Miami Dade College

Course Description

COP2805C | Advanced Java Programming | 4.00 credits

This is an advanced level programming course using Java. Students will learn how to code, compile and execute programs. Topics include object serialization, Java Collection, sorting/searching algorithms, multithreading and networking capabilities, and Java databases. Prerequisite: COP2800.

Course Competencies:

Competency 1: The student will demonstrate an understanding of files and streams by:

1. Creating programs that use sequential file input/output (I/O)
2. Distinguishing between text I/O and binary I/O
3. Serializing objects and arrays
4. Creating programs that use random access file processing

Competency 2: The student will demonstrate an understanding of generics by:

1. Describing the benefits of generics
2. Defining and using generic classes and interfaces
3. Using wildcards

Competency 3: The student will demonstrate an understanding of elementary data structures by:

1. Using the standard methods defined in the Collection, Map, and Set interfaces
2. Distinguishing between set, list, stack, queue, priority queue, and map
3. Using the Iterator and Comparable interfaces

Competency 4: The student will demonstrate an understanding of searching and sorting algorithms by:

1. Describing the big O notation used to estimate algorithm efficiency
2. Developing a recursive algorithm for solving a problem and identifying its exit condition
3. Implementing sorting algorithms such as insertion sort, bubble sort, and merge sort
4. Using search algorithms such as binary search

Competency 5: The student will demonstrate an understanding of multithreading by:

1. Creating programs executing in a different thread
2. Using thread pools and thread-safe classes
3. Using synchronized methods or blocks to synchronize threads and avoid race conditions
4. Using locks and semaphores to synchronize threads

Competency 6: The student will demonstrate an understanding of networking by:

1. Explaining simple networking terms (URLs, IP, TCP, client/server model)
2. Explaining network programming concepts
3. Creating server and client programs using sockets

Competency 7: The student will demonstrate an understanding of database programming with Java by:

1. Explaining database concepts
2. Creating programs accessing databases using Java Database Connectivity (JDBC)
3. Using SQL statements to create and drop tables
4. Using SQL statements to retrieve and modify records

Competency 8: The student will demonstrate an understanding of server-side programming by:

1. Creating web applications using Servlets

2. Developing web applications based on the Model-View-Controller (MVC) architecture using Java EE technologies such as the Java Server Faces technology

Competency 9: The student wi**ll** demonstrate an understanding of project development by:

1. Describing team project development
2. Creating group projects
3. Participating as a member of a project team
4. Finding and reviewing a professional source of information

Learning Outcomes:

- Use quantitative analytical skills to evaluate and process numerical data
- Solve problems using critical and creative thinking and scientific reasoning
- Formulate strategies to locate, evaluate, and apply information