



COURSE SPECIFICATION

(DATABASE SYSTEMS-1)

Programme(s) on which the course is given	CS, IT
Major or Minor element of programs	Major
Department offering the program	Computer Science
Department offering the course	Information Systems
Academic year / Level	3 rd Year / 1 st Semester

A- Basic Information

Title	Database Systems-1			Code	IS331	
Credit Hours	Lecture	3	Tutorial	-	Practical	3
	Total					6

B- Professional Information

1- Overall aims of course

- Understand the fundamental concept and issues of database management.
- Obtain knowledge about the organization of database systems.
- Understand relational database theories, standard SQL, and database design.
- Use commercially available database systems.

2- Intended learning outcomes of course (ILOs)

a- Knowledge and understanding

- a2 Understand and apply a wide range of principles and tools available to the software engineer, such as design methodologies, choice of algorithm, language, software libraries and user interface technique.
- a6 Know and understand the principles and techniques of a number of application areas informed by the research directions of the subject, such as artificial intelligence, databases and computer graphics.

b- Intellectual skills

- b1** Solve a wide range of problems related to the analysis, design and construction of computer systems
- b2** Analyze the requirements of a range of computer-based systems and examine the design alternatives based on the constraints imposed by society, organizations, and technology.
- b5** Integrate and evaluate information and data from a variety of sources.
- b6** Be creative in the solution of problems and in the development of designs.
- b7** Work with and model computer systems at different and appropriate levels of abstraction.

c- Professional and practical skills

- c5** Design, write and debug computer programs in appropriate languages.
- c6** Use appropriate computer-based design support tools
- c7** Apply computer science skills in a commercial or industrial environment.

d- General and transferable skills

- d1** Display an integrated approach to the deployment of communication skills.
- d3** Work effectively with and for others.
- d4** Strike the balance between self-reliance and seeking help when necessary in new situations.
- d5** Display personal responsibility by working to multiple deadlines in complex activities
- d8** Retrieve information from a variety of sources such as libraries, printed or electronic sources.

3- Contents

Topic	No. of hours	Lecture	Tutorial/ Practical
1 An Overview of Database Management. <ul style="list-style-type: none">• What is a database system?• Why database?• Data independence.• Relational systems and others.• Oracle: Intro to Oracle & SQL*Plus, create/modify tables	6	3	3
2 Database System Architecture <ul style="list-style-type: none">• The three levels of the architecture.• Mappings.• The database administrator.• The database management system.• Data communications.• Client/server architecture..• Distributed processing.• Oracle: SQL-Add, update, delete data	6	3	3
3 An Introduction to Relational Databases <ul style="list-style-type: none">• An informal look at the relational model.• Relations and relvars.	6	3	3

<ul style="list-style-type: none"> • What relations mean. • Optimization. • The catalog. • The suppliers-and-parts database. • Oracle: SQL-Retrieving data from a single table 			
4 An Introduction to SQL <ul style="list-style-type: none"> • Views. • Transactions. • Embedded SQL. • Dynamic SQL and SQL/CLI. • SQL is not perfect. • Oracle: Multitable queries 	6	3	3
5 Types. <ul style="list-style-type: none"> • Values v Variables. • Types v Representations. • Type Definition. • Operators. • Type generators. • SQL facilities. • Oracle: Multiuser Environment; 	6	3	3
6 Relations <ul style="list-style-type: none"> • Relation types. • Relation values. • Relation variables. • SQL facilities. • Oracle: PL/SQL Programs 	6	3	3
7 Mid-term Exam, Relational Algebra <ul style="list-style-type: none"> • Closure revisited. • The original algebra: Syntax. • The original algebra: Semantics. • What is the algebra for? • Further points. • Additional operators. • Grouping and ungrouping. • Oracle: Advanced PL/SQL, Oracle Forms 	6	3	3
8 Integrity <ul style="list-style-type: none"> • Predicates and propositions. • Relvar predicates and database predicates. • Checking the constraints. • Internal v external constraints. • Correctness v consistency. • Integrity and views. • A constraint classification scheme. • Keys. • Triggers (a digression). • SQL facilities. • Oracle: Oracle Forms 	6	3	3
9 Views <ul style="list-style-type: none"> • What are views for? • View retrievals. • View updates. • Snapshots (a digression). • SQL facilities. • Oracle: Custom Forms (Selected Topics) 	6	3	3
10 Functional Dependencies <ul style="list-style-type: none"> • Basic definitions. • Trivial and nontrivial dependencies. 	6	3	3

<ul style="list-style-type: none"> • Closure of a set of dependencies. • Closure of a set of attributes. • Irreducible sets of dependencies. • Oracle: Custom Forms (Selected Topics) 			
<ul style="list-style-type: none"> • Further Normalization I: 1NF, 2NF, 3NF, BCNF, <ul style="list-style-type: none"> • - First, second, and third normal forms. • Boyce/Codd normal form. • A note on relation-valued attributes. • The normalization procedure summarized. • A note on denormalization. • Orthogonal design (a digression). • Other normal forms. • Oracle: Report Builder (Selected Topics) 	6	3	3
11 Semantic Modeling <ul style="list-style-type: none"> • The overall approach. • The E/R model. • E/R diagrams. • Database design with the E/R model. • A brief analysis. • Oracle: Creating an Integrated Application 	6	3	3
12 Recovery <ul style="list-style-type: none"> • System recovery. • Media recovery. • Two-phase commit. • Savepoints (a digression). • SQL facilities. • Oracle: Project 	6	3	3
13 Concurrency <ul style="list-style-type: none"> • Three concurrency problems. • The three concurrency problems revisited. • Deadlock. • Serializability. • Recovery revisited. • Isolation levels. • Intent locking. • ACID dropping. • SQL facilities. • Oracle: Project Presentations 	6	3	3
Total number of Hours for the course	84	42	42

4- Teaching and learning methods

- 4.1 Information collection
- 4.2 Research assignment
- 4.3 Lectures
- 4.4 Class activities
- 4.5 Practical training / lab
- 4.6 Case study

5- Student assessment methods

5-a Methods

- 5.a.1 Reports, assignments, and exercises to assess knowledge and understanding.
- 5.a.2 Regular oral, practical and written quizzes to assess intellectual skills.

- 5.a.3 Practical projects, final practical and oral exams to assess professional skills.
- 5.a.4 Reports, assignments, and discussions to assess general and transferable skills.
- 5.a.5 Final written exam to assess knowledge and understanding.

5-b Assessment schedule

Assessment 1	5 th week.	Mid term exam
Assessment 2	8 th week.	
Assessment 3	10 th week.	
Assessment 4	16 th week (Oral and practical)	
Assessment 5	17 th -18 th weeks (final written exam)	

5-c Weighting of assessments

Semester work	10%
Mid-term examination	10%
Oral / Practical examination.	20%
Final-term examination	60%
Total	100%

6- List of references

6-a Course notes

None

6-b Essential books (text books)

- [1] An Introduction to Database Systems, C.J. Date, Addison Wesley.
- [2] A Guide to Oracle 9i, Morrison & Morrison. 2003.

6-c Recommended books

- [1] Fundamentals of Database Systems, El Masri and Navathe, 3rd Edition, Addison Wesley.

6-d Periodicals, Web sites, ... etc

Related web sites.

7- Facilities required for teaching and learning

- Datashow, screen, and laptop computer.
- Database laboratory

Course coordinator:

Dr. Arabi Keshk

Head of Department:

Prof. Nabil Abd El-Wahed Ismail

Date: / /

