Anglia Ruskin University

Course Information Sheet

BSc (Hons) Computer Gaming Technology

Mode and course length – Full-Time (4 years)

Location – ARU Cambridge Campus

Awarding Body – Anglia Ruskin University. As a registered Higher Education provider Anglia Ruskin University is regulated by the Office for Students.

Overview

We love computer games. Talking about them, playing them, designing them, and building them. If you do too, come and study in our Games Development Studio. You'll learn to design graphics and games using artificial intelligence, 3D modelling and animation – and create a portfolio to help launch an exciting career.

Your course has a new home in Compass House, which extends our campus along East Road. You'll have the latest technology at your fingertips and be able to collaborate with other students on innovative projects to hone your skills.

Forget the stereotypes – gaming isn't just for teenage boys. Half of all gamers are female, and the average age is 31*. This means the industry is huge, and a variety of exciting jobs await you.

You'll be creating games and everything you design will build into a valuable portfolio to help you secure your dream job when you graduate. You'll even have chance to do a year's work placement – offering plenty of practical experience and a head start in industry.

Based in our new home in Compass House, Cambridge, you'll enjoy having the latest technology at your fingertips and collaborating with other students on innovative projects.

You'll study both the theory and practical aspects of gaming and experience the whole development process, from initial concepts to programming, testing and publication. You'll spend plenty of time in our Games Development Studio, which simulates a commercial working studio and features up-to-date hardware and software. We currently have GameMaker, 3DGameStudio, Unreal Tournament 3 Editor, Adobe Flash and Action Script, Java and C++, Microsoft XNA Game Studio, Visual C# Express, Microsoft Visual Studio, Photoshop, GIMP, 3ds Max, Blender, Fusion, Audacity, Second Life and Unity3D.

18% of the UK games industry is based in Cambridge**, so it's a great place to study, surrounded by studios large and small. Many famous developers are based locally, including Sony, Frontier, Jagex, Inertia Game Studios, Eidolon Studios and PTM Games. Our department is also a member of TIGA, the association for games developers in the UK.

We host the annual Brains Eden Gaming Festival, when students from across Britain and Europe compete in teams to build games.

* Theesa.com

** nesta.org

Course Delivery

Our courses are delivered through teaching and learning methods which provide students with the widest possible exposure to a modern and innovative higher education experience.

These methods vary and could include attendance at lectures and seminars, undertaking laboratory exercises or work-based activities, practical work, performances, presentations, field trips, other relevant visits and e-learning through Canvas, our online

learning management system.

Each course is divided into a number of ‘modules’ which focus on particular areas, each of which has a specific approach to its delivery. This information is published to students for each module they take via the Module Definition Form (MDF) and Canvas.

Assessment

Throughout the course, we’ll use a range of assessment methods to help measure your progress. You’ll demonstrate your learning through the games you produce, but there will also be a mix of exams, personal learning plans and projects.

Fees

Information about your course fee including any annual fee increases or deposits (if required) can be found in your offer letter.

Modules

Core Modules

Year 1: Foundation in Engineering, Computing and Technology

This module will provide students with the necessary skills to begin studying at level 4 in Engineering, Computer Science and related courses.

Students will be introduced to the core skills necessary to succeed in higher education, including thinking critically, researching and referencing appropriately, demonstrating appropriate numeracy and ICT skills, and communicating effectively verbally and in writing.

In addition to these fundamental skills, Students will cover the subjects underpinning the technological disciplines. Fundamental mathematical skills will be covered, alongside pre-calculus, followed by an introduction to calculus and vector and matrix arithmetic. Students will also be introduced to Classical mechanics, and its application to real-world scenarios. Students will be introduced to the fundamentals of computer science, learning about the principles behind programming and applying them through a series of practical coding exercises. Students will undertake a multi-disciplinary group project as they learn about the collaborative nature of engineering, and design from a broader perspective of business.

The module is made up of the following 8 constituent elements:

- Interactive Learning Skills and Communication (ILSC)
- Information Communication Technology (ICT)
- Critical Thinking
- Maths for Scientists
- Maths for Engineers
- Physics for Engineers
- Fundamentals of Computing
- Engineering Design

Year 2: Introduction to Game Engine Technology

Across the worldwide games industry, there are many development environments within which games and interactive experiences can be developed. These environments, or ‘engines’ can be complex environments, and act as the core stage in a long and potentially, complex production pipeline. A working knowledge of a game engine is vital in order to be able to implement even the most simple digital video game. Every game engine has it’s strengths and weaknesses. Some game engines are particularly strong at displaying large continuous open worlds, others may be optimised for the current generation of games consoles, while others are of particular interest when creating multi-platform games at minimal cost. This module seeks to provide students with an understanding of the common and transferable concepts within game engines and how such engines integrate into the production pipeline within a commercial games studio. Students will be able to develop this understanding to a level where they will be able to understand the features of a commercial game engine and match these to the requirements of a specific project, and in the process, select the most appropriate engine. Students will also gain a working knowledge of a commercial game engine and learn through firsthand experience, the typical tools and techniques for working effectively within a

commercial game engine. These core skills will be transferable across a range of technologies and will serve as a strong foundation for future technical studies on the course. Students taking this module will also be required to attend a one hour class per week to study personal development planning (PDP) during which they will be required to create a PDP portfolio.

Year 2: Analytical Techniques for Game Developers

Game developers regularly face unique challenges in implementing their chosen game mechanics. Many of these challenges cannot be met using existing capabilities within a game engine and must be implemented from first principles. These game mechanics can range from 2D or 3D spatial operations, solving complicated combat or logical equations, and calculating trajectories as examples. Without the knowledge of fundamental mathematical concepts, game developers will be limited in the type of mechanics they can implement and therefore the complexity of their games. This module will help students to assess their existing analytical and mathematical skills and sympathetically enable them to remedy any basic deficiencies. It will then develop the core mathematical skills needed for successful study on the BSc (Hons) Computer Gaming Technology degree. This module will also introduce students to key mathematical techniques which help game developers analyse and solve practical challenges in game development. It will provide a solid background in relevant basic techniques while also providing an environment in which to solve typical game development problems.

Year 2: Introduction to Game Programming

This module provides an introduction to the high level programming knowledge a game programmer needs (although it requires no prior programming experience). The student will use industry-standard tools and techniques to design, implement, test and document simple programs using a current programming language.

The module will enable students to understand the principal components of high-level programming code, laying the foundation for subsequent game development modules which require structured programming ability. It will emphasise the principles of good programming practice and introduce the techniques required to develop games which:

* are robust and efficient

* implement the required game mechanics

* contain modular and reusable code

* consists of elegant, easy to read code

By the end of the module, students should have sufficient mastery of a high-level programming language to allow them to design, implement and test simple game mechanics.

The skills taught within the module are intended to be directly transferable to the games industry and will provide a suitable foundation for students who will be expected to apply programming skills in future modules within the BSc (Hons) Computer Gaming Technology degree. These skills are readily transferable outside of the games industry and will provide a strong foundation for other software development disciplines.

Year 2: Introduction to Computer Gaming

This module is an introduction to the study of gaming and development of computer games. The module uses standard computer platforms suitably equipped with 2D and 3D games development environments in which students implement a complete game. The teaching and learning programme of the module covers two separate, but mutually dependent strands of study and activity. A theoretically-based strand of study looks at the fundamentals of game analysis, design, the requirements of interaction and an outline of game theory with its ideas of states, goals and strategies These ideas are foundational for both the analysis and design of games and will recur throughout subsequent modules. Alongside this analysis of game genre, forms, their historical and cultural significance provides an informed understanding of the user response to games. The practical strand of activity introduces the student to implementing a game using current specialist game development technologies. This practical strand helps (in concert with other modules not specific to gaming) to develop the fundamental skills of computer games development. These strands come together in the assignment for the module. This will require the student to apply knowledge gained from the theoretical aspects of the module to survey and analyse existing games, to produce a theoretically well founded games design, to plan the practical implementation of the game in a suitable technology, to carry out that implementation and to test and evaluate the result. The final game implementation will also include a design document detailing how and why the game

has been designed in the specific way. The student will be expected to demonstrate application of the theoretical concepts within the documentation and final game. The skills acquired in this module may be enhanced through further study by selecting the Level 5 module Games Design And Development.

Year 2: Software Development for Games

Due to the high computational costs associated with Computer Gaming Technologies, industry places huge importance on the efficiency with which programming languages are used to develop the games. More specifically, this pertains to handling of memory allocation, pointers/references to data structures, size of binary files, garbage collection and compiler warnings.

This module provides an introduction to high-level programming language such as C++ to complement previously taught programming languages such as C# or Java. This will enable students to gain further insight and experience of another widely used programming language, which will be further utilised in a gaming context in future modules.

This module will place particular importance on object-oriented style of programming including some design considerations. Code will be written using an appropriate development environment (such as Visual C++, Dev C++, or C++ Builder) but confined to the use of the standard library so as to promote source code portability to other platforms. Students will also be taught how explicit types of memory allocation can be used to manipulate data and how this can influence computer resources, and thus will gain an understanding of the underlying architecture behind how programming languages manage their data.

Year 3: Software Design and Implementation

Software Design and Engineering is a form of engineering that applies the principles of computer science to achieving cost-effective solutions to software problems. The aim of this module is to give to students a real-world experience in software engineering. The number, size, and application domains of computer applications have grown and most people depend on the effectiveness of the software development. Therefore software products have to be efficient, of very good quality and to help us to be more efficient and productive. This module will provide you with the basic intellectual tools to be able to design, implement and test software systems. The concepts of a software life cycle, system theory, design methodologies and relational data modelling are introduced. The students will be given the opportunity to apply a design methodology to a case study producing diagrammatic representations of the data and functionality of a system. The module will introduce students to the essentials of database design and will include implementation. CASE tools are used to study topics including analysis and design in UML and managing the OO software development process.

Year 3: Game Design and Development

This module provides the student with a formally rigorous approach to the design of computer games, and provides a sound understanding of the development and delivery technologies which underpin modern high performance games. The theoretical aspects of the module involve understanding the development and management processes required to create a modern computer game. Students will also gain an understanding of how to represent games in formal, game-theoretic terms, and also the computational models and architectures which underpin modern games. Mathematical aspects include core concepts for implementing interactions within a game environment. These are introduced through the practical needs of simple interactive games which provide a rationale for trigonometry, vector manipulation, algebra and problem solving with algorithms. A key theoretical part of the module involves an understanding of the architecture and function of modern game engines. This theoretical knowledge is applied in the practical aspects of the module. These practical aspects require the student to develop a game from a specified genre, utilising a carefully-managed production cycle, and to become familiar with the range of tools which underpin games production: level editors, game engines and scripting languages. This rigorous approach is central to the skill set of contemporary professional games developers. The module uses a wide range of resources, since it is important for students to be exposed to a number of different development tools and game engines, as these typically have restricted and specialised functionality. In addition to a proprietary game development environment, extensive use is made of open source development tools.

Year 3: Game Engine Technology: Systems Modelling

The video games industry utilises different development environments to create interactive video games and immersive experiences. These environments are often complex and contain many elements, sections and mechanisms which enable the user to model the game (or real) world systems and develop their intended artefact.

More importantly, different development environments are constructed using concepts such as: Camera, Actor, Pawn, Game and Player State/mode in a variety of ways. It is therefore imperative to amass a working knowledge of a number of development platforms (engines) and critically evaluate them for strengths and weaknesses in order to gain a breadth and in depth knowledge in the field of game development.

This module will complement previously taught modules and seek to provide a working knowledge of an additional industry standard game development platform to expand students' basic knowledge. This will be achieved through first-hand experience of typical tools and techniques to work effectively within the game engine selected. These skills will continue to build up students' abilities, making sure they are transferable across a range of technologies serving as a strong foundation for future employment in the field.

In most games, visual representation of game entities need to be modelled in addition to mechanics and rules systems. 3D Modelling and Animation concepts, tools and techniques will form part of the material in this module in order to give students a much needed appreciation and common language with games artists who form an integral part in the long chain of video games production.

Year 3: Object-Oriented Programming for Games

Object-oriented programming (OOP), in its most basic definition is a programming style which is used to compartmentalise code so that it is structured in a logical manner which humans will find intuitive and easy to develop, maintain and modify. Video games can run anywhere from a few thousands, to millions of lines of code, which is why it is imperative to write code that can be modified and maintained with ease by multiple programmers. OOP helps programmers to think and arrange the code into what is known as objects that contain information about their state and behavior.

This module will initially cover the core pillars of Object-oriented programming methodology: Encapsulation, Inheritance, Polymorphism and Interfaces. Each one of these is a major topic in their own right and the students' focus will be directed towards adopting these necessary practices in high-level languages as pertinent to video game development. This will then lead on to a discussion of Object-oriented design patterns such as Adaptor, Factory, Singleton and Decorator.

Year 4: Professional Issues: Video Games and Society

This module aims to provide an understanding of the social, professional, legal and ethical issues which have arisen, and which may potentially arise, within the video games industry. It is designed to enhance advanced reflective thinking and to develop the ability to engage in coherent and objective debates on current and future issues. The module covers relevant and current topics within the video games industry such as, but not restricted to; Computer Law (e.g. Data Protection; Intellectual Property; Hacking), age restricted content, socially sensitive content, culturally sensitive content and the wider public image of the video games industry. These, and other, topics will be discussed in the context of their social, ethical and legal implications. Other aspects such as the ethical and professional responsibilities of graduates will be critically appraised. The skills developed in his module are a key part of professional development for game developers seeking to embody professional values and approaches within the video games industry. As such this module offers to balance technical skills of students with relevant soft skills. An important aspect of this module will be developing skills in researching relevant information to help form an objective view of a topic. This skill will also assist the student with engaging in robust debates about relevant issues, and to develop a professional attitude towards the video games industry. A high level of in class student participation is expected; non attendance/non-contribution may be penalised.

Year 4: Final Project

The individual Final Project module allows students to engage in a substantial piece of individual research and / or product development work, focused on a topic relevant to their specific discipline. The topic may be drawn from a variety of sources including: Anglia Ruskin research groups, previous / current work experience, the company in which they are currently employed, an Anglia Ruskin lecturer suggested topic or a professional subject of their specific interest (if suitable supervision is available). The project topic will be assessed for suitability to ensure sufficient academic challenge and satisfactory supervision by an academic member of staff. The chosen topic will require the student to identify / formulate problems and issues, conduct literature reviews, evaluate information, investigate and adopt suitable development methodolgies, determine solutions, develop hardware, software and/or media artefacts as appropriate, process data, critically appraise and present their finding using a variety of media. Regular meetings with the project supervisor should take place, so that the project is closely monitored and steered in the right direction. The project developed in this module is the most substantial piece of work that the student is

producing during their undergraduate studies. Thus, the choice of project topic and the quality of the work is likely to bear a great influence on the student's career / employability. Therefore, the module will also include aspects of Personal Development Plan and CV preparation. The students are strongly advised to allocate appropriate attention, time and effort to this module. The successful completion of the module will increase students' employability, as they will acquire skills directly applicable to real world projects.

Year 4: Professional and Entrepreneurial Portfolio

This module allows students to demonstrate their ability to create a professional quality artefact in a relevant aspect of their area of study. Based on the idea of creating a creative arts 'show reel the final work will demonstrate attainment in technical, professional and market knowledge. In this module students are required to take on a quasi-professional role in the development of a substantial piece of work which will include research, specification, design, documentation, development and evaluation. A key element is for students to evaluate their skill set, and, if necessary, specify and undertake a learning programme to gain the skills they need. As far as possible students will use real world market and commercial requirements to guide the development process from initial idea to the final deliverable. Weekly seminars will be used to guide and monitor progress with the emphasis on supporting appropriate learning activities rather than delivering content. Lectures on particular technologies relevant to student project topics may be covered as well as generic issues such as legal, professional and project management. The module will provide an opportunity to develop new skills or take existing knowledge further within a supportive framework. This might include the creation of a website, desktop application or complete game, either individually or as part of a small team. The assessment of the module is based on the research, justification, process, documentation, implementation and evaluation of an agreed artefact. This will be measured by three deliverables - the initial research / feasibility plan; an account of the project process, specification, design, implementation, skills development and professional issues; the finished artefact and presentation. Where group work is specified the contribution of each individual will be assessed separately. A professional and real world approach is encouraged and work can be undertaken for third party clients and practitioners of the industry.

Year 4: Emergent Gaming Technologies

The games industry exploits a wide range of interactive hardware within games. These range from the XBOX Kinect, Occulus Rift virtual reality headset, haptic joysticks and accelerometer based devices such as the Wii remote. This module aims to develop knowledge and understanding of the recent developments of Gaming-related hardware, game input and visualisation technology. It is designed to enhance the skillset of students with adding value by extending their ability to use a variety of hardware that relates to gaming and apply techniques and processes to develop games that go beyond the conventional input (e.g. keyboard, mouse) and output (e.g. flat screens) methods or interaction with the player. The topics of this module are by its own nature cutting-edge of Emergent technologies and, as such, the content will vary, but will include two key areas: - Game Input Techniques e.g. Motion Capture using Inertia Measurement Unit Sensors (IMUs), Infrared Cameras (IR), Pressure / Touch sensors. - Visualisation Techniques e.g. Field-of-View displays, Augmented and Virtual Reality. The purpose of this module is to bring the students to the fore-front of developing for, and with, game input and visualisation hardware and thus, is adapted to the advances and the state-of-the-art of the field. The students will have the opportunity to develop Human Computer Interfaces and tangible, haptic User Interfaces for games and the result will enhance their portfolios in yet another aspect of Game Development.

Year 4: Artificial Intelligence for Games

Artificial Intelligence (AI) is a field of automated and rational decision making that is pervasive in many areas of computer science including the area of video game development. AI in games differs from other more traditional applications of the field given the need to build systems that govern and direct players for the purposes of entertainment, rather than optimality.

This module covers both the foundational theory of AI decision making and examines the tools, techniques and practices to achieve common requirements of the video game industry. This looks creation of pathfinding agents, responding to stimuli and changing behaviour via finite state machines and behaviour trees, long-term planning and decision making, ‘director’ management systems and Procedural Content Generation (PCG). There will also be a brief overview of the new trends in computational intelligence as and when they become more prevalent in industry. All topics are supported by case studies of applications of these techniques within the video game industry and will expect students to engage in sessions where we deconstruct well-known AI implementations in commercial games.

Optional Modules

(Subject to availability)

Year 2: Simulation in Games

Video games rely on realistic simulations in many elements of gameplay, for example, the ability to move objects in a realistic manner, detecting collisions, and creating moving vehicles. Understanding the techniques to add realistic simulation into games enables a richer gaming experience and consequently reduces development cost. One of the game developer's challenges is the complexity of simulations in a game which results in great number of interactions that reduces the computation efficiency and takes an immense amount of processing time and power. Real-world motions are based on the rules of physics which can make simulated game worlds appear more natural. Objects will not fall realistically without accurate simulation of gravity, and without the knowledge of momentum, explosions and collisions will not be realistic. An understanding of Newton's laws of motion provides a great deal of knowledge on which to model the behaviour of moving objects, including collision detection. Collision detection mechanisms relies on a branch of physics that underpins Einstein's special theory of relativity. While game engines often provide limited capabilities in physics simulation within the engine itself, game developers cannot always be guaranteed to be using an engine in which such capabilities are already provided. It is often the case that even when such basic simulation capabilities are provided, it is necessary to extend or adapt them to the specific requirements of the game. This module will provide students with the ability to examine and differentiate knowledge in the discipline of physics. Students will be able to apply this knowledge in the context of game development to understand, extend basic simulation techniques for themselves, without relying on pre-built functionality within game engines, in order to make their games more dynamic. For students to assess their existing analytical, mechanical and physical skills and build up the skills necessary for successful completion of this course (BSc (Hons) Computer Gaming Technology). This module justifies the practical physics techniques that are required to examine, distinguish, and analyse realistic challenges in game development.

Year 2: Acoustics, Sound and Music

This module introduces the basic properties of waves with special emphasis on sound waves in air. Sound wave phenomena is demonstrated by means of a selection of experiments conducted during lecture sessions. The basic equations describing the behaviour of sound waves will be introduced and used. The mechanical properties of stretched strings and vibrating air columns in pipes will be studied as simple models of musical instruments and demonstrations performed with these. A range of musical instruments will be examined in order to highlight the variation of acoustic characteristics common to each. The topic of room acoustics will be introduced and derivation of acoustic parameters will be conducted in accordance with ISO acoustic measurement procedures. There will be a brief survey of the basics of human hearing and psychoacoustics.

Year 3: Interaction and Usability

Developing effective human-computer interfaces is a vital yet poorly understood area. As such it is necessary to have some understanding of a variety of fields including cognitive psychology and usability theory which has recently become a major issue in web design / effective e-commerce implementation. The user experience (beyond traditional usability) is a key design issue, where the importance of the perceptions and experience of the user is considered. This module seeks to develop understanding of interaction design through the delivery of core theory which is then applied to the analysis, design, implementation and evaluation of a limited functionality horizontal prototype. The student will be introduced to the notion of user mental models (following the approach of Donald Norman) and the extent to which they can be utilized in the design of conceptual models underlying the designed interface. Students will then examine the range of discovery methods used to harvest user, task and environmental data to support user needs analysis comprising user characterisation (including the notion of user personae), task analysis (hierarchical task analysis / action and object taxonomies) and environmental analysis. Following a discussion of visual style / aesthetics, the preceding analysis will then progress to documented design rationale supporting by logical storyboards showing information, action and navigation screen components. The design is then prototyped in an appropriate high level interface prototyping tool and subjected to critical introspective and user evaluation. Note that ideally students will be expected to possess some scripting experience prior to starting the module. Students will document all the above to produce the final assignment. The module would be of considerable benefit to those who intend to design interfaces (including web design), become usability / testing consultants or work within user training / user support roles. Specialist resources required for this module are prototyping and access to the safari online text (Badre A (2002) Shaping Web Usability - Interaction Design in Context Addison-Wesley).

Year 3: Advanced Acoustics and Psychoacoustics

The understanding of sound mechanisms in the field of audio technology is of great importance. Since there are many sound producing processes involved it is vital that the student has a working knowledge and an appreciation of the limitations of the technologies used.

This module reviews the mechanisms of sound production and transmission. Binaural localisation of single sources is examined, and the implications for stereophonic recording and reproduction are explained. This leads to a discussion of quadraphonic and other surround-sound systems. The field of room acoustics is explored using theoretical models, measurement hardware and computer virtualisation.

Next, the design and construction of loudspeakers is examined. Newer driver designs such as flat-panel, plasma and rotary woofer loudspeakers are explored.

The module also examines psychoacoustics, It outlines aural physiology and the perception of psychophysical attributes of sound. The relationships between these and the measurable physical parameters are examined in detail. Current theories of pitch perception are examined, such as place theory, periodicity theory and volley theory. Auditory grouping processes are explored using Gestalt principles. Loudness perception is explored by considering the derivation and implications of the equal-loudness curves. Musical timbre is examined by looking at how evaluation of perceptual timbral similarity leads to the concept of a multi-dimensional timbre space.

Finally, several categories of auditory illusion are presented, such as Shepard/Risset tones and the McGurk effect.

Year 3: Audio for Games

Game audio is an often misunderstood element of game production, requiring appropriate sound engineering skills and knowledge of the relevant tools and technology. A good audio engineer working in the game industry must also be creative and imaginative, as they are often asked to create unique sounds for often unrealistic and other worldly environments and scenarios. Creating the soundtrack for a game includes writing music, creating unique sound effects and ambient effects, as well as recording character voices and spoken instructions.

To be part of this growing industry, one must be able to produce non-linear, interactive experiences, not just one off sound effects or music loops. That means one must be able to implement the audio into the game, rather than simply create it and pass it on to a programmer for incorporation into the game. This module uses the Unreal Development Kit (UDK) to teach the implementation of audio into a real game environment that has been previously constructed by the makers of UDK software. This module will also introduce the use of a popular middleware software package, designed to integrate specialised audio production tools with the game development engine.

Year 4: Data Structures and Algorithms

The concept of the algorithm is a central pillar of computer science, and is closely related to the concept of the data structure: the storage mechanism that algorithms are used to manipulate. The aim of this module is to raise awareness of efficient programming practice by critically appraising the core data structures and algorithms available to the computer scientist. A range of algorithm analysis techniques will be employed to quantitatively evaluate the performance of common data structures and algorithms in order that prudent choices may be made in the assembly of non-trivial software artefacts with specific performance targets or constraints. In addition to empirical and cyclomatic techniques, asymptotic analysis (in space and time) will be particularly emphasised, and the student will learn how to categorise algorithms into specific complexity classes, enabling them to select from among multiple possible approaches to a given computational problem. The focus of data structures and algorithms is largely theoretical, and requires some experience of elementary topics in algebra and discrete mathematics, such as roots, linear, exponential and quadratic growth functions, limits, summation notation, probability, sets and graph theory.

Year 4: Mobile Technology

This module investigates in detail the technology of "next generation" mobile devices from mobile phones to media centres. The basic communication infrastructure will be covered to establish the context of data transmission to devices including environmental issues of base station location, components and testing. The full range of current and near production devices will be evaluated, in the context of services that can be rendered to users. Extensive use of case study materials will be used to evaluate services: video, conferencing, gaming, internet rich applications and voice over IP among other applications. Practitioners will present these examples of actual and future applications wherever possible and students will be able to

practically compare alternative technologies particularly for enterprise deployment. Students will be encouraged to develop their own ideas within the technology and prepare content of whatever form to be rendered and tested on mobile devices using the latest software packages. This material may be for entertainment, games, e-learning/training, conferencing, or applications of existing services: e-mail, Instant messaging, news etc.

Year 4: Audio Programming

This module builds on previous learning in the area of computer programming to produce useful audio algorithms for game and/or virtual reality environments. As well as utilising algorithm development and scripting software, the learning materials will explore the combination of game design software and audio production technologies.

The theory and implementation of procedural audio effects (e.g.filtering, delay, distortion) and physical modelling of acoustic systems (e.g. oscillators and strings) will be examined such that they can be incorporated into the production of a simple game. Issues such as algorithm stability and evaluation will be discussed alongside potential (optional) enhancements to improve the feasibility / impact / realism of the audio excerpts and components designed.

Module material will be delivered through a series of weekly lectures and related guided tutorials. Exposition of the theory of the choice audio algorithms will be delivered during lectures alongside insights on development methodology. Tutorial sessions will focus on applying the lecture material to the implementation of a series of audio algorithms and, later in the module, their incorporation into a gaming environment.