**(Prerequisite: CIS 105 and MAT 104 or CIS 106 or CIS 109)**

**COURSE DESCRIPTION**

The course introduces students to fundamental programming concepts to include event-driven programming, object-oriented programming, basic data structures, and algorithmic processes. Emphasis is placed on structure, decision making, looping, arrays, methods, objects, events, databases, pseudo coding, and visual flowcharting to construct workable programs.

**INSTRUCTIONAL MATERIALS**

**Required Resources**

Farrel, J. (2015). *Programming Logic and Design: Comprehensive.* (8th ed.). Boston: Cengage.

Visual Logic software PIN. **Note:** This PIN is provided with your textbook materials. Please follow the instructions located in the online course shell to activate your software.

A thumb drive to save your VLSIG file.

**Supplemental Resources**

How to Design Programs. (2011). General format. Retrieved from <http://www.htdp.org/>

IBM. (2004). UML basics: The sequence diagram. Retrieved from <http://www.ibm.com/developerworks/rational/library/3101.html>

Unified Modeling Language. (2011). General format. Retrieved from <http://www.uml.org/>

Visual Logic Brief Tutorial (designed for instructors, but helpful for students. Requires Flash) Retrieved from: <http://www.visuallogic.org/Tutorial.html>

**COURSE LEARNING OUTCOMES**

1. Demonstrate the use of algorithms and pseudocoding to the problem-solving process.
2. Distinguish among the basic types, steps, and properties of programming.
3. Apply the techniques of functional decomposition, modularization techniques, and debugging strategies into program design.
4. Describe the features and fundamental data structures of programming design.
5. Select and create the appropriate conditional and iteration constructs for a given programming task.
6. Design and write programs using the appropriate data structure and fundamental programming constructs for a given problem.
7. Select and describe relational comparison operators, AND / OR logic and their precedence for a given problem.
8. Describe the use of arrays and subscripts, and the steps involved in declaring, initializing, loading, and searching arrays.
9. Demonstrate an understanding of the data hierarchy for files, basic file operations, and sequential file processing.
10. Explain the types and uses of files on permanent storage devices.
11. Describe the process of sorting records and the bubble sort technique.
12. Explain and identify object-oriented concepts.
13. Identify object-oriented classes and also the attributes and methods they contain.
14. Explain the use and benefits of object-oriented programming and event-driven programming.
15. Develop design documents for an interactive event-driven program.
16. Use technology and information resources to research issues in computer programming design.
17. Write clearly and concisely about computer programming design topics using proper writing mechanics and technical style convention.

**WEEKLY COURSE SCHEDULE**

The standard requirement for a 4.5 credit hour course is for students to spend 13.5 hours in weekly work. This includes preparation, activities, and evaluation regardless of delivery mode.

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| **Week** | **Preparation, Activities, and Evaluation** | **Points** |
| 1 | Preparation   * Reading(s)   + Chapter 1: An Overview of Computers and Programming * Videos, accessible in the online course shell   + “A Simple Program” (4 min 46 s)   + “A Simple Program (Visual Logic)” (4 min 01 s)   + “The Program Development Cycle, Part 1” (2 min 37 s)   + “The Program Development Cycle, Part 2” (4 min 44 s)   + “The Program Development Cycle, Part 3” (5 min 31 s)   + “The Program Development Cycle (Visual Logic)”  (3 min 14 s)   Activities   * Discussion   Evaluation   * Lab 1: Install Visual Logic | 20  10 |
| 2 | Preparation   * Reading(s)   + Chapter 2: Elements of High-Quality Programs * Videos, accessible in the online course shell   + “Declaring Variables and Constants” (4 min 43 s)   + “Declaring Variables and Constants (Visual Logic)”  (2 min 51 s)   + “Understanding Data Types” (4 min 39 s)   + “Understanding Data Types (Visual Logic)” (4 min 42 s)   + “Arithmetic Operator Precedence” (3 min 55 s)   + “Modularizing a Program” (2 min 25 s)   + “Modularizing a Program (Visual Logic)” (6 min 59 s)   Activities   * Discussion   Evaluation   * Lab 2: Exercise 6 on page 35 | 20  10 |
| 3 | Preparation   * Reading(s)   + Chapter 3: Understanding Structure * Videos, accessible in the online course shell   + “Understanding Structure” (2 min 34 s)   + “Structuring Unstructured Logic” (4 min 43 s)   + “Structuring Unstructured Logic (Visual Logic)” (5 min 26 s)   Activities   * Discussion   Evaluation   * None | 20 |
| 4 | Preparation   * Reading(s)   + Chapter 4: Making Decisions * Videos, accessible in the online course shell   + “Boolean Expressions and Decisions” (3 min 41 s)   + “AND and OR Decisions” (8 min 22 s)   + “AND and OR Decisions (Visual Logic)” (3 min 27 s)   + “Writing Efficient Nested Selections” (5 min 06 s)   + “Writing Efficient Nested Selections (Visual Logic)”  (3 min 34 s)   Activities   * Discussion   Evaluation   * Lab 3: Exercise 5 (Part A) on page 172 | 20  20 |
| 5 | Preparation   * Reading(s)   + Chapter 5: Looping * Videos, accessible in the online course shell   + “A Quick Introduction to Loops” (53 s)   + “Looping” (4 min 51 s)   + “Looping (Visual Logic)” (3 min 8 s)   + “Nested Loops” (6 min 15 s)   + “Nested Loops (Visual Logic)” (5 min 17 s)   Activities   * Discussion   Evaluation   * Midterm Exam (Chapters 1-4) | 20  100 |
| 6 | Preparation   * Reading(s)   + Chapter 6: Arrays   + Chapter 7: File Handling and Applications * Videos, accessible in the online course shell   + “Understanding Arrays” (3 min 52 s)   + “Understanding Arrays (Visual Logic)” (2 min 46 s)   + “Accumulating Values in an Array” (4 min 38 s)   + “Accumulating Values in an Array (Visual Logic)” (6 min 31 s)   + “Using Parallel Arrays” (5 min 27 s)   + “Using Parallel Arrays (Visual Logic)” (6 min 18 s)   + “Understanding Files” (6 min 48 s)   + “File Operations” (3 min 47 s)   + “File Operations (Visual Logic)” (3 min 48 s)   + “Control Break Logic” (7 min 09 s)   + “Merging Files” (3 min 26 s)   Activities   * Discussion   Evaluation   * Assignment 1: Fran’s Virtual Fruit Stand, Part 1 | 20  190 |
| 7 | Preparation   * Reading(s)   + Chapter 8: Advanced Data Handling Concepts (pages 322-341 only)   + Chapter 9: Advanced Modularization Techniques * Videos, accessible in the online course shell   + “Swapping Values” (1 min 14 s)   + “The Bubble Sort” (5 min 02 s)   + “Bubble Sort (Visual Logic)” (4 min 19 s)   + “Methods with a Parameter” (3 min 42 s)   + “Methods with a Parameter (Visual Logic)” (4 min 3 s)   + “Methods with Multiple Parameters” (2 min 42 s)   + “Methods with Multiple Parameters (Visual Logic)”  (5 min 14 s)   + “Overloading Methods” (2 min 37 s)   + “Recursion” (5 min 47 s)   Activities   * Discussion   Evaluation   * Lab 4: Chapter 9 Exercise 4 on page 421 | 20  20 |
| 8 | Preparation   * Reading(s)   + Chapter 10: Object-Oriented Programming * Videos, accessible in the online course shell   + “An Introduction to Object-Oriented Programming” (4 min 31 s).   + “Creating a Class” (3 min 49 s)   + “The this Reference” (4 min 34 s)   Activities   * Discussion   Evaluation   * Lab 5: Exercise 4 on page 468 | 20  20 |
| 9 | Preparation   * Reading(s)   + Chapter 12: Event-Driven GUI Programming, Multithreading, and Animation * Videos, accessible in the online course shell   + “GUI Components” (4 min 49 s)   + “Multithreading” (2 min 29 s)   Activities   * Discussion   Evaluation   * Assignment 2: Fran’s Virtual Fruit Stand, Part 2 | 20  190 |
| 10 | Preparation   * Reading(s)   + Chapter 13: System Modeling with the UML * Videos, accessible in the online course shell   + “The UML” (3 min 22 s)   + “Class and Object Diagrams” (4 min 32 s)   Activities   * Discussion   Evaluation   * Technical Paper: Object-oriented Programming (OOP) / Event-Driven Programming (EDP) versus Procedural Programming (PP) | 20  140 |
| 11 | Preparation   * Reading(s): None   Activities   * Discussion   Evaluation   * Final Exam (Chapters 5, 6, 7, 8, 9, 10, 12, and 13) | 100 |

**GRADING SCALE – UNDERGRADUATE**

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| **Assignment** | **Total Points** | **% of**  **Grade** |
| Lab Assignments (2 problems worth 10 points each and 3 problems worth 20 points each) | 80 | 8% |
| Assignment 1: Fran’s Virtual Fruit Stand, Part 1 | 190 | 19% |
| Assignment 2: Fran’s Virtual Fruit Stand, Part 2 | 190 | 19% |
| Technical Paper: Object-oriented Programming (OOP) / Event-Driven Programming (EDP) versus Procedural Programming (PP) | 140 | 14% |
| Midterm Exam: Chapters 1 through 4 | 100 | 10% |
| Final Exam: Chapters 5, 6, 7, 8, 9, 10, 12, and 13 | 100 | 10% |
| *Tests are open book with a 2-hour time limit and may contain multiple-choice, true / false, and essay questions.* | | |
| Participation (10 discussions worth 20 points apiece)  **Note:** Week 11 discussions are not graded. | 200 | 20% |
| Totals | 1,000 | 100% |

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| **Points** | **Percentage** | **Grade** |
| 900 – 1,000 | 90% – 100% | A |
| 800 – 899 | 80% – 89% | B |
| 700 – 799 | 70% – 79% | C |
| 600 – 699 | 60% – 69% | D |
| Below 600 | Below 60% | F |

**Attendance Policy:**

This course uses the Visual Logic platform for lab work. Visual Logic does not directly record attendance, but attendance is recorded when you submit your work to the assignment in Blackboard.