

American University of Beirut
Faculty of Engineering and Architecture
Department of Industrial Engineering and Management

INDE 513: Information Systems

Fall 23

Instructor:

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Course Description:

This course investigates data modeling, storage, acquisition, and utilization in Industrial Engineering via manual and computerized methods. Topics include: the Development of effective spreadsheet applications using Excel, design and implementation of relational databases via E-R modeling, relational schema, normalization, and SQL using Access and SQL Server, Web-based database applications using HTML and ASP.NET., Interface design and data management application life cycle. All topics are covered within the context of typical Industrial Engineering problems.

Course Objectives:

Having successfully completed this course, you will be able to:

- Select the most appropriate data management approach (manual, spreadsheet, database, or Web-based database) for a given IE problem.
- Work with multiple Excel worksheets and workbooks simultaneously.
- Import text, database, and Web-based data into Excel.
- Use macros, user controls, data validation, protection, and other elements to develop effective Excel applications for IE problems.
- Analyze IE problems to identify the pertinent objects, attributes, data types, and relationships needed for designing a database.
- Design relational databases and improve existing relational databases (normalization).
- Implement relational databases for typical IE problems using MS Access and SQL.
- Develop rudimentary Web-based databases for typical IE problems.

Software:

Microsoft Excel, Access.

Course Notes: There are no published textbooks for this course. All the required material will be uploaded on Moodle.

Grading:

- Homework/Class Assignments: 20%
- Project: 30%
- Midterm: 20%
- Final: 30%

Tentative Schedule:

1. Introduction to data management
2. Spreadsheets:
 - 2.1. Working with Lists in Excel
 - 2.2. Working with Multiple Worksheets and Workbooks in Excel
 - 2.3. Creating Excel Applications
 - 2.4. Importing Data into Excel
3. Databases
 - 3.1. Introduction to Databases
 - 3.2. Conceptual Data Modeling: Fundamental Concepts
 - 3.3. Conceptual Data Modeling: Entity-Relationship Diagrams

Midterm

- 3.4. Relational Data Modeling
 - 3.5. Normalization of Relational Schema
 - 3.6. Creating and Populating Databases with Access
 - 3.7. Using Queries in Access
 - 3.8. Designing User Interfaces in Access
 - 3.9. Defining and Manipulating Database Data: SQL
4. Data applications and the WEB
 - 4.1. Introduction to Web-based Databases
 - 4.2. Constructing Static Web Pages using HTML
 - 4.3. Dynamic Web Pages: Data Input, Output, and Page Flow
 - 4.4. Dynamic Web Pages: Interacting with Databases
5. Data Management Application Life Cycle

Final Exam