



## Python game development in 2D and 3D on Godot. Module 1

**Learning goals** are to get acquainted with the Godot game development software and learn how to code in the GDScript language (Python dialect).

### Course Syllabus:

#### Day one

##### Introduction to Godot Engine interface

- the basic properties and features of Godot
- introducing the Godot interface
- introduction to the Node system
- adding images to a project
- creating objects in Godot

**Learning outcome:** learned the basics of the Godot Engine.

**Practical task:** add new objects to the level.

#### Day two

##### Programming 2D Platformer in Godot

- introduction to programming in Godot
- creating the first scripts
- adding the CollisionShape node
- creating the basics of the Platformer, jump 'n' run game

**Learning outcome:** learned the basics of the programming in GDScript.

**Practical task:** come up with and implement a level concept.

#### Day three

##### Coins and user interface (UI)

- introduction to variables and conditions
- create a script for coins
- explore the Area2d node and related events
- first look at user interface (UI) and creating Text elements
- learning commands for interacting with the UI

**Learning outcome:** can work with new components and add a user interface.

**Practical task:** add a new item to collect (collectibles).

#### Day four

##### Enemies and portals

- learn how to work with the Tree and the change\_scene command
- creating scripts for enemy movement and attack
- basics of the Prefab concept
- creating new levels.

**Learning outcome:** learned how scenes work in Godot and can create new levels.

**Practical task:** add new levels and prefabs to the game.

## Python game development in 2D and 3D on Godot. Module 2

**Learning goals** are to get acquainted with the Godot game development software and learn how to code in the GDScript language

### Course Syllabus:

#### Day one

##### Bullets and lives

- in-depth study of how variables work
- adding new elements to the UI
- creating scripts for displaying values in the UI
- introduction to Instance and creating objects using code

**Learning outcome:** know how to add new UI elements to the game.

**Practical task:** create items that increase the number of lives and bullets.

#### Day two

##### Potions and powerups

- learning how scripts interact with each other
- creating potions and powerups in the game
- discover Timer and Wait commands

**Learning outcome:** can add powerups to the game and work with new commands.

**Practical task:** add a new type of potion to the game.

#### Day three

##### Items and inventory

- introduction to creating arrays
- adding items to the game
- introduction to Grid element, TextureButton element
- studying button click events

**Learning outcome:** know how to create inventory interface, can work with new components of UI.

**Practical task:** add new collectibles to the game.

#### Day four

##### Dialogs for NPCs

- installing plugins for Godot
- introduction to dictionaries
- creating non-player characters

**Learning outcome:** can add non-player characters to the game and know how the dictionary structure works.

**Practical task:** add new dialogs and NPCs to the game

## Python game development in 2D and 3D on Godot. Module 3

**Learning goals** are to get acquainted with the Godot game development software and learn how to code in the GDScript language

### Course Syllabus:

#### Day one Introduction to 3D. Creating landscape

- creating 3D primitives in Godot
- download and import models
- introduction to control in 3D space
- basic features of Terrain Editor

**Learning outcome:** know how to create 3D elements and the possibilities of terraforming.

**Practical task:** add and import new models to the game, make the game world more picturesque.

#### Day two 3D space physics, FPS character creation

- learning StaticBody and KinematicBody nodes
- creating a character basis
- creating a character movement script
- creating and designing solid state objects

**Learning outcome:** we added a character for a first-person shooter (FPS), wrote a script for his movements, created static and movable solid objects.

**Practical task:** improve the character movement script over the game level add his interaction with objects.

#### Day three Shooting and bullets

- interacting with the RigidBody node and creating physical objects
- working with the Area node and its events
- programming the weapon selection
- programming the bullet firing

**Learning outcome:** know how to create weapons and bullets in 3D-shooter, get to know new nodes.

**Practical task:** add a new type of weapon.

#### Day four Enemies and NPCs in 3D FPS

- adding enemy animated models
- programming the movement of non-player characters (NPC)
- the basics of animations in Godot
- learning scripts for chasing and attacking a character

**Learning outcome:** can add non-player characters and enemies to the game, learned new programming commands.

**Practical task:** add new enemies with different features.

## Python game development in 2D and 3D on Godot. Module 4

**Learning goals** are to get acquainted with the Godot game development software and learn how to code in the GDScript language

### Course Syllabus:

#### Day one

##### Creating tasks for a player

- adding goals to the game
- creating tasks and quests for the player
- introduction to basic quest mechanics
- creating original tasks, game improvements

**Learning outcome:** created game tasks of several types, learned new commands and algorithms.

**Practical task:** add new tasks for player.

#### Day two

##### UI in 3D games

- adding a user interface to display the number of bullets
- adding collectibles and displaying their number on the screen
- creating a button to exit the game
- creating the start menu

**Learning outcome:** can add the user interface to the game.

**Practical task:** improve the appearance of the UI.

#### Day three

##### Adding a sound design to the game

- download and import audio files
- basic elements of Audio
- activate sounds through the script
- sync the game and sounds

**Learning outcome:** know how to add sounds to the game.

**Practical task:** add new sounds to the game.

#### Day four

##### Visual design and working with light

- adding a particle system
- working with light nodes
- learn the properties of light
- applying shadows and managing light through a script

**Learning outcome:** learned the basics of the particle system and new commands.

**Practical task:** improve the appearance of the game.

## Python game development in 2D and 3D on Godot. Module 5

**Learning goals** are to get acquainted with the Godot game development software and learn how to code in the GDScript language

### Course Syllabus:

#### Day one **Preparing to create a Horror game**

- adding models
- working with the camera
- interacting elements and buttons in the UI
- switching between cameras

**Learning outcome:** created the basics of the Horror game.

**Practical task:** download and add new models to the game.

#### Day two **Creating a Horror game**

- adding enemies
- animating objects
- introduction to states, animations, and keys
- scripts for interacting with animations

**Learning outcome:** improved the Horror game, learned the basics of animations.

**Practical task:** connect new types of enemies to the game.

#### Day three **Horror game refinement**

- creating the start menu
- adding quests
- introduction to signal concept
- programming interactions between scripts via signals

**Learning outcome:** knew the signal concept and created the start menu.

**Practical task:** improve the appearance of the game.

#### Day four **Horror game improvement**

- adding traps
- creating a losing and winning scene
- adding sound effects and visual effects
- adjusting the level light

**Learning outcome:** know how to improve the game design.

**Practical task:** finalize the project.

## Python game development in 2D and 3D on Godot. Module 6

**Learning goals** are to get acquainted with the Godot game development software and learn how to code in the GDScript language

### Course Syllabus:

#### Day one **Preparing to create a Racing game**

- adding car models
- creating Terrain
- adding tracks and obstacles
- programming car movement

**Learning outcome:** prepared to create the Racing game.

**Practical task:** download and add new models to the game.

#### Day two **Physics and UI in races**

- adding a Timer
- car physics improvement
- adding weather conditions to the game
- adding rival models

**Learning outcome:** learned the Timer and new physics elements.

**Practical task:** add new types of rivals.

#### Day three **Rival behaviour and finish**

- creating time race mode
- programming rivals' movements
- getting to know the PathFollow node
- programming the finish line, award conditions
- creating a UI for displaying results

**Learning outcome:** learned new nodes and commands.

**Practical task:** improve the appearance of the game.

#### Day four **Creating a car shop and car upgrade shop**

- adding car upgrade shop with new features purchase
- adding car shop with car selection menu
- programming new cars and their characteristics
- adding shop selection to the start menu
- optimization and improvement of the written code

**Learning outcome:** implemented new game elements, refine the game.

**Practical task:** improve the game design.

## Python game development in 2D and 3D on Godot. Module 7

**Learning goals** are to get acquainted with the Godot game development software and learn how to code in the GDScript language

### Course Syllabus:

#### Day one

##### **Return to 2D and create a JRPG game**

- prepare levels, introduction to Tilemap
- introduction to character animation in 2D
- learn the "Animation tree" concept
- programming character movement

**Learning outcome:** learned how to create the basis of JRPG style game.

**Practical task:** add new textures to the game.

#### Day two

##### **Creating new scenes in JRPG style**

- levels improvement using Tiles
- studying the YSort node and distribution objects by layers
- saving character's location when changing scenes
- creation of the start menu

**Learning outcome:** created several game scenes.

**Practical task:** make new game scenes and implement the transitions between them.

#### Day three

##### **Adding inventory, chests, and collectibles**

- adding collectibles and virtual inventory
- creating inventory, adding items
- adding chests and items drag and drop to inventory
- creating UI

**Learning outcome:** know how to add new collectibles to the game.

**Practical task:** add new items to the game and place chests on the level.

#### Day four

##### **Creating item shops**

- adding game currency
- creating shops and implementing items sale
- writing shop scripts to items purchase

**Learning outcome:** added game currency, created sale/ buy game shops.

**Practical task:** add crafting items shop and shop exit button.

## Python game development in 2D and 3D on Godot. Module 8

**Learning goals** are to get acquainted with the Godot game development software and learn how to code in the GDScript language

### Course Syllabus:

#### Day one

##### **Inventory and accessory crafting and improving**

- adding crafting mechanics and creating workbench
- creating script implementing a crafting recipe
- adding and programming UI to output all recipes
- adding weapons, armor, accessories and new features to crafting

**Learning outcome:** added crafting mechanics and UI elements to the game.

**Practical task:** add a slot with accessories that can increase the maximum number of lives.

#### Day two

##### **Combat system and enemies**

- creating new combat scene
- adding monster enemies to the player's combat scene
- implementation of the zone of dynamic transition to the combat scene
- use of inventory during battle

**Learning outcome:** implemented combat game scene.

**Practical task:** add new types of enemies and combat scenes to the game.

#### Day three

##### **Character development system**

- adding a character development system through experience, abilities and rewards in quests
- introduction to the quests game mechanics and programming quests
- the use of conditions and signals to implement quests

**Learning outcome:** created character development system and added quests to the game.

**Practical task:** add new quests and new table with tasks.

#### Day four

##### **Game export and publishing**

- Godot game export in required format
- introduction to hosting and registration
- uploading the game project to the site
- publishing game online and generating its link

**Learning outcome:** know how to publish a game online.

**Practical task:** upload all the games created during the course and publish them online.



## Python game development in 2D and 3D on Godot. Module 9

**Learning goals** are to get acquainted with the Godot game development software and learn how to code in the GDScript language

### Course Syllabus:

#### Day one

##### Writing game scenario

- learning the basics of creating game scenarios
- working on the structure of the game scenario, the role of introduction
- first level detailed scenario sketch
- intermediate game levels development
- elaboration of the idea of the final level

**Learning outcome:** we created the basis for a game scenario.

**Practical task:** generate an idea and write a story for the game.

#### Day two

##### Creating locations

- patterns and levels prototypes
- approaches in game design
- rough and detailed level sketch
- designing new levels

**Learning outcome:** created levels in the game.

**Practical task:** add new levels to the game.

#### Day three

##### Preparing for project presentation

- Fixing previously studied topics
- Selecting game for the final project
- Discussion, implementation and refining of the final game
- Preparation of materials for the project presentation

**Learning outcome:** prepared materials for final project presentation.

**Practical task:** finish the selected game, complete the presentation, prepare the speech for the final project demonstration.

#### Day four

##### Projects presentation

- final preparation for the project presentation
- presentations of the final project according to plan
- discussion of the results of the work, questions and students answers
- summing up the course results, outlining the study prospects

**Learning outcome:** the results are summed up and the course is completed.

**Practical task:** presentations and discussion of created projects, projects analysis and feedback on the work on the course.