

## GAU, Faculty of Engineering

<b>Course Unit Title</b>	Operating Systems	
<b>Course Unit Code</b>	CEN217	
<b>Type of Course Unit</b>	Compulsory for AIE, IE	
<b>Level of Course Unit</b>	2nd year BSc	
<b>National Credits</b>	4	
<b>Number of ECTS Credits Allocated</b>	6	
<b>Theoretical (hour/week)</b>	3	
<b>Practice (hour/week)</b>	0	
<b>Laboratory (hour/week)</b>	2	
<b>Year of Study</b>	2	
<b>Semester when the course unit is delivered</b>	3	
<b>Mode of Delivery</b>	Face to face, E-learning	
<b>Language of Instruction</b>	English	
<b>Prerequisites</b>		
<b>Corequisites</b>		
<b>Recommended Optional Programme Components</b>	Basic background in computing fundamentals	
<b>Objectives of the Course:</b>		
<ul style="list-style-type: none"> <li>• Provide a general understanding of operating system components</li> <li>• Teach process scheduling methods and multitasking concepts</li> <li>• Explain deadlock management and resource allocation problems</li> <li>• Teach memory management methods and virtual memory concepts</li> </ul>		
<b>Learning Outcomes</b>		
When this course has been completed the student should be able to		Assess.
1	Understand what an operating system is, its role, structure, applications, and relationships among its components	1,3
2	Explain the basic services provided by operating systems	1,3
3	Describe processes and process state transitions	1,3
4	Describe process scheduling policies and algorithms	1,3
5	Describe basic algorithms associated with deadlock management	1,3
6	Describe basic algorithms associated with memory management	1,3
Assessment Methods: 1. Written Exam, 2. Oral Exam, 3. Assignment, 4. Project/Report, 5. Presentation, 6. Lab Work		
<b>Course's Contribution to Program</b>		
		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	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	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	Ability to design systems, processes or products by applying modern methods of work study, ergonomics, production systems and simulation while fulfilling requirements under realistic conditions	3
11	Ability to plan and improve system performance using production planning, quality planning and control, information system design and project planning techniques	4

CL: Contribution Level (1: Low, 2: Medium, 3: High)

#### Course Contents

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

#### Recommended Sources

- Textbook: Modern Operating Systems, 3rd Edition, Andrew S. Tanenbaum Supplementary: Operating Systems: Internals and Design Principles, 5th Edition, William Stallings

#### Assessment

Attendance	10 %
Laboratory	10 %
Midterm	30 %
Final exam	40 %

#### ECTS Allocated Based on the Student Workload

Activities	Number	Duration (hour)	Total Workload (hour)
In-class lecture (including exam weeks)	15	3	45
Lab and tutorial	8	2	16
Project/presentation/report writing	5	4	20
Midterm exam	2	15	30
Final exam	1	15	15
Self-study	15	4	60
Quiz	0	0	0
Assignment	0	0	0

E-learning activities	0	0	0
Total Workload			186.00
Total Workload / 30 (h)			6.20
ECTS Credit of the Course			6