MGT 3745 - Business Programming (using Python)

Spring 2026 Syllabus

Dr. Yiyang Zeng

Instructor: Dr. Yiyang Zeng
Email: yiyang.zeng@scheller.gatech.edu
Phone: 617-850-5655
Office: Scheller College of Business 4122
Office Hours: By appointment

Course: MGT 3745
Credits: 3
Time: T/Th 3:30 PM - 4:45 PM
Room: Scheller College of Business 224

Embracing AI and Human Judgment in Programming

In today's rapidly evolving technological landscape, we navigate uncharted territory together where artificial intelligence serves as a powerful ally in our programming journey. Large language models (LLMs) like ChatGPT, Claude, Gemini, and others have become indispensable tools that can accelerate our development process, generate code snippets, debug issues, and even suggest architectural solutions.

However, the true mastery lies not in outsourcing our thinking to these tools, but in developing a symbiotic relationship with them. Think of LLMs as skilled collaborators rather than replacements for human intellect. They excel at implementation details, syntax precision, and rapid prototyping, but they require human guidance to ensure alignment with business objectives, ethical considerations, and strategic vision.

The most effective programmers today are those who:

- Understand fundamental data science and Python workflows deeply
- Know when and how to leverage AI tools appropriately
- Apply critical human judgment to evaluate, refine, and contextualize AI-generated solutions
- Recognize that while AI can write code, only humans can ensure it serves meaningful business purposes

Remember, these tools augment your capabilities—they don't replace the foundational skills and critical thinking that make you a successful business programmer. Your unique perspective, domain knowledge, and judgment remain irreplaceable assets in creating solutions that drive real business value.

1 Overview

1.1 What is this course about?

This is a hands-on course in which students will develop technical programming skills in Python within a business context. We will also briefly discuss other programming languages, though Python remains our core focus and the language we'll use extensively throughout the course. Students will master core Python programming constructs while learning to apply these skills to analyze economic data and solve real-world business problems.

The course bridges technical programming proficiency with business acumen, enabling students to:

- Transform raw business data into actionable insights
- Automate repetitive business processes and analyses
- Build data-driven decision support systems
- Communicate technical solutions to non-technical stakeholders

Students will first ground themselves in Python fundamentals, then progress to applying Python within data science workflows commonly used in business analytics, business economics, and strategic analysis.

1.2 Why take this class?

Steve Jobs once said, "Everybody in this country should learn how to program a computer. . . because it teaches you how to think." In today's business environment, this statement is more relevant than ever.

Practical reasons for business students to learn Python include:

- **Career Readiness:** Tech companies, consulting firms, financial institutions, research organizations, and data-driven businesses extensively use Python. Python skills enhance employability in analytical and technical roles across industries.
- **Strategic Leadership:** Managers with programming skills possess deeper understanding of technical challenges and innovations. This "technical fluency" enables better communication with IT teams and more informed technology adoption decisions.
- **Market Advantage:** In an era of big data and AI, the ability to independently analyze data and automate processes provides significant competitive advantages.
- **Business Analytics Foundation:** Python serves as a gateway to advanced analytics, machine learning, and AI applications that are transforming business operations.
- **Data-Driven Decision Making:** Most business analysis time (often 80% or more) is spent on data preparation, cleaning, and transformation. Python provides the tools to handle these tasks efficiently.
- **Future-Proofing:** As AI and automation reshape business landscapes, programming skills ensure you can adapt, innovate, and lead through technological change.

1.3 Course Objectives

After successful completion of this course, students will be able to:

- Write computer programs featuring core Python constructs for business applications
- Use Python data structures to manipulate and analyze business data
- Apply advanced data analysis tools (NumPy, pandas) to business problems
- Load, clean, transform, and merge business datasets
- Create visualizations for business reporting and analysis
- Use Jupyter for development and interactive analysis
- Understand data science workflows and Python's role in business analytics
- Communicate technical solutions and insights to business stakeholders

1.4 What is the structure of this class?

The course is divided into two interconnected parts:

Part 1: Python Fundamentals for Business Students develop core programming skills with immediate business applications, including data manipulation, financial calculations, basic analytics, and collaborative AI-assisted development techniques.

Part 2: Data Science Applications in Business Building on Python fundamentals, students apply their skills to advanced business analytics, including data wrangling, statistical analysis, and business problem-solving.

Throughout both parts, emphasis is placed on connecting technical skills to business value, ensuring students can articulate how their code solves real business problems and effectively communicate technical workflows to non-technical audiences.

1.5 The Role of AI in Modern Business Programming

Generative AI tools have transformed programming education and practice. While these tools can write syntactically correct code, learning programming remains essential for developing conceptual understanding and critical thinking skills necessary to effectively use AI tools.

Students will learn to:

- Develop "code sense" – conceptual understanding of program design and behavior
- Evaluate and modify AI-generated code for business appropriateness
- Apply human judgment to ensure technical solutions align with business objectives
- Balance efficiency gains from AI tools with the need for deep understanding

1.6 Relationship of this course to other curricula

This course provides foundational programming and data analysis skills that complement advanced business analytics courses. Students interested in deeper technical specialization may consider:

- MGT 4046 - Data Analytics in Accounting

- MGT 4050 - Business Analytics
- MGT 4803 - Machine Learning for Business

MGT 3745 provides essential technical foundations for these advanced courses while remaining accessible to students without prior programming experience.

2 Course Components

2.1 Lectures

Lecture slides and materials will be posted on Canvas after each class session.

2.2 Homework

During the semester, there will be 10 homework assignments designed to reinforce core concepts through practical application. Homework assignments are graded on a pass/fail basis, emphasizing mastery of fundamental skills over competitive performance.

Although homework is graded pass/fail, working on these assignments carefully will help prepare you for the exams and projects, and help you become a more proficient programmer. Assignments will be submitted on Canvas by 11:59 PM ET on due dates. Students are expected to complete all assignments independently unless explicitly stated otherwise.

2.3 Vibe Coding and Presentation (First Half)

Working in teams of 4-5 students, participants will collaboratively create a small software application using AI-assisted development techniques. Teams will present their project, demonstrating both technical implementation and business value.

2.4 Business Analysis Project and Presentation (Second Half)

Working in teams of 3-4 students, participants will apply Python data science techniques to analyze a real business dataset, developing insights and recommendations. Projects will culminate in presentations demonstrating both analytical rigor and business acumen.

2.5 Mid-term Check-in Exam

A focused assessment evaluating understanding of core Python programming concepts and their application to business problems from the first half of the course.

2.6 Final Exam

A comprehensive evaluation covering all course material, with greater emphasis on topics and applications from the second half of the course.

3 Course Administration

3.1 Prerequisites

No prior programming experience is required. However, students should have basic analytical and quantitative skills. Familiarity with fundamental concepts in statistics, data analysis, or spreadsheet

usage is helpful but not required.

3.2 Recommended Materials

- **Python for Everybody: Exploring Data in Python 3** by Charles Severance
- **Python for Data Analysis, 2nd Edition** by Wes McKinney
- **Anaconda** (Required - Individual Python environment and package manager)

All materials are available free online with distribution instructions provided on Canvas.

3.3 Anaconda Environment Setup

Anaconda is required for this course as it provides a consistent Python environment across different operating systems. Installation instructions and tutorials will be provided on Canvas.

3.4 Course Mode

This is a residential synchronous class with in-person instruction. Classes will not be recorded, and virtual attendance is not permitted.

3.5 Assessment Components

Component	Percentage	Notes
Homework	25%	10 assignments, pass/fail
Vibe Coding and Presentation	20%	Group project, first half
Business Analysis Project and Presentation	20%	Group project, second half
Mid-term Check-in Exam	15%	Individual exam, first half
Final Exam	20%	Individual exam, comprehensive

3.6 Final Grading Policy

Letter grades will be assigned based on overall percentage:

- A: 90% and above
- B: 80-89%
- C: 70-79%
- D: 60-69%
- F: Below 60%

3.7 Weekly Themes

The course follows a thematic structure allowing flexibility in pacing and depth based on class needs:

Weeks 1-4: Python Fundamentals

- Introduction to Python programming environment

- Data types, variables, and basic operations
- Control structures and decision-making
- Functions and modular programming

Weeks 5-8: Data Structures and Business Applications

- Lists, dictionaries, and data manipulation
- File input/output for business data
- Introduction to AI and data analysis tools
- Vibe Coding and Presentation (First Half)

Weeks 9-12: Data Analysis and Visualization

- Data cleaning and preprocessing
- Statistical analysis for business insights
- Data visualization for business reporting
- Text analysis and processing

Weeks 13-15: Advanced Business Analytics

- Advanced data wrangling techniques
- Business Analysis Project and Presentation (Second Half)
- Integration of business logic in Python
- Best practices for business applications

3.8 Important Dates - Spring 2026

Event	Date
First day of classes	January 12
Martin Luther King Jr. Day (no classes)	January 19
Mid-term exam period	Week of March 10-14
Withdrawal deadline	March 18
Spring Break (no classes)	March 23-27
Final instructional days	April 27-28
Reading period	April 29-30
Final exams	April 30 - May 7

3.9 Collaboration and Academic Integrity

Collaboration is encouraged for learning and problem-solving. However, submitted work must reflect individual understanding unless explicitly designated as group work.

All code submissions must include one of the following statements:

- "This assignment is solely my work."
- "I worked on this assignment with [list collaborators]."

Academic integrity is fundamental to this course. All students are expected to abide by the Georgia Tech Honor Code.

3.10 Canvas Safe Submission

No system is perfect, and on occasion, students have submitted work through Canvas only to find out later the work was not correctly submitted and there is no record of submission, or the wrong files were submitted. The source of these problems almost always lies with student's over-confidence in the system accommodating user error. To avoid the risk of non-submission of work, students should go back to the assignments page on Canvas and double-check that you have turned in the assignment properly. You can download a copy of it from Canvas and verify that it is exactly what you intended to submit. Turning in the correct file and validating that you have done that correctly is solely your responsibility – in short, it is your job to verify it. You can submit your homework file multiple times on Canvas until the cut-off time, with the last submission being the one that will be graded.

3.11 Plagiarism

Plagiarism is considered a serious offense. You are not allowed to copy and paste or submit materials created or published by others, as if you created the materials. All materials submitted and posted must be your own original work. Please also see the policy on collaboration, above.

3.12 Student Honor Code

All students are expected and required to abide by the letter and the spirit of the Georgia Tech Honor Code. I am very serious about this expectation because ethical behavior is extremely important in all facets of life. To review the Georgia Tech Honor Code, please visit https://policylibrary.gatech.edu/student-life/academic-honor-code. Any student suspected of behavior in violation of the Georgia Tech Honor Code will be referred to Georgia Tech's Office of Student Integrity.

3.13 Accommodations

Students requiring accommodations should contact the Office of Disability Services at disabilityservices.gatech.edu or 404-894-2563. Approved accommodations will be honored upon presentation of documentation.

3.14 Syllabus Subject to Change

This syllabus may be updated during the semester. Changes will be announced via Canvas and apply to all enrolled students.