

ITAO 20210 - Coding Fundamentals

Fall 2026

Course Description

Coding Fundamentals aims to help you learn how to code in Python - one of the world's most popular, flexible, and robust programming languages. More specifically, you will learn the programming fundamentals including when and how to use different data types and data structures, how to make decisions and repeat tasks, as well as the object-oriented programming principles. You will also gain hands-on experience on how to collect, analyze, and visualize data by leveraging a popular set of Python libraries. You are not expected to have any prior knowledge or experience with coding or the Python programming language. However, you are expected to have some familiarity with basic statistical concepts such as mean, median, standard deviation, z-score, etc.

Course Objectives

By successfully completing this course, you will achieve the following objectives:

- Understand the fundamentals of coding.
- Develop fluency with the Python programming language.
- Develop competency in using Python to collect, analyze, and transform data.
- Become proficient in communicating insights through the use of data visualizations.

Course Values

In this course, we emphasize three core virtues that are essential not only for learning to code but also for developing as a thoughtful and responsible problem solver: **curiosity, patience, and integrity**.

- **Curiosity:** Great programmers are lifelong learners who seek to understand how code works and explore multiple ways to solve a problem. Throughout the course, we will examine different solution strategies including AI-generated solutions, and discuss their respective strengths, limitations, and trade-offs. Our goal is not simply to find an answer, but to understand *why* a solution works.
- **Patience:** Learning to code is an iterative process that requires persistence. Debugging and refining programs can be challenging, but each error provides an opportunity to deepen your understanding. Rather than viewing mistakes as setbacks, we will treat them as valuable learning experiences that help us become more effective problem solvers.
- **Integrity:** Meaningful learning requires honest effort and personal responsibility. You are expected to submit work that reflects your own understanding while acknowledging any assistance you receive. If you consult classmates, online resources, or AI tools while completing homework, please clearly disclose how they contributed to your work. Transparency allows us to support your learning while upholding the academic integrity of the course.

Class Location & Time

- Location: L068 Mendoza
- Time:

Section 1	Section 2
9:30 - 10:45 AM on Tuesday	11:00 AM - 12:15 PM on Tuesday

Instructor

- Xiaojing Duan | Associate Teaching Professor
- Email: xduan@nd.edu
- Office: 219 Mendoza College of Business
- Phone: (574) 631-4133 (o) | (574) 238-3301 (m)

Office Hours Location & Time

- Location: 369 Mendoza
- Time: 4 - 6 PM on Monday and Thursday

Tutoring Location & Time

- Location: [Zoom link](#)
- Time: 8 - 10 PM on Sunday and Thursday

Course Overview

This course is delivered in a flipped-classroom approach and meets in person only once a week. It comprises 13 modules. Each module introduces new concepts through videos and tutorials. The module content will be released a week prior to the in-person class. Students are expected to work through the content prior to the in-person class and come prepared with questions or points of discussion.

Videos

There are two types of videos in this course: lecture videos and spotlight videos. The lecture videos provide you with a high-level introduction to new concepts in coding. The spotlight videos are inspiring interviews of well-renowned professors from different disciplines on how coding is used in their fields.

Tutorials

The tutorials in this course walk you through concepts and techniques in detail with sample code. They are delivered in the Jupyter Notebook format. Each tutorial is accompanied by 5 practice problems which are to assess your understanding of the concepts covered in that tutorial. Each practice problem is worth 1 point. As you work through the tutorials, you are expected to complete the practice problems and submit the notebooks in Vocareum.

Labs

The labs in this course aim to reinforce what you have learned from the tutorials and help you use the knowledge to solve more complex problems. Each lab consists of 5 problems that are accumulative, which means they assess not only your understanding of the content introduced in a particular module but also the course content up to that point in time. Each problem is worth 1 point. We will walk through 3 of the 5 lab problems during the in-person class and you can vote for those 3 problems. It's important that you become familiar with the problems before the in-person class. After you complete the lab problems, you are expected to submit them in Vocareum.

Note: You are expected to submit the tutorials and labs on time (see the course site for exact due dates). Submissions made within the first 24 hours after the deadline will incur an automatic 25% penalty. **No submission will be accepted more than 24 hours past the deadline.**

Quizzes

The quizzes are formative assessments of your mastery of the course content. They are timed, open-book, and computer-based. Each quiz consists of 5 questions and each question is worth 1 point. You are expected to

complete each quiz in 5 minutes individually before the due date (**see the course site for exact due dates**). **No quiz can be taken after the due date**. If you need accommodations, please reach out to the Sara Bea Center so accommodations can be made for you accordingly.

Midterm & Final Exams

The midterm and final exams are comprehensive assessments of your mastery of the course content. They are timed, open-book, and computer-based. You are expected to take them on the scheduled dates (see the course site for the exact date). If you need accommodations, please reach out to the Sara Bea Center so accommodations can be made for you accordingly.

Class Participation

The success of this course depends heavily upon your full attention and active participation during the in-person class. For this reason, your participation in each class will be graded. To earn the 1-point participation grade, you have to attend class and engage in the class discussion.

Tutoring Sessions

Because of the flipped nature of this course and we meet in person only once a week, you are highly encouraged to attend at least one tutoring session every week. You can ask any content-related questions during those sessions. They are hosted by TAs via Zoom. The Zoom link and date & time are listed on page 1 of the syllabus.

Course Grading

Grading Components: Your final grade in this course will be determined based on the following weighted items:

Item	Points	Percentage
Tutorials	120	25%
Labs	60	13%
Quizzes	60	13%
Participation	14	3%
Midterm Exam	100	21%
Final Exam	120	25%
Total	474	100%

Grading Scale: Your letter grade in this course will be determined using the following scale:

Range	Grade	Range	Grade
93 or above	A	70.0 - 74.9	C+
90.0 - 93.9	A-	65.0 - 69.9	C

85.0 - 89.9	B+	60.0 - 64.9	C-
80.0 - 84.9	B	55.0 - 59.9	D
75.0 - 79.9	B-	55 or below	F

However, it is important to note that the IT, Analytics and Operations department follows a grading policy for 20000 level undergraduate courses that stipulates that the overall GPA for a course must fall within the range of 3.0-3.5. After computing final grades according to the standard formula, I will compute the overall GPA for the class. If the overall GPA falls outside the required range, I will adjust the grading scale accordingly.

Course Topics

Date	Module	Topic	Description
8/25	1	Introduction	Learn what coding is and how to use the Jupyter Notebook environment for coding
9/1	2	Operators and Variables	Learn what variables and operators are and how to use them in Python
9/8	3	Strings and Booleans	Learn what strings and booleans data types are and how to use them in Python
9/15	4	Lists and Tuples	Learn how and when to use Python's lists and tuples data structures
9/22	5	Dictionaries and Arrays	Learn how and when to use Python's dictionaries and ndarrays data structures
9/29	6	Making Decisions with Conditional Statements	Learn how to use the if-elif-else and try-except-else conditional statements to control the execution flow of code
10/6	7	Repeating Tasks with Loops	Learn how to use for-loops to repeat tasks on a sequence of data and while-loops to repeat tasks depending on a condition
10/13	-	Midterm Exam at regular class time on Tuesday, October 14	
-	-	Fall Break: No Class	
10/27	8	Recycling Code with Functions	Learn how to use the built-in functions and define customized functions to recycle code
11/3	9	Organizing Code with Classes and Objects	Learn the Object-Oriented Programming (OOP) principles such as what objects are and how to create them by defining a class and its attributes & methods
11/10	10	Introduction to Pandas	Learn the basics of the pandas package and how to use it to import & explore data
11/17	11	Analyzing Data	Learn how to use the pandas package to derive the summary and group-level statistics of data

11/24	12	Visualizing Data	Learn how to use the pandas and matplotlib packages to visualize data
12/1	13	Manipulating Data	Learn how to use the pandas package to concatenate and merge data
12/8	Review		
	Final Exam (TBD)		

Honor Code

This course is conducted in accordance with the University's Academic Code of Honor. We have a zero-tolerance policy for violations of this policy. To quote from du Lac, *"At a minimum, a student found responsible for an Honor Code violation usually fails the assignment in question. A more serious offense may result in failure of an entire course, or suspension or dismissal from the university."*

You are expected to complete the tutorials, labs, quizzes, midterm and final exam on your own (unless otherwise stated). You may discuss general strategies for solving problems with other students, but the work you turn in should be entirely your own work.

Generative AI Policy

This course is conducted in accordance with the [University's Generative AI Policy for Students](#). To quote, *"With this in mind, remember that representing work that you did not produce as your own, including work generated or materially modified by AI, constitutes academic dishonesty. Use of Generative AI in a way that violates an instructor's articulated policy, or using it to complete coursework in a way not expressly permitted by the faculty member, will be considered a violation of the Honor Code."*

In this course, you are encouraged to use Generative AI tools to support your learning, explore new ideas, and deepen your understanding of the topics covered. However, AI-generated content should not be accepted at face value. Generative AI tools can make mistakes, provide incomplete explanations, or produce solutions that appear convincing but contain errors. As a learner, your role is to critically evaluate, verify, and refine any information or suggestions provided by AI. If you use AI tools while completing homework, please clearly disclose how they contributed to your work. Please note that the use of Generative AI or any other AI-powered tools is not permitted during quizzes and exams.

Inclusiveness

The University of Notre Dame is committed to social justice. We share that commitment and strive to maintain a positive learning environment based on open communication, mutual respect, and non-discrimination. In this class, we will not discriminate on the basis of race, sex, age, economic class, disability, veteran status, religion, sexual orientation, gender identity, color, or national origin. Any suggestions as to how to further such a positive and open environment will be appreciated and given serious consideration.

Accommodations for Students with Disabilities

It is the policy and practice of The University of Notre Dame to provide reasonable accommodations for students with properly documented disabilities. Students who have questions about Sara Bea Disability Services or who have, or think they may have, a disability are invited to contact Sara Bea Disability Services for a confidential discussion in the Sara Bea Center for Students with Disabilities or by phone at (574) 631-7157.

Because the University's Academic Accommodations Processes generally require students to request accommodations well in advance of the dates when they are needed, students who believe they may need accommodation for this course are encouraged to contact Sara Bea Disability Services at their earliest opportunity. Additional information about Sara Bea Disability Services and the process for requesting accommodations can be found at sarabeadisabilityservices.nd.edu.

Health and Safety Protocols

In this class, as elsewhere on campus, students must comply with all University health and safety protocols. Information about changes in protocols can be monitored at covid.nd.edu. Students, faculty, and staff should be ready to respond to changes as they happen to ensure a healthy community for all.

We are part of a community of learning in which compassionate care for one another is part of our spiritual and social charter. Consequently, compliance with these protocols is an expectation for everyone enrolled in this course. Persistent deviation from expected health and safety guidelines may be considered a violation of the University's "Standards of Conduct, as articulated in *du Lac: A Guide for Student Life*, and will be referred accordingly.

Supplemental Materials

This course doesn't require any textbooks. If you'd like to explore additional topics in coding, please refer to the following two resources:

- **Automate the Boring Stuff with Python** by Al Sweigart
Free online version: <https://automatetheboringstuff.com>
- **Python Data Science Handbook Essential Tools for Working with Data** by Jake VanderPlas
Free online version: <https://jakevdp.github.io/PythonDataScienceHandbook/>