Programming for Business, DS 662

Term: Fall Semester 2024
Credits: 4.0
Section 01 meets TR 2:10PM – 3:30PM in Paul College Room G59

INSTRUCTOR: Maryann Clark, Senior Lecturer in Decision Sciences

OFFICE: Paul College, room 101B

EMAIL: maryann.clark@unh.edu Include your course name in the subject line of the email. Please do not message me through MyCourses (Canvas).

OFFICE HOURS: Tuesdays and Thursdays 11:15AM – 12:15PM in room 101B or by appointment.

PREREQUISITE: Management Information Systems ADMN 410

REQUIRED MATERIALS: You are required to bring a laptop to class. Reading materials for this course will be provided to you at no charge. All materials can be accessed through MyCourses / Modules. Students will use the following free online resources: [Python for Everybody](#) by Charles Severance, [W3Schools/Python](#), [Pandas Documentation](#), [Real Python](#), [Stack Overflow](#) as well as other online resources as needed.

COURSE OVERVIEW

Data volume and complexity has grown exponentially, requiring more powerful analytical tools. Business school graduates need data analysis skills to gather and analyze relevant data, and to visualize results. The versatile and popular Python programming language improves work for everyone. Python can be used to automate processes, to collect and prepare data for analysis and to provide insight for important business decisions. Python's strength as a data analysis tool gives real-time information which is vital to today's decision-making process.

This applied technology foundations course focuses on using the Python programming language in a business setting. Students will gain an understanding of fundamental computer programming concepts and how to use these concepts to solve business problems and improve business processes.

The fundamental concepts covered in this course include:

- Programming logic and principles
- Data collection
- Data visualization
- Data wrangling
- Generating meaningful insight from data analysis

This course will provide you with hands-on exposure to the above-listed fundamental concepts and prepare you for advanced courses and careers in information systems management. In addition to learning these essential fundamental concepts, you will develop critical thinking and problem-solving skills.

COURSE OBJECTIVES

When you have successfully completed this course, you should be able to:

1. Utilize core Python elements such as variables and flow control structures.
2. Identify when to work with lists and dictionaries.
3. Apply Python built-in functions and identify when to create your own Python functions to facilitate code reuse.
4. Predict the output of a given Python script.
5. Utilize Python libraries including Pandas for business data analysis.
6. Conduct Python development with Colab Notebooks and data stored in .csv and .zip files.
7. Utilize an API (Application Programming Interface) to collect data from websites.
8. Utilize Python data cleaning and exploration tools and libraries to format data. Identify categorical and numeric data, conduct analyses, and generate meaningful insight.

LEARNING ACTIVITIES

This course utilizes the Active Learning approach to promote student engagement. This means that students are expected to fully participate in their learning by practicing skills, solving problems, struggling with complex questions, proposing solutions, and explaining ideas as part of classroom activities.

Brief activities are introduced within lectures during the first half of class meeting time. These activities interspersed in the lecture specifically focus on Course Objectives 1 through 3 as mastery of those objectives requires hands-on, interactive experience in addition to completion of assigned readings.

The second half of class meeting time will be spent on group-based collaborative learning activities or programming assignments (group and individual) with encouragement and support from your peers and the instructor. Course Objectives 4 through 8 will be achieved through the collaborative challenges and assignments covered in the second half of class meeting time.

ASSESSMENT ACTIVITIES

Assignments – Assignments include individual and group programming assignments. Point values for assignments will vary. Programming assignments are aligned with the first five Course Learning Objectives. Expect weekly assignments.

The purpose of the programming assignments is to ensure that you can apply the concepts discussed during the lecture and in your readings. The following criteria is used to grade programming assignments:

- Compliance – the program must address the stated problem.
- Functionality – the program must work correctly.
- Documentation – the program must have appropriate and adequate commenting.
- Efficiency – the program must use as few lines of code as possible. Keep it clean and simple.

Programming assignments are an important learning tool to help you master the material and prepare for exams. Some programming assignments will be completed individually, and some will be

completed in groups. Much (but not all) of the programming assignment work will be done during the second half of class meeting time, where the instructor will be available to provide support as needed prior to assignment submission. All programming assignments will be submitted through MyCourses. Feedback on submitted programming assignments will be provided in MyCourses and may include written comments or video feedback. For group programming assignments one member of the group submits the assignment and all members have access to the submitted assignment as well as the feedback on the submitted assignment.

Exams – There are three exams for this course. Exams are closed book and closed notes. Exams will be given in class and will be in MyCourses. You may have one cheat sheet, which must be an 8.5-inch x 11-inch sheet of paper with only ONE side of handwriting**.** Exams will include multiple choice and true/false questions and a programming section that requires the design and development of Python scripts.

Make-up exams are only offered under extreme circumstances and must be pre-approved by the instructor.

Mac users: The Safari browser cannot be used to take exams in MyCourses as it does not display embedded images. Exams will have embedded images. You must download and use a different browser prior to the start of the exam. Firefox or Chrome are recommended.

Project – There will be one group project at the end of the course, designed for you to show comprehensive application of the concepts covered in class and in your reading. Guidelines and specifications for the project will be posted in MyCourses. All group members must contribute to the development of the project. At the end of the semester a peer evaluation will be done by all students in the group. If a student is not contributing equally and appropriately to group work throughout the semester, that student's scores on all group-based assignments and the project will be reduced accordingly.

GRADING POLICY

Assessments – The MyCourses "Grades" page will display your current weighted percentage score in the sidebar. You can use the "what-if" feature in MyCourses to show how your final grade could be affected by grades you may earn on upcoming assignments. At the end of the semester, when all grades have been entered, the "Total" percentage score MyCourses displays will be used to determine your final letter grade for the course.

Assessment	Percentage of overall grade	
Programming Assignments (13)	40%	
Exam 1	15%	
Exam 2	15%	100%
Exam 3	15%	
Group Project	15%	

Final Letter Grade Distribution – Shown below is the letter grade associated with each range of points. Note that 89.99 is not an A- it is a B+ and 93.99 is an A- not an A. Grades will not be "rounded up" and

there will not be extra credit opportunities to "boost" your grade. Remember that I do not give you your grades, you earn your grades! I objectively evaluate your work and report your grades to you.

Grades Scored Between	Will Equal
94% and 100%	A
90% and Less Than 94%	A-
87% and Less Than 90%	B+
84% and Less Than 87%	B
80% and Less Than 84%	B-
77% and Less Than 80%	C+
74% and Less Than 77%	C
70% and Less Than 74%	C-
67% and Less Than 70%	D+
64% and Less Than 67%	D
60% and Less Than 64%	D-
0% and Less Than 60%	F

STUDENT EXPECTATIONS

Attendance Policy – All students are expected to attend each day, and to be on time. To maintain an environment conducive to learning and minimize disruptions, students are expected to remain in the classroom for the entire duration of the class session. Please take care of personal needs, such as using the restroom or filling water bottles, before or after class. Leaving and re-entering the classroom during the lecture can be distracting to your classmates and disrupt the flow of the session. If you have a medical condition or other special circumstances that require you to leave the classroom frequently, please discuss this with me privately at the beginning of the semester so that appropriate accommodation can be provided. Thank you for your cooperation in creating a respectful and focused learning environment.

You are allowed three absences during the semester, which you should save for minor illness and emergencies that prevent you from attending class. Arriving late to class is considered an absence. Your final grade for the course will be dropped by a third of a letter for each absence after three (for instance, a grade of C+ would drop to a C with 4 absences or to a C- with 5 absences.) Absences associated with a Dean's Letter or a Bereavement Letter (see below) are not counted as any of your three allowed absences with respect to this attendance policy.

In MyCourses / Grades you will have access to "Roll Call Attendance". This feature will display the days you were marked absent. Note that the "Total" grade shown in MyCourses, at the bottom of the Grades page, does not include the penalty applied for four or more absences. This penalty is applied at the end of the semester, prior to posting final grades to Webcat.

If you are absent you are responsible for the material covered the day you missed. Suggestions for making up the material: get the class notes for the day you missed from a classmate, and check for updated in-class work posted in MyCourses. You are encouraged to then attend the instructor's office hours with any questions on the class notes or material posted in MyCourses.

Students are excused from class if they are participating in:

- official intercollegiate events,
- official adaptive sports events facilitated by Northeast Passage,
- jury duty,
- required military service, or
- important religious holidays and/or observances.

Students are required to provide documentation to the instructor for absences due to official intercollegiate events, required military service, or jury duty.

Dean's letters: If you are dealing with an unexpected, extenuating circumstance that will keep you out of class or affect your performance for more than a day or two please contact the Dean of Students (dean.students@unh.edu) to request a Dean's Letter be sent to all your instructors. If you have a Dean's Letter and you have questions about completing course requirements, please email the instructor immediately at maryann.clark@unh.edu.

Bereavement letters: If the letter/flexibility you're requesting is regarding a loss in your immediate family, please contact Paul College Associate Dean Lu Echazu at luciana.echazu@unh.edu to request a letter be sent to your instructors.

Excessive Absences – When students are absent from class to such an extent that their own progress is seriously impaired, they will be reported to the dean of their college by their instructor. When reports are received by a college dean, the dean will consider each student's class standing, academic record, and other pertinent factors; the dean may then a.) warn the student against continued absences by letter or by interview, b.) place the student on scholastic warning or c.) report the student to the Academic Standards and Advising Committee for a decision as to whether the student shall continue in the University.

Course Communication – MyCourses is the primary means I have for sharing course content and communicating changes. The syllabus is tentative and may change as the semester progresses. Please check MyCourses at least once a day to see if there are announcements that need your attention. These announcements may include a more complete description of an assignment, changes in the syllabus, changes in exams, or other changes in your responsibilities for completing the course.

Technical Support – If you have computer issues and require technical support please contact the UNH Technology Help Desk. You can walk up to the Technology Help Desk at the Dimond Library with your questions during their business hours, without an appointment. You can also get help online or by phone.

Curtailed Operations – The university will announce "curtailed operations" prior to weather events that have the potential to create hazardous driving conditions. During curtailed operations UNH does not hold in-person classes so we will not meet in our classroom. You will still be responsible for that day's in-class work and any assignments. I will record the day's lecture content and post it in MyCourses. A MyCourses announcement will also be posted outlining the expectations for the day's work and will include details on where to find the recorded lecture content. We will not meet synchronously online during curtailed operations.

Late Work – The submission of late work is not permitted as you will be given ample time to complete assignments. Exceptions will be made if you experience a medical emergency requiring hospitalization

or if I have received a letter from the Dean of Students indicating you have encountered an unexpected, extenuating circumstance.

Academic Misconduct: Cheating and Plagiarism – The overwhelming majority of us work very hard in this course, and that work is recognized and appreciated. Therefore, academic misconduct will not be tolerated. See the UNH Student Rights, Rules, Responsibilities (SRRR) Handbook, the section titled "Academic Integrity" for examples of academic misconduct. In this course the penalty for academic misconduct is a failing grade in the course. If the academic misconduct involves two parties; i.e. one person did the work and another person submitted the work as their own; the penalty is a failing grade for both parties. It is permissible for students to discuss the nature of an assignment or how to use a feature of the software. However, not a single keystroke of the work you submit should be done by anyone but you, nor should your individual work be based on ideas or data supplied by someone else. You should not give, receive, or solicit specific information (such as formulas, codes, or functions) from other students in your class or in other classes. Exchange of detailed information about an assignment or exam is considered cheating.

Use of ChatGPT and other AI (Artificial Intelligence) tools – This course recognizes the importance of technological advancements, including the use of AI tools, in the field of programming. While students are encouraged to explore various resources for learning, it is essential to maintain academic integrity. Remember that the primary goal of this course is to develop your programming skills and problem-solving abilities. While AI tools can be valuable for learning, relying on them for graded work undermines your own learning experience.

- Permissible use of ChatGPT and other generative AI tools:
    - For clarification on programming concepts, syntax, or general coding principles.
    - To enhance understanding of specific topics covered in the course.
    - AI tools can be used to decipher and understand error messages encountered during programming assignments. If an AI tool is used for this, it must be cited in the code's comments. Include a description of the error and how you resolved it with an AI tool. AI tools may not be used to decipher and understand error messages encountered during exams.
    - As a supplementary resource for reviewing concepts and preparing for exams.

- Prohibited use of ChatGPT and other AI tools:
    - The use of AI tools for generating code, comments, or written responses that directly contribute to the completion of programming assignments or exams is not permitted and will be considered academic misconduct. While AI tools can be valuable for general learning and clarification of concepts, they should not be used to generate solutions for programming assignments or exams.
    - AI tools may not be used to decipher and understand error messages encountered during exams.

STUDENT SUPPORT SYSTEMS

Accommodations – If you have a disability and require accommodation you must register with Student Accessibility Services (SAS) at 227 Smith Hall. Contact SAS at (603) 862-2607 or www.unh.edu/sas. If you have a UNH Accommodation Letter you are required to meet with me to develop a working

agreement regarding the implementation of your accommodations. Email me to schedule a time to discuss this working agreement privately in my office.

Emotional or Mental Health Distress – If you find emotional or mental health issues are affecting your success in this course please contact the University's [Psychological and Counseling Services (PACS)](#) (3rd floor, Smith Hall, at 3 Garrison Avenue 603-862-2090) which provides counseling appointments and other mental health services.

Mandatory Reporting of Sexual Violence and Harassment – UNH and its faculty are committed to assuring a safe and productive educational environment for all students. To this end, the university requires faculty members to report incidents of sexual violence and harassment shared by students. All incidents shared with faculty will be reported to the university's Title IX Coordinator. If you wish to speak to a confidential service provider who does not have this reporting responsibility, see this list of [confidential resources](#).

INCLUSION STATEMENT

The Programming for Business course is an exciting opportunity for all students to explore the power of computer programming in an unintimidating and safe environment. There will be many opportunities for hands-on practice of concepts we cover. I am available to help anyone debug or improve their programs. Asking for help during our in-class programming activities is encouraged, as is offering to help others. There is much to be learned from both asking for help and offering to help. All students' unique characteristics, skills and experiences are respected. This is a shared learning environment; shared between the instructor and the student.

No prior programming experience is necessary. Often there will be several ways to accomplish the goal you have been given, we will consider different examples and find solutions that are efficient and clear to us, and to others who will view our work in the future. Programmers must be sensitive to the fact that the work they do will most likely be considered by other programmers who come after them and clear documentation is an important element of programming.

It is also important to understand that this course will require external work outside of the safety of the classroom and MyCourses. The expectation is that I will guide you to ask the right questions and that you will learn to access the answers you need from an online community.

COURSE CONTENT OUTLINE

For deliverable due dates and times go to the Home Page in MyCourses and scroll down to the Course Summary.

Python Module 1

- Introduction to Programming
    - Why learn programming?
    - Setting up the programming environment: Install Anaconda
    - Python syntax
- Variables & Expressions
    - Components of a program, reserved words
    - Expressions and statements
    - Algorithm to program

- Variables and their type
- Input
- Operators
- Output Formatting & Conditionals
  - F-strings
  - Conditionals and logic
  - Conditional statements: if, elif, else
  - Boolean expressions
    - Comparison operators
    - Logical operators
  - Exception handling with try and except
- Functions
  - Flow of execution
  - Built-in functions and user-defined functions
  - Parameters, arguments, and the return statement

Python Module 2

- Iteration
  - while loop
  - for loop
- Strings & Files
  - Slicing strings, indexing
  - String methods
  - File handling
- Lists & Dictionaries
  - Lists, tuples, sets, dictionaries
  - Creating lists, looping through lists, slicing lists
  - Accessing and adding elements in dictionaries
- Databases and SQL
  - Python SQLite3 library
  - Using SQL commands
- Modules and Errors
  - Advantages of modules, import statement
  - Syntax errors, runtime errors and logic errors
- Accessing data with APIs
  - Making API requests using Python
  - Python libraries: requests and textblob

Python Module 3

- Intro to Pandas in Python
  - Series and DataFrames in Pandas
  - Google Colab for data analysis, GitHub
- Exploring Data in Pandas and Visualizing Results: Data Wrangling
  - Working with csv files
  - Analysis of categorical data
  - Visualizing data, plotting results

- o   Analysis of numerical data
- Cleaning Data and Working with String Series
  - o   Pandas string processing functions
  - o   Cleaning data: dealing with missing values, correcting errors, dropping columns
- Combining DataFrames & Sorting
  - o   Joining DataFrames (inner, outer, left, and right joins)
  - o   Sorting values
- Grouping and aggregating data
  - o   Splitting data into groups, applying a function, aggregating results
  - o   Analysis of datetime data