COLEMAN UNIVERSITY

San Diego, CA San Marcos, CA

Course Syllabus

COM153 Game Programming Concepts C++

COURSE DESCRIPTION

This course will introduce object-oriented programming in C++ using DirectX in the field of game programming. Students will learn the importance of game design, modular coding and using the APIs of graphics engines and DirectX: to draw and display images, manipulate 3D meshes and objects, play Sounds and Audio files, use scripts and templates, and implement a peer to peer networked FPS game. Students will learn how to use an existing framework and how to apply it to future applications in an object-oriented manner.

GENERAL COURSE INFORMATION

Number of Units / Weeks	8 /10
# Hours Lecture / # Hours Laboratory	60/40/120
Prerequisites	COM103
Course Developer(s)	Anthony Le, B.A., John Ramos, B.S.
Date Approved / Last Review	March 2010 / Nov. 2012

LEARNING OUTCOMES

Upon successful completion of the course, students will be able to:

- Apply the fundamentals of object-oriented programming in C++ in the use and access of functions, structures, classes, and APIs
- Demonstrate the use of DirectX to gather inputs, display graphics, play audio files, create a P2P network, and manipulate 3D objects
- Demonstrate the basics of Networking utilizing tools: including enumerating adapters, network connections, hosting, joining a session and message handling
- Demonstrate 3D computer graphics theory using 3D objects to create a multiplayer FPS game, with the knowledge of how to deal with templates, linked lists, scripts, players, messages, 3D sounds, textures, maps and meshes

LEARNING OBJECTIVES

To achieve the learning outcomes specified for this course, students will upon successful completion of the course:

- Use an Integrated Development Environment (IDE) to develop object-oriented skills in member variables, member data types and funtions, structs, classes, derived classes, encapsulation, inheritance and polymorphism.
- Use an IDE to apply basic skills to add, modify and produce object-oriented programming modules to graphics Engine utilizing DirectX, DirectInput, DirectSound, Xbox Controller, DirectPlay and 3D object manipulation and animation.
- Use an IDE to integrate programming modules into the FPS graphics engine and existing framework.
- Utilize the framework and engine to produce and implement a 3D multiplayer first person shooter (FPS) game.

INSTRUCTIONAL METHODS EMPLOYED IN THIS COURSE

A number of instructional/learning methods are employed in this course, including the following:

- Lecture
- Reading
- Assignments/Projects
- Labs
- Team Environment
- Build on prior learning of students to enhance richness of class activities.

INFORMATION RESOURCES FOR THIS COURSE

Textbook

Young, Vaughan. Programming a Multiplayer FPS in DirectX. Hingham, MA: Charles River Media, 2004. ISBN 9781584503637.

Other Materials

Coleman College. The College Writer's Guide. San Diego: Coleman College, 2009.

Microsoft Visual Studio
http://www.microsoft.com/visualstudio/en-us/
Retrieved April 7, 2010

Web Site Readings

http://www.gamedev.net
http://www.coderedgames.com

COURSE OUTLINE

WEEK	*TOPIC*	*READING*	*PROJECT ASSIGNED*
1	Object-Oriented Concepts in C++ Engine Design	Lesson 1 Chapter 1 Lesson 2	Project Overview Discussion: Converting existing programs using an object-oriented approach. **Read** Lessons 1 & 2 and Chapter 1 35 pages: 3.6 hours Discussion Questions: Chapter 1 15 Questions: 1 hour **Evaluation:** graded, 1 point **Design Project:** Concepts & Core Design Total hours: 15.4 hours **Evaluation:** graded, 5 points
2	Framework Engine Control: Input Devices	Chapter 2 Lesson 3 Chapter 3 Lesson 4	**Read** Lessons 3 & 4 and Chapters 2 – 3 94 pages: 11.8 hours Discussion Questions: Chapter 2-3 30 Questions: 2 hours **Evaluation:** graded, 2 points **Project 1:** Add Message Box and Virtual Key Codes to FPS Engine 4 hours **Evaluation:** graded, 5 points

WEEK	***TOPIC***	***READING***	***PROJECT ASSIGNED***
3	Scripting DirectX Device & Rendering	Chapter 4 Lesson 5 Chapter 5 Lesson 6	**Read** Lessons 5 & 6 and Chapters 4 – 5 90 pages: 11.3 hours Discussion Questions: Chapter 4-5 30 Questions: 2 hours **Evaluation:** graded, 2 points **Project 2:** Add DirectInput and Font Rendering to FPS Engine 8 hours **Evaluation:** graded, 9 points
4	DirectMusic & DirectSound	Chapter 6 Lesson 7	**Read** Lesson 7 and Chapter 6 35 pages: 4.4 hours Discussion Questions: Chapter 6 15 Questions: 1 hour **Evaluation:** graded, 1 point **Project 3:** Add Playing of different Musical Notes to FPS Engine 8 hours **Evaluation:** graded, 9 points
5	DirectPlay & Networking	Chapter 7 Lesson 8	**Read** Lesson 8 and Chapter 7 54 pages: 6.8 hours Discussion Questions: Chapter 7 15 Questions: 1 hour **Evaluation:** graded, 1 point Midterm Exam (Chapters 1-7) **Evaluation:** graded, 15 points
6	P2P Message Handler Xbox Controller Project	Chapter 7 Lesson 9	**Read** Lesson 9 4 pages .4 hours **Project 4:** Add Xbox controller to Engine and FPS Game 8 hours **Evaluation:** graded, 9 points

WEEK	***TOPIC***	***READING***	***PROJECT ASSIGNED***
7	Materials & Meshes Objects & 3D Rendering	Chapter 8 Lesson 10 Chapter 9 Lesson 11	**Read** Lessons 10 & 11 and Chapters 8 – 9 114 pages 14.3 hours Discussion Questions: Chapter 8-9 30 Questions: 2 hours **Evaluation:** graded, 2 points
8	Scene Management & Maps Game Foundation & Logic	Chapter 10 Lesson 12 Chapter 11 Lesson 13	**Read** Lessons 12 & 13 and Chapters 10 – 11 113 pages: 14.1 hours Discussion Questions: Chapter 10-11 30 Questions: 2 hours **Evaluation:** graded, 2 points **Project 5:** Debug and Run FPS Game. (Optional: add Health Display to Heads Up Display) 20 hours **Evaluation:** graded, 20 points
9	Players & Game Messages Weapons & Bullet Manager	Chapter 12 Lesson 14 Chapter 13 Lesson 15	**Read** Lessons 14 & 15 and Chapters 12 – 13 98 pages: 12.3 hours Discussion Questions: Chapter 12-13 30 Questions: 2 hours **Evaluation:** graded, 2 points
10	The Full FPS Game	Chapter 13	Final Exam **Evaluation:** graded, 15 points

Total hours of required reading: 79 hours
Total hours Design Project 15.4 hours
Total hours chapter/discussion questions: 13 hours
Total hours Program sets 48 hours – 30 hours lab = 18 hours
Total hours of out-of-class activities: 125.4 hours

Your Grades for this Course

Your final grade for this course will be based on an assessment by the Instructor of your performance on a number of course activities, which may include objective tests, classroom exercises, laboratory demonstrations, project papers, or other types of activities. The chart below indicates in what activities you will engage, how many possible points can be earned for each activity, and the percentage of your final grade that will be accounted for by each activity.
Students in this course should be graded following Coleman University assessment practices and policies. A point system is used in the University to indicate student performance on various required activities or projects. For this course, it is recommended that points be distributed as follows:

Coleman University Grade Assignment Policy:

Percent	Letter Grade	Grade Points
94-100	A	4
90-93	A-	3.67
87-89	B+	3.33
84-86	B	3
80-83	B-	2.67
77-79	C+	2.33
74-76	C	2
70-73	C-	1.67
67-69	D+	1.33
64-66	D	1
60-63	D-	0.67
N/A	INC	0
N/A	W	0
60 or above	CR	0
59 or below	NC	0
N/A	I	0
N/A	W	0
N/A	AU	0
N/A	TR	0
N/A	WV	0

Legend	
CR = Credit	NC = No Credit

I = Incomplete	W = Course Withdrawal
AU = Audit	TR = Transfer Credit
WV = Waiver	

ACADEMIC ACCOMMODATION / ADJUSTMENT POLICY:

In accordance with Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act (ADA), Coleman University offers accommodations to students with documented physical, psychological, and/or cognitive disabilities. Coleman University will adhere to all applicable federal, state, and local laws, regulations, and guidelines with respect to providing reasonable accommodations as required to offer equal educational opportunities to qualified disabled individuals.

To qualify for an academic accommodation under ADA, the student must provide adequate documentation of a disability. Students seeking academic accommodations should contact the campus ADA Coordinator at 858-966-3953 or via email at ada@coleman.edu. The ADA Coordinator will review the documentation provided and verify ADA coverage. Students covered under ADA must meet with the ADA Coordinator at the beginning of every term to determine the appropriate academic accommodations. Failing to meet with the ADA Coordinator at the beginning of every term may impact the availability of accommodations.

After the academic accommodations have been determined, the students' instructors will be notified by the ADA Coordinator. If any problems or concerns regarding the provision of accommodations occur, the student must inform the ADA Coordinator. If the student feels accommodation is not being made appropriately, the student may follow the published Student Grievance Procedures.