GAU, Faculty of Engineering

Course Unit Title	Operating Systems
Course Unit Code	CEN307
Type of Course Unit	Compulsory, Computer Engineering Students
Level of Course Unit	3rd Year BSc
National Credits	4
Number of ECTS Credits Allocated	7 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, Laboratory Experiments
Language of Instruction	English
Prerequisities and co-requisities	-
Recommended Optional Programme Components	Basic bacground Computing Fundamentals

Objectives of the Course:

- A general understanding of the operating system components
- Process scheduling methods which explain how the many processes can use the CPU so that multitasking becomes possible
- Deadlock management which gives the student an understanding of what kind of problems may occur when many processes need the same limited amount of I/O resources to continue working and the solutions to these problems.
- Memory management methods to help the student understand how the memory is multiple accessed by the processes.

Learning Outcomes

When this course has been completed the student should be able to		Assesment.
1	High-level understand of what is an operating system, the role it plays, its structure and applications, and the relationship between them	1
2	Basic knowledge of the services provided by operating systems.	1
3	Describe the concept of a process and list the various process state transitions	1
4	Describe process scheduling policies	1
5	Describe basic algorithms associated with deadlock management	1
6	Describe basic algorithms associated with memory management	1
7	Conduct experiments to gain hands-on experience with the command line shell and services of different operating systems	1,2,5

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	4
2	Ability to design and conduct experiments as well as to analyze and interpret data	2
3	Ability to work in multidisciplinary teams while exhibiting professional responsibility and ethical conduct	1
4	Ability to apply systems thinking in problem solving and system design	4
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	4
7	Ability to express their ideas and findings, in written and oral form	3
8	Ability to design and integrate systems, components or processes to meet desired needs within realistic constraints	4
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.	4

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

Course Contents

Week			Exams
1	Chapter 1	Introduction	
2		Introduction	
3	Chapter 2	Processes	
4		Processes	
5	Chapter 3	Processes Scheduling Concepts	Quiz
6		Processes Scheduling Algorithms	
7		Processes Scheduling Performance Analysis	
8			Midterm
9	Chapter 4	Deadlock Concepts and System Safety	
10		Deadlock Avoidance Algorithm(s)	
11		Deadlock Detection Algorithm(s)	
12	Chapter 5	Memory Management: Basics and Swapping	2nd Midterm Exam
13		Memory Management: Paging and Segmentation	
14		Memory Management: Virtual Memory	Laboratory Exam
15			Final

Recommended Sources

Textbook:
Andrew S. Tanenbaum, "Modern Operating Systems", Prentice Hall, 3rd Edition, 2009.

Supplementary Material (s):
William Stallings, "Operating Systems: Internals and Design Principles", Prentice Hall, 5th Edition, 2005

Assessment

Attendance	10%	Less than 25% class attendance results in NG grade.
Laboratory	10%	Less than 25% laboratory attendance results in NG grade.
Midterm Exam	30%	Written Exam
Quiz	10%	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	8	2	16
Assignments	-	-	-
Project/Presentation/Report Writing	5	4	20
E-learning Activities	-	-	-
Quizzes	-	-	-
Midterm Examination	2	15	30
Final Examination	1	15	15
Self Study	15	4	60
Total Workload			186
Total Workload/30 (h)			6.2
ECTS Credit of the Course			7