

## GAU, Faculty of Engineering

<b>Course Unit Title</b>	Distributed Systems	
<b>Course Unit Code</b>	CEN490	
<b>Type of Course Unit</b>	Elective, computer engineering students	
<b>Level of Course Unit</b>	4th Year BSc	
<b>National Credits</b>	3	
<b>Number of ECTS Credits Allocated</b>	6 ECTS	
<b>Theoretical (hour/week)</b>	3	
<b>Practice (hour/week)</b>	0	
<b>Laboratory (hour/week)</b>	0	
<b>Year of Study</b>	4	
<b>Semester when the course unit is delivered</b>	8	
<b>Mode of Delivery</b>	Face to Face, Laboratory Experiments,	
<b>Language of Instruction</b>	English	
<b>Prerequisites and co-requisites</b>		
<b>Recommended Optional Programme Components</b>	Basic background in computer systems	
<b>Objectives of the Course:</b>		
<ul style="list-style-type: none"> <li>➤ Understanding distributed systems</li> <li>➤ Understanding distributed computing in networks</li> <li>➤ Understanding typical applications for distributed computing</li> <li>➤ Design of simple distributed systems</li> </ul>		
<b>Learning Outcomes</b>		
When this course has been completed the students should be able to		Assesment.
1	Understand architecture and operation of distributed systems	1,2
2	Analyze simple distributed systems	1,2,5
3	Identify the role of multicast and anycast computing	1,2
4	Identify typical underlying protocols in distributed computing	1,2
5	Learn the concepts of P2P and grid computing	1
Assesment Methods: 1. Written Exam, 2. Assignment 3. Project/Report, 4.Presentation, 5 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 data	3
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	4
5	Knowledge of contemporary issues while continuing to engage in lifelong learning	
6	Ability to use the techniques, skills and modern engineering tools necessary for engineering practice	5
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.	2
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		Evolution of distributed computing	
2		Basic concepts of distributed systems	
3		Basic concepts of distributed systems	Quiz
4		Protocols	
5		Protocols	
6		Interprocess communication for distributed computing	
7			Midterm
8		Multicasting in distributed computing	
9		Multicasting in distributed computing	
10		Anycasting in distributed computing	
11		Distributed anycast processing	Quiz
12		Mutual Exclusions	
13		Mutual Exclusions	
14		Review	
15			Final

### Recommended Sources

**Textbook:** Distributed Systems: Concepts and Design, Coulouris, Dollimore, Kindberg, Addison-Wesley, 4th edition (Other editions are also useful)

**Supplementary Material (s):** Distributed Operating Systems. Tannenbaum, Prentice Hall, 1995

### 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)	14	3	42
Labs and Tutorials	5	3	15
Assignments	7	3	21
Project/Presentation/Report Writing			
E-learning Activities			
Quizzes	2	10	20
Midterm Examination	1	15	15
Final Examination	1	25	25
Self Study	14	2	28
Total Workload			166
Total Workload/30 (h)			5.53
ECTS Credit of the Course			6