I.   **CATALOG DESCRIPTION:**
   A.   Department Information:
   Division: Science and Math
   Department: Computer Science
   Course ID: CS 215
   Course Title: Programming with Java
   Units: 4
   Lecture Hours: 3
   Laboratory Hours: 3
   Prerequisite: CS 110

   B.   Catalog and Schedule Description: An introduction to the network-friendly language, Java. Topics include object-oriented design, multiple platform environment, program logic structures, graphical user interface, visual J++, Java Applet, and recursion.

II.   **NUMBER OF TIMES COURSE MAY BE TAKEN FOR CREDIT:** One

III.   **EXPECTED OUTCOMES FOR STUDENTS:**
   Upon completion of the course, the student should be able to:
   A.   Design an algorithm for a programming problem.
   B.   Define vocabulary for object-oriented programming.
   C.   Write programs for multiple platforms using Java.
   D.   Use object-oriented methods.
   E.   Read and write Java programs.
   F.   Document a program.
   G.   Demonstrate the modular approach in problem solving.
   H.   Organize data into arrays and files.
   I.   Distinguish and use selective logic.
   J.   Compare the performance of different types of loops.
   K.   Apply design standards in software engineering.

IV.   **COURSE CONTENT:**
   A.   An overview of the World Wide Web and Java.
      1.   Using the Internet and the World Wide Web
      2.   Downloading development tools
      3.   HTML
      4.   Design with Applets
      5.   Visual J++
   B.   Problem solving with object-oriented design methods
      1.   Classes and objects
      2.   Messages and methods
      3.   Class and instance data values
      4.   Inheritance and polymorphism
   C.   Elements for data organization
      1.   Variables and expressions
      2.   Constants and classes
      3.   Reserved words and identifiers
      4.   Characters and strings
   D.   Control structures
      1.   If and nested If statements
      2.   Boolean data types
      3.   Conditional expressions
      4.   Switch statements

     E. Repetitions
- 1. For loops
- 2. While loops
- 3. Do / While loops
- 4. Nested loops

     F. Arrays
- 1. Simple arrays
- 2. Arrays of objects
- 3. Vectors

     G. Classes and methods
- 1. Programmer-defined class methods
- 2. Value parameters
- 3. Reference parameters
- 4. Scope and lifetime of identifiers

     H. File I/O
- 1. File and FileDialog Objects
- 2. Low-level and high-level file I/O
- 3. Handling exceptions
- 4. Object I/O

     I. Graphical user interfaces and threads
- 1. Applets, panels, containers, and components
- 2. Abstraction layers for user I/O
- 3. Discrete user input
- 4. Browser/Applet interaction

     J. Advanced features
- 1. Recursion
- 2. Algorithms and data structures
- 3. Software engineering

V.   METHODS OF INSTRUCTION:
  A. Lecture
  B. Discussion
  C. Multi-media
  D. Projects

VI.   TYPICAL ASSIGNMENTS:
  A. Read the chapter introducing Java and hypothesize what the major differences and similarities are between Java and other programming languages with which you are familiar. Email your essay to the instructor before the next laboratory meeting.

  B. Analyze the sample program in Chapter 3 and deduce the algorithm.

  C. Write Java programs in lab.
Sample programming problem using recursion:
Write a recursive method that displays a string backward on screen and test the method with a Tester program. (Hint: The string and the index position should be parameters. Recur to the last index position in the string, and display an individual character after each recursive call.)

  D. Discuss special Java programming techniques in class.

VII.   EVALUATION(S):
  A. Programming Projects
One project per week

  B. Examinations and quizzes
Two exams: midterm and final
Weekly quizzes on reading assignments

Sample test questions:
- Explain why the int type represents values between –2147483648 and 2147483647. Where do these two numbers come from?
- Invent a good use for using the bitwise operators | and ^ (and, perhaps, ~) with a mask.
- What are "free methods" in Java?
- What is a "void" return type is a method?
- How does a method return a class type?

VIII.   TYPICAL TEXT(S):
1. <u>Java: An Introduction to Problem Solving and Programming</u>, Savitch, Walter; Prentice Hall, 2004.
2. <u>Object-Oriented Program Development Using Java: A Class-Centered Approach</u>, Bronson, Gary; Course Technology, Inc., 2005.
3. <u>Java Programming: From Problem Analysis to Program Design</u>, 2ond edition, Malik, D.S.; Course Technology, 2005.

IX.   OTHER SUPPLIES REQUIRED OF STUDENTS: None