

| DEPARTMENT OF COMPUTER SCIENCE | | | | CLASS: II B.Sc. Computer Science | | | | |
|--------------------------------|-------------|-------------|------------------|----------------------------------|--------------------|-----|-----|-------|
| Sem | Course Type | Course Code | Course Title | Credits | Contact Hours/week | CIA | Ext | Total |
| III | Core-5 | 20U3DMC5 | Operating system | 5 | 5 | 25 | 75 | 100 |

| Nature of Course | | | |
|---------------------|---|--|---------------------------|
| Knowledge and skill | ✓ | | Employability oriented |
| Skill oriented | | | Entrepreneurship oriented |

COURSE OBJECTIVES :

This course is designed

- To familiarize with basic knowledge of computer operating Systems
- To learn about its Structure, functions and resource management.

| Units | Operating Systems | Total Hours: 75 | K-Level |
|-------|--|-----------------|----------|
| Unit1 | Introduction - History of operating system- Different kinds of operating system – Operating system concepts - System calls-Operating system structure. | 15 hrs | Up to K2 |
| Unit2 | Processes and Threads: Processes - threads - thread model and usage - inter process communication. | 15 hrs | Up to K3 |
| Unit3 | Scheduling - Memory Management: Memory Abstraction - Virtual Memory - Page replacement algorithms. | 15 hrs | Up to K3 |
| Unit4 | Deadlocks: Resources- introduction to deadlocks - deadlock detection and recovery - deadlocks avoidance - deadlock prevention. Multiple processor system: multiprocessors - multi computers. | 15 hrs | Up to K3 |
| Unit5 | Input / Output: principles of I/O hardware - principles of I/O software. Files systems: Files - directories - files systems implementation - File System Management and Optimization. | 15 hrs | Up to K4 |

Books for Study:

1. Andrew S. Tanenbaum, "Modern Operating Systems", 2nd Edition, PHI private Limited, New Delhi, 2008.

Books for Reference :

1. William Stallings, "Operating Systems - Internals & Design Principles", 5th Edition, Prentice - Hall of India private Ltd, New Delhi, 2004.
2. Sridhar Vaidyanathan, "Operating System", 1st Edition, Vijay Nicole Publications, 2014.

Web resources:

1. <http://williamstallings.com/Extras/OS-Notes/notes.html>
2. https://www.tutorialspoint.com/operating_system/operating_system_tutorial.pdf
3. <https://lecturenotes.in/subject/56/operating-systems-os>

Rationale for Nature of the course:

In the recent days learning operating systems is essential to know the working functions of computers, to become a computer programmer and to ensure the designed programs that work to the strengths of a particular operating system. The theoretical knowledge helps to understand the concepts and working functions of an operating systems.

Activities having direct bearing on Skill development / Employability /Entrepreneurship

- Seminar
- Assignment preparation
- Presentation with ICT tools □ Physical demonstrations.

Pedagogy:

The teaching methods includes Chalk and talk, PowerPoint, demonstrations, assignments and group discussions.

Lecture schedule:

| Unit | Topics | Hrs | Mode |
|----------|---|-----|--|
| Unit I | Introduction - History of operating system | 3 | Chalk and talk, Quiz and assignment |
| | Different kinds of operating system – | 4 | |
| | Operating system concepts - System calls | 4 | |
| | Operating system structure. | 4 | |
| Unit II | Processes - threads - | 5 | Chalk and talk, Group discussion |
| | thread model and usage | 5 | |
| | - inter process communication. | 5 | |
| Unit III | Scheduling | 5 | Chalk and talk, Quiz and assignment |
| | Memory Management: Memory Abstraction | 5 | |
| | Virtual Memory - Page replacement algorithms. | 5 | |
| Unit IV | Deadlocks: Resources- introduction to deadlocks | 3 | PPT, Chalk and talk, Quiz and assignment |
| | deadlock detection and recovery | 5 | |
| | deadlocks avoidance - deadlock prevention | 4 | |
| | Multiple processor system: multiprocessors - multi computers. | 3 | |
| Unit V | Input / Output: principles of I/O hardware - principles of I/O software | 5 | PPT, Chalk and talk, Quiz and assignment |
| | Files systems: Files - directories - files systems implementation | 5 | |
| | File System Management and Optimization. | 5 | |

Learning Outcome Based Education & Assessment (LOBE)
Blue Print – Operating systems
Articulation Mapping – K Levels with Courses Learning Outcomes (CLOs)
BLUE PRINT FOR INTERNAL ASSESSMENT – I

| S. No. | CLOs | K-Level | Section A | | Section B | | Section C (Either / or Choice) | Section D (Open Choice) |
|---------------------------------|-------|-----------|---------------------|---------|---------------------|-------------|--------------------------------------|-------------------------------|
| | | | MCQs | | Short Answers | | | |
| | | | No. of Questions | K-Level | No. of Questions | K- Level | | |
| 1. | CLO 1 | Up to K 2 | 2 | K1 & K2 | 1 | K1 | 2 (K1&K1) | 1(K2) |
| 2. | CLO 2 | Up to K 3 | 2 | K1 & K2 | 1 | K2 | 2 (K2&K2) | 1(K3) |
| No. of Questions to be asked | | | 4 | | 3 | | 4 | 3 |
| No. of Questions to be answered | | | 4 | | 3 | | 2 | 2 |
| Marks for each Question | | | 1 | | 2 | | 5 | 10 |
| Total Marks for each Section | | | 4 | | 6 | | 10 | 30 |

BLUE PRINT FOR INTERNAL ASSESSMENT – II

| S. No. | CLOs | K-Level | Section A | | Section B | | Section C (Either / or Choice) | Section D (Open Choice) |
|---------------------------------|-------|-----------|---------------------|---------|---------------------|-------------|--------------------------------------|-------------------------------|
| | | | MCQs | | Short Answers | | | |
| | | | No. of Questions | K-Level | No. of Questions | K- Level | | |
| 1. | CLO 3 | Up to K 4 | 2 | K1 & K2 | 1 | K2 | 2 | 1(K4) |
| 2. | CLO 4 | Up to K 3 | 2 | K1 & K2 | 1 | K1 | 2 | 1(K3) |
| No. of Questions to be asked | | | 4 | | 3 | | 4 | 3 |
| No. of Questions to be answered | | | 4 | | 3 | | 2 | 2 |
| Marks for each Question | | | 1 | | 2 | | 5 | 10 |
| Total Marks for each Section | | | 4 | | 6 | | 10 | 30 |

Learning Outcome Based Education & Assessment (LOBE)

Blue Print – Operating systems

Articulation Mapping – K Levels with Courses Learning Outcomes (CLOs)

| S. No. | CLOs | K-Level | Section A | | Section B | | Section C (Either / or Choice) | Section D (Open Choice) |
|---------------------------------|-------|-----------|---------------------|---------|---------------------|-------------|--------------------------------------|-------------------------------|
| | | | MCQs | | Short Answers | | | |
| | | | No. of Questions | K-Level | No. of Questions | K- Level | | |
| 1 | CLO 1 | Up to K-2 | 2 | K1 & K2 | 1 | K1 | 2 (K1&K1) | 1(K2) |
| 2 | CLO 2 | Up to K-3 | 2 | K1 & K2 | 1 | K2 | 2 (K2&K2) | 1(K3) |
| 3 | CLO 3 | Up to K-3 | 2 | K1 & K2 | 1 | K2 | 2 (K3&K3) | 1(K4) |
| 4 | CLO 4 | Up to K-3 | 2 | K1 & K2 | 1 | K1 | 2 (K3&K3) | 1(K3) |
| 5 | CLO 5 | Up to K-4 | 2 | K1 & K2 | 1 | K2 | 2 (K4&K4) | 1(K3) |
| No. of Questions to be asked | | | 10 | | 5 | | 10 | 5 |
| No. of Questions to be answered | | | 10 | | 5 | | 5 | 3 |
| Marks for each Question | | | 1 | | 2 | | 5 | 10 |
| Total Marks for each Section | | | 10 | | 10 | | 25 | 30 |

Distribution of Section-wise Marks with K Levels

| K Levels | Section A (No Choice) | Section B (No Choice) | Section C (Either/or) | Section D (Open Choice) | Total Marks | % of Marks without choice | Consolidated |
|----------------|-----------------------------|-----------------------------|--------------------------|-------------------------------|----------------|------------------------------------|--------------|
| K1 | 5 | 4 | 10 | - | 19 | 15.83 | 42% |
| K2 | 5 | 6 | 10 | 10 | 31 | 25.83 | |
| K3 | - | - | 20 | 30 | 50 | 41.67 | 42% |
| K4 | - | - | 10 | 10 | 20 | 16.67 | 16% |
| Total Marks | 10 | 10 | 50 | 50 | 120 | 100.00 | 100% |

Distribution of Unit-wise questions with K Levels

| Section A | Section B | Section C | Section D |
|--|---|--------------------------------------|-------------------------------------|
| 2 Questions for each Unit (K1 & K2 Level) | 1 Question from each Unit (K1 & K2 Level) | 2 Questions from Unit-I (K1 Level) | 1 Question from Unit-I (K2 Level) |
| | | 2 Questions from Unit-II (K3 Level) | 1 Question from Unit-II (K3 Level) |
| | | 2 Questions from Unit-III (K3 Level) | 1 Question from Unit-III (K4 Level) |
| | | 2 Questions from Unit-IV (K2 Level) | 1 Question from Unit-IV (K3 Level) |
| | | 2 Questions from Unit-V (K4 Level) | 1 Question from Unit-V (K3 Level) |

K1 – Remembering and recalling facts with specific answers

K2 – Basic understanding of facts and stating main ideas with general answers

K3 – Application oriented – Solving Problems

K4 – Examining, analyzing, presentation and make interferences with evidences

COURSE OUTCOMES:

On the completion of the course the students will be able to

| CLOs | COURSE OUTCOME | Knowledge Level (basis of Bloom's Taxonomy) |
|------|---|---|
| CO-1 | Understand the basic structures of Modern operating system and its functions and applications. | Up to K2 |
| CO-2 | Understand the concepts of Multi-process ,multiprogramming, threads and scheduling methods | Up to K3 |
| CO-3 | Acquire the knowledge of synchronization, dead lock and prevention methods. | Up to K3 |
| CO-4 | Demonstrate the design and management concepts of main memory, virtual memory along with issues and challenges. | Up to K4 |
| CO-5 | Understand the various types of I/O management and resource management techniques. | Up to K3 |

MAPPING OF COs WITH PSOs:

| Course Outcomes | PSO 1 (Knowledge Base) | PSO 2 (Problem Analysis & Investigation) | PSO 3 (Communication Skills & Design) | PSO 4 (Individual and Team Work) | PSO 5 (Professionalism Ethics and equity) | PSO 6 (Life Long Learning) |
|-----------------|---------------------------|---|--|-------------------------------------|---|-------------------------------|
| CO-1 | 3 | 1 | 1 | 2 | 1 | 1 |
| CO-2 | 2 | 3 | 2 | 1 | 1 | 1 |
| CO-3 | 2 | 3 | 1 | 1 | 1 | 2 |
| CO-4 | 3 | 2 | 2 | 1 | 2 | 1 |
| CO-5 | 2 | 2 | 2 | 3 | 2 | 1 |

3- Advanced Application

2- Intermediate

1- Introductory

Course Designer(s):

1. Er.J.Rajendran

2. Prof.J.Mayajothi