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Description generated with very high confidenceCOURSE PLAN**

|  |  |  |  |
| --- | --- | --- | --- |
| **Department :** | **Information aand Communication Technology** | | |
| **Course Name & code :** | **Operating Systems** | | **ICT 2258** |
| **Semester & branch :** | **IV sem** | **IT** | |
| **Name of the faculty :** | **Dr.Manjula Shenoy K, Dr. Sivakumar V, Mrs Anuradha Rao** | | |
| |  |  |  |  | | --- | --- | --- | --- | | **L** | **T** | **P** | **C** | | **3** | **1** | **0** | **4** |   **No of contact hours/week:** | | | |

**COURSE OUTCOMES (COS)**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **At the end of this course, the student should be able to:** | | |  | | --- | | **No. of**  **Contact**  **Hours** | | |  | | --- | | **Marks** | | **Program Outcomes (POs)** | **PSO** | **BL (Recommended)** |
| **CO1** | Articulate the functionalities of general operating system. | 9 | 10 | 1,2,3 | 1,2,3 | 3 |
| **CO2** | Apply the knowledge of Process management to solve synchronization problems. | 17 | 40 | 1,2,3 | 1,2,3 | 3 |
| **CO3** | Illustrate memory management techniques of an Operating System | 16 | 38 | 1,2,3 | 1,2,3 | 3 |
| **CO4** | Apply the knowledge of Scheduling in disk and process management | 6 | 12 | 1,2,3 | 1,2,3 | 3 |
| **CO5** |  |  |  |  |  |  |
|  | **Total** | **48** | **100** |  |  |  |

\*\*\* **COURSE LEARNING OUTCOMES (CLOS)**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **At the end of this course, the student should be able to:** | | |  | | --- | | **No. of Contact Hours** | | |  | | --- | | **Marks** | | **Program Outcomes(POs)** | **Learning Outcomes (LOs)** | **BL (Recommended)** |
| **CLO1** | Articulate the functionalities of general operating system. | 9 | 10 | 1,2,3 | **1,2,3** | 3 |
| **CLO2** | Apply the knowledge of Process management to solve synchronization problems. | 17 | 40 | 1,2,3 | **1,2,3** | 3 |
| **CLO3** | Illustrate memory management techniques of an Operating System | 16 | 38 | 1,2,3 | **1,2,3** | 3 |
| **CLO4** | Apply the knowledge of Scheduling in disk and process management | 6 | 12 | 1,2,3 | **1,2,3** | 3 |
|  |  |  |  |  |  |  |
|  | **Total** | **48** | **100** | **1,2,3** | **1,2,3** | **1,2,3** |

**\*\*\* Applicable to programs applied for IET accreditation only.**

**Assessment Plan**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***IN – SEMESTER ASSESSMENTS*** | | | | | | | | | |
| **S. No.** | **Assessment Mode** | | **Assessment Method** | **Time Duration** | **Marks** | **Weightage** | **Typology of Questions (Recommended)** | **Schedule** | **\*\*Topics Covered** |
| 1 | **MISAC** | **1** | **Surprise Assignment** | **20 Mins** | **5** | 1 Question × 5M = 5 marks  (Minimum 5 questions to be given) | Bloom’s taxonomy (B) level of the question should be L3 and above. | Febraury 13th to 16th , 2023 | Introducton to OS  Operating System Structures, Distributed systems,System calls etc  Computing environments  Process concepts: Process states, Process control block  Scheduling queues, Schedulers, Context switch  Process scheduling: Basic concepts, Scheduling criteria  scheduling algorithms FCFS and SJF |
| **2** | **Quiz** | **15 Mins** | **5** | 10 MCQs × ½ = 5 | Bloom’s taxonomy (BT) level of the question should be L3 and above. | Febraury 27th to March 4th 2023 | Introducton to OS  Operating System Structures, Distributed systems,System calls etc  Computing environments  Process concepts: Process states, Process control block  Scheduling queues, Schedulers, Context switch  Process scheduling: Basic concepts, Scheduling criteria  All scheduling algorithms, Multi-threaded programming overview, Multithreading models |
| **3** | **In-semester Exam 1** | **60 Mins** | **15** | **Objective:** 5M  10 MCQs × ½ = 5 marks  **Descriptive:** 10 M  (2 Questions of 2 marks +2 Questions of 3 marks) | Bloom’s taxonomy (BT) level of the question should be L3 and above. | March 10th to 13th 2023 | Introducton to OS  Operating System Structures, Distributed systems,System calls etc  Computing environments  Process concepts: Process states, Process control block  Scheduling queues, Schedulers, Context switch  Process scheduling: Basic concepts, Scheduling criteria  All scheduling algorithms, Multi-threaded programming overview, Multithreading models,thread issues,local storage,process syncronization upto Dekkers algorithm. |
| **4** | **In-semester Exam 2** | **60 Mins** | **15** | **Objective:** 5M  10 MCQs × ½ = 5 marks  **Descriptive:** 10 M  (2 Questions of 2 marks +2 Questions of 3 marks) | Bloom’s taxonomy (BT) level of the question should be L3 and above. | April 18th to 20th 2023 | Process synchronization,deadlock,memory management upto paging |
|  |  |  |  |  |  |  |  |  |  |
| 2 | **FISAC** | **1** | **Surprise Assignment** | **20 Mins** | **5** | 1 Question × 5M = 5 marks  (Minimum 5 questions to be given) | Bloom’s taxonomy (BT) level of the question should be L3 and above. | March 27th to Apri 1st 2023 | Process synchronization and deadlock avoidance bankers algo. |
| **2** | **Quiz** | **15 Mins** | **5** | 10 MCQs × ½ = 5 | Bloom’s taxonomy (BT) level of the question should be L3 and above. | May 2nd to 8th 2023 |  |
| ***END – SEMESTER ASSESSMENT*** | | | | | | | | | |
| 1 | **Regular/Make–Up Exam** | | | 180 Mins | 50 | Answer all 5 full questions of 10 marks each. Each question can have 3 parts of 2/3/4/5/6 marks. | Bloom’s taxonomy (BT) level of the question should be L3 and above. | 17th week of the semester | Comprehensive examination covering full syllabus. |

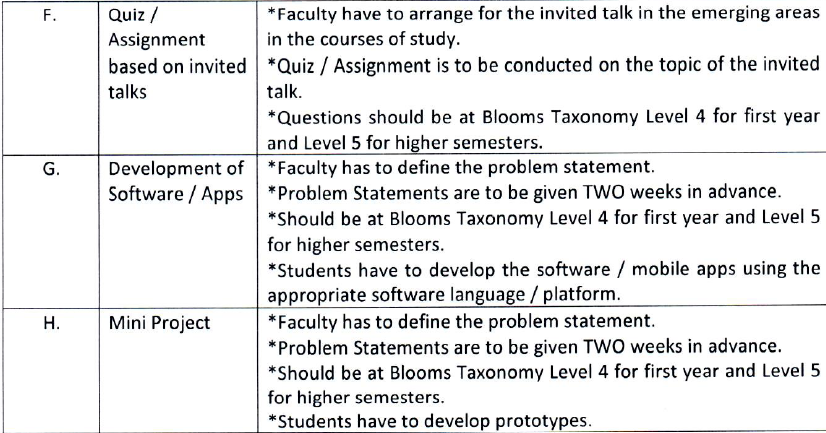
***\*\* Individual faculty will be entering the topics***

***\*\*\* Individual faculty must identify the assessment method from table 3 and fill in the details.***

***NOTE: Information provided in the table is as per the In-semester assessment plan and schedule of V and VII semester B. Tech provided from Academic Section.***

**Flexible In-semester Assessment Component (FISAC):**

1. The FISAC 1 & FISAC 2 may be any of the types given in Table 1. However, tne two components should be of different type.
2. The type of assessment should be informed to the students well in advance.
3. Syllabus for the last component of In-semester Assessment (ISAC) i.e. FISAC 2 should cover the topics mentioned for self-study if any / topics which are not covered till MISAC 4: In-Semester Exam 2.

**Table 1: Flexible In-semester Assessment Component (FISAC)**

**LESSON PLAN**

|  |  |  |  |
| --- | --- | --- | --- |
| **L No** | **TOPICS** | |  | | --- | | **Course Outcome Addressed** | |
| 1 | Introducton to OS | CO1 |
| 2 | Operating System Structures, Distributed systems,System calls etc | CO1 |
| 3 | Computing environments | CO1 |
| 4 | Process concepts: Process states, Process control block | CO2 |
| 5 | Scheduling queues, Schedulers, Context switch | CO2 |
| 6 | Process scheduling: Basic concepts, Scheduling criteria | CO4 |
| 7 | scheduling algorithms | CO4 |
| 8 | scheduling algorithms((T) | CO4 |
| 9 | Tutorials on scheduling algorithms(T) | CO4 |
| 10 | Multi-threaded programming overview, Multithreading models, Threading issues | CO2 |
| 11 | The Critical section problem | CO2 |
| 12 | Classic problems of synchronization | CO2 |
| 13 | Synchronization hardware | CO2 |
| 14 | Semaphores | CO2 |
| 15 | Monitors | CO2 |
| 16 | Tutorial on sychronization problems | CO2 |
| 17 | Deadlock characterization | CO2 |
| 18 | Methods for handling deadlocks | CO2 |
| 19 | Deadlock prevention | CO2 |
| 20 | Deadlock avoidance | CO2 |
| 21 | Deadlock Detection | CO2 |
| 22 | Deadlock Prevention | CO2 |
| 23 | Algoithms of dead locks(T) | CO2 |
| 24 | Tutoial | CO2 |
| 25 | Swapping, | CO3 |
| 26 | Contiguous memory allocation. | CO3 |
| 27 | Paging, Structure of the page table | CO3 |
| 28 | Segmentation. | CO3 |
| 29 | Summary | CO3 |
| 30 | Tutorial | CO3 |
| 31 | Demand paging | CO3 |
| 32 | copy on write | CO3 |
| 33 | page replacement | CO3 |
| 34 | allocation of frames | CO3 |
| 35 | Thrashing | CO3 |
| 36 | Summary | CO3 |
| 37 | Tutorial | CO3 |
| 38 | File concept, Access methods | CO3 |
| 39 | directory structure, file system structure, directory implementation | CO3 |
| 40 | Allocation methods, free space management | CO3 |
| 41 | Disk structure, and disk-scheduling | CO4 |
| 42 | Tutorial | CO4 |
| 43 | Characteristics of Real time operating systems | CO1 |
| 44 | Classification of real time systems | CO1 |
| 45 | Micro kernels and RTOS, Scheduling in RTOS | CO1 |
| 46 | Rate monotonic scheduling, EDF, Priority inversion | CO1 |
| 47 | Design principles, Kernel modules | CO1 |
| 48 | Process management, Memory management | CO1 |

**Course Articulation Matrix**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CO** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO 9** | **PO 10** | **PO 11** | **PO 12** | **PSO1** | **PSO2** | **PSO3** |
| **CO1** | **3** | **1** | **2** |  |  |  |  |  |  |  |  |  | **3** | **3** | **3** |
| **CO2** | **1** | **2** | **3** |  |  |  |  |  |  |  |  |  | **2** | **2** | **2** |
| **CO3** | **1** | **2** | **3** |  |  |  |  |  |  |  |  |  | **2** | **2** | **2** |
| **CO4** | **1** | **2** | **3** |  |  |  |  |  |  |  |  |  | **2** | **2** | **2** |
| **CO5** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Articulation Level** | **1.5** | **1.7** | **2.7** |  |  |  |  |  |  |  |  |  | **2.2** | **2.2** | **2.2** |

**FACULTY MEMBERS TEACHING THE COURSE (IF MULTIPLE SECTIONS EXIST):**

|  |  |  |  |
| --- | --- | --- | --- |
| **FACULTY** | **SECTION** | **FACULTY** | **SECTION** |
| **Dr. Manjula Shenoy K** | **A** |  |  |
| **Mrs Anuradha Rao** | **B** |  |  |
| **Dr. Sivakumar V** | **C** |  |  |

**References:**

1. Silberschatz A., Galvin P.B. & Gagne G*., Operating System Concepts (9e),* Wiley, 2012*.*
2. Stallings W., *Operating Systems: Internals and Design Principles (9e),* Pearson, 2017*.*
3. Laplante P.A. & Ovaska S.J., *Real time systems design and analysis (4e),* Wiley, 2013*.*
4. Mall R., *Real time systems: Theory and Practice (2e),* Pearson, 2009.

**Submitted by: Dr. Manjula Shenoy K**

**(Signature of the faculty)**

**Date:**

**Approved by:**

**(Signature of HOD)**