



# Indra Ganesan

## COLLEGE OF ENGINEERING

Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai  
Accredited by NAAC with 'B+' Grade, 2(f) & 12B Status Institution by UGC

IG Valley, Madurai Main Road, Manikandam, Tiruchirappalli - 620012

# NAAC DOCUMENTS

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## QUALITY INDICATOR FRAME WORK

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### CRITERION – 1

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## CURRICULAR ASPECTS

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SUBMITTED BY

**IQAC**

INTERNAL QUALITY ASSURANCE CELL

**INDRA GANESAN COLLEGE OF ENGINEERING**





<b>Criteria 1</b>	<b>Curricular Aspects</b>	<b>100</b>
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## 1.1 Curricular Planning and Implementation (20)

**1.1.1 The Institution ensures effective curriculum planning and delivery through a well-planned and documented process including Academic calendar and conduct of continuous internal Assessment**

### Table of Content

S. No	Description
1.	Preface of the Course File
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# INDRA GANESAN COLLEGE OF ENGINEERING

IG Valley, Manikandam, Tiruchirappalli, Tamil Nadu – 620 012, India  
(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25)

## DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

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### PREFACE OF THE COURSE FILE

Batch : 2020-2024

Academic Year : 2021-2022 / EVEN


Program : COMPUTER SCIENCE AND ENGINEERING

Year & Semester : 2<sup>nd</sup> Year / 4<sup>th</sup> Semester / 'A' Section

Course Code : CS8493                      NBA Course Code: C204

Name of the Course : Operating System

Faculty in-charge : Mrs.A.Ramya Asst.Prof / CSE

  
Signature of the Faculty in-charge

  
HoD / CSE

  
Dr. G. Balakrishnan, M.E., Ph.D.,  
Principal

Indra Ganesan College of Engineering  
IG Valley, Madurai Main Road  
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## DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

### REVIEW OF COURSE FILE

(to be pasted on the inner side of the file-backside).(#-State Yes/No.)

S.N	Details	Date:	R-I-*	R-II-*&	R-III-*&	R-IV-*&\$	R-V-*&\$@
1.	Preface of the course file		y				
2.	Vision, Mission, PEOs, POs, PSOs, Blooms taxonomy		y				
3.	Subject handlers of yesteryears		y				
4.	Timetable/Workload of the staff – Distribution of teaching load – Roles and Responsibilities		y				
5.	Syllabus signed by staff & HoD		y				
6.	Lecture Schedule signed by staff & HoD		y				
7.	Course Committee meeting circular and minutes		y				
8.	Identification of Curricular gap and Content Beyond the syllabus		y				
9.	Self-study topics		y				
10.	Previous AU Question papers		y				
11.	Unit wise Q&A and Objective type questions		y				
12.	Unit wise course material			y	y	y	
13.	Assignment question paper with sample answer sheets and mark entry			y	y	y	
14.	Tutorial question paper with key and mark entry			y	y	y	
15.	Class test/IA test Q Paper with Key, sample answer papers and mark entry			y	y	y	
16.	IA Test- result analysis-CAP-evidence-root cause analysis.			y	y	y	
17.	Retest –Q paper-Attendance-marks			y	y	y	
18.	AU Web portal entry sheet			y	y	y	
19.	Very poor performance in first two tests-action taken.-communication to parents-evidence				y	y	
20.	Absence for two tests-action taken-communication to parents-evidence.				y	y	
21.	Indiscipline of student reported, if any						
22.	Special class/coaching class/remedial class/attendance-CAP			y	y	y	
23.	Conduct of Seminar, Quizzes - proof						
24.	Content beyond the syllabus - proof						
25.	Student feedback on faculty						y
26.	Course end survey						y
27.	Internal Assessment sheet						y
28.	AU question paper with students feedback						y
29.	Discrepancy of the question paper and correspondence, if any						y
30.	AU result analysis-Details of arrear students.						y
31.	AU grade sheet						y
32.	CO – PO & PSO attainment sheet						y
	<b>Signature of Course handling faculty</b>		<i>A. Ref</i>	<i>A. Ref</i>	<i>A. Ref</i>	<i>A. Ref</i>	<i>A. Ref</i>
	<b>Signature of HoD</b>		<i>D. Hida</i>	<i>D. Hida</i>	<i>D. Hida</i>	<i>D. Hida</i>	<i>D. Hida</i>



**Indra Ganesan College of Engineering**  
 Madurai Main Road (NH-45B), Manikandam, Tiruchirappalli-620012  
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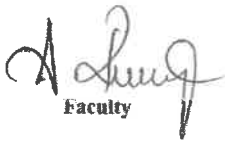
**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**  
**MASTER TIME-TABLE : EVEN SEMESTER 2021-2022**

**II CSE / III SEM**


**ROOM NO :**

**CC : Mrs. T. Anita Dorothy**

II YEAR	9.15 - 10.10	10.10 - 11.00		11.15 - 12.10	12.10 - 01.00		01.45 - 02.30	02.30 - 03.15		03.30 - 04.10	04.10 - 05.00			
Period	1	2		3	4		5	6		7	8			
Mon			<b>B R E A K</b>	OS CS8493		<b>L U N C H</b>			<b>B R E A K</b>					
Tue	OS CS8493													
Wed				OS CS8493							OS CS8493			
Thu														
Fri														

  
 Faculty

  
 HOD / CSE

  
**Dr. G. Balakrishnan, M.E., Ph.D.,**  
 Principal  
 Indra Ganesan College of Engineering  
 IG Valley, Madurai Main Road  
 Manikandam, Trichy-620 012.



Date: 16.02.2022

## CENTRE FOR ACADEMIC COURSES

ANNA UNIVERSITY : CHENNAI – 600 025

### ACADEMIC SCHEDULE FOR NON-AUTONOMOUS AFFILIATED COLLEGES

#### March 2022 – June 2022 (Even Semester – Except Semester II)

UG (FT/PT) Degree Programmes

Sl. No.	Programme	Semester	Commencement of Classes	Last working day	Commencement of Practical Examinations	Commencement of End Semester Examinations
1.	B.E. / B.Tech. (Full-Time)	IV, VI, VIII	07.03.2022	11.06.2022**	13.06.2022	22.06.2022
2.	B.E. / B.Tech. (Part-Time)	IV, VI				
3.	B.Arch. (Full-Time)	IV, VI, VIII, X				

#### RE - OPENING DAY FOR THE NEXT SEMESTER: 01.08.2022 (Monday)

#### NOTE:

1. The Theory and Practical Examination schedules will be published in due course (Practical Examinations will be conducted before the theory examinations).
2. If necessary, loss of classes due to various curricular / co-curricular activities of the department / college may be compensated by conducting classes on Saturdays.

\*\* In order to ensure minimum no. of working days, the following Saturdays are declared as working days.

Sl. No.	Working Days (Saturdays)	Time Table of the Week Day to be Followed	Sl. No.	Working Days (Saturdays)	Time Table of the Week Day to be Followed
1.	12.03.2022	Thursday	5.	07.05.2022	Tuesday
2.	26.03.2022	Friday	6.	21.05.2022	Wednesday
3.	09.04.2022	Tuesday	7.	04.06.2022	Thursday
4.	23.04.2022	Monday	8.	11.06.2022	Friday

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DIRECTOR  
ACADEMIC COURSES

**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**

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**CS8493 OPERATING SYSTEMS**

**L T P C**

**3 0 0 3**

**COURSE OBJECTIVES:**

To understand the basic concepts and functions of operating systems.

- To understand Processes and Threads
- To analyze Scheduling algorithms.
- To understand the concept of Deadlocks.
- To analyze various memory management schemes.
- To understand I/O management and File systems.
- To be familiar with the basics of Linux system and Mobile OS like iOS and Android.

**UNIT I OPERATING SYSTEM OVERVIEW**

**7**

Computer System Overview-Basic Elements, Instruction Execution, Interrupts, Memory Hierarchy, Cache Memory, Direct Memory Access, Multiprocessor and Multicore Organization. Operating system overview-objectives and functions, Evolution of Operating System.- Computer System Organization Operating System Structure and Operations- System Calls, System Programs, OS Generation and System Boot..

**UNIT II PROCESS MANAGEMENT**

**11**

Processes - Process Concept, Process Scheduling, Operations on Processes, Inter-process Communication; CPU Scheduling - Scheduling criteria, Scheduling algorithms, Multiple-processor scheduling, Real time scheduling; Threads- Overview, Multithreading models, Threading issues; Process Synchronization - The critical-section problem, Synchronization hardware, Mutex locks, Semaphores, Classic problems of synchronization, Critical regions, Monitors; Deadlock - System model, Deadlock characterization, Methods for handling deadlocks, Deadlock prevention, Deadlock avoidance, Deadlock detection, Recovery from deadlock..

**UNIT III STORAGE MANAGEMENT**

**9**

Main Memory – Background, Swapping, Contiguous Memory Allocation, Paging, Segmentation, Segmentation with paging, 32 and 64 bit architecture Examples; Virtual Memory – Background, 55 Demand Paging, Page Replacement, Allocation, Thrashing; Allocating Kernel Memory, OS Examples.

**UNIT IV FILE SYSTEMS AND I/O SYSTEMS**

**9**

Mass Storage system – Overview of Mass Storage Structure, Disk Structure, Disk Scheduling and Management, swap space management; File-System Interface - File concept, Access methods, Directory Structure, Directory organization, File system mounting, File Sharing and Protection; File System Implementation- File System Structure, Directory implementation, Allocation Methods, Free Space Management, Efficiency and Performance, Recovery; I/O Systems – I/O Hardware, Application I/O interface, Kernel I/O subsystem, Streams, Performance..

  
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## UNIT V CASE STUDY

9 Linux

System - Design Principles, Kernel Modules, Process Management, Scheduling, Memory Management, Input-Output Management, File System, Inter-process Communication; Mobile OS - iOS and Android - Architecture and SDK Framework, Media Layer, Services Layer, Core OS Layer, File System..

**TOTAL : 45 PERIODS**

### COURSE OUTCOMES

After the completion of this course, students will be able to:

CO1: Analyze various scheduling algorithms.

CO2: Understand deadlock, prevention and avoidance algorithms

CO3: Compare and contrast various memory management schemes.

CO4: Understand the functionality of file systems.

CO5: Perform administrative tasks on Linux Servers.

CO6: Compare iOS and Android Operating Systems.

### TEXT BOOKS:

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, "Operating System Concepts", 9 th Edition, John Wiley and Sons Inc., 2012.

### REFERENCES:

1. Ramaz Elmasri, A. Gil Carrick, David Levine, "Operating Systems – A Spiral Approach", Tata McGraw Hill Edition, 2010.
2. Achyut S.Godbole, Atul Kahate, "Operating Systems", McGraw Hill Education, 2016.
3. Andrew S. Tanenbaum, "Modern Operating Systems", Second Edition, Pearson Education, 2004.
4. Gary Nutt, "Operating Systems", Third Edition, Pearson Education, 2004.
5. Harvey M. Deitel, "Operating Systems", Third Edition, Pearson Education, 2004
6. Daniel P Bovet and Marco Cesati, "Understanding the Linux kernel", 3rd edition, O'Reilly, 2005.
7. Neil Smyth, "iPhone iOS 4 Development Essentials – Xcode", Fourth Edition, Payload media, 2011.



Name and Signature of the Faculty Incharge



HoD/CSE



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## DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

### Lecture Schedule

Degree/Program: **B.E CSE**

Duration: **2021-2022 Even**

Course code & Name: **CS8493 & OPERATING SYSTEMS**

Semester: **IV** Section: **A** Faculty : **Mrs.A.Ramya**

#### AIM:

To learn the operating system handles the memory and processes of the computer, as well as all of its software and hardware

#### OBJECTIVES:

To impart knowledge on

- To understand the basic concepts and functions of operating systems.
- To understand Processes and Threads
- To analyze Scheduling algorithms.
- To understand the concept of Deadlocks.
- To analyze various memory management schemes.
- To understand I/O management and File systems.
- To be familiar with the basics of Linux system and Mobile OS like iOS and Android

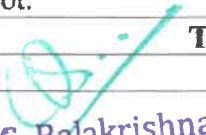
PREREQUISITES: Knowledge in Computer Organization & Architecture

#### COURSE OUTCOMES:


After the course, the student should be able to:

CO	Course Outcomes	POs	PSOs
C405.1	Analyze various scheduling algorithms and process synchronization	1,2,3,4	1,2
C405.2	Explain deadlock prevention and avoidance algorithms.	1,2,3,4	1,2
C405.3	Compare and contrast various memory management schemes.	1,2,3,4	1,2
C405.4	Explain the functionality of file systems, I/O systems, and Virtualization	1,2,3,4	1,2
C405.5	Compare iOS and Android Operating Systems.	1,2,3,4	1,2

S.No	Date	Period	Topics to be Covered	Book & Page. No.
<b>UNIT I OPERATING SYSTEM OVERVIEW</b>				<b>Target periods :07</b>
1	18.03.22	02	Computer System Overview-Basic Elements, Instruction Execution	T1
2	21.03.22	01	Interrupts, Memory Hierarchy, Cache Memory	T1
3	22.03.22	01	Direct Memory Access, Multiprocessor and Multicore Organization	T1
4	23.03.22	03	Operating system overview- objectives and functions	R1
5	25.3.22	06	Evolution of Operating System.- Computer System Organization	R1
6	28.3.22	03	Operating System Structure and Operations. System Calls	R1
7	29.3.22	01	System Programs, OS Generation and System Boot.	R1
<b>UNIT II PROCESS MANAGEMENT</b>				<b>Target periods :11</b>
8	30.3.22	03	Processes - Process Concept, Process Scheduling	T1

  
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9	30.3.22	6	Operations on Processes, Inter-process Communication; CPU Scheduling -	T1
10	4.4.22	3	Scheduling criteria, Scheduling algorithms	T1
11	5.4.22	1	Multiple-processor scheduling, Real time scheduling	
12	6.4.22	3	Threads- Overview, Multithreading models	R1
13	11.4.22	6	Threading issues Process Synchronization	R1
14	12.4.22	3	The critical-section problem, Synchronization hardware	R1
15	13.4.22	1	Mutex locks, Semaphores, Classic problems of synchronization	T1
16	18.4.22	3	Critical regions, Monitors	T1
17	19.4.22	6	Deadlock – System model, Deadlock characterization, Methods for handling deadlocks	T1
18	20.4.22	3	Deadlock prevention, Deadlock avoidance, Deadlock detection, Recovery from deadlock.	
<b>UNIT III STORAGE MANAGEMENT</b>				<b>Target Periods :09</b>
19	25.4.22	1	Main Memory – Background, Swapping, Contiguous Memory Allocation	R1
20	26.4.22	3	Paging, Segmentation,	R1
21	27.4.22	6	Segmentation with paging, 32 and 64 bit architecture	R1
22	2.5.22	3	Virtual Memory – Background	R1
23	3.5.22	1	Demand Paging, Page Replacement	R1
24	4.5.22	3	Allocation	R1
25	9.5.22	6	Thrashing	R1
24	10.5.22	3	Allocating Kernel Memory	T1
25	11.5.22	1	OS Examples.	T1
<b>UNIT IV FILE SYSTEMS AND I/O SYSTEMS</b>				<b>Target Periods :08</b>
26	16.5.22	3	Overview of Mass Storage Structure, Disk Structure,	R1
27	17.5.22	6	Disk Scheduling and Management, swap space management	R1
28	18.5.22	3	File-System Interface - File concept, Access methods	T1
29	23.5.22	1	Directory Structure, Directory organization, File system mounting	T1
30	24.5.22	3	File Sharing and Protection; File System Implementation	T1
31	25.5.22	6	File System Structure, Directory implementation, Allocation Methods	T1
32	30.5.22	3	Free Space Management, Efficiency and Performance, Recovery	T1
33	31.5.22	1	I/O Systems – I/O Hardware, Application I/O interface, Kernel I/O subsystem, Streams, Performance.	T1
<b>UNIT V CASE STUDY</b>				<b>Target Periods:09</b>
34	1.6.22	3	Linux System - Design Principles	T1
35	2.6.22	6	Kernel Modules, Process Management	T1
36	6.6.22	3	Scheduling, Memory Management	T1
37	7.6.22	1	Input-Output Management, File System	T1
38	8.6.22	3	Inter-process Communication; Mobile OS	T1
39	13.6.22	6	iOS and Android - Architecture and SDK Framework	T1
40	14.6.22	3	Media Layer, Services Layer	T1
41	15.6.22	1	Core OS Layer.	T1
42	18.6.22	3	File System	T1
<b>Content Beyond the Syllabus</b>				
43	15.6.22	6	Real world applications of Linux OS	Material

  
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 Manikandam, Trichy-620 012.

## Book Reference - Text Books

Sl.	Title of the Book	Author	Publisher	Year
1.	Operating System Concepts	Abraham Silberschatz, Peter Baer Galvin and Greg Gagne	9th Edition, John Wiley and Sons Inc	2012.
2.	Operating Systems – A Spiral Approach	Ramaz Elmasri, A. Gil Carrick, David Levine	Tata McGraw Hill Edition	2010.

## Website Reference

W1: [www.webopedia.com/TERM/O/operating\\_system.html](http://www.webopedia.com/TERM/O/operating_system.html)

W2: [https://www.tutorialspoint.com/operatingsystem/os\\_overview.htm](https://www.tutorialspoint.com/operatingsystem/os_overview.htm)

W3: [www.dictionary.com/browse/operating--system](http://www.dictionary.com/browse/operating--system)



Signature of the Faculty In-charge



HoD / CSE



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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

## Identification of Curricular Gap & Content Beyond Syllabus(CBS)

Name of the Faculty :A.Ramya

Course Code & Name: CS8493 & OPERATING SYSTEMS

Degree & Program:B.E/CSE

Semester & Section: II / A

Academic Year: 2021 -2022 /EVEN

### I. Mapping of Course Outcomes with POs & PSOs.( before CBS)

Table.1 Mapping of COs, C, PSOs with POs - before CBS.

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C405.1	3	3	2	2	-	-	-	-	-	2	1	1	2	1
C405.2	3	3	2	2	1	-	-	-	-	2	1	1	2	1
C405.3	3	3	2	2	1	-	-	-	-	2	1	1	2	1
C405.4	3	3	2	2	-	-	-	-	-	2	1	1	2	1
C405.5	3	3	2	2	1	-	-	-	-	2	1	1	2	1
C405.6	3	3	2	2	1	-	-	-	-	2	1	1	2	1

### II. Identification of content beyond syllabus.


Table.2 Identification of content beyond syllabus

Details of Content Beyond Syllabus(CBS) added	POs strengthened/ vacant filled	CO/Unit
Android (operating system)	PO5(6) Vacant filled	C405.5 / V

### III. Mapping of Course Outcomes with POs & PSOs. (After CBS)

Table.3 Mapping of COs, C, PSOs with POs- after CBS.

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C405.1	3	3	2	2	-	-	-	-	-	2	1	1	2	1
C405.2	3	3	2	2	1	-	-	-	-	2	1	1	2	1
C405.3	3	3	2	2	1	-	-	-	-	2	1	1	2	1
C405.4	3	3	2	2	-	-	-	-	-	2	1	1	2	1
C405.5	3	3	2	2	1	-	-	-	-	2	1	1	2	1
C405.6	3	3	2	2	*1	-	-	-	-	2	1	1	2	1

  
Signature of the Faculty

  
HoD/CSE

  
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## DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

### Proof of Content Beyond Syllabus

Name of the Faculty :A.Ramya

Course Code & Name: CS8493 & OPERATING SYSTEMS

Degree & Program:B.E& CSE

Semester & Section: II / A

Academic Year: 2021 -2022 /EVEN

### Topic: Android (operating system)

#### Android Architecture

Linux kernel

Libraries

Android runtime

Application Framework

Applications

#### Linux Kernel

The android uses the powerful Linux kernel and it supports a wide range of hardware drivers. The kernel is the heart of the operating system that manages input and output requests from the software. This provides basic system functionalities like process management, memory management, device management like camera, keypad, display, etc the kernel handles all the things.

#### Libraries

The on top of a Linux kernel there is a set of libraries including open-source web browsers such as WebKit, library libc. These libraries are used to play and record audio and video. The SQLite is a database that is useful for the storage and sharing of application data. The SSL libraries are responsible for internet security etc.

#### Android Runtime

The android runtime provides a key component called Dalvik Virtual Machine which is a kind of java virtual machine. It is specially designed and optimized for android. The Dalvik VM is the process virtual machine in the android operating system. It is software that runs apps on android devices.

The Dalvik VM makes use of Linux core features like memory management and multithreading which is in java language. The Dalvik VM enables every Android application to run its own process. The Dalvik VM executes the files in the .dex format.

#### Application Framework

The application framework layer provides many higher-level services to applications such as windows manager, view system, package manager, resource manager, etc. The application developers are allowed to make use of these services in their applications.

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Principal

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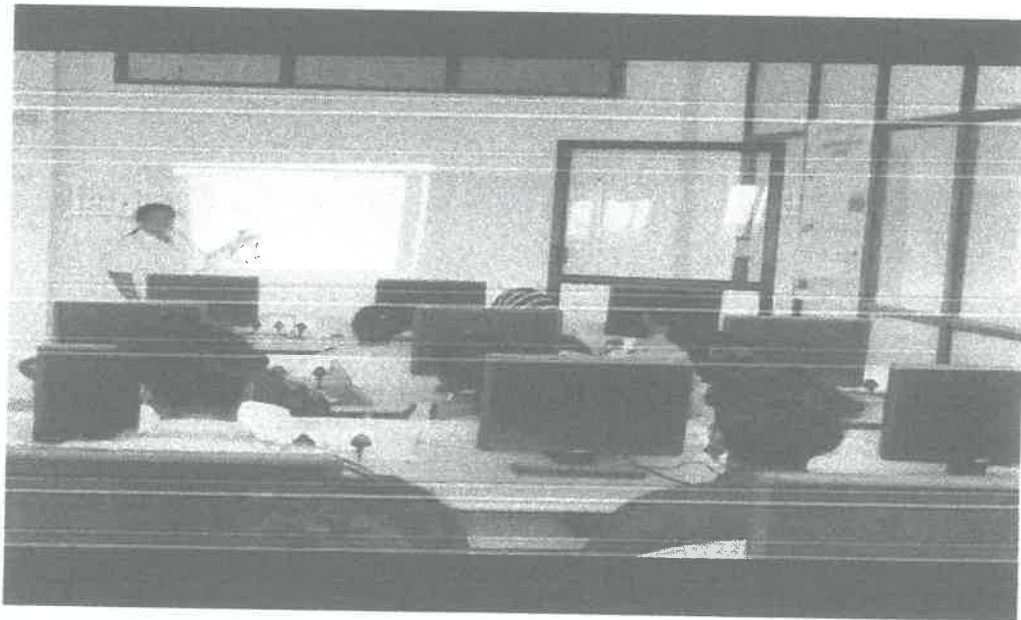
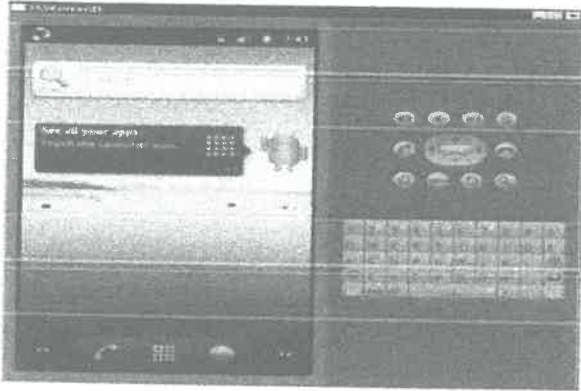
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## Android Emulator

The Emulator is a new application in the Android operating system. The emulator is a new prototype that is used to develop and test android applications without using any physical device.

## Android Emulator



**Android (operating system)**

  
Signature of the Faculty

  
HoD/CSE

  
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## DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

### Assignment Answer Sheet

Name of the Student : Appas A.D

AU Register Number: S11220104004

Assignment – 01			Date of Issue:	11.5.22	Marks	10
Course code	CS8493	Course Title	Operating System			
Year	II	Semester/Section	V/A	Date of Submission:		

Q.No	Questions	CO
1	Explain Operating System Process.	1
2	Explain Operating System Scheduling	2

### Mark Allocation

Rubrics	Marks Allocated	Marks obtained
Content Quality	4	3
Presentation Quality	4	3
Timely submission	2	1
Total marks	10	7



Name and Signature of the Faculty Incharge

[A. LAMY A]



HoD/CSE

  
Dr. G. Balakrishnan, M.E., Ph.D.,  
Principal  
Indra Ganesan College of Engineering  
IG Valley, Madurai Main Road  
Manikandam, Trichy-620 012.



# INDRA GANESAN COLLEGE OF ENGINEERING

IG Valley, Manikandam, Tiruchirappalli, Tamil Nadu – 620 012, India  
(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25)

## IQAC Academic Audit Form

ACADEMIC YEAR: 2021-2022 EVEN / ODD SEMESTER

Name of Department :

Year / Sem / Sec :

No. of Students Registered :

Details of Examination :

IA Test -1 / IA Test -2 / IA Test -3 / Model Test

S.No.	Course Code	List of Reg.No Verified	Course Log Book Verified (Y/N)	Course File Verified (Y/N)	No of students Attended	No of Absentees	No of Failures	Pass %	Remarks
1	MA8402	811220164012	Yes	Yes	30	-	-	85	Good
2	CS8491	811220104024	Yes	Yes	29	1		93	Nicely presented
3	CS8492	81122010403	Yes	Yes	30	0		97	Neatly presented
4	CS8493	811220104043	Yes	Yes	28	2	0	100	Presented well
	CS8495	811220104050	Yes	Yes	30	0		83	Good.
	CS8494	811220104053	Yes	Yes	30	0		86	Well answered

Verified by

External Member Name and Signature:

Internal Member Name and Signature:

Overall Remarks:

Dr. G. Balakrishnan, M.E., Ph.D.,  
Principal

Indra Ganesan College of Engineering  
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Manikandam, Trichy-620 012.

HoD/ CSE

IQAC Co-ordinator

Principal





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## STUDENT FEEDBACK ON FACULTY THEORY COURSE

ACADEMIC YEAR: 2021-22 SEMESTER even.

Name of Department : CSE Year / Sem: II / 4th Faculty Name A. Ramya.  
Subject Code & Name CS8493 - Operating Systems

S.No.	QUESTIONS	Excellent	Very Good	good	Satisfactory	Somewhat Satisfactory	Not Satisfactory
		5	4	3	2	1	0
1.	Delivery of Lectures by Interactive Communication	✓					
2.	Use of Teaching Aids and ICT		✓				
3.	Level of Preparedness & Knowledge Level	✓					
4.	Involvement in mentoring and guiding	✓					
5.	Effective Time management	✓					
6.	Is the teacher completing syllabus as per lecture schedule?		✓				
7.	Is the teacher distributing answer scripts of students as per schedule?		✓				
8.	Is the teacher addressing grievances on answer scripts of IA while distributing?	✓					
9.	Is the teacher covering content beyond syllabus (CBS)?	✓					
10.	Is the teacher punctual to class?	✓					

*D. Jide*  
HoD/ CSE

*neegith*  
IQAC co-ordinator

*[Signature]*  
Principal




**INDRA GANESAN COLLEGE OF ENGINEERING**  
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**DEPARTMENT OF COMPUTER SCIENCE ENGINEERING**

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Internal Assessment Exam-1  
Answer Key

**Part-A**

1. An Operating System (OS) is an interface between a computer user and computer hardware. An operating system is a software that performs all the basic tasks like file management, memory management, process management, handling input and output, and controlling peripheral devices such as disk drives and printers.
- 2 . Batch processing is the method computers use to periodically complete high-volume, repetitive data jobs. Certain data processing tasks, such as backups, filtering, and sorting, can be compute intensive and inefficient to run on individual data transactions.
3. Spooling is the temporary storage of data for usage and execution by a device, program, or system. Data is transmitted to and held in memory or other volatile storage until the software or computer asks for it to be executed. SPOOL stands for Simultaneous Peripheral Operations On-Line.
4. Tightly-coupled software means routines (modules, programs) that work in only one type of system and are dependent upon each other. For example, an operating system depends on its drivers to activate a peripheral device. Such drivers would require extensive programming changes to work in another environment.
5. A system call is a method for a computer program to request a service from the kernel of the operating system on which it is running. A system call is a method of interacting with the operating system via programs..
6. The term "real-time system" refers to any information processing system with hardware and software components that perform real-time application functions and can respond to events within predictable and specific time constraints.
7. There are five types of system calls:
  - Process control.
  - File management.
  - Device management.
  - Information maintenance.
  - Communications.

  
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8. Dual-mode operation forms the basis for I/O protection, memory protection and CPU protection. In dual-mode operation, there are two separate modes: monitor mode (also called 'system mode' and 'kernel mode') and user mode. In monitor mode, the CPU can use all instructions and access all areas of memory.

9 API lets the operating system manage the requests so your software is less likely to affect other software when it crashes. There are many APIs. They simplify system calls, implement cross-platform interface so you can port the app, manage access to secure areas, and do many other useful things.

10. Batch Operating System. ...

Real-Time Operating System. ...

Time-Sharing Operating System. ...

Distributed Operating System. ...

Embedded Operating System. ...

Network Operating System. ...

Mobile Operating System.

### Part-B

11 a. An operating system (OS) is the program that, after being initially loaded into the computer by a boot program, manages all of the other application programs in a computer. The application programs make use of the operating system by making requests for services through a defined application program interface (API).

A computer system is a set of integrated devices that input, output, process, and store data and information. Computer systems are currently built around at least one digital processing device. There are five main hardware components in a computer system: Input, Processing, Storage, Output and Communication devices.

Batch Operating System. ...

Real-Time Operating System. ...


Time-Sharing Operating System. ...

Distributed Operating System. ...

Embedded Operating System. ...

Network Operating System. ...

Mobile Operating System.

  
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11 b. An operating system is a type of software that acts as an interface between the user and the hardware. It is responsible for handling various critical functions of the computer or any other machine. Various tasks



that are handled by OS are file management, task management, garbage management, memory management, process management, disk management, I/O management, peripherals management, etc.

## Generation of Operating System


Below are four generations of operating systems.

The First Generation

The Second Generation

The Third Generation

The Fourth Generation



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### 1. The First Generation (1940 to early 1950s)

In 1940, an operating system was not included in the creation of the first electrical computer. Early computer users had complete control over the device and wrote programs in pure machine language for every task. During the computer generation, a programmer can merely execute and solve basic mathematical calculations. an operating system is not needed for these computations.

### 2. The Second Generation (1955 – 1965)

GMOSIS, the first operating system (OS) was developed in the early 1950s. For the IBM Computer, General Motors has created the operating system. Because it gathers all related jobs into groups or batches and then submits them to the operating system using a punch card to finish all of them, the second-generation operating system was built on a single-stream batch processing system.

### 3. The Third Generation (1965 – 1980)

Because it gathers all similar jobs into groups or batches and then submits them to the second generation operating system using a punch card to finish all jobs in a machine, the second-generation operating system was based on a single stream batch processing system. Control is transferred to the operating system upon each job's completion, whether it be routinely or unexpectedly.

### 4. The Fourth Generation (1980 – Present Day)

The fourth generation of personal computers is the result of these PDPs. The Generation IV (1980–Present)The evolution of the personal computer is linked to the fourth generation of operating systems. Nonetheless, the third-generation minicomputers and the personal computer have many similarities. At that time, minicomputers were only slightly more expensive than personal computers, which were highly expensive.

12a.. The operating system functions like a manager of all the available resources. Therefore operating system is defined as an interface between the system and the user. There are various types of operating systems such as Batch Operating Systems, Multi-programming Operating Systems, distributed operating

systems time-sharing operating systems, real-time operating systems, and distributed operating systems. Each operating system offers different types of features and advantages. The below article covers in detail the Multiprocessing operating system.

A multiprocessing operating system is defined as a type of operating system that makes use of more than one CPU to improve performance. Multiple processors work parallelly in multi-processing operating systems to perform the given task. All the available processors are connected to peripheral devices, computer buses, physical memory, and clocks. The main aim of the multi-processing operating system is to increase the to increase the speed of execution of the system. The use of a multiprocessing operating system improves the overall performance of the system. For example, UNIX, LINUX, and Solaris are the most widely used multi-processing operating system.

**Working of Multi-Processing Operating System** Multi-processing operating system consists of multiple CPUs. Each CPU is connected to the main memory. The task to be performed is divided among all the processors. For faster execution and improved performance, each processor is assigned a specific task. Once all the tasks of each processor are completed they are compiled together in order to produce a single output. The allocation of resources for each processor is handled by the operating system. This process results in better utilization of the available resources and improved performance.

12b. Operating system is a software that acts as an intermediary between the user and computer hardware. It is a program with the help of which we are able to run various applications. It is the one program that is running all the time. Every computer must have an operating system to smoothly execute other programs. The OS coordinates the use of the hardware and application programs for various users. It provides a platform for other application programs to work. The operating system is a set of special programs that run on a computer system that allows it to work properly. It controls input-output devices, execution of programs, managing files, etc.

### Services of Operating System

Program execution

Input Output Operations

Communication between Process

File Management


Memory Management

Process Management

Security and Privacy

Resource Management

User Interface

  
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Networking

Error handling

Time Management

### Part-C

13a. a system call is a programmatic way in which a computer program requests a service from the kernel of the operating system it is executed on. A system call is a way for programs to interact with the operating system. A computer program makes a system call when it makes a request to the operating system's kernel. System call provides the services of the operating system to the user programs via Application Program Interface(API). It provides an interface between a process and an operating system to allow user-level processes to request services of the operating system. System calls are the only entry points into the kernel system. All programs needing resources must use system calls.


A user program can interact with the operating system using a system call. A number of services are requested by the program, and the OS responds by launching a number of systems calls to fulfill the request. A system call can be written in high-level languages like C or Pascal or in assembly language. If a high-level language is used, the operating system may directly invoke system calls, which are predefined functions.

A system call is a mechanism used by programs to request services from the operating system (OS). In simpler terms, it is a way for a program to interact with the underlying system, such as accessing hardware resources or performing privileged operations.

A system call is initiated by the program executing a specific instruction, which triggers a switch to kernel mode, allowing the program to request a service from the OS. The OS then handles the request, performs the necessary operations, and returns the result back to the program.

  
Staff Incharge

  
Hod/CSE

  
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# INDRA GANESAN COLLEGE OF ENGINEERING


IG Valley, Manikandam, Tiruchirappalli, Tamil Nadu – 622 012, India



(Approved by AICTE, New Delhi and affiliated to Anna University, Chennai)

## Internal Assessment Test Answer Book

Name	P. Gayathri			Year/ Semester/Section	II / III
Batch No.	81A220104016	Date/Session	12.10.22. FN	Department	CSE
Course code	C88493	Course Title	operating Systems		
Internal Assessment Test	IAT 1 <input checked="" type="checkbox"/>	IAT 2 <input type="checkbox"/>	IAT 3 <input type="checkbox"/>	Model	<input type="checkbox"/>
Name and Signature of the Invigilator with date	D. Suganya D. S. 2/10/22				

Instruction to the Student: Put tick mark to the question attended in the column against question.

Part A			Part B / Part C				Total Marks
Q. No.	✓	Marks	Q. NO.	✓	a	b	
					Marks	Marks	
1		2	11	✓	7		7
2		1	12				0
3		1	13			✓	8
4		1	14				
5		2	15				
6		2	16				
7		2	Total				15
8		2	20.				 Name and Signature of the Examiner with date
9		1					
10		1					
<b>Total</b>		<b>15</b>	<b>Grand Total</b>				

To be filled by the examiner							
Course Outcomes	1	2	3	4	5	6	Total
Marks allotted	32	18					
Marks Obtained	17	13					
IQAC Audit - Remarks							 Name and Signature of the IQAC member
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24	811220104046	Sumithira R	17	9	26	52
25	811220104048	Swarnambigai V	22	11	33	66
26	811220104050	Thirumavalavan K	20	11	31	62
27	811220104051	Vinith Roshan A	19	8	27	54
28	811220104052	Yuvaraj M	27	13	40	80
29	811220104053	Yuva Sri S	26	12	38	76
30	811220104301	Santhosh Kumar S	28	14	42	84

**MARKS RANGE:**

<20	20-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100
0	0	1	0	6	3	6	7	3

Total No.of Candidates Present	30
Total No.of Candidates Absent	0
Total No.of Students Pass	30
Total No. of Students Fail	0
Percentage of Pass	100%.

  
STAFF INCHARGE

  
HoD/CSE

  
PRINCIPAL

  
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IG VALLEY, MANIKANDAM, TIRUCHIRAPPALLI - 620012  
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING  
ACADEMIC YEAR 2021 - 2022 (EVEN SEMESTER)  
**STUDENTS MARK STATEMENT- CO BASED**

**INTERNAL ASSESSMENT I**

**SUBJECT CODE & TITLE:** CS6493 & operating Systems

**YEAR/SEM:** 2<sup>nd</sup> year / 4<sup>th</sup> Semester

**MONTH & YEAR:**

S.NO	REG NO	STUDENT NAME	CO204.1 (32)	CO204.2 (18)	TOTAL (50)	TOTAL (100)
1	811220104002	Akshaya T	26	10	36	72
2	811220104004	Appas Ali D	25	12	37	74
3	811220104005	Aravindh V K	50	5	20	40
4	811220104007	Ayisha Siddeequa A	30	16	46	92
5	811220104008	Benasir S	28	28	14	84
6	811220104012	Cibina S	14	12	26	52
7	811220104013	Devi K	23	6	29	58
8	811220104014	Divyadharshini A	15	10	25	50
9	811220104015	Divyakeerthan P	29	14	43	86
10	811220104016	Gayathri P	22	8	30	60
11	811220104017	Gnanaprakasam A	25	9	34	68
12	811220104018	Gowrisankar G	20	8	28	56
13	811220104019	Hariharan K	24	11	35	70
14	811220104024	Kamali A	29	14	46	86
15	811220104025	Kamatchi S	26	12	38	76
16	811220104027	Kiruthika M	20	9	29	58
17	811220104029	Mathavan N	21	12	39	78
18	811220104031	Monisha R	26	10	36	72
19	811220104032	Priya P	29	13	42	84
20	811220104033	Priyadharshini G	26	11	37	74
21	811220104039	Sathyapriya N	29	15	44	88
22	811220104041	Sivaranjani M	31	17	48	96
23	811220104043	Sneka R	12	7	19	38

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