



Advance Operating System (AOS) Course Outline

Credit Hourse/Course Cod: 3/CS505
Semester /Timing/Day: 1 ST Semesters MS student /1:30 to 3:30 pm/Monday
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Course Information

Course Description

The Advance Operating system course is a graduate-level course that covers the Operating System (OS) *advanced* and *basic*. Concepts. This course is MS level student for The University of Haripur. It includes a broad range of topics such as Introduction of Operating System (OS), Addresses space, Process and Threads, Memory management, file system, INPUT/OUTPUT MANAGEMENT, and *OS security issue*, etc. This also contains *Resource links* of operating system such as free *online Operating systems courses* important tutorial and useful links, etc

Prerequisite(s) and Specific Course Requirements (if any)

Student are expected to have the following background:

- 1- Basic of Operating System
- 2- C++

Course Outcomes (no more than five)

After successfully finished this course; the student will get the following outcome

1. Your basic and advance concepts about operating System will be clear
2. You will be able to apply operating system in a creative way
3. You will master not only basic concept of os, but also learn advance concept of Operating system

Assessments and Evaluation

List the different assessment instruments you will use to evaluate student learning. Provide a description for each assessment instrument and the reason why you are using it

The performance of the student will be evaluated using the midterm exam, final example, quizzes, assignment, semester group projects. Total 3 quizzes and 3 assignments will frame to check the concept of operating System. The group assignment will only allow us to solve on google doc file, so that each student will learn; how OS works. .

Required Text

- Modern Operating System By Tanenbaum
- Operating System (Internal and Design Principle) By William Stalling s

Teaching methodology

Online and face to face teaching methodology will be used for teaching. All quizzes and assignments will be solved and submit through moodle **CoursesTeach.com**. All class lectures will be delivered through a face-face classroom using multimedia. The recorded videos lecture and handout will be provided on the Moodle course. The handout will be also provided in google doc format and so that students can easily customize these handouts.

Course Policies

Each policy statement should be between 30-50 words. You can refer students to further detail at a later stage. Use this space to outline the existence of the policy.

Grading Policy

The assignment rubric will be provided with the assignment. Next, the midterm and final exam dates will be displayed on the website. The final grade of the course will be based on assessments such as quizzes, assignments, class participation, midterm exam final exam, and final projects. The marks distribution is shown in the table.

Marks head	Total Frequency	Marks Frequency	Total Mars Heads
Quiz	3	5	5
Assignment	3	5	5
Class participation	1	5	5
Discussion(CoursesTeach)	10	-	10
Final paper	1	50	50
Mid Term Paper	1	25	25
Total Marks :			100

Assignment Submission Policy and Deadlines

Late submission will not be accepted and not be graded. Please submit your assignment on time through Moodle **CoursesTeach.com**. The only electronic version will be accepted.

Badges

Student will be award with a different type of badges (Good, Excellent Badges) during moodle course based on participation on discussion form, materials engagement and assignment, and quiz marks.

Academic Integrity Police

Collaborative group work will be encouraged, but plagiarism will not be accepted. Please submit original work. copy and paste will not be allowed. The 20 % grade will be decreased; if student plagiaries in a second time.

Participation Policy

The students' participation during class and online discussion groups (moodle) will be required. At the end of the course; Students' participation will be evaluated. The high participated student will be award with 5% marks in the final exam. Every student will allow to an asked questions in online discussion groups and class What Groups.

Attendance policy

Students who arrive late for the class will not be allowed. All student required that; their attendance must be 75%

before exam, otherwise, he will not be allowed in final exam.

Use of technology

The students can bring laptops during class, but use in such a way that cannot disturb other people. Please do not use your laptop for other activities such as movies, songs, etc. Please turn off your cell phone or put them in silent mode during class.

Email and WhatsApp communication

All information about course will be sent on your office email address and Class WhatsApp group. Check your email and WhatsApp group regularly.

Office hour

During office hour, students are allowed to ask questions from instructor at MSTEAM. Time will be every day 10 to 11 pm.

Creative Elements (no more than 3)

In this section, include elements that make your course stand out and require students' participation, critical thinking, and active learning.

- 1) A bonus point will be given to high participated student during class
- 2) Bonus the point will be given to excellent badge students
- 3) Bonus the point will be given to that student who has zero similar in assignments

COURSE SCHEDULE

In the table, insert a weekly plan with topics. Include formative and summative assessments. Please do not copy the table off the Internet

WEEK	TOPIC	TEXT/CHAPTER
1. Introduction	Week# 1: What is an OS?, The layers Structure Simple example: Display screen, Simple Example- Abstraction Simple Example- Resource Manager Resource Multiplexing, The Major issues of OS Protection and security as an example, Type of Operating Systems, Difference between System software and Application software, What happens when you click the mouse	Chapter01:Introduction to Advance operating System
	Week# 2: Major OS Components What is mean by process? Process Management System, I/O Management Memory management, Secondary Storage, File System Hardware Resources in a Computer System-Malik The organization with I/O Bus2-Areej	Chapter01:Introduction to Advance operating System

2. OS structure	Week#3: OS structure Definition, Goal of OS structure , DOS-Like structure (Simple Structure) Monolithic structure Layer structure Microkernel's	Chapter01:Introduction to Advance operating System
3. Address Space	Week# 4: What is process Address Space? Example-Covert any C program into process Part 1,COFF File Format,. ELF Objects File Format P1. ELF Objects File Format P2 Example of C P1(C program details) Example of C P2(Symbols and References) Example of C P3 (m.o Relocation Info) Example of C P3(Executable after Relocation and External Reference Resolution (.text)) Strong and Weak Symbols. Linker's Symbol Rules. Private address space (NARGIS TARIQ)	Chapter:02 Process And Threads
4- Process and Threads	Week#5: Process definition, Multiprogramming and Multitasking Operating System, Multiprogramming System Multiprocessor systems, Private Address Spaces , Control Flow. Altering the Control Flow (synchronous). Altering the Control Flow (asynchronous) or Exceptional Control Flow Exceptional Control flow , Interrupt P1, Interrupt P2, Traps, Fault, aborts, Trap Example. Fault Example	Chapter:02 Process And Threads
	Week#6: Context Switching P1, Context Switching P2 , Context Switching P3, When to Switch a Process , Process creation. Process State , Process state Diagram ,Two-state process model , 9five-state process model BCP (Process Control Block)	Chapter:02 Process And Threads
	Week#7. Suspending Processes (7-State Model), Unix SVR4 processes, Modes of Execution ,System Call P1, System Call P2. System Program Process Control Block (PCB),PCB- Memory Table , PCB- IO tables, PCB- File table. Fork: Creating new processes, Fork: With the example	
	Week #8 Process, Zombies, wait: Synchronizing with children. Wattpad, exec: Running new programs, Process and Threads,	

	Concurrency	
	Week#9 Process: Concurrency, Threading and Parallelism, User Interface, Threads, Process Context Switch, Process Context Switch, Threads Context Switching, User Level and kernel-level thread	
5. Memory Management	Week# 10 : What is the OS?, How Memory is Organized, How OS improve the CPU utilization, What is Memory Management?, Virtual Memory Management, Embedded System and Desktop System, How VM Works,(page fault, page replacing),Linker and Loader, Swapping, Memory Hierarchy	Chapter:03 Memory Management
	Week# 11: Fixed partitions, Variable size Partitioning, How to limit register and base register works, Modern Technique: Paging, Address translation, Paging disadvantages, Multi-Level Page Tables	Chapter:03 Memory Management
	Week#9: Paging vs <u>Segmentation</u> , How <u>Segmentation</u> Works, First Fit Algorithm, Next Fit Algorithm, Best Fit Algorithm, Worst Fit Algorithm, Advantages and Disadvantages of Memory Allocation Methods File	Chapter:03 Memory Management
6.File System	Week#12: File System, How file system work, Design issues and challenges of file system, File and Directory, Basic Operations, Sync and Seek system call, File access method, Directory, Steps in fully Qualified path file protection Week 13: Linked List Allocation, Advantages and disadvantages of Linked List Allocation, Contiguous Allocation in Operating system, Advantages and Disadvantages of Contiguous Allocation Methods, Indexed File Allocation in Operating System. Advantages and Disadvantages of Indexed File Allocation Method	Chapter:04 File System
7 . Input/Output	Week 14 : I/O Interface in computer organization , Principles of I/O Software Synchronous vs. asynchronous Operation, Device Controllers , Device Controllers tasks	

	P6 layers of the i/o system, memory mapped i/o vs Direct i/o	
8 .Security	Week 15 agenda. Protection & Security or Privacy, Goal of Protection, Security Violation Categories. Principles of Protection, Domain Structure, Access Matrix. Week 15 Agenda, Security issue. Policy versus mechanism	