

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

COURSE PLAN – PART I			
Name of the programme and specialization	M.Tech. CSE		
Course Title	ADVANCED CONCEPTS IN OPERATING SYSTEMS		
Course Code	CS 603	No. of Credits	3
Course Code of Pre-requisite subject(s)	NIL		
Session	July 2018	Section (if, applicable)	
Name of Faculty	Dr. S. Mary Saira Bhanu	Department	CSE
Email	msb@nitt.edu	Telephone No.	9442970006
Name of Course Coordinator(s) (if, applicable)	NA		
E-mail		Telephone No.	
Course Type	Core course		
Syllabus (approved in BoS)			
CS603: Advanced Concepts in Operating Systems			
UNIT I			
Multiprocessor Operating Systems: System Architectures- Structures of OS – OS design issues –			
Process synchronization – Process Scheduling and Allocation- memory management.			
UNIT II			
Distributed Operating Systems: System Architectures- Design issues – Communication models –			
clock synchronization – mutual exclusion – election algorithms- Distributed Deadlock detection			
UNIT III			
Distributed scheduling - Distributed shared memory - Distributed File system – Multimedia file systems - File placement - Caching			
UNIT IV			
Database Operating Systems: Requirements of Database OS – Transaction process model – Synchronization primitives - Concurrency control algorithms			
UNIT V			
Mobile Operating Systems: ARM and Intel architectures - Power Management - Mobile OS Architectures - Underlying OS - Kernel structure and native level programming - Runtime issues- Approaches to power management			

TEXT BOOK:

1. M Singhal and NG Shivaratri , Advanced Concepts in Operating Systems, Tata McGraw Hill Inc, 2001

REFERENCE BOOK

1. A S Tanenbaum, Distributed Operating Systems, Pearson Education Asia, 2001
2. Source Wikipedia, Mobile Operating Systems, General Books LLC, 2010

COURSE OBJECTIVES

1. To study the characteristics of Multiprocessors and Multicomputers
2. To learn the issues related to designing OS
3. To learn the latest trends in building mobile OS

COURSE OUTCOMES (CO)

Course Outcomes	Aligned Programme Outcomes (PO)
1. Knowledge about advanced concepts in OS	PO1-PO7, P9, P10
2. Ability to develop OS for distributed systems	PO1-PO7, PO9 – PO11
3. Ability to develop modules mobile devices	PO1-PO7, PO9 – PO11

COURSE PLAN – PART II**COURSE OVERVIEW**

This course enables the students to know the importance of Operating System (OS) and understand how OS services are implemented and used in multiprocessor systems, distributed systems and mobile systems. The course focuses on the design of Process management, Memory management, and File management in advanced OS. The concepts related to handling transactions and issues related to designing database OS are covered. The course deals with the architecture of mobile OS and power management.

COURSE TEACHING AND LEARNING ACTIVITIES

S.No.	Week/Contact Hours	Topic	Mode of Delivery
1	1	Introduction to Uniprocessor OS, OS structure, components of OS	C&T
2	2	Multiprocessor OS - Hardware, Classification based on Interconnection networks, Memory	C&T, PPT

		access, MOS configurations and implementation	
3	3	MOS design issues – Threads –Hyper Threads, Multi core, Processor management – Allocation and Scheduling	C&T, PPT
4	4	Process Synchronization, Memory Management, Fault tolerance and reliability	C&T, PPT
5	5	Distributed systems, Overview-Hardware concepts, Middleware concepts, Design issues	C&T, PPT
6	6	Communication models – Distributed computing models	C&T, PPT
7	7	Clock synchronization – Logical Clock, Physical Time Services	C&T, PPT
8	8	Mutual exclusion – Non Token based algorithms	C&T, PPT
9	9	Token based Mutual exclusion algorithms - election algorithms-Bully algorithm and Ring algorithm	C&T, PPT
10	10	Distributed Deadlock detection – Deadlock prevention, Deadlock Detection algorithms-	C&T, PPT
11	11	Distributed scheduling – Load balancing algorithms, Distributed shared memory – Consistency models	C&T, PPT
12	12	Distributed File system – File and Directory services - Multimedia file systems - File placement - Caching	C&T, PPT
13	13	Database Operating Systems: Requirements of Database OS – Transaction process model	C&T, PPT
14	14	Synchronization primitives - Concurrency control algorithms – Lock based algorithms, Timestamp based algorithms – optimistic	C&T, PPT

		algorithms	
15	15	Mobile Operating Systems: ARM and Intel architectures - Mobile OS Architectures – Android, IOS	C&T, PPT
16	16	Kernel structure and native level programming – Runtime issues- Approaches to power management	C&T, PPT

COURSE ASSESSMENT METHODS (shall range from 4 to 6)

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Written Test 1	September IV Week	1 hour	20 %
2	Assignment	October IV Week		10%
3	Written Test 2	November II week	1 hour	20 %
CPA	Compensation Assessment*	December I week		20%
6	Final Assessment *	December III Week		50 %

*mandatory; refer to guidelines on page 4

COURSE EXIT SURVEY (mention the ways in which the feedback about the course shall be assessed)

Feedback to be collected at the end of semester through MIS

COURSE POLICY (preferred mode of correspondence with students, compensation assessment policy to be specified)

MODE OF CORRESPONDENCE (email/ phone etc)

Through email

COMPENSATION ASSESSMENT POLICY

Students should not absent for assessments. If the reason for absence is genuine, the student can appear for compensation assessment. The medical certificate/on duty certificate should be submitted within one week after rejoining. The portions for the compensation assessment will be Test 1 and Test 2 portions.

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

- **At least 75% attendance in each course is mandatory.**

- A maximum of 10% shall be allowed under On Duty (OD) category.
- Students with less than 65% of attendance shall be prevented from writing the final assessment and shall be awarded 'V' grade.

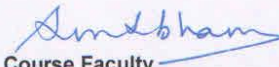

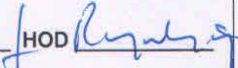
ACADEMIC DISHONESTY & PLAGIARISM

- Possessing a mobile phone, carrying bits of paper, talking to other students, copying from others during an assessment will be treated as punishable dishonesty.
- Zero mark to be awarded for the offenders. For copying from another student, both students get the same penalty of zero mark.
- 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

FOR APPROVAL

 Course Faculty _____
 FCC-Chairperson _____
 HOD _____

Guidelines:

- a) The number of assessments for a course shall range from 4 to 6.
- b) Every course shall have a final assessment on the entire syllabus with at least 30% weightage.
- c) One compensation assessment for absentees in assessments (other than final assessment) is mandatory. Only genuine cases of absence shall be considered. Details of compensation assessment to be specified by faculty.
- d) The passing minimum shall be as per the regulations.
- e) Attendance policy and the policy on academic dishonesty & plagiarism by students are uniform for all the courses.
- f) Absolute grading policy shall be incorporated if the number of students per course is less than 10.
- g) Necessary care shall be taken to ensure that the course plan is reasonable and is objective.