UNIVERSITY OF THE PEOPLE

Syllabus for Algorithms

Credits: 3
MSIT 5214

Instructor Contact Information:

You can also always send your instructor a private message through the Moodle Messaging system. Once logged into your course, click your instructor's Moodle profile page to be provided the ways in which to communicate with your instructor. Your instructor's email will also be listed in their profile.

Course Description

The course aims to delve into topics in algorithm design and analysis, focusing on intricate problem-solving techniques applicable across diverse computational domains. The course will explore algorithms, data structures, graphs and beyond, providing students with a comprehensive understanding of algorithmic efficiency and its applications in various fields.

Through a combination of theoretical exploration and practical applications, students will develop proficiency in analyzing, designing, and implementing algorithms to tackle complex computational challenges. Moreover, students will cultivate adeptness in confronting algorithmic dilemmas encountered in real-world scenarios, thereby augmenting their ability in problem-solving across a spectrum of computational realms.

Learning Objectives

Program Learning Outcomes (PLOs)

PLO 1: Students will be able to apply the principles of information technology, computer science, business administration and other disciplines to the analysis of complex computing problems.

PLO 2: Students will be able to design and evaluate solutions to complex computing problems using industry-recognized best practices and standards.

PLO 3: Students will be able to analyze user needs in the development and implementation of computing-based solutions.

PLO4: Students will be able to assess the ethical considerations in the development, implementation, evaluation, and management of IT systems.

PLO 5: Students will be able to construct clear, well-organized arguments supported by credible research-based evidence.

Course Learning Outcomes (CLOs)

By the end of this course students will be able to:

1. Analyze and apply various algorithm design techniques to solve practical problems, evaluating their efficiency and correctness.

2. Evaluate algorithmic solutions and their applicability across diverse real-world scenarios, considering their impact on computational domains.

3. Compare and contrast different algorithmic design paradigms, elucidating their strengths and weaknesses in solving complex computational problems.

4. Synthesize efficient algorithmic solutions for complex computational problems, integrating diverse algorithmic design paradigms and evaluating their effectiveness across various computational domains and practical applications.

5. Assess the efficiency and correctness of algorithms through rigorous analysis employing techniques such as loop invariants and asymptotic analysis.

Co/Prerequisites

None

Course Materials

UoPeople courses use open educational resources (OER) and other materials specifically donated to the University with free permissions for educational use. Therefore, students are not required to purchase any textbooks or sign up for any websites that have a cost associated with them.

The main required textbooks for this course alisted below. Instructions on how to access the textbook are provided in the reading assignments of the units. Additional learning resources will also be provided in the course Learning Guide for each week to supplement your understanding of the material.

Main Textbooks:

- A, A., & R, L. P. (2023). *Advanced data structures and algorithms: Learn how to enhance data processing with more complex and advanced data structures*. BPB Publications. (Accessed through LIRN)

- Campesato, O. (2024). *Java Basics Using ChatGPT/GPT-4.* Mercury Learning & Information. (Accessed through LIRN)

- Cutajar, J. (2018). *Beginning java data structures and algorithms: Sharpen your problem solving skills by learning core computer science concepts in a pain-free manner*. Packt Publishing, Limited. (Access through LIRN)

Technology Requirements

Students are required to have access to a computer with a reliable Internet connection in order to complete all requirements for a course. Students must also have the ability to save documents and files. Typically, University of the People learning materials are provided to students in either Adobe PDF or Microsoft Office compatible formats. Therefore, students need to be able to open and save documents in these formats as well.

This course requires the use of Java or Python.

Install and Configure an Integrated Development Environment (IDE)

Throughout this course, you will be designing and implementing algorithms. While there are several IDEs used to compile and run programs, the programming languages we will use are Java or Python. You may choose either of the two languages to create and compile your programs. You do not have to use one of the IDEs suggested below, however, we have provided installation and configuration instructions for a few choices. You can use any online compiler too. These instructions will assure you have correctly set up the programming environment with the appropriate libraries.

1. If you choose to use Java programming language, follow the link below to the instructions below for downloading, installing, and configuring Java JDK and Eclipse IDE review.
   Java JDK 17 and Eclipse or Intelij for Java installation and set up

2. If you choose to use Python programming language, follow the link below to the instructions for downloading, installing, and configuring Python IDLE review.
   Python IDLE or Intelij for Python installation and set up

Campus Tech Support Email for English programs: support@uopeople.edu

Regular and Substantive Interaction

As your instructor, they will interact and engage with each of you on a regular basis throughout the term to support your learning. They will provide direct instruction related to the course's learning objectives, respond to your questions, grade and/or provide feedback on your submitted coursework, post regular announcements, and engage in the course discussion areas regarding academic course content when appropriate.

Course Expectations and Learning Activities

Discussions

Some units in this course require that you complete a Discussion Assignment. You are required to develop and post a substantive response to the Discussion Assignment in the Discussion Forum. A substantive response is one that fully answers the question that has been posed by the instructor. In addition, you must extend the discussion by responding to at least two (2) of your peers' postings in the Discussion Forum. Grading rubrics are provided in the Discussion Forum for each week. Discussion Forums are only active for each current and relevant learning week, so it is not possible to contribute to the forum once the learning week has come to an end.

Assignments/Projects

The assignment activities are graded by your instructor. The grading rubric is listed under the assignment instructions. The grading rubric is a document that outlines the criteria that your instructor will use to grade your work. Assignment Activities range from written assignments to creating presentation slides.

Course Forum

The Course Forum is the place to raise issues and questions relating to the course. It is regularly monitored by the instructors and is a good place to meet fellow students taking the same course. While it is not required to participate in the Course Forum, it is highly recommended.

Class Introduction

This section is your opportunity to introduce yourself to your classmates and create a vibrant learning community. By sharing your background, interests, and goals, you can create meaningful connections and discover commonalities with your peers.

Participation Expectations

To succeed in this course, you are expected to actively engage and participate regularly. Below are specific guidelines to help you meet these expectations:

- Be involved and active in your courses.
- Be highly motivated and disciplined.
- Check the course homepage, calendar and assignment page, the course syllabus, your UoPeople email, and the Moodle course discussion forums several times a week.
- Post the required comments and responses to the discussion forum for your course.
- Keep up with your assignments and online quizzes/exams (as applicable) and manage your time well. These quizzes test your knowledge and comprehension of the new content.
- Participate actively in class discussions.
- Be polite and respectful.
- Use good grammar and correct spelling.
- Be honest and original. Plagiarism will not be tolerated in any online course.

Non-participation is characterized by lack of any assignment submissions, inadequate contributions to the Discussion Forums, and/or lack of peer feedback to Discussion/Written Assignments. Also, please note the following important points about course participation:

- Assignments must be submitted on or before the specified deadline. A course timeline is provided in the course schedule, and the instructor will specify deadlines for each assignment.
- Occasionally there may be a legitimate reason for submitting an assignment late. Most of the time, late assignments will not be accepted and there will be no make-up assignments.
- All students are obligated to inform their instructor in advance of any known absences which may result in their non-participation.

Feedback and Suggestions

We value your input and would encourage you to complete the end of course survey to provide us with course feedback and suggestions, and report issues

Evaluation and Grading Scale

Grading Weights:

Category	% Of Grade	Grade Items (Learning Activities)	Associated Learning Objectives/Outcomes
Discussions	40%	1. Unit 1 – Discussion Forum 2. Unit 3 – Discussion Forum 3. Unit 4 – Discussion Forum 4. Unit 5 – Discussion Forum 5. Unit 6 – Discussion Forum	• CLO 1, CLO4, CLO5 • CLO1, CLO2 • CLO1, CLO2, CLO3, CLO4 • CLO1, CLO4 • CLO1, CLO2, CLO3

Category	% Of Grade	Grade Items (Learning Activities)	Associated Learning Objectives/Outcomes
		6. Unit 8 – Discussion Forum	• CLO1, CLO2, CLO4, CLO5
Assignment Activities	60%	1. Unit 2 – Assignment Activity 2. Unit 3 – Assignment Activity 3. Unit 4 – Assignment Activity 4. Unit 5 – Assignment Activity 5. Unit 7 – Assignment Activity	• CLO1, CLO2, CLO3, CLO4 • CLO1, CLO2 • CLO1, CLO2, CLO3, CLO4 • CLO1, CLO4 • CLO2, CLO3, CLO4, CLO5
TOTAL 100%			

Grading Scale:

Letter Grade	% Grade	Grade Points
A+	98%-100%	4.00
A	93-97%	4.00
A-	90%-92%	3.67
B+	88%-89%	3.33
B	83%-87%	3.00
B-	80%-82%	2.67
C+	78%-79%	2.33
C	73%-77%	2.00
C-	70%-72%	1.67
D+	68-69%	1.33
D	63%-67%	1.00
D-	60%-62%	0.67
F	<60	0.00
W	N/A	N/A

Students may also be granted Withdrawal (W), if they withdraw from the course, or an Incomplete (I) should their circumstances permit.
A student who feels they were graded unfairly, or who seeks to dispute a grade, may initiate a grade appeal process. Refer to University Policies for more information on withdrawals and appeals.

Course Schedule

UNIT 1: Fundamentals of Algorithms: Concepts, Analysis, and Applications

- Watch/Read the reading assignments due by Saturday or Sunday.
- Discussion first response due by Sunday.
- Discussion replies due by Wednesday.

UNIT 2: Divide and Conquer

- Watch/Read the reading assignments due by Saturday or Sunday.
- Assignment Activity submission due by Wednesday.

UNIT 3: Analysis of Searching and Sorting Algorithms

- Watch/Read the reading assignments due by Saturday or Sunday.
- Discussion first response due by Sunday.
- Discussion replies due by Wednesday.
- Assignment Activity submission due by Wednesday.

UNIT 4: Data Structures: Concepts and Applications-I

- Watch/Read the reading assignments due by Saturday or Sunday.
- Discussion first response due by Sunday.
- Discussion replies due by Wednesday.
- Assignment Activity submission due by Wednesday.

UNIT 5: Data Structures: Concepts and Applications-II

- Watch/Read the reading assignments due by Saturday or Sunday.
- Discussion first response due by Sunday.
- Discussion replies due by Wednesday.
- Assignment Activity submission due by Wednesday.

UNIT 6: Hash Tables and their Applications

- Watch/Read the reading assignments due by Saturday or Sunday.
- Discussion first response due by Sunday.
- Discussion replies due by Wednesday.

UNIT 7: Graphs and Algorithms

- Watch/Read the reading assignments due by Saturday or Sunday.
- Assignment Activity submission due by Wednesday.

UNIT 8: String Matching Algorithms

- Watch/Read the reading assignments due by Saturday or Sunday.
- Discussion first response due by Sunday.
- Discussion replies due by Wednesday.

University Policies & Processes

Late Work/Make-up Policy

Please review the Late Work policy in the University Catalog.

Code of Conduct

University of the People expects that students conduct themselves in a respectful, collaborative, and honest manner at all times. Harassment, threatening behavior, or deliberate embarrassment of others will not be permitted. Any conduct that interferes with the quality of the educational experience is not allowed and may result in disciplinary action, such as course failure, probation, suspension, or dismissal. For more information on this topic, please review the General Code of Conduct in the University Catalog.

Procedures for Resolving Academic Grievances/Appeals

If you believe that the final grade you received for a course is erroneous, unjust, or unfair, please contact your course instructor. This must be done within fourteen days of the last day of the term. For more information on this topic, please review the Grievance Policy and Grade Appeals Procedure in the University Catalog.

Withdrawal and Drop Date Policy

Please review the Course Drops and Withdrawals policy of the University Catalog.

Academic Integrity and Plagiarism

Please review the Code of Academic Integrity in the University catalog.

Intellectual Property

UoPeople respects the intellectual property rights of others who seek to create, preserve, and disseminate knowledge through teaching, collective learning, and continued research at the University at large. For more information on this topic, please review the Intellectual Property policy in the University catalog.

Reasonable Accommodations

Contact your Program Advisor to open a request for support.

Student Support Services & Resources

English Programs

Academic Advising: advising@uopeople.edu
Financial Aid: financial.aid@uopeople.edu
Library Resources: library@uopeople.edu
Payment Processing: payments@uopeople.edu
Student Services: student.services@uopeople.edu
Technical Support: support@uopeople.edu