Northern Marianas College
CURRICULUM ACTION REQUEST

Effective Semester / Session: Fall 2015

Type of Action:

<table>
<tr><td>__</td><td>New</td></tr>
<tr><td>X</td><td>Modification</td></tr>
<tr><td>__</td><td>Move to Inactive (Stop Out)</td></tr>
<tr><td>__</td><td>Cancellation</td></tr>
</table>

Course Alpha and Number: CS 227

Course Title: Introduction to Programming

Reason for initiating, revising, or canceling:
This course guide has been updated to reflect the change of the textbook in accordance with the change in programming language to JAVA.

Seung Ho Pak _(signature)_ 4/9/15

Proposer: Date
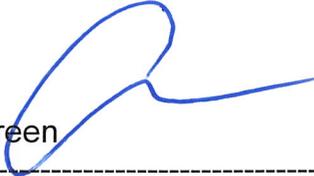
Chavel Green _(signature)_ 4/9/15

Department Chair: Date

Barbara K. Merfalen _(signature)_ 5/5/15

Dean of Academic Programs and Services   Date

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Course: CS 227 Introduction to Programming

1. **Department**
   Business

2. **Purpose**
   In this introductory computer programming course, students will be taught the fundamentals of programming that are applicable to any programming language. All fundamental programming concepts will be taught in this course using Java, a computer programming language. The primary target population is students interested in computers that currently consist of the students in the A.A.S. in Business Administration degree with the Computer Applications emphasis.

3. **Description**

   A. **Required/Recommended Textbook(s) and Related Materials**
      Required:
      Joyce Farrell, *Java Programming, 7th Edition, Course Technology,* Cengage Learning, 2014.

      Readability level: Grade 12

   B. **Contact Hours**
      1. **Lecture:** 3 hours per week / 45 hours per semester
      2. **Lab:** Held in computer classroom / lab
      3. **Other:** N/A

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

   D. **Catalogue Course Description**
      This course introduces computer programming with emphasis on program design, coding, debugging, testing, documentation, and algorithm design. The course presents such fundamentals of programming as data types, operators, control structures, arrays, strings, and functions. This course prepares students to develop applications using the Java programming language. Students will be able to build useful programs using Java constructs while learning the basics of structured and object-oriented programming language and techniques. They will also be introduced to GUI and Web-based programming in Java. The course includes advanced coverage of arrays, inheritance, and GUI concepts.

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Prerequisites: CS 222, MA 132. English Placement Level: EN 101. Math Placement Level: MA 161. (Offered: Spring)

E. Degree or Certificate Requirements Met by Course
This course is a required course for the A.A.S. degree in Business Administration with an emphasis in Computer Applications, and several associated Certificates of Achievement in the computer field. It also serves as a computer elective course for other degree options.

F. Course Activities and Design
Course activities include lectures and demonstrations using a computer and screen projector. Assignments involve creating simple programs to demonstrate proficiency. Individual coaching is used to discover and eliminate syntax errors and other program bugs. Exams assess students' understanding of the materials learned. A final project assesses the students' ability to apply the programming concepts.

4. **Course Prerequisite(s); Concurrent Course Enrollment; Required English/Mathematics Placement Level(s)**
Prerequisites: CS 222, MA 132
English Placement Level: EN 101
Math Placement Level: MA 161

5. **Estimated Cost of Course; Instructional Resources Needed**
Cost to the College: Instructor's salary

Cost to the Student: Tuition for a 3-credit course; Lab Fees, storage device for backup: USB Flash Drive – 2GB or higher and the cost of the textbook.

Instructional resources needed for this course include computer hardware and software, computer supplies, computer maintenance, lab aides' stipends and reproduction of teaching supplies, instructor's computer console, computer projector and projection screen, sound card and speakers, 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.

7. **Course Outline**

This is a topical outline and does not necessarily indicate the sequence of instruction.

1.0   Creating java programs;

2.0   Using data, methods, classes and objects;

3.0   Object concepts;

4.0   Making decisions;

5.0   Looping;

6.0   Characters, strings, and stringbuilder;

7.0   Arrays, advanced array concepts;

8.0   Introduction to inheritance;

9.0   Advanced inheritance concepts;

10.0 Exception handling;

11.0 File input and output;

14.0 Introduction to swing components;

13.0 Advanced GUI topics;

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14.0 Graphics; and

15.0 Applets, images, and sounds;

8. **Instructional Goals**
This course will introduce students to:

1.0 Designing elementary computer algorithms;

2.0 Developing small Java programs that implement basic algorithmic design;

3.0 Organizing and documenting program code;

4.0 The differences between integer, floating point, and character string data;

5.0 Problem analysis and designing a solution algorithm that will correctly solve the problem;

6.0 Implementing the algorithm by coding it into a programming language;

7.0 Debugging programs by removing syntax and logic errors;

8.0 Declaring and initializing variables using self-documenting identifiers;

9.0 Function parameters, arguments, definitions, function calls, and return values;

10.0 Ability to Java data types with a Java program;

11.0 Java principles to accomplish data input, output, selection, and repetition structures. Use selection control structures and logical operations including IF, IF...ELSE, nested IF, SWITCH statements, AND, OR, NOT, WHILE, DO...WHILE, FOR and ARRAY;

12.0 Concepts of object oriented programming including inheritance, class and interface; and

13.0 Designing and displaying simple Java applets using sounds, images, and graphics.

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9. **Student Learning Outcomes**
Upon successful completion of this course, students will be able to:

1.0   Read, interpret, analyze and explain introductory Java programs;

2.0   Use editors to compose programming code and compilers to produce executable software;

3.0   Organize program code into modules using methods following the principles of modularity and abstraction;

4.0   Write, document, test and debug Java programs, making use of variables, expressions, selection and looping statements;

5.0   Assemble data and methods into classes at an introductory level following principles of encapsulation and data hiding;

6.0   Make use of arrays to store and process lists of data;

7.0   Analyze problems and develop computer algorithms to solve novel problems;

8.0   Understand the difference between the following variable data types: integer, floating point, and character string, array;

9.0   Test and debug the program by removing syntax and logic errors;

10.0   Implement the algorithm by coding it into a programming language;

11.0   Declare and initialize variables using self-documenting identifiers;

12.0   Implement selection control structures using if else, else if, switch;

13.0   Implement repetition control structures using while, do while, for;

14.0   Understand the concepts of inheritance, polymorphism, and information hiding;

15.0   Derive classes to access constructors, data fields, and methods of a superclass;

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16.0   Use the exception-handling mechanisms built into the Java language, including the try, catch, finally, and throws keywords;

17.0   Discover how to work with input and output files;

18.0   Create user interfaces with the Swing components and use all the Java layout managers and event handling;

19.0   Explore the graphical capabilities of Java; and

20.0   Create and write an HTML document to host an applet by handling images and sounds in Java.

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

1.0   Class attendance and participation ;

2.0   Practical project assignments; and

3.0   Periodic exams.