NOVA COLLEGE-WIDE COURSE CONTENT SUMMARY
ITD 260 – DATA MODELING AND DESIGN (3 CR.)

Course Description

Introduces life cycle application development methodologies in a systematic approach to developing relational databases and designing applications. Presents content introducing functional and business process modeling, using modeling information to produce application designs, analyzing data requirements as entities, attributes, and relationships and map an entity relationship diagram to an initial database design. Identifies the available automated development tools and utilizes Oracle Developer software to perform practical applications of these concepts. Prerequisite: Oracle or SQL programming including DDL, DML, transaction control & queries with SELECT statement and some exposure to procedural language programming. Lecture is 3 hours per week.

General Course Purpose

The purpose of this course is to provide a comprehensive introduction to database modeling and design implementing the Database Systems Development Life Cycle. The course will define and use essential database terms and concepts. The emphasis of the course is on the design and use of a relational database. The student will analyze complex business scenarios, and design and create models to support said scenario.

The course is designed to be project-based providing hands-on challenges to experience each design and modeling technique. The student will learn the details of normalization, a matrix diagram and how to build an Entity Relationship Diagram to represent user requirements. Students will then learn how to transform the Entity Relationship Diagram into The Table Diagram, preparing a database model for development (and ITD132).

Course Prerequisites/Corequisites

Prerequisite: ITE 115

Course Objectives

Upon completion of this course, the student will be able to:

a) Describe the importance of information within an organization
b) Understand the Systems Development Life Cycle
c) Describe the process of modeling business requirements
d) Apply business concepts to a data model
e) Understand the concept of data normalization
f) Analyze user information requirements to develop an entity relationship model
g) Design and interpret conceptual data models
h) Develop a relational database design using an Entity Relationship Model
i) Identify and correct poor database designs
j) Describe Structured Query Language
k) Describe Data Warehouse databases
l) Understand data types and data objects, and define their use in Object-Oriented databases

Major Topics to be Included

a) Introduction to Database Technologies
b) Introduction to Database Concepts
c) Systems Development Life Cycle
d) Identifying Business Requirements
e) Entity Relationship Data Modeling
f) Normalization
g) Advanced Data Modeling Concepts
h) Transform A Data Model Into A Functional Database
i) Structured Query Language
j) Data Warehousing

k) Object Oriented Concepts

Student Learning Outcomes

Introduction to Database Technologies
- Systems Development Life Cycle
- Identify Business Requirements
- Entity Relationship Data Modeling
- Normalization
- Advanced Data Modeling Concepts
- Transform a Data Model into a Functional Database
- Structured Query Language
- Database Management Concepts
- Data Warehousing
- Object-Oriented Concepts

Introduction to Database Concepts
- Learn the history of data processing
- Learn the history of databases
- Learn essential database vocabulary
- Understand the need to develop database systems
- Understand the current position of database systems in organizational success

Systems Development Life Cycle
- Learn the Systems Development Life Cycle

Identifying Business Requirements
- Describe the process of modeling business requirements
- Determine entities among data requirements
- Determine the attributes associated to entities
- Determine the interrelatedness of entities / business matters of importance

Entity Relationship Data Modeling
- Understand the Data Modeling Process including scope definition and requirements
- Define Entity, Attribute and Relationship
- Convert a business rule to a ERD relationship
- Illustrate the entities, attributes and relationships in an accurate ERD accurate graphic representation
- Explain relationship's ordinality
- Explain relationship's cardinality/degree
- Verbalize the Entity Relationship Diagram's notation

Normalization
- Define Normalization
- Describe Normalization
- Resolve a many – to – many relationship
- Create an Entity Relationship Diagram in 3rd Normal Form

Advanced Data Modeling Concepts
- Understand and model subtypes and supertypes
- Understand and model hierarchical data
- Understand and model recursive relationships
- Understand and model historical data

Transform a Data Model Into a Functional Database
- Distinguish between a conceptual model and a physical model
- Define relational database terminology
- Relate the conceptual design to a physical model

- Map entities and attributes
- Define Primary Keys
- Map relationships to Foreign Keys

Structured Query Language
- Describe Structured Query Language
- Demonstrate basic syntax in SQL (SELECT, FROM)
- Demonstrate selecting specific rows of data / projection (WHERE)
- Understand how to show a table design (DESCRIBE)

Data Warehousing
- Describe Data Warehousing
- Understand the difference between a transactional database and a data warehouse

Object Oriented Concepts
- Define an object
- Define an object orientated database

Required Time Allocation per Topic

In order to standardize the core topics of ITD 260 so that a course taught at one campus is equivalent to the same course taught at another campus, the following student contact hours per topic are required. Each syllabus should be created to adhere as closely as possible to these allocations. Of course, the topics cannot be followed sequentially. Many topics are taught best as an integrated whole, often revisiting the topic several times, each time at a higher level. There are normally 45 student-contact-hours per semester for a three credit course. (This includes 15 weeks of instruction and does not include the final exam week so 15* 3 = 45 hours. Sections of the course that are given in alternative formats from the standard 16 week section still meet for the same number of contact hours.) The final exam time is not included in the time table. The category. Other optional content, leaves ample time for an instructor to tailor the course to special needs or resources.

Topic	Hours	Percentage
Introduction to Database Technologies	2	4
Introduction to Database Concepts	2	4
Systems Development Life Cycle	3	5
Identifying Business Requirements	3	5
Entity Relationship Data Modeling	3	5
Normalization	6	12
Advanced Data Modeling Concepts	6	12
Transform a Data Model Into a Functional Database	5	11
Structured Query Language	5	11
Data Warehousing	**2**	**4**
Object Oriented Concepts	**3**	**5**
Exams and Quizzes	**5**	**12**
TOTAL HOURS	**45**	**100**