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|  | **Daffodil International University**  **Department of Computer Science and Engineering (CSE)**  **Course Outline** | | | | | |  |
| **Course Code:** | CSE 323 | | | | | | |
| **Course Title:** | Operating Systems | | | | | | |
| **Program:** | B.Sc. in CSE | | | | | | |
| **Faculty:** | Faculty of Science and Information Technology (FSIT) | | | | | | |
| **Semester:** | Spring | | **Year:** | | 2020 | | |
| **Credit:** | 3.00 | | **Course Hour:** | | 3.00 | | |
| **Course Level:** | L3T2 | | **Prerequisite:** | | CSE 213, CSE 231 | | |
| **Course Category:** | Core Engineering | | | | | | |
| **Instructor Name:** | Subhenur Latif | | | | | | |
| **Designation:** | Assistant Professor | | | | | | |
| **Email:** | snlatif@daffodilvarsity.edu.bd | | | | | | |
| **Office Address:** | Room-409, CSE Building, DIU | | | | | | |
| **Class Hours:** | **Section** | **Class Day** | | **Class Hours** | | **Classroom** | |
|  |  | |  | |  | |
|  | |  | |  | |
| **Google Classroom Code:** |  | | | | | | |

1. **Course Rationale**

Operating systems are central to computing activities. An operating system is a program that acts as an intermediary between a user of a computer and the computer hardware. Two primary aims of an operating system are to manage resources (e.g. CPU time, memory) and to control users and software. Operating system design goals are often contradictory and vary depending of user, software, and hardware criteria. This course describes the fundamental concepts behind operating systems, and examines the ways that design goals can be achieved.

* 1. **Course Objective**

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| 1. To learn the fundamentals of Operating Systems.  2. To learn the mechanisms of OS to handle processes and threads and their communication  3. To learn the mechanisms involved in memory management in contemporary OS  4. To gain knowledge on distributed operating system concepts that includes architecture, mutual exclusion algorithms, deadlock detection algorithms and agreement protocols  5. To know the components and management aspects of concurrency management  6. To learn programmatically to implement simple OS mechanisms. |

* 1. **Course Outcomes (CO’s)**

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| --- | --- |
| **CO1** | Able to analyze the structure of OS and basic architectural components involved in OS design. |
| **CO2** | Able to analyze and design the applications to run in parallel either using process or thread models of different OS. |
| **CO3** | Able to analyze the various device and resource management techniques for timesharing and distributed systems. |
| **CO4** | Able to identify the Mutual exclusion, Deadlock situation and agreement protocols of Distributed operating system |
| **CO5** | Able to analyze different storage management systems adopted in OS. |

* 1. **Program Outcomes (PO’s)**

Program Outcomes are reported in Appendix-I.

* 1. **CO-PO Mapping [attainment level used for COs from 1(weak)-3(strong) correlation]**

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| PO’s  CO’s | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| CO1 |  | 2 |  | 1 |  |  |  |  |  |  |  |  |
| CO2 |  | 3 | 2 | 1 |  |  |  |  |  |  |  |  |
| CO3 |  | 2 |  | 3 |  |  |  |  |  |  |  |  |
| CO4 |  | 3 | 3 | 3 |  |  |  |  |  |  |  |  |
| CO5 | 2 | 1 | 1 | 2 |  |  |  |  |  |  |  |  |

* 1. **CO Assessment Scheme**

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| --- | --- | --- | --- | --- | --- | --- |
| **Assessment Task** | **CO’s** | | | | | **Mark**  **(Total=100)** |
| **CO1** | **CO2** | **CO3** | **CO4** | **CO5** |
| Attendance | -- | -- | -- | -- | -- | 7 |
| Class Test (CT1, CT2, CT3) | -- | -- | -- | -- | -- | 15 |
| Assignment | -- | -- | -- | -- | -- | 5 |
| Presentation | -- | -- | -- | -- | -- | 8 |
| Midterm Examination | 5 | 8.5 | 8.5 | 3 | 0 | 25 |
| Semester Final Examination | 5 | 5 | 5 | 12.5 | 12.5 | 40 |
| Total Mark | 13 | 13.5 | 13.5 | 12.5 | 12.5 | 100 |

# **Strategies and approaches to learning**

# **Teaching and Learning Activities (TLA)**

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| --- | --- |
| **TLA1** | Lectures twice a week using multimedia of different topics. |
| **TLA2** | Active discussion in class regarding efficient solving of the logical and mathematical problems. |
| **TLA3** | Group discussion and presentation regarding diverse problems and corresponding lectures. |
| **TLA4** | Evaluation of class performances to reach each student in a class for every topic. |

1. **Course Schedule and Structure**
   1. **Textbook**

**Operating System Concepts, 9th edition by Silberschatz, Galvin, Gagne**

* 1. **Reference Books**

**Modern Operating Systems (Latest Edition): Andrew S. Tanenbaum**

* 1. **Course Plan/Lesson Plan**

| **Week** | **Lesson.** | **Topic** | **Teaching and Learning Activities (TLAi)** | **Textbook & Video Reference** | **Related CO’s** |
| --- | --- | --- | --- | --- | --- |
| 1 | Les. 1 | Introduction to operating  system | **TLA1** | **(Silberschatz: ch 1)** | CO1 |
| Les. 2 | operating system   |  | | --- | | structures | | **TLA1**  **TLA2**  **TLA3** | **(Silberschatz: ch 1)** | CO1 |
| 2 | Les. 3 | Services, user interface | **TLA1**  **TLA1** | **(Silberschatz: ch 2)** | CO1  CO2 |
| Les. 4 | System calls | **TLA1**  **TLA1** | **(Silberschatz: ch 2)** | CO1  CO2 |
| 3 |  | (Class Test – 1, Assignment – 1) | | |  |
| Les. 5 | Process scheduling | **TLA1**  **TLA2** | **(Silberschatz: ch 3)** | CO3 |
| Les. 6 | |  | | --- | | Operations on processes | | **TLA1**  **TLA2** | **(Silberschatz: ch 3)** | **CO1** |
| 4 | Les. 7 | IPC | **TLA1**  **TLA2** | **(Silberschatz: ch 3)** | **CO1, CO6** |
| Les. 8 | Threading | **TLA1**  **TLA2** | **(Silberschatz: ch 4)** | **CO1** |
| 5 |  | (Class Test – 2) | | |  |
| Les. 9 | Scheduling Criteria | **TLA1**  **TLA2** | **(Silberschatz: ch 6)** | CO3 |
|  | Les. 10 | Scheduling algorithms | **TLA1**  **TLA2**  **TLA4** | **(Silberschatz: ch 6)** | CO3 |
| 6 | Les. 11 | Deadlock characterization | **TLA3** | **(Silberschatz: ch 7)** | CO3, **CO4** |
| Les. 12 | Methods for handling deadlocks | **TLA4** | **(Silberschatz: ch 7)** | CO3, **CO4** |
| (MID–TERM EXAM) | | | | | |
| 7 | Les. 13 | Deadlock prevention | **TLA2** | **(Silberschatz: ch 7)** | **CO4** |
| Les. 14 | Deadlock avoidance | **TLA2**  **TLA3** | **(Silberschatz: ch 7)** | **CO3,** **CO4** |
| 8 | Les. 15 | Deadlock detection | **TLA3** | **(Silberschatz: ch 7)** | **CO4** |
| Les. 16 | Deadlock avoidance algorithm | **TLA4** | **(Silberschatz: ch 7)** | **CO4** |
| 9 | Les. 17 | Memory management strategy | **TLA2** | **(Silberschatz: ch 8)** | **CO3,** **CO5** |
| Les. 18 | Swapping, paging, segmentation | **TLA2** | **(Silberschatz: ch 8)** | **CO5** |
| 10 |  | (Class Test-3, Assignment – 2) | | |  |
| Les. 19 | |  | | --- | | Virtual memory management | | **TLA2** | **(Silberschatz: ch 8)** | **CO5** |
| Les. 20 | Demand paging | **TLA2**  **TLA3** | **(Silberschatz: ch 9)** | **CO3** |
| 11 | Les. 21 | Page replacement | **TLA4** | **(Silberschatz: ch 9)** | CO3 |
| Les. 22 | Disk structure | **TLA1**  **TLA2** | **(Silberschatz: ch 10)** | **CO1** |
| 12 | Les. 23 | Disk scheduling | **TLA4** | **(Silberschatz: ch 10)** | CO3 |
| Les. 24 | RAID structure | **TLA2** | **(Silberschatz: ch 10)** | **CO1** |
| (FINAL EXAM) | | | | | |

1. **Assessment Methods**

* 1. **Grading System**

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| **Numerical Grade** | **Letter Grade** | **Grade Point** |
| 80-100 | A+ | 4.00 |
| 75-79 | A | 3.75 |
| 70-74 | A- | 3.50 |
| 65-69 | B+ | 3.25 |
| 60-64 | B | 3.00 |
| 55-59 | B- | 2.75 |
| 50-54 | C+ | 2.50 |
| 45-49 | C | 2.25 |
| 40-44 | D | 2.00 |
| Less than 40 | F | 0.00 |

1. **Additional Support for Students**

* Student Portal:

<http://studentportal.diu.edu.bd/>

* Academic Guidelines

<https://daffodilvarsity.edu.bd/article/academic-guidelines>

* Rules and Regulations of DIU

<https://daffodilvarsity.edu.bd/article/rules-and-regulation>

* Career Development Center:

<https://cdc.daffodilvarsity.edu.bd/>

* For general queries:

<http://daffodilvarsity.edu.bd/>