Course program and reading list

Semester 2 Year 2022

School: Efi Arazi School of Computer Science M.Sc.

Introduction to Operating Systems and SQL for Data Science

Lecturer:

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Course No.:	Course Type :	Weekly Hours :	Credit:
3608	Lecture	3	0

Course Requirements :	Group Code :	Language:
Final Exam	222360801	English

Course Description

This course covers selected topics in two areas: Operating Systems and Data Management.

The first part of the course presents basic concepts in operating systems, including Processes and threads, Scheduling, Thread synchronization, and race conditions deadlock. In addition, the course offers common theoretical synchronization problems such as Dining Philosophers and Producer/Consumer.

The course's second part presents relational databases, SQL language, relational algebra, and Normalization, which provide a theoretical foundation for relational databases. In addition, the course offers Semantic models, Entity relation (ER), Transactions, and a practical session to use databases.

This course will provide practical tools to manage data, identify the different sources of information and access the data for analysis purposes.

Course Goals

Provide basic knowledge and experience with the following topics:

- Basic concepts in operating systems, including Processes and threads, Scheduling, Synchronization, Cache, Memory Management, File System.
- The theoretical concept of database management.
- Relational databases, relational algebra, and SQL language.
- Standard formats for storing and transferring information, such as XML, JSON, etc.
- Interact with various information sources using Python and Pandas.

Grading

30% - Homework exercises

70% - Final Exam

Learning Outcomes

- Demonstrate an understanding of Operating Systems concepts to enhance efficient usage.
- Read a database schema and interpret its structure.
- Demonstrate access, retrieval, and updating of SQL language data.
- Demonstrate accessing, retrieving, and updating data in XML JSON formats.
- Develop Python code to interface with SQL servers and internet data.

Reading List

- Modern Operating Systems (4th Ed.), By Andrew S. Tanenbaum
- Operating System Internals and Design Principles (7th Ed.), By William Stallings
- Elmasri R. & Navathe S. Fundamentals of Database Systems (6th Ed.), By Addison-Wesley
- Principles of Database Management: The Practical Guide to Storing, Managing and Analyzing Big and Small Data, by: Wilfried Lemahieu, Seppe vanden Broucke, Bart Baesens
- SQL QuickStart Guide: The Simplified Beginner's Guide To SQL, ClydeBank Technology