Catalog Description

CS 481/681, Advanced Computer Game Design (3+0) 3 credits

The engineering, science, and art in creating advanced computer games. Design and implementation of game components in producing usable and engaging computer games. Prerequisite: CS381

Introduction

We will study the technology, science, and art involved in the creation of computer games. The course will emphasize hands-on development of games. We will study the art and design principles for developing usable and engaging games including: software engineering, human computer interaction, gameplay, thematic structure, graphic design, choreography, music and sound effects, and game aesthetics.

The course will include visiting lectures and a variety of group projects. The group projects will involve system implementation, but emphasize design and use of existing tools. The final group project will require the students to go through all phases of brainstorming, system conceptualization, specification, design, implementation, and evaluation.

Instructor

Sushil J. Louis: SEM 233 (784-4315), sushil@cse.unr.edu, http://www.cse.unr.edu/~sushil/

- Office Hours
  - MW: 10:00 - 11:00
  - T: 10:00 - 11:00
  - And by appointment (email sushil@cs.unr.edu for an appointment)

Textbook

- Required: There is no required textbook for this course. However, there are a set of required readings for this course on the class web page.


- Recommended: Chris Crawford on Game Design by Chris Crawford. New Riders Games; 1st edition (June 18, 2003)

Course Objectives

Students will demonstrate an understanding of the principles of game software architecture and design by completing game design assignments and projects.

How does this relate to National Standards about what Students in Computer Science and Engineering should know? The section below lists the criteria by which students will be judged.

ABET Criteria 3 outcomes

1. an ability to apply knowledge of computing, mathematics, science, and engineering.
2. an ability to design and conduct experiments, as well as to analyze and interpret data.
3. an ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs, within realistic constraints specific to the field.
4. an ability to function effectively on multi-disciplinary teams.
5. an ability to analyze a problem, and identify, formulate and use the appropriate computing and engineering requirements for obtaining its solution.
6. an understanding of professional, ethical, legal, security and social issues and responsibilities.
7. an ability to communicate effectively with a range of audiences.
8. the broad education necessary to analyze the local and global impact of computing and engineering solutions on individuals, organizations, and society.
9. a recognition of the need for, and an ability to engage in continuing professional development and life-long learning.
10. a knowledge of contemporary issues.
11. an ability to use current techniques, skills, and tools necessary for computing and engineering practice.
12. an ability to apply mathematical foundations, algorithmic principles, and computer science and engineering theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.
13. an ability to apply design and development principles in the construction of software systems or computer systems of varying complexity.

In addition, our Department has specific objectives for our students:
Computer Science and Engineering Program Objectives:

Within 3 to 5 years of graduation, our graduates will:

1. be employed as computer science or computer engineering professionals beyond entry level positions or be making satisfactory progress in graduate programs.

2. have peer-recognized expertise together with the ability to articulate that expertise as computer science or computer engineering professionals.

3. apply good analytic, design, and implementation skills required to formulate and solve computer science or computer engineering problems.

4. demonstrate that they can function, communicate, collaborate and continue to learn effectively as ethically and socially responsible computer science or computer engineering professionals.

Course Outcomes

Now we can relate national criteria and departmental objectives to this course’s outcomes. That is, what do I expect from you when you finish the course and how will we measure whether you know what you are expected to know.

Students will demonstrate an understanding of the principles of game software architecture and design by completing game design projects.

1. Students will understand principles of game software architecture

   - **Assessment Method:** Create a game from existing graphics, physics, and artificial intelligence components
   - CSE Program objectives impacted: 2, 3, 4
   - ABET Criterion 3 outcomes: 1, 4, 5, 11, 13

2. Students will understand principles of game design

   - **Assessment Method:** Implement games in projects
   - CSE Program objectives impacted: 2, 3, 4
   - ABET Criterion 3 outcomes: 1, 4, 5, 7, 11, 13

Topics

1. Introduction and course outline

2. Review of History of Computer Games and Game Design principles

3. Game Design Process

4. Game Design Roles

5. Game Design Principles

6. Serious Games
Assignments, Presentations, and Projects

You will build two games. The first one may be a simple 2D arcade style game. We expect the second game to be an industrial strength one-level minimum, original, serious game built in a multi-disciplinary team.

During the design and implementation of these games you will present your ideas, create specification documents, analyze requirements and produce requirements documents, and work in multi-disciplinary teams.

There will be reading assignments covering the required readings.

You will be using ECC computers and a special set of computers in the DeLaMere Library.

Graduate component

Graduate students will achieve deeper understanding of the material presented by being given additional readings and additional work in all course assignments and projects.

Any group with a graduate student is a graduate group. Graduate groups will also have to complete portions of the assignments and projects clearly identified in the assignment and project handouts. For example, in designing an arcade game, graduate groups will design the game with multiple levels. An undergraduate group will need only design one level.

Grading

You will be evaluated on project deliverables, project presentations and publications, class participation, and readings. The tentative (subject to modification) breakdown looks like:

<table>
<thead>
<tr>
<th>Item</th>
<th>SubItem</th>
<th>Final Grade Percentage</th>
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<tbody>
<tr>
<td>First Project</td>
<td>Concept</td>
<td>1%</td>
</tr>
<tr>
<td></td>
<td>Specification and Design</td>
<td>4%</td>
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<tr>
<td></td>
<td>Implementation, Integration, and Testing</td>
<td>10%</td>
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<td><strong>15%</strong></td>
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<tr>
<td>Final Project</td>
<td>Concept</td>
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<tr>
<td></td>
<td>Specification and Design</td>
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<tr>
<td></td>
<td>Implementation, Integration, and Testing</td>
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<tr>
<td>Project downloadable installer</td>
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<tr>
<td>Readings</td>
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<tr>
<td>Class participation</td>
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<td>4%</td>
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<tr>
<td>Game Videos and Posters</td>
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<tr>
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Disability Statement

The Department of Computer Science and Engineering supports providing equal access for students with disabilities. I am available to discuss appropriate academic accommodations that students may require. Please meet with me at your earliest convenience to ensure timely and appropriate accommodations.
0.1 Late Policy

No late projects, presentations, or assignments will be accepted.

Attendance

All students are expected to attend all scheduled classes.

Sharing

You are encouraged to discuss ideas and techniques broadly with other class members, but not the specifics of assigned problems except as part of group projects. Read the code of student conduct at http://www.unr.edu/stsv/acdispol.html.

All write-ups, reviews, documentation, and other written material must be original and may not be derived from other sources.

Guest Lectures

From time to time we will have invited speakers to give us a talk related to this course. The class may then meet at another location. I will notify the class when we such a lecture and I will post a message on our web page.

Communications

If I need to communicate with the class as a group I’ll post a message on our web page. You are required to check the class web page and your email every day. The class web page is at: http://www.cs.unr.edu/~sushil/class/games/index.html.