UNIVERSITY OF BRADFORD  
Faculty of Engineering and Informatics  
School of Electrical Engineering and Computer Science  
Programme title: BSc (Hons) Computer Science

<table>
<thead>
<tr>
<th>Awarding institution:</th>
<th>University of Bradford</th>
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</thead>
<tbody>
<tr>
<td>Teaching institution:</td>
<td>Namal College</td>
</tr>
<tr>
<td>Final and interim award(s):</td>
<td>BSc (Honours) [Framework for Higher Education Qualifications level 6]</td>
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<tr>
<td></td>
<td>Diploma of Higher Education [Framework for Higher Education Qualifications level 5]</td>
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<tr>
<td>Programme title:</td>
<td>Computer Science</td>
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<tr>
<td>Programme approved / accredited by:</td>
<td>N/A</td>
</tr>
<tr>
<td>Duration:</td>
<td>3 years full time</td>
</tr>
<tr>
<td>UCAS code:</td>
<td>N/A</td>
</tr>
<tr>
<td>Subject benchmark statement(s):</td>
<td>Computing, Engineering</td>
</tr>
<tr>
<td>Date produced:</td>
<td>March 2010</td>
</tr>
<tr>
<td>Last updated :</td>
<td>September 2014</td>
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Introduction

The BSc Computer Science is administered at Namal College in conjunction with the School of Electrical Engineering and Computer Science, part of the Faculty of Engineering and Informatics (SEI) of the University of Bradford, UK. Both Namal College and SEI are committed to providing you with a very high standard of up-to-date information and communication technology facilities to support the formal teaching of the BSc Computer Science. Both institutions are also committed to promoting educational opportunities for women, mature and alternatively qualified students, as well as for school-leavers and traditionally qualified students.

Computer Science concentrates on the theoretical foundations of computation and computer technology. It incorporates ideas from many other disciplines, including mathematics, engineering, psychology and graphical design and has a close affinity with electronic communications as illustrated by the Internet and World Wide Web. The term ‘convergence’ is often used to describe how these two disciplines are coming together.
Programme Aims

The programme is intended to provide you with a sound grounding in the fundamentals of computer software development (programming) and the tools and applications that modern computer scientists use. This aim will be achieved by:

- Providing you with a core of fundamental modules, in stages 1 and 2 that are essential to all computer scientists, plus a wide range of options, particularly in the final stage, 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 that will enable you to develop your personal portfolio of skills. The School of Electrical Engineering and Computer Science is committed to providing a very high standard of up-to-date computing facilities to support the practical hardware and programming requirements of the programmes.

- Developing discipline skills and personal transferable skills so that on graduation you may move directly into responsible positions in industry or commerce, or may pursue further programmes of study.

Programme Learning Outcomes

Learning outcomes indicate what you should know, understand and be able to do on successful completion of your programme. Computer Science is a subject where current practices in the field are changing rapidly as technologies evolve and new programming languages emerge. However the underlying theory and principles do not change rapidly. You will study these fundamentals and learn how to apply them to the analysis of problems and how to plan, implement and evaluate the solutions. You will learn about new technologies and languages required to implement solutions.

In order to achieve the learning outcomes of the BSc award you will develop the following:

- **Knowledge and understanding**: a systematic understanding of the fundamental concepts and theories of computer science including detailed knowledge of hardware, computer architecture, information and communication technologies; a firm grasp of the mathematical foundations of computing and how they underpin the formal specification and design of commercial applications; specific knowledge networks and computer communications; 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; ability to manage and/or contribute to a team approach to software engineering projects; an 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:** exercise of initiative in information management, interpretation and presentation; ability to make decisions in a variety of contexts; application of IT and communications skills to management problems; report writing and presentation skills; creative and systematic problem solving; teamwork and leadership; project management; and personal management

On completion of this award at Certificate of Higher Education level, you should be able to:

1. Demonstrate knowledge of fundamental concepts and theories of computer science, and the environment in which they operate; basics of software construction and the tools required to support it, develop skill in constructing software.
2. State and explain relevant models, principles and practices applicable to the study of computers, computer architecture and systems.
3. Explain how logic is used as a tool for describing computer 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.

On completion of this award at Diploma of Higher Education level, you should 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.
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 computer systems.
6. Use personal and technical skills to communicate effectively within computing environments in partnership with other professionals.

Although the University does not recruit directly to Ordinary degrees this route is available. 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 Computing.
• an ability to deploy accurately established techniques of analysis and enquiry within Computing.
• conceptual understanding that enables the student:
to devise and sustain arguments, and/or to solve problems, using ideas and techniques.

- to describe and comment upon particular aspects of current research, or equivalent scholarship, or practice in Computing.

- 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:
  - the exercise of initiative and personal responsibility
  - the learning ability needed to undertake appropriate further training of a professional or equivalent nature.

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 [Level 4]

<table>
<thead>
<tr>
<th>Module Code</th>
<th>Module Title</th>
<th>Type</th>
<th>Credits</th>
<th>Level</th>
<th>Study period</th>
</tr>
</thead>
<tbody>
<tr>
<td>CM0113L</td>
<td>Developing Professional Skills</td>
<td>C</td>
<td>20</td>
<td>4</td>
<td>1,2</td>
</tr>
<tr>
<td>CM0107L</td>
<td>Computer Architecture and Systems Software</td>
<td>C</td>
<td>20</td>
<td>4</td>
<td>1,2</td>
</tr>
<tr>
<td>CM0111L</td>
<td>Formal Foundations</td>
<td>C</td>
<td>20</td>
<td>4</td>
<td>1,2</td>
</tr>
<tr>
<td>CM0130L</td>
<td>Fundamentals of Internet Technology</td>
<td>C</td>
<td>20</td>
<td>4</td>
<td>1,2</td>
</tr>
<tr>
<td>CM0116D</td>
<td>Software Development (Part 1)</td>
<td>C</td>
<td>20</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>CM0117D</td>
<td>Software Development (Part 2)</td>
<td>C</td>
<td>20</td>
<td>4</td>
<td>2</td>
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</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.
Stage 2 [Level 5]

<table>
<thead>
<tr>
<th>Module Code</th>
<th>Module Title</th>
<th>Type</th>
<th>Credits</th>
<th>Level</th>
<th>Study period</th>
</tr>
</thead>
<tbody>
<tr>
<td>CM0229L</td>
<td>Database Systems</td>
<td>C C</td>
<td>20</td>
<td>5</td>
<td>1,2</td>
</tr>
<tr>
<td>CM0228L</td>
<td>Software Engineering with Group Project</td>
<td>C C</td>
<td>20</td>
<td>5</td>
<td>1,2</td>
</tr>
<tr>
<td>CM0315L</td>
<td>Computer Communications and Networks</td>
<td>C O</td>
<td>20</td>
<td>5</td>
<td>1,2</td>
</tr>
<tr>
<td>CM0316L</td>
<td>Data Structures and Algorithms</td>
<td>C O</td>
<td>20</td>
<td>5</td>
<td>1,2</td>
</tr>
<tr>
<td>CM0318L</td>
<td>Symbolic and Declarative Computing/Artificial Intelligence</td>
<td>C O</td>
<td>20</td>
<td>5</td>
<td>1,2</td>
</tr>
<tr>
<td>CM0415L</td>
<td>Computer Architecture and Systems Software 2</td>
<td>C O</td>
<td>20</td>
<td>5</td>
<td>1,2</td>
</tr>
</tbody>
</table>

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 [Level 6]

<table>
<thead>
<tr>
<th>Module Code</th>
<th>Module Title</th>
<th>Type</th>
<th>Credits</th>
<th>Level</th>
<th>Study period</th>
</tr>
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<tbody>
<tr>
<td>CM0347K</td>
<td>Final Year Project</td>
<td>C</td>
<td>40</td>
<td>6</td>
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<tr>
<td>CM0340D</td>
<td>Neural Networks and Fuzzy Systems</td>
<td>O O</td>
<td>20</td>
<td>6</td>
<td>1</td>
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<tr>
<td>CM0606D</td>
<td>Decision Support Systems</td>
<td>O O</td>
<td>20</td>
<td>6</td>
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<tr>
<td>CM0332D</td>
<td>Formal Methods</td>
<td>O O</td>
<td>20</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>CM0359D</td>
<td>Large Scale Data Driven Applications</td>
<td>O O</td>
<td>20</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>CM0328D</td>
<td>AI for Games</td>
<td>O O</td>
<td>20</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>CM0518D</td>
<td>Concurrent and Distributed Systems</td>
<td>O O</td>
<td>20</td>
<td>6</td>
<td>2</td>
</tr>
</tbody>
</table>

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

Teaching and Assessment Strategies

You will experience a wide range of teaching and learning environments. Concepts, principles and theories are generally explored in formal lectures, practiced in associated tutorials and seminars, and demonstrated in laboratory classes. Practical skills are developed in laboratory sessions. Professional and personal skills are developed through the Developing Professional Skills module which involves communications skills, library skills, group work and presentations. The Software Engineering with Group Project develops an appreciation of how to manage group dynamics in whilst working on a substantial software engineering exercise. Honours students undertake a major individual project in their final year, drawing together the
knowledge and experience gained throughout the programme. The project provides the opportunity for you to demonstrate your ability to solve problems using current ideas and techniques that are at the forefront of computing and information systems disciplines. Students who achieve an Ordinary degree may be given the opportunity to ‘top-up’ to a classified Honours degree at a later stage at which time they will undertake the individual project.

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

Methods of assessment are similarly varied and your progress will be assessed using a mix of formal examinations, presentations, reports, laboratory tests, essays, coursework assignments, and projects. The appropriate method is chosen so that you may demonstrate the particular learning outcomes of each module.

**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. 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.

A typical offer would be a Certificate of Foundation Studies in Information Technology from Namal College, or three A-levels at grade C or equivalent.
Additionally, candidates are expected to achieve IELTS 6.0 or equivalent through UoB English Language test or Toefl.

**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.

All students admitted to Namal College will go through a process of induction. Ongoing support for students is provided in the form of one-stop facilities located in the main building of the College, open all day during term time, with limited daily opening hours during non-term time. All students on the BSc Computer Science are allocated a personal tutor who will provide both academic and pastoral support.

The Staff Student Liaison Committee gives the opportunity for students to give formal feedback to the Programme Tutor and/or Namal College about curricular issues and the general running of the programme.

In addition, Namal College provides library and computing services. Arrangements are being made to provide registered students with 24/7 access via the College intranet [http://www.namal.edu.pk](http://www.namal.edu.pk) which will have links to useful information, including:

- Programmes and modules
- Programme Tutors contact information
- Student Handbook
- Learning & Behaviour Agreement
- Programme Timetable
- Examination timetable
- Answers to Frequently Asked Questions (FAQs)
- Coursework submission record
- E-mail Archives

Students on the BSc Computer Science will also be provided with links to the University of Bradford internal website, its virtual learning environment, Blackboard, and the School intranet.

**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.

[http://www.bradford.ac.uk/academic-skills/index.php](http://www.bradford.ac.uk/academic-skills/index.php)

**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:**

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](http://www.bradford.ac.uk/ecoversity)

**Further Information:**

For further information please check the university prospectus, or contact Admissions at Namal College or Faculty of Engineering and Informatics:

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GPO Mianwali, Pakistan  
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[www.namal.edu.pk](http://www.namal.edu.pk)

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

**Disclaimer**

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