Miami Dade College

Course Competencies Template - Form 112

GENERAL INFORMATION	
Name: Diane King	Phone #: 7-7021
Course Prefix/Number: COP2700	Course Title: Database Application Programming
Number of Credits: 4	
Degree Type	☐ B.A. ☐ B.S. ☐ B.A.S ☐ A.A. ☒ A.S. ☐ A.A.S. ☐ C.C.C. ☐ A.T.C. ☐ V.C.C
Date Submitted/Revised: October 5, 2006	Effective Year/Term:
☐ New Course Competency ☒ Revised Course Competency	
Course to be designated as a General Education course (part of the 36 hours of A.A. Gen. Ed. coursework): ☐ Yes ☐ No	
The above course links to the following Learning Outcomes: ☐ Communication ☐ Social Responsibility ☐ Numbers / Data ☐ Ethical Issues ☒ Critical thinking ☒ Computer / Technology Usage ☐ Information Literacy ☐ Aesthetic / Creative Activities ☐ Cultural / Global Perspective ☐ Environmental Responsibility	
Course Description (limit to 50 words or less, <u>must</u> correspond with course description on Form 102): This course introduces the fundamentals of databases and database management systems. Current database management software is featured. Through the hands-on use of current tools, the students will design, implement and use databases to derive information from industry-relevant databases. Pre-requisites: CGS1060 or CGS1021 or Computer Competency Test, and CIS1321.	
Prerequisite(s): CGS1060 or CGS1021 or Computer Competency Test, and CIS1321	Corequisite(s):

Course Competencies: (for further instruction/guidelines go to: http://www.mdc.edu/asa/curriculum.asp)

Competency 1: The students will demonstrate an understanding of both a theoretical and practical understanding of databases by:

1. Defining data.
2. Defining information.
3. Describing the process by which information is derived from data.
4. Describing how a database is implemented.
5. Detailing variant database models, how they differ, and the advantages to each model.
6. Describing the methods by which databases are used.
7. Describing different database types and their use in industry and science.
8. Developing awareness of the different database engines, models and providers through on-line research.
9. Defining a database transaction.
10. Discussing in general terms how database engines resolve all transactions.

Revision Date: 11-6-2009

Approved By Academic Dean Date: _____   Reviewed By Director of Academic Programs Date: _____

Competency 2: The student will demonstrate an understanding of accomplishing a database design by:

1. Describing all data types.
2. Discussing the basic tenets of proper database design by describing the impact of:
   a.   Data duplication
   b.   Data redundancy
   c.   Data integrity
   d.   Implicit information storage
   e.   Referential integrity
3. Describing the components and the symbols that make up an entity relationship diagram.
4. Developing and creating an entity relationship diagram for modeling a database.
5. Describing and executing the general methods of design as applied to databases.
6. Describing normalization.
7. Describing the three primary normal forms.
8. Improving the entity-relationship diagram to ensure that the database is normalized.

Competency 3: The student will demonstrate an understanding of proficiency in SQL by:

1. Describing the basic characteristics of the Standard Query Language.
2. Describing the syntax of SQL.
3. Defining a query.
4. Discussing in general terms the process by which a well-constructed query is executed against a database.
5. Writing and implementing basic queries.
6. Writing and implementing basic queries formatted for specific output.
7. Writing and implementing basic queries that use all data types.
8. Writing and implementing basic queries that alter the structure of tables.

Competency 4: The student will demonstrate an understanding of acquiring the techniques by which to optimize information retrieval by:

1. Relating tables in the design.
2. Identifying the data elements by which to relate tables.
3. Relating tables in the database.
4. Describing and exploring the advantages of using an index.
5. Detailing how a database implements and uses indexing.
6. Identifying the optimum data elements for indexing through:
   a.   Cardinality,
   b.   Uniqueness,
   c.   Propensity for transformation.
7. Writing queries by which to create/alter tables that incorporate Primary Keys and Keys.

Competency 5: The student will demonstrate an understanding of acquiring the techniques by which to derive information by:

1. Describing referential integrity.
2. Describing foreign keys.
3. Writing queries by which to create/alter tables that incorporate Foreign Keys.
4. Implementing queries that use related tables.
5. Describing joins and joins queries.
6. Writing and executing outer join queries.
7. Writing and executing inner join queries.
8. Contrasting the results of the two types of join queries.

Competency 6: The student will demonstrate an understanding of proficiency in designing, developing, and implementing complex queries by:

1. Writing and executing multi-table joined queries.
2. Writing and executing summarizing queries.
3. Writing and executing nested embedded queries.
4. Writing and executing queries for high-performance retrieval.
5. Writing and executing queries for high-throughput transactional applications.
6. Writing and executing queries that return well-formed XML.

Competency 7: The student will demonstrate an understanding of creating a database by:

1. Evaluating metadata.
2. Evaluating the application requirements.
3. Modeling the database design using an entity-relationship diagram.
4. Writing and executing queries which create the database.
5. Importing existent data.
6. Writing and executing the queries to insert individual records into the database.
7. Optimizing the database.
8. Designing, creating and implementing views.
9. Describing the interconnectivity between database drivers/connectors and the database.

Competency 8: The student will demonstrate an understanding of implementing a program and making available to users and programs industry-relevant databases by:

1. Identifying industry-relevant datasets and obtaining same via the internet.
2. Implementing all previous competencies on industry-relevant datasets.
3. Designing, writing and executing queries to solve industry-specific questions and problems.
4. Designing, writing and executing queries for generating multi-dimensional information with embedded semantics for use by domain experts.