

## **PROGRAMME SPECIFICATION**

### **Course record information**

Name and level of final award:	BSc (Honours) Computer Games Development BSc (Honours) Computer Games Development with Industrial Placement The BSc (Hons) Computer Games Development is a B.Sc. Honours degree that is Bologna FQ-EHEA first cycle degree or diploma compatible.
Name and level of intermediate awards:	BSc Computer Games Development Diploma of Higher Education in Computer Games Development Certificate of Higher Education in Computer Games Development
Awarding body/institution:	University of Westminster
Teaching Institution:	University of Westminster
Status of awarding body/institution:	Recognised Body
Location of delivery:	Central London (Cavendish)
Language of delivery and assessment:	English
Mode, length of study and normal starting month:	3 years full time 4 years full-time with industry placement
QAA subject benchmarking group(s):	QAA subject benchmark for Computing British Computer Society guidelines on accreditation
Professional statutory or regulatory body:	This programme is accredited by the British Computer Society (BCS)
Date of course validation/review:	February 2015
Date of programme specification approval:	December 2015
Valid for cohorts:	2016/17 for levels 4 and 5, 2017/18 for levels 4, 5 and 6
Course Leader:	Dr Li Jin
UCAS code and URL:	<a href="http://www.westminster.ac.uk/courses/undergraduate">http://www.westminster.ac.uk/courses/undergraduate</a>

## What are the minimum entry requirements for the course?

There are standard minimum [entry requirements](#) for all undergraduate courses. Students are advised to check the standard requirements for the most up-to-date information.

[westminster.ac.uk/courses/undergraduate/how-to-apply](http://westminster.ac.uk/courses/undergraduate/how-to-apply)

For most courses a decision will be made on the basis of your application form alone. However, for some courses the selection process may include an interview to demonstrate your strengths in addition to any formal entry requirements.

More information can be found here: [westminster.ac.uk/courses/undergraduate/how-to-apply](http://westminster.ac.uk/courses/undergraduate/how-to-apply)

## Aims of the course

Computer game development combines technology and creativity in multidisciplinary way. The game industry is still an expanding and challenging sector with continually evolving ideas and cutting-edge technologies. Thus it requires practitioners to exercise more flexibility in software specifications and functionality through adapting their approaches to design and management while keeping abreast of broad changes to technology. This course covers all major technical aspects of the computer games development process from design to production. It aims to prepare students for a career in software development with a particular emphasis on computer games development. The course provides students with a solid understanding of game technologies including programming, applied maths, computer graphics, and game engines. Meanwhile, students are supported to expand a broad range of knowledge and skills including mobile and web application development, and human computer interaction. In order to enhance student employability, the course offers a number of talks from creative industry and supports students to take participation in prestige game competitions and digital fairs as well as seek industrial placements and internships. Upon completion of the course students will be expected to gain a software developer role in the games industry and wider creative industry. However, since the games industry relies on the work of multidisciplinary groups, a range of design, production and management modules is involved in the course structure. As an integrated course of programming and design, it offers diverse career opportunities including game designer and game producer in well-established game companies as well as small and medium sized game studios. Additionally, the skill set gained fully prepares graduates for other software career within general computing sectors. Graduates will possibly continue further research study at an advanced level in either creative computing or general computer science areas.

The BSc Computer Games Development has been designed to:

- To provide students with a comprehensive knowledge and understanding of the fundamental principles and technologies that underpin the discipline of computing with emphasis on the technical skills and theories required in computer games development;
- To give students technical expertise and specialisation in computer games development and practical experience enabling them to be effective in a rapid developing range of careers in wider creative industry;
- To equip students with solid knowledge and understanding of software development principles across the whole game production procedure;
- To provide students with a full game development experience, from concept to software design to final implementation by incorporating industry software tools, game engines and APIs;

- To provide a motivating and inclusive environment with the opportunity to develop themselves intellectually and socially and to encourage students to develop as independent and self-critical problem solvers;
- To prepare graduates with professional attitudes with awareness of ethical, legal, and social issues, interpersonal and entrepreneurial skills required in the industry;
- To prepare graduates with awareness, knowledge and practical skills in the field of computer games for continued study at an advanced level in either formal postgraduate study or as continued professional development.

### What will you be expected to achieve?

Learning outcomes are statements on what successful students have achieved as the result of learning. These are threshold statements of achievement the learning outcomes broadly fall into four categories:

- The overall **knowledge and understanding** you will gain from your course (KU).
- **Graduate attributes** are characteristics that you will have developed during the duration of your course (GA).
- **Professional and personal practice learning outcomes** are specific skills that you will be expected to have gained on successful completion of the course (PPP).
- **Key transferable skills** that you will be expected to have gained on successful completion of the course (KTS).

In following list of Learning Outcomes, L4 refers to your first year of study, L5 refers to your second year of study, and L6 refers to your final year of study. Each statement in the list describes a course learning outcome (statement of achievement) and its associated domain as described in the table below.

Code	Domain	Description
C	Client-User Focussed	Associated with the user interface and usability of systems. Focussed on the client component of systems.
D	Data	Relates to knowledge and application of the processing and storage of information.
M	Maths	Relates to mathematical skills and knowledge.
O	Operating Environment	Relates to knowledge and understanding of the environment in which users run application software.
P	Programming	Relates to programming and development skills.
S	Skills	Relates to professional and practical skills.

For example: **L5-O-LO1-CG**

**L5**, this at level 5 (second year)

**O**, it relates to the Operating Environment domain

**LO1**, it relates to learning outcome 1

**CG**, the course code i.e. Computer Games.

#### **Level 4 learning outcomes**

##### **Upon completion of level 4 you will be able to:**

L4-M-LO1-CG - Analyse small scale problems focusing on games and design their solutions by applying algorithmic and mathematical techniques.

L4-M-LO2-CG - Apply core mathematical elements to solve algorithmic problems in games development.

L4-P-LO3-CG - Apply programming principles and constructs to implement solutions to small scale problems.

L4-D-LO4-CG - Methodically capture game requirements and create a game specification that meets them.

L4-D-LO5-CG - Describe, create and manipulate simple data collections through their underlying representation for a computer games application.

L4-O-LO6-CG - Describe the structure of a computing system, the design of its basic components and explain the interactions of hardware and software components.

L4-C-LO7-CG - Use appropriately the client-server architecture with respect to client design and security implications.

L4-S-LO8-CG - Recognise and explain behaviour constraints of a professional code of conduct towards third parties in a Computer Games working environment.

L4-S-LO9-CG - Following guidance, review literature in Computer Games and present in written and oral form own work and learning, critically comparing, contrasting and evaluating the findings.

#### **Level 5 learning outcomes**

##### **Upon completion of level 5 you will be able to:**

L5-M-LO1-CG - Demonstrate competency in object oriented design and algorithmic and mathematical approaches to solve a computer game problem.

L5-M-LO2-CG - Employ appropriate mathematics and physics in computer graphics programming for a computer game.

L5-P-LO3-CG - Develop user requirements, specifications and models of a medium-scale computer game into an implemented solution with appropriate digital assets, following an object oriented approach.

L5-D-LO4-CG - Demonstrate how information is modelled, persistently stored, manipulated and retrieved, as data, to serve scalable solutions to medium-scale object-oriented computer games problems.

L5-D-LO5-CG - Employ a standard process such as storyboarding to design, represent and formally communicate the specification of a computer game.

L5-O-LO6-CG - Analyse and evaluate game engines and explain their architecture and execution mechanisms.

L5-C-LO7-CG - Identify and explain security risks and their implications for computer games.

L5-C-LO8-CG - Identify, evaluate, and improve on interface issues between human users and computer games using multiple platforms.

L5-S-LO9-CG - Demonstrate professional responsibility in the development of quality computer games solutions in a global context and the presentation and defence of these in multiple communication forms, supported by methodical research.

### **Level 6 learning outcomes**

**Upon completion of level 6 you will be able to:**

L6-M-LO1-CG - Methodically and independently develop requirements to a solution for a large scale computer games problem using appropriate languages and tools.

L6-M-LO2-CG - Design and develop a 3D game prototype employing Game AI with related mathematics

L6-P-LO3-CG - Demonstrate technical skills in the production of advanced 3D game prototype with real time graphics algorithms using industry standard game development API

L6-C-LO4-CG - Demonstrate and appraise the main threats to computer systems and networks security and integrity.

L6-S-LO5-CG - Demonstrate complete handling of the full life-cycle of a computer games project underpinned by an entrepreneurial approach and a focus on the needs of real clients and the wider society.

L6-S-LO6-CG - Apply appropriate research methodologies in carrying out independent research in computer games and produce a report demonstrating evidence of critical thinking.

### **How will you learn?**

Your course is a collection of learning opportunities. The teaching and learning methods are directly related to the aims and learning outcomes identified above. You will be led from a broad understanding and skills across the course and key theoretical concepts, to focused knowledge and specialised skills in depth by the end of the course. At the point of graduation you will have gained a thorough subject knowledge, together with an appreciation of the industrial environment, and further demonstrated an ability to identify the professional opportunities open to you for your future careers.

The course is organised into a number of **modules** at each level. These are the building blocks of your course. Each module consists of a number of learning activities over a number of weeks designed to help you achieve the knowledge and skills related to a particular area within your subject. There are a series of practical modules that support increasing depth of skills and knowledge across the three years of the course. These develop professional possibilities for specialisation within game production.

The principal aim of your course is to equip you for professional life, or higher study, relevant to your current programme of study. To prepare you for this, the learning in your course will not take place only in the class. Your learning will use four methods, each supporting the others:

- **Lectures** will give you access to expertise and present you with the knowledge you need in your subject.

- **Practical tutorial or laboratory sessions** will allow you to understand, apply and strengthen your skills under the guidance of a tutor.
- **Independent study time** will let you take more control of your own learning and give you the framework that will help you to keep on learning without supervision.
- **Personal development** will allow you to complement your knowledge with the specific specialised skills that meet your individual needs.

The first year of study (Level 4) provides you an underpinning knowledge of computer science. You are introduced to the key core skills including software development principles, fundamental programming and mathematics. You will also be introduced to the procedure of game production, game design theory and playability for a 2D game group project development. In supporting your full transition into Higher Education, the course has additional classes and support sessions at this level that you will need to fully engage with so you can prepare for the advanced study that follows.

To achieve a degree of specialisation in game development, the second year (Level 5) introduces game specific modules with professional practice including object oriented programming and principles, 3D graphics programming, applied math and physics, game engines architecture with execution mechanism. You will further develop the ability to integrate knowledge and skills you have learnt to work on a game development group project. Following that level you may choose to take a year placement in industry to strengthen your understanding of industry needs through direct application of your evolving skills, as well as gain work experience, which is invaluable for your final year of study and long-term career prospects after graduation.

Building upon the comprehensive knowledge and skills attained in Level 4 and 5, the third year (Level 6) introduces advanced techniques and specialised skills in game development including real time graphics, game AI (Artificial Intelligence), networking games, and advanced programming using industry standard game development API to design and implement a 3D game prototype. The final year completes your preparation for going into industry and further study with an ability to handle the complexity of large-scale projects and environments and with full control of your further development needs.

The Course responds to the rapidly developing game industries, with their demand for highly skilled professionals, and the emergence of new approaches to game production. It will prepare you for work in an increasingly challenging and rewarding field by giving you a clear perspective of the current nature and practice of games development. You will be equipped with a broad range of practical and conceptual knowledge and skills specific to game development and also applicable to the wider skills required in creative industry.

Throughout all levels of your course you will also develop necessary, distinct, attributes that will help you compete effectively in a global changing environment.

The Graduate Attributes (GA) are developed throughout the course through the knowledge and professional skills modules, and are intended to ensure that you have a deep knowledge of the subject area, you are critical and creative thinkers, are professional, socially, ethically and environmentally aware, global in outlook and community engaged, and a literate and effective communicator. The table below maps these key attributes to the core course modules.









## How will you be assessed?

In your course, assessment and feedback are the key elements in measuring learning. The assessment strategy of the course supports to foster the highly skilled and professional game development practitioners of the future.

You will undertake a **wide variety of assessment** tasks as their progress through your degree course on both practical and theoretical elements via a mix of formative and summative with project based synoptic assessment. Their nature will vary according to your level and the nature of the task. The benefit is that this provides a range of activities to support and encourage the blended learning and allows you to demonstrate your skills and understanding in a variety of ways.

The formative assessment helps you see where you are in your learning and what you have learned so far, while summative assessment measures how much you have learned in a way that contributes to your overall grades. The formative assessment plays an important role to provide feedback to you as this serves to indicate your progress and helps identify strengths and weaknesses. The major feedback is given throughout modules in tutorials, and group discussions, and in the final demonstrations and vivas in practical modules. A wider range of feedback can be further achieved through student participations of national and international game competitions (e.g. Dare to be digital, Brains Eden, GamesJam) and your involvement of community events. This allows you to identify areas for improvement while demonstrating your skills and knowledge to game industry and society.

All modules are assessed through coursework and exams including paper exams and in-class test. Practical modules are typically assessed through a combination of individual practical work and group projects. Other practice-theory modules draw upon a range of assessment methods, including written report/essay, presentations and demonstration, and online study tasks. Some of the work will be completed individually, and sometimes you will work with other students as part of a team, emulating as close as possible the environment students will face in their later life in industry. Clear Assessment Criteria are stated in module documents, and these are linked to the module Learning Outcomes. you will receive written feedback from all assessments, and this directly relates to the assessment criteria for each module.

The group project modules at level 4 and 5 and the final year project at level 6 assess learning outcomes from other modules (called 'synoptic assessment'). This allows combining elements of learning from different modules and show the accumulated knowledge and understanding of computer game development approach and technology, especially supporting the linkage of principle and practice. It also helps to reduce formal assessment and so ensure that you have as much time and opportunity as possible to develop practical skills alongside the more specific skills that are being assessed. It is particularly important for game development, which requires design and implementation by a team or even multiple teams working together each responsible for specific production phases of game production. Much of game production responsibility is game documentation. Therefore, you will write essays and research reports, and learn how to write in a style suitable to a piece of academic work, and to make proper use of references and bibliographies.

All assessments that contribute to the final grades will be assessed against set criteria, following rigorous quality mechanisms that ensure our academic judgement remains fair and consistent with the wider educational sector. Typically, assessment will become longer, and more self-managed, as you get into the second year and the final year of the course and you will have more freedom to focus on specialist areas to innovate through your own decisions informed by your own research. **Assessment is designed to be a learning experience in itself** and will help students make that transition from small practical exercises to more complex piece of work towards the substantial, year-long, project of the final year.

You will receive oral and written feedback in response to all assessment, in response to questions in lectures, seminars and tutorials, group discussions, and project supervision. You also have an opportunity to discuss the outcome with module staff to identify areas for improvement, and of current strengths which are to be nurtured and developed. Furthermore, feedback will also come from your interaction with other students and with industry. All feedback will be useful to help you guide your learning so that you develop the right skills faster.

## **Employment and further study opportunities**

University of Westminster graduates will be able to demonstrate the following five Graduate Attributes:

- Critical and creative thinkers
- Literate and effective communicator
- Entrepreneurial
- Global in outlook and engaged in communities
- Social, ethically and environmentally aware

University of Westminster courses capitalise on the benefits that London as a global city and as a major creative, intellectual and technology hub has to offer for the learning environment and experience of our students.

The BSc Computer Games Development course aims to create high quality graduates who have a strong focus on solving real-world problems, will have adaptability and maturity, and have a strong foundation of knowledge and the technical capability to be able to immediately contribute to their workplace environment. Graduates of the BSc Computer Games Development course will have been taught and utilised industrial tools and techniques and will be versed in all aspects of game production. As well as having a solid background in software development with a particular emphasis on computer games development, graduates from the course shall also have multiple specialism in gaming technology during their early years as a computing professional. Graduates shall be independent thinkers, lifelong learners and be able to analyse, critically reflect, and be able to confidently and effectively communicate. Graduating from this accredited course where professional skills and practice are embedded, graduates shall be able to meet the required professional and ethical standards expected in game industry. Graduates shall also be capable and prepared for the broadening their knowledge by undertaking Masters level study or higher.

Upon completion of the course students will be expected to gain a software developer role in the game industry and wider creative industry. However, since the game industry relies on the team work of multidisciplinary groups, a range of design, implementation and management modules is embedded across the course. The course offers diverse career opportunities for the actual role within the team may be, for example, designer, programmer, or producer. Our graduates have been successful in securing jobs roles in both well known companies and SMEs including Microsoft, Sony, We R Interactive, Marmalade, Portable Pixels, Slitherine Software UK Ltd., etc. Additionally, the skill set gained fully prepares you for other software development career within general computing sectors and even other types of roles possible are in computer science research in a commercial company or academic institution.

## **Course structure**

This section shows the core and option modules available as part of the course and their credit value. Full-time Undergraduate students study 120 credits per year. Course structures can be subject to change each academic year following feedback from a variety of sources.

Modules are described as:

- **Core** modules are ones that must be undertaken by all students on the course.
- **Option** modules are related to your specific course
- **Electives: Faculty electives** are modules offered by the faculty; **Westminster electives:** are modules from across the whole University which allow you to broaden your experience.

The list below shows the core and option modules that are available as part of the course and their credit value. A *core* module is one that must be attempted to gain the award of BSc Computer Games Development. Student choice is allowed for by designating a number of modules at levels 5 and 6 as subject-specific *options*. Over the course of the programme students can take up to 2 free choices (either 2 options; or 1 option + 1 elective) at both level 5 and 6 (timetable dependant) though should seek advice from their personal tutor and other academics concerning their choice. The Department organises module information sessions where advice is given to students regarding their module choices.

Some, but not all, of these modules will have to be taken to gain the award of BSc Computer Games Development. The course specific regulations give full details of what must be taken and passed in order to gain an award.

#### BSc (Hons) Computer Games Development – Core Modules

Credit Level 4 - Core				
Module code	Module title	Status	UK credit	ECTS
4COSC004W	Computer Systems Fundamentals	Core	20	10
4COSC001W	Programming Principles I	Core	20	10
4MMCS003W	Web Design & Development	Core	20	10
4CCGD002W	Mathematics for Games Development	Core	20	10
4COSC005W	Programming Principles II	Core	20	10
4CCGD001W	Game Development Group Project I	Core	20	10
<b>Award of Certificate of Higher Education available in Computer Games Development</b>				
Credit Level 5 - Core				
Module code	Module title	Status	UK credit	ECTS
5COSC001W	Object Oriented Programming	Core	20	10
5CCGD002W	Applied Maths and Physics	Core	20	10
5CCGD003W	3D Graphics Programming	Core	20	10
5CCGD004W	Game Engine Architecture	Core	20	10
5CCGD001W	Game Development Group Project II	Core	20	10
<b>In addition the module Computer Science Placement is core for those undertaking the Industrial Placement year.</b>				
<b>Award of Diploma of Higher Education available in Computer Games Development</b>				
Credit Level 6 - Core				
Module code	Module title	Status	UK credit	ECTS
6COSC006W	Final Year Project	Core	40	20
6CCGD001W	Game Development Group Project III	Core	20	10
6CCGD002W	Advanced Maths and Game AI	Core	20	10
6CCGD003W	Networked Games & Security	Core	20	10
<b>Award of BSc available in Computer Games Development</b>				
<b>Award of BSc Honours available in Computer Games Development</b>				

BSc (Hons) Computer Games Development –Option Modules (at levels 5 & 6 you can pick 1 elective instead of an option module).

Credit Level 5 – Options				
Module code	Module title	Status	UK credit	ECTS
5COSC005W	Mobile Application Development	Option	20	10
5COSC006W	Server-side Web Development	Option	20	10
Credit Level 6 – Options				
6COSC005W	Advanced Server-Side Web Programming	Option	20	10
6MMCS004W	Advanced Interactive Media Development	Option	20	10
6SENG002W	Concurrent Programming	Option	20	10

Please note: Not all option modules will necessarily be offered in any one year.

### Professional Body Accreditation or other external references

#### Reference points for the course

##### Internally

University Teaching and Learning policy statements,  
University Quality Assurance Handbook and Modular Frameworks, staff research.

##### Externally

QAA Subject Benchmark statements,  
Professional, Statutory, Regulatory Body requirements/guidance,  
University and SEEC (credit consortium) level descriptors.

##### Professional body accreditation

British Computer Society (BCS) Criteria.

#### Academic Regulations

The current Handbook of Academic Regulations is available at [westminster.ac.uk/academic-regulations](http://westminster.ac.uk/academic-regulations)

#### How will you be supported in your studies?

##### Course Management

The BSc (Honours) Computer Games Development course is under the Computer Science Department (CS) and the management structure supporting the course is as follows:

- Dr Li Jin, Course Leader is responsible for day to day running and overall management of the course and development of the curriculum
- Dr Alexandra Psarrou, Head of Department, holds academic responsibility for the course and other courses within the Department
- Professor Jane Lewis, Dean of Faculty, holds overall responsibility for the course, and for the other courses run by the Faculty

##### Academic Support

Upon arrival, an induction programme will introduce you to the staff responsible for the course, the campus on which you will be studying, the Library and IT facilities, additional support available and to your Faculty Registry Office. You will be provided with the Course Handbook, which provides detailed information about the course. Each course has a course leader or Director of Studies. All students enrolled on a full-time course and part time students registered for more than 60 credits a year have a personal tutor, who provides advice and guidance on academic matters. The University uses a Virtual Learning Environment called Blackboard where students access their course materials, and can communicate and collaborate with staff and other students.

## **Learning Support**

The Academic Learning Development Centre supports students in developing the skills required for higher education. As well as online resources in Blackboard, students have the opportunity to attend Study Skills workshops and one to one appointments.

Learning support includes four libraries, each holding a collection of resources related to the subjects taught at that site. Students<sup>1</sup> can search the entire library collection online through the Library Search service to find and reserve printed books, and access electronic resources (databases, e-journals, e-books). Students can choose to study in the libraries, which have areas for silent and group study, desktop computers, laptops for loan, photocopying and printing services. They can also choose from several computer rooms at each campus where desktop computers are available with the general and specialist software that supports the courses taught at their Faculty. Students can also securely connect their own laptops and mobile devices to the University wireless network.

## **Support Services**

The University of Westminster Student Affairs department provide advice and guidance on accommodation, financial and legal matters, personal counselling, health and disability issues, careers, specialist advice for international students and the chaplaincy providing multi-faith guidance. The University of Westminster Students' Union also provides a range of facilities to support students during their time at the University.

## **How do we ensure the quality of our courses and continuous improvement?**

The course was initially approved by a University Validation Panel in **2009**. The panel included internal peers from the University, academic(s) from another university and a representative from industry. This helps to ensure the comparability of the course to those offered in other universities and the relevance to employers.

The course is also monitored each year by the Faculty to ensure it is running effectively and that issues which might affect the student experience have been appropriately addressed. Staff will consider evidence about the course, including the outcomes from Course Committees, evidence of student progression and achievement and the reports from external examiners, to evaluate the effectiveness of the course. Each Faculty puts in to place an action plan. This may for example include making changes on the way the module is taught, assessed or even how the course is structured in order to improve the course, in such cases an approval process is in place.

A course review takes place periodically to ensure that the curriculum is up-to-date and that the skills gained on the course continue to be relevant to employers. Students meet with review panels to provide feedback on their experiences. Student feedback from previous years e.g. from Course Committees is also part of the evidence used to assess how the course has been running.

## **How do we act on student feedback?**

Student feedback is important to the University and student views are taken seriously. Student feedback is gathered in a variety of ways.

- Through Course Committees students have the opportunity to express their voice in the running of their course. Student representatives are elected to Committee to expressly represent the views of their peer. The University and the Students' Union work together to provide a full induction to the role of the student representatives.
- Each Faculty also has its own Faculty Student Forum with student representatives; this enables wider discussions across the Faculty. Student representatives are also represented on key Faculty and university committees.

---

<sup>1</sup> Students enrolled at Collaborative partners may have differing access due to licence agreements.

- All students are invited to complete a questionnaire before the end of each module. The feedback from this will inform the module leader on the effectiveness of the module and highlight areas that could be enhanced.
- The University also has an annual Student Experience Survey which seeks the opinions of students about their course and University experience. Final year Undergraduate students will be asked to complete the National Student Survey which helps to inform the national university league tables.

**Please note:** This programme specification provides a concise summary of the main features of the course and the learning outcomes that a student might reasonably be expected to achieve and demonstrate if s/he takes full advantage of the learning opportunities that are provided. This specification should be read in conjunction with the Course Handbook provided to students and Module Handbooks, which provide more detailed information on the specific learning outcomes, content, teaching, learning and assessment methods for each module.

**Copyright of University of Westminster 2015 ©**