

# **Game Audio Curriculum Guideline**

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Prepared by the  
**Game Audio Education Working Group of the  
Interactive Audio Special Interest Group**

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**Interactive Audio Special Interest Group (IASIG)  
Game Audio Curriculum Guideline v. 1.0**

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## **About the IASIG**

The Interactive Audio Special Interest Group (IASIG) was formed in 1994 to allow developers of audio software, hardware, and content to exchange ideas about improving the state of the art in interactive audio. In the beginning, IASIG activities focused primarily on influencing hardware and software design, as well as leveraging the combined skills of the audio community to make better tools. The IASIG has been influential in the development of audio standards, features, and APIs for desktop and mobile platforms (operating systems) and has helped numerous hardware companies define their directions for the future. In recent years the IASIG membership has grown to include educators, whose contributions to the group are evident in this document.

IASIG Working Groups discuss specific topics in order to create consensus-based recommendations. Each Working Group is managed by a Working Group Chairperson(s), and supervised by the IASIG Steering Committee. The majority of Working Group activity is in discussion via private email lists. Every participant is free to choose their own level of contribution, though participants are encouraged to work on creating issues and solutions, not to just sit back and review everyone else's work. The process is geared towards gaining consensus, and the wider SIG membership is given ample opportunity to participate through reports given at regular physical meetings as well as via e-mail, fax, or regular mail (as the case may be) before publication of the group's recommendations.

### **About the Education Working Group**

The EDUWG members include educators and independent/in-house game audio professionals from all around the world. Some provided materials for this document, while others contributed by reviewing the resulting document for accuracy and clarity. In preparation of these guidelines the authors also asked audio directors, composers, and sound designers at some of the major game development studios to tell us what skills and knowledge they expected from their audio staff. And we asked educators in the US and abroad who are currently teaching game audio in a variety of settings, including music schools, two year colleges and four year university programs, to share their curriculum suggestions.

In addition to these guidelines, we provide additional information regarding terminology and further reading on many of the topic areas at <http://www.iasig.org/wiki/index.shtml>.

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## **About this Document**

This document is intended to aid educators as well as students with regards to what knowledge is required to work in the area of video game sound & music. It has been developed over several years and consultation with many experts who gave their time to ensure that this Curriculum Guideline was as complete as possible at the time of release.

As the EDUWG continues to receive feedback from industry and academia we will include additional relevant material into future editions ensuring that our curriculum recommendations are up to date on current developments, and addressing the challenges of the future. This way the document will continue to be a valuable resource to anyone who is interested in understanding the skills and knowledge required to make a 'game audio' expert.

### **Background**

A common question heard by both industry practitioners and academics is, 'How can I get a job in the video game industry?'

Both private and public sector post-secondary education now provide training in the field of "games", but there are significant gaps in the overall curriculum, especially when it comes to audio. Some degrees in video game design or development may offer a few hours of instruction on audio, and some degrees in sound design or composition may offer a few hours of instruction on games, but there are very few options for students who want a dedicated knowledge of game audio that will meet the needs of the game industry.

Brian Schmidt, an industry veteran whose *GameSoundCon* workshops help train game audio specialists, notes: 'Although many schools teach music composition and sound design, few if any teach the additional skills needed to create music and sounds for interactive games ... There are numerous issues that traditional composers or sound designers ignore when faced with working on their first game. For example, what is a 'parameterized' sound effect, how do I create interactive music? What is XMA compression? Why can't I just use Pro Tools to create game audio? These issues are second nature to game audio professionals, but they are overlooked in traditional music or sound design courses.'

Conferences and workshops that offer 'boot camp' style introductions to game audio are helpful for audio professionals familiar with linear media, but do not supplant the need for a more comprehensive formal education that is seen as critical by those active in the video game industry. To meet the needs of the industry, many colleges, universities and trade schools around the world that have programs in game design, development, and business, are now looking at how to add an audio component. However, educational interest is so new that approved curricula do not exist and each school must make their own determination of appropriate courses, tracks, and degree directions to produce graduates ready for the job market.

The educators and interactive audio experts in the IASIG recognized this as an opportunity to bring together game audio professionals and university professors to create a modular and adaptable set of Curriculum Guidelines that can be put into practice by schools around the world.

### **Scope**

The Guidelines provide information, assistance and suggested teaching topics to institutions wishing to implement game audio into their existing curriculum, whether as an entirely new program, or simply as one or more additional courses to an existing program. We recognize the variety of needs and institutional structures involved, and so encourage educators at all levels to view the Guidelines as a model from which they can create different combinations and/or courses as needed for the specific requirements of their schools for their students.

While the focus is on audio for video games (at this time the largest market for interactive audio) it is assumed that interactive audio for other media (educational products, interface sounds, etc.) will be a growing area, and skills are aimed at students learning the most important aspects of interactive audio that can be applied to a number of industries.

Audio for interactive applications is an evolving discipline, so this document will be periodically updated as technologies and techniques change and as we receive feedback.

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## **Courses vs. Skills**

When the EDUWG set about developing the Guidelines, we were quickly confronted with the many institutional, structural, and pedagogical differences between different institutions, instructors, and countries involved. Some members desired delivering an exemplar 4-year (US style) curriculum, while others noted that learning outcomes would be more universally useful than course listings. Ultimately, the group decided to present the skills requirements in a modular format that could maximize flexibility in order to be integrated into a variety of programs, which we refer to as the "Skills List". Alongside the Skills List, we also present an example of how a degree program might be implemented in a standard 4-year US university.

## **The Missing Link: Programming**

It will be evident to the experienced educator or practitioner that this document does not provide much guidance regarding one particularly vital role within game audio development, namely that of the Audio Programmer. After much debate and consultation, the EDUWG concluded that an Audio Programmer should - while having experience in audio -- obtain an undergraduate degree in Computer Science first and foremost, and that a description of the skills and courses for a Computer Science degree is outside the scope of this document.

We would encourage Game Audio Programmer programs to include the core first-year courses we recommend for all students. In addition, we would expect those students to take some of the electives proposed here. Anyone wishing to contribute to expanding the recommendations for those topics in future versions of this document is encouraged to join the IASIG.

## About Game Audio

### The Interdisciplinary Nature of Game Audio and the 'Jack of All Trades'

Game audio is not a single discipline, but a combination of disciplines that are often separated by school and faculty on university campuses (e.g. Arts and Humanities vs. Sciences).

Moreover, game audio practitioners often find themselves having to wear many hats. While in big-budget game productions and in large production companies the job descriptions for employees are often clear, in mid-and low-budget productions and in smaller companies the border-lines between work descriptions of composers, sound designers, audio engineers, programmers and the like often tend to blur.

Today, a large section of the industry (not only those that develop games but also the others that provide applications and content for web sites, customer service systems, toys, mobile phones and such) still has a 'one person' audio department and that one person must work across all audio disciplines. In other words s/he has to be a 'jack-of-all-trades' that composes, designs sound, implements both, and manages the entire audio development process. This blurring of the boundaries of job descriptions is also true (though to a lesser extent) for the video, television and film industries as well. However, the implementation of sound into a game is a far more complicated process than in the film or television market.

To implement audio into a game requires an understanding that audio forms one part of a game system or algorithm, and even composition must often be thought of in terms of programming-like logic. Game audio professionals must not only be competent in one area (e.g., expressly in music composing, or in audio recording), but in other areas of audio as well. For example, a composer, working on a low-or mid-budget game, besides composing, recording and mixing music, usually ends up recording and editing sound effects, designing sound, and even recording and editing dialog. Moreover, the skills required are those for traditional linear media (e.g. film, video), plus an additional skill-set related to the requirements of the interactive, non-linear, programming-based media (responding to in-game parameters, creating dynamic, interactive compositions, and so on). Any curriculum for game audio should include these additional areas of interactive media while at the same time providing traditional, linear, non-interactive methods so that the student will be competent entering either field.

Students should have a basic understanding of all of the audio areas mentioned above at an early stage in their learning cycle to allow them to explore possibilities beyond their immediate perceived interests. The integration of audio content into a game requires collaboration between composers, sound designers, implementers and audio programmers. A thorough understanding of all audio disciplines will enable audio teams to work more efficiently. Decisions regarding real-time mixing, for instance, and the various needs of audio compression often need to be made as a team to prioritize requirements at each point in the game development process.

### Career-Based Requirements of a Game Audio Professional

Considering that many of the available jobs are freelance contracts for audio professionals, schools should provide courses to help graduates not only survive, but thrive in the marketplace. Courses in marketing, business development (especially the video game and music industry), finance and law are important. When working as freelance, contract, or on an in-house basis, students often need to wear other hats such as salesperson, accountant, or marketing expert. The EDUWG strongly suggests that students work in some form of internship as part of their program. These internships, of course, not only help the student to develop career skills and networking, but also help to bring fresh ideas and the latest trends back into the classroom.

### A Note on 'Soft' Skills

One of the key findings of our discussions and surveying of industry professionals was the strong need for *soft* skills (personal, interpersonal, emotional and communicative skills), particularly adaptability and the ability to independently upgrade skills. Many of those involved in the industry stated that what was more important than training technical skills was soft skills or emotional intelligence - what might be referred to as self-management skills. In the development of the curriculum within such a technologically-driven discipline, our focus has inevitably been on technical skills and knowledge. However there is significant evidence that

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success in finding and keeping work in any industry (particularly technologically-based industries) is not simply dependent upon technical ability but also on a student's soft skills. Where possible, these skills should be cultivated in the student, as they are as important as the technical skills we describe below. The annual report from Project Bar-B-Q 2008,<sup>1</sup> an interactive audio think-tank conference, rated interpersonal skills as being very important for every audio position. Personal and interpersonal skills, referred to in the UK as 'employability' skills, also featured strongly in our analysis of 40 recruitment advertisements for jobs in games audio. We found that interpersonal skills could be grouped into three main areas:

- 1) **Interpersonal skills:** such as the ability to develop and sustain productive working relationships: 'Good interpersonal skills'; 'Able to support the development of relationships'; 'Build lasting relationships.'
- 2) **Teamwork skills:** 'Great teamwork skills'; 'Be a team player who is able to share his/her ideas with others'; 'Ability to work collaboratively with the other members of a team'; 'Demonstrate the ability to work in a team environment'; 'Able to mentor and support team members'; 'Is able to work well under guidance and direction'; 'Knowing how to work under pressure, for long hours, as part of a close-knit team.'
- 3) **Communication skills:** 'Great communication skills'; 'Excellent communicator (spoken and written)'; 'Pro-active communicator'; 'Able to share ideas and import new ideas and/or processes'.

The EDUWG also found a recurring theme in terms of the personal attributes of the students: 'Proactive, self-motivated person who can multitask effectively'; 'Working without direct supervision'; 'The ability to both take direction well and make strong, self-directed decisions'; 'Demonstrated ability to be proactive and self-motivated'; 'Well organized, rigorous and autonomous.'

### A Note on Skill Obsolescence

Useful to our conception of a Curriculum Guideline was a summary by Hutchings and Saunders, who state 'In the highly competitive environment all higher education institutions face, the ability to conceive, design, market, deliver and re-engineer curricula that meet the diverse and rapidly changing vocational disciplinary and artistic aspirations and expectations of their clients, is critically important'.<sup>2</sup> In other words, skill obsolescence can go beyond merely the tools of the trade, and it is necessary that an allowance for aesthetic, industrial and technological obsolescence is built into a curriculum. The nature of the game industry requires an ongoing, evolving approach to course design that can rapidly adapt to changing technology and tools. For universities, the bureaucratic structure of approving changes to courses can be difficult and very time consuming (often up to as much as two years). Therefore, the nature of course descriptions as well as the proposed content outlined below had to be flexible enough to allow for what may be significant changes to occur. In other words, this Curriculum Guideline is an ongoing work and we encourage feedback so that we may continually update these skills.

In particular, the need to develop autonomous learning is clear not only from our research into the job market discussed above but also from the fast moving nature of the game industry itself where the market is driven by technological development and innovation. Within the Curriculum Guideline the emphasis is on teaching *principles*, not *packages*, as by the end of a four year program it is very likely that current software and even the fundamental technologies of the game consoles they are built on will have entered a new cycle.

Our courses, therefore, are organized around the concepts and principles behind the design and development of audio for games, rather than around any hardware or software specific skills, and would strongly encourage a constructivist approach that may prove more effective in producing the kind of auto-didactic who can continue to refresh their skills on their own. As scholar Mike Rawson describes, 'learning to learn' has become a critical part of the skills agenda, and is an essential 'package of skills' to ensure future employability.<sup>3</sup>

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<sup>1</sup> Lieberman, D., Lewis, J., Kwasneski, J., Brandon, A., Collins, K., Prum, J. and Kastbauer, D. 2008. Group Report: So You Want to Work in Game Audio? <http://www.projectbarbq.com/bbq08/bbq08r6.htm>

<sup>2</sup> Hutchings, T. & Saunders, D. 2001. Curriculum Methodology: A Case Study in Large-scale Curriculum Development. *Active Learning in Higher Education* 2(2), 143-163

<sup>3</sup> Rawson, M. 2000. Learning to Learn: more than a skill set. *Studies in Higher Education* 25(2), 225-238.

## **Problem-Based Learning with an Experiential Focus**

Criticism of the concept of 'learning outcomes' has come with fears that complex learning cannot take place, and that attention would be focused on those things that can be described in terms of objectives and outcomes. We recognized, therefore, that there had to be opportunities in the Curriculum Guideline for exploration, for in-depth study and personal growth. Analysis, criticism, and self-reflexive thinking, journal and essay writing and discussion, along with self-directed but guided learning are seen as essential in fostering learning-*to-learn*.<sup>4</sup>

One way of promoting the development of such skills is simply to make students aware of the importance placed on these skills by potential employers such as the results of our job analysis survey. Although highlighted in the Curriculum Guideline as specific learning outcomes, we feel that modules viewed as 'generic' are traditionally undervalued by students and that these should be embedded into the context of the students' projects. Skills development most effectively takes place through a process of 'active participation, feedback and reflection' and so we would recommend that these are developed within an experiential learning cycle that involves simulation and role play within team projects.

*Active participation, feedback and reflection* is addressed particularly in the recommendation for an interdisciplinary final major project that should involve students in a five-stage process of awareness, practice, feedback, reflection, and further practice post-feedback. This interdisciplinary project would also allow them to learn about, experience and reflect upon different team roles and if we are going to prepare students to work in a globalized industry, students should also develop an understanding of cross-cultural capability. Moreover, we would recommend on-going journal writing throughout the entire program in order for students to reflect on their own progress and learning.

As part of a final-year thesis project, students are required to create a portfolio that not only demonstrates technical competence, but also accompanied by written analysis of their own work explaining their thought processes, self-criticism, research methods for the projects, design philosophy and approach taken. In this way, we are creating reflective practitioners that have the skills to analyze and discuss their work with others.

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<sup>4</sup> Knight, P. T. 2001. Complexity and Curriculum: a process approach to curriculum-making. *Teaching in Higher Education* 6(3), 369-381.

## Roles and Specializations for Game Audio Professionals

There are a wide variety of roles related to sound and music within the games industry. The industry is fast changing and each company has their own methods, job titles, and terminology and so it would be impossible to list every possibility here. It is hoped that this list<sup>5</sup> of the most commonly advertised positions will help the reader to understand the structure of the document that follows, along with requirements for positions.

### Sound Design Positions

Sound design positions can encompass a wide variety of skills, and increasingly these positions are becoming more specialized in larger companies. It is recommended that students wishing to obtain positions described in this section undertake the Sound Design specialization, as well as specialize further in their fourth year. In addition, programming skills and asset management skills are particularly valued.

- *Implementer* —responsible for wiring up assets to objects, events, states, parameters, and more. An in-depth understanding of audio middleware as well as spreadsheet and database software is necessary.
- *Recording Engineer* —specializes in recording sounds in a studio or on location. They have understanding of microphones and placement, pre-amps, acoustics as it relates to achieving good quality recordings, and creating recordings that can subsequently be utilized further down the chain.
- *Foley Engineer* —A Recording Engineer who specializes in recording sounds that are made by character interactions. Examples are footsteps, movement, object interactions, etc.
- *Field Recordist* —specializes in recording sounds on location, typically for the purpose of use when creating sound effects and ambiances.
- *Mixer* —takes finished sound assets and mixes the game and cinematics for final delivery.
- *Sound Designer* —creates the actual sound file assets implemented into the game engine. They often work from a spotting list and schedule.
- *Sound Event Designer* — works very closely with the design group to define the events and states to which the dialogue system will respond to. These events typically provide content for the voiceover recording scripts.
- *Procedural or Technical Sound Designer* —designs the granular or particle type sound effects recombinant playback system that reacts to various parameters in real-time. They may or may not create the sounds themselves.
- *Asset Provider* —There are a lot of freelancers who are now paid to simply provide assets. This is also often reflected internally within larger companies where one person's role may be to simply create and provide sounds, separate from another role which specifically deals with integration.

### Music Positions

There are a variety of music-based positions within the industry. In addition to undertaking traditional music training, we have included courses for interactive media.

- *Composer* —responsible for writing musical score for the game.
- *Orchestrator* —works with the composer to create arrangements/orchestrations suitable for live musicians to perform/record.
- *Music Preparation/Copyist* —creates performance scores for musicians based upon the master orchestrations. This typically also includes copying, proof-reading, binding, and library duties of the recording sessions.
- *Music Editor* —responsible for editing music to the requirements of the music system.
- *Implementer* —attaches music to events and objects within the game.

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<sup>5</sup> Adapted from Project Bar-B-Q 2008 Report: Lieberman, D., Lewis, J., Kwasneski, J., Brandon, A., Collins, K., Prum, J. and Kastbauer, D. 2008. Group Report: So You Want to Work in Game Audio? <http://www.projectbarbq.com/bbq08/bbq08r6.htm>

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- *Musician* —Responsible for performing the music for recording.
- *Music Supervisor* —oversees all music production for the game and possibly provides the aesthetic vision.
- *Note Tracker* —Creates MIDI note maps for music-based puzzles and games.

### Voice/Dialog and Localization Positions

It is recommended that students wishing to specialize in voice/dialog undertake the sound design track and take many electives in voice, theatre, and communication.

- *Dialog Event Designer* —works intimately with the design team to define the events and states that the in-game speech system will respond to, the outcome of which will feed content for the voiceover recording scripts.
- *Character Profiler* —creates the character bios and often the audition reading scripts. It's a quick task that may or may not be teamed up with the writers or design team
- *VO Actors* —supplies voiceover performances for one or more character in a game
- *VO Director* — directs voice actors and game designers in order to coax the best possible performances for use in a game. This role may also encompass recording and processing (see Dialog Processor).
- *VO Editor* — edits raw voice recordings and uses the director's notes in order to provide selected takes.
- *Dialog Lead / Coordinator* — coordinates all dialog work, knows the speech system in extreme detail. This is often a task for the Dialog Event Designer.
- *Dialog Processor* —performs creative processing, adjusts levels, and EQs edited voice in order to 'finalize' the voice set.
- *Casting Director* —responsible for finding, auditioning, assessing, and hiring actors, both for voice and motion capture. They may also be involved in the negotiating of rates and logistics of getting actors where they need to be.
- *Localization Coordinator / Producer* —works with licensees and other studios that provide translations and localized recordings of dialog. They have non-audio responsibilities, too, such as written in-game text.
- *Localization Asset Manager* —tracks voice assets and their status, responsible for managing the database for all who need information about those assets.

### Management Positions

Management positions are generally garnered from being promoted from within a company after years of experience. Nevertheless, it is beneficial to the student wishing to enter these positions to undertake a sound design specialization, in addition to courses in business, project management, and human resources.

- *Project Manager* —oversees the entire game project and will interact with the Audio Lead in order to ensure the audio team has their needs met.
- *Audio Lead / Director* —oversees all audio aspects of a given game project. Responsibilities include overseeing all assets, as well as defining the schedule.
- *Audio Producer / Associate Producer* — acts as liaison between the producers and audio team for the game. Typically, responsibilities include schedule and logistics management as well as aesthetic decisions.
- *Director of Sound* —in charge of the entire audio division within a game company.
- *Technical Audio Director* —analyzes, defines, and informs teams about their audio pipeline, including tool choices. This is sometimes a responsibility covered by the Director of Sound.

## **Programming Positions**

The ideal audio programmer should have the skills of a programmer plus an understanding of the special needs of audio, particularly when it comes to real-time processing, compression and CPU management, but also with regards to implementation and audio middleware. In particular, advanced understanding of DSPs and sound synthesis programming is essential.

- *Audio Gameplay Programmer* — adds the audio engine to the overall game engine, as well as creates and maintains the event and data calls between them. This person supports the audio team members with pipeline issues.
- *Audio Tools Programmer* — acts as a liaison between the audio team and the programmers in order to provide necessary tools for audio production
- *Audio Engine Programmer* — develops custom audio engines, or adapts existing audio engines, for the specific needs of the game or company.

## **Quality Assurance Positions**

Audio QA (quality assurance) is usually an entry-level position from which a person branches out into another area of specialization. An audio QA person should, ideally, have a background in sound design.

- *Audio Tester* — play-tests through the game in order provide feedback to the audio team to ensure a quality soundtrack.

## Skills List

### Methodology

Working from the Roles/Specializations set forth in the prior section, the EDUWG set about identifying and prioritizing skills important to each of the typical jobs available in those areas. We collected a range of job advertisements that listed skill requirements and collated the information. We also surveyed members of the game audio community to come up with lists of skills that they undertake in their own jobs.

In the tables below we have grouped the list of skills into the following categories:

- Industry and Management
- Game Design
- Career Development
- Studio skills, and Dialogue session management skills
- Microphone and Recording Skills
- Linear Sound Editing Skills, Mixing and Mastering
- Digital Audio and Acoustics Theory
- Linear Sound Design Theory
- Game Sound Design Theory
- Implementation - Theoretical and Technical Skills
- Synthesis and Sampling
- Game Music Analysis
- Music History and Analysis
- Practical Composition
- Practical Arranging and Orchestration
- Aural and Reading Skills

Within each category, the skills and knowledge required are presented in the common educational parlance of 'learning outcomes' that explain what a student should be able to do upon completing a course or program.

Checked blocks next to each skill indicate the specializations that require that specific skill. This is not to suggest that the skills are not useful to other specializations, just that they are not as high a priority in those other areas.

The outcomes can be used (as presented herein) as the basis for developing courses/modules aimed at these specializations, or combined in other ways, as is appropriate to the particular course objectives. The whole list could also be the basis for an undergraduate program, as shown in the example syllabus that appears later in the document.

*Note 1: Only four of the six Roles/Specializations are shown in these tables: "Programming Positions" are not listed, as explained earlier, and "QA Positions" are essentially an initial step towards specialism and are therefore encompassed within the other four.*

*Note 2: The last five categories (above) are music-specific, and thus are listed in a separate table without prioritization for the other specializations.*

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Skills by Category	Specialization			
	Music Positions	Sound Design Positions	Voice / Dialog Positions	Management Positions
<b>Industry and Management</b>				
A1. Understand budgeting, scheduling, contracts, and project management.	✓	✓	✓	✓
A2. Define elements related to a production plan document, product development and marketing.	✓	✓	✓	✓
A3. Identify and distinguish between the various roles, positions and responsibilities within an audio production team.	✓	✓	✓	✓
A4. Discuss the structure of the game development industry.	✓	✓	✓	✓
A5. Understand industry practices with regards to staff work VS freelance roles and the advantages / disadvantages of these roles.	✓	✓	✓	✓
A6. Identify the distinct stages in the game development process (Pre-Production, Production, 'Post Production').	✓	✓	✓	✓
A7. Communicate effectively with a variety of colleagues; understand other departments & how they interact with the audio team.	✓	✓	✓	✓
A8. Write an Audio / Music Design Document for a real or fictitious project.	✓	✓	✓	✓
A9. Demonstrate knowledge of a range of group working processes and leadership strategies.	✓	✓	✓	✓
<b>Game Design</b>				
B1. Define genre characteristics in game design.	✓	✓		✓
B2. Evaluate the success of game releases through post-mortem analysis and evaluate games from the perspective of successful play mechanics.	✓	✓	✓	✓
B3. Define elements related to game strategy, theory and game play.				✓
<b>Career Development</b>				
C1. Create a demo reel. Create a portfolio of technical projects together with written accompaniments that explain the thought processes, research methods, design philosophy and approach taken.	✓	✓	✓	✓
C2. Identify resources for self-promotion and contact management including job networking skills.	✓	✓	✓	✓
C3. Identify issues and approaches to working and running a business as a freelancer.	✓	✓	✓	✓
C4. Understand basic game audio copyright and IP issues.	✓	✓	✓	✓

**Interactive Audio Special Interest Group (IASIG)  
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Skills by Category	Specialization			
	Music Positions	Sound Design Positions	Voice / Dialog Positions	Management Positions
<b>Studio skills, and Dialogue session management skills</b>				
<b>D1.</b> Understand and be able to set up a basic project recording studio suitable for media production.	✓	✓	✓	✓
<b>D2.</b> Understand and demonstrate signal flow. (Signal routing and bussing in hardware and software DAW.)	✓	✓	✓	✓
<b>D3.</b> Demonstrate the ability to cast and manage voice talent.			✓	✓
<b>D4.</b> Direct a dialog recording session and voice talent demonstrating an awareness of performance, character, narrative arc and location.			✓	✓
<b>D5.</b> Schedule dialog recording sessions, plan script division and localization.			✓	✓
<b>D6.</b> Edit, label and coordinate a recording with a script.			✓	✓
<b>D7.</b> Demonstrate an ability to edit dialog of unwanted noise, etc. as well as be able to decide which recordings are salvageable, and which need re-recording.		✓	✓	✓
<b>Microphone and recording skills</b>				
<b>E1.</b> Direct a basic recording session using microphones, mixer and editing system.	✓	✓	✓	✓
<b>E2.</b> Understand mic choice and placement for Foley recording, sound effects recording and instrument recording.	✓	✓	✓	✓
<b>E3.</b> Select, use, and appropriately place microphones and associated equipment for location recording.		✓	✓	✓
<b>E4.</b> Make appropriate mic selections and placements for dialogue recording including single and multiple actors, Static and 'live' or motion capture performances.			✓	✓
<b>E5.</b> Conduct an ADR recording session with an awareness of recording facial movements etc for post record animation lip-sync.			✓	✓
<b>E6.</b> Plan, schedule and coordinate a recording session using small groups of instruments of between 7-12 players, and demonstrate an understanding of processes and approaches to large-scale multi-instrument recording.	✓	✓		✓

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<b>Skills by Category</b>	<b>Specialization</b>			
	<b>Music Positions</b>	<b>Sound Design Positions</b>	<b>Voice / Dialog Positions</b>	<b>Management Positions</b>
<b>Linear Sound Editing Skills, Mixing and Mastering</b>				
<b>F1.</b> Demonstrate appropriate use of automation, plug-ins and DSP for mixing and production.	✓	✓		✓
<b>F2.</b> Source appropriate sounds for sound effect design.		✓		
<b>F3.</b> Demonstrate sound effects editing, looping, and common transformation techniques.		✓		✓
<b>F4.</b> Discuss and implement mixing strategies.		✓		✓
<b>F5.</b> Master assets appropriately for final delivery.	✓	✓	✓	✓
<b>F6.</b> Demonstrate an understanding of multichannel and 3D audio formats and techniques.	✓	✓		✓
<b>F7.</b> Balance and match audio for convincing interactive dialogue (including concatenation) across multiple recording sessions.			✓	
<b>Digital Audio and Acoustics Theory</b>				
<b>G1.</b> Understand propagation concepts: directionality, distance attenuation, occlusion, obstruction, reflection, diffraction, refraction, interference, standing waves.		✓		✓
<b>G2.</b> Identify and implement room and reverb effects.		✓		✓
<b>G3.</b> Identify and use knowledge related to the physical properties of sound.		✓		✓
<b>G4.</b> Demonstrate an understanding of human perception principles and their impact on interactive audio systems.		✓		✓
<b>G5.</b> Understand sound production principles: vibration, damped/driving oscillations, resonance.		✓		
<b>G6.</b> Demonstrate an understanding of audio data compression and encoding including the advantages/disadvantages of formats.	✓	✓	✓	✓
<b>G7.</b> Demonstrate an understanding of digital audio theory such as sampling theory.	✓	✓	✓	✓
<b>G8.</b> Use appropriate sample rates for file size savings (including variable sample rate concatenation).		✓		

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<b>Skills by Category</b>	<b>Specialization</b>			
	<b>Music Positions</b>	<b>Sound Design Positions</b>	<b>Voice / Dialog Positions</b>	<b>Management Positions</b>
<b>Linear Sound Design Theory</b>				
<b>H1.</b> Demonstrate a comprehensive knowledge of approaches to sound design for film.		✓		✓
<b>H2.</b> Understand use of sound as a counterpoint to visuals.		✓		✓
<b>H3.</b> Understand the subjective nature of sound and semiotic functions of sound.		✓		✓
<b>H4.</b> Understand the use of sound to focus attention.		✓		✓
<b>H5.</b> Understand use of diegetic sound for emotional cues.		✓		✓
<b>H6.</b> Understand audio-visual synchresis as a vehicle for characterization.		✓		✓
<b>Game Sound Design Theory</b>				
<b>I1.</b> Define the different types, functions and roles of sound within games.		✓		✓
<b>I2.</b> Evaluate and implement types of sound for avatar, non-player character, information, instructional, etc.		✓		✓
<b>I3.</b> Discuss similarities and differences in the approach to sound design for linear visual media and interactive media.		✓		✓
<b>I4.</b> Discuss the evolution of SFX from the beginning of game SFX up through contemporary games.		✓		✓
<b>I5.</b> Analyze and discuss seminal game sound design approaches.		✓		✓
<b>I6.</b> Evaluate the effectiveness of sound and music in current and past game titles.	✓	✓	✓	✓

**Interactive Audio Special Interest Group (IASIG)  
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Skills by Category	Specialization			
	Music Positions	Sound Design Positions	Voice / Dialog Positions	Management Positions
<b>Implementation - Theoretical and Technical Skills</b>				
<b>J1.</b> Apply provided or original assets to a game level using a commonly available level editing tool.		✓		
<b>J2.</b> Demonstrate a comprehensive knowledge of current gaming platforms and a solid understanding of their various capabilities and limitations with particular regard to audio e.g. PS3, Xbox360, Wii, iOS, browser games, etc.	✓	✓	✓	✓
<b>J3.</b> Implement nonrepetitive design strategies including randomization in time, pitch, volume, envelope, and sample start points, together with pseudo-granular approaches and variation through layered re-combinations.		✓		
<b>J4.</b> Implement algorithms and audio systems such as weapon, impact, crowd, vehicle, physics systems.		✓		
<b>J5.</b> Understand and use prioritization.		✓		
<b>J6.</b> Demonstrate an understanding of Interactive mixing including base mixes, ducking, and snapshot mixes.		✓		✓
<b>J7.</b> Select and use appropriate middleware tools such as XACT, Wwise, Fmod, (or equivalent).	✓	✓	✓	✓
<b>J8.</b> Demonstrate an understanding of appropriate dialogue techniques for interactive products including approaches to concatenation or 'stitching'.			✓	✓
<b>J9.</b> Tag animations and cut scenes with appropriate sounds and timings.		✓		
<b>J10.</b> Maintain and use sound databases and similar file management tools.	✓	✓	✓	✓
<b>J11.</b> Identify common real-time DSP uses and understand their resource needs.		✓		✓
<b>J12.</b> Mix and master sound design projects both for linear digital video and interactive applications.		✓		✓
<b>Synthesis and Sampling</b>				
<b>K1.</b> Produce simple sampler patches and identify the use of sampling approaches within current and past game technologies.	✓	✓		
<b>K2.</b> Synthesize sounds in a variety of methods (e.g. FM, granular, modal, and physical modeling).	✓	✓		
<b>K3.</b> Identify the historical and potential future applications of analog, digital and sampling synthesis.	✓	✓		

**Interactive Audio Special Interest Group (IASIG)  
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<b>Additional Music-Specific Skills, Deemed High Priority For All Those Wishing To Work In Game Music</b>
<b>Game Music Analysis</b>
L1. Understand the aesthetics and practices of interactive music.
L2. Understand the relationship between genre and musical styles in game and linear media production.
L3. Understand and be able to critique contemporary game scores.
L4. Understand the evolution of game music and its relationship to technological advances.
L5. Understand parallels between interactivity in contemporary non-linear music/performance art and game music.
<b>Music History and Analysis</b>
M1. Identify and analyze musical pieces from throughout history on the basis of tonality, melody, rhythm, arrangement, style, genre and technique.
M2. Analyze and discuss film and TV music cues, their approach, emotional implications to picture based on rhythmic, harmonic and melodic relationships.
M3. Formulate theories as to the future trends in adaptive music, both 'commercial' and 'art'.
M4. Discuss and distinguish between the different periods of Western music development and identify examples by period, compositional style, instrumentation, technology.
M5. Identify the influence of major composers and movements within the historical development of musical genres.
M6. Analyze and discuss the major trends and innovators in computer music.
M7. Discuss the evolution of 20th Century music, including the major composer innovators.
M8. Discuss the influence of World Music in contemporary media culture.
M9. Identify specific origins and instruments of Non-Western music, and distinguish between the different sounds and styles of cultural centers across the globe, according to instrumentation, harmony, rhythm, etc.
<b>Practical Composition</b>
N1. Compose advanced scores for games that use transition matrices, branching and looping, basic algorithmic options, adaptive and randomization techniques.
N2. Create advanced sequences utilizing tempo/meter changes and matching to picture using markers.
N3. Understand the basic concepts of sequencing in order to move files from sequencer to sequencer.
N4. Use and modify MIDI controller information to create instrument tracks using articulations and expression.
N5. Compose, arrange, and orchestrate effective dramatic music for picture in a variety of styles.
N6. Create effective synth sketches for preliminary review before live instrument recording.
N7. Apply advanced harmonic theory including modes, and polytonality.
N8. Demonstrate an awareness of current theoretical trends in music composition.

**Interactive Audio Special Interest Group (IASIG)  
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<b>Additional Music-Specific Skills, Deemed High Priority For All Those Wishing To Work In Game Music (Continued)</b>
<b>Practical Arranging and Orchestration</b>
<b>01.</b> Identify the distinct instruments and their roles in an arrangement.
<b>02.</b> Creatively and effectively use sample based instruments and patches to produce expressive MIDI orchestrations and arrangements of musical material.
<b>03.</b> Use and modify virtual instruments to create a range of contemporary timbres.
<b>04.</b> Discuss arranging practices for multiple styles of writing.
<b>05.</b> Discuss the major innovators in orchestration.
<b>06.</b> Arrange music. Modify and print parts for small groups of instruments.
<b>07.</b> Conduct small groups through various styles and pieces.
<b>08.</b> Formulate theories as to the future trends in orchestration.
<b>09.</b> Demonstrate a full understanding of music preparation for game orchestration (i.e. multi-layered, multi-stem orchestration).
<b>Aural and reading Skills</b>
<b>P1.</b> Identify progressions, intervallic and harmonic relationships.
<b>P2.</b> Transcribe and analyze examples of mainly tonal music.
<b>P3.</b> Demonstrate ability in score reading, writing, and sight singing.

## Example 4-Year US Curriculum

The US-style curriculum presented below is planned around a 4-year undergraduate (Bachelor of Arts) degree program. It is expected that the course syllabi included are used as guidelines for course development, rather than as fixed entities. We present programs for Music and for Sound Design only. The student wishing to further specialize will take additional courses as noted, along with specializing in their fourth year projects.

The first year is common for both Music and Sound Design. During this year students would also take standard required BA courses (such as, for instance, a basic English Composition, and so on). During their second and third years, students would select either the music or sound design. This would lead to further specialization through electives and their fourth year projects (for example into a management role, dialog, or implementation).

### A Note on Terminology

Although there has been involvement from people in several countries and areas of the world (with the majority of representation from North America, Australia and Europe), the largest proportion of the IASIG Game Audio Education Working Group is based in the U.S., and this remains one of the major centers in video game development, and so we have chosen to use American terminology with regards to the curriculum.

A **course** is a one-semester block of classes that works towards building a qualification (in the UK, this is referred to as a 'module'). We have assumed that each course has a planned 3 hours in-class per week (x 14 weeks of class time) as well as an additional 3 hours of student learning (homework, labs) per week.

A **semester** refers to a 16-week block of classes (what in many Commonwealth countries is referred to as a 'term'). In our example, each year has two semesters and typically about 2 weeks of each semester is reserved for exams. It is assumed that a student will take four or five courses per semester. In our example each semester has 2 or more curriculum courses, and 1 or more general education or elective courses, of 3 credits per course. Over the example four year US program this leads to a total of 120 credits and 1008 hours of specialist in-class time.

A **degree program** (major) is the collection of courses that makes up the complete qualifications. A **specialization** is a stream within that program where the student may specialize in a given area.

The "X" followed by a number in the course name distinguishes the courses for the purpose of our syllabi explanation.

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<b>Music Specialization</b>	
<b>Year One</b>	
Video Game Design & Theory (X-01)	Video Game and Game Audio History * (X-02)
Music Theory 1 (X-25)	MIDI & DAW 1 (X-03)
Recording Techniques 1 (X-05)	Introduction to Sound (X-06)
Gen Ed/Elective	Gen Ed/Elective
Gen Ed/Elective	Gen Ed/Elective
<b>Year Two</b>	
Mixing and Mastering 1 (X-07)	Mixing and Mastering 2 (X-08)
Music Theory 2 (X-26)	MIDI & DAW 2 (X-04)
History of Music 1 (X-27)	History of Music 2 (X-28)
Composition 1 (X-29)	Composition 2 (X-30)
Gen Ed/Elective	Gen Ed/Elective
<b>Year Three</b>	
Interactive Composition and Implementation 1* (X-23)	Interactive Composition and Implementation 2* (X-24)
Arranging and Orchestration 1 (X-32)	Arranging and Orchestration 2 (X-33)
Interactive Audio Aesthetics* (X-34)	Game Music Analysis* (X-35)
History of Music 3 (non-Western) (X-36)	History of Music 4 (20 <sup>th</sup> C) (X-37)
Gen Ed/Elective	Gen Ed/Elective
<b>Year Four</b>	
Video Game Industry (X-19)	Video Game Career Development* (X-20)
Senior Project 1* (X-21)	Senior Project 2* (X-22)
Gen Ed/Elective	Gen Ed/Elective
Gen Ed/Elective	Gen Ed/Elective
Music Elective	Music Elective
<b>Music Electives:</b> History and Theory of Film Media, Film & Narrative Scoring, Computer Music History, Music & Sound Design for Animation, Sound Design for Games 1* & 2*, Sound Design Implementation 1* & 2*, Recording Techniques 2. Particular instrument training and performance may also be included. OOP computer programming is also beneficial.	

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<b>Sound Design Specialization</b>	
<b>Year One</b>	
Video Game Design & Theory (X-01)	Video Game and Game Audio History * (X-02)
MIDI & DAW 1 (X-03)	MIDI & DAW 2 (X-04)
Recording Techniques 1 (X-05)	Introduction to Sound (X-06)
Gen Ed/Elective	Gen Ed/Elective
Gen Ed/Elective	Gen Ed/Elective
<b>Year Two</b>	
Mixing and Mastering 1 (X-07)	Mixing and Mastering 2 (X-08)
Sound Design for Games 1* (X-09)	Sound Design for Games 2* (X-10)
Audio Implementation 1* (X-11)	Audio Implementation 2* (X-12)
Gen Ed/Elective	Gen Ed/Elective
Gen Ed/Elective	Gen Ed/Elective
<b>Year Three</b>	
Recording Techniques 2 (X-13)	Interactive Mixing* (X-14)
Dialog for Games * (X-15)	Game Sound Analysis* (X-16)
Interactive Audio Aesthetics* (X-17)	New Game Platforms* (X-18)
Gen Ed/Elective	Gen Ed/Elective
Gen Ed/Elective	Gen Ed/Elective
<b>Year Four</b>	
Video Game Industry (X-19)	Video Game Career Development* (X-20)
Senior Project 1* (X-21)	Senior Project 2* (X-22)
Gen Ed/Elective	Gen Ed/Elective
Gen Ed/Elective	Gen Ed/Elective
Sound Design Elective	Sound Design Elective
<b>Electives:</b> All music courses, OOP computer programming courses, Sound for Film, Music & Sound Design for Animation, Film Sound History.	

**Interactive Audio Special Interest Group (IASIG)  
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## Sample Syllabi

The following examples incorporate some of the skills listed in skill blocks in the Skills List section of this Guideline. These are not designed to be definitive syllabi, and do not cover every aspect of the Skills List, but rather are intended as starting blocks from which instructors may build their own syllabi. Moreover, we primarily include only Syllabi examples that are distinctive to game audio.

Each syllabus is designed for a one-semester, 3 credit course, as described previously. We include some recommended reading material, but also encourage searching the 'Resources' section of the IASIG EDUWG Wiki (<http://www.iasig.org/wiki/>) for the latest and most up-to-date materials and further options.

The learning objectives in the examples include, and in some cases expand upon, the skills that were indicated as 'high priority' in the Skill Set section of this Guideline. We understand that there may be some repetition of skills across courses: in these instances, it is assumed that the student will obtain more advanced skills. Examples of suggested course content and methods of evaluation are included for reference.

## Exclusions

Skills that are not covered in these syllabi include all B category skills, D1 and D2, G3, G4 and G5, all M, N, O and P category skills. Many courses that the student should undertake are likely already in existence at universities planning to implement the Guideline, and there are many examples of syllabi for such courses available online. Such courses include:

- Music History (we anticipate several general music history courses to cover the entire repertoire of Western and Non-Western music and 20<sup>th</sup> C Music History) (X-27, X-28, X-36, X-37)
- Computer Music History (elective)
- Sound for Film/Film Sound History (elective)
- Music and Sound Design for Animation (elective)
- Video Game Industry (X-19)
- Recording Techniques 1 & 2 (X-05, elective)
- MIDI & DAW 1 & 2 (recording studio skills) (X-03, X-04)
- Introduction to Sound (acoustics and psychoacoustics) (X-06)
- Video Game Design & Theory (X-01)
- Mixing and Mastering 1 & 2 (X-07, X-08)
- Composition 1 & 2 (X-29, X-30)
- Arranging and Orchestration 1 & 2 (X-32)

<b>Included Syllabi List</b>		
<b>Year</b>	<b>Track</b>	<b>Course</b>
One	Core	Video Game and Game Audio History (X-02)
Two	Core	Audio Implementation 1(X-11)
Two	SD	Sound Design for Games 1 & 2 (X-09, X-10) Audio Implementation 2 (X-12)
Three	SD	Interactive Audio Aesthetics (X-17) Interactive Mixing (X-14) Game Sound Analysis (X-16) Dialog for Games (X-15) New Game Platforms (X-18)
Three	M	Interactive Composition 1 & 2 (X-23, X-24) Game Music Analysis (X-35) Interactive Audio Aesthetics (X-17)
Four	Core	Video Game Career Development (X-20) Senior Project 1 & 2 (X-21, X-22)

**Interactive Audio Special Interest Group (IASIG)  
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**Year One: [core] Video Game and Game Audio History (X-02)**

I. Catalog Description:

Prerequisite: None

This course presents an overview of the history of video games, with a special focus on the sound and music. Students will learn how various technological advances impacted both the style and structure of gameplay, as well as sound and music.

II. Recommended Texts:

- Collins, Karen. *Game Sound: An Introduction to the History, Theory and Practice of Video Game Music and Sound Design*. MIT Press, 2008.
- Kent, Steven L. *The Ultimate History of Video Games: From Pong to Pokémon*. Three Rivers 2001.

III. Course Objectives:

Upon completion of the course students will be able to:

- Analyze and discuss seminal game sound design approaches [I5]
- Discuss the evolution of sound effects from 8-bit up through contemporary games [I4]
- Understand the evolution of game music and its relationship to technological advances [L4]
- Demonstrate a comprehensive knowledge of current gaming platforms and a solid understanding of their various capabilities and limitations with particular regard to audio, e.g. PS3, Wii, iPhone, browser games, etc. [J2]

IV. Methods of Presentation:

Lecture, discussion, guest speakers, case studies, projects.

V. Course Content:

Term % Topic

25% History and evolution of video games.  
25% Exploration of technological Issues.  
25% Exploration of historical impact of technology on audio.  
25% Final Paper or Composition.

VI. Methods of Evaluation:

Participation 15%  
Mid-Term 20%  
Presentations/written assignments 45%  
Final 20%

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**Year Two: [core] Audio Implementation 1 (X-11)**

I. Catalog Description:

Prerequisite: None

An introduction to the techniques and methodologies most commonly used in implementing sound and music assets into an electronic game environment. It will cover the basic principles of sound implementation as part of the game development structure, project workflow, and common middleware tools.

II. Recommended Texts:

- Brandon, Alexander. *Audio for Games: Planning, Process, and Production*. New Riders Games, 2004.
- Wwise Manual. (<http://www.audiokinetic.com/>)

III. Course Objectives:

Upon completion of the course students will be able to:

- Demonstrate an understanding of audio data compression and encoding including the advantages/disadvantages of formats [G6]
- Demonstrate an understanding of digital audio theory such as sampling theory [G7]
- Use appropriate sample rates with an understanding of frequency relationships for file size saving (including variable sample rate concatenation) [G8]
- Define the different types, functions and roles of sound within games [I1 ]
- Implement non-repetitive design strategies including randomization in time, pitch, volume, envelope, pseudo-granular approaches and variation through layered re-combinations [J3]
- Apply provided or original assets to a game level using a commonly available level editing tool [J1]
- Select and use appropriate middleware tools such as XACT, Wwise, Fmod, (or equivalent) [J7]
- Evaluate the effectiveness of sound and music in current and past game titles [H3]

IV. Methods of Presentation:

Lecture, discussion, guest speakers, case studies, projects.

V. Course Content:

Term % Topic

15%	Music and sound design strategies for gameplay
10%	Asset management, processing and delivery (including media formats)
25%	Effective music and sound effect design for game play with limited resources
10%	MIDI, Mods, game music formats
25%	Understanding of level editing and use of tools
15%	Assignments and presentations

VI. Methods of Evaluation:

Participation	15%
Mid-Term	20%
Presentations/written assignments	45%
Final	20%

**Interactive Audio Special Interest Group (IASIG)  
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**Year Two: [SD] Audio Implementation 2 (X-12)**

I. Catalog Description:

Prerequisite: Audio Implementation 1

This course builds on the techniques and methodologies taught in *Audio Implementation 1*. The course will briefly review the basic principles of sound implementation then focus on the use of level editors, audio region authoring, and real-time DSP. Common middleware tools will continue to be used in class. Guest lectures by audio directors from various developers. Audio design document authoring and goals will be discussed. Asset management tools (Perforce, Alienbrain, etc) will be demonstrated. Version control techniques will be discussed.

II. Recommended Texts:

- Hight, John and Jeannie Novak. *Game Development Essentials: Game Project Management*. Delmar Cengage Learning 2007.
- Wwise manual. (<http://www.audiokinetic.com/>)

III. Course Objectives:

Upon completion of the course students will be able to:

- Implement advanced non-repetitive design strategies including randomization in time, pitch, volume, envelope, sample start points, and pseudo granular approaches. Variation through layered re-combinations [J3]
- Implement algorithms and audio systems such as weapon, impact, crowd, vehicle, physics systems [J4]
- Understand and use prioritization [J5]
- Demonstrate an understanding of Interactive mixing, including base mixes, ducking, and snapshot mixes [J6]
- Demonstrate an understanding of appropriate dialog techniques for interactive products including approaches to concatenation or 'stitching' [J8]
- Tag animations and cut scenes with appropriate sounds and timings [J9]
- Maintain and use sound databases and similar file management tools [J10]
- Identify common real-time DSP uses and understand their resource needs [J11]
- Understand propagation concepts : Directionality, distance attenuation, occlusion, obstruction, reflection, diffraction, refraction, interference, standing waves [G1]
- Identify and implement room and reverb effects [G2]
- Write an Audio Design Document for a real or fictitious project [A8]
- Demonstrate an ability to use version control tools, asset management systems, and archiving strategies [A10]

IV. Methods of Presentation:

Lecture, discussion, class work/lab, case studies, projects.

V. Course Content:

Term % Topic

20%	Audio engines and required media formats- Level 2
20%	Expertise using middleware tools
20%	Real time DSP techniques and uses
15%	Assignments and presentations
25%	Audio Design Document

VI. Methods of Evaluation:

Participation 15%; Mid-Term 20%; Presentations/written assignments 45%; Final 20%

**Interactive Audio Special Interest Group (IASIG)  
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**Year Two: [SD] Sound Design for Games 1 (X-09)**

I. Catalog Description:

Prerequisite: none

This course examines the roles and functions of sound in games and linear media. Interactive techniques such as randomization and prioritization are discussed and explored.

II. Recommended Texts:

- Case, Alex. *Sound FX: Unlocking the Creative Potential of Recording Studio Effects*, Focal Press, 2007.
- Chion, Michel. *Audio-Vision: Sound on Screen*. Columbia University Press, 1994.
- Huber, David Miles and Robert E. Runstein. *Modern Recording Techniques*. Focal Press, 2010.
- Rose, Jay. *Producing Great Sound for Film and Video*. Focal Press, 2008.
- Rose, Jay. *Audio Postproduction for Film and Video*. Focal Press, 2008.
- Sonnenschein, David. *Sound Design: The Expressive Power of Music, Voice, and Sound Effects in Cinema*. Michael Wiese Productions, 2002.

III. Course Objectives:

Upon completion of the course students will be able to:

- Identify and distinguish between the various roles, positions and responsibilities within an audio production team [A3]
- Direct a basic recording session using microphones, mixer and editing system [E1]
- Demonstrate an understanding of multichannel and 3D audio formats and techniques [F6]
- Master assets appropriately for final delivery [F5]
- Discuss and implement mixing strategies [F4]
- Balance and match audio for convincing interactive dialog (including concatenation) across multiple recording sessions [F7]
- Source appropriate sounds for sound effect design [F2]
- Demonstrate appropriate use of automation, plug-ins and DSP for mixing and production [F1]
- Demonstrate sample sound effects editing and common transformation techniques [F3]
- Create digital audio content suitable for accompanying portfolio projects [as part of C1]

V. Methods of Presentation:

Lecture, project work, discussion, case studies.

VI. Course Content:

Term % Topic

20%	Principles and functions of sound in media
20%	Studio fundamentals and set-up including signal flow
20%	Appropriate microphone use for Foley and SFX recording
20%	Sound effects and basic sound design including processing
20%	Assignments and project 20%

VII. Methods of Evaluation:

Participation 15%

Mid-Term 20%

Presentations/written assignments 45%

Final 20%

**Interactive Audio Special Interest Group (IASIG)  
Game Audio Curriculum Guideline v. 1.0**

**Year Two: [SD] Sound Design for Games 2 (X-10)**

I. Catalog Description:

Prerequisite: Sound Design for Games 1

A continuation of *Sound Design for Games 1*, this course focuses on digital signal processing, use of synthesizers and samplers as sound design tools, and on advanced sound design techniques. In particular, advanced use of sound design techniques for video games is explored, and students begin to work towards developing their own style.

II. Recommended Texts:

- Case, Alex. *Sound FX: Unlocking the Creative Potential of Recording Studio Effects, 1st ed.* Focal Press, 2007.
- Chion, Michel. *Audio-Vision: Sound on Screen.* Columbia University Press, 1994.
- Huber, David Miles and Robert E. Runstein. *Modern Recording Techniques. 7th ed.* Focal Press, 2010.
- Rose, Jay. *Producing Great Sound for Film and Video.* Focal Press, 2008.
- Rose, Jay. *Audio Postproduction for Film and Video.* Focal Press, 2008.
- Sonnenschein, David. *Sound Design: The Expressive Power of Music, Voice, and Sound Effects in Cinema.* Michael Wiese Productions, 2002.

III. Course Objectives:

Upon completion of the course students will be able to:

- Understand mic choice and placement for Foley recording, sound effects recording and instrument recording [E2]
- Select, use, and appropriately place microphones and associated equipment for location recording [E3]
- Evaluate and implement types of sound for avatar, NPC, information, instructional, etc. [I2]
- Discuss similarities and differences in the approach to sound design for linear visual media and interactive media [I3]
- Synthesize sounds in a variety of methods (from FM to granular, modal, and physical modeling) [K2]

IV. Methods of Presentation:

Lecture, hands-on learning, projects.

V. Course Content:

Term % Topic

40% Digital signal processors  
30% Multi-track audio  
30% Sound design with synthesizers and samplers

VI. Methods of Evaluation:

Attendance and participation 15%  
Quizzes 15%  
Projects 70%

**Interactive Audio Special Interest Group (IASIG)  
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**Year Three: [SD] Dialog for games (X-15)**

I. Catalog Description:

Prerequisite: Audio Implementation 1

This course provides the students with the recording skills and microphone techniques needed for recording voice on the set and in the field. The course will also explain the process of Automatic Dialog Replacement, and audio editing on computers.

II. Recommended Texts:

- Chion, Michel. *The Voice in Cinema*. Columbia University Press, 1998.
- Purcell, John. *Dialog Editing for Motion Pictures: A Guide to the Invisible Art*. Focal Press. 2007.

III. Course Objectives:

Upon completion of the course students will be able to:

- Direct a dialog recording session and voice talent demonstrating an awareness of performance, character, narrative arc and location. [D4]
- Demonstrate the ability to cast and manage talent. [D3]
- Schedule dialogue recording sessions, plan for script division and localization. [D5]
- Edit, label and coordinate a recording with a script. [D6]
- Demonstrate an ability to edit dialog of unwanted noise, etc. as well as be able to decide which recordings are salvageable, and which need re-recording [D7]
- Make appropriate mic selections and placements for dialogue recording including single and multiple actors, Static and 'live' or motion capture performances. [E4]
- Conduct an ADR recording session with an awareness of recording facial movements etc. for post record animation lip-sync [E5]
- Clean-up, balance and match audio for convincing interactive dialog (including concatenation) across multiple recording sessions. [F7]
- Demonstrate an understanding of appropriate dialogue techniques for interactive products including approaches to concatenation or 'stitching'. [J8]

IV. Methods of Presentation:

Lecture, hands-on learning, projects.

V. Course Content:

Term % Topic

20%	Dialogue recording techniques
10%	ADR
20%	Preparation and organization for dialogue recording
20%	Two-track audio cleanup and editing
30%	Assignments and mini-projects

VI. Methods of Evaluation:

Attendance and participation 15%  
Practical assignments 20%  
Quiz 15%  
Mini-project(s) 50%

**Interactive Audio Special Interest Group (IASIG)  
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**Year Three [SD] Interactive Mixing (X-14)**

I. Catalog Description:

Prerequisite: Mixing & Mastering 1 &2, Sound Design for Games 1 & 2

This course focuses on mixing audio for linear and non-linear media. Students will combine and utilize the knowledge and experience they have gained in *Mixing & Mastering 1 and 2*, and *Sound Design for Games 1 & 2*, and work on mixing sound design projects both for linear digital video and interactive applications.

II. Recommended Texts:

- Bridgett, R. (2008) *Post-production sound: a new production model for interactive media*. Soundtrack, 1 (1), pp.29-39.
- Rob Bridgett (2009) *The Future Of Game Audio - Is Interactive Mixing The Key?* [Internet]. Available from: <[http://www.gamasutra.com/php-bin/article\\_display.php?story=4025](http://www.gamasutra.com/php-bin/article_display.php?story=4025)> [Accessed 26 February 2010].

III. Course Objectives:

Upon completion of the course students will be able to:

- Discuss and implement mixing strategies [F4]
- Mix and master sound design projects both for linear digital video and interactive applications [I12]
- Demonstrate an understanding of multichannel and 3D audio formats and techniques. [F6]

IV. Methods of Presentation:

Hands-on learning, supervised in-class (lab) work, projects.

V. Course Content:

Term % Topic

100% Mixing and mastering sound design projects

VI. Methods of Evaluation:

Attendance and participation 15%

Project 1 25%

Project 2 25%

Final Project 35%

**Interactive Audio Special Interest Group (IASIG)  
Game Audio Curriculum Guideline v. 1.0**

**Year Three [SD] Game Sound Analysis (X-16)**

I. Catalog Description:

Prerequisite: Introduction to Sound; Sound Design for Games 1

What makes a great sound design? This course will explore concepts of what it is that makes game sound unique. We will take a look at the people who are creating these noises and discover great designs and designers along the way. Using isolated and in-game examples, we will explore the current landscape of sound design for games of all types from consoles to on-line from MMO to first person role-playing games. Ideas of iterative & adaptive sound will be examined with an ear toward finding out what makes great audio design tick.

II. Recommended Texts:

- Collins, Karen. *Game Sound: An Introduction to the History, Theory, and Practice of Video Game Music and Sound Design*. The MIT Press, 2008.

III. Course Objectives:

Upon completion of the course students will be able to:

- Discuss the evolution of SFX from 8-bit up through contemporary games. [I4]
- Analyze and discuss seminal sound designs from various video games. [I5]
- Demonstrate a comprehensive knowledge of approaches to sound design for film [H1]
- Understand the use of sound as a counterpoint to visuals [H2]
- Understand the subjective nature of sound/semiotic functions of sound [H4]
- Understand the use of sound to focus attention [H5]
- Understand the use of diegetic sound for emotional cues [H6]
- Understand audio-visual synchresis as a vehicle for characterization [H7]

IV. Methods of Presentation:

Lecture, discussion, guest speakers, case studies, projects.

V. Course Content:

Term % Topic

25%	History and evolution of film and video game sound design.
50%	Analysis of current, seminal works in the post-modern vein
25%	Final Presentation or SFX project.

VI. Methods of Evaluation:

Participation 15%  
Mid-Term 20%  
Presentations/written assignments 45%  
Final 20%

**Interactive Audio Special Interest Group (IASIG)  
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**Year Three [SD] New Game Platforms (X-18)**

I. Catalog Description:

Prerequisite: Introduction to Sound

This course discusses the audio opportunities and challenges faced by current console platforms and new online and mobile gaming platforms. Technical capabilities and specifications of the hardware will be explained. Serious discussions about new audio possibilities and pushing current sound design techniques will also be part of this class.

II. Recommended Texts:

No suitable texts available.

III. Course Objectives:

Upon completion of the course students will be able to:

- Demonstrate a comprehensive knowledge of current gaming platforms and a solid understanding of their various capabilities and limitations with particular regard to audio e.g. PS3, Wii, iPhone, browser games, etc. [J2]
- Produce simple sampler patches and identify the use of sampling approaches within current and past game technologies [K1]
- Identify the historical and potential future applications of analog, digital and sampling synthesis [K3]

IV. Methods of Presentation:

Lecture, presentation, discussion, case studies.

V. Course Content:

Term % Topic

70% Audio specifications and requirements of current game platforms.  
30% Current and future sound design capabilities.

VI. Methods of Evaluation:

Attendance and participation 20%  
Mid-term 40%  
Final 40%

**Interactive Audio Special Interest Group (IASIG)  
Game Audio Curriculum Guideline v. 1.0**

**Year Three [M] Interactive Music Composition 1 (X-23)**

I. Catalog Description:

Prerequisite: Music Composition 1 & 2

Applied approaches to scoring for video games. It prepares students for entry level work at a game development company or as a freelance game music professional, including experience with typical game music workflow, and approaches to scoring for video games. An overview of the video game and interactive industries including contracts, licensing, toolsets and job opportunities.

II. Recommended Texts:

- Dallin, Leon. *Techniques of Twentieth Century Composition: A Guide to the Materials of Modern Music*. WC Brown. 1974.

III. Course Objectives:

Upon completion of the course students will be able to:

- Compose advanced scores for games that use transition matrices, branching and looping, basic algorithmic options, adaptive and randomization techniques [N1]
- Create advanced sequences utilizing tempo/meter changes and matching to picture using markers [N2]
- Demonstrate a full understanding of music preparation for game orchestration (i.e. multi-layered, multi-stem orchestration) [O9]

IV. Methods of Presentation:

Lecture, discussion, guest speakers, case studies, multiple writing projects.

V. Course Content:

Term % Topic

25%	Interactive Music Techniques
20%	Technical Aspects of Writing for Video Games
10%	Creating a Reel
25%	Writing Assignments and Presentations
10%	Audio Design Document, Budgeting, Project Management
10%	Analysis of Video Game Music

VI. Methods of Evaluation:

Participation 15%  
Mid-Term Project 20%  
Presentations/writing assignments 45%  
Final Project 20%

**Interactive Audio Special Interest Group (IASIG)  
Game Audio Curriculum Guideline v. 1.0**

**Year Three [M] Interactive Music Composition 2 (X-24)**

I. Catalog Description:

Prerequisite: Interactive Music Composition 1

This course continues to build on the foundations learned in *Interactive Music Composition 1*. It features advanced approaches to scoring for video games, including implementation using middleware like XACT, Wwise and Fmod. It includes examples, guest speakers, and applied scoring to develop the knowledge and skills that game composers and implementers are using in today's industry. This course deepens the preparation of students for entry level work in music at a game development company or as a freelance game music professional.

II. Recommended Texts:

- Wwise manual. ([www.audiokinetic.com](http://www.audiokinetic.com))
- Collins, Karen. *Game Sound: An Introduction to the History, Theory, and Practice of Video Game Music and Sound Design*. The MIT Press. 2008.

III. Course Objectives:

Upon completion of the course students will be able to:

- Create a demo reel. Create a portfolio with technical projects, but also with written accompaniments to these technical projects that explain the thought processes, research methods for the project, design philosophy and approach taken [C1]
- Understand budgeting, scheduling, contracts, project management [A1]
- Plan and organize a recording session using small groups of instruments of between 7-12 players, or demonstrate an understanding of processes and approaches to large-scale multi-instrument recording [E6]
- Demonstrate the ability to use version control tools, asset management systems, and archiving strategies [A10]
- Compose advanced scores for games that utilize transition matrices, branching and looping, basic algorithmic options, adaptive and randomization techniques. [N1]

IV. Methods of Presentation:

Lecture, discussion, guest speakers, case studies, multiple writing projects.

V. Course Content:

Term % Topic

25%	Advanced Interactive Music Techniques
15%	Advanced Technical Aspects of Writing for Video Games
10%	Creating a Reel
15%	Writing Assignments and Presentations
10%	Audio Design Document, Budgeting, Project Management
10%	Analysis of Advanced Video Game Music
15%	Understanding Middleware Technologies and Formats as it Applies to Video Game Music

VI. Methods of Evaluation:

Participation	15%
Mid-Term	20%
Presentations/written assignments	45%
Final	20%

**Interactive Audio Special Interest Group (IASIG)  
Game Audio Curriculum Guideline v. 1.0**

**Year Three [M] Game Music Analysis (X-35)**

I. Catalog Description:

Prerequisite:

What makes a great game score? This course explores concepts of what it is that makes game music unique. We will take a look at the people who compose and examine and analyze game scores in and out of context. Using scores, soundtracks, and in-game examples we will explore the current landscape of music for games of all types from consoles to online games. Ideas of interactive and adaptive music will be examined with an ear toward finding out what makes a great game score tick.

II. Recommended Texts:

No suitable texts available.

III. Course Objectives:

Upon completion of the course students will be able to:

- Understand the aesthetics and practices of interactive music [L1]
- Understand the relationship between genre and musical styles in game and liner media production [L2]
- Understand and be able to critique contemporary game scores [L3]
- Understand the evolution of game music and its relationship to technological advances [L4]
- Understand parallels between interactivity in contemporary non-linear music/performance art and game music [L5]

IV. Methods of Presentation:

Lecture, discussion, guest speakers, case studies, projects.

V. Course Content:

Term % Topic

25% History and evolution of video game scores.  
50% Analysis of current, reviewed video game scores.  
25% Final Paper or Composition.

VI. Methods of Evaluation:

Participation 15%  
Mid-Term 20%  
Presentations/written assignments 45%  
Final 20%

**Interactive Audio Special Interest Group (IASIG)  
Game Audio Curriculum Guideline v. 1.0**

**Year Three [M] Interactive Audio Aesthetics (X-34)**

I. Catalog Description:

Prerequisite: History of Music 1, 2

This class covers the history of interactive and adaptive music from the perspective of 20<sup>th</sup> century music history. From the early serial pieces of Messiaen and Schoenberg to the works of Cage, Feldman and the rest of the New York School, parallels will be drawn with existing game scores and techniques. Through score reading, listening sessions, video presentations & discussions, this class looks at the cross currents in theoretical thought that exists between adaptive audio composition for new media & the developments of major composition movements and composers of the 20<sup>th</sup> century.

II. Recommended Texts:

- Collins, Karen. *Game Sound: An Introduction to the History, Theory, and Practice of Video Game Music and Sound Design*. The MIT Press. 2008.
- Cage, J. *Silence: Lectures and Writings*. Marion Boyars Publishers Ltd. 1973

III. Course Objectives:

Upon completion of the course students will be able to:

- Discuss the evolution of 20<sup>th</sup> century music, including the major composer innovators, and the parallels with non-linear game music [M4]
- Formulate theories as to the future trends in adaptive music, both 'commercial' and 'art'. [M3]
- Analyze and discuss the major trends and innovators in computer music [M6]

IV. Methods of Presentation:

Lecture, discussion, guest speakers, case studies, projects.

V. Course Content:

Term % Topic

- 25% History and evolution of interactive music and compositional trends.
- 25% Discussion of current interactive music in commercial and concert media.
- 25% Analysis of current, seminal works in the interactive audio vein.
- 25% Final Presentation or Composition

VI. Methods of Evaluation:

- Participation 15%
- Mid-Term 20%
- Presentations/written assignments 45%
- Final 20%

**Interactive Audio Special Interest Group (IASIG)  
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**Year Four [core] Video Game Career Development (X-20)**

I. Catalog Description:

Prerequisite: None

This course serves as an exploration of the variety of career paths in the electronic game industry. The primary focus will be on the five major disciplines of game development: visual design, programming, game design, music & sound design, and production/project management. Also considered will be jobs in business management, marketing, advertising and retail. Issues covered will include web site promotion, demo 'reels', networking events, etc.

II. Recommended Texts:

- Carey, Kirstin. *Starving Artist No More: Hearty Business Strategies for Artists*. Small Talk. 2005.
- Marks, Aaron. *The Complete Guide to Game Audio*. Focal Press. 2008.

III. Course Objectives:

Upon completion of the course students will be able to:

- Discuss the structure of the game development industry [A4]
- Define elements related to a production plan document, product development and marketing [A2]
- Understand industry practices with regards to staff work VS freelance roles and the advantages/disadvantages of these roles [A5]
- Identify the distinct stages in the game development process (Pre-Production, Production, Post-production) [A6]
- Communicate effectively with a variety of colleagues, understand other departments and how they interact with the audio team [A7]
- Demonstrate knowledge of a range of group working processes and leadership strategies [A9]
- Identify issues and approaches to working and running your business as a freelancer [C3]
- Identify resources for self-promotion, contact management including job networking skills [C2]
- Create a demo reel [C1]
- Understand basic game audio copyright and IP issues [C4]

IV. Methods of Presentation:

Lecture, discussion, guest speakers, case studies, projects.

V. Course Content:

Term % Topic

20%	Structure of Game Industry and work force
20%	Job interview and resume preparation
20%	Portfolio preparation and management
20%	Alternative career paths in Games
10%	Resources for networking
10%	Web, resume & portfolio assignments and presentations

VI. Methods of Evaluation:

Participation 15%  
Mid-Term 20%  
Presentations/written assignments 45%  
Final 20%

**Interactive Audio Special Interest Group (IASIG)  
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**Year Four [core] Senior Project 1, 2 (X-21 / X-22)**

I. Catalog Description:

Prerequisite: None

This is a final project course providing a team experience for the game development student in their specific discipline of study and projected specialization. Members of each team will fulfill the roles of design, project management, visual design, programming and audio in a completed game project as a requirement for completing the development program. Students will lead/develop in their specific portion of a game project concurrent with other game development majors.

II. Recommended Texts:

- Belbin, R.M. (2010) *Team Roles at Work*. 2nd ed. Butterworth-Heinemann.
- Handy, C. (1999) *Inside Organizations: 21 Ideas for Managers*. New Ed. Penguin.

III. Course Objectives:

Upon completion of the course students will be able to:

- Work effectively on a game development team
- Distinguish between the different team roles and responsibilities
- Lead/develop a project in the specific discipline of study
- Evaluate the effectiveness of a range of group working processes, team development processes and leadership strategies
- Communicate effectively with a variety of colleagues and understand other departments & how they interact with the audio team

IV. Methods of Presentation:

Team discussion, guest speakers, case studies, main projects.

V. Course Content:

Term % Topic

15%	Concept Development
15%	Preproduction and documentation
15%	Project Plan and design guidelines
20%	Full Production
10%	Evaluation and playtesting
10%	Revisions and asset management
15%	Final presentations

VI. Methods of Evaluation:

Participation 15%  
Mid-Term 20%  
Presentations/written assignments 45%  
Final 20%

## What's Next and Further Resources

The IASIG Game Audio Education Working Group intends to continue to develop material especially for this Curriculum Guideline. This includes:

- Examples of real-world tasks and the skills involved
- Case studies: a 'week in the life of'
- Glossaries
- Up-to-date lists of resources
- WIKI
- Expansion of syllabi examples to include courses not currently detailed (if such a need is found).

By joining the IASIG, you can ensure that you have access to these materials and that you are kept informed of the latest developments—and you can share your own stories, ideas, and suggestions. To join, visit [www.iasig.org](http://www.iasig.org) and click the "Join/Renew Now" link.