

 OSTİM TEKNİK ÜNİVERSİTESİ A N K A R A	FACULTY OF ENGINEERING COURSE SYLLABUS FORM	Doküman Kodu	MF.FR.003
		Yayın Tarihi	06.09.2024
		Revizyon No	0
		Revizyon Tarihi	0
		Gizlilik Sınıfı	Hizmet içi

CENG 303 – OPERATING SYSTEMS DESIGN AND CONSTRUCTION					
Course Code	Course Name			Semester	
CENG 303	Operating Systems Design and Construction			Fall ☒ Spring ☐ Summer ☐	
Hours				Credit	ECTS
Theory	Practice	Lab	3	8	
3	0	0			

Course Details	
Department	Computer Engineering
Course Language	English
Course Level	Undergraduate ☒ Graduate ☐
Mode of Delivery	Face to Face ☒ Online ☐ Hybrid ☐
Course Type	Compulsory ☒ Elective ☐
Course Objectives	The information in CENG 303 helps students comprehend the fundamentals of operating systems (OS), which serve as the foundational computing framework for a wide range of computer applications. The course bridges the gap that exists between user applications that require OS services and computer architecture. Students can design and manage computing infrastructures, create high performance and concurrent software applications, and create systems applications and libraries.
Course Content	Introduction, Operating-System Structures, Processes, Threads & Concurrency, CPU Scheduling, Synchronization Tools and Examples, Deadlocks
Course Method/ Techniques	Lecture ☒ Question & Answer ☒ Presentation ☐ Discussion ☒
Prerequisites/ Corequisites	
Work Placement(s)	
Textbook/References/Materials	
Operating System Concepts by Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, 10th Ed. Wiley	

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Course Category				
Mathematics and Basic Sciences	☐		Education	☐
Engineering	☒		Science	☐
Engineering Design	☐		Health	☐
Social Sciences	☐		Profession	☐

Weekly Schedule		
No	Topics	Materials/Notes
1	Introduction: What Operating Systems Do, Computer-System Organization, Computer-System Architecture, Operating-System Operations, Resource Management	
2	Security and Protection, Virtualization, Distributed Systems, Kernel Data Structures, Computing Environments, Free and Open-Source Operating Systems	
3	Operating-System Structures: Operating-System Services, User and Operating-System Interface, System Calls, System Services, Linkers and Loaders, Why Applications Are Operating-System Specific	
4	Operating-System Design and Implementation, Operating-System Structure, Building and Booting an Operating System, Operating-System Debugging	
5	Processes: Process Concept, Process Scheduling, Operations on Processes	
6	Interprocess Communication, IPC in Shared-Memory Systems, IPC in Message-Passing Systems, Examples of IPC Systems, Communication in Client– Server Systems	
7	Threads & Concurrency: Overview, Multicore Programming, Multithreading Models, Thread Libraries	
8	Midterm Exam	
9	Implicit Threading, Threading Issues, Operating-System Examples	
10	CPU Scheduling: Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Thread Scheduling	
11	Multi-Processor Scheduling, Real-Time CPU Scheduling, Operating-System Examples, Algorithm Evaluation	
12	Synchronization Tools: Background, The Critical-Section Problem, Peterson’s Solution	
13	Hardware Support for Synchronization, Mutex Locks, Semaphores, Monitors, Liveness, Evaluation	
14	Synchronization Examples: Classic Problems of Synchronization, Synchronization within the Kernel, POSIX Synchronization, Synchronization in Java, Alternative Approaches	
15	Deadlocks: System Model, Deadlock in Multithreaded Applications, Deadlock Characterization, Methods of Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock	
16	Final Exam	

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Assessment Methods and Criteria		
In-term studies	Quantity	Percentage
Attendance	12	6
Lab		
Practice		
Fieldwork		
Course-specific internship		
Quiz/Studio/Criticize		
Homework	4	24
Presentation / Seminar		
Project		
Report		
Seminar		
Midterm Exam	1	30
Final Exam	1	40
Total		100%
Contribution of Midterm Studies to Success Grade		
Contribution of End of Semester Studies to Success Grade		
Total		100%

ECTS Allocated Based on Student Workload			
Activities	Quantity	Duration (Hrs)	Total Workload
Course Hours	14	3	42
Lab			
Practice			
Fieldwork			
Course-specific Work Placement			
Out-of-class study time	15	4	60
Quiz/Studio/Criticize			
Homework	4	15	60
Presentation / Seminar			
Project			
Report			
Midterm Exam and Preparation for Midterm	1	19	19
Final Exam and Preparation for Final Exam	1	19	19
Total Workload			200
Total Workload / 25			8
ECTS Credit			8

