CSCE 4215
Programming Math & Physics for Games
Syllabus 2016
Ian Parberry
Dept. of Computer Science & Engineering
University of North Texas

About Me
- My name is Ian Parberry.
- If you wish to be formal, call me "Dr. Parberry".
- Contact: ian@unt.edu.
- For more information: http://larc.unt.edu/ian

Office Hours
Tue 2:30-5:00
Thu 2:30-5:00
NTDP F209

Catalog Description
Fundamentals of game math and physics for game development, including linear algebra, matrix math for graphics, quaternions, basic physics equations, game math and physics implementation, physics engines.

Prerequisites
The listed prerequisites for this class are:
1. MATH 2700: Linear Algebra and Vector Geometry
2. CSCE 2100: Computing Foundations I
3. PHYS 1710/PHYS 1730: Mechanics

Learning Outcomes
1. Demonstrate knowledge of linear algebra applied to computer games and graphics.
2. Demonstrate knowledge of geometry applied to computer games and graphics.
3. Demonstrate a basic understanding of mechanics sufficient to understand and solve problems involving bodies in motion.
4. Construct discrete implementations from continuous mathematical models demonstrating knowledge of numerical methods and programming paradigms.
5. Demonstrate competency in the writing and testing of math and physics-related code for computer games.
Course Philosophy

The professional game programmer:
- Needs a working knowledge of game math and physics.
- Does not need rote memorization of math formalism.
- Needs an intuitive understanding of what all the math means, and how it is implemented in code.
- Does not need to write their own physics engine.
- Needs to be understand from personal experience how physics engines work, where their pitfalls lie, and how they are used.

Assessment

- There will be 8 programs and a final project.
- That’s all. No written homeworks or exams.
- You will be working with game physics code both from scratch and with the Box2D physics engine.
- I will give you working code that you must modify.
- You will submit source code via Subversion (more details later).

Grades

- Each program will be graded A through F.
- The final project will be worth 2x.
- That’s a total of 10 letter grades.
- Your final grade will be determined as follows:

<table>
<thead>
<tr>
<th>Program Grade</th>
<th>Final Grade</th>
</tr>
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<tbody>
<tr>
<td>A</td>
<td>32-40</td>
</tr>
<tr>
<td>B</td>
<td>24-31</td>
</tr>
<tr>
<td>C</td>
<td>16-23</td>
</tr>
<tr>
<td>D</td>
<td>8-15</td>
</tr>
<tr>
<td>F</td>
<td>0-7</td>
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</tbody>
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The Game Lab

- NTRP F204
- Open 20 hours per week (ish)
- Lab hours will be posted
- 24 Intel Core i7-3930K CPU @ 3.2GHz with 32GB of RAM (hex-core, hyperthreaded)
- Dual monitors, DirectX 11.2 capable video cards
- 64-bit Windows 8.1
- Visual Studio 2015

Class Policies

- Attendance is not mandatory, but try not to miss too many classes.
- Please put your cellphones on “stun”, but it’s not the end of the world if you forget.
- No makeup work unless you have a documented emergency and I am notified as soon as the situation allows.
- No group work.
**Cheating Policy**

- The Department of Computer Science & Engineering cheating policy will be adhered to.
- Any student caught cheating will receive a grade of **F** for this course, and further disciplinary action will be taken.

**ADA**

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.

**DEPARTMENT OF COMPUTER SCIENCE and ENGINEERING**

**CHEATING POLICY**

- Cheating will be suspected if an assignment that calls for independent development and implementation of a program results in two or more solutions similar to one that can be converted to another by a mechanical transformation.
- Cheating will be suspected if a student who was to complete an assignment independently cannot explain both the intricacies of his/her solution and the techniques used to generate that solution.
- While it is not possible to give a complete definition of cheating, the following gives examples of clear instances of cheating and not cheating:
  - **Cheating:**
    - Turning in someone else's work as your own. This includes, but is not limited to, another classmate, another textbook, a student in another class, or a student in a prior semester.
    - Allowing someone to turn in your work as their own.
    - Several people writing one program and turning in multiple copies, all represented (implicitly or explicitly) as individual work.
    - Stealing an examination or solution.
    - Using unauthorized material during a test or quiz.
    - Changing a test, program, or other student work after the work has been graded and requesting that the work be regraded.

- **Not Cheating:**
  - Turning in work alone or with the help of the course's staff.
  - Submission of one assignment for a group of students if group work is explicitly permitted (or required).
  - Getting or giving help on any university or department operating system.
  - High-level discussion of course material for better understanding. Discussion of assignments for clarification.

- When cheating is deemed to have occurred, appropriate disciplinary action will be taken.
- A notice will be placed in the student's permanent computer science record outlining the behavior and the subsequent disciplinary action.
- The instructor will impose a penalty of failure in the course and may deny the student permission to drop the course.
- It is also possible that the student may be barred from subsequent registration in any computer science and engineering courses at the University of North Texas.
- The matter will be referred to the appropriate dean for further university action.
DEPARTMENT OF COMPUTER
SCIENCE and ENGINEERING
CHEATING POLICY

• The student is directed to the University of North Texas Student Handbook for general university regulations on cheating under the section on categories of misconduct.
• All procedures concerning cheating are subject to the student’s right to due process as outlined in the Student Handbook.

Summary

• This is a class on programming the mathematics and physics needed in games.
• The emphasis is on the understanding and implementation of math and physics.
• There are 8 programs and a final project.
• Don’t cheat.