



Information Technology 1 - Scope and Sequence

Course Description

This course is an exciting, hands-on introduction to the vast and ever-evolving world of technology. Designed to equip students with a strong foundation in digital literacy and technical proficiency, this course provides an immersive exploration of key technology disciplines. Students will navigate the inner workings of operating systems, uncover the fundamentals of networking, and experiment with digital design, programming, and game development. They will also bring ideas to life through 3D modeling, robotics, and interactive virtual environments, gaining a well-rounded understanding of how technology powers the modern world.

More than just technical skills, this course fosters critical thinking, creativity, and problem-solving, encouraging students to think like innovators and engineers. By tackling real-world challenges and engaging in hands-on projects, students will develop the confidence and expertise needed to advance in the field of technology, whether pursuing further studies or preparing for future career opportunities.

Module 1: Foundational Technology Concepts

Overview:

This module introduces students to the structure and purpose of operating systems, the basics of networking, and the use of command-line tools. Students gain practical experience in simulated environments to understand how devices communicate and how systems are managed.

Key Topics:

- Operating Systems: Definition, purpose, and examples of operating systems (e.g., Linux, Windows, macOS, and simulations).
- Networking Fundamentals: LANs, WANs, IP addressing, and the Domain Name System (DNS).
- Command-Line Proficiency: Running commands for retrieving system information, messaging, and interacting with simulated systems.

Skills Developed:

- Navigating and operating within command-line environments.
- Analyzing and documenting network paths using tools like traceroute.
- Understanding global connectivity through geolocation of network hops.
- Basic troubleshooting and diagnostic skills in networking.

Assignments/Projects:

- Simulated Command-Line Interaction: Students practice executing commands to retrieve user data, send messages, and view network activity.
 - Network Analysis Report: Using traceroute and geolocation commands, students analyze and document network paths, identifying key connectivity points globally.
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Module 2: Digital Design

Overview:

Students explore digital art through the creation of scalable visual assets for interactive applications. Emphasis is placed on pixel-based designs, pattern creation, and consistency in style.

Key Topics:

- Pixel Art Foundations: Resolution, scalability, and the practical applications of pixel-based designs.
- Seamless Patterns: Techniques for creating and integrating patterns into larger designs.
- Advanced Texturing: Color theory, layering, and creating subtle variations to enhance realism.

Skills Developed:

- Designing scalable digital assets for use in 2D environments.
- Creating patterns and textures that tile seamlessly.
- Applying advanced artistic techniques to create cohesive and appealing designs.

Assignments/Projects:

- **Tileset Design:** Students create a set of foundational tiles, such as grass, water, and sand, emphasizing seamless integration.
 - **Visual Variation Development:** Students expand their tilesets by creating variations, such as environmental elements and decorative assets.
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Module 3: Web Development

Overview:

This module introduces students to the structure and styling of web content, as well as basic interactivity. Students learn to create user-friendly, visually engaging web pages using HTML, CSS, and JavaScript.

Key Topics:

- **HTML Basics:** Semantic elements, content organization, and accessibility.
- **CSS Styling:** Selectors, properties, responsive design, and visual aesthetics.
- **Introductory JavaScript:** Event handling, user input, and dynamic updates.

Skills Developed:

- Structuring and organizing content using semantic HTML elements.
- Applying CSS to style and layout web pages for readability and engagement.
- Enhancing user experience with JavaScript by adding interactivity and responsiveness.

Assignments/Projects:

- **Web Page Design:** Students build multi-page websites, focusing on clear navigation, styled content, and interactive elements.
 - **Dynamic Tools Development:** Projects include creating interactive tools, such as calculators, that respond to user input.
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Module 4: Platform Game Development

Overview:

Students learn the fundamentals of 2D game development through the creation of a platformer. The module focuses on player mechanics, environmental interaction, and basic animations.

Key Topics:

- **Character Controls:** Implementing running, jumping, and interaction mechanics.
- **Environmental Design:** Creating platforms, obstacles, and interactive elements.
- **Animations:** Adding visual feedback to enhance gameplay.

Skills Developed:

- Programming character movement and interactions.
- Designing interactive environments that challenge players.
- Incorporating animations and visual effects to improve player experience.

Assignments/Projects:

- Platformer Development: Creation of a functional 2D game with player movement and environmental elements.
 - Feature Expansion: Students add gameplay enhancements, such as scoring and animations, to improve game complexity and engagement.
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Module 5: Three-Dimensional Design

Overview:

This module introduces students to the principles of 3D modeling, emphasizing creativity and precision. Students learn to conceptualize, design, and refine models for use in both virtual and physical contexts.

Key Topics:

- Geometric Fundamentals: Understanding 3D shapes, transformations, and spatial relationships.
- Texturing and Detail: Applying surface textures to enhance visual realism.
- Prototyping: Designing models for functionality and practicality.

Skills Developed:

- Designing and transforming geometric models using 3D tools.
- Applying textures to enhance realism and functionality.
- Iteratively refining designs to meet both aesthetic and practical goals.

Assignments/Projects:

- Object Design: Students create basic 3D models and experiment with transformations and textures.
 - Refinement Projects: Students enhance their initial designs, adding complexity and usability.
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Module 6: Virtual Environments

Overview:

Students build immersive virtual spaces by applying 3D modeling skills to interactive environments. This module emphasizes creating cohesive spaces that incorporate lighting, animation, and user interaction.

Key Topics:

- Scene Composition: Combining textures, objects, and layouts to build cohesive environments.
- Lighting and Animation: Enhancing realism with dynamic lighting and motion effects.
- User Interaction: Designing spaces for intuitive exploration and engagement.

Skills Developed:

- Designing immersive virtual environments with cohesive layouts.
- Using animations to add depth and motion to scenes.
- Implementing navigation systems for user interaction.

Assignments/Projects:

- Environment Design: Students create virtual spaces with realistic lighting, textures, and animations.
 - Interactive Elements: Projects include adding responsive features, such as motion and feedback mechanisms.
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Module 7: Robotics and Simulation

Overview:

This module introduces students to robotics through simulation tools. Students learn to design, assemble, and program robotic systems, emphasizing mechanical functionality and logical behaviors.

Key Topics:

- Robotic Components: Designing functional parts such as wheels and platforms.
- Sensors and Actuators: Understanding their roles and integrating them into systems.
- Simulated Behaviors: Testing and refining robotic functionality in virtual environments.

Skills Developed:

- Designing mechanical components for robotic systems.
- Integrating sensors and actuators to achieve specific behaviors.
- Simulating and refining robot functionality through testing.

Assignments/Projects:

- Robotic Assembly: Students design and assemble robotic systems virtually, focusing on specific tasks.
 - Behavior Programming: Development of programs to simulate behaviors such as navigation and obstacle avoidance.
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Module 8: Programming Fundamentals

Overview:

Students develop computational thinking and programming skills by learning to write clear, efficient code. This module emphasizes logical problem-solving and dynamic application development.

Key Topics:

- Variables and Data Management: Storing and manipulating data.
- Control Flow: Using loops and conditionals to direct program behavior.
- Debugging and Testing: Identifying and resolving errors.

Skills Developed:

- Writing structured code to solve problems.
- Using logical frameworks to design and test dynamic applications.
- Debugging and optimizing code for clarity and performance.

Assignments/Projects:

- Interactive Applications: Development of programs that include user input and feedback mechanisms.
 - Problem-Solving Challenges: Students tackle structured problems with logical solutions.
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Module 9: Game Development

Overview:

This module expands on earlier programming and design lessons to create advanced games. Students explore complex mechanics, user engagement features, and iterative design processes.

Key Topics:

- Advanced Mechanics: Collision detection, randomization, and multi-level challenges.
- User Feedback Systems: Real-time scoring, difficulty adjustment, and adaptive features.
- Iterative Development: Testing and refining games for improved engagement.

Skills Developed:

- Creating dynamic games with complex mechanics and systems.
- Designing interactive elements to enhance player engagement.
- Refining games through testing and user feedback.

Assignments/Projects:

- Game Development: Design games with advanced mechanics and multi-level progression.
 - Customization: Add features like power-ups and adaptive difficulty.
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Module 10: Capstone Project

Overview:

The capstone project serves as the culmination of the course, allowing students to showcase their skills and reflect on their learning journey through a professional portfolio.

Key Topics:

- Portfolio Development: Creating a multi-page website to showcase projects and skills.
- Integrated Learning: Demonstrating connections between design, programming, and robotics.
- Self-Reflection: Analyzing growth, strengths, and aspirations.

Skills Developed:

- Synthesizing knowledge and skills into a cohesive portfolio.
- Demonstrating technical proficiency across multiple disciplines.
- Communicating ideas effectively through a professional online presence.

Assignments/Projects:

- Portfolio Website: Students create a professional website highlighting their work and achievements.
- Reflection Report: A written summary of the learning journey, emphasizing key takeaways.

***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.