CEng 334 - Introduction to Operating Systems
Syllabus
Spring '2021-2022

Course Description
The course will cover the following topics: Introduction to operating systems. Memory management. Process management. Concurrent processes. Deadlocks. Processor management. I/O and device management. File management and File systems. Introduction to distributed operating systems. Synchronization in distributed systems. Distributed file systems. Overview of contemporary OS technology.

CEng 334 provides knowledge for understanding the general concept of operating systems which are basic computation infrasturcture for all kinds of computer applications. Course fills in the gap between the computer architecture and the user applications needing O.S. services. It enables students to develop systems applications and libraries, high performance and concurrent software applications, design and administer computation infrastructures.

Course Objectives
Students taking this course will be able to:

- Understand design and implementation of operating systems.
- Understand data structures and memory organization mechanisms of a complex software systems.
- Understand resource sharing mechanisms of a complex software system.
- Understand concurrent data exchange mechanisms of a complex software system.
- Verify data integrity in concurrent systems.
- Design and implement algorithms for problems requiring concurrency and synchronization.
- Understand authentication and security requirements of an operating system.
- Understand contemporary system infrastructures used in computation.

Prerequisites: CEng 331 (Computer Organization)
Instructors:
S1: Dr. Erol Şahin, A-207, erol@ceng.metu.edu.tr
S2: Dr. Onur Tolga Şehitoğlu, B-209, onur@ceng.metu.edu.tr

Teaching assistants:
Çağrı Utku Akpak (A-205, `cakpak@ceng.metu.edu.tr`)
Deniz Sayin (A-409 `sayin@ceng.metu.edu.tr`)

Lectures:
S1: Thursday 11:40-13:00 (YPA2), and Friday 13:40-14:00 (YPA3)
S2: Monday 15:40-17:20 (BMB1) and Wednesday 12:40-13:20 (BMB1).

Textbooks:

- Operating System Concepts, by Silberschatz, Galvin and Gagne Wiley.
- Operating Systems: Three Easy Pieces, Remzi H. Arpaci-Dusseau and Andrea C. Arpaci-Dusseau,
- Little book of semaphores, by Allen B. Downey, Grean Tea Press (free for download)

Lecture Videos:
Playlist for lecture videos from past years:
`http://tiny.cc/o86puz`

Course Schedule

Date	Topic	Activity
7 – 11 Mar	Introduction and OS Overview	
14 – 18 Mar	Processes, Threads	
21 – 25 Mar	Threads	
28 Mar – 1 Apr	Synchronization	PA 1: IPC (Due: 17 Apr)
4 – 8 Apr	Synchronization: Semaphores	
11 – 15 Apr	Synchronization: Monitors and Condition Variables, Deadlocks	
18 – 22 Apr	Scheduling	Midterm I PA 2: concurrency and synchronization (Due: 15 May)
25 – 29 Apr	Scheduling	
9 – 13 May	Memory Management and Virtual Memory	
16 – 20 May	Memory Management and Virtual Memory	
23 – 27 May	Disks and Filesystems	Midterm II, PA 3: Filesystems (Due: 12 Jun)
30 May – 3 Jun	Filesystems Interface, I/O systems	
6 – 10 Jun	Multi-processor systems, virtualization	
13 – 17 Jun	OS Security	

All dates are tentative, subject to change.

Exams and Grading:

Midterm I	21%
Midterm II	21%
Final	23%
Assignments	30%
Quizes	5%

Communication:

- Course web page: `https://odtuclass.metu.edu.tr`
- Discussion on course content, `https://cow.ceng.metu.edu.tr/c/courses-undergrad/ceng334/`
- Official announcements: ODTUClass.
- Course conduct related questions should be posted to the instructor and/or teaching assistants in private. Make sure you include "CENG 334" in the subject line

Policies:

- Late submission penalty = $5d^2$, d is number of days of late submission.
- Students need to collect 25/100 in average from programming assignments announced before the final exam (typically first two assignments). Otherwise **student will not be qualified for final and graded as NA**.
- All works submitted should be fully your own and individual. We have a zero tolerance policy on cheating and plagiarism. All attempts will be subject to disciplinary action.