Course Name: Database Design
Course Code: IS414

I. Basic Course Information

Major or minor element of program: Both Major Minor
Department offering the course: Information Systems Department

Academic level: 400 Level
Semester in which course is offered: Second (Spring) Semester
Course pre-requisite(s): IS312 Database Systems - 2

Credit Hours: 3
Contact Hours Through:

Lecture	Tutorial *	Practical *	Total
2.5	0.0	1.5	4.0

* 1.5 hours for **either** Tutorial or Practical

Approval date of course specification: January 2015

II. Overall Aims of Course

To provide the students with knowledge and skills needed to design relational database schemas (conceptual and logical design). Design issues related to new database models are also considered.

III. Program ILOs covered by course

Program Intended Learning Outcomes (By Code)			
Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
K16,K17,K22	I10,I14,I18	P4,P12,P20,P21	G2,G4,G9

IV. Intended Learning Outcomes of Course (ILOs)

a. Knowledge and Understanding

On completing the course, students should be able to:

K.1 Explain the different data model used in the conceptual database design.
K.2 Illustrate the functional dependencies and their role in database design.
K.3 Realize the importance of having normalised relations and the different normal forms.
K.4 Demonstrate the properties of a well-designed relational schema.
K.5 Describe the new database models such as XML databases.
K.6 Show the new technologies used to store data such as JSON.
K.7 Explain the design of NoSQL systems.

b. Intellectual/Cognitive Skills

On completing the course, students should be able to:

I.1 Read a conceptual database schema expressed using the ER model.
I.2 Convert English specification into ER schema.
I.3 Minimize a given set functional dependencies to produce its minimum cover.
I.4 Determine the highest normal form of a given relational schema.
I.5 Determine the validity of an XML data and JSON objects.

c. Practical/Professional Skills

On completing the course, students should be able to:

P.1 Build ER schema for a given database requirements.
P.2 Use a commercial CASE tool to build conceptua/logical schemas.
P.3 Analyze a relational database schema to determine its normal form.
P.4 Design and validate a DTD for an XML document.
P.5 Transform an XML document using XSLT.
P.6 Validate a JSON object.

d. General and Transferable Skills

On completing the course, students should be able to:

G.1 Work effectively as a part of a team to apply skills gained throughout the course to design and build a complete database.
G.2 Practice to combine conceptual and logical database design processed to build a well designed relational schema.
G.3 Learn to normalize DB tables up to suitable normal form.

V. Course Matrix Contents

	Main Topics / Chapters	Duration (Weeks)	Course ILOs Covered by Topic (By ILO Code)			
			K & U	I.S.	P.S.	G.S.
1-	Overview of relational database design	0.5	K1			
2-	Review of studied concepts in conceptual database design	0.5	K1	I1		
3-	Conceptual schema design methodologies	2		I2	P1	G1
4-	Converting conceptual schema into relational schema	1	K1	I1,I2	P1	G2

5-	Views	1	K1	I3	[ ]	[ ]
6-	Problems in ill designed relation schema	1	K4	[ ]	P1,P2	G1,G2
7-	Functional dependencies and Normalization	2	K2,K3,K4	I3,I4	P3	G1,G3
8-	XML Databases	2	K5	I5	P4,P5	G2
9-	JSON Data	1	K6	I5	P6	G1
10-	NoSQL Systems	2	K7	[ ]	[ ]	G1
	Net Teaching Weeks	**13**				

VI. Course Weekly Detailed Topics / hours / ILOs

Week No.	Sub-Topics	Total Hours	Contact Hours	
			Theoretical Hours	Practical Hours *
1	Overview of relational database design and review	2.5	2.5	
2	Conceptual schema design methodologies	4	2.5	1.5
3	Conceptual schema design methodologies	4	2.5	1.5
4	Converting conceptual schema into relational schema	4	2.5	1.5
5	Views	4	2.5	1.5
6	Problems in ill designed relation schema	4	2.5	1.5
7	**Midterm Exam**			
8	Functional dependencies and Normalization	4	2.5	1.5
9	Functional dependencies and Normalization	4	2.5	1.5
10	XML Databases	4	2.5	1.5
11	XML Databases	4	2.5	1.5
12	JSON Data	4	2.5	1.5
13	NoSQL Systems	4	2.5	1.5
14	NoSQL Systems	4	2.5	1.5
15	**Final Exam**			
Total Teaching Hours		**51**	**33**	**18**

* **No Practical/Tutorial during the first week of the semester**

VII. Teaching and Learning Methods

Teaching/Learning Method	Selected Method	Course ILOs Covered by Method (By ILO Code)			
		K & U	Intellectual Skills	Professional Skills	General Skills
Lectures & Seminars	X	K1-K7	I1-I5	P1, P3 -P5	G1,G2
Tutorials					
Computer lab Sessions	X			P3,P5	G1-G3
Practical lab Work	X	K2-K5	I2,I4-I5	P4,P5	G2
Reading Materials	X	K1-K7	I1-I5		
Web-site Searches	X			P2-P6	
Research & Reporting					
Problem Solving / Problem-based Learning	X		I2-I5		
Projects	X		I1-I5	P1-P6	G1-G3
Independent Work					
Group Work					
Case Studies	X		I2-I5		G1-G3
Presentations					
Simulation Analysis					
Others (Specify):					

VIII. Assessment Methods, Schedule and Grade Distribution

Assessment Method	Selected Method	Course ILOs Covered by Method (By ILO Code)				Assessment Weight / Percentage	Week No.
		K & U	I.S.	P.S.	G.S.		
Midterm Exam	x	K1,K4	I1,I2,I3	P1,P2		10%	7
Final Exam	x	K1-K5	I1-I7	P1-P5		60%	15
Quizzes	x	K5	I5	P4		5%	5,12
Course Work	X		I1-I7	P1-P5	G1-G3	15%	
Report Writing							
Case Study Analysis							
Oral Presentations							
Practical							
Group Project	X			P1-P5	G1-G3	10%	
Individual Project							
Others (Specify):							

IX. List of References

Essential Text Books	• El Masri, Navathe, "Fundamentals of Database Systems" • C. J. Date, "An Introduction to Database Systems"
Course notes	• None
Recommended books	• Rob and Coronel, "Database Systems Design Implementation and Management", 9th 2011
Periodicals, Web sites, etc …	• http://www.openlineconsult.com/db/ • http://class2go.stanford.edu • http://www.cs.wisc.edu/~dbbook/

X. Facilities required for teaching and learning

List the facilities required

- Data Show
- White Board
- Case tool
- Computer Lab

Course coordinator: Dr. Neamat El Tazi

Head of Department: Ass. Prof. Ehab Ezzat

Date: January 2015