

IE411 Operating Systems 3-0-2-4

Semester I, 2022-2023

Instructor

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Course Website

Google Classroom – IE411-2022 (Class Code **zgmloy7**)

Course Outline

The course explains the evolution of computer operating systems from a simple program loader to a complete resource manager of a computing platform. We look at the structure of a modern operating system, and the design of its components. Important components like processes, memory, I/O, file systems, and security subsystem are studied in detail. We also study the implementation of these constructs in the context of a basic Unix-like operating systems.

In the laboratory, experiments/assignments covers: system programming in Unix like OS, multithreading, and concurrency control. At the end of the course, students are expected to have an in-depth understanding of a modern OS architecture and be able to understand and implement programs using system calls.

Course Outcomes

At the end of the course, students will have the basic understanding of OS architectures, modules, and the underlying algorithms. They will be able to use system calls to write multi-threaded applications, and be able to understand and work with various file systems. They will be able to work with OS simulators and measure the performance of schedulers, call overheads, and file system comparisons.

P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12
X	X	X		X			X	X			X

Text Books

- **T-1** Silberschatz, Galvin, Gagne, "Operating System Concepts," 10th Ed.
- **T-2** Bach M., "The Design of the Unix Operating System," PHI
- **T-3** Stevens, Rago, "Advanced Programming in the UNIX Environment," Addison Wesley

Evaluation Scheme

Labs	30%
MidSem Test	30%
Final Test	40%

Lecture Schedule

	Description	# of lectures (tentative)
1	Overview	3
	1.1 Review of a Computer System	
	1.2 Evolution of Operating System	
	1.3 Components of a modern OS	
	1.4 Operating System Architecture	
2	Process Control	5
	2.1 Need for a process abstraction	
	2.2 Process and Scheduling	
	2.3 Process synchronization, Inter process communication	
	2.3 Resource management among processes	
3	Memory Subsystem	5
	3.1 Storage hierarchy	
	3.2 Running programs on a system	
	3.3 Virtual memory	
	3.4 Secondary storage mechanisms	
4	File Subsystem	5
	4.1 Concepts, User view of information/data	
	4.2 Filesystem constructs and implementation	
	4.3 Unix-like File systems	
5	I/O Handling	4
	5.1 I/O control, device management	
	5.2 Device driver and virtual device abstraction	
	5.3 Resource protection	
6	Additional Topics	4
	6.1 Security subsystem	
	6.2 Distributed and real-time OS	

