

CTI 110
WEB, PROGRAMMING, AND DATABASE FOUNDATIONS

COURSE DESCRIPTION:

Prerequisites: None

Corequisites: None

This course covers the introduction of the tools and resources available to students in programming, mark-up language and services on the Internet. Topics include standard mark-up language Internet services, creating web pages, using search engines, file transfer programs; and database design and creation with DBMS products. Upon completion students should be able to demonstrate knowledge of programming tools, deploy a web-site with mark-up tools, and create a simple database table.

Course Hours per Week: Class, 2. Lab, 2. Semester Hours Credit, 3.

LEARNING OUTCOMES:

Upon successful completion of this course, the student will be able to:

- a. Describe the major components in web-based programming environment
- b. Describe the client/server programming model
- c. Distinguish mark-up language from scripting language and database language
- d. Analyze and write a simple web application using HTML and Scripting language
- e. Apply decision and repetition structures in program design.
- f. Write and incorporate methods and functions to demonstrate program competence.
- g. Define variables and arrays used in program methodology.
- h. Describe the creation of a database, and the definition of tables and fields
- i. Implement input and output to a database

OUTLINE OF INSTRUCTION:

- I. Introducing Computer Programming
 - A. What is a Computer Program
 - B. What Do Programmers Do
 - C. The Software Development Cycle
 - D. The Importance of Writing and Communicating
 - E. What are Programming Languages
 - F. Compilers and Interpreters
 - G. So Many Languages
 - H. Standalone and Network Applications
 - I. Markup Languages

- II. Client/Server Applications – Getting Started
 - A. Client/Server Design in Web Applications
 - B. Working with Files and Folders
 - C. Locating Files and Folders
 - D. Working with Local Web Server
 - E. Languages and Software
 - F. Installing a Text Editor
 - G. Installing Web Browsers
 - H. Installing Web Server
 - I. Using URLs with Your Web Server
 - J. Saving Your Work Files
 - K. Importance of Backups
 - L. Creating an HTML Document
 - M. Creating a PHP Program
 - N. Creating an Interactive HTML and PHP Program

- III. Program Design – From Requirements to Algorithms
 - A. Important Characteristics of Successful Instructions
 - B. Sequence, Selection and Repetition Structures
 - C. Key Elements of a Simple Requirements Document
 - D. Input, Processing, Output (IPO) Chart Based on a Simple Requirements Document
 - E. User Interface Design Based on a Simple Requirements Document
 - F. Pseudocode in the Form of an Algorithm
 - G. Variables and Assignment Operations
 - H. Write Simple Arithmetic and Boolean Expressions

- IV. Basics of Markup – Creating a User Interface with HTML
 - A. Purpose of Markup Languages
 - B. Technologies That Led to Html
 - C. Basic Protocols of The Internet And World Wide Web
 - D. Simple Web Page Using Common Html Tags
 - E. Html Table to Display a List in Columns and Rows
 - F. Html Table to Layout a Simple Web Page
 - G. Purpose of Style Sheets
 - H. Simple Cascading Style Sheet (CSS)
 - I. Simple Html Forms
 - J. Role of the Name Attribute to Submit Html Forms

- V. Creating a Working Program – Basics of PHP
 - A. Distinguish Between Markup and Programming Languages.
 - B. .php Files That Combine PHP Instructions with HTML.
 - C. PHP Instructions That Correctly Apply Basic PHP Syntax.
 - D. Variables in PHP Instructions.

- E. \$_POST Array to Receive Form Input.
- F. Expressions That Perform Basic Arithmetic in PHP.
- G. Expressions That Use Common PHP Functions.
- H. Print Statements to Generate HTML Output from PHP.
- I. number_format() Function To Format Numeric Output

VI. Persistence – Saving and Retrieving Data

- A. Distinguish Between Transient and Persistent Data
- B. Advantages of Remote Data Storage
- C. Use of Text Files With A DBMS For Data Storage
- D. Basic Operations That Can Be Performed on a Text File
- E. fopen(), fgets(), And fclose() to Read Data
- F. fopen(), fputs(), And fclose() to Write Data
- G. Escape Characters in Text Output
- H. fopen(), fputs(), And fclose() to Append Data
- I. explode() and list() to Parse Character Strings
- J. PHP File-Handling Functions to Process Multiple Files

VII. Programs that Choose – Introducing Selection Structures

- A. Purpose of a Selection Structure.
- B. Result of a Boolean Expression.
- C. Relational Operators.
- D. Simple Truth Table.
- E. Distinguish Between an If and If..Else Structure.
- F. Selection Structure Based on Requirements.
- G. Application Containing an If Structure.
- H. Application Containing an If..Else Structure.
- I. Compare Two Strings Without Regard For Case.
- J. Construct a String Using a Selection Structure.

VIII. Multiple Selection, Nesting, ANDs and ORs

- A. Requirements That Require Multiple Selection Structures
- B. Multiple But Distinct Selection Structures in a Single Application
- C. Importance of Input Validation
- D. trim() Function to Remove Leading and Trailing White Space
- E. Syntax and Use of the Logical Operator AND
- F. Syntax and Use of the Logical Operator OR
- G. Multiple Selection Structures Using ELSEIF
- H. Top Down Design to Solve More Complex Requirements
- I. Nest Selection Structures to Meet Requirements
- J. Challenge of Software Testing

IX. Programs That Count – Harnessing the Power of Repetition

- A. Purpose of Loops

- B. Structure of a For Loop
 - C. Processing of a For Loop
 - D. Design and Code a For Loop
 - E. Variables to Control a For Loop
 - F. For Loop to Accumulate a Total
 - G. For Loop to Find High/Low Values in a Series
 - H. For Loop to Generate a Html Table
 - I. For Loop to Process a Data File
 - J. Selection Statements Inside a For Loop
 - K. For Loop Inside a For Loop
- X. “While NOT End-Of-File” – Introducing Event-Controlled Loops
- A. Characteristics of Event-Controlled Loops
 - B. Trace the Processing of a While Loop
 - C. Design and Code a While Loop
 - D. Standard Algorithm to Process a File of Unknown Length
 - E. While Loop to Process a Simple Data File
 - F. Selection Structures Within a While Loop
 - G. While Loop to Process a File of Records
 - H. While Loop to Process Selected **Records** in a File
 - I. While Loop to Process Selected **Fields** in a File
- XI. Structured Data – Working with Arrays
- A. Key Characteristics of Arrays
 - B. Array Using Index Value
 - C. Array Using the Array() Function
 - D. Assign Values to Array Elements
 - E. Access Array Elements in Expressions
 - F. Work With Arrays of Strings
 - G. For Loop to Process an Array
 - H. sizeof() Function to Control a For Loop
 - I. While Loop to Read Data From a File Into an Array
- XII. Program Modularity – Working with Functions and Objects
- A. Importance of Modular Approaches.
 - B. Key Characteristics of Functions.
 - C. Purpose of Arguments and Parameter Lists.
 - D. Function Name and Any Arguments.
 - E. Write Code That Receives a Value Returned by a Function Call.
 - F. Common Pre-Defined php Functions
 - G. php Die() or Exit() Function to End an Application's Execution
 - H. Create a New Function and Use This in a php Application.