Introduction
The Computer Games industry employs multidisciplinary teams to design and develop computer games, but each specialist in the team needs an appreciation of the role of others, and a feel for ‘the big picture’. The BSc (Hons) in Computer Science for Games aims to develop computer scientists with a particular interest in games programming. The shortage of skilled computer scientists within the games industry provides job opportunities for graduates from this programme but the solid computer science base allows diversification beyond games, offering a range of additional prospects.

This programme is offered by the School of Electrical Engineering and Computer Science, one of the oldest such departments in the United Kingdom, with support from the School of Media, Design and Technology. Both are located in the Faculty of Engineering and Informatics which, with its close ties to the National Media Museum and the Bradford Animation Festival, provides a vibrant teaching and research environment, providing opportunities to progress to postgraduate taught programmes or research degrees on completion of your undergraduate degree.
Programme Aims
The BSc (Hons) Computer Science for Games is intended to provide you with the theoretical base, and the tools and techniques which software developers need, regardless of their field of application, but placed within the interesting, practical context of games design. This aim will be achieved by:

- providing you with a core of fundamental modules that are essential to all computer scientists in the first year, which are built upon in the second year. In parallel, the technical fundamentals and conventions of interactive systems and video games are introduced in the first year, and then developed in the second year. The final year consists of a major project, together with choices from a range of options, so that you may choose the particular area in which you are strong or wish to specialize, which builds on the knowledge and understanding gained earlier.
- providing the support, in the form of lectures, labs and tutorials together with up-to-date computing facilities, that will help you to successfully complete your programme.
- developing your discipline skills and personal transferable skills so that on graduation you are in a position to apply for positions in industry or commerce, or pursue further programmes of study.

Programme Learning Outcomes
Learning outcomes indicate what you should know and understand, and be able to do on successful completion of the programme. They have been developed with reference to three sets of subject benchmarks, published by the Quality Assurance Agency for Higher Education (QAA). The subject benchmark statements are computing (2007), art and design (2008) and communication, media, film and cultural studies (2008). The detailed subject benchmark statements are accessible through the QAA website (http://www.qaa.ac.uk/AssuringStandardsAndQuality/subject-guidance/Pages/Honours-degree-benchmark-statements.aspx). When you have completed the programme you will have acquired the following:

- **Knowledge and understanding** including a systematic understanding of the fundamental concepts and theories of computer science and how they apply to the development of computer games; the ability to comment on aspects of current research in the discipline.
- **Discipline Specific Skills** including how to analyse problems and develop solutions using leading edge ideas and techniques; how to develop computer programs using object oriented programming languages; how to choose which programming languages to use for specific applications; the ability to contribute to a team approach to computer games projects; the ability to read and make use of research articles in journals and research literature; competence in the use of major software application packages.
- **Personal and Transferable Skills** including the exercise of initiative in information management, interpretation and presentation; the ability to make decisions in a variety of contexts; report writing and presentation skills; creative and systematic problem solving; teamwork; project management; and personal management.

FHEQ Level 4
When you have completed Level 4 you will be able to:

1. Demonstrate a knowledge of fundamental concepts and theories of computer science for games, and the environment in which they operate.
2. Demonstrate a knowledge of basics of software construction and the tools required to support it, develop skill in constructing software.

3. State and explain relevant, models, principles and practices applicable to the study of computers, computer architecture and systems.

4. Collect, manage and present information, ideas and concepts, and interpret data using suitable techniques.

5. Work effectively as individuals and in groups.

6. Communicate accurately and reliably with a range of audiences using basic theories and concepts of the subjects of study.

**FHEQ Level 5**

When you have completed Level 5 you will be able to:

1. Apply knowledge and skills in computing to the analysis of complex software engineering.

2. Apply knowledge of investigative and research principles to demonstrate an understanding of how to evaluate computing designs, processes and products in the games market.

3. Apply knowledge of relevant software to problems and system.

4. Apply knowledge of computer systems to the assessment and management of specific problems and challenges.

5. Demonstrate the use of practical computer science skills in design and manufacture, and testing of games.

6. Use personal and technical skills to communicate effectively within computing environments in partnership with other professionals.

**FHEQ Level 6**

When you have completed Level 6 you will be able to:

1. Demonstrate comprehensive and coherent knowledge, understanding and application of computing science for games concepts and principles.

2. Evaluate appropriate aspects of theory and practice in computing.

3. Synthesise, evaluate, choose and apply solutions to open-ended computing problems and situations in a critical manner.

4. Research a range of contemporary, relatively complex computing problems independently and in groups.

5. Contribute to research into gaming computer science issues using appropriate data, sources and methodologies.

6. Act independently in planning and managing tasks with limited guidance.

7. Autonomously analyse, critique and challenge contemporary issues in Computer Science for games.

Although the University does not recruit directly to Ordinary degrees this route is available to students. A Bachelor’s degree (Ordinary) is awarded to students who have demonstrated:

- a systematic understanding key aspects of their field of study, including acquisition of coherent and detailed knowledge informed by aspects of Computer Science for Games.
• an ability to deploy accurately established techniques of analysis and enquiry within Computer Science for Games.
• conceptual understanding that enables the student:
  o to devise and sustain arguments, and/or to solve problems, using ideas and techniques.
  o to describe and comment upon particular aspects of current research, or equivalent scholarship, or practice in Computer Science for Games.
• an appreciation of the uncertainty, ambiguity and limits of knowledge.
• the ability to manage their own learning, and to make use of primary sources.

Typically, holders of the qualification will be able to:
• apply the methods and techniques that they have learned to review, consolidate, extend and apply their knowledge and understanding.
• communicate information, ideas, problems and solutions to both specialist and non-specialist audiences.

And holders will have:
• the qualities and transferable skills necessary for employment requiring:
  o the exercise of initiative and personal responsibility
  o the learning ability needed to undertake appropriate further training of a professional or equivalent nature.

The Curriculum
The map of your studies is detailed below showing core (C) and optional (O) modules. Each year, or stage, of an Honours programme comprises two semesters with 60 credits being studied in each semester. For 20 credit double modules (last character in module code is a ‘D’) all of the teaching and assessment is undertaken in the same semester. For 20 credit linked modules (last character in the module code is an ‘L’) and the 40 credit project there is teaching and assessment in both semesters. Ordinary degrees comprise 100 credits in each stage. Core and optional modules are not shown for Stage 1 of the ordinary programme because this is not available as an entry route. At the end of Stage 1 there may be the possibility to transfer onto the Ordinary route, to be discussed with the programme leader.

Stage 1 [FHEQ Level 4]

<table>
<thead>
<tr>
<th>Code</th>
<th>Module Title</th>
<th>Level</th>
<th>sem</th>
<th>credit</th>
<th>Hons</th>
<th>Ord</th>
</tr>
</thead>
<tbody>
<tr>
<td>CM0129D</td>
<td>Fundamentals of Internet Technology</td>
<td>4</td>
<td>1</td>
<td>20</td>
<td>C</td>
<td>n/a</td>
</tr>
<tr>
<td>CM0116D</td>
<td>Software Development Part 1</td>
<td>4</td>
<td>1</td>
<td>20</td>
<td>C</td>
<td>n/a</td>
</tr>
<tr>
<td>CM0107L</td>
<td>Computer Architecture and Systems Software</td>
<td>4</td>
<td>1&amp;2</td>
<td>20</td>
<td>C</td>
<td>n/a</td>
</tr>
<tr>
<td>CM0113L</td>
<td>Developing Professional Skills</td>
<td>4</td>
<td>1&amp;2</td>
<td>20</td>
<td>C</td>
<td>n/a</td>
</tr>
<tr>
<td>CM0117D</td>
<td>Software Development Part 2</td>
<td>4</td>
<td>2</td>
<td>20</td>
<td>C</td>
<td>n/a</td>
</tr>
<tr>
<td>EM0129D</td>
<td>History and Conventions of Computer Games</td>
<td>4</td>
<td>2</td>
<td>20</td>
<td>C</td>
<td>n/a</td>
</tr>
</tbody>
</table>

Students who have achieved at least 120 credit points at Level 4 may exit the programme and are eligible for the award of Certificate of Higher Education.
Students who have achieved at least 120 credit points at Level 5 may exit the programme and are eligible for the award of Diploma of Higher Education.

**Stage 3 [FHEQ Level 6]**

<table>
<thead>
<tr>
<th>Code</th>
<th>Module Title</th>
<th>Level</th>
<th>sem</th>
<th>credit</th>
<th>Hons</th>
<th>Ord</th>
</tr>
</thead>
<tbody>
<tr>
<td>CM0347K</td>
<td>Final Year Project</td>
<td>6</td>
<td>1&amp;2</td>
<td>40</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>Or</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CM0341Q</td>
<td>Final Year Project (UAS)</td>
<td>6</td>
<td>1&amp;2</td>
<td>40</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>CM0353D</td>
<td>Advanced Rendering and Real Time Graphics</td>
<td>6</td>
<td>1</td>
<td>20</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>EM0338D</td>
<td>Physics and Dynamics Programming for Games</td>
<td>6</td>
<td>1</td>
<td>20</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>EM4053D</td>
<td>Computer Animation*</td>
<td>7</td>
<td>1</td>
<td>20</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>EM3054D</td>
<td>Computer Graphics and Systems *</td>
<td>7</td>
<td>2</td>
<td>20</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>CM0518D</td>
<td>Concurrent and Distributed Systems</td>
<td>6</td>
<td>2</td>
<td>20</td>
<td>C</td>
<td>O</td>
</tr>
<tr>
<td>CM0354D</td>
<td>Real Time Simulation and Modelling</td>
<td>6</td>
<td>2</td>
<td>20</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>CM0331D</td>
<td>Human Computer Interaction (Design &amp; Development)</td>
<td>6</td>
<td>2</td>
<td>20</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>CM0328D</td>
<td>AI for Games</td>
<td>6</td>
<td>2</td>
<td>20</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>CM0506D</td>
<td>Real Time Systems</td>
<td>6</td>
<td>2</td>
<td>20</td>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>

* Only one of these two M level double modules may be chosen

The curriculum may change, subject to the University's programme approval, monitoring and review procedures.

**Study abroad and work placement opportunities**

You have the option to undertake an industrial placement, or of studying or working abroad for a year between Stages 2 and 3; this option is strongly encouraged. The School has an industrial training tutor who has contacts with a large number of outside organisations and who assists in helping you find a placement. The University’s International Office provides a wide range of opportunities and support for students to gain international experience. Both options provide the opportunity to gain valuable experience, and are viewed favourably by prospective employers.

**Learning, Teaching and Assessment Strategies**

The programme is designed to give you a wide experience of teaching, learning and assessment strategies. Concepts, principles and theories are generally explored in formal lectures, practised in associated tutorials and seminars, and demonstrated in laboratory classes. Practical skills are developed in laboratory sessions. The programme is designed to allow you to develop and enhance your practical and inter-personal skills through working in
small groups engaging in problem solving scenarios. Project work is included to allow you to demonstrate your ability to solve problems using the knowledge, understanding and skills you have gained during your programme.

Each set of 20 credits on the programme requires you to commit an average 200 hours of study. Some of these hours will be formally timetabled - lectures, laboratories, seminars and tutorials – while others involve private study. The balance between these forms of study changes as you pass through the three years of the programme. There are more “contact hours” (time spent with tutors) in the earlier stages of the programme; by the final year you are expected to manage more of your own learning, under the general guidance of your tutors.

An optional placement year, normally taken between Stages 2 and 3, will enable you to extend and apply your learning in an appropriate industrial/commercial context, and gain first-hand experience of how your skills might be applied in the workplace.

The assessment methods you will encounter are varied and your progress will be reviewed using a mix of formal examinations, reports, laboratory portfolios, essays, oral presentations (either individual or team) and the final year dissertation. Your performance in each module will be assessed using a mix of these assessment systems to allow you to demonstrate the particular module learning outcomes.

**Assessment Regulations**
This Programme conforms to the standard University Regulations which are available at the following link: [http://www.bradford.ac.uk/aqpo/ordinances-and-regulations/](http://www.bradford.ac.uk/aqpo/ordinances-and-regulations/)

**Admission Requirements**
The University welcomes applications from all potential students regardless of their previous academic experience; offers are made following detailed consideration of each individual application. Most important in the decision to offer a place is our assessment of a candidate’s potential to benefit from their studies and of their ability to succeed on this particular programme. Entrance requirements for each programme will vary but consideration of your application will be based on a combination of your formal academic qualifications and other relevant experience.

If you have prior certificated learning or professional experience which may be equivalent to parts of this programme, the University has procedures to evaluate this learning in order to provide you with exemptions from specified modules contained within the curriculum. Please talk to us if you do not fit the standard pattern of entry qualifications.

The University of Bradford has always welcomed applications from disabled students, and these will be considered on the same academic grounds as are applied to all applicants. If you have some form of disability you may wish to contact the programme leader before you apply.

**Entry requirements:** Typical offer (UCAS tariff points): 260

- A total of 260 UCAS tariff points, to include 160 points from 2 GCE A levels or equivalent. At least one from Computing, ICT, Maths or a science is preferred. Or DMM in a relevant BTEC Diploma. International Baccalaureate (see UCAS tariff point requirements).

- GCSE English and Maths minimum grade C.
• For international students: minimum IELTS at 6.0 or the equivalent.

Learning Resources

The JB Priestley Library on the city campus and our specialist library in the School of Management provide a wide range of printed and electronic resources to support your studies. We offer quiet study space if you want to work on your own, and group study areas for the times when you need to discuss work with fellow students. Subject librarians for each School provide training sessions and individual guidance in finding the information you need for your assignment, and will help you organise your references properly. 

Student PC clusters can be found in both our libraries and elsewhere on the campus. Many of these are open 24/7. You can also use the University's wireless network to access the internet from your own laptop. Most of our journals are available online (both on and off campus), and you can also access your University email account, personal information and programme-related materials this way. Staff are on hand during the daytime to help you if you get stuck, and there is a 24/7 IT helpline available.

Student Support and Guidance

All students admitted to the School undertake a process of induction led by a senior member of staff. Thereafter, ongoing support for students is provided in the form of one-stop facilities located at the School Student Support Office (SSO). Support for registered students is also provided 24/7 via the intranets of the School, the departments and the School's Technical Support. The School uses Blackboard, the University’s Virtual Learning Environment (VLE), to support students on their individual modules.

Programme Team

Support for you personally and in your programme of study, will be provided both by the University and the Programme Team. You will be allocated a personal tutor who is someone with whom you will be able to talk about any academic or personal concerns. The School will ensure that there is someone available with whom you feel comfortable to help and support you. You will be provided with a comprehensive series of handbooks that you can consult on a range of learning issues and your programme tutors will be available to consult on subject specific queries.

As a student on the BSc (Hons) Computer Science for Games, you will be allocated a personal tutor who provides support and guidance on matters relating to your learning, teaching and academic progress. There are specialist tutors in the School who deal with issues where other social factors (relating to gender or disability, for example) may have an impact on your academic performance. The Student Staff Liaison Committee gives the opportunity for you to give formal feedback to the Programme Team and Departments about curricular issues and the general running of the programme.

The University of Bradford provides important facilities such as extended access to library and computing services, counselling and welfare services, and careers advice. The Disability Service provides targeted support for all students with known disabilities and routinely arranges dyslexia assessments and appropriate support (i.e. reasonable adjustment for disabled students).
The Hub, Student Support Centre

The Hub, Student Support Centre provides a central reception where students can receive information, advice and guidance on a whole range of topics about their life at University. The Hub is located in the Richmond Building adjacent to the Atrium.

The teams located within The Hub:

- Accommodation
- Admissions
  - Education Liaison
  - Enquiries
- Student Administration and Support
  - Bursaries and Financial Support
  - Finance and Credit Control Group
  - Payzone
  - Records and Tuition Fees
- International Office
- Customer Service Team

www.brad.ac.uk/hub
+44 1274 232233

Students’ Union

We value the feedback provided by students and collaborate with the Students’ Union, through a system of Student representatives and formal staff student liaison committees, so that any issues you wish to raise are addressed rapidly. The Students Union provide professional academic representation and advice. The Students’ Union and the University of Bradford work in partnership to provide confidential counselling and welfare services where you can get help with any aspect of your personal or academic life. Student Financial and Information Services (based in the Hub) will provide you with information about a diverse range of issues such as council tax, personal safety and tourist information. International Students can access a range of additional advice and support services through the Student’s Union.

Employability and Career Development

The University is committed to helping students develop and enhance their employability profile and capabilities through learning opportunities embedded within the curriculum. Furthermore, the University is committed to supporting students to develop their commitment towards a career pathway(s) and to implementing a career plan. Professional career guidance and development support is available throughout your time as a student and as a graduate from Career Development Services. The support available from Career Development Services includes a wide range of information resources, one to one appointments, a weekly workshop programme, a mentoring programme, graduate recruitment and careers fairs, plus information and help to you find part time work, summer work placements, graduate internship programmes and graduate entry vacancies. In addition, some students as part of their programme of study may have the opportunity to complete a
Career & Personal Development accredited module delivered by the Career Development Service. All students are encouraged to access Career Development Services at an early stage during their studies and to use the extensive resources available on their website [www.careers.brad.ac.uk](http://www.careers.brad.ac.uk).

Career Development Services annually undertakes a survey of all graduates to find out their destination six months after graduation. The survey gathers data on the employment and further study routes graduates have entered and a range of other information including job roles, name and location of employers, salary details etc. The survey findings for each programme of study are presented on the programme information pages on the University website and via Career Development Services’ website [www.careers.brad.ac.uk](http://www.careers.brad.ac.uk).

**Learner Development Unit for Academic Skills Advice**

For undergraduate students who are looking to improve their marks during their time at university, study skills and maths advice is available to all regardless of degree discipline or level of study. Students can access a programme of interactive workshops and clinics which is delivered throughout the year. This is in addition to our extremely popular face-to-face guidance from our advisers, who also offer a wide range of online and paper based materials for self-study: [http://www.bradford.ac.uk/academic-skills/index.php](http://www.bradford.ac.uk/academic-skills/index.php)

**Disability**

Disabled students will find a supportive environment at Bradford where we are committed to ensuring that all aspects of student life are accessible to everyone. The Disability Service can help by providing support, advice and equipment to help you get the most out of your time at Bradford. It is a place where you can discuss any concerns you may have about adjustments that you may need, whether these relate to study, personal care or other issues. For more information contact the Disability Service by phoning: 01274 233739 or via email: disabilities@bradford.ac.uk

**University policies and initiatives**

**Learning and Teaching**

Our University approach to learning, teaching and assessment is encapsulated by an integrated set of themes and principles within our Curriculum Framework. All of our degree programmes have been designed to provide you with an inclusive and engaging learning environment which gives you the opportunity to thrive and develop in your area of study. Our research-informed programmes have a particular focus on developing your employability. We also place a strong emphasis on collaborative, real-world and enquiry-based learning, supported by appropriate learning technologies. Our assessment is designed not just to measure your achievement, but also to shape and guide your learning through preparing you for the increasing level of challenge as you progress through your degree. Together, these lead to you developing a distinctive set of graduate attributes which will prepare you for life beyond university.

**Ecoversity** is a strategic project of the University which aims to embed the principles of sustainable development into our decision-making, learning and teaching, research activities
campus operations and lives of our staff and students. We do not claim to be a beacon for sustainable development but we aspire to become a leading University in this area. The facilities we create for teaching and learning, including teaching spaces, laboratories, IT labs and social spaces, will increasingly reflect our commitments to sustainable development. Staff and student participation in this initiative is crucial to its success and its inclusion in the programme specification is a clear signal that it is at the forefront of our thinking in programme development, delivery, monitoring and review. For more details see www.bradford.ac.uk/ecoversity

Further Information
For further information, please check the University prospectus or contact Admissions.

The Admissions Office
The University of Bradford
Richmond Road
Bradford, BD7 1DP
UK
+44 (0)1274 233054
http://www.brad.ac.uk/courses/

The Recruitment and Marketing Office
Faculty of Engineering and Informatics
The University of Bradford
Horton Building
Richmond Road
Bradford, BD7 1DP
UK
+44 (0)1274 235963
ugadmissions@scim.brad.ac.uk

http://www.bradford.ac.uk/ei/electrical-engineering-and-computer-science/about/computing/courses/

Disclaimer:
The details of this Programme Specification and information contained therein are subject to change in accordance with the University of Bradford’s course approval, monitoring and review procedures.