BSc Computer Science programme

CM3030 Games Development

Module description

Target Audience: Final Year of the BSc Computer Science Online

Module goals and objectives

Upon successful completion of this module, you will be able to:

1. Explain and critically evaluate the types of software used in games development, e.g. games engines, middleware, development tools
2. Explain and critique the development practices used in the games industry, as well as examples of games
3. Use game development tools to develop video games to a specific brief
4. Apply the principals of game design to designing games
5. Understand, explain and use standard AI concepts and techniques relevant to modern video game production
6. Carry out, document and report on the process of short projects

Textbook and Readings

Specific essential readings for each week from the following list are included in the Readings page for each week. All are available to all students from the online library.

- Games Design Workshop, Tracey Fullerton (4th Edition).
- Art of Games Design, Book of Lenses (3rd Edition), Jesse Schell.
- Learning C# by Developing Games with Unity 2020 (5th Edition), Harrison Ferrone.
- Hands-On Unity 2020 Game Development, Nicolas Alejandro Borromeo.

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Module outline

The module consists of ten topics that focus on key areas of the fundamentals of computer science.

Topic 1. Games Industry and Unity (Orientation).	**Key concepts:** History and current state of Games Industry Installation and Intro to Unity What Games Design is. **Learning outcomes:** 1. Summarise some of the key roles in the industry, and how much work is involved in making a game. 2. Understand the need and use for engines and frameworks in games development 3. Explain the role of Games Design, and the Games Design Document during development.
Topic 2. Games Design 1 and Unity (Games Design Documents, Assessments)	**Key concepts:** Analysing a game - what makes it good or bad to play? Ideation Unity Intro - basic interaction and scene building. **Learning outcomes:** 1. Analyse a game and determine *why* it is good or bad. 2. Know and produce ideas for potential development projects. 3. Build a basic scene with some interactivity in Unity.
Topic 3. Games Design 2 and Unity (Good and Bad Games, Ideation)	**Key concepts:** Meaningful decisions Skill and Chance Basic instantiation, co-ordinates and physics in Unity **Learning outcomes:** 1. Understand the role of meaningful decisions and skill and chance in games. 2. Design and create games systems 3. Use basic instantiation, co-ordianates and physics functions in Unity

Topic 4. Games Design 3 and Unity (Events and the Input System)	**Key concepts:** The importance of prototyping during pre-production The importance of, and how to give and receive, feedback on the developing game. Events and Input in Unity **Learning outcomes:** 1. Understand the importance of prototyping in game development. 2. Prepare to receive and interpret feedback on iterations of the developing game. 3. Use events and the Input System within Unity.
Topic 5. Game Feel and Unity (Basic UI in Unity)	**Key concepts:** Game Feel UI in Unity **Learning outcomes:** 1. Explain and discuss the concept of game feel. 2. Identify and modify a developing game to improve game feel. 3. Implement a simple UI in a Unity game.
Topic 6. Unity (Mecanim, version control, assets)	**Key concepts:** Using mechanim for 'gameplay purposes' Version control and Unity Asset import into Unity. **Learning outcomes:** 1. Use Mechanim for purposes other than visual animation. 2. Understand how to use version control for developing a game. 3. Prepare and import audio-visual assets into Unity
Topic 7.	**Key concepts:** State machines for AI Using Navmeshes in Unity

Unity (NavMesh and state machines)	**Learning outcomes:** 1. Implement state machines in the context of AI. 2. Implement a navmesh agent for NPC navigation in Unity
Topic 8. Importance of feedback/playtesting and developer interview	**Key concepts:** Importance of playtesting Focus on group work for assignment **Learning outcomes:** 1. Understand and discuss value of iterative playtesting on developing game project.
Topic 9. Designing Expressive Games	**Key concepts:** Understand how values and ideas are embedded in games, even if it's unintended. Examine and discuss examples of games that have been used for more than entertainment Identify some methods for designing expressive games. **Learning outcomes:** 2. How values and ideas are embedded in games - consciously or not. 3. How games can be made for more than fun 4. How to go about designing these games
Topic 10. Ethics and Summary of Course.	**Key concepts:** Violence in games debate Lootboxes Wrap up of course **Learning outcomes:** 1. Identify key points in the debate on videogame violence. 2. Identify key points in the debate on the use of lootboxes in videogames.

Activities of this module

The module is comprised of the following elements *(please explain in detail the activities included in the module, for example:*

- *Lecture videos.*
  - *Lectures broadly divided between the topics of 'Games Design/Production' and 'Unity'.*
- *Practice Quizzes.*
  - *Each video has a practice quiz after it, and some longer videos have in-video questions.*
- *Peer Reviewed Assignments.*
  - *There are a number of peer reviewed assignments, some of which are direct practices to help students achieve in the graded assignments.*
- *Graded Assignments.*
  - *There are two graded assignments – a group games development document for the mid-way assessment, and a group game project for the final submission (which comprises of a build (per group), the source for the game (per group), and a reflective account of the games production (per student i.e. individually authored).*
- *Discussion Prompt.*
  - *Many videos have discussion prompts in addition to practice quizzes. It is strongly recommended that students engage in these debates with their colleagues.*
- *Group work*
  - *The majority of the assessed work in this unit is done as a group. Both graded assignments and some peer review activities are group work.*
- Team check points
  - There are regular activities where you can comment on how well you think your team is working together and to quickly identify and remedy any problems that might occur.
- Feedback and playtesting milestones.
  - There are three designated points in the latter half of the course where you will be provided with a page to upload a Unity WebGL build. You will then share the link to this page with others via the discussion forums so that they can play your game and give you feedback to improve your game for the final assignment.

How to pass this module

This module is 100% coursework, and there is no exam.

The module has two major assessments:

- Coursework:

○ Mid-term assessment: A group games design document. This will be a detailed account of the game that you intend to make for your final assessment. This will be negotiated, agreed on and written as a group.
You will submit a single .pdf document for your group.

○ Final assessment: A group developed game. This will be the product of several weeks' worth of development time, using the group games design document and the feedback on it as your starting point for development. There will be three feedback/playtesting points in the course where you will be expected to submit an in-development (but still playable) build of your game for testing and feedback from your fellow students. Further playtesting outside of this is strongly encouraged.
*You will submit a desktop build of the game and the source code (as a link to the repository) as a **group**. You will also submit a reflective account of the production of the game as an **individual**.*

● The coursework consists of several activities. This is a detailed breakdown of all of the marks (see an example below and please provide the table relevant to your module)

Activity	Required?	Deadline week	Estimated time per module	% of final grade
Mid-term assessment	Yes	9	10 hours	30
Final assessment	Yes	22	30 hours	70
Peer assessment: Solo concept document	Yes	2	2 hours	0

Peer assessment: WebGL build of Unity test	Yes	4	1 hour	0
Peer assessment: Group concept document	Yes	5	2 hours	0
Peer assessment Make a menu.	Yes	10	3	0
Playtesting / feedback milestones	Yes	15, 18, 21	Variable	0, but collecting feedback and response to it is part of final assessment report.