Scope and Sequence Computer Technology 1

Course Description

Computer Technology 1 is an introductory course designed to familiarize young students with fundamental concepts in digital creativity, programming, 3D modeling, game design, and virtual reality. Students will engage with interactive activities to develop foundational skills in using digital tools while exploring technology in a hands-on, engaging way. The course emphasizes creative problem-solving, digital literacy, and gradual skill-building through structured lessons and projects.

Module 1: Introduction to Digital Tools and Communication

Key Topics:

- Navigating an online learning environment
- Sending and receiving messages through a digital platform
- Creating and customizing digital avatars using pixel art

Skills Developed:

- Basic computer literacy and navigation
- Digital communication and interaction
- Creativity in digital self-expression

Assignments/Projects:

- Customize and update a profile picture using pixel art tools
- Submit a profile page link for review

Module 2: Introduction to Programming with Simple Games

Key Topics:

- Basic game development concepts
- Controlling a game character using input devices

- Implementing simple movement mechanics

Skills Developed:

- Understanding basic programming logic
- Using keyboard and mouse inputs to interact with a digital environment
- Developing problem-solving skills through coding

Assignments/Projects:

- Create a game with a controllable character
- Modify controls to allow movement via keyboard
- Implement game boundaries and collectable tokens

Module 3: Animation and Character Design

Key Topics:

- Designing animated characters using pixel art
- Creating frame-by-frame animations
- Exporting assets for use in a game

Skills Developed:

- Digital animation principles
- Creating sprite-based animations
- Asset management for game development

Assignments/Projects:

- Design and animate a simple character
- Implement the character in a game engine
- Ensure smooth transitions between animation frames

Module 4: Game Development with a Visual Game Engine

Key Topics:

- Introduction to visual game engines
- Implementing player controls in a game
- Adding environmental elements and interactions

Skills Developed:

- Using a drag-and-drop game creation tool
- Structuring a game environment with backgrounds and objects
- Implementing movement and camera tracking

Assignments/Projects:

- Create a game using a visual game engine
- Add complete keyboard movement and background elements
- Implement mobile-friendly controls for gameplay

Module 5: Advanced Game Features and Interactivity

Key Topics:

- Adding interactive objects such as obstacles and collectibles
- Implementing scoring mechanics
- Introducing sound and music to enhance gameplay

Skills Developed:

- Understanding object behaviors and interactions
- Implementing feedback mechanisms (e.g., sound and animations)
- Structuring a game to include goals and progression

Assignments/Projects:

- Implement obstacles and scoring mechanics
- Add sound effects and background music
- Finalize and test game for completeness

Module 6: Introduction to 3D Modeling

Key Topics:

- Basic 3D modeling concepts
- Creating and manipulating 3D shapes
- Applying textures to models

Skills Developed:

- Understanding 3D coordinate systems
- Constructing basic 3D shapes
- Applying colors and textures to 3D objects

Assignments/Projects:

- Create a 3D model of an object
- Organize objects into groups for future animation

Module 7: 3D Animation and Object Manipulation

Key Topics:

- Structuring 3D objects for animation
- Creating jointed movements
- Exporting and optimizing animations

Skills Developed:

- Grouping objects for logical movement
- Defining pivot points for rotations
- Animating simple gestures

Assignments/Projects:

- Implement a waving animation for a 3D character
- Apply animations to a completed 3D model

Module 8: Introduction to Virtual Reality (VR) Environments

Key Topics:

- Understanding virtual environments
- Placing objects and interacting in a VR space
- Creating simple 3D scenes with animated objects

Skills Developed:

- Navigating a VR development interface
- Positioning and moving objects within a 3D world
- Applying basic interactivity to VR elements

Assignments/Projects:

- Create a simple VR scene
- Implement animations in a virtual space

Module 9: Simulating Real-World Concepts in VR

Key Topics:

- Simulating scientific concepts using VR
- Applying textures and animations for realism
- Exporting and embedding VR projects into web pages

Skills Developed:

- Understanding animation loops in VR simulations
- Structuring and presenting 3D educational models
- Embedding VR content into web pages

Assignments/Projects:

- Create a simulation of a globe's rotation
- Animate a planetary orbit system
- Publish VR content in a web format

Module 10: Digital Creativity and Personalization

Key Topics:

- Customizing digital profiles with creative assets
- Designing profile themes and backgrounds
- Adding personalized interactive elements

Skills Developed:

- Creating custom graphics using painting tools
- Formatting web page elements using simple code
- Integrating multimedia elements into digital spaces

Assignments/Projects:

- Design and apply a personalized profile background
- Implement a custom welcome page with interactive elements

Module 11: Introduction to 3D Printing Concepts

Key Topics:
- Constructing 3D objects for printing
- Understanding solid modeling techniques
- Exporting models for real-world applications

Skills Developed:
- Creating complex 3D shapes
- Preparing models for 3D printing
- Showcasing digital designs in a web format

Assignments/Projects:
- Build and refine a 3D model
- Create a web showcase of the 3D model

Module 12: Introduction to Robotics Simulation

Key Topics:
- Configuring and programming virtual robots
- Implementing movement and control logic
- Attaching functional robotic components

Skills Developed:
- Writing simple programs for robot movement
- Understanding actuator-based mechanics
- Testing and refining robot behavior

Assignments/Projects:
- Program a robot to perform basic movement tasks
- Add an interactive robotic component

Module 13: Robotics Challenge – Battlebot Arena

Key Topics:
- Designing a robot for competition
- Programming autonomous behaviors
- Running and testing robots in a simulated battle environment

Skills Developed:
- Developing strategic programming logic
- Creating interactive battle simulations
- Refining robot movement and response to stimuli

Assignments/Projects:

- Build a battle-ready robot
- Program the robot to navigate and engage with opponents

Module 14: Introduction to Classic Game Development

Key Topics:

- Exploring the fundamentals of platformer games
- Designing interactive game objects
- Implementing game physics and enemy interactions

Skills Developed:

- Structuring a game for progression
- Creating animated characters and objects
- Implementing collision detection and scoring systems

Assignments/Projects:

- Develop a side-scrolling platform game
- Add collectibles, enemies, and scoring mechanics

Module 15: Game Development Finalization

Key Topics:

- Adding final polish to a game project
- Implementing additional gameplay features
- Testing and debugging

Skills Developed:

- Refining and optimizing game performance
- Implementing advanced game mechanics
- Completing a full game project

Assignments/Projects:

- Add final features such as levels and enemy behaviors
- Submit a finished, playable game

*__Disclaimer:__ The course structure and content outlined in this scope and sequence are subject to change. MYTEK LAB reserves the right to adjust the order, pacing, and topics covered to best meet the needs of students and ensure an optimal learning experience.