Department of Liberal Education
Era University, Lucknow
Course Outline
Effective From: 2023-24

Name of the Program	**B.A. / B.Sc. (LIBERAL EDUCATION)**			**Year/ Semester:**	**3rd / 5th**
Course Name	**Operating System**	**Course Code:**	**CS302**	**Type:**	**Theory**
Credits	**04**			**Total Sessions Hours:**	**60 Hours**
Evaluation Spread	**Internal Continuous Assessment:**	**50 Marks**		**End Term Exam:**	**50 Marks**
Type of Course	○ Compulsory	◉ Core		○ Creative	○ Life Skill
Course Objectives	1. To understand various operating system types, Architecture design of OS and their services. 2. To study process management concepts and various scheduling algorithm. 3. To understand process synchronization concepts and dead lock handling mechanism. 4. To learn various memory management schemes and Disk management techniques.				

Course Outcomes (CO): *After the successful course completion, learners will develop following attributes:*

Course Outcome (CO)	**Attributes**
CO1	Demonstrate understanding of the concepts, structure and design of operating Systems.
CO2	Know different OS types and basic component of OS architecture.
CO3	Demonstrate understanding of operating system design and its impact on application system design and performance.
CO4	Demonstrate competence in recognizing and using operating system features.
Pedagogy	Interactive, discussion-bases, student-centered, presentation.
Internal Evaluation Mode	Mid-term Examination: 20 Marks Activity: 10 Marks Class test: 05 Marks Online Test/Objective Test: 05 Marks Assignments/Presentation: 05 Marks Attendance: 05 Marks

Session Details	**Topic**	**Hours**	**Mapped CO**
Unit 1	**Introduction:** Definition and types of Operating systems, Batch Systems, Multi programming, Time-Sharing, Parallel, Distributed and Real-Time Systems, Operating System Components and Services, Operating System Structure, System Calls, System Programs, Virtual Machines. **Activity:** • Case study of operating systems evolution.	12	CO1

Unit 2	**Process Management:** Process Concept, Process Scheduling, Cooperating Processes, Threads, Interprocess Communication, CPU Scheduling Criteria, Scheduling Algorithms, Multiple-Processor Scheduling, Real-Time Scheduling and Algorithm evaluation. **Activity:** • Evaluation of scheduling algorithms. •	15	CO2
Unit 3	**Process Synchronization and Deadlocks:** The Critical-Section Problem, Synchronization Hardware, Semaphore, Classical Problems of Synchronization, Critical Regions, Monitors, Deadlocks-System Model, Characterization, Deadlock Prevention, Avoidance and Detection, Recovery from Deadlock, Combined approach to Deadlock Handling. **Activity:** • Graphical representation of deadlock state. •	15	CO3
Unit 4	**Memory Management:** Logical and Physical Address Space, Swapping, Contiguous Allocation, Paging, Segmentation with Paging, Virtual Memory, Demand Paging and its performance, Page Replacement Algorithms, Allocation of Frames, Thrashing, Page Size and other considerations, Demand Segmentation. **Disk Management:** Disk Structure, Disk scheduling, Disk management, Recovery, Swap-Space Management, Disk Reliability. **Activity:** • Evaluation of page replacement algorithms.	18	CO4

CO-PO and PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	2	1		1	1	2	2	3	1	2	2	2	2
CO2	2	1	1		2	1	2	1	1	2	1	1	1	2
CO3	1	2	2	1	1	2	1	1	2	2	2	1	2	2
CO4	1	2	1	1	1	1	1	2	2	1	1	2	1	1

Strong contribution-3, Average contribution-2 , Low contribution-1,

Suggested Readings:

Text- Books	1. Abraham Siberschatz and Peter Galvin "Operating System Concepts", Wiley. 2. Milan Milankovic, "Operating Systems, Concept and Design", McGraw Hill.
Reference Books	1. Harvey M Deital, "Operating System", Addison Wesley. 2. Tannenbaum, "Operating System", TMH.
Para Text	**Unit 1:** • https://archive.nptel.ac.in/noc/courses/noc16/SEM2/noc16-cs10/ **Unit 2:** • https://archive.nptel.ac.in/noc/courses/noc21/SEM2/noc21-cs88/ **Unit 3:** • https://nptel.ac.in/courses/106106144 **Unit4:** • https://nptel.ac.in/courses/106105214 •

Recapitulation & Examination Pattern		
Internal Continuous Assessment:		
Component	**Marks**	**Pattern**
Mid Semester	20	**Section A:** Contains **10** MCQs/Fill in the blanks/One Word Answer/ True-False type of questions. Each question carries **0.5 Marks.** **Section B:** Contains **07** descriptive questions out of which **05** questions are to be attempted. Each question carries **03 Marks**.
Activity	10	Will be decided by subject teacher
Class Test	05	Contains **05 descriptive questions.** Each question carries **01** Mark.
Online Test/ Objective Test	05	Contains **10 multiple choice questions.** Each question carries **0.5** Marks.
Assignment/ Presentation	05	Assignment to be made on topics and instruction given by subject teacher
Attendance	05	As per policy
Total Marks	**50**	

Course created by: Dr. Mohd Haleem

Signature:

Approved by: Prof. Mansaf Alam

Signature: