

Python Programming with Data Structure Course Description

Course Code Number	CS-222 Second Semester	Course Title	Python Programming with Data Structure
Semester Hours	1.5 hours	No. of Credit Units	3
Prerequisite	CS-221	Course Coordinator	Dr. Thi Thi Soe Nyunt Dr. Yu Mon Zaw

Course Description

This course covers techniques for the data structures and algorithms analysis. The course aims to enable the student to understand in-depth data structures and to know how to apply them to resolve practical issues. Topics include: Stack, Queue, Link List, Searching, Sorting, Recursion, Trees, and Graphs.

Course Aim

The aim of this course is

- To introduce techniques for representation of the data in the real world
- To design and implement various data structures and algorithms
- To understand algorithms and how to analyze algorithms performance
- To use existing data structures and algorithms in programming language libraries
- To apply data structures and algorithms to solve complex problems

Reference Book

- Problem Solving with Algorithms and Data Structures by Brad Miller, David Ranum
- Data Structures and Algorithms in Python by Michael T. Goodrich, Roberto Tamassia and Michael H. Goldwasser
- Fundamentals of Python Data Structures by Kenneth A. Lambert
- Introduction to Programming Using Python by Y. Daniel Liang

Learning Outcomes

Upon the successful completion of this course, Student will be able to:

- understand data structures and algorithms in computer science perspectives
- understand algorithms analysis procedure, space and time complexity of various algorithms
- understand how to use existing data structures and algorithms found in python's libraries
- understand how to apply data structures and algorithms to solve real world problem

Course Organization

Student participation in this course will involve the following activities:

1. Attending the lectures
2. Practical assignments
3. Moodle (LMS)
4. Reading Assignment and Quiz
5. Project
6. Exam

Assessment plan for the course

Exam	30%
Quiz / Assignment	10%
Class participation	10%
Moodle	10%
Project	40%

Grading System

UCSY follows a letter grade system comprising of grades A, A-, B+, B, B-, C+, C, C-, D and F. All marks obtained by students during the semester will be used in the grading process.

The grading scale for this course is:

Marks obtained	Letter Grade	Grade Point
≥ 90	A	4
85-89	A-	3.75
80-84	B+	3.25
75-79	B	3
70-74	B-	2.75
65-69	C+	2.25
60-64	C	2
55-59	C-	1.75
50-54	D	1
0-49	F	0

Fail Grade: C-, D, F (Grade point <2)

Class Attendance and Participation Policy:

- **Attendance**

Class attendance is mandatory. Most of the material you will learn will be covered in the lectures, so it is important that you not miss any of them. You are expected to show up on time for class, and stay for the whole lecture. Students are expected to attend each class, to complete any required preparatory work (including assigned reading) and to participate actively in lectures, discussions and exercises.

- Mobile phones must be silenced and put away for the entire lecture unless use is specified by the instructor. You may not make or receive calls on your cell phone, or send or receive text messages during lectures.
- You are responsible for all materials sent as email. Ignorance of such material is excuse. You are responsible for all materials presented in the lectures.
- Your conduct in class should be conducive towards a positive learning environment for your classmates as well as yourself.
- **Assignment, Quizzes, Moodle Test and Labs**
We will take a short 3 to 5 quiz for every lecture and 30 points quiz moodle test after one or two chapters. Any assignment or quiz is simply missed, regardless of the reason why (e.g. illness, work, traffic, car trouble, computer problems, death, etc), and earns a grade of zero. You are strongly encouraged to complete all assignments and attend all quizzes so that you can check that you understand the material and can throw out bad grades, or grades for which you had to miss an assignment or quiz for a valid reason. Late submissions will not be accepted for any graded activity for any reason.
- There are no extra credit opportunities.
Students may not do additional work nor resubmit any graded activity to raise a final grade.
- **Test**
Test will start after two or three chapters finished and the coordinator will announce the date for the test.
- **Exam**
The exam will be conducted on-campus, in a classroom. The date/times/locations will be posted on Board as soon as possible.

For this course, the following additional requirements are specified:

All work submitted for a grade must have been prepared by the individual student. Students are expressly prohibited from sharing any work that has been or will be submitted for a grade, in progress or completed, for this course in any manner with a person other than the instructor and teaching assistant(s) assigned to this course). Specifically, students may not do the following, including but not limited to:

- Discuss questions, example problems, or example work with another person that leads to a similar solution to work submitted for a grade.
- Give to, show, or receive from another person (intentionally, or accidentally because the work was not protected) a partial, completed or graded solution.
- Ask another person about the completion or correctness of an assignment.
- Post questions or a partial, completed or graded solution electronically. (e.g. Web Site).
- All work must be newly created by the individual student for this course. Any usage of work developed for another course, or for this course in a prior semester, is strictly prohibited without prior approval from the instructor.
- Posting or sharing course content (e.g. instructor provided lecturer note, assignment directions, assignment questions, or anything not created solely by the student), using any non-electronic or electronic medium (e.g. web site, FTP site, any location where it is

accessible to someone other than the individual student, instructor and/or teaching assistant(s)) constitutes copyright infringement and strictly prohibited without prior approval from the instructor.

Tentative Lecture Plan

No.	Topic	Week	Remark
1.	Introduction	1	Quiz/Assignment
2.	Algorithm and Analysis	2	Quiz/Assignment
3.	Basic Data Structures	3+4+5	
4.	Stack		
5.	Queue		
6.	Dequeue		Quiz/Assignment
7.	Link List		Quiz/Assignment
8.	Recursion		Quiz/Assignment
9.	Searching and Sorting	6+7	
10.	Searching Algorithms		Quiz/Assignment
11.	Sorting Algorithms		Quiz/Assignment
12.	Trees	8+9	
13.	Binary Tree		
14.	Binary Tree Traversal		Quiz/Assignment
15.	Graphs	9 +10	
16.	Data structure for graph		
17.	Graph traversal		Quiz/Assignment
18.	Project selection/ scope discussion	11+12	
19.	Project design discussion	13+14	
20.	Project development discussion	15+16+17+18	
21.	Revision	19	