

Game Programming with VB

Course Syllabus and Planner

Updated May, 2018

Course Overview

The *Game Programming with Visual Basic* curriculum is a one-year (two-semester) course covering introductory programming and game design topics. The curriculum uses the Visual Basic programming language and has a focus on fundamental programming skills throughout the year.

This course is recommended for students in 6th – 12th grades. Other introductory programming courses are not required; students merely need to have typical computer usage skills prior to starting.

Teaching Strategies

The course material is designed to appeal to a variety of students, from traditional learners who thrive on written text to audio-visual students who enjoy a multi-media format. All content is delivered through an online system that allows students to work seamlessly both in the classroom and at home.

Labs and Programming Environment

Every chapter contains one or more hands-on programming labs where students will design or implement programs to demonstrate understanding of the lesson topics. Students will get the opportunity to work on individual and group projects and will experience all phases of a project lifecycle, including requirements, design, implementation, and testing.

During the first semester, students will use a free version of the Microsoft Visual Studio development environment to learn fundamental Visual Basic programming skills. In the second semester, those programming skills will be applied to a variety of game design topics. A Windows-based computer or laptop is required to complete the hands-on programming assignments.

Course Planner

A typical school year consists of approximately 36 calendar weeks or 180 days of school. The course plan covers approximately 164 school days, with additional time allocated for review, make-up work, and individual projects. The suggested number of days factors in 1 day per lesson & quiz, 1 day per lab, and 1 day per test. Some classes may move faster or slower than the suggested pace.

Each chapter contains multiple lessons, quizzes and a chapter test in addition to the listed Lab assignments. Team Projects and other assignments may be adjusted to fit the available time.

Days	Reading and Objectives	Labs
6	Chapter One: Introduction to Computers <ul style="list-style-type: none"> Computer History Computer Hardware Computer Software Programming Languages 	Install IDE Install the Visual Studio Community 2013 development environment
5	Chapter Two: Get Your Feet Wet <ul style="list-style-type: none"> Introducing Visual Basic Visual Basic Development Environment Your First Program 	Hello, Again Create a simple Hello World program using the Form Design screen.
5	Chapter Three: Exploring Visual Basic Programs <ul style="list-style-type: none"> Common Graphical Elements Visual Basic Syntax Responding to Button Clicks 	A Personal Message Respond to a button click with a pop-up message.

Days	Reading and Objectives	Labs
5	Chapter Four: Data Types and Variables <ul style="list-style-type: none"> Data Types Variables Using Data in Forms 	Various Variables <p>Experiment with the use of different data types</p>
5	Chapter Five: Basic Flow Control <ul style="list-style-type: none"> Expressions and Operators The “If” Statement Using the “If” Statement 	Weekend Dreaming <p>Use the “if” statement to make decisions within a program</p>
5	Chapter Six: Getting User Input <ul style="list-style-type: none"> InputBoxes Getting User Input Validating User Input 	Enter Your Name, Please <p>Write a program to gather and validate user input.</p>
5	Chapter Seven: Working with Numbers <ul style="list-style-type: none"> Converting Between Strings and Numbers Math Operators and Common Functions Using Math in Programs 	Average Game Scores <p>Write a program to gather numeric input, perform some mathematical operations, and display the result.</p>
5	Chapter Eight: Working with Strings <ul style="list-style-type: none"> Initializing Chars and Strings String Operators and Functions Using Strings in a Program 	Pig Latin Translator <p>Use string functions to convert input text to and from “Pig Latin”.</p>

Days	Reading and Objectives	Labs
5	Chapter Nine: Using the Debugger <ul style="list-style-type: none"> • Debugging Concepts • Stepping Through a Program • Runtime Exceptions 	Guess My Letter Analyze and correct several bugs in an existing program.
5	Chapter Ten: Loops in Programs <ul style="list-style-type: none"> • For Loops • While Loops • Using Loops in a Program 	Getting Loopy Write several loops that will make the computer beep a given number of times.
6	Chapter Eleven: Functions <ul style="list-style-type: none"> • Writing Subs and Functions • Parameters for Subs and Functions • Calling Subs and Functions • Writing Your Own Function 	Zip Zap Latin Create a function to modify the way the Pig Latin Translator program works.
6	Chapter Twelve: Arrays and Structures <ul style="list-style-type: none"> • Simple Arrays • Two-Dimensional Arrays • Structures • Using Structures and Arrays in a Program 	Piggy Bank Use arrays and structures to create a simple bank account with deposit and withdrawal history.

Days	Reading and Objectives	Labs
5	Chapter Thirteen: Distributing Your Programs <ul style="list-style-type: none"> What Your Program Needs to Run Distributing to the Public Installing and Un-Installing a Published Program 	Publish a Program Practice publishing an existing program and installing it on a different computer.
10	Chapter Fourteen: Team Project <ul style="list-style-type: none"> Understanding Teams 	Team Project Students will work in teams to define, design, create, and test a program on a topic of interest.
5	Chapter Fifteen: Game Design <ul style="list-style-type: none"> Game Proposal Game Engine Types of Computer Games 	Your Game Concept Students will practice brainstorming game themes, rules, and engines, and present their results to the class.
5	Chapter Sixteen: Graphics in Visual Basic <ul style="list-style-type: none"> Screen Coordinates and Points The Graphics Object Pens, Brushes, and Shapes 	Stick Figure Art Students will create a program that draws a stick figure or other simple vector image using lines, circles, and rectangles.
5	Chapter Seventeen: Using Timers <ul style="list-style-type: none"> Events and Timers Blinking Stars Bouncing Lines 	Coloring in the Lines Students will enhance the bouncing lines program to change colors at runtime.

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6	Chapter Eighteen: User Input <ul style="list-style-type: none"> • Mouse Events • Keyboard Events • The Select Statement 	Dancing Squares Apply keyboard input concepts to control a square on the screen. Dancing Circles Apply mouse input concepts to control a circle on the screen.
6	Chapter Nineteen: Your First Game <ul style="list-style-type: none"> • Starting Your Game • Using Timers for Animation • Hitting or Missing the Ball • Final Touches 	Double Your Trouble Extend the “Pong” game created in the chapter to include a second ball.
5	Chapter Twenty: Images and Animation <ul style="list-style-type: none"> • Animation Concepts • Loading and Displaying Images • Animation with Timers 	Your Own Animation Students will create their own simple graphical applications.
6	Chapter Twenty-One: Sprites <ul style="list-style-type: none"> • A Sprite Concepts • Introducing Bubble Blaster • Sprite Movement 	Starting Bubble Blaster Students will kick off the Bubble Blaster game and place bubbles on the screen. Ships and Bubbles Students will add bubble motion and display the player’s ship on the screen.

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10	Chapter Twenty-Two: Game Logic <ul style="list-style-type: none"> Controlling the Ship Sprite Lifespans Collision Detection Winning the Game 	Ship Movement Ready, Aim, Fire! Damage Control Victory at Last <p>In these chapter activities, students will complete the basic Bubble Blaster game by adding movement, shots, collision detection, and end-of-game detection.</p>
6	Chapter Twenty-Three: Sound <ul style="list-style-type: none"> Simple Sounds Loading and Playing Sound Files Adding Sound to Bubble Blaster 	Mary Had a Little Lamb <p>Students will create simple music from notes.</p> Finish Bubble Blaster Sounds <p>Students will complete the sound effects for the Bubble Blaster game.</p>
6	Chapter Twenty-Four: Artificial Intelligence <ul style="list-style-type: none"> Understanding AI Learning How to Fish A Smarter Fisherman 	Completing DoAI() <p>Write a simple AI routine to pick a random card.</p> The Smarter Fisherman <p>Write a smarter AI routine to pick a card based on observed game history.</p>

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5	Chapter Twenty-Five: Saving Your Games <ul style="list-style-type: none"> File Input and Output SaveFileDialog and OpenFileDialog Saving and Loading the Game State 	Freezing and Thawing Fish Add game save/load capability to the Go Fish card game
6	Chapter Twenty-Six: Game Physics <ul style="list-style-type: none"> Reflection Gravity and Projectiles Wind Acceleration 	Ice Cream Toss Complete a simple ballistic game using gravity effects. Huff and Puff Add wind effects to the Ice Cream Toss game.
5	Chapter Twenty-Seven: Drawing Text and Printing <ul style="list-style-type: none"> Printing Text Using the Printer 	Word Search Create a Word Search game on the screen. Printing Word Search Write code to support printing of the word search game to paper.
10	Chapter Twenty-Eight: Final Project <ul style="list-style-type: none"> Chain Reaction Creating the Game Board Putting Your Mark Blowing Things Up Last Link in the Chain 	Starting the Game Making Your Mark Exploding Cells Final Touches Students will follow a series of guided activities to complete the “Chain” board game from scratch.
	Review, make-up work, extra time to complete projects, teacher-led activities if desired.	