

# CS2468: DATA STRUCTURES AND DATA MANAGEMENT

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## Effective Term

Semester A 2023/24

## Part I Course Overview

### Course Title

Data Structures and Data Management

### Subject Code

CS - Computer Science

### Course Number

2468

### Academic Unit

Computer Science (CS)

### College/School

College of Engineering (EG)

### Course Duration

One Semester

### Credit Units

3

### Level

B1, B2, B3, B4 - Bachelor's Degree

### Medium of Instruction

English

### Medium of Assessment

English

### Prerequisites

CS2360 Java Programming or equivalent

### Precursors

Nil

### Equivalent Courses

Nil

### Exclusive Courses

Nil

## Part II Course Details

### Abstract

Data structures are essential in computer science. This course aims to develop an understanding of the concepts and techniques of fundamental data structures, data management and simple file systems.

### Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Describe the functionality of a data structure as an abstract data type.			x	
2	Implement an abstract data type in a programming language.			x	
3	Implement and test data structures for common structures; select an appropriate data structure from a given set of structures to solve a given problem.			x	
4	Develop the attitude to propose solutions through independent investigation.		x	x	
5	Develop the ability to design, implement, and apply data structures and data storage management to simple real life problems.		x	x	

#### A1: Attitude

Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

#### A2: Ability

Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.

#### A3: Accomplishments

Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

### Teaching and Learning Activities (TLAs)

TLAs		Brief Description	CILO No.	Hours/week (if applicable)
1	Lecture	Explain concepts, different kind of data structures, algorithms for data structures	1, 2, 3, 4, 5	3 hours per week
2	Tutorials	Do exercises about concepts, data structure algorithms and programming	1, 2, 3, 4, 5	8 hours per semester

3	Pre-mid-term	The students have to give narrative-type answers or write simple functions in a programming language to test their understanding of fundamental concepts.	1, 2, 3, 4, 5	1 hour per semester
4	Midterm	We will test all the contents we have learnt so far.	1, 2, 3, 4, 5	2 hour per semester
5	Assignments	The students have to finish two or three assignments through individual investigation. The first assignment is to apply the learnt data structures for problems, and the second is to let the student combine several data structures to solve problems.	1, 2, 3, 4, 5	

**Assessment Tasks / Activities (ATs)**

	ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Assignments	1, 2, 3, 4, 5	8	2 assignments will be given.
2	Exercises (in-lecture and in-tutorial)	1, 2, 3, 4, 5	10	10 in-lectures exercises will be given in 10 weeks. 10 in-tutorial exercises will be given in 10 weeks .
3	Pre-mid-term test	1, 2, 3, 4, 5	4	
4	Midterm	1, 2, 3, 4, 5	8	

**Continuous Assessment (%)**

30

**Examination (%)**

70

**Examination Duration (Hours)**

2

**Additional Information for ATs**

For a student to pass the course, at least 30% of the maximum mark for the examination must be obtained.

**Assessment Rubrics (AR)****Assessment Task**

Exercises (in-lecture and in-tutorial)

**Criterion**

Perfect answers full mark. 50% for in-perfect answers.

**Assessment Task**

Assignments

**Criterion**

Question has a score

**Excellent (A+, A, A-)**

High

**Good (B+, B, B-)**

Significant

**Fair (C+, C, C-)**

Moderate

**Marginal (D)**

Basic

**Failure (F)**

Not even reaching marginal levels

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**Assessment Task**

Pre-mid-term test

**Criterion**

Question has a score

**Excellent (A+, A, A-)**

High

**Good (B+, B, B-)**

Significant

**Fair (C+, C, C-)**

Moderate

**Marginal (D)**

Basic

**Failure (F)**

Not even reaching marginal levels

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**Assessment Task**

Midterm

**Criterion**

Question has a score

**Excellent (A+, A, A-)**

High

**Good (B+, B, B-)**

Significant

**Fair (C+, C, C-)**

Moderate

**Marginal (D)**

Basic

**Failure (F)**

Not even reaching marginal levels

**Assessment Task**

Final exam

**Criterion**

Question has a score

**Excellent (A+, A, A-)**

High

**Good (B+, B, B-)**

Significant

**Fair (C+, C, C-)**

Moderate

**Marginal (D)**

Basic

**Failure (F)**

Not even reaching marginal levels

## Part III Other Information

**Keyword Syllabus**

Abstract data types, data structures, linked lists, stacks, queues, binary trees, multiway trees, Btrees, sorting, searching, file processing, physical characteristics of data storage devices, access and retrieval times, updating files.

**Reading List****Compulsory Readings**

Title	
1	Michael T. Goodrich and Roberto Tamassia. Data Structure and Algorithms in Java. John Wiley & Sons, Inc. 5th edition.

**Additional Readings**

Title	
1	Cormen, Thomas H., Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein. Introduction to Algorithms. Cambridge, MA: MIT Press, 3rd edition.