DEPARTMENT OF COMPUTER APPLICATIONS
NATIONAL INSTITUTE OF TECHNOLOGY
TIRUCHIRAPPALLI

COURSE PLAN – PART I	
Name of the programme and specialization	M.Sc. (Computer Science)
Course Title	Operating Systems Fundamentals
Course Code	CAS 719 · No. of Credits · 3
Course Code of Prerequisite subject(s)	Computer Architecture
Session	July -2023 · Section (if, applicable) · NA
Name of Faculty	Dr. B.Balaji · Department · Computer Applications
Email	balaji@nitt.edu · Telephone No. · 8971027077
Name of PAC Chairman	Dr. U. Srinivasulu Reddy
E-mail	usreddy@nitt.edu · Telephone No. · 8438207784
Course Type	Core Course

Syllabus (approved in BoS)

Operating System concepts - OS Structure – OS Services - System calls – Process management: Process Concept-Operations on process-Cooperating processes- Inter-process communication. Process scheduling-Scheduling algorithms.

Threads- Multithreading models – Containers - Process synchronization- critical-section – Synchronization hardware – Semaphores – Classic problems of synchronization – critical regions. Deadlocks: Characterization, Prevention, Avoidance, Detection, and Recovery.

Memory Management: Paging, segmentation, Demand Paging, Page Replacement, Allocation of Frames. File Concepts, Access and Allocation Methods, Free Space Management.

Disk Structure, Disk Scheduling and Disk Management. Protection and security, Distributed Operating Systems – Distributed system structure, Distributed file system, Mobile Operating systems.

Case Studies: UNIX, Linux, Android, and Windows Operating Systems.

COURSE OBJECTIVE(S)

- To understand the design of an operating system and services provided by the OS.
- To understand what a process is and how processes are synchronized and scheduled.
- To acquire knowledge on different approaches to memory management.
- To understand the structure and organization of the file system and disk.
- To know the concepts of distributed and Mobile operating systems.

COURSE OUTCOMES (CO)

Course Outcomes	Aligned Programme Outcomes (PO)

Students will be able to:	
1. Use system calls for managing processes, memory, and the file system.	PO I, II, III, IV, V
2. Explore various types of operating systems including UNIX, Linux, Android, and Windows.	PO I, II, III, IV, V
3. Explore the functionalities of distributed and mobile operating systems	PO I, II, III, IV, V

COURSE PLAN – PART II

COURSE OVERVIEW

This course focuses on how the operating system effectively manages the system resources. The objective of this course is to provide classical internal algorithms and structures of operating systems, including CPU scheduling, memory management and file management concepts.

COURSE TEACHING AND LEARNING ACTIVITIES

S.No.	Week/ Contact Hours	Topic	Mode of Delivery
1	Week 1 (3 Classes)	OS Structure – OS Services - System calls	PPT, Chalk, and Talk
2	Week 2 (3 Classes)	Process management: Process Concept-Operations on process-Cooperating processes	PPT, Chalk, and Talk
3	Week 3 (3 Classes)	Inter-process communication. Process scheduling-Scheduling algorithms.	PPT, Chalk, and Talk
4	Week 4 (3 Classes)	Threads- Multithreading models – Containers	PPT, Chalk, and Talk
5	Week 5 (3 Classes)	Process synchronization- critical-section – Synchronization hardware	PPT, Chalk, and Talk
6	Week 6 (3 Classes)	Semaphores – Classic problems of synchronization – critical regions	PPT, Chalk, and Talk
7	Week 7 (3 Classes)	Deadlocks: Characterization, Prevention, Avoidance, Detection, and Recovery.	PPT, Chalk, and Talk
8	Week 8 (3 Classes)	Memory Management: Paging, segmentation	PPT, Chalk, and Talk
9	Week 9 (3 Classes)	Demand Paging, Page Replacement, Allocation of Frames	PPT, Chalk, and Talk
10	Week 10 (3 Classes)	File Concepts, Access and Allocation Methods, Free Space Management.	PPT, Chalk, and Talk
11	Week 11 (3 Classes)	Disk Structure, Disk Scheduling and Disk Management	PPT, Chalk, and Talk
12	Week 12 (3 Classes)	Protection and security, Distributed Operating Systems	PPT, Chalk, and Talk
13	Week 13 (3 Classes)	Distributed system structure, Distributed file system, Mobile Operating systems.	PPT, Chalk, and Talk
14	Week 14 (3 Classes)	Case Studies: UNIX, Linux, Android, and Windows Operating Systems.	PPT, Chalk, and Talk

COURSE ASSESSMENT METHODS

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Cycle Test 1	6th Week	60 Minutes	20
2	Assignment 1/Quiz/Viva/Seminar	8th week	-	10
3	Cycle Test 2	10th Week	60 Minutes	20
4	Compensation assessment*	12th Week	60 Minutes	20
5	Final Assessment	-	180 Minutes	50

ATTENDANCE POLICY (A uniform attendance policy as specified below shall be followed)

> - **At least 75% attendance in each course is mandatory.**
> - Students with **less than 65% of attendance** shall be prevented from writing the final assessment and **shall be awarded 'V' grade.**

ACADEMIC DISHONESTY & PLAGIARISM

> - Talking to other students, and copying from others during an assessment will be treated as punishable dishonesty.
> - Zero marks to be awarded for the offenders. For copying from another student, both students get the same penalty of zero marks.
> - The departmental disciplinary committee including the course faculty member, PAC chairperson, and the HoD, as members, shall verify the facts of the malpractice and award the punishment if the student is found guilty. The report shall be submitted to the Academic office.
>
>   The above policy against academic dishonesty shall be applicable for all the programmes.

ADDITIONAL INFORMATION

Students can contact the faculty to clarify their doubts in person anytime during working hours.

Compensation assessment policy:
> - One compensation assessment for absentees in assessments (other than final assessment) is mandatory. Only genuine cases of absence shall be considered.

Note: prior permission from faculty is required.

FOR APPROVAL

Dr.B.Balaji
Course Faculty   **CC-Chairperson**   **HOD**