

# MGT 3745 Business Programming

(using Python)

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## 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) such as ChatGPT, Claude, Gemini, and others have become valuable tools that can accelerate development, generate code snippets, debug issues, and even suggest architectural solutions.

However, true mastery lies not in outsourcing our thinking to these tools, but in developing a thoughtful and effective working relationship with them. LLMs are best understood as skilled collaborators rather than replacements for human judgment. They excel at implementation details, syntax precision, and rapid prototyping, but they still require human guidance to ensure alignment with business objectives, ethical considerations, and strategic goals.

MGT 3745 is a hands-on introduction to programming in Python designed specifically for business students. Students learn how to write Python programs and apply them to real business and data analytics tasks, including data cleaning, transformation, analysis, and visualization. Python is widely used across industries — including finance, consulting, marketing, product management, and data science — and much of real-world analytics work involves loading, cleaning, transforming, and reshaping data.

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 that code serves meaningful business purposes.

Remember, these tools augment your capabilities — they do not 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?

MGT 3745 is a hands-on introduction to programming in Python designed specifically for business students. Students learn how to write Python programs and apply them to real business and data analytics tasks, including data cleaning, transformation, analysis, and visualization. Python is widely used across industries and much of real-world analytics work involves data preparation: loading, cleaning, transforming, and reshaping data.

The course is organized in two parts: (1) Python Fundamentals, which covers core programming concepts, syntax, and problem-solving; and (2) Python for Data Science and AI, which applies Python to data wrangling, analysis, visualization, and an introduction to machine learning in a business context. While AI tools can now generate code, they cannot replace understanding. The course emphasizes developing code sense and using technical judgment responsibly.

### Course Learning Outcomes:

- Write Python programs using core language constructs and use Python data structures to store and manipulate data.
- Create effective data visualizations in Python and use Colab as a development environment.
- Build AI- and data-driven decision support systems.
- Critically evaluate, debug, and adapt AI-generated code in a business programming context.

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 a 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 help you adapt, innovate, and lead through technological change.

### 1.3 What is the structure of this class?

The course is divided into two interconnected parts:

**Part 1: Python Fundamentals for Business Students** develops core programming skills with immediate business applications, including basic programming concepts, Python syntax, data structures, and introductory data analysis using tools such as NumPy and pandas.

**Part 2: Data Science Applications in Business** builds on Python fundamentals and applies them to advanced business analytics, including data cleaning, visualization, business problem-solving, and an introduction to machine learning concepts and implementation.

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

### 1.4 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 the conceptual understanding and critical thinking skills needed to use AI tools effectively.

Students will learn to:

- Develop “code sense” — a 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.

## 1.5 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

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

### 2.2 Homework

During the semester, there will be 8 homework assignments designed to reinforce core concepts through practical application. Only the **best 7** homework scores will count toward the final grade, and each counted homework is worth 4%. Each assignment will be graded for the quality and correctness of the submitted work. The instructor will guide students to **work on assignments in class** in advance, so the workload at home is reduced.

Completing the assignments carefully will help prepare you for later coursework and help you become a more proficient programmer. Homework will also be discussed in class so that students can review key ideas and common mistakes. Assignments will be submitted on Canvas by 11:59 PM ET on the due dates. Students are expected to complete all assignments independently unless explicitly stated otherwise. Generative AI tools are allowed on all homework assignments, but each submission must include a brief AI-use disclosure stating whether AI was used, which tool(s) were used, and how they were used. **Late submissions may receive at most 50% credit.**

### 2.3 Business Analysis Project and Presentation

The most effective way to learn is through hands-on practice. Working in teams of up to 4 students, participants will apply Python data science techniques to analyze a real business dataset and develop insights and recommendations. The project will include a proposal, a midpoint presentation, a midpoint report with peer review, a final presentation, and a final report with peer review. Presentations will be delivered in person.

## 2.4 Quizzes

There will be 8 **in-class** quizzes during the semester. Only the **best 7** quiz scores will count toward the final grade, and each counted quiz is worth 2%. Quizzes must be taken in person. The dates of the quizzes will be announced in advance. Together, the quizzes account for 14% of the total course grade.

## 2.5 Ed Discussion

Please use Ed Discussion for content-related questions and for topics that may be helpful to the whole class. If several students are wondering about the same issue, posting there allows everyone to benefit from the clarification. The instructor will check Ed Discussion regularly and reply as quickly as possible. Students are also encouraged to use the platform to discuss ideas and help one another.

## 2.6 Guest Speakers (Optional)

Optional guest speakers may be invited to discuss how programming is used in industry and business and to share insights about their day-to-day work.

# 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 use is helpful but not required.

## 3.2 Recommended Materials

There is no required textbook, but the following optional references are recommended:

- *Python for Everybody: Exploring Data in Python 3* by Charles Severance
- *Python for Data Analysis*, 2nd Edition by Wes McKinney
- *The Elements of Statistical Learning*, 2nd Edition by Trevor Hastie, Robert Tibshirani, and Jerome Friedman

All materials are available free online, and distribution instructions will be provided on Canvas.

### 3.3 Environment Setup

**Google Colab** will be used as the primary interactive development environment for this course. Most in-class programming activities will use Colab, and students are also encouraged to complete homework assignments in Colab.

Using a local Anaconda environment is optional. Installation instructions and tutorials will be provided on Canvas for students who prefer to work locally.

### 3.4 Assessment Components

Component	Description	Weight
Homework	8 assignments; only the best 7 count	28%
Project Proposal	Group project component	10%
Project Midpoint Presentation	Group project component	12%
Project Midpoint Report and Peer Review	Group project component	12%
Project Final Presentation	Group project component	12%
Project Final Report and Peer Review	Group project component	12%
Quiz	8 in-class quizzes; only the best 7 count	14%

### 3.5 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%

## 4 Course Policies

### 4.1 Attendance and Participation

**Attendance is required.** Although attendance is not graded separately, students are expected to attend class because quizzes, presentations, and homework discussions take place in person, and students must be present to receive credit for in-class activities unless an absence is excused. Students who must miss class because of illness, an Institute-approved absence, or a religious observance should notify the instructor in advance when possible.

## 4.2 Extensions and Late Assignments

Any late homework assignment may receive at most 50% credit. Because only the best 7 of the 8 homework assignments count, the lowest homework score will be dropped.

Missed homework assignments due to illness, family emergencies, interviews, or similar circumstances will be handled through a limited forgiveness policy. To receive partial credit for a missed homework assignment, students must:

1. Explain the reason for the absence and provide supporting documentation when available (for example, a medical note, approved Institute absence documentation, or a letter from the Dean of Students).
2. Complete the missed assignment.
3. Email the instructor and upload the missed assignment to Canvas no later than 4 weeks after the original deadline.

For presentations, all group members are expected to attend. If a scheduling conflict arises, the group should contact the instructor in advance to discuss rescheduling.

## 4.3 Collaboration and Academic Integrity

Collaboration is encouraged for learning, but submitted work must be the student's own unless an assignment explicitly states otherwise. Students may discuss ideas with classmates, but they must never share or copy code and must never give or receive code files from another student.

Generative AI tools are permitted on all homework assignments and on all group project components unless the instructor announces otherwise. Students remain fully responsible for the correctness, quality, and originality of any AI-assisted work, and they must be able to explain and defend any code or analysis they submit. Every homework submission and every group project deliverable must include a brief AI-use disclosure stating whether AI was used, which tool(s) were used, and how they were used. Submitting AI-generated work without proper review, understanding, or the required disclosure may constitute academic misconduct. Quizzes and exams are closed-book and closed-note, and AI tools may not be used during them.

## 4.4 Accommodations for Students with Disabilities

If you are a student with learning needs that require accommodations, contact the Office of Disability Services (404-894-2563) as soon as possible to make an appointment, discuss your needs, and obtain an accommodations letter. Please also email me as soon as possible so that we can arrange a time to discuss your learning needs.

## **4.5 Plagiarism**

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

## **4.6 Student Honor Code**

All students are expected and required to abide by both the letter and the spirit of the Georgia Tech Honor Code. I take this expectation very seriously because ethical behavior is extremely important in all facets of life. To review the Georgia Tech Honor Code, please visit the Georgia Tech Academic Honor Code page. Any student suspected of behavior in violation of the Georgia Tech Honor Code will be referred to Georgia Tech's Office of Student Integrity.

## **4.7 Student-Faculty Expectations Agreement**

At Georgia Tech, we believe it is important to strive for an atmosphere of mutual respect, acknowledgement, and responsibility between faculty members and the student body. The Student-Faculty Expectations articulate some basic expectations that you can have of me and that I have of you. In the end, respect for knowledge, hard work, and cordial interactions helps build the environment we seek. Therefore, I encourage you to remain committed to the ideals of Georgia Tech while in this class.

## **4.8 Food Policy**

Students are permitted to bring food to class since the class meets during lunchtime, provided that the food is odor-free and does not disrupt others. Please be considerate of your classmates by avoiding foods with strong smells. Be sure to clean up after yourself and dispose of any trash properly.

## **4.9 Syllabus Subject to Change**

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

# **5 Campus Resources for Students**

## **5.1 Graduate Student Academic and Professional Success Resources**

A list of resources for graduate students is available on the Office of Graduate and Postdoctoral Education website, including academic resources, student services, and professional development

opportunities.

## **5.2 Student Well-Being**

At Georgia Tech, we are concerned about your overall physical, social, and mental well-being. A comprehensive list of wellness-related resources is maintained by the Office of the Vice President for Student Engagement and Well-Being at [students.gatech.edu/student-resource-guide](https://students.gatech.edu/student-resource-guide).