Course Name: Database Concepts and Design Course Code: ITEC211

General Information						
Course Code	ITEC 211	**Level/Year**	**3/2**	**Required (R) / Selected Elective (SE)**		**R**
Credit Hours	**Theory**	**2**	**Lab**	**1**	**Total**	**3**
Prerequisites	**NIL**	**Course Coordinator**		**Dr. Yasir Ahmad**		
Corequisites	**NIL**	**Track Leader**		**Dr. Yasir Ahmad**		

Course Description

This course aims to discuss the basic concepts and designs of the database. It covers topics such as database system architecture, data model, levels of abstraction, data independence, and concurrency control. It focuses on how to design databases for given problems, and how to use database effectively, including ER modelling, key and participation constraints, weak entities, class hierarchies, aggregation and conceptual DB designing the ER model. Relational model: creating and modifying relation using query language, enforcing integrity constraints, ER relational and view. Schema refinement and normal forms: Functional dependencies, reasoning about functional dependencies, normal forms, decompositions, and normalization. Relational Queries: Relation algebra operation and commercial query languages. Students will be trained on one of the software tools like Oracle, Sybase, MySQL, DB2 etc.

Course Objectives : On completion of the course, the student will be able to:

- Understand and discuss the concepts of database design
- Design a conceptual data model and logical database model, convert the logical database designs to physical designs and develop the physical database
- Evaluate a set of queries using relational algebra operations
- Execute a set of queries using SQL

Course Contents

List of Topics	Weeks
CH 1: Database and Database Users	1,2
CH 2: Database System Concepts and Architecture	3, 4, 5
CH 3: Chapter 4: Data Modelling Using the Entity-Relationship (ER) Model	5, 6, 7
CH 4 The Relational Data Model and Relational Database Constraints	8, 9, 10
CH 5: Relational algebra	10, 11, 12
CH 6: Functional Dependencies and Normalization for Relational Databases	13, 14, 15

Textbook

- Elmasri, R., Navathe, S., and Navathe, B., “Fundamentals of Database Systems" , Pearson New International Edition, 7th Edition, ISBN-10: 0133970779 | ISBN-13: 9780133970777, 2016

Reference Materials

- Carlos Coronel, Steven Morris, Peter Rob. “Database Systems: Design, Implementation, and Management”. Eleventh Edition, Course Technology Cengage Learning, 2015.

Course Learning Outcomes		
CLO	**Description**	**Mapped PI**
CLO#01	**Define** the basic concepts and terminology of database systems like database design, architectures, models, constraints, environment, Functional Dependencies and Normalization.	PI 1.1
CLO#02	**Identify** various mini-worlds, their differences, problems domains, constraints and represent their database in variety of ways like ERD, Relational Model etc.	PI 1.3
CLO#03	**Design** various solution using database models and concepts like ERD, Relational Model, Relational Algebra, Normalization, Functional Dependency etc.	PI 2.1
CLO#04	**Implement** the solutions in variety of ways like relational algebra DDL, DML etc. using advance database programming Languages.	PI 2.3
CLO#05	**Draft** professional documentation that clearly represents technical topics.	PI 3.1
CLO#06	**Deliver** effective oral presentations on technical topics, using appropriate visual aids	PI 3.2

CLO-PI-SO Mapping						
	SO-1	**SO-2**	**SO-3**	**SO-4**	**SO-5**	**SO-6**
CLO#01	PI 1.1					
CLO#02	PI 1.3					
CLO#03		PI 2.1				
CLO#04		PI 2.3				
CLO#05			PI 3.1			
CLO#06			PI 3.2			