GAME 3150: Game Design Algorithms
324 Ryder Hall
Fall 2012
Mondays 2:50-4:30
Wednesdays 2:50-4:30

Instructor:
Magy Seif El-Nasr
Associate Professor
Northeastern University
445A Ryder Hall
Email: magy@northeastern.edu

Description:
This class is focused on uncovering how a game engine works. This includes graphics, rendering algorithms as well as networking, collision detection, threading, handling events and input, and scene management. Students will work on several assignments in-class and outside that will allow them to apply the theoretical concepts within a game engine. For this class we will use XNA. In addition to the individual assignments, students will work in a team of two to develop a game using an engine of their choice, such as Half Life, Unreal UDK or XNA.

Learning objectives:
The objective of this class is to give students a practical understanding of the algorithms needed to build and design games both 3D and 2D.

Specifically, if successful, students will be able to demonstrate understanding of the following concepts:
- Game engine architecture
- 3D graphics concept of rendering, translation, rotation, and manipulation of complex objects within a scene as well as lighting and camera basics
- Collision detection
- Game logic programming
- Threading and memory management
- Network game programming
- Adding and handling input devices
- How to build a game using XNA game engine

Teaching Method:
The course will be taught in a combination of lecture and in-class and out-of-class assignments that demonstrate knowledge and understanding of the subject through applying the concepts algorithmically.

Course Prerequisites:
GAME 2150
GAME 3150 Syllabus

Text Book:

References (Recommended):
- Tom Miller and Dean Johnson. *XNA Game Studio 4.0 Programming: Developing for Windows Phone 7 and Xbox 360*, Addison-Wesley Professional, 2010.
- Aaron Reed. *Learning XNA 4.0: Game Development for the PC, Xbox 360, and Windows Phone 7*, O’Reilly, 2010.

Evaluation:
Grading rubrics are established for each assignment. For assignments, demonstration of code execution will merit understanding of the concepts (80%). 20% of the assignment will be based on code review done by instructor.
For the project assignment, different criteria are used. In particular, the criteria will include: (a) demonstration of presentation skills through presentation of the project ideas and final project, (b) creativity in selection and development of the game pitch, (c) demonstration of writing and communication abilities, and (d) demonstration of ability to work in group and manage complexity of the project.

Assignments (50%) – individual

Quiz (20%)

Project (30%) – group of two
  Iteration 1: 5%
  Iteration 2: 5%
  Iteration 3: 5%
  Final: 15%
  Pitch: 0% advancement to planning
  Project Plan: 0% advancement to iteration 1

Software Required:
- XNA

Optional Software:
- Half Life
- Unreal UDK
- Unity

Class Conduct:
*Cell phones and Texts:* No use or cell phones, texting is permitted.
*Social Networking:* social networking is not allowed unless specified by the instructor.
*Late:* Don’t be late (more than 7 minutes is considered late). Every class you are late without permission will result in deduction of 2% from your grade.
Attendance: attendance is required. Absence without a pressing and convincing excuse will result in 5% deduction from your grade.

Use of 3D party assets or code: you are encouraged to use resources from the Internet. All arts and code used from other resources should be acknowledged and the sources/author should be credited. Failure to do so will be considered plagiarism, which has severe repercussion to your grade and your academic standing in the University. As a student in the University you are expected to be familiar with and abide by Northeastern University rules of academic honesty and integrity, including plagiarism. Full text of Northeastern’s Academic Honesty and Integrity Policy can be found online on the Office of Student Conduct and Conflict Resolution (www.osccr.neu.edu) at http://www.northeastern.edu/osccr/academichonesty.html.

Disability:
Any student who feels s/he may need an accommodation based on the impact of a disability should contact me privately to discuss your specific needs. Additionally, if you have a documented disability you are protected from discrimination and have the right to a reasonable accommodation. Additional information can be found at the Northeastern University Disability Resource Center (www.access-disability-deaf.neu.edu).

Participation in TRACE:
TRACE (Teacher Rating and Course Evaluation) is a required part of every course. Your participation is needed and encouraged as it is one way to enhance the quality of the course. Your voice matters.

Tentative Outline:

<p>| Week 1 (Sept 5): | Introductions |
| Week 2 (Sept 10, 12): | Game Architecture, 2D Graphics |
| Week 3 (Sept 17, 19): | 3D Graphics, Scene graph |
| Week 4 (Sept 24, 26): | Camera, Lighting and other objects |
| Week 5 (Oct 1, 3): | collision detection and physics |
| Week 6 (Oct 10): | threading and memory management |
| | Oct 8th No class |
| Week 7 (Oct 15, 17): | AI and Games |
| | Oct 15th Guest Lecture |
| Week 8 (Oct 22, 24): | Network Programming |
| Week 9 (Oct 29, 31): | Character (NPCs behavior) and planning. Game Project Cycle |</p>
<table>
<thead>
<tr>
<th>Week 10 (Nov 5, 7):</th>
<th>Input Devices, sensors. Project planning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 11 (Nov 11, 14):</td>
<td>Intelligence in avatar control (Smart Body)</td>
</tr>
<tr>
<td>Week 12 (Nov 19-21):</td>
<td>project work and re-planning&lt;br&gt;Nov 21&lt;sup&gt;th&lt;/sup&gt; thanksgiving</td>
</tr>
<tr>
<td>Week 13 (Nov 26):</td>
<td>project work and critique of iteration 2</td>
</tr>
<tr>
<td>Week 14 (Dec 3&lt;sup&gt;rd&lt;/sup&gt;):</td>
<td>project work, final polish and critique</td>
</tr>
</tbody>
</table>