GAU, Faculty of Engineering

Course Unit Title	Data Structures and Algorithms
Course Unit Code	SEN211
Type of Course Unit	Compulsory, Computer Engineering students
Level of Course Unit	3rd Year BSc
National Credits	4
Number of ECTS Credits Allocated	6 ECTS
Theoretical (hour/week)	3
Practice (hour/week)	-
Laboratory (hour/week)	2
Year of Study	3
Semester when the course unit is delivered	5
Mode of Delivery	Face to Face
Language of Instruction	English
Prerequisities and co-requisities	ENG102
Recommended Optional Programme Components	-

Objectives of the Course:

- Stacks and Queues
- Linked Lists
- Binary Trees and Binary Search Trees
- Elementary and Efficient Sorting Algorithms

Learning Outcomes

When this course has been completed the student should be able to		Assesment.
1	Describe the Data Structures	1
2	Apply the structures on different problems	1
3	Write the related programs of Data Structures	1,3,5
4	Apply the sorting techniques	1,5

Assesment Methods: 1. Written Exam, 2. Assignment 3. Project/Report, 4.Presentation, 5 Lab. Work

Course's Contribution to Program

		CL
1	Ability to understand and apply knowledge of mathematics, science, and engineering	3
2	Ability to design and conduct experiments as well as to analyze and interpret data	4
3	Ability to work in multidisciplinary teams while exhibiting professional responsibility and ethical conduct	3
4	Ability to apply systems thinking in problem solving and system design	3
5	Knowledge of contemporary issues while continuing to engage in lifelong learning	1
6	Ability to use the techniques, skills and modern engineering tools necessary for engineering practice	3
7	Ability to express their ideas and findings, in written and oral form	4
8	Ability to design and integrate systems, components or processes to meet desired needs within realistic constraints	1
9	Ability to approach engineering problems and effects of their possible solutions within a well structured, ethically responsible and professional manner	3
10	To apply fundamental concepts of software design, database design, data processing and artificial intelligence in the modeling, designing, implementing, testing and deploying software solutions.	3
11	Ability to analyse and design hardware systems by applying the principles of embedded systems, microprocessors, computer networks, distributed systems and data communication.	3

CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate 4: High, 5:Very High)

Course Contents

Week			Exams
1		Stacks	
2		Application of Stacks	
3		Queues	
4		Priority Queues	
5		Linked Lists , Singly Linked Lists	
6		Doubly Linked Lists	Quiz
7		Circular Lists	
8			Midterm
9		Binary Trees	
10		Tree Traversal, postorder, preorder and inorder traversal	
11		Binary Search Tree, Heaps	
12		Elementary Sorting Algorithms, Insertion Sort, Selection Sort, Bubble S.	
13		Efficient Sorting Algorithms, Heap sort, Merge Sort, Radix S., Quicksort	Quiz
14		"	Lab. Exam
15			Final

Recommended Sources

Textbook(s): Data Structures and Algorithms in Java, Adam Drozdek, Thomson, (2nd Edition 2005)
Data Structures and Program Design, Robert L. Kruse, Prentice-Hall,(3rd Edition 1997)

Assessment

Attendance	5%	
Laboratory	10%	
Midterm Exam	30%	Written Exam
Quiz	15%	Written Exam
Final Exam	40%	Written Exam
Total	100%	

ECTS Allocated Based on the Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class (including the Exam week)	15	3	45
Labs and Tutorials	10	2	20
Assignments	-	-	-
Project/Presentation/Report Writing	3	5	15
E-learning Activities	-	-	-
Quizzes	2	8	16
Midterm Examination	1	15	15
Final Examination	1	16	16
Self Study	14	3	42
Total Workload			169
Total Workload/30 (h)			5.63
ECTS Credit of the Course			6