

# ENG 346 Data Structures and Algorithms for Artificial Intelligence Course Overview

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ENG 346 - Data Structures and Algorithms for Artificial Intelligence

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### Agenda



- Introduction
- Importance of Data Structures and Algorithms
- Syllabus review
- Test for current knowledge
- Methodology
- Course materials review: Coursebook and other resources
- Assignments, exams, and project
- Office hours and communication channels
- Encouraging questions and motivation





BSc, Bilkent University, Computer Engineering, 1996
MSc, Bilkent University, Computer Engineering, 1999
MSc, Gebze Technical University, Entreshp. & Innov. Man., 2024
PhD, Gebze Technical University, Computer Engineering, 2023

#### HAVELSAN



- 1996 Development of HVL Firewall (The 1<sup>st</sup> in Turkey)
- 2001 Developer in various projects: TuAF IS, MELTEM, etc.
- 2010 YGO Product Manager
- 2014 Move to HVL Istanbul Office ©
- 2014 Systems Engineer
- 2016 R&D Project Coordinator

• Nov 2022 – ICF Certified Pro. Coach

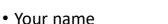
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# Introduce yourself



- Your department
- Your expectations from the course
- Your skill of AI knowledge





# **Course Overview**

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#### Why Data Structures and Algorithms



- Data structures are vital in handling and manipulating large datasets in fields like machine learning and data science.
- Algorithms are used for data analysis, pattern recognition, and more.
- Code efficiency, e.g., optimizations in searching and sorting, which is critical for software performance.
- Structural approach to problem solving
- Critical Thinking and Problem-Solving Skills: Encourages to break down complex problems into manageable components.
- Code reusability, i.e., reusable code components, which can be used across various projects, saving time and effort.
- Resource management, i.e., efficient use of system resources like memory and processing power.
- Problem classification, understanding different types of problems so that choosing appropriate solutions.
- Foundation for advanced topics, such as artificial intelligence, cryptography, and database management systems.
- Interviews and Job Opportunities

# **Purpose and Outcomes**



Purpose of the course This is a course designed to enhance advanced Python programming, data structures, and algorithm skills necessary for developing software, coding, and conducting group work in the field of data science and artificial intelligence

Learning outcomes

- Ability to perform basic data structures and algorithm design and analysis
- Ability to collaborate in software development
- Possessing skills in current software development technologies

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# Methodology



- Face-to-face lectures,
- Active participation expected,
- Hands-on coding,
- Homeworks: Individual work expected,
- Project: May be group project based on the project idea,
- One midterm exam,
- · One final exam.

# Grading



• Quiz: 15

• Homework: 15

• Midterm Exam: 20

• Projects: 20

• Final Exam: 30

• Total: 100

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# Schedule



Week#	Topic	Assessment
Week 1	Basic Python Concepts	
Week 2	Object-Oriented Programming	HW1
Week 3	Arrays, Linked Lists, Maps	
Week 4	Stacks and Queues	HW2
Week 5	Tree Algorithms	
Week 6	Sorting Algorithms	HW3
Week 7	Advanced Python Libraries	
Week 8	Python Libraries	Midterm exam
Week 9	UI Development with Python	HW4 + Project proposals
Week 10	Introduction to Data Science	
Week 11	Introduction to Machine Learning	HW5 + Project proposals presentations
Week 12	Data Cleaning and Preprocessing	
Week 13	Data Analysis and Visualization	HW6
Week 14	Final Projects	
Week 15	-	
Week 16	Final exam	Final project presentations

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#### **Textbooks and Other Resources**



**Textbooks** 

• Goodrich, Michael T., Roberto Tamassia, and Michael H. Goldwasser, Data structures and algorithms in Python,

John Wiley & Sons Ltd, 2013.

· Grus, Joel,

Data science from scratch: first principles with python,

O'Reilly Media, 2019.

Recommended

- <a href="https://www.kaggle.com/learn">https://www.kaggle.com/learn</a>
- https://www.coursera.org/learn/python-data
- <a href="https://www.coursera.org/learn/python-data-analysis">https://www.coursera.org/learn/python-data-analysis</a>

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#### Office Hours and Communication



- No office. We can talk between and after the lectures.
- Reach me at kince@gtu.edu.tr

# **MS Teams Access**



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