Course Specification

Program on which the course is given: IT Diploma
Department offering the program: Information System
Department offering the course: Information System
Academic year /level: 2008/2009 – First year
Date of specification approval: 

A- Basic Information

Title Database 1
Lecture Three Hours /Week
Code: IS520

B- Professional Information

1- Overall Aims of Course:

The main objective of this course is to introduce students to fundamentals of database technology by studying databases from three viewpoints: those of the database user, the database designer, and the database administrator. It teaches the use of a database management system (DBMS) by treating it as a black box, focusing only on its functionality and its interfaces. Topics include: introduction to database systems, relational database systems, database design methodology, SQL and interfaces, 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 should be able to:
   a1- Fully understand of database technology and structure.
   a2- Perform the steps involved in designing and analyzing the entities of a database system.

b) Intellectual Skills:
   At the end of the course, the student should be able to:
   b1- Build and work on database systems.
   b2- Interact with the various query languages such as (SQL) and get a piece of information from a given database system.
c) Professional and Practical Skills:
   At the end of the course, the student will be able to:
   c1- Draw an Entity Relationship Diagram (ERD) for a given database system as a practical work.
   c2- Analyze a new system for a company, factory, or bank and specify efficiently the significant requirements needed to build such a database.
   c3- Interact with a query language (SQL) to gain any information from the database system.

d) General and Transferable Skills:
   At the end of the course, the student should be able to:
   d1- Deal simple database engine such as (MS Access) and use it to build simple database.
   d2- Extract some knowledge from the database using any query language.
   d3- Design crystal reports that can help efficiently the mangers and decision maker.

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:

<table>
<thead>
<tr>
<th>Lecture Topic</th>
<th>Lecture</th>
<th>ILOs</th>
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<tr>
<td>Database and database users:</td>
<td>3</td>
<td>a1,b1,b2, c2,d1,d2</td>
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<tr>
<td>- Introduction.</td>
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<td>- A database example.</td>
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<td>- Characteristics of database approach.</td>
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<td>- Intended uses of DBMS.</td>
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<td>- Implications of the database approach.</td>
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<tr>
<td>Database system concepts and architecture:</td>
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<td>- Data models, Schemas, and instances.</td>
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<td>- DBMS architecture and data independence</td>
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<td>- Database languages and interface</td>
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<td>- The database system environment</td>
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<td>- Classification of database management system</td>
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### Data modeling using the entity-relationship model:
- High-level conceptual data models for database design.
- ER Model concepts.
- Notation for entity-relationship (ER) diagram.
- Proper naming of schema constructors.
- Relationship types of degree higher than two.

### Record storage and primary file organization:
- Secondary storage devices
- Placing file records on disk.
- Operations on files.
- Files of unordered records (Heap files).
- Files of ordered records (sorted files).
- Hashing techniques.
- Other primary file organization.

### Index structures for files:
- Types of single-level ordered indexes.
- Multilevel indexes
- Dynamic multilevel indexes using B-Tree and B+ Tree
- Other Types of indexes

### The relational data model and relational algebra:
- Relational model concepts
- Relational model constraints
- Update operations on relations
- Defining relations
- The relational algebra
- Additional relational operations

### SQL – A relational database language:
- Data definition in SQL
- Queries in SQL
- Update statements in SQL
- Views in SQL
- Specifying additional constraints as assertions
- Specifying indexes
- Embedded SQL

### Functional dependencies and normalization for relational database:
- Informal Design guidelines for relation schemas
- Functional dependencies

### Overview of the database design process:
- Role of information systems in organizations.
- The database design process.
- Physical database design guidelines
- Automated design tools
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 (19.5%)
- Final written exam (62.5%)

6- List of Recommended Textbooks:


7- Facilities Required for Teaching and Learning:
  a) Vital Facilities:
      - Computer lab supported by a database engine.
      - 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.