



El Camino College
COURSE OUTLINE OF RECORD – Official

Course Acronym:	CIS
Course Number:	16
Descriptive Title:	Application Development and Programming Using Visual Basic.Net
Division:	Business
Department:	Computer Information Systems
Course Disciplines:	Computer Information Systems
Catalog Description:	This course is an introduction to the fundamental concepts and models of application development including program design, data structures, programming, problem solving, programming logic, and design techniques for event-driven programs. A step-by-step, hands-on, project experience is used with a modern application programming language and development platform.
Prerequisite:	Computer Information Systems 13 with a minimum grade of C or equivalent experience
Co-requisite:	
Recommended Preparation:	
Enrollment Limitation:	
Hours Lecture (per week):	2
Hours Laboratory (per week):	3
Outside Study Hours:	4
Total Course Hours:	90
Course Units:	3
Grading Method:	Letter Grade only
Credit Status:	Credit, degree applicable
Transfer CSU:	Yes
Effective Date:	Prior to July 1992
Transfer UC:	Yes
Effective Date:	Prior to July 1992
General Education:	Area 4B - Language and Rationality: Communication and Analytical Thinking ECC
Term:	
Other:	
CSU GE:	

Term:	
Other:	
IGETC:	
Term:	
Other:	
Student Learning Outcomes:	<p>SLO #1 Creating an Interface</p> <p>Creating an application using the fundamental concepts and models of application development including program design techniques, data structures, programming, problem solving and programming and business function logic.</p> <p>SLO #2 Application Development</p> <p>Demonstrate well-written, logical, and readable programs using a disciplined coding system and professional project planning and management methodology, including requirements document, event planning, flow charts, site maps, timelines, Gantt charts, data diagrams, user case documents, testing and debugging.</p> <p>SLO #3 Software Development Environment</p> <p>Identify and describe issues involved with software development including ethical conduct, business strategies, social media use, copyright laws and business practices.</p> <p>SLO #4 Data Driven Application</p> <p>Create an application utilizing a database to store, modify, delete and retrieve database information for viewing and decision making.</p>
Course Objectives:	<ol style="list-style-type: none"> 1. Use primitive data types and data structures offered by the development environment. 2. Choose an appropriate data structure for modeling a simple problem. 3. Identify basic programming concepts. 4. Write simple applications that relate to a specific domain. 5. Design, implement, test, and debug a program that uses each of the following fundamental programming constructs: basic computation, simple I/O, standard conditional, iterative structures, and the definition of functions. 6. Test applications with sample data. 7. Apply core program control structures.
Major Topics:	<p>I. Program Design and Development (4 hours, lecture)</p> <p>A. Anatomy of a program</p> <p>B. Program Development Life Cycle (PDLC)</p> <ol style="list-style-type: none"> 1. Program analysis and design 2. Program development 3. Program testing and implementation <p>C. Visual Studio rapid application development (RAD) tool</p>

D. .NET Framework

E. Survey of applications

1. Windows

2. Web

3. Database

4. Mobile

5. Microsoft Office

II. User Interface Design (6 hours, lecture)

A. Graphical User Interface (GUI)

B. Wireframe

C. Storyboard

D. Mock-ups

III. Object-Oriented Programming (4 hours, lecture)

A. Namespaces

B. Classes

C. Objects

D. Controls

IV. Programming Using Data (6 hours, lecture)

A. Data

B. Data types

C. Data Storage

D. Scope

E. Variables

V. Programming Constructs (6 hours, lecture)

A. Arithmetic Operations

B. Arrays

C. File Handling

D. Structures

1. Decision structures

2. Loop structures

3. Procedures

4. Functions

VI. Testing and Debugging (4 hours, lecture)

A. The debugging tool

B. Breakpoints

C. Watches and traces

VII. Interfacing with Databases (6 hours, lecture)

A. Database Structures

B. Database Connections

C. ADO.NET framework

D. Adding, deleting, modifying, selecting and binding data

E. Language Integrated Query (LINQ)

VIII. Integrated Development Environment (IDE) (3 hours, lab)

A. Visual Studio Editor

B. Project types

C. Project and solution files

D. Compilation, run, debug

IX. Program Design (3 hours, lab)

A. Requirements and Use Cases

B. TOE charts

C. Event Plans

X. Graphical User Interface (GUI) (6 hours, lab)

A. User interface layouts and themed designs

- B. GUI development
- C. GUI controls
- D. Design time vs run time properties

XI. Windows Application Infrastructure (3 hours, lab)

- A. VB.NET Namespaces
- B. VB.NET Classes
- C. Object Instantiation

XII. Data Manipulation and Memory (9 hours, lab)

- A. Memory utilization
- B. Data types
- C. Conversion Functions
- D. Strings and String manipulation.
- E. Arithmetic data operations
- F. Memory Utilization

XIII. Decisions and Loops (6 hours, lab)

- A. Repetition Structures
- B. Single and nested decision structures
- C. Switches

XIV. Events (9 hours, lab)

- A. Event handlers
- B. Functions
- C. Subs
- D. Run-time properties

XV. Error Handling (3 hours, lab)

- A. Syntax, Logic, and Runtime errors
- B. Error trapping using Try/Catch blocks

	<p>C. Trap user errors</p> <p>XVI. Integrating Data and Databases (12 hours, lab)</p> <p>A. (ActiveX Data Objects) ADO.NET namespace</p> <p>B. Database Connections</p> <p>C. Binding Programs</p> <p>D. Data Binding Controls</p> <p>E. Datasets and Data Adapters</p> <p>F. LINQ (Language Integrated Query)</p> <p>G. (ActiveX Data Objects) ADO.NET namespace</p>
Total Lecture Hours:	36
Total Laboratory Hours:	54
Total Hours:	90
Primary Method of Evaluation:	3) Skills demonstration
Typical Assignment Using Primary Method of Evaluation:	<p>Before writing the code for the application, create a requirements document, a Use Case document and event planning document for each event. Application description:</p> <p>Your local gas station chain has a made-to-order sandwich station. The station has asked you to create a Windows application that allows the customers to enter their order on a flat screen computer. Create an application that allows the user to select one of 5 sandwich choices (create your own list) with prices displayed, 3 types of bread choices at no additional cost, and 4 condiment choices at no additional cost. The station has a loyalty program that deducts 5% of the cost of an order for every 10 points a customer has earned. Allow the users to enter their customer loyalty number, and display their total number of loyalty points they currently have. If eligible to use loyalty points, deduct the loyalty points from their account. Compute the cost of their order. Customers cannot receive money back if their loyalty points exceed the full cost of their sandwich. The application will keep a record of each order, including the quantities of each type of sandwich sold, the total tax and total amount collected from the customer, along with a current balance of loyalty points. This data will be stored in a database.</p>
Critical Thinking Assignment 1:	<p>Before writing the code for the application, create a requirements document, a Use Case document and event planning document for each event. Application description:</p> <p>Your college wants you to write a Windows Application that students can use to balance their checkbooks. This program will be installed on all computers in the student union. The application should allow the user to enter a starting balance and indicate whether the account has a monthly interest rate. Validate the beginning balance to verify that the number is valid. Allow the user to enter checks, ATM cash withdrawals, and other deposits. Also calculate the interest for 1 month and add the interest amount to the final balance. The user can record multiple debits and deposits and continue until indicating</p>

	that they are finished. Data validation is needed for all input. An opening splash screen will be displayed as well.
Critical Thinking Assignment 2:	<p>Before writing the code for the application, create a requirements document, a Use Case document, a flow chart of logic, and an event planning document. Application description:</p> <p>The science museum has asked you to write a Windows application that children can use to find the total number of hours and years they have slept during their lifetime, assuming they sleep an average of 8 hours per night. The user should enter her first name, her birth date (ask for the month, day, and year separately in numeric form) and the current date (ask for the month, day, and year separately in numeric form). To calculate the number of hours slept, assume 360 days per year and 30 days per month. The program must display the user's name and the number of hours slept. Based on 360 days per year and 8 hours of sleep per day, the program also should show how many years, months, and days the user has slept in her lifetime. The user can click a Clear button to clear all entries and results. An Exit button must be available to close the application. Because children normally will use this program, the museum has asked you to develop a colorful and fun user interface.</p>
Other Evaluation Methods:	Completion, Homework Problems, Multiple Choice, Objective Exam, True/False
Instructional Methods:	Demonstration, Discussion, Group Activities, Lab, Lecture, Multimedia presentations
If other:	
Work Outside of Class:	Answer questions, Problem solving activity, Required reading, Skill practice, Study
If Other:	
Up-To-Date Representative Textbooks:	Diane Zak, <u>Programming With Microsoft Visual Basic 2019/2022</u> , 9th ed., Course Technology, Cengage Learning, 2023.
Alternative Textbooks:	
Required Supplementary Readings:	
Other Required Materials:	External storage device
Requisite:	Prerequisite
Category:	sequential
Requisite course(s): List both prerequisites and corequisites in this box.	Computer Information Systems 13 with a minimum grade of C
Requisite and Matching skill(s): Bold the requisite skill. List the corresponding course objective under each skill(s).	<p>Define the requirements for new or revised software applications, and the various programming solutions available.</p> <p>CIS 13 - Explain the development and use of information systems in business.</p> <p>Use file management, database and spreadsheet software packages to solve business problems.</p>

	CIS 13 - Solve common business problems using appropriate information technology applications and systems.
Requisite Skill:	equivalent experience
Requisite Skill and Matching Skill(s): Bold the requisite skill(s). If applicable	
Requisite course:	
Requisite and Matching skill(s):Bold the requisite skill. List the corresponding course objective under each skill(s).	
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Requisite Skill and Matching skill(s): Bold the requisite skill. List the corresponding course objective under each skill(s). If applicable	
Enrollment Limitations and Category:	
Enrollment Limitations Impact:	
Course Created by:	Richard Kapperman
Date:	03/01/1988
Original Board Approval Date:	
Last Reviewed and/or Revised by:	M. Chaban
Date:	10/10/2018
Last Board Approval Date:	12/19/2022