

**COMP 4478: Game Programming**

Department of Computer Science

Winter 2023

**Instructor Information**

Instructor: Dr. **Sabah Mohammed**, Full Professor and Professional Engineer

Office Location: AT5013

Telephone: +1 (807) 3438777

E-mail: sabah.mohammed@lakeheadu.ca

Website: https://www.lakeheadu.ca/users/M/mohammed/node/17391

Office Hours: Tuesday 11:30-12:30 PM EST

**Teaching Assistant (TA) Information**: TBA (An email will be send at the beginning of the term)

**Course Identification**

Course Number: COMP4478FA

Course Name: Game Programming

Course Location: Hybrid: RB1044 (D2L for Course Materials and Assignments)

Class Times: 2:30-5:30PM EST **F**

Prerequisites: COMP 2412 Data Structures

**Course Description/Overview** -

The Game Programming course is designed for a new generation of computer science students who share a passion for games and multimedia programming. Students design and develop original games for PCs, Mobile and the Web by applying proven game design and software engineering principles. The course uses Daniel Pink metaphor to train gamers on developing creative games. The course starts with a prototyping game development environment that uses cross platform gaming environment like **HaxeFlixel** and **UNITY** to design any innovative game that targets the web, mobile devices and variety of virtual machines as well as the GPU. The skills learned in this course prepare the student for R&D and for joining the gaming industry as well as to ignite the passion for creative game development. Enjoy the unique and award winning course.

Calendar\_Link: <http://navigator.lakeheadu.ca/Catalog/ViewCatalog.aspx?pageid=viewcatalog&topicgroupid=11851&entitytype=CID&entitycode=Computer+Science+4478>

**Course Learning Objectives**

By the end of this course, students will be able to:

* Identify, choose, and implement appropriate algorithmic, programming, and mathematical techniques to develop software components for various aspects of computer games, such as character control, scene management, artificial intelligence, graphics and animation, etc.
* Create prototype games or game fragments by integrating original software components with existing professional tools, such as game engines, middleware, and common application programming interfaces.
* Develop and maintain major game projects and to present them in class
* Plan, prioritize, and manage tasks related to software development using game design patterns
* Evaluate and select appropriate hardware and software platforms for a particular game strategy.
* Develop and maintain software documentation and communicate technical ideas using verbal, written, and digital communication skills.
* Test, debug, and optimize a game or game component to meet production requirements

**Course Resources**

Course Website and Software Resources:

* myCourseLink (D2L)
* HaxeFlixel: <https://haxeflixel.com/>
* Unity: <https://unity3d.com/get-unity/download>
* JavaFX 8: <https://docs.oracle.com/javase/8/javafx/get-started-tutorial/jfx-overview.htm>
* PyGame: <https://www.pygame.org/download.shtml>
* Other IDEs and Tools will be Desribed in Class

Required Course Text(s)

**Textbook 1:**Jeremy McCurdy, Haxe Game Development Essentials, November 2015, Packet Publishing, ISBN: 9781785289781

**Textbook 2:**

Unity 5.x Game Development Blueprints, By John P. Doran, 2016, Packet Publishing, ISBN 9781785883118

**Course Schedule/Outline**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Date | Lecture Title | Assignment Start at D2L | | Assignment Due Date |
| Jan. 11, 2023 | **L1**: Introduction to Game Programming using Haxe and HaxeFlixel | **HaxeFlixel Game Project** (20%)  Exercise 1 (5%): |  | |
| Jan. 18, 2023 | L2: The HaxeFlixel OO Game Development Cycle | Assignment 1 (10%) |  | |
| Jan. 25, 2023 | **L3**: Primitive Animation Effects |  | Exercise 1 | |
| Feb. 1, 2023 | **L4**: Animation with Sprites |  |  | |
| Feb. 8, 2023 | **L5**: Tiled Based Games and Game Physics |  | Assignment 1 | |
| Feb 15, 2023 | L6: Project 1 Presentations |  | Project 1 | |
| Feb 22, 2023 | **Study Break** |  |  | |
| Mar. 1, 2023 | **L7:**  Introducing the Unity Game Development Ecosystem | Unity Project 2 (20%)  Exercise 2 (5%) |  | |
| March 8, 2023 | **L8**: Unity Game Object | Assignment 2 (10%) |  | |
| March 15, 2023 | **L9**: Unity 2D Animation and Unity Joint Animation |  | Exercise 2 | |
| March. 22, 2023 | **L10**: Unity Mobile Games |  | Assignment 2 | |
| March 29, 2023 | **L11: Course Exam (30%)** |  |  | |
| April 5, 2023 | **L12: Project 2 Presentations** |  | Project 2 | |

**Assignments and Evaluations**

Be sure to list everything that you intend to use to calculate the final course mark. A table works well here. Note - If you plan to include some kind of participation mark, be clear about your expectations.

|  |  |  |
| --- | --- | --- |
| Item | Date(s) | Value |
| Assignments | See Schedule | 20% |
| Exercises | See Schedule | 10% |
| Projects (Presentations 5% + Programming 15% for Each Project) | See Schedule and You will present your project s using Zoom (10Min) | 40% |
| Online Final Exam 1 | Zoom + D2L will be used- More Instructions to Follow (See Schedule)- Show Your Student ID | 30% |
| Class attendance/participation | Zoom Attendance | 5% Bonus |
| Total |  | 100 +5 |

**Late Assignments**

Late assignments will be deducted 1 Mark for each 1hour delay and up to 3hrs. After the three hours late assignments will automatically receive a 0 mark.

**Assignments/Exercise/Projects**

Detailed descriptions of the course tasks will provided at your D2L. Please see the course schedule for the time these tasks will appear at the D2L and for the due dates for submitting them.

**Virtual Lab:**

You may like to use the university virtual lab for your programming: http://lakeheadu.ca/labs.

**Course Policies**

My expectations for our course policies are as follows:

* Student should follow the behavioral standards (<https://www.lakeheadu.ca/students/student-life/student-conduct/academic-integrity/node/51239>)
* Zoom Attendance is highly encouraged,
* Office Hourse via D2L Chat at the specified time (See above).

**Academic Integrity Statement:**

I understand and agree that:

(1) Unless otherwise allowed by the course instructor, I must complete the assignments in this course without the assistance of anyone else.

(2) Unless otherwise allowed by the course instructor, I must not access any sources or materials (in print, online, or in any other way) to complete any course exam.

I further understand and agree that, if I violate either of these two rules, or if I provide any false or misleading information about my completion of course assignments or exams, I may be prosecuted under the Lakehead University Student Code of Conduct – Academic Integrity, which requires students to act ethically and with integrity in academic matters and to demonstrate behaviours that support the University’s academic values.

**Copyright**

Students should be aware that all instructional, reference, and administrative materials prepared for this course are protected in their entirety by copyright. Students are expected to comply with this copyright by only accessing and using the course materials for personal educational use related to the course, and that the materials cannot be shared in any way, without the written authorization of the course instructor. If this copyright is infringed in anyway, students may be prosecuted under the Lakehead University Student Code of Conduct – Academic Integrity, which requires students to act ethically and with integrity in academic matters and to demonstrate behaviours that support the University’s academic values.

**Zoom Recording Policy**

In COMP4478, in the context of remote instruction and participation, video and audio recordings of class activities will be made to ensure students' and instructors' easy and comprehensive access to those activities. The recordings are **confidential** and are intended only for the use of the course students and instructors. They may otherwise not be used or disclosed. During recording, to protect others' privacy, each student should ensure that no one else is present in the location where they are being recorded without that non-student's consent. The recordings are made under the authority of sections 3 and 14 of The Lakehead University Act, 1965. Questions about the collection of the images and sounds in the recordings may be directed to Dr. V. Mago.

**Regulations**

It is the responsibility of each student registered at Lakehead University to be familiar with, and comply with all the terms, requirements, regulations, policies and conditions in the Lakehead University [Academic Calendar](http://navigator.lakeheadu.ca/Catalog/ViewCatalog.aspx?pageid=viewcatalog&catalogid=25&chapterid=6999&loaduseredits=False). This includes, but is not limited to, Academic Program Requirements, Academic Schedule of Dates, University and Faculty/School Policies and Regulations and the Fees and Refund Policies and Schedules (Lakehead University Regulations webpage, 2020-21).

**Academic Integrity**

A breach of Academic Integrity is a serious offence. The principle of Academic Integrity, particularly of doing one’s own work, documenting properly (including use of quotation marks, appropriate paraphrasing and referencing/citation), collaborating appropriately, and avoiding misrepresentation, is a core principle in university study. Students should view the [Student Code of Conduct - Academic Integrity](https://www.lakeheadu.ca/students/student-life/student-conduct/academic-integrity/node/51239) for a full description of academic offences, procedures when Academic Integrity breaches are suspected and sanctions for breaches of Academic Integrity.

**Supports for Students** – there are many resources available to support students. These include but are not limited to:

* [Health and Wellness](https://www.lakeheadu.ca/current-students/student-health-and-counselling-centre)
* [Student Success Centre](https://www.lakeheadu.ca/current-students/student-success-centre)
* [Student Accessibility Centre](https://www.lakeheadu.ca/current-students/student-services/accessibility/)
* [Library](https://library.lakeheadu.ca/)
* [Lakehead International](https://www.lakeheadu.ca/international)
* [Indigenous Initiatives](https://www.lakeheadu.ca/indigenous)

Lakehead University is committed to achieving full accessibility for persons with disabilities. Part of this commitment includes arranging academic accommodations for students with disabilities and/or medical conditions to ensure they have an equitable opportunity to participate in all of their academic activities. If you are a student with a disability and think you may need accommodations, you are strongly encouraged to contact Student Accessibility Services (SAS) and register as early as possible. For more information, please contact [Student Accessibility Services](http://studentaccessibility.lakeheadu.ca/)  (SC0003, 343-8047 or [sas@lakeheadu.ca](mailto:sas@lakeheadu.ca))

**Mental Health Help**

All of us can benefit from support during times of struggle. If you or anyone you know experiences academic stress, difficult life events or feelings of anxiety or depression, Student Health and Wellness is here to help. Their services are free for Lakehead Students and appointments are available. You can learn more about confidential mental health services available on and off campus at lakeheadu.ca/shw