



Unity 3D Technology. Game Development Course for Beginners. Module 1

Learning goals are to gain the necessary skills to create your own 2D or 3D games in the Unity environment and to learn the basics of programming

Course Syllabus:

Day one Introduction to Unity. Creating your first 2D game project

- Introduction to Unity and the world of Unity games
- SharkArcade: searching assets and prepare assets for the game
- Unity interface, creating a 2D game project
- Creating Objects and moving around the game scene, changing the Object properties
- Environment creation
- Creating invisible walls: Collider, MeshRenderer

Learning outcome: understand the game development interface and start working on creation of the first 2D game.

Practical task: prepare assets for the SharkArcade game, create your first game objects, environment and materials.

Day two Setting up game Characters. Scripting Basics

- Character Creation: texture, material and components
- Creating the first script, scripting principles
- C# Programming language: basic concepts, commands, variables
- Vector math, define the view direction
- Adjust the Character's rotation to the camera

Learning outcome: customize the appearance and physics of the characters, create their own first custom scripts in C#.

Practical task: write a script, create and customize your character.

Day three Managing component properties from a script. Object's physics

- Objects and their properties. Accessing object properties
- Conditionals in scripts
- Character control, receiving input from the user using axes
- Moving objects: local coordinates, forces and speed of movement

Learning outcome: create scripts using conditionals, configure the properties and movement of Objects using scripts.

Practical task: write scripts to control the character.

Day four Camera control, frame-by-frame animation. Prefabs

- Game Objects Hierarchy: parent and child objects
- Game Objects and accessing Object properties from scripts
- 2D animation in Unity. Creating animation frames
- Prefabs: creating and deleting Objects in the scene

Learning outcome: program various Object states, set up frame-by-frame animation.

Practical task: create game objects from the prefab, create scripts to control camera movement.



Unity 3D Technology. Game Development Course for Beginners. Module 2

Learning goals are to gain the necessary skills to create your own 2D or 3D games in the Unity environment and to learn the basics of programming

Course Syllabus:

Day one **Creating new characters. Scripts to control your character**

- Writing a script to control your character
- Customizing your character's movement
- Creating a splash effect
- Spawn surrounding fish

Learning outcome: create a game scene by adding new characters with new properties.

Practical task: add a new character to the game, create scripts for realistic character behavior.

Day two **Triggers. In-game interface**

- Colliders and triggers. Tracking collider collision
- Event Triggers. Methods in C#.
- Unity game interface. Scoring points.

Learning outcome: understand triggers and their difference from colliders, create a scoring system.

Practical task: write scripts for implementing the mechanics of eating fish and counting score in the game.

Day three **Creating an enemy**

- Creating an enemy game object, its texture and vision
- Programming the behavior of an enemy shark
- Accessing script properties from other scripts
- Stalking the player

Learning outcome: create an enemy in a 2D game - an enemy shark, explain the principles of creating mobs vision in games.

Practical task: create a new game character, implement enemy behavior using scripts.

Day four **Programming of damage and defeat. Methods in C#**

- Working with the interface in programming
- Methods and parameters in C#
- Creating and running your own methods
- Programming damage

Learning outcome: use methods to control the game

Practical task: write scripts to implement damage and defeats.

Unity 3D Technology. Game Development Course for Beginners. Module 3

Learning goals are to gain the necessary skills to create your own 2D or 3D games in the Unity environment and to learn the basics of programming

Course Syllabus:

Day one **Start of creating a new game: Adventure Game**

- Scene control in a 3D game
- Tools for 3D objects
- Landscape modeling using Terrain
- The standard set of assets: Standard Assets

Learning outcome: work with the Unity 3D Editor, the Terrain object and landscape tools.

Practical task: prepare assets for a new game, create a landscape and place objects in the scene.

Day two **Terrain Materials. Vegetation and terrain details**

- What are the normal maps and how to work with them?
- Adding layers to Terrain and drawing with Paint Texture
- Configuring materials in Terrain Layers
- Adding grass with Paint Details

Learning outcome: work out a realistic natural map in their game.

Practical task: add layers to Terrain, draw smth with Paint Texture, add details to your landscape.

Day three **Natural materials and working with light in Unity**

- Tree object: generating branch groups using nodes
- Materials for wood. Paint Trees mode
- Working with scene lighting
- Generating lighting

Learning outcome: add and configure materials and textures for vegetation.

Practical task: create new textures, set and customize lighting objects

Day four **Creating a game character with a third-person view**

- ThirdPersonCharacter from Standard Assets
- Logic of building a character hierarchy with a third-person view
- Working with character physics.

Learning outcome: create our own character with a third-person view, program the character's movement physics.

Practical task: create a test character model, create a script for character movement

Unity 3D Technology. Game Development Course for Beginners. Module 4

Learning goals are to gain the necessary skills to create your own 2D or 3D games in the Unity environment and to learn the basics of programming

Course Syllabus:

Day one **Creating a Game character with a third-person view (continued)**

- Search and replace of the character model
- Implementation of the friction force and jump mechanics in the script
- Adding a character animation

Learning outcome: adjust the character's movement to match the gameplay

Practical task: write scripts for flexible character movement mechanics

Day two **Animation and character states. Jump and kick animation**

- Customize and refine your character's animation
- Implementing and configuring of the jump animation
- Implementing and configuring of the impact animation

Learning outcome: understand the animation management interface and its flexible settings, improve the movement of characters.

Practical task: write and debug scripts for implementing jump and kick.

Day three **Creating an Artificial Intelligence for Enemy Bot**

- Creating motion map
- Creating artificial intelligence for an agent (bot)

Learning outcome: use the tools of the Unity program for creating a bot and its artificial intelligence.

Practical task: create an enemy bot with artificial intelligence and program it.

Day four **Updating the functionality of the Enemy Bot**

- Improve the enemy bot's vision
- Creating a player's health level
- The process of dealing damage from an enemy bot
- Adding animation to the bot and the player

Learning outcome: improve the movement mechanics of the player and the enemy bot, implement the mechanics of dealing damage.

Practical task: write scripts to improve the mechanics of character movement.



Unity 3D Technology. Game Development Course for Beginners. Module 5

Learning goals are to gain the necessary skills to create your own 2D or 3D games in the Unity environment and to learn the basics of programming

Course Syllabus:

Day one Summing up the game creation

- Final setup and testing of created games
- Discussion of final games and presentation preparing
- Outline the game presentation
- Discussion of interim results and Summing up the work on projects

Learning outcome: test the finished game, analyze the work, prepare the project presentation, and present it.

Practical task: check up a presentation plan, compile content (images, screenshots) for your game projects presentation.

Day two Creating a model for a new project Space Shooter

- Installing Blender
- Basics of 3D-modeling in the Blender environment;
- Basic tools for working with objects;
- Modeling a spaceship.

Learning outcome: start creating a Space Shooter, learn the basics of creating 3D-models for the games.

Practical task: creating a spaceship model.

Day three Materials and shaders. 3D game modeling in Blender

- The New project conception
- Refine the spaceship model, add materials and textures
- Work with materials using the Shader Editor.

Learning outcome: understand the physical characteristics of the materials, the concepts of color maps, normals, metal and stiffness.

Practical task: refine the spaceship model: color it, add materials and textures.

Day four Creating an asteroid model. Procedural 3D modeling in Blender

- Creating an asteroid model
- Learning modifiers
- Asteroid texturing
- UV scanning

Learning outcome: use textures to create randomly shaped objects and work with modifiers in Blender.

Practical task: create asteroid model in Blender, using procedural generation.



Unity 3D Technology. Game Development Course for Beginners. Module 6

Learning goals are to gain the necessary skills to create your own 2D or 3D games in the Unity environment and to learn the basics of programming

Course Syllabus:

Day one Working with assets in Blender and Unity

- Model export to Unity, using addons
- Combining materials
- Create a new 3D game project and import a spaceship model
- Hierarchy of objects in the scene
- Creating the sky: Skybox.

Learning outcome: export 3D models from Blender to Unity, create a game project.

Practical task: create textures from materials in Blender, first setup of the sky and lighting in the scene.

Day two Spaceship and flame control

- Spaceship movement programming
- Programming of friction using a script
- Create and configure the spaceship's turbine flames

Learning outcome: control a spaceship from the keyboard, program the physics of its movement.

Practical task: write a script for programming friction while flying the spaceship, create a realistic flame shape from the nozzle of engines.

Day three Spaceship rotation. Setting up camera movement

- Implementing the cosmic dust effect
- Spaceship turns: terms and types of turns
- Setting up the camera position

Learning outcome: explain the theory of setting the speed and tilt of game objects, adjust the camera movement.

Practical task: add the effect of cosmic dust, implement the tilt of the ship in three directions, add a new movement to the camera.

Day four Asteroid movement. Setting up Asteroid Spawn

- Variables PlayerRotation, CameraMovement
- Movement and rotation of asteroids
- Setting up asteroid spawn, creating an asteroid prefab and asteroid object
- Destruction of asteroids

Learning outcome: set up asteroid spawn using scripts.

Practical task: create scripts for spawning asteroids using variables and loops.

Unity 3D Technology. Game Development Course for Beginners. Module 7

Learning goals are to gain the necessary skills to create your own 2D or 3D games in the Unity environment and to learn the basics of programming

Course Syllabus:

Day one Asteroid Impact Programming

- Tracking the asteroid collisions with the player
- Tracking asteroid-to-asteroid collisions
- Editing explosion particles
- Programming an explosion

Learning outcome: create an explosion effect for asteroids and program this animation with scripts.

Practical task: creating and configuring particles, configuring the explosion effect using scripts.

Day two Sounds in the game. Health in the game. Programming the interface

- Adding sound to the game
- HP (health points) system
- Game interface. Canvas and Panel
- Displays the numeric HP value in the game interface

Learning outcome: add sounds to the game, create and configure the HP system for your game.

Practical task: write a script to add sounds to the game, to display HP value in the game interface.

Day three Laser shooting

- The visual part of laser shooting
- Programming of laser shooting

Learning outcome: create a laser object and programmed it to fire a laser.

Practical task: write and debug a script for laser shooting control.

Day four Tracking the intersection of the laser beam with the game object. Ammo system

- Tracking the intersection with an object
- Programming of the ammo system
- Visualization of the ammo system
- Debugging and testing game scripts

Learning outcome: program laser hit tracking, program ammo system.

Practical task: create scripts for setting up the intersection of the laser beam with the game object, create code for managing ammo.



Unity 3D Technology. Game Development Course for Beginners. Module 8

Learning goals are to gain the necessary skills to create your own 2D or 3D games in the Unity environment and to learn the basics of programming

Course Syllabus:

Day one **Points system. Release of laser beams from each gun**

- Release of laser beams from each gun
- Tracking asteroid collisions with the player
- Programming of scoring during the flight of the spaceship
- Scoring points when an asteroid explodes

Learning outcome: create a delay before the explosion, create a scoring system in the game.

Practical task: create scripts for tracking collisions and for scoring system in the game.

Day two **Creating a missile**

- Creating and texturing a missile model
- Exporting the missile model to Unity
- Configuring the missile: fire particles
- Adding missile components

Learning outcome: use new tools in Blender, create a missile model, and export it to Unity.

Practical task: create a missile model in Blender, set up a missile in Unity.

Day three **Implementation of missiles shooting**

- Implementation of missile movement
- Interaction of the missile with other objects
- Missile shooting: creating a child element
- Script for firing missile

Learning outcome: implement the movement and firing of the missile using scripts, implement the collision of the missile with asteroids.

Practical task: create a missile movement script, a missile firing script.

Day four **Creating images in Blender and Postprocessing**

- Adding a missile explosion object
- Creating a missile icon in Blender and adding it to Unity
- Adding postprocessing effects to the game

Learning outcome: improve the appearance of the game by implementing a realistic explosion and postprocessing effects.

Practical task: create a missile model icon in Blender and export it to Unity.



Unity 3D Technology. Game Development Course for Beginners. Module 9

Learning goals are to gain the necessary skills to create your own 2D or 3D games in the Unity environment and to learn the basics of programming

Course Syllabus:

Day one **Creating enemies and bosses**

- Sketchfab service. Adding enemy models
- Programming the enemies spawn
- Implementing simple artificial intelligence for enemies
- Creating scripts for shooting the enemy

Learning outcome: add an enemy and know how to work with new components.
Practical task: create movement and shooting scripts for the enemy.

Day two **Adding new levels and creating the initial game menu**

- Introduction to public methods
- Implementation of level generation and transition conditions
- Adding game points
- Game add-ons and extensions

Learning outcome: create and program the initial menu, extend the game by adding new levels.
Practical task: add generation of new levels to the game.

Day three **Completing the creation of the Space Shooter game**

- Final setup and testing of the created game
- Analyze your project and choose topics for your presentation
- Analyze your skills gained during the course
- Prepare content for the presentation about the Space Shooter game

Learning outcome: test the finished game, analyze the work, select topics and collect content for the project presentation.
Practical task: prepare a presentation plan, create content (images, screenshots) for the presentation about your game projects.

Day four **Course graduation. Presentation of created projects**

- Preparing presentation
- Presentation of projects to parents
- Discuss the course results
- Further education, knowledge and skills in GameDev – personal development and education prospects

Learning outcome: prepare and present your projects, receive recommendations and choose the way for further development in gamedev.
Practical task: prepare and take part in game presentation.