

# Computer Game Development

School of Computer Science

Computer Science Department

Course no.: 2-7063810-1

Degree: B.A.

# Schedule

3rd year, 1st semester.

# Lecturer

Prof. Erel Segal-Halevi, 58.3.26, 09-7431290, davidesh@ariel.ac.il.

Office hours: Thursday 15:00-17:00, by appointment.

# Teaching assistant/tutor

# Victor Kushnir, [victork@ariel.ac.il](mailto:victork@ariel.ac.il). Office hours: by appointment.

# Course goal

# The course teaches principles of design and development of computer games. It aims to prepare the students for work in the growing industry of game development in Israel.

# A more general goal is to have students practice in designing and developing a complex software project.

# Prerequisites

\* Passing grades in: Object Oriented Programming, Systems Programming 2, Algorithms 1.

# Method of instruction

# The course applies project-based learning. During the course, every team of students designs a unique, novel computer game, and programs their game in the Unity engine.

# The development proceeds in small steps: each week, the students develop a new aspect of their game, based on the material taught in class. They receive feedback from the TA on each weekly assignment; additionally, they present parts of their work in class and get additional feedback from the lecturer. At the final lecture, they present their project in front of judges from leading game development companies. The judges choose the 3 best games of the year.

# The material is taught in a weekly lecture, given frontally in class, and simultaneously broadcast in Zoom. The lecture consists of two parts: In the first part, selected students present their solutions to last week’s assignment; in the second, new material is taught.

# Course plan

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| Lesson unit | Subject | Lesson # |
| 1 | Game design: ideas; player experience; formal elements. | 1 |
| 2 | Unity: game-objects and components. C# basics. | 2 |
| 3 | Unity: triggers. | 3 |
| 4 | Unity: physics engine. | 4 |
| 5 | Game design: dramatic elements. | 5 |
| 6 | Unity: two-dimensional world; tilemap. | 6 |
| 7 | Unity: three-dimensional world; terrain. | 7 |
| 8 | Game design: dynamic elements. | 8 |
| 9 | Game design: tuning. | 9 |
| 10 | Unity: multi-player games. | 10 |
| 11 | Unity: user interface. | 11 |
| 12 | Advanced topic: AI / analytics / mobile games. | 12 |
| 13 | Game presentation & competition. | 13 |

# Course requirements:

# There will be weekly assignments of two types:

# Usual assignments – for rehearsing the material taught on class.

# Rolling assignments – for developing the novel computer game.

# All in all, there will be 18 assignments; each assignment is worth 3% of the grade, for a total of 54%.

# In addition to submitting the assignments in time, each student has to present 3 assignments in class; each presentation is worth 12% of the grade, for a total of 36%.

# Finally, each team should present their project in the game competition, which occurs in the final lecture. This presentation is worth 10% of the grade.

# Learning Outcomes:

By the end of the course, you will be able to:

1. Invent a unique and novel computer game.

2. Define the player experience in your game.

3. Design all elements of your game – formal, dramatic and dynamic.

4. Program your game in Unity and C#.

5. Perform thorough unit-tests and play-tests on your game.

6. Tune and improve your game so that it attains the desirable player experience.

# Main textbook and additional text books:

1. Lecture notes from previous years (in Hebrew) are available at GitHub:

<https://github.com/gamedev-at-ariel/gamedev-5785>

2. Video recordings of lectures from 2022 (in Hebrew) are available at Youtube:

<https://www.youtube.com/playlist?list=PLM9fKcsATjxjqsyIcU4IRWuo-w4rQf_Pb>

3. Tracy Fullerton: “***Game Design Workshop: A Playcentric Approach to Creating Innovative Games*”, 4th edition, CRC Press, 2018.**

4. Jeremy Gibson Bond: “***Introduction to Game Design, Prototyping, and Development: From Concept to Playable Game with Unity and C#*** ”, 3rd edition, Addison-Wesley, 2022.

# Required material for the examination

# There is no exam – the course grade is based on assignments only.