International University of Central Asia

Information Technology Program

Agreed
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«_____» _____2019

Program Head
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Approved
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«_____» _____2019

Vice president for academic affairs
and strategic planning
Kalchakeeva A. M. _____

Syllabus – Spring 2019

Instructor: Toksaitov Dmitrii Alexandrovich

Course name: Game Development

Credits: 4

Course Time: Tue, Th: 11:05-12:25

Office Hours: Sat, Sun (remotely through Skype at toksaitov@hotmail.com)

E-mail: toksaitov_d@iuca.kg

I. Course Description

The course introduces students to the topic of game development. It covers theory and practice of video game production. It delves into the fields of computer graphics, computational physics, artificial intelligence, and game-play design. During the course students will get an opportunity to build market-ready games for desktop, web, or mobile platforms. Students will learn on how to use the Unity game engine, the leading game authoring tool on the market. Students will also take a look on a popular alternative, Unreal Engine 4. Finally, they will be introduced to the topic of building a simple game engine from scratch on their own.

Throughout the course, students will have to create a game on their own or together with another student in a team. It is up to the student or the team to select the type of the game to make.

Students will get a chance to make one presentation about any market game of their choice. The presentation should be focused on the game's internals, its development or production process, and tools or techniques used to create it.

II. Course Plan

Week	Topic	Hours
1	Introduction, History, Industry Overview	3
2	Vectors	3
3	Matrices	3
4	Space Transformation	3
5	The Unity Engine	3
5–7	The C# Language in the Unity Environment	6
8	The Unity OOP Model	3
9–11	The Graphics, Physics and UI Subsystems	9
12	The AI Subsystem	3
13–14	Unreal Engine 4 Overview	6
15–16	Building Your Own Game Engine	6

III. Resources

Course Materials, Recordings and Screencasts

Students will find all the course materials on GitHub. We hope by working with GitHub students will become familiar with the Git version control system and the popular (among developers) GitHub service. Though version control is not the focus of the course, some course tasks may have to be submitted through it on the GitHub Classroom service.

Every class is screen casted online and recorded to YouTube for students' convenience. An ability to watch a class remotely MUST NOT be a reason to not attend the class. Active class participation is necessary to succeed on this course.

- **https://github.com/iuca/iuca-gamedev**

Literature

Course Book:

- 3D Math Primer for Graphics and Game Development, Second Edition by Fletcher Done and Ian Parberry (ISBN: 978-1-4398-6981-9)

Supplemental Reading:

- Game Development Essentials: An Introduction 3rd Edition by Jeannie Novak (ISBN: 978-1111307653)
- Game Coding Complete, Fourth Edition by McShaffry and David Graham (ISBN: 978-1133776574)
- Game Engine Architecture, Second Edition by Jason Gregory (ISBN: 978-1568814131)
- Game Programming Patterns by Robert Nystrom (ISBN: 978-0990582908)
- Mathematics for 3D Game Programming and Computer Graphics, Third Edition by by Eric Lengyel (ISBN: 978-1435458864)

IV. Grading

The course grade is formed from the following:

Practice tasks	30 points (30%)
Presentation	10 points (10%)
Quizzes	15 points (15%)
Course project	40 points (40%)
Piazza participation	5 points (5%)
Total:	**100 points (100%)**

V. Scale

	Points	**US Transcript (4.0 system)**	**Grade (Transcript)**	**Kyrgyz Diploma Grade**
A	*94-100*	4	Отлично	Отлично
A-	*90-93*	3,67	Отлично	Отлично
B+	*87-89*	3,33	Хорошо	Отлично
B	*83-86*	3.0	Хорошо	Хорошо
B-	*80-82*	2,67	Хорошо	Хорошо
C+	*77-79*	2,33	Средне	Хорошо
C	*74-76*	2.0	Средне	Хорошо
C-	*70-73*	1,67	Средне	Удовлетворительно
D+	*67-69*	1,33	Плохо	Удовлетворительно
D	*63-66*	1	Плохо	Удовлетворительно
D-	*60-62*	0,67	Плохо	Удовлетворительно
F	*0-59*	0	Провал	Неудовлетворительно

VI. Exams

Theory midterm and final will include quizzes with a list of multiple-choice and open questions. The quizzes are conducted in an electronic form.

For practice midterm and final students must prepare the list of labs and project tasks that they feel confident to defend. An inability to defend a single solution selected at random from the list of selected tasks by the student will result in a grade of F. Students will have 20 minutes to defend their work. The official documentation may be used during the exam. Any attempts to cheat will result in a grade of F. The instructor may ask a number of questions about the student's solution to ensure that he understands the work. The grade may be lowered at the discretion of the instructor if the student can't answer the question properly. The number of prepared tasks and a proper defense will form the final grade for the midterm examination.

VII. Policies

- Attendance is mandatory. More than three misses without a reason will result in 5 points being deducted from the student. If a student has health/family/personal emergency, he

must notify the instructor if possible (through e-mail), to increases the chances for the miss to be not counted.

- Active work during the class may be awarded with up to 10 points at the instructor's discretion.
- Poor student performance during a class can lead to up to 3 points deducted from his final grade.
- Late submissions will receive a penalty of 10 points for every day after the deadline.

We believe that a question from one student is probably a question that other students are also interested in. That is why we encourage students to use Piazza to ask questions in public that other students can see and answer and NOT ask them through E-mail in private UNLESS the question itself is about private matters to discuss with the instructor.

VIII. Academic Honesty

Plagiarism can be defined as "an act or an example of copying or stealing someone else's words or ideas and appropriating them as one's own". The concept of plagiarism applies to all tasks and their components, including program code, abstracts, reports, graphs, statistical tables, etc.

In addition to being unethical, this indicates that the student has not studied the given material. Tasks written from somewhere for 10% or less will be assessed accordingly or will receive a "0" at the discretion of the teacher. If plagiarism is more than 10%, the case will be transferred to the IUCA Disciplinary Committee.

For reports that contain "cut-and-paste", the grade will be reduced, or the work will be canceled. Students are not recommended to memorize before exams, as this is a difficult and inefficient way to learn; and since practice exams consist of open questions designed to test a student's analytical skills, memorization invariably leads to the fact that the answers are inappropriate and of poor quality. Learning exams will decline at the discretion of the teacher.

The following are examples of some common acts of plagiarism:

- Representing the work of others as their own
- Buying work from a website or from another source and presenting it as your own work
- Copying sentences, phrases, paragraphs or ideas from other people's works, published or unpublished, without referring to the author
- Replacing selected words from a passage and using them as your own
- Copying from any type of multimedia (graphics, audio, video, Internet streams), computer programs, musical compositions, graphs or diagrams from other people's works without representation of authorship
- Using other people's ideas or phrases without specifying the author