



Department of Computer Applications National Institute of Technology-Tiruchirappalli

1. COURSE OUTLINE TEMPLATE			
Course Title	OPERATING SYSTEMS		
Course Code	CAS 769	No. of Credits	3
Department	Computer Applications	Faculty	Dr. C. Sivaraj
Pre-requisites Course Code	NA		
PAC-Chairman	Dr. S. Sangeetha		
Other Course Teacher(s)/Tutor(s) E-mail	<u>sivaraj@nitt.edu</u>	Telephone No.	+91-7339431431
Course Type	Core course		
2. COURSE OVERVIEW			
<p>Covers the classical internal algorithms and structures of operating systems, including CPU scheduling, memory management, and device management. Considers the unifying concept of the operating system as a collection of cooperating sequential processes. Covers topics including file systems, virtual memory, disk request scheduling, concurrent processes, deadlocks, security, and integrity.</p>			
3. COURSE OBJECTIVES			
<ul style="list-style-type: none">➔ <i>To describe the basic organization of computer systems</i>➔ <i>To provide a clear understanding of operating system concepts.</i>➔ <i>To be aware of the services provided by operating systems and their underlying principles.</i>➔ <i>To be introduced to various types of operating systems and their design perspectives.</i>			
4. COURSE OUTCOMES (CO)			
<ul style="list-style-type: none">➔ <i>Know the evolutions of operating systems</i>➔ <i>Understand the basic organization of computer systems</i>➔ <i>Know the concepts of operating system functions and structures.</i>➔ <i>Understand the design issues associated with operating systems.</i>➔ <i>Be familiar with various types of operating systems including UNIX, Linux and windows.</i>			

5. COURSE OUTCOME (CO)	Aligned Programme Outcome (PO)											
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12
Know the evolutions of operating systems	H	M				M				H		
Understand the basic organization of computer systems	M	M			H							
Know the concepts of operating system functions and structures.	H	L	H	M				L	H		M	
Understand the design issues associated with operating systems	H	M	L	L	M		M					
Be familiar with various types of operating systems including UNIX, Linux and windows		L			H			H	H		L	H

6. COURSE TEACHING AND LEARNING ACTIVITIES			
Week	#Class	Topic	Mode of Delivery
1	Class I	Operating System concepts and basics	Talk, Chalk
	Class II	Structure of operating system	Talk, Chalk
	Class III	OS Services and User interface	Talk, Chalk
2	Class I	System calls and its types	Power point presentation
	Class II	Process concepts and operations	Power point presentation
	Class III	Cooperating processes and introduction of Inter Process Communication	Power point presentation
3	Class I	Types of IPC methods: Shared-memory Systems and Message-passing systems	Power point presentation
	Class II	Process scheduling basics CPU scheduler and scheduling criteria	Power point presentation
	Class III	Various process scheduling algorithms (FCFS, SJF, Priority)	Talk, Chalk, Power point presentation
	Class IV	Various process scheduling algorithms contd... (RR, multilevel Q, multilevel feedback Q)	Talk, Chalk, Power point presentation

4	Class I	Thread concepts and Multi-Threading Models	Talk, Chalk,
	Class II	Process synchronization and Critical section problem, Peterson's solution	Talk, Chalk, Power point presentation
	Class III	Synchronization Hardware : TestAndSet and Swap H/W instructions based solutions	Talk, Chalk, Power point presentation
5	Class I	Semaphores: Binary and counting Semaphores usage and implementation, deadlocks and starvation, priority inversion	Talk, Chalk, Power point presentation
	Class II	Classic problems of synchronization (Bounded Buffer, Reader-Writer and Dining Philosophers)	Talk, Chalk, Power point presentation
	Class III	Critical regions, Deadlocks concepts and its characterization	Talk, Chalk, Power point presentation
	Class IV	Deadlock Prevention, Deadlock Avoidance	Talk, Chalk
6	Class I	Deadlock Detection, and Deadlock Recovery.	Talk, Chalk
	Class II	Memory Management Basics (Basic Hardware's and Address Binding, Swapping)	Power point presentation
	Class III	Contiguous and non- contiguous memory allocation methods	Talk, Chalk, Power point presentation
7	Class I	Paging concepts, Structure of Page table	Power point presentation
	Class II	Segmentation concepts, and intel Pentium segmentation example	Talk, Chalk, Power point presentation
	Class III	Virtual memory management concepts, Demand Paging	Talk, Chalk, Power point presentation
	Class IV	Page Replacement concepts and algorithms (FIFO, Optimal, LRU, LRU approx., counting)	Talk, Chalk, Power point presentation
8	Class I	Allocation of frames and Algorithms	Talk, Chalk
	Class II	File Concepts, Access and Allocation Methods (Contiguous, Linked and indexed)	Talk, Chalk, Power point presentation
	Class III	Free Space Management	Talk, Chalk
	Class IV	Disk Structure and disk attachment, Disk Scheduling (FCFS, SSTF, SCAN, C-SCAN, LOOK)	Talk, Chalk, Power point presentation
9	Class I	Disk Management(Formatting, Boot Block, Bad Blocks)	Talk, Chalk, Power point presentation
	Class II	RAID structure (Levels)	Talk, Chalk, Power point presentation
	Class III	Case Studies: Linux and Windows Design principles, Kernel Modules and Process Management	Talk, Chalk, Power point presentation
10	Class I	Linux and Windows : Scheduling , Memory Management and file system	Talk, Chalk, Power point presentation
	Class II	Linux OS and windows: Inter Process Communications and Network Structure	Talk, Chalk, Power point presentation
	Class III	Overview of Distributed and Mobile Operating systems.	Talk, Chalk, Power point presentation

7. COURSE ASSESSMENT METHODS

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Test 1	4 th week	60 Minutes	20%
2	Test 2	8 th week	60 Minutes	20%
3	Assignment/Seminar	7 th week to 10 th Week	6 days	10%
4	Semester Exam	November	180 Minutes	50%

8. ESSENTIAL READINGS : Textbooks, reference books, etc

1. Abraham Silberschatz, Peter B. Galvin and Greg Gagne, "Operating System Concepts Essentials", John Wiley & Sons Inc., 2010.
2. Andrew S. Tanenbaum, "Modern Operating Systems", 3rd Edition, Prentice Hall, 2007.
3. William Stallings, "Operating Systems: Internals and Design Principles", 7th Edition, Prentice Hall, 2011.
4. Garry Nutt, "Operating Systems", 3rd Edition, Addison-Wesley, 2003.

9. COURSE EXIT SURVEY (mention the ways in which the feedback about the course is assessed and indicate the attainment also)

1. The students through the class rep may give their feedback at any time to the course coordinator which will be duly addressed.
2. The students may also give their feedback during Class Committee meeting.
3. 'Course Outcome Survey' form will be distributed on the last working day to all the students and the feedback on various rubrics will be analyzed.
4. The COs will be computed after arriving at the final marks.

10. COURSE POLICY (including plagiarism, academic honesty, attendance, etc.)**At classes:**

Interactive and productive interactions are anticipated. Abusive terms are highly restricted. Attendance is noted for every class. Appreciate if they are willing to prepare for placement and participating social services after informing properly to the department.

Exam Policy:

Exams are equal to all the students. No privileges will be given to any one at any cost. Absentees on cycle tests won't be allowed for end semester examinations. Assignments are mandatory and should be submitted by the notification of the teacher.


Basic Policies on dishonest or Misconduct:

Students are encouraged to come with notebooks and encouraged to note down from teachers lecture. Asked to avoid electronic gadgets and unwanted notes at the time of examinations. Copying and re using existing notes for assignments are not appreciable.


11. ADDITIONAL COURSE INFORMATION

The students can get their doubts clarified at any time with their faculty member with prior appointment.

For Senate's Consideration


C. Sivaraj
Course Faculty


Dr. S. Sangeetha
PAC-Chairperson


Dr. S.R. Balasundaram
HOD