. You may get an answer faster by talking to me after class – I will often stay on the class Zoom session for 5 to 10 minutes after class if students have questions.

11.Honor Code

The UNC Honor Code is in effect for all work in this course. The "Instrument of Student Judicial Governance" gives examples of actions that constitute academic dishonesty:

http://instrument.unc.edu/instrument.text.html#academicdishonesty

Student often ask what is okay to talk about with other students and what is not. I do encourage you to help each other learn the course material – your fellow students can often be a great resource for learning. However, you should not discuss the details of a solution to an assignment with other students, and should never copy or share answers for an assignment with other students. It is okay to talk about course material with other students, but you should not discuss detailed solutions to pending assignments. **All work you submit should be your own**. One way to help insure this is that if you do discuss course material with other students, do not take any written notes.

12. Accessibility Resources and Services (ARS)

The University of North Carolina at Chapel Hill facilitates the implementation of reasonable accommodations, including resources and services, for students with disabilities, chronic medical conditions, a temporary disability or pregnancy complications resulting in barriers to fully accessing University courses, programs and activities.

Accommodations are determined through the Office of Accessibility Resources and Service (ARS) for individuals with documented qualifying disabilities in accordance with applicable state and federal laws. See the ARS Website for contact information: https://ars.unc.edu or email ars@unc.edu.
(source: https://ars.unc.edu/faculty-staff/syllabus-statement)

13. Counseling and Psychological Services (CAPS)

CAPS is strongly committed to addressing the mental health needs of a diverse student body through timely access to consultation and connection to clinically appropriate services, whether for short or long-term needs. Go to their website: https://caps.unc.edu/ or visit their facilities on the third floor of the Campus Health Services building for a walk-in evaluation to learn more.

(source: Student Safety and Wellness Proposal for EPC, Sep 2018)

14. Title IX Resources

Any student who is impacted by discrimination, harassment, interpersonal (relationship) violence, sexual violence, sexual exploitation, or stalking is encouraged to seek resources on campus or in the community. Please contact the Director of Title IX Compliance (Adrienne Allison – Adrienne.allison@unc.edu), Report and Response Coordinators in the Equal Opportunity and Compliance Office (reportandresponse@unc.edu), Counseling and Psychological Services (confidential), or the Gender Violence Services Coordinators (gvsc@unc.edu; confidential) to discuss your specific needs. Additional resources are available at safe.unc.edu.

15. Tentative Schedule of Topics

- Python Introduction
    - Data, Loops, Modules
    - Functions, Iteration
    - Strings, Lists, Tuples
    - Files, Regular Expressions
    - Dictionaries
- Text Analysis
    - Parsing, Indexing
    - Aggregation
- Data Analysis
    - NumPy Basics
    - Pandas
        - Pandas Basics
        - Data Loading, Storage
        - Data Aggregation, Group Operations
        - Pivot Tables
- Machine Learning
    - Scikit-learn