Introduction

MSc Advanced Computer Science provides students who already possess a thorough grounding in the fundamental principles of computer science with the knowledge of leading-edge principles and methods for computer science, to specialize in some of the more current directions in the field, including formal methods, advanced software development, advanced database techniques, human computer interaction or Internet security and protocols. The programme of study culminates in a dissertation, enabling you to bring your advanced studies together in a significant piece of work. In summary, the MSc Advanced Computer Science offers you the opportunity to build your own path of study—from the advanced computing modules, the extended list of optional modules available, as well as the dissertation—so as to match your specific career aspirations.

The MSc Advanced Computer Science is located in the Faculty of Electrical Engineering and Computer Science (SEECS) part of School of Engineering and Informatics in the University of Bradford. As one of the oldest computing schools in the country, the school offers a vibrant postgraduate atmosphere of study that currently includes variety of MSc degree programmes and over 100 postgraduate and research students.

Programme aims

Today's information technology market is increasingly demanding employees with a knowledge and understanding of advanced computer software industry skills. In furtherance of the University’s mission “Making knowledge work”, this programme aims to enable you to develop computing related knowledge and understanding, practical discipline skills and a range of transferable skills that will enhance your personal and professional development.
Programme Learning outcomes

You will gain mastery of Computing fundamentals and principles, learn how to apply them to the analysis of problems and how to plan, implement and evaluate the solutions by demonstrating:

- **Knowledge and Understanding.** You will develop mastery of the practical and theoretical concepts of computer science, current and emerging trends in technology.

- **Discipline Specific Skills** in advanced level of the concepts and theories of computer science including information engineering, software development, software project management, human-computer interaction and formal methods. You will develop a firm grasp of the mathematical foundations of computer science and how they underpin the formal specification and modelling of computer systems.

- **Personal and Transferable Skills,** developed as a core thread throughout the proposed modules, requiring written and oral presentation, analysis, problem-solving, flexible specialisation, team-working and time management. In addition, the need to balance and integrate the requirements of advanced computing will enable students to develop initiative and flexibility to a broader range of approaches and environments.

On completion of this award you will be able to:

At PG Certificate and PG Diploma level,

- LO1. Demonstrate an advanced understanding of some of the theories, principles and techniques of computing;
- LO2. Select, adapt and apply project management skills to software projects;
- LO3. Critically analyse and evaluate database technology and apply it to specific situations;
- LO4. Deploy advanced level of programming skills;
- LO5. Demonstrate a critical awareness of current and possible future opportunities and problems in computing; evaluating current developments and trends;
- LO6. Apply statistical data analysis, statistical learning methods and data analytics techniques to information to generate and test hypotheses/predictions regarding crimes;
- LO7. Understand underlying technical concepts of formal methods in software engineering and delivery of systems and apply them to practical prototype information systems;
- LO8. Demonstrate the ability to critically apply data mining techniques;
- LO9. Explain and relate concepts and be able to apply appropriate practical techniques in the area of human-computer interaction.

At MSc level, all the above and including:

- LO10. Select, design, plan and manage a self-directed and managed research-informed original project, demonstrating a critical analysis and evaluation of relevant material and the ability to apply relevant skills and research methodologies in the production of an advanced report.
The Curriculum

Typically for a taught Masters programme, the programme lasts for 12 months of full-time study (two semesters of instruction through a series of modules all of which are integrated to form a complete and coherent programme of study, followed by completion of a major dissertation project in the summer) or 24 months of part-time study following a similar pattern.

The MSc Advanced Computer Science covers a range of specialist topics, leading to the qualification of a Master’s degree. Typically, a taught full-time Master’s programme lasts for twelve months of full-time study. The programme has two stages: the taught programmes stage which takes place during the first two semesters (or four semesters for the part-time route), and the project/dissertation stage. The taught programmes stage is organised on a modular basis. Students proceeding onto the Masters level undertake a project which the student has to agree with the School during the first taught semesters.

The map of your studies is detailed below. In each of the first two semesters, modules accounting for 60 credits are studied. For each module, all of the teaching and assessment is undertaken in the same semester. In semester one you will study three optional modules from the list below. In semester two you will study one core 20-credit module in Advanced Software Development and two optional modules provided in the list below. From the end of the second semester, project work lasting for three months is undertaken. This accounts for a further 60 credits in the assessment. Due to the advanced nature of this MSc, you are allocated a supervisor for your project whose research interests best match the project area. The project is assessed by means of a viva voce examination and a dissertation report.

<table>
<thead>
<tr>
<th>Module Code</th>
<th>Credit</th>
<th>Sem</th>
<th>Level</th>
<th>Module Title</th>
<th>Core/Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>CM1019D</td>
<td>20</td>
<td>1</td>
<td>7</td>
<td>Formal Methods (PG)</td>
<td>O</td>
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<tr>
<td>CM1032D</td>
<td>20</td>
<td>1</td>
<td>7</td>
<td>Information Engineering (PG)</td>
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<tr>
<td>CM1013D</td>
<td>20</td>
<td>1</td>
<td>7</td>
<td>Software Project Management</td>
<td>O</td>
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<tr>
<td>CM1066D</td>
<td>20</td>
<td>1</td>
<td>7</td>
<td>Networks and Protocols</td>
<td>O</td>
</tr>
<tr>
<td>CM0423D</td>
<td>20</td>
<td>2</td>
<td>7</td>
<td>Advanced Database Techniques*</td>
<td>O</td>
</tr>
<tr>
<td>CM1033D</td>
<td>20</td>
<td>2</td>
<td>7</td>
<td>Advanced Software Development</td>
<td>C</td>
</tr>
<tr>
<td>CM1034D</td>
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<td>7</td>
<td>Human Computer Interaction (Design &amp; Development)</td>
<td>O</td>
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<tr>
<td>CM1064D</td>
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<td>7</td>
<td>Internet Security and Protocols</td>
<td>O</td>
</tr>
<tr>
<td>CM1072D</td>
<td>20</td>
<td>2</td>
<td>7</td>
<td>Data Mining*</td>
<td>O</td>
</tr>
<tr>
<td>CM0428D</td>
<td>20</td>
<td>2</td>
<td>7</td>
<td>Statistical Data Analysis</td>
<td>O</td>
</tr>
<tr>
<td>CM0424Z</td>
<td>60</td>
<td>DISS</td>
<td>7</td>
<td>Dissertation</td>
<td>C</td>
</tr>
</tbody>
</table>

Students could choose EITHER Advanced Database Techniques* OR Data Mining* but NOT BOTH.

The curriculum may change, subject to the University’s programme approval, monitoring and review procedures.
Teaching and Assessment strategies

Students on the MSc Advanced Computer Science will experience a range of teaching and learning environments. Concepts, principles and theories are generally explored in formal lectures, demonstrated in laboratory classes, and practised in associated tutorials and seminars. Practical skills are developed in labs. Professional and personal skills are developed through discussion, presentations and small-scale project work which involve problem solving and design exercises, often tackled by working in small groups. A particular strength of this programme is the contribution made to the teaching programme by successful research active members of staff.

Each 20-credit module on the programme requires 200 hours of study. Some of these hours will be formally timetabled lectures, laboratories, seminars, tutorials and workshops, while others will involve carrying out private study by students.

Methods of assessment are similarly varied and students’ progress will be assessed using a mix of formal examinations, presentations and seminar papers, reports, laboratory tests, coursework assignments, and projects. The appropriate method is chosen to reflect the particular learning outcomes of each module.

Assessment Regulations

This Programme conforms to the standard University Assessment Regulations for Postgraduate Programmes which are available at the following link: 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.

We are continually reviewing and developing our practices and policies to make the University more inclusive, but if you are disabled we may need to make some adjustments to make sure that you are not disadvantaged. We would advise you to contact the programme leader before you apply to discuss these.

Generally, applicants are expected to possess a good Honours degree (normally 2:2 or above) in computer science, computer engineering, informatics or other computer-related subjects from an approved degree-awarding body.
Candidates applying to the programme with non-standard qualifications will be judged on an individual basis using the University's APEL procedures. In addition, a test of written and spoken English normally needs to have been passed at grade 6.0 for IELTS or 550 for TOEFL (or 250 for the computer-based test) or above.

Learning Resources

The JB Priestley Library on the city campus and our specialist libraries in the School of Health and 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 all 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 online journals are available on the internet (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

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.

In School programme tutors currently act as personal tutors for individual students.

Students’ Union

We value the feedback provided by students and collaborate with the Students’ Union, through a system of programme representatives and formal staff student liaison committees, so that any issues you wish to raise are addressed rapidly.

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 (part of 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.
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

Employability and Career Development

The University is committed to helping students develop and enhance their employability profile, 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, internship programmes and graduate/postgraduate entry vacancies. In addition, some students will receive seminars and workshops delivered by Career Development Services as part of their programme of study. 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 web site www.careers.brad.ac.uk.

Career Development Services annually undertakes a survey of all postgraduates 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.

The specific provision on this programme is designed to enable graduates to work in the fields of: film production; TV production (where applicable); training and teaching production.
Learner Development Unit for Academic Skills Advice

For postgraduate students on taught programmes 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. 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/

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 equipment and advice to help you get the most out of your time at Bradford and 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

Ecoversity

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

The Recruitment and Marketing Office
Faculty of Engineering and Computing
The University of Bradford
Horton Building, Richmond Road
Bradford, BD7 1DP, UK
Disclaimer

The contents of this programme specification may change, subject to the University's regulations and programme approval, monitoring and review procedures.