

**Faculty of Computers and Information Technology**

**Operating Systems-2**

**Information :**

**Course Code :** CS432

**Level :** Undergraduate

**Course Hours :** 3.00- Hours

**Department :** Department of Computer Science

**Instructor Information :**

| Title               | Name   | Office hours |
|---------------------|--|--------------|
| Professor           | Tarek Ahmed Mahmoud Mohamed                  | 1            |
| Associate Professor | Tarek Abdul Hamid Abdul Aziz Hussein         | 1            |
| Associate Professor | Ibrahim Eldesouky Fattoh Abdelmageed         |              |
| Teaching Assistant  | Belal Taha Fathi Taha Hussien                |              |
| Teaching Assistant  | Linah Mohammed Ibrahim Elsayed Ahmed Elnaghi |              |
| Teaching Assistant  | Fatmaelzahra Hamdi Abdallah Mohamed          |              |
| Teaching Assistant  | Yasmina Mohamed Nasr Abdel Latif Eldafrawy   |              |

**Area Of Study :**

Apply the basic concepts of process and thread.  
 Combine and evaluate different methods to manage the real memory.  
 Analyze the requirements of synchronization and design a solution for these requirements. Compare and evaluate methodologies from range of techniques and methods to implement a file system.  
 Use effectively communication skills.  
 Understand knowledge that enhances skills in protection and security.  
 Show a complete understanding of distributed systems.

**Description :**

File systems: File concept, access methods, directory systems, file protection. Processes synchronization: Process Concept, the producer/consumer problem, the critical section problem, semaphores, Distributed operating systems: distributed systems structures, distributed file systems, distributed coordination, network structures.

**Course outcomes :**

**a.Knowledge and Understanding: :**

|     |   |
|-----|---|
| 1 - | Discuss fundamental concepts related to processes and threads in operating systems  |
| 2 - | Describe the up to date technologies used to support Inter-process communication in operating systems.  |
| 3 - | Explain the principles and techniques of synchronization, virtual memory, file system management and implementation, I/O systems, interrupts, protection and security, distributed systems and SMP. |

**b.Intellectual Skills: :**

|     |  |
|-----|--|
| 1 - | Analyze different problems in operating systems.   |
| 2 - | Propose a set of alternative solutions for a given operating system problem.               |
| 3 - | Select and justify the appropriate models in operating systems for a given problem domain. |

|     |   |
|-----|---|
| 4 - | Compare and differentiate between algorithms, methods and techniques that solve the operating systems problems. |
|-----|---|

**c. Professional and Practical Skills: :**

|     |  |
|-----|--|
| 1 - | Analyze, Design, Implement and test computer based systems.  |
| 2 - | Apply, design methodologies, programming languages, and different supporting tools for the development and documentation of operating system concepts. |
| 3 - | Acquire and manage different information about the implementation of the operating systems using scientific literature and web sources.                |

**d. General and Transferable Skills: :**

|     |  |
|-----|--|
| 1 - | Work on a team to develop solutions for operating systems problems   |
| 2 - | Apply communications skills in presentation and report writing for operating systems concepts and modules. |
| 3 - | Apply quantitative methods and skills in understanding and presenting OS cases.                            |

**ABET Course outcomes :**

|     |   |
|-----|---|
| 1 - | Understand the basic concepts of process and thread.                                      |
| 2 - | Compare and evaluate different methods to manage the real and virtual memory.             |
| 3 - | Analyze the requirements of synchronization and design a solution for these requirements. |
| 4 - | Compare and evaluate methodologies and techniques to implement a file system.             |
| 5 - | Acquire knowledge that enhances skills in system protection and security.                 |

**Course Topic And Contents :**

| Topic  | No. of hours | Lecture | Tutorial / Practical |
|--|--------------|---------|----------------------|
| Process, and threads concepts overview   | 4            | 2       | 2                    |
| Inter-process communication and synchronization overview   | 4            | 2       | 2                    |
| Semaphores and classical problems (i.e., dining philosophers, producer-consumer, reader . writer, sleeping barber, etc.) | 4            | 2       | 2                    |
| Memory management overview   | 4            | 2       | 2                    |
| Virtual memory concept, demand paging , page replacement and frame allocation  | 4            | 2       | 2                    |
| File system concepts and structure   | 4            | 2       | 2                    |
| Implementing file systems  | 4            | 2       | 2                    |
| Input/output systems   | 4            | 2       | 2                    |
| Mid Term Exam  | 2            |         |                      |
| Interrupts   | 4            | 2       | 2                    |
| Protection and Security  | 4            | 2       | 2                    |
| Distributed systems  | 4            | 2       | 2                    |
| Student Presentations  | 4            | 2       | 2                    |
| Final Exam   | 2            |         |                      |

**Teaching And Learning Methodologies :**

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|--|
| Interactive Lectures including Discussions |
| Tutorials                                  |

Practical Lab Sessions

Self-Study (Project / Reading Materials / Online Material / Presentations)

Case Studies

Problem Solving

**Course Assessment :**

| Methods of assessment  | Relative weight % | Week No | Assess What |
|------------------------|-------------------|---------|-------------|
| Assignments            | 8.00              | 4       |             |
| Final Exam             | 40.00             | 14      |             |
| Midterm Exam (s)       | 20.00             | 9       |             |
| Presentations          | 8.00              | 12      |             |
| Quizzes                | 10.00             | 5       |             |
| Research and Reporting | 7.00              |         |             |
| Team Work Projects     | 7.00              |         |             |

**Course Notes :**

An Electronic form of the Course Notes and all the slides of the Lectures is available on the Students Learning Management System (Moodle)

**Web Sites :**

IEEE Transactions on Parallel and Distributed Systems. <https://www.computer.org/web/tpds>