Northern Marianas College
CURRICULUM ACTION REQUEST

Effective Semester / Session: Spring 2010

Type of Action:

__	New
X	Modification
__	Move to Inactive (Stop Out)
__	Cancellation

Course Alpha and Number: CS 246

Course Title: Database Applications II

Reason for initiating, revising, or canceling:
This course guide is being revised to update the textbook used in this course to a newer edition.

Wil Maui 1/21/10

Proposer: Wil Maui, Instructor Date

1.21.10

Department Chair Date

1.21.10

Dean of Academic Programs and Services Date

Northern Marianas College
Course Guide

Course: CS 246 Database Applications II

1. **Department**
   Business

2. **Purpose**
   This is the second course in data management and database systems. The focus of this course is on database design. This course provides a historical perspective of the data management field and covers data models and abstract; the relational data model; design concepts, principles, methods, and practices; database design tools; and structured query language (SQL). This course is required for students pursuing the A.A.S. degree in Business Administration with an emphasis in Computer Applications. It will also benefit individuals who would like to gain knowledge and skills in designing and implementing a database.

3. **Description**

   A. **Required/Recommended Textbook(s) and Related Materials**
   Required: Coronel, Carlos, Steven Morris, and Peter Rob. *Database Systems: Design, Implementation, and Management*. 9th ed. Boston, Mass: Thomson Learning, Inc., 2010.
   Readability level: Grade 12

   B. **Contact Hours**
      1. **Lecture:** 3 hours per week / 45 hours per semester
      2. **Lab:** Class is held in a computer classroom/lab
      3. **Other:**

   C. **Credits**
      1. **Number:** 3
      2. **Type:** Regular degree credits

   D. **Catalogue Course Description**
   This is the second course in data management and database systems. The focus of this course is on database design. This course provides a historical perspective of the data management field and covers data models and abstracts; the relational data model; design concepts, principles, methods, and practices; database design software; and structured query language (SQL). Prerequisite: CS 140. English Placement Level: EN 202. Math Placement Level: MA 132. (Offered Spring)

Northern Marianas College
Course Guide

Course: CS 246 Database Applications II

E. Degree or Certificate Requirements Met by Course
This is a required course for the A.A.S. degree in Business Administration with an emphasis in Computer Applications.

F. Course Activities and Design
This course consists of class lectures, class exercises, homework assignments, and exams. Students also do a required class project on database design and implementation. The class and homework exercises use hypothetical situations in business and in other areas.

4. Course Prerequisite(s); Concurrent Course Enrollment; Required English/Mathematics Placement Level(s)
Prerequisite(s): CS 140
English Placement Level: EN 202
Math Placement Level: MA 132

5. Estimated Cost of Course; Instructional Resources Needed
Cost to the Student: Tuition for a 3-credit course, cost of textbook, and the student activities fee.

Cost to the College: Instructor's salary.

Instructional resources needed for this course include instructor's computer system, software, computer projector and projection screen, flash drive, whiteboard, whiteboard markers, photocopied handouts, and appropriate reference materials.

6. Method of Evaluation
Student grades will be based on the regular letter grade system as described below:

A: Excellent – grade points: 4.0;
B: Above average – grade points: 3.0;
C: Average – grade points: 2.0;
D: Below average – grade points: 1.0;
F: Failure – grade points: 0.0.

NMC's grading and attendance policies will be followed.

Northern Marianas College
Course Guide

Course: CS 246 Database Applications II

7. Course Outline

This is a topical outline and does not necessarily indicate the sequence in which the material will be presented.

1.0 Database Systems
- 1.1 Data vs. information
- 1.2 Introducing the database and the Database Management System (DBMS)
- 1.3 Why database design is important
- 1.4 The historical roots of the database: How modern databases evolved from files and file systems
- 1.5 Flaws in file system data management
- 1.6 Database systems: How database system differ from a file system and how DBMS functions within the database system

2.0 Data Models
- 2.1 Why data models are important
- 2.2 About the basic data-modeling building blocks
- 2.3 What business rules are and how they affect database design
- 2.4 How the major data models evolved, and their advantages and disadvantages
- 2.5 How data models can be classified by level of abstraction

3.0 The Relational Database Model
- 3.1 A logical view of data
- 3.2 Keys
- 3.3 Integrity rules revisited
- 3.4 Relational database operators
- 3.5 The data dictionary and the system catalog
- 3.6 Relationships within the relational database
  - 3.6.1 The 1:1 one relationship
  - 3.6.2 The 1:M relationship
  - 3.6.3 The M:N relationship
- 3.7 Data redundancy revisited
- 3.8 Indexes

4.0 The Entity Relationship (ER) model
- 4.1 Entities
- 4.2 Attributes
- 4.3 Relationship
- 4.4 Connectivity and cardinality
- 4.5 Relationship strength

Northern Marianas College
Course Guide

Course: CS 246 Database Applications II

- 4.6 Relationship participation
- 4.7 Relationship strength and week entities
- 4.8 Relationship degree
- 4.9 Composite entities
- 4.10 Entity supertypes and subtypes

5.0 Normalization of Database Tables
- 5.1 Normalization
  - 5.1.1 The need for normalization
  - 5.1.2 Conversion to first normal form
  - 5.1.3 Conversion to second normal form
  - 5.1.4 Conversion to third normal form
  - 5.1.5 Improving the design
  - 5.1.6 Limitations on system-assigned keys
  - 5.1.7 The Boyce-Codd Normal Form (BCNF)
- 5.2 Normalization and database design
- 5.3 Higher-level normal forms
- 5.4 Denormalization

6.0 Structured Query Language (SQL)
- 6.1 Data definition commands
  - 6.1.1 The database model
  - 6.1.2 Creating the database
  - 6.1.3 The database schema
  - 6.1.4 Data types
  - 6.1.5 Creating table structures
  - 6.1.6 SQL constraints
  - 6.1.7 SQL index
- 6.2 Data Manipulation Commands
  - 6.2.1 Adding table row
  - 6.2.2 Saving table changes
  - 6.2.3 Listing table rows
  - 6.2.4 Updating table rows
  - 6.2.5 Restoring table contents
  - 6.2.6 Deleting table rows
  - 6.2.7 Inserting table rows with a Select Subquery
- 6.3 Select queries
- 6.4 Advance data definition commands
- 6.5 Advanced Select queries
- 6.6 Virtual tables: Creating views
- 6.7 Joining database tables
- 6.8 Converting an ER Model into a database structure

Northern Marianas College
Course Guide

Course: CS 246 Database Applications II

7.0 Database Design
- 7.1 Changing data into information
- 7.2 The information system
- 7.3 The Systems Development Life Cycle (SDLC)
- 7.4 The Database Life Cycle (DBLC)
- 7.5 Database design strategies
- 7.6 Centralized vs. decentralized design

8. Instructional Goals

This course will introduce students to:

1.0 The historical development of the data management field, the database system, and database management systems;

2.0 The importance of business rules, data models, data abstraction, and translating business rules into data model components;

3.0 The Relational Database Model and how to design and implement a relational database;

4.0 Database design concepts, principles, methods, and techniques and creating conceptual entity relationship diagram (ERD) using designing software;

5.0 Using structured query language (SQL) and query by example (QBE) to create and maintain a database;

6.0 Using QBE to create database applications; and

7.0 The Systems Development Life Cycle (SDLC) and the Database Life Cycle (DBLC).

9. Student Learning Outcomes

Upon successful completion of this course, students will be able to:

1.0 Show knowledge in the historical development of the data management field, the database system, and database management systems;

2.0 Show knowledge of business rules, data models, data abstraction, and translate business rules into data model components;

3.0 Demonstrate knowledge in the Relational Database Model and be able to design and implement a relational database;

4.0 Apply proper design concepts, principles, methods, and techniques to create a conceptual entity relationship diagram (ERD) using designing software;

5.0 Use structured query language (SQL) and query by example (QBE) to create and maintain a database;

6.0 Use QBE to create database applications; and

7.0 Demonstrate knowledge in the Systems Development Life Cycle (SDLC) and the Database Life Cycle (DBLC).

10. Assessment Measures

Assessment of student learning may include, but not be limited to, the following:

1.0 Classwork;

2.0 Homework assignments;

3.0 In-class tests;

4.0 Take home tests; and

5.0 A class project.