NATIONAL UNIVERSITY OF MODERN LANGUAGES ISLAMABAD

DEPARTMENT OF SOFTWARE ENGINEERING

DATABASE SYSTEMS (CSDB-203)

COURSE OUTLINE – BSSE PROGRAM

I. Course Details

Credit Hours	4 (3+1)
Pre-requisites	-
Course Leader	Dr. Nargis Fatima
Recommended Textbook(s)	1. Modern database management, Jeffrey A. Hoffer, 12th Edition, Pearson, 2016. 2. Database systems: A practical approach to design, implementation, and management, Thomas Connolly and Carolyn Begg, 6th Edition, Pearson, 2015.
Recommended Reference (Books/Websites/Articles)	1. Database system concepts, Avi Silberschatz, Henry F. Korth and S. Sudarshan, 6th Edition, McGraw-Hill, 2010. 2. Database systems: Design, implementation and management, Carlos M. Coronel, 13th Edition, Cengage Learning, 2018.

II. Course Learning Outcomes (CLO)

CLOs	Description	Domain	Taxonomy Level	PLOs	Assessment Artifact
CLO1	**Explain** fundamental database concepts.	Cognitive	2	2	Q1, A1, Midterm
CLO2	**Design** conceptual, logical and physical database schemas using various data models.	Cognitive	5	3	Q2, A2. Midterm, Final Term
CLO3	**Identify** functional dependencies & resolve database anomalies by normalizing database tables.	Cognitive	2	2	Q3, A3, Final Term
CLO4	**Design** databases to experiment using Structured Query Language (SQL) for database definition and manipulation	Cognitive	5	4	Midterm, Final Term

III. Course Assessment

Assessment Theory		Assessment Lab	
Evaluation Methods	**Weight (%) [T]**	**Evaluation Methods**	**Weight (%) [L]**
Quizzes	15	Lab Reports	14

Assignments	10	Midterm Assessment	4
Presentation/Project	10	Final Term Assessment (Final Project)	7
Midterm	25		
Final Term	40		
Total	100		
Total (T+L)	**T =(T/100)*75**	**Total (L)**	**25**

IV. Grading Policy

For students admitted in Fall 2021 and onwards

Grade	A+	A	B+	B	C+	C	D+	D	F
%age	>=90	80-89	75-79	70-74	65-69	60-64	55-59	50-54	<50
GPA	4.00	4.00	3.50-3.99	3.00-3.49	2.50-2.99	2.00-2.49	1.50-1.99	1.00-1.49	0.00

For students admitted before Fall 2021

Grade	A1	A2	A3	B1	B2	B3	C1	C2	D	F
%age	>=90	80-89	77-79	74-76	70-73	67-69	64-66	60-63	50-59	<50
GPA	4.00	4.00	3.66	3.33	3.00	2.66	2.33	2.00	1.50	0.00

V. Course Contents

Fundamental database concepts, Database approach vs file based system, database architecture, three level schema architecture, data independence, relational data model, attributes, schemas, tuples, domains, relation instances, keys of relations, integrity constraints, entity relationship model, entity sets, attributes, relationship, entity-relationship diagrams, EERD, relational algebra, selection, projection, Cartesian product, types of joins, functional dependencies, normal forms, Structured Query Language (SQL), data definition languages ,Joins and sub-queries in SQL, Transaction Management , indexes.

VI. Weekly Breakdown

Week No.	CLO	Topics	Reference
1	CLO 1	Course introduction, fundamental database concepts, database approach vs file-based system, components of DBMS environment, roles in the database environment.	Chapter 1
2		Three level schema architecture, data independence, database approach and applications. Advantages and dis-advantages of database management system, database languages overview	Chapter 2 [Textbook 2]
3	CLO 2	Data models introduction, database schemas, data modeling process in organization, business rules, structure, types, and business rules constraints, relational keys	Chapter 2, Chapter 12 [Textbook 2]
4		ERD vs business rules, components of ERD, entity type, relationship type, attributes	Chapter 2 [Textbook 2]

5		Strong vs weak entity, structural constraints (one to one, one to many, many to many), limitations of ERD, Enhanced Entity–Relationship Modeling (EERD), data modeling concepts of the Enhanced Entity–Relationship (EER) model	Chapter 3 Chapter 13 [Textbook 2]
6		Enhanced Entity–Relationship (EER) model (continued) relational model and logical database design	Chapter 3, 4
7	CLO 3	Relational Algebra- selection, projection, various operations, cartesian product, union, set difference, join operation.	Chapter 5 [Textbook 2]
8		Functional dependencies (Full functional dependency, partial functional dependency, transitive dependency)	Chapter 4
9		Normalization process- 1NF, 2NF, 3NF, BCNF, 4NF, denormalization	Chapter 14 [Textbook 2]
10	CLO 4	SQL-manipulating data, using DML, data control languages, grant, revoke	Chapter 6
11		Transaction control language: commit roll back save point in SQL.	Chapter 6
12		Database security	Chapter 20 [Textbook 2]
13		Database views, horizontal vs vertical views, grouped and joined views	Chapter 20 [Textbook 2]
14		Database recovery techniques	Chapter 20 [Textbook 2]
15		Database transaction management	Chapter 22 [Textbook 2]
16		File organization and indexes	Chapter 18 [Textbook 2]