East West University
Department of Computer Science and Engineering
Course Outline
Spring 2018 Semester

Course Information

Course: CSE301 Database Systems

Credit and Teaching Scheme:

	Theory	Laboratory	Total
Credits	3	1	4
Contact Hours	3 Hours/Week for 13 Weeks	2 Hours/Week for 13 Weeks	5 Hours/Week for 13 Weeks

Prerequisite: CSE 205 Discrete Mathematics

Instructor Information

Instructor: 　Mohammad Rezwanul Huq, PhD
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Class Routine and Office Hour

Day	08:30-10:00	10:10-11:40	11:50-01:20	01:30-03:00	03:10-04:40	04:50-06:20
Sunday	**Office Hour**	CSE 301 (2) AB1-802	CSE 464 (1) Room 222	**Office Hour**	CSE 301 (3) AB2-204	
Monday				**Office Hour**	CSE 301 (4) AB1-802	CSE 301 (3) LAB Room 529 (till 18:50)
Tuesday	**Office Hour**	CSE 301(2) AB1-802	CSE 464 (1) AB2-204	**Office Hour**	**Office Hour**	
Wednesday				**Office Hour**	CSE 301 (4) AB1-802	CSE 301 (4) LAB Room 530 (till 18:50)
Thursday		CSE 301 (2) LAB Room 534 (till 12:10)		**Office Hour**	CSE 301 (3) Room 213	

Course Objective

This course introduces the fundamental concepts and practices of designing and implementing database system. It also enables the student to design and perform complex query operations on relational databases. It builds the capability of optimizing the databases efficiently by applying different techniques. Knowledge of this course will be needed as prerequisite knowledge for future courses such as CSE 411 Software Engineering and Information System Design, CSE 435 Software Quality Assurance, CSE 436 Multimedia Design and Development.

Course Outcomes (COs)

After completion of this course students will be able to:

CO1	**Understand** basic concepts of relational database, **construct** and **interpret** algebraic expressions to represent relations.
CO2	**Perform** and **organize** different query operations for data manipulation.
CO3	**Discuss**, **use** and **examine** different models and optimization techniques to design efficient relational database system.
CO4	**Use** and **examine** software tools, **demonstrate** skills and **write** report to design, build and test real life database.

Mapping of Course Outcomes (COs) to Program Outcomes (POs)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	X											
CO2	X	X										
CO3	X	X	X									
CO4		X	X		X				X	X		X

Program Outcomes (POs)

PO1	**Computer Science and Engineering Knowledge:** Apply knowledge of mathematics, natural sciences, algorithm, and hardware design to the solution of complex problems of different areas of Computer Science and Engineering such as Software Systems, Information Systems, Intelligent Systems, Hardware Systems, and Networking Systems.
PO2	**Problem Analysis:** Identify, formulate, research literature, and analyse complex Computer Science and Engineering problems reaching substantiated conclusions using principles of mathematics, natural sciences, algorithm, and hardware design.
PO3	**Design/Development of Solutions:** Design solutions for complex Computer Science and Engineering problems and design systems, components, or processes that meet specified needs with appropriate consideration for realistic constraints.
PO4	**Investigation:** Conduct investigation into complex Computer Science and Engineering problems using research based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.

PO5	**Modern Tool Usage:** Create, select and apply appropriate techniques, resources, and modern Software Engineering, Hardware Engineering, and Information Technology tools to complex Computer Science and Engineering activities, with an understanding of the limitations.
PO6	**Computer and Society:** Apply reasoning informed by contextual knowledge to assess societal, legal and cultural issues and the consequent responsibilities relevant to professional Computer Science and Engineering practice.
PO7	**Contemporary Issues and Sustainability:** Understand the impact of professional Computer Science and Engineering solutions in societal and contemporary contexts and demonstrate knowledge of and need for sustainable development.
PO8	**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of computing practice.
PO9	**Individual Work and Team Work:** Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings.
PO10	**Communication:** Communicate effectively on complex Computer Science and Engineering activities with the computing community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	**Project Management:** Demonstrate knowledge and understanding of Computer Science and Engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	**Life-Long Learning** Recognise the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Mapping of Course Outcomes (COs) to Knowledge Profile

CO	K1	K2	K3	K4	K5	K6	K7	K8
CO1	X	X						
CO2	X	X						
CO3	X	X	X					
CO4	X	X	X		X			

Knowledge Profile

	Attribute
K1	A systematic, theory-based understanding of the natural sciences applicable to Computer Science and Engineering.
K2	Conceptually-based mathematics, numerical analysis, statistics and formal aspects of computer and information science to support analysis and modeling applicable to Computer Science and Engineering.
K3	A systematic, theory-based formulation of engineering fundamentals required in Computer Science and Engineering.
K4	Engineering specialist knowledge that provides theoretical frameworks and bodies of knowledge for the accepted practice areas in Computer Science and Engineering; much is at the forefront of Computer Science and Engineering.

K5	Knowledge that supports engineering design in a practice area of Computer Science and Engineering.
K6	Knowledge of engineering practice (technology) in the practice areas in the Computer Science and Engineering.
K7	Comprehension of the role of engineering in society and identified issues in engineering practice in Computer Science and Engineering: ethics and the professional responsibility of an engineer to public safety; the impacts of engineering activity: economic, social, cultural, environmental and sustainability.
K8	Engagement with selected knowledge in the research literature of Computer Science and Engineering.

Complex Engineering Problems and Activities

Attributes of Complex Engineering Problems Involved

CO	PO	Attributes
CO1	PO1	Range of conflicting requirements, Depth of knowledge required
CO2	PO1, PO2	Range of conflicting requirements, Depth of analysis required, Familiarity of issues
CO3	PO1, PO2, PO3	Range of conflicting requirements, Depth of analysis required, Familiarity of issues

Attributes of Complex Engineering Activities Involved

CO	PO	Attributes
CO4 (Project)	PO5, PO10	Range of resources, Level of interaction, Familiarity

Descriptions of Range of Complex Engineering Problem Solving

Attribute	Complex Problems
Range of conflicting requirements	Involve wide-ranging or conflicting technical, engineering and other issues
Depth of analysis required	Have no obvious solution and require abstract thinking and originality in analysis to formulate suitable models.
Depth of knowledge required	Requires research-based knowledge, much of which is at, or informed by, the forefront of Computer Science and Engineering and that allows a fundamental-based, first-principles analytical approach.
Familiarity of issues	Involve infrequently encountered issues.
Extent of applicable codes	Are outside problems encompassed by standards and codes of practice for professional Computer Science and Engineering.
Extent of stakeholder involvement and level of conflicting requirements	Involve diverse groups of stakeholders with widely varying needs.
Consequences	Have significant consequences in a range of contexts.
Interdependence	Are high-level problems that include many component parts or sub-problems.

Complex Engineering Activities

Attribute	Complex Problems
Range of resources	Involve the use of diverse resources (for this purpose, resources include people, money, equipment, materials, information and technologies)
Level of interaction	Require resolution of significant problems arising from interactions between wide-ranging or conflicting technical, engineering or other issues
Innovation	Involve creative use of Computer Science and Engineering principles and research-based knowledge in novel ways
Consequences to society and the environment	Have significant consequences in a range of contexts, characterized by difficulty of prediction and mitigation
Familiarity	Outside problems encompassed by standards and codes of practice for professional Computer Science and Engineering

Course Topics, Teaching-Learning Method, and Assessment Scheme

Course Topic	Teaching-Learning Method	CO	Mark of Cognitive Learning Levels					Mark of COs	Exam (Mark)
			C1	C2	C3	C4	C5		
Introduction to Database Management Systems	Lecture, Class Discussion, Discussion Outside Class with Instructor/ Teaching Assistant	CO1	2					2	Midterm Exam I (15)
Introduction to the Relational Model	Do	CO3		1	2			3	
Writing Basic and DDL and DML Queries using SQL (Structured Query Language)	Do	CO2			7			7	
Writing Basic Relational Algebra	Do	CO1			3			3	
Intermediate and Advanced SQL Queries (SELECT-PROJECT-JOIN, SET OPERATIONS,	Do	CO2				5		5	Midterm Exam II (15)

Topic	Teaching-Learning Method	CO					CO Mark	Final Exam
AGGREGATE etc.)								
Writing advanced Relational Algebra Expressions	Do	CO1				3	3	
Designing a Database using E-R Model	Do	CO3				7	7	
Database Normalization based on Functional Dependency, Boyce-Codd Normal Form	Do	CO3		2		6	8	Final Exam (20)
Database Indexing and Hashing Techniques	Do	CO3			5		5	
Transaction Management	Do	CO1	1	1	3		5	
Concurrency Control Protocols	Do	CO2		2			2	

Experiment	Teaching-Learning Method	CO	Mark of Psychomotor Learning Levels				CO Mark
			P1	P2	P3	P4	
Introduction to oracle, SQL, simple DDL Commands	Preparing Pre-Lab Report, Lab Experiment and Result Analysis, Preparing Post-Lab Report	CO3	0.5	1			1.5
Basic query pattern, single row function, Simple DML queries	Do	CO3	0.5	1			1.5
Introduction to group by clause, aggregate function	Do	CO3	0.5	1			1.5
Introduction to sub-query, Including constraints	Do	CO2	0.5	1			1.5
Joining Multiple Tables, Introduction to view & sequence	Do	CO2	0.5	1			1.5
Designing a Database using an ER model	Do	CO3	0.5	1			1.5
Transforming an ER	Do	C03	0.5	1			1.5

model into a Relational Schema							
User Access Control & Project template discussion	Do	CO2	0.5	1			1.5
Lab Exam	Individual Lab Exam	CO1 CO2 CO3	1	5			6
Lab Project including Report and Presentation	Team-based moderately complex Lab Project with report writing, and oral/poster presentation	CO4		2	2.5	2.5	7
Total			**5**	**15**	**2.5**	**2.5**	**25**

*Notes:
- **Late assignments suffer a penalty rate of 20% per day, up to 5 days (weekends count towards the 5 days).** Assignments that are more than 5 days late are penalized by 100%.
- Group-based assignment must be done in group of 3, **STRICTLY NO COPYING** from other groups.

Learning Taxonomy:
Cognitive Domain

Level	Category	Meaning	Keywords
C1	Knowledge	Ability to observe and remember previously learned information; knowledge of specific facts, terms, concepts, principles, ideas, events, places etc.; mastery of subject material.	Arrange, Underline, Label, Name, Identity, Enumerate, List, State, Indicate, Select, Define, Read, Describe, Record.
C2	Comprehension	Ability to understand information and grasp material; translating knowledge from one form to another; interpreting, comparing and contrasting material; predicting consequences and future trends.	Infer, Review, Explain, Report, Rewrite, Estimate, Distinguish, Describe, Trace, Identity, Classify, Indicate, Discuss, Recognize, Translate, Give examples, Defend, Summarize, Paraphrase.
C3	Application	Ability to use information, learned material, methods, concepts, theories, principles, laws and theories in new situations; problem solving using required knowledge or skills.	Change, Apply, Manipulate, Teach, Illustrate, Use, Report, Determine, Solve, Construct, Write, Interpret, Organize, Provide, Employ, Investigate, Translate.
C4	Analysis	Ability to break down material and recognition of organization	Analyze, Solve, Test, Debate, Compare, Contrast, Diagram,

		structure; identification of components and relationships between components; recognitions of patterns and hidden meanings.	Determine, Criticize, Prioritize, Categorize, Experiment, Subdivide, Calculate, Questions, Illustrate, Appraise, Relate, Examine.
C5	Synthesis	Ability to combine parts or apply prior skills and knowledge to produce a new whole; integrate ideas into a solution; generalize from given facts; propose a plan of action; formulate new classification methods.	Assemble, Combine, Propose, Set Up, Compile, Devise, Compose, Adapt, Explain, Manage, Intervene, Arrange, Categorize, Reorganize, Structure, Validate, Substitute, Generate, Integrate, Express, Perform, Plan, Prepare, Negotiate, Model.
C6	Evaluation	Ability to judge and assess the value of theories and presentation, based on their value, logic or adequacy, for a given purpose; compare and make choices based on reasoned argument; verify the value of argument; verify the value of evidence; recognize subjectivity.	Enumerate, Interpret, Predict, Attach, Reframe, Choose, Evaluate, Estimate, Conclude, Revise, Judge, Support, Compare, Measure, Critique, Decide, Defend, Rate, Grade, Criticize, Appraise, Contrast, Justify, Assess, Score, Argue.

Psychomotor Domain

Level	Category	Meaning	Keywords
P1	Imitation	Copy action of another; observe and replicate.	Relate, Repeat, Choose, Copy, Follow, Show, Identify, Isolate.
P2	Manipulation	Reproduce activity from instruction or memory	Copy, response, trace, Show, Start, Perform, Execute, Recreate.
P3	Precision	Execute skills reliably; independent of help.	Assemble, Implement, Organize, Calibrate, Demonstrate, Build, Perfect, Control, Complete, Measure.
P4	Articulation	Adapt and integrate expertise to satisfy a non-standard objective.	Modify, Master, Develop, Adapat, Formulate, Coordinate, Combine, Solve, Integrate.
P5	Naturalization	Automated, unconscious mastery of activity and related skills at strategic level.	Design, Rank, Manage, Compose, Develop, Specify, Construct, Invent.

Overall Assessment Scheme

		CO	Assessment Area Mark

Assessment Area	CO1	CO2	CO3	CO4	
Class Participation	1.25	1.25	1.25	1.25	5
Class Test/Quizzes	2.5	2.5	2.5	2.5	10
Midterm Exam - I	5	7	3		15
Midterm Exam -II	3	5	7		15
Final Exam	5	2	13		20
Assignments with report and presentation	1.5	1.5	3.5	3.5	10
Laboratory Experiments, Exam, and Lab Project	2	5	8	10	25
Total Mark	20.25	24.25	38.25	17.25	100

Student Learning Time (SLT)

Activity	Hours
Theory	
Contact Hours (3 Hours/Week × 13 Weeks)	39.0
Final Examination on 14th Week	1.5
Review Lessons and Preparation for Class Tests/Quizzes (3.5 Hours/Week × 13 Weeks)	45.5
Preparation for Exams (Midterm Exam I = 9, Midterm Exam II = 9, Final Exam = 9.5)	27.5
Carryout Assignment	6.5
Subtotal	**120.0**
Laboratory	
Lab Works (2 Hours/Experiment × 8 Experiment)	16.0
Lab Examination	2.0
Preparation for Lab Work and Writing Lab Reports (1 Hour/Experiment × 8 Experiment)	8.0
Lab Project including Report and Presentation	14.0
Subtotal	**40.0**
Total	160.0

Teaching Materials/Equipment

Text Book:
Avi Silberschatz, Henry F. Korth, S. Sudarshan, *Database System Concepts*, Sixth Edition, McGraw-Hill, ISBN 0-07-352332-1

Reference Book:
Hector Garcia-Molina. Jeffrey D. Ullman and Jennifer Widom, *Database Systems: The Complete Book*, Stanford InfoLab (2nd edition)

Assignments:
Assignment description will be provided.

* Lecture Slides and Lab Manuals will be made available to the students during the class.

Grading System

Marks (%)	Letter Grade	Grade Point	Marks (%)	Letter Grade	Grade Point
97-100	A+	4.00	73-76	C+	2.30
90-96	A	4.00	70-72	C	2.00
87-89	A-	3.70	67-69	C-	1.70
83-86	B+	3.30	63-66	D+	1.30
80-82	B	3.00	60-62	D	1.00
77-79	B-	2.70	Below 60	F	0.00

Exam Dates

Section	Term I	Term II	Final
2	11 February 2018	11 March 2018	15 April 2018
3	08 February 2018	08 March 2018	12 April 2018
4	07 February 2018	07 March 2018	11 April 2018

Academic Code of Conduct

Academic Integrity:
Any form of cheating, plagiarism, personification, falsification of a document as well as any other form of dishonest behavior related to obtaining academic gain or the avoidance of evaluative exercises committed by a student is an academic offence under the Academic Code of Conduct and **may lead to severe penalties as decided by the Disciplinary Committee of the university.**

Special Instructions:
- Students are expected to attend all classes and examinations. A student MUST have at least 80% class attendance to sit for the final exam.
- Students will not be allowed to enter into the classroom after 20 minutes of the starting time.
- For plagiarism, the grade will automatically become zero for that exam/assignment.
- Normally there will be **NO make-up exam**. However, in case of **severe illness, death of any family member, any family emergency, or any humanitarian ground**, if a student miss any exam, the student MUST get approval of makeup exam by written application to the Chairperson through the Course Instructor **within 48hours**of the exam time. Proper supporting documents in favor of the reason of missing the exam have to be presented with the application.
- For **final exam**, there will be NO makeup exam. However, in case of **severe illness, death of any family member, any family emergency, or any humanitarian ground**, if a student miss the final exam, the student MUST get approval of **Incomplete Grade** by written application to the Chairperson through the Course Instructor **within 48 hours**of the final exam time. Proper supporting documents in favor of the reason of missing the final exam have to be presented with the application. **It is the responsibility of the student to arrange**

an Incomplete Exam within the deadline mentioned in the Academic Calendar in consultation with the Course Instructor.

- All mobile phones MUST be turned to silent mode during class and exam period.
- There is **zero tolerance for cheating**in exam. Students caught with cheat sheets in their possession, whether used or not;writing on the palm of hand, back of calculators, chairs or nearby walls; copying from cheat sheets or other cheat sources; copying from other examinee, etc. would be treated as cheating in the exam hall. The only penalty for cheating is **expulsion for several semesters as decided by the Disciplinary Committee of the university**.