CSCE 4220.001 & CSCE 5260.001
Game Programming 2

Instructors:  
Curtis Chambers  
Dr. Ian Parberry

Semester:  
Spring 2017

Office Hours:  
Tues & Thurs 1PM – 2PM  
Friday 3PM – 6PM

Class Time:  
Tue & Thur  
11:30 AM – 12:50 PM

Email:  
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Location:  
NTDP F209

Course Description:
Game engine programming techniques, including real-time 3D graphics programming, shader techniques, terrain rendering, level of detail, collision detection, particle engines, 3D sound and character animation.

This class will cover 3D game programming with the Unreal Engine 4 (UE4) paired with C++ programming in Visual Studio. Students will have access to the full Unreal source code. Each class meeting will consist of a lecture followed by a hands-on tutorial. Class attendance is mandatory. Grades will be based on the completion of the class tutorial projects, assignments, and a final project.

Learning Outcomes:
By the end of the course, you will have:

1. Knowledge of the basic techniques of 3D game programming.
2. Experience working with a commercial grade game engine.
3. Ability to program a 3D game.
4. Ability to use more than one revision control system.
5. Experience with programming using a very large code base.

Prerequisites: CSCE 4210 (Game Programming I) and CSCE 4215 (Programming Math and Physics for Games).

Course Requirements:

Attendance: Required.
Exams: None.
Grade: The grade for this class will be based on a sequence of tutorials, assignments, and a project.

**Disability Accommodation:**

The University of North Texas complies with Section 504 of the 1973 Rehabilitation Act and with the Americans with Disabilities Act of 1990. The University of North Texas provides academic adjustments and auxiliary aids to individuals with disabilities, as defined under the law. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring accommodation, please see the instructor and/or contact the Office of Disability Accommodation at 940-565-4323 during the first week of class.

**Course Topics:** (subject to change)

<table>
<thead>
<tr>
<th>Introduction to UE4</th>
<th>Physics Volumes</th>
<th>UE4 Programming</th>
<th>UE4 Interfaces</th>
<th>Character Setup</th>
<th>HUD and Text</th>
<th>Triggers and Matinee</th>
<th>UE4 Blueprints, Advanced</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Creating a scene</td>
<td>• Post Processing</td>
<td>• Adding C++ code to UE4 Projects</td>
<td>• Blueprint Contracts</td>
<td>• Introductory First Person Shooter</td>
<td>• Adding Dynamic Text</td>
<td>• Moving platforms</td>
<td>• Introductory Top-Down Shooter</td>
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<td>Camera Manipulation</td>
<td>• UE4 Sculpting</td>
<td>• to UE4 Projects</td>
<td>• Interfaces messaging</td>
<td>• Animations</td>
<td>• Designing and Implementing Heads-Up Display</td>
<td>• Events</td>
<td>• Rotations</td>
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<td>Insertion of Objects</td>
<td>• Dynamic Physics</td>
<td>• Player Controls</td>
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<td>• Player Controls</td>
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<td>Transform Objects</td>
<td>• Water Meshes and Physics</td>
<td>• Adding a Character</td>
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<td>• Adding a Character</td>
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<td>Lighting</td>
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<td>Textures</td>
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| UE4 Blueprints, Advanced | Sound | Artificial Intelligence (Simple) | | | |
|--------------------------|--------|----------------------------------|--------------------------|
| • Rotations              | • Creating Sound Cues | • Rudimentary AI Navigation | | |
| | • Sound Modulation      | • Introductory AI logic | | |
Schedule: Assignment will be due both in class and on blackboard.

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Assignments (tentative)</th>
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<td>1</td>
<td>1/16</td>
<td>Introductions, Office Hours Survey, UE4 Setup Assignment</td>
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<td>2</td>
<td>1/23</td>
<td>Tutorial 1</td>
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<td>3</td>
<td>1/30</td>
<td>Pitch Week, Project Schedule 1</td>
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<td>4</td>
<td>2/6</td>
<td>Tutorial 2</td>
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<td>5</td>
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<td>Tutorial 3</td>
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<td>6</td>
<td>2/20</td>
<td>Milestone 1, Project Schedule 2</td>
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<td>7</td>
<td>2/27</td>
<td>Tutorial 4</td>
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<tr>
<td>8</td>
<td>3/6</td>
<td>Tutorial 5</td>
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<td>-</td>
<td>3/13</td>
<td>Spring Break (no classes)</td>
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<td>9</td>
<td>3/20</td>
<td>Milestone 2, Project Schedule 3</td>
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<td>10</td>
<td>3/27</td>
<td>Tutorial 6</td>
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<td>11</td>
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<td>Tutorial 7</td>
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<td>12</td>
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<tr>
<td>13</td>
<td>4/17</td>
<td>Tutorial 9</td>
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<tr>
<td>14</td>
<td>4/24</td>
<td>Project Development (final touches)</td>
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<tr>
<td>15</td>
<td>5/1</td>
<td>Project Development (final touches)</td>
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<td>16</td>
<td>5/8</td>
<td>Final Presentation</td>
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Grading Policy:

Grading is, for the majority, binary. In that, you either completed all tasks required on time or you did not. Partial (half) credit is available for late assignments and tutorials up to 1 week after their due date. Afterwards, no credit will be awarded.

After receiving your grade for an assignment, you have one week to discuss it with me. Afterwards, I will make no changes to the grade. Do not come to me at the end of the semester to argue a letter grade bump or penalty that is the result of assignments LONG past it is your job to keep up with your grade throughout the semester, not just at the end of it.

Tutorials

There will be 9 Tutorials.

Each will instruct and test you on the UE4 game development environment. Come prepared to class to maximize productivity. Later tutorials require that you have completed and practiced previous tutorials and their relevant content. A list of topics are also provided in the syllabus that you can use to prepare.

Completing a tutorial on time will earn you full credit. Late tutorials will be accepted up to one week after their due date/time. Late tutorials will earn you half credit.
Assignments

There are a total of 8 Assignments.

Completing an assignment on time will earn you full credit. Late assignments will be accepted up to one week after their due date/time. Late assignments will earn you half credit.

- Office Hours Survey

This allows me to maximize your availability to students outside class. The lab will also be open at these times.

- UE4 Setup
- Project Schedules (3 total)

Throughout the semester, you will be required to keep track of and present your productivity. Since the final project requires you to work on your game while keeping up with the material in the course, you are to propose and update your weekly schedule on the class SVN.

- Project Pitch

You will submit, via blackboard, a small PowerPoint presentation before class. You will then present your game pitch during this week. This, along with your first project schedule, are to uploaded to the class SVN.

- Project Milestone 1

You will demonstrate your project in its current state in class. At this time, you should have a rough game. You will submit a document via blackboard (before class) stating what you’ve accomplished, what you haven’t accomplished and what you need to change (if applicable). This, along with your project schedule, are to uploaded to the class SVN. A blackboard upload of your presentation is also required.

- Project Milestone 2

You will demonstrate your project in its current state. At this time, your game should be nearing completion. You will submit a document via blackboard (before class) stating what you’ve accomplished, what you haven’t accomplished and what you need to change (if applicable). This, along with your project schedule, are to uploaded to the class SVN. A blackboard upload of your presentation is also required.

Final Project

During finals week, each student will have 30 minutes to demonstrate their project. A schedule will be drawn up towards the end of the semester. What I will be looking for is completeness, playability, and if your project contains things that were not covered in class (techno points). Part of this assignment will require you to submit material via blackboard.
The final project is your final grade. Letter grade bumps or penalties will then be applied towards your final grade for the course.

Your final grade will reflect:

- The quality of your game,
- The contribution you made to it,
- The use of subversion,
- Your performance during presentations (pitch and milestones),
- Your final presentation, and
- Your performance on the tutorials and assignments.

Letter Grade Bump and Penalties:

The total number of graded submissions will be 17: 9 Tutorials and 8 Assignments.

- Each is worth 1 point. Late assignments are worth half. A student that fully completes all graded submissions will receive a letter grade bump (if applicable) at the end of the semester.
- For each 5 points missing (effectively one-third of the total) at the end of the semester, you will be penalized a letter grade.

Failure to use the class SVN throughout the semester will result in a letter grade penalty.

The max grade bump you can receive is 1. The maximum grade penalties you can receive is 4.

If you do not submit a final project, the highest grade you could receive is a F.

Course Policies:

Academic Misconduct

- The department, college, and university have very strict guidelines regarding academic misconduct. Students are expected to submit their own work on individual programming projects (tutorials, assignments, and final project).
- You are allowed to discuss solutions, but do NOT work with other students on shared program solutions. Do NOT use even partial program solutions from the Internet without properly citing them. Do NOT recycle a complete game. You may borrow and integrate code from any legal source as long as you properly cite your resources. Failure to do so is considered cheating.
- You will be graded on your contribution to the code. Be honest – attribute your work. Using code without acknowledging it to the instructor is cheating, and will be dealt with in accordance to the departmental cheating policy.
- If it is determined that you have cheated, the first instance of cheating in the class will result in a grade of ZERO on the assignment in question and referral to the department
chairman and dean of engineering. The second instance of cheating in the class will result in a grade of F in the class, and a dismissal hearing may be initiated by the dean of engineering.

- You need to do your own work on your final project as well. Here there should be no ambiguity at all.
- In case the above description, and in-class discussion of my views on appropriate and inappropriate collaboration does not answer all of your questions, please look at the university Student Rights and Responsibilities web page.
- You are responsible for the information covered in class, whether you attend class or not. Individualized lectures will not be given. Please check with other class members for any notes that might have been missed during an absence. Attendance WILL be taken in lecture and your attendance is strongly recommended to improve your opportunity to meet course objectives.
- Students should expect an "in-lab" program each week in lab. The program will be submitted before that lab session is complete.
- There will be two Milestones to check-up on the progress of your final project; each with increasing requirements to ensure that you are working on your individual project.
- Progress on your final project should start by the first week of class. The software used is available for home use. The lab is also open during my office hours and other key hours. With both, you are fully expected to have the ability to work on your project outside of class. Students who plan to have difficulty with this should meet with me before the end of the second week of classes.
- Each student should adhere to the university’s student code of conduct.

**Excused Absences:**

Students are expected to schedule routine appointments and activities so as not to conflict with attending class. However, some absences cannot be prevented. In the event of a medical emergency or family death, etc., students must request an excused absence as quickly as feasible following the event. Use common sense. Students must provide documentation that verifies the reasoning for the excused absence.

**Emergencies:**

By definition, emergencies cannot be planned for. Your instructor attempts to make accommodations in these instances that allow for making up missed work and completion of the course in a timely manner. Students must provide documentation that verifies the emergency.