Course Specification

Program on which the course is given: IT Diploma
Department offering the program: Information Systems
Department offering the course: Information Systems
Date of specification approval: 

A- Basic Information

Title
Lecture
Code: IS521

B- Professional Information

1- Overall Aims of Course:

This course gives an overview of database architectures, including the Relational, Hierarchical, Network, and Object Models. Database interfaces, including the SQL query language; Database design using the Entity-Relationship (E-R) Model. Issues such as security, integrity, and query optimization are discussed. The course includes topics such as normalization, data quality management, implementation issues, database application development, concept of transactions, ODBC, JDBC, database tuning, database Administration, and current topics (distributed databases, data warehouses, data mining).

2- Intended Learning Outcomes of Course:

a) Knowledge and Understandings:

At the end of the course, the student will know:

a1- The fundamental concept and issues of database management
a2- The organization of database systems.

b) Intellectual Skills:

At the end of the course, the student will be able to:

b1- Think in solving a wide range of problems related to the analysis, design and construction of database systems.

b2- Creatively solve problems, develop designs, and aware of the context of computer developments.
c) Professional and Practical Skills:
At the end of the course, the student will be able to:
c1- Understand relational database theories, standard SQL, and database design

c2- Deal with the commercially available database systems.

d) General and Transferable Skills:
At the end of the course, the student will be able to:
d1- Apply a wide range of principles and tools available to the software engineer, such as problem solving, design methodologies, good thinking, choice of algorithm, programming language, software libraries and user interface technique.
d2- Interact with the software life cycle, from requirements definition to development and evaluation.

e) Attitude:
At the end of the course, the student will be able to:
e1- Enhance self-study abilities.
e2- Enhance team-work skills.

3- Course Content:

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<th>Lecture Topic</th>
<th>Lecture</th>
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<td>- Research issues in mandatory access control</td>
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<td>- Modeling multilevel entities as single-level Objects.</td>
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<td>- Object updates and secure garbage collection mechanisms</td>
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<td>- Polyninstantiation</td>
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<th>The Architectures of an object base environment for simulation:</th>
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<td>- Object-Oriented rule evaluation</td>
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Transition from a relation to object model implementation:
- Modeling complex data
- Survey of extended relational system
- O-Raid system design and implementation
- Expand query Language
- Extend data definition Facility
- Data manipulation language (DML)

An Object-Oriented knowledge for KBMS-supported evolutionary prototyping of software systems:
- Knowledge model overview
- Classes
- Objects and instances
- Structural association definitions
- Encapsulation and inheritance
- extensible kernel model
- Structural association patterns
- Behavioral abstraction
- Method model and control associations
- Method model object and evolutionary prototyping
- Rule definition

Applying OOAD in the design and implementation of an intelligent geographic information system:
- Modeling and query processing
- Spatial data modeling
- The design methodology
- The responsibility-driven approach
- Developing the data model
- The Exploratory phase
- The analysis phase

Temporal/Historical database systems:
- The Indexical database model
- The structures
- Discussion of the structures
- An indexical example: the Watergate database
- The operations
- Partial Functions
- HRDM
- Bitemporal database models
Temporal query language for a conceptual model:
- The temporal data model
- Conceptual objects: entities
- Temporal objects: roles
- Non-Temporal attributes
- Temporal attributes
- Classes and super-class/sub-class relationships
- Conceptual relationships
- Temporal relationships
- Temporal constraints among relationships
- Temporal Query Language constructs
- Temporal projection
- Temporal selection
- Temporal version restriction operators
- Temporal scope operators

A data model for time-series analysis:
- Main features of the data model
- Vector based data model
- Concepts
- Rules
- Calendar
- Temporal query language
- Special operators for time-series database
- Handling of missing values

A relational model and SQL-like query language for spatial databases:
- Weak data typing
- Uniformity of attribute values
- Experience from temporal databases
- Spatial regions
- Attribute values
- Value Navigation
- Spatial tuples
- Spatial relations
- weak equality and restructuring
- Spatial Expressions
- Boolean Expressions
- Relational Expressions

4- Teaching and Learning Methods:

- Lectures
- Tutorials
- Class discussions
5- Assessment:
   a) Student Assessment Methods:
      - Assignments
      - Midterm written exam
      - Oral exam
      - Practical exam
      - Final written exam

   b) Assessment Schedule and Weighting:
      - Four assignments with a rate one assignment every 2 weeks (9%)
      - One written mid-term exam at the sixth week of the semester (9%)
      - One oral and practical exam at the end of the semester (19%)
      - Final written exam (63%)

6- List of Recommended Textbooks:

7- Facilities Required for Teaching and Learning:
   a) Vital Facilities:
      - Computer lab supported by Oracle and SQL Server or MYSQL software
      - Data show device.

   b) Lecturing Facilities:
      - Overhead Projector, Data show device.

8- Attitudes:
   At the end of the course, the students are expected to:
   1- Have a positive attitude towards the aim of the course.
   2- Like analyzing with software tools and packages in database.
   3- Be satisfied with the important points of the course contents.

Course lecturer /Coordinator:

Head of the Department: Prof. Dr. Hamed Nassar.