UNITED INTERNATIONAL UNIVERSITY

Department of Computer Science and Engineering (CSE)

Course Syllabus

1	**Course Title**	Database Management Systems
2	**Course Code**	CSI 221 / CSE 3521
3	**Trimester and Year**	Fall 2021
4	**Pre-requisites**	NIL
5	**Credit Hours**	3.00
6	**Section**	B
7	**Class Hours**	Sun: 08:30 AM – 10:00 AM Wed: 08:30 AM – 10:00 AM
8	**Classroom**	Room # 310
9	**Instructor's Name**	Mohammad Imam Hossain
10	**Email**	imam@cse.uiu.ac.bd
11	**Office**	Room # 319-A [Permanent Campus]
12	**Counselling Hours**	

Saturday	10:01 AM - 02:00 PM
Sunday	10:01 AM - 11:00 AM 01:31 PM – 02:30 PM
Tuesday	10:01 AM - 11:00 AM 01:31 PM – 02:30 PM
Wednesday	10:01 AM - 02:00 PM

13	**Text Book**	1. Database System Concepts by S.Sudarshan, Henry F.Korth, Avi Silberschatz 2. Database Systems: The Complete Book by Hector Garcia-Molina, Jeffrey D. Ullman, Jennifer Widom 3. Database Systems: Design, Implementation and Management by Carlos Coronel, Steven Morris 4. Database Management Systems by Raghu Ramakrishnan, Johannes Gehrke
14	**Reference**	1. http://www.db-book.com/ 2. Stanford course link: https://cs145-fa20.github.io 3. UC Berkeley course link: https://cs186berkeley.net 4. MIT Open Course: https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-830-database-systems-fall-2010/lecture-notes/ 5. MySQL Reference Manual: https://dev.mysql.com/doc/refman/8.0/en/ 6. MySQL Practice: https://www.w3resource.com/sql-exercises/ 7. Simulators list: ▪ ER diagram: https://erdplus.com ▪ MySQL: https://demo.phpmyadmin.net/master-config/ ▪ Normalization: http://www.ict.griffith.edu.au/normalization_tools/normalization/ind.php ▪ B+ Tree: https://www.cs.usfca.edu/~galles/visualization/BPlusTree.html ▪ Extendible Hashing: https://devimam.github.io/exhash/ ▪ Serializable Schedule: https://devimam.github.io/dbtxn/

15	**Course Contents (approved by UGC)**	Concepts and methods in database system, File organization and retrieval, Data manipulation, Query formulation and language, Database models, Data description languages, database integrity and security, Data dictionary/directory systems, database administration, Database design, Survey of some existing database management systems, Some applications using commercial languages.
16	**Course Outcomes (COs)**	

COs	Description
CO1	Explain the fundamentals of database systems including: data models, database architectures, database manipulations, file organization and retrieval
CO2	Extrapolate the theories and techniques in developing database applications, management and security
CO3	Demonstrate the management and administration of database systems
CO4	Prescribe new developments and trends in databases using commercial languages on contemporary issues

17	**Teaching Methods**	Lecture (L), Case Study (CS), Q/A, Assignment (A), Class Test (CT), Mid, Final exam
18	**CO with Assessment Methods**	

CO	Assessment Method	(%)
-	Attendance	5%
-	Assignments	5%
-	Class Tests	20%
CO1, CO2, CO3	Midterm exam	30%
CO2, CO3, CO4	Final exam	40%

19 Mapping of COs and Program outcomes

COs	Program Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	C											
CO2		C										
CO3			C									
CO4			C									

20 Lecture Outline

Class	Topics/Assignments	COs	Reading Reference	Lecture Outcomes/Activities
1	Introduction to database, relational database, necessity of database management systems. Different data models and administration of database.	CO1, CO3	Ch 1	Student will know the importance of database management systems
2	Entity relationship data model: attributes and constraints.	CO1	Ch 6	Get the idea of entity database model
3	Entity relationship data model: case study to design database.	CO1, CO2	Ch 6	Apply the knowledge of entity model to design real life database
4	Introduction to schema models, definition and manipulation language,	CO1		Introduce with the schema concepts of

					database
5	Relational Database: constraints, attributes, manipulations.	CO1, CO3	Ch 2	Introduce with relational database model
6	Relational Database: simple query details	CO1, CO3	Ch 3	Apply basic queries using enterprise language
7	Relational Database: complex query details	CO1, CO3	Ch 4	Apply complex queries using enterprise language
8	Relational Database: View concepts	CO1, CO3		Visualize the outcome of database queries
9	Relational Algebra: Basic Operations	CO2		Understand the internal process of database queries
10	Relational Algebra: complex Operations	CO2		Understand the internal process of database queries
11	Relational Database: security and integrity management	CO2		Impose the security and integrity in database.
12	Review of mid syllabus	--		
	MIDTERM EXAM			
13	Database theories: functional dependencies, impact of functional dependencies.	CO2	Ch 7	Know the theories of functional dependencies
14	Database techniques: anomaly problems, normalization, different normal forms	CO2	Ch 7	Know the techniques to minimize redundancy
15	Database theories and techniques: application of functional dependencies to normalize the database into different normal forms.	CO2	Ch 7	Apply the knowledge of database theories to reduce redundancy
16	Application of Normalization in designing database on real life problems	CO2, CO4	Ch 7	Apply the database theory and techniques in real life.
17	Indexing and Hashing: introduction, importance, types, applications	CO2	Ch 14	Understand the database techniques to reduce the time complexity of queries
18	Indexing: B+ tree structure, manipulation of B+ tree structure	CO2	Ch 14	Understand the database techniques to reduce the time complexity of queries
19	Hashing: Dynamic hash structure and its manipulation	CO2	Ch 14	Understand the database techniques to reduce the time complexity of queries
20	Transaction: definition, characteristics, importance, states	CO3	Ch 17	Map the database knowledge with real tasks

21	Transaction: consistency and serializability	CO3	Ch 17	Impose the important characteristics to ensure actual tasks
22	Transaction: atomicity and back up system. RAID: different levels.	CO3	Ch 12	Understand the back up techniques.
23	File storage management	CO3	Ch 12	Visualize the overall file systems.
24	Review of final syllabus	--	--	

Appendix 1: Assessment Methods

Assessment Types	Marks
Attendance	5%
Assignments	5%
Class Tests	20%
Mid Term	30%
Final Exam	40%

Appendix 2: Grading Policy

Letter Grade	Marks %	Grade Point	Letter Grade	Marks%	Grade Point
A (Plain)	90-100	4.00	C+ (Plus)	70-73	2.33
A- (Minus)	86-89	3.67	C (Plain)	66-69	2.00
B+ (Plus)	82-85	3.33	C- (Minus)	62-65	1.67
B (Plain)	78-81	3.00	D+ (Plus)	58-61	1.33
B- (Minus)	74-77	2.67	D (Plain)	55-57	1.00
			F (Fail)	<55	0.00

Appendix-3: Program outcomes

POs	Program Outcomes
PO1	An ability to apply knowledge of mathematics, science, and engineering
PO2	An ability to identify, formulate, and solve complex engineering problems
PO3	An ability to design solutions for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations
PO4	An ability to investigate complex problems using research-based knowledge and research methods design and conduct experiments, as well as to analyze and interpret data
PO5	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice
PO6	The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
PO7	Understand and evaluate the sustainability and impact of professional engineering work in the solution of complex engineering problems in societal and environmental contexts
PO8	An understanding of professional and ethical responsibility
PO9	An ability function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings
PO10	An ability to communicate effectively
PO11	Project management and finance
PO12	A recognition of the need for, and an ability to engage in life-long learning