Game Design I-Theory of Games and Level Design
Mon 12:00-2:50 p.m.

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Course Objectives:
Upon completion of the course the students will be able to:

*Define Games and Play
* Recognize and apply basic principles of game design, including the design of rules, a core game mechanic, victory and loss conditions
*Rapidly prototyping a game design idea
*Playtest and revise a game concept
*Complete a finalized game design document
*Understand the theoretical and technical requirements of game asset creation including:
-Introduction to lowpoly modeling for games
-Introduction to texturing for games
-Introduction to game engine workflow

Attendance/Homework/Grading Policy:

Attendance:
Attendance is absolutely important in this course. If you have three unauthorized absences you will fail the course. Authorized absences can only include such things as sickness or family emergency.

Homework:
Homework will be given on a weekly or biweekly basis. It will directly reflect upon what is covered in class but will encourage that the student investigating issues more deeply than dealt with in the classroom.

This is a challenging course and you will be spending at least 20 hours/week on homework.

Backups:
All project work completed over the course of each semester must be archived. SVA servers are not a reliable place to store data and may be deleted. As a result, it is recommended that students purchase a portable firewire drive or make frequent CD/DVD burns. Please note that excuses for missing homework will not be accepted.

It is the student's responsibility to keep up to date with the class, both in terms of homework assignments given and weekly
topics. In most circumstances I will not cover material more than once.

Grading:
50% grading of weekly assignments
30% final assignment
20% attendance

MANDATORY READING:
Rules of Play: Game Design Fundamentals, Salen and Zimmerman
Unity Game Development Essentials, Will Goldstone (http://www.amazon.com/Unity-Game-Development-Essentials-Goldstone/dp/184719818X)

SUGGESTED READING (THEORY AND TECHNIQUE):
Game Art: Creation, Direction, and Careers, Riccard Linde
Game Architecture and Design-A New Edition

Websites:
Everything About Games: **www.gamasutra.com**
Notes on Character Design: **http://www.gamasutra.com/resource_guide/20011119/meretzky_01.htm**

Unity3d.com
learningunity3d.com
www.3dbuzz.com

COURSE COMPONENTS
The course will have four areas of emphasis:

1. Playing Games: Students must play games in order to learn how to design them. This class will focus on digital games but analog games are also important.

2. Analyze Games: Every time students play a game, they should have an opportunity to analyze it. The analysis might take the form of an informal discussion or it might be a formal written critique.

3. Making Games: The course will involve students in the creation of games. These games may be digital or non-digital although for the purposes of this course, most games will be digital. Game design projects involve making a game from scratch, and can be designed to take place within a single class, over a weekend, during two or three weeks, or over the course of a single semester.

4. Iterative Design Process: Iterative design is a play based design process. Emphasizing play testing and prototyping, iterative design is a method in which design decisions are made based on the experience of playing a game while it is in development. Iterative design is a cyclic process that alternates between prototyping, play testing, evaluation, and refinement.

PRODUCTION DEADLINES:
Session 2:Initial Game Ideas
Session 3: Initial Design Document-Play testing
Session 8:Alpha Ends
Session 14:Beta Ends
Session 15: Production Ends-Evaluation

COURSE OUTLINE
Session 1:

THEORY:
Why Do We Play?

Introduction to Unity as a development tool
What is a core mechanic?

In Class Exercise:
Battlestar Galactica Online
Cultural Rhetoric Vs. Cultural Resistance
Games tell you something about culture-Can you tell them something else?
The Point of Modding-And this course

The game design and production process:
Iterative design+play testing (repeat)

Concept to Completion (concept (the design document)>level design>maquette modeling>revision (playtesting)>production modeling> production shading>production lighting)

TECHNIQUE:
Introduction to Unity

Homework:
Read:
ROP, Chapter 30: Games as Cultural Rhetoric ,Chapter 32: Games as Cultural Resistance,

Do:
Arrive to class 2 with initial game ideas. Using the Making Games Questionnaire as a starting point write an initial design document attempting to clarify and identify what your game project for the semester will be. Note, please review goals of final project and think about a good idea first.

Arrive with production quality concept sketches of your initial idea and a graph paper drawing of your initial level design.

Session 2:
THEORY:
A quick primer on Modularity and size
Why powers of two?

TECHNIQUE:

Basic navigation and the Interface
Units of Measurements: grid side and spacing consistent with 3d applications.
Playerstart
Lighting

Homework:
Read:
http://www.gamasutra.com/features/20051202/mader_01.shtml (very important article)
ROP: Chapter 2+Commisioned Essay 1: Reiner Knizia, Play as Research

Do:
FINAL Design Document –
For next week create the following:

*Story: Arrive to class with a detailed (several paragraph) history and background on the place where your level is going to be played. Where is it? What time frame does it take place in? Give detailed elements which could help to fill out our sense of this world. This needs to be a typed word document with the point being that the story idea should help to flesh out the visual style and structure of your level

* Level design: Arrive to class with a **playable** visual depiction of what the terrain, features, and architecture in your world look like. This will be made in Unity using BSP modeling and must be consistent with what you believe the extent of the game will play like. Think about how tall objects are, what their size is, and how these elements influence the interactivity of the game. The end result will look like a simple bounding box world.

* Production schedule: Make a word or excel spreadsheet which contains all the elements which you could possibly need to build to make the level complete. This will include characters, environments, props and other things. Start with critical elements and end with “added features” that would be nice to add but are

not necessary. Plan a strategy for completing your level in the course of the 15 week semester and using the predefined deadlines as a basis

Please be aware that students will need to consider the following:

1. What makes a level exciting?
2. Why do I want to play this level?
3. Is there a Point?
4. How am I using the physical environment in a novel or engaging manner?
5. How am I using modular methods to make my level design easier to do and more efficient?

Session 3:

DESIGN Presentation and production planning
Playtesting and criticism

THEORY:
What is a level? Analog Vs. Digital
A combination of design, interactivity and the rules
How does space affect our perception of emotions?

TECHNIQUE:

Homework:
Read:
ROP, Chapter 6: Interactivity

Do:
Using your initial design presentation as a starting point and based upon the feedback of your initial presentation, produce and alternative game design that changes and improves the idea and/structures you've created.

In addition, working from your production schedule, for next class, arrive with at least two static mesh models completely finished and production quality. These elements do not need to be textured but they should be finished and may have an initial UV applied to them.

Session 4:

THEORY:
Modularity in the modeling process
Game Art Optimization
Polycount reduction-tricks and tips
L.O.D. (level of detail). Think about the silhouette

TECHNIQUE:
Working With Static Mesh
Avoiding the fan polygon-Ways to cap holes

Homework
Read:
ROP, Chapter 23: Games as the play of experience

Do:
Using a single object as your starting point, conceptualize a complete and modular element which could be used as a design asset within your game. From this idea, think of modular methods which you can use and reuse accordingly. Finally, build the model, import into Unity and show as many possible variations as you can think of.

Session 5:

TECHNIQUE:
UV Manipulation
What is a UV?
Compare UV vs Projection Mapping. What situation requires what method?
Tools to manipulate UVs
- UV Texture Editor
- Relax UV
- Stitch UV
- UV snapshot

What is an ATLAS?

TECHNIQUE:Concept Art to Completion
Game shading in Practice
The importance of Color

Homework:
Do:
For next week, bring to class four complete new 5"x7" 300 dpi PSD digital concept art examples of your semester project. We will be using this as a starting point for game texturing and lighting. One good trick as a starting point is to take renders from 3d and use these as a background layer for your photoshop work.

In addition, arrive to class with one model correctly UVed and laid out with an ATLAS texture.

Session 6:

TECHNIQUE:
Texture Painting I
Game Texture Restrictions
Color Palette and Size Restrictions
Color Depth and preferred file format
- TGA vs. DDS

Color Map vs. Diffuse Map
Alpha channel vs. transparency Maps
Tiling Texture

Texture Painting in practice: Photoshop tips and tricks
- Working from Nature: Photographs
- The Clone Tool

Homework:
Do:
Shoot a series of digital photos to use as reference materials for your semester project to use with texturing (Please do not download textures from the internet). Arrive to class with a database of these photos. In addition, and using one of your concept art examples as a starting point, model and texture in production

quality an in game element for your final. Arrive to class with this object in your level and finished.

Session 7:
In class work on midterm

Technique:
Making a Unity Shader
How this differs from photoshop textures
Building a simple normal map using Photoshop

Homework:
Do:
Work on midterm. All in game elements must be modeled and placed in your game. All in game models must reflect final quality and must have an initial UV applied to them.

In our midterm we will playtest and critique games to get a sense of how we will need to modify or change the project. Please be aware that an incomplete game will result in a failing grade for the midterm.

Session 8:
MIDTERM

ALPHA-all modeling and interaction complete

Playtesting and evaluation

Session 9:
TECHNIQUE:
Creating a texture set
Using an initial texture to create a library of varying images
Creating texture sets that reflect concept art and lighting design
Creating Realistic Terrain (using a quad poly)

H**omework:**
Do:
Arrive to next class with three environmental texture set (6 variations) of any anticipated asset in your game (for example, floor, wall, sky). Note that this set must be self tiling and in correct format/size.

In addition, make a color study of your environment and prepare a large format concept art which shows what the sky and background environments will look like. Please note, this image should be @ 512 height by at least 3000 width.

Session 10:
TECHNIQUE:
Particles and Special Effects
Cloud layers/ smoke layers
Combustion and gaming

Homework:
Do:
Using any available software, create a complete series of particles that you can use to represent any of the

following [fire, smoke. Sparks, clouds, dust, etc…]. Please note that these particle systems must be consistent with the overall concept design of your level.

Session 11:
TECHNIQUE:
Advanced Texture Techniques:
Static Mesh, vertex lighting, and baked Shadows

Faking Global Illumination into Textures
Using ambient occlusion to get the dirty real look

Homework:
Do:
This week's homework assignment is a challenge. The goal is to build a simple and basic self contained environment which will be lit via global illumination only. Keep it simple and focus on building ALPHA textures for any element which will be globally illuminated. The goal is to make something look as photoreal as possible and have all the lighting detail built into the texture only.

Session 12:
THEORY:
Game Lighting in Practice: A General Theory of Lighting

TECHNIQUE:
Lightmaps vs. Vertex Lighting
Adding Lights in Unity
- Light parameters
- Adjusting Shadow Quality/size

Homework:
Do:
TBA

Session 13:
In class work on Final Project

Homework:
Do:
Work on final project

Session 14:
In class work on Final Project

Homework:
Do:
Work on final project

Session 15:
FINAL PROJECT

The final project for the semester will be to create unique game art of your own design. Aesthetics, style, and all other methods are open to interpretation and will be judged relative to the success of the final piece. The format, in terms technique, is open to individual interpretation but the style must be consistent with the students' individual aesthetic interests and the game must be a Unity Tournament level. This will be a long term project and will be formulated over the course of the semester through the creation of initial game ideas, a revised formal design document, followed by a production schedule including a focus on iterative design and playtesting.

The format of the final project will be based upon something which can be physically turned in and played. In addition, on the due date for the final project, students will be asked to play and evaluate each other's game to determine success.