

## ITSW 2022 Course Syllabus

1. **Name of Course:** Game Audio Programming

2. **Number of Hours:** 42

3. **Course Description:**

In this course, we will cover the fundamentals of audio programming for games. This is a lab course and will consist mostly of hands-on programming. After an initial overview covering basics such as audio formats and common hardware configurations, we will write code to do the following: load sounds in ADPCM format; play back “one shot” and looping sounds; and stream audio from an external device. We will then use these building blocks to write a low-level sound engine as well as an application-level sound manager.

4. **Course Learning Objectives:**

1. Develop a general understanding of audio formats and hardware structure.
2. Develop a library of C++ programs that perform discrete audio tasks (load a sound into memory, play a sound, play a looping sound, stream a sound from an external device).
3. Program a low-level sound engine from a spec given to you.
4. Program a high level sound manager from a spec given to you.
5. Integrate your low- and high-level sound modules into an existing game in order to give it audio capabilities.

5. **Required Materials** (Available at the ACC Bookstore):

None -- the instructor will supply an electronic lab manual and links to on-line reference resources.

6. **Prerequisites:**

- C/C++ programming experience.
- GAME 1010 Video Game Programming
- Access to a computer with a C++ compiler and the latest DirectX libraries.
- Internet access.
- Or, consent of instructor

7. **Evaluation:**

*Grading Policies*

College work must exhibit higher order thinking skills including analysis, synthesis, and evaluation. Mere knowledge about a situation or demonstration of comprehension of the material is not sufficient to prepare you for employment consideration. As a Video Game Development student, you must consistently apply higher order thinking in order demonstrate mastery of the material covered in this course. Grades are given for results not for effort. Read the definitions for each grade noted below, as this is really how grades are determined.

Grading is based on an absolute scale - you are not competing with anyone else, but you will be challenging yourself. There are no distributions of grades; hence, all of you can earn an A in this course. Note: Students earns grades, faculty members do not give them. Your final grade will be based on both individual and learning team performance.

Your final grade will be based on the points that you earn during the course. You may receive “fractions” of points on some assignments. When calculating your final grade, I will use the standard rounding convention – meaning that scores with a fraction of  $\frac{1}{2}$  or greater will be rounded up, those with a score of less than  $\frac{1}{2}$  will be rounded down. I will use the following grading scale to calculate your letter grade.

The grading scale is based on a 100-point (or percentage) scale:

*How points and percentages equate to grades*

<b>A</b>	90 and above	<b>A</b> = Excellent performance. Work is exemplary and worthy of emulation by others. Student is in full attendance and constructively contributes to the learning environment.
<b>B</b>	80-89	<b>B</b> = Above average performance. All assignments are complete and exhibit a complete understanding and an ability to apply concepts.
<b>C</b>	70-79	<b>C</b> = Average performance. Accomplishes only the minimum requirements. Oral and written communication is at an acceptable level for a college student.
<b>D</b>	60-69	<b>D</b> = Demonstrates understanding at the most rudimentary level. Work is minimally passing.
<b>F</b>	< 59	<b>F</b> = Work is not passing, characterized by incompleteness, lateness, unsatisfactory demonstration of understanding and application.

This is a lab course. You will be graded primarily on the quality of your finished product.

- 20% -- attendance and participation
- 20% -- quality of sound applications library
  - 1) Load a sound into memory
  - 2) Play a single sound

- 3) Play a looping sound
- 4) Stream a sound from an external device

30% -- quality of the low-level sound engine

30% -- quality of the high-level sound manager

Extra Credit – integration of your low- and high-level sound modules into an existing game to provide audio functionality.

## 8. **Course Outline:**

Course content, by week:

1. Introduction – audio overview: data and hardware formats; introduction to our programming environment.
2. Polling sound hardware using DirectX.
3. Loading sound data into memory.
4. Playing “one shot” and looped sounds.
5. Streaming sounds from an external device (I).
6. Streaming sounds from an external device (II).
7. Low-level sound engine development (I).
8. Low-level sound engine development (II).
9. Low-level sound engine development (III).
10. Low-level sound engine development (IV).
11. High-level sound manager development (I).
12. High-level sound manager development (II).
13. High-level sound manager development (III).
14. High-level sound manager development (IV).

## 9. **Video Game Development Program Philosophy**

The Video Game Development Program has been designed, developed and implemented in partnership with leading video games studio managers and directors in Austin. The video games industry has undergone significant changes in how games are developed. They are rarely developed by few persons working in isolation. Today’s games are often developed by teams of 50 to 200 on schedules from 2 to 3 years with budgets of \$10M to \$20M. The large publishers drive the game development funding and schedules. Consequently, it is critical that personnel in the industry communicate and collaborate effectively. This drove the certificate requirements definition. Students are required to successfully complete courses in four categories:

1. The base industry courses: Video Games Industry, Business of Video Games and Video Games Development.
  - a. Students will understand what drives the industry, why games are developed, what is needed for success and how to get from idea to delivery.
2. The course specialization courses: Video Game Programming, Video Game Art, Video Game Design and Video Game Production.
  - a. Students will understand the requirements, objectives, limitations and goals of the different disciplines in a studio. This is essential for communication and collaboration.
  - b. Students in these core courses will be cross-discipline in order to build an understanding and appreciation of how different discipline teams collaborate and contribute to the final product.
3. The five specialization electives.
  - a. Students will develop skills in the discipline in which the student will seek employment.
4. Non-specialization electives
  - a. These are optional courses that will give you a deeper understanding of what other disciplines do and how they function. They will help you understand how to work with others on the team and to get the 'big picture.' These courses do not count towards the Video Game development certificate.
5. Capstone Project
  - a. This multi-person team project will simulate the real video game development environment. Students will develop a concept, turn it into a design, implement the programming and art required and produce it on the committed schedule. Go/no go milestones and final "publisher" acceptance reviews will mimic the industry. The students will have a deliverable for their portfolio that can be used for employment purposes.

Throughout the program each course will focus on knowledge transfer, skill building and teamwork. There will be a heavy emphasis on projects that will broaden and deepen each student's portfolio development. Portfolios are critical to demonstrating an individual's capabilities. Some projects will individual, many will be team based. How much a student gets out of each course will largely be determined by how much the students puts into the course. Video game development is highly complex, difficult work. The courses are designed to prepare students for that environment. So, come expecting to work hard.

The program is designed to reinforce key concepts such as teamwork, collaboration, and cooperation across all disciplines in the games

development and management process. Many concepts are repeated throughout the program because they are extremely important to successful game development.