

Birmingham City University
Technology Innovation Centre



MSc Data Communications

MSc Data Networks and Security

MSc Software Development and Security



Birmingham City University – Technology Innovation Centre Postgraduate Study

This booklet provides an outline of the following postgraduate courses:

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Whether you are progressing directly from your first degree, or looking to develop skills to advance or change your present career, we provide a flexible range of qualifications at Postgraduate Certificate, Diploma and Master's Degree level. These courses offer multiple starting points and are flexible in terms of both duration and delivery patterns.

You will benefit from both the outstanding resources and facilities at our Millennium Point campus and our close engagement with industry. This ensures that our courses equip you with up-to-date skills, relevant to the needs of industry. The Technology Innovation Centre also incorporates a CISCO Academy Training Centre, providing training for network professionals throughout Europe, the Middle East and Africa.

Located in Birmingham City Centre, our students enjoy all the facilities of a thriving international city, including culture and entertainment for all tastes and excellent local, regional and national transport links.

Standard Course Structure

MSc: 180 Credits

Master's Project Including Project Proposal, Research Plan and write-up (60 credits - 600 hours)

Postgraduate Diploma: 120 Credits

Module 3 (30 Credits - 300 Hours)	Module 4 (30 Credits - 300 Hours)
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Postgraduate Certificate: 60 Credits

Module 1 (30 Credits - 300 Hours)	Module 2 (30 Credits - 300 Hours)
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Specific module information for each course can be found on the relevant course page in this booklet.

The successful completion of two modules leads to the award of Postgraduate Certificate (PgC). Completion of two further modules leads to the award of Postgraduate Diploma (PgD) and the completion of the project will lead to the award of Master of Science (MSc).

The Master's Project is the ultimate test of your ability to integrate and synthesise what you have learnt on the course. It will allow you to demonstrate your ability to apply your knowledge and skills to the solution of a substantial practical problem, or an investigation into a research topic appropriate to the rationale of the course.

When undertaking the Master's Project, you will have an academic supervisor from the University, as well as a second member of academic staff to act as a moderator. For part-time students or for those students whose project is based in industry, an industrial mentor from the company will be appointed with responsibility for day-to-day supervision during the project.

Assessment

The main emphasis of the assessment strategy is to highlight the need for effective communication of thoughts and ideas within a professional environment. For this reason, project reports, record keeping and oral presentations are used extensively for assessment purposes, although time constrained tests may also be used where appropriate. A particular feature of the courses is that assessment focuses largely on projects and case studies.

Personal development planning is an integral part of the learning process of each element of the course.

Programme Duration

The course duration for full-time study is typically 16 months if you start your course in September and 19 months if you start in January. For part-time study the course duration is typically two and a half to three years. The interim awards of Postgraduate Certificate (PgC) and Postgraduate Diploma (PgD) allow for an interruption of studies and continuation at a later date to cater for career developments or unforeseen personal circumstances.

The academic year is divided into semesters of approximately 15 weeks each, which run from September to January and January to June.

Entry Requirements

You will normally be expected to hold at least a Second Class Honours degree or equivalent in an appropriate discipline. You will also be considered for entry if you do not have the standard entry qualifications, but can provide evidence of necessary knowledge and skills to successfully enter and complete the course.

Further Information

To apply, or for further information, please contact:

Course Enquiries
Birmingham City University
Technology Innovation Centre
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Curzon Street
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B4 7XG

Tel: +44 (0)121 331 6400
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MSc Data Communications

The MSc Data Communications will provide you with the expertise and knowledge required for the specification, design, implementation and management of complex systems in industry and commerce. Networking practitioners require a broad range of skills and knowledge, even if they choose to specialise, in order to maintain a high-level perspective of a complex system. You will develop an appreciation of system design and management, as well as a detailed understanding of methodologies in system specification, analysis, implementation and testing.

This course has been designed with Cisco-specific curriculum, enabling you to work towards the Cisco Certified Network Professional (CCNP) certification as part of your postgraduate studies.

Course Aims

- Meet the market need for data communications and networking professionals with the necessary knowledge and skills to develop complex systems.
- Encourage systematic approaches to the development of complex mid-range networking and data communication systems.
- Provide an opportunity to work on a range of challenging engineering projects within the constraints and demands of an industrial environment.

Career Development Opportunities

The UK communications industry is one of the largest in the world, influencing all business sectors and encouraging innovations and competitive products and services. This course reflects increasing use of complex communication systems by industry, requiring professionals who are able to take a multidisciplinary approach to system design, implementation, test and management.

MSc Data Communications Course Structure

MSc: 180 Credits

Master's Project Including Project Proposal, Research Plan and write-up (60 credits - 600 hours)

Postgraduate Diploma: 120 Credits

Management of Network Services (30 Credits - 300 Hours)	Network Diagnostics and Troubleshooting (30 Credits - 300 Hours)
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Postgraduate Certificate: 60 Credits

Design of Communication Systems I (30 Credits - 300 Hours)	Design of Communications Systems II (30 Credits - 300 Hours)
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Please refer to the Module Directory on page 6 for further information.

MSc Data Networks and Security

The MSc in Data Networks and Security builds on the core Design of Communication Systems and Network Management modules of the MSc Data Communications course, before focusing on issues of network security. The course reflects the increasing need to secure the complex communications systems used by industry. Combating fraud and malice, together with the requirements for handling errors and mischance are now core objectives in the development of network and communication systems.

This course has been designed with Cisco-specific curriculum, enabling you to work towards Cisco Certified Network Professional (CCNP) and Fundamentals of Network Security (FNS) certification as part of your postgraduate studies.

Course Aims

- Develop your understanding of generic networking principles.
- Develop your ability to plan, manage, implement, synthesise and communicate secure network solutions.
- Develop the multidisciplinary skills required to design and implement secure data networking systems.
- Develop the project management and interpersonal skills required to operate effectively in project teams.

Career Development Opportunities

The security landscape is changing so dramatically, that industry requires flexible, multi-skilled individuals who are to able maintain a high-level perspective of a complex system and embed secure networking practice in their approach to system design, implementation, test and management. The MSc Data Networks and Security provides the knowledge and skills which allow individuals to operate successfully in this rapidly changing environment.

MSc Data Networks and Security Course Structure

MSc: 180 Credits

Master's Project Including Project Proposal, Research Plan and write-up (60 credits - 600 hours)

Postgraduate Diploma: 120 Credits

Network Security (30 Credits - 300 Hours)	Management of Network Services (30 Credits - 300 Hours)
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Postgraduate Certificate: 60 Credits

Design of Communication Systems I (30 Credits - 300 Hours)	Design of Communications Systems II (30 Credits - 300 Hours)
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Please refer to the Module Directory on page 6 for further information.

MSc Software Development and Security

The MSc Software Development and Security is aimed at graduates or experienced software developers who wish to develop or update their skills across several fields, including secure computing, advanced software modelling using object oriented techniques, graphical user-interface design, data modelling and database design. It is also suitable for those wishing to investigate specialised topics such as distributed computing, advanced operating systems, network programming and applications for security.

Course Aims

- Develop your ability to plan, manage, design, implement, synthesise and communicate a secure software-based solution to a given problem.
- Develop the knowledge and skills required to develop complex secure software-based applications.
- Provide a range of challenging computer application development projects within the constraints and demands of a secure industrial environment.
- Provide an opportunity to investigate how software-based solutions are designed, developed and enhanced in order to provide secure solutions for new market opportunities.

Career Development Opportunities

Industry, business and commerce require capable technologists who are able to assess the software security issues affecting their operations and who are able to develop secure solutions to resolve these issues. The course will provide you with the expertise and knowledge required for the specification, design, implementation, testing and management of complex, yet secure, computer applications in which software is a major component.

MSc Software Development and Security Course Structure

MSc: 180 Credits

Master's Project Including Project Proposal, Research Plan and write-up (60 credits - 600 hours)

Postgraduate Diploma: 120 Credits

Distributed Applications Development (30 Credits - 300 Hours)	Building Secure Applications (30 Credits - 300 Hours)
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Postgraduate Certificate: 60 Credits

Object Oriented Applications Development (30 Credits - 300 Hours)	Information Systems Development Techniques (30 Credits - 300 Hours)
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Please refer to the Module Directory on page 6 for further information.

Module Directory

Building Secure Applications

Provides a detailed knowledge of program-level, system-level and network-level security, including the techniques which may be used to build a secure distributed application. It aims to equip you with the ability to develop applications securely and to analyse and mitigate security issues affecting or likely to affect a distributed application.

Security advantages and limitations of bar-coding, RFID and smart card device technologies are also covered. This includes biometrics as a technique for personal identification and authentication, and experience of the integration of bar-code, RFID and smart card facilities into the design and operation of a distributed application, in order to mitigate the disadvantages of password-based security keying.

This module encompasses a wide range of issues and techniques relating to building secure software systems incorporating automatic identification and client-server technologies. Topics covered include; computer platform and software applications security, user group management and permissions, data and application levels, human and machine aspects of security, and automatic identification and data capture.

Design of Communication Systems I

This module will allow you to design and implement scalable networking systems and includes the topics of Network Design Concepts, Advanced Routing Protocols and WAN Technologies.

The module will develop your skill in designing and implementing communication systems solutions to a given specification. It aims to extend knowledge and techniques for the design, configuration and deployment of networking devices, routers and switches, within Local Area Networks (LANs) and Wide Area Networks (WANs) which are typically found at medium to large network sites.

Design of Communications Systems II

This module will enable you to design and implement communication systems to agreed requirements and analyse and evaluate an existing network against established criteria. The module covers Remote Access Networks, Campus Network Design and Multi-layer Switched Networks.

This module will develop your skill in appropriate technologies to design and implement a total network solution from campus design to national and International size networks. The focus of this module will be to provide effective solutions to satisfy the growing demands of electronic commerce.

Distributed Applications Development

There is a growing market for software engineers with an understanding of the development of both web and other distributed applications, as well as the network infrastructures through which such applications are delivered. The module explores the technologies on which distributed applications are based, and the development environments which facilitate them.

Topics covered in this module include, development and deployment of remote and distributed applications, management and configuration of remote environments, developing and deploying server based web applications, implementing and utilising Service Oriented Architectures.

Information Systems Development Techniques

This module will enable you to develop a technical appreciation and competence in end-to-end systems development through the delivery of a completed database project.

The module will involve the creation, prototype implementation, delivery, documentation, and maintenance strategy development for an information system which structures, stores and provides interfaces to a complex set of relational data stored on a server database accessible through client applications. The project deliverables will include statistical summarisation.

Topics covered in the module include structured techniques for developing large information systems, structured systems design and development, data modelling and database design, database development and deployment, database applications implementation and advanced database techniques.

Management of Network Services

The module will enable you to make informed decisions when applying the concepts of network management and traffic engineering within a commercial Network. The module will allow you to examine current techniques available for managing a communication system. It will also provide you with experience of network performance analysis using modelling tools.

You will examine the protocols used to allow the management of sophisticated communication systems. In addition students will use simulation software to plan, analyse and trouble-shoot computer networks. Specific topics include Systems Management, Network Security Techniques and Network Design & Modelling.

Network Diagnostics and Troubleshooting

This module will allow you to develop a sound knowledge of troubleshooting strategies for all 7 OSI layers, which will allow networks to meet the operational demands made of them. The module will provide you with the knowledge and hands-on experience in trouble-shooting sub-optimal performance in a converged network and is an integral part of any approach to obtain the technical proficiency and knowledge of a network professional.

This module is designed to enable you to implement a variety of network management and trouble-shooting or diagnostic strategies for the efficient operation of a network. Specific topics include Network Management and Diagnostic Tools, Network Diagnostics Methodologies for Lower Layers and Network Diagnostics Methodologies for Upper Layers.

Network Security

Many Professional Network managers/engineers now require extensive knowledge within this subject area. This module is a senior-level introduction to the principles and practice of securing computer network systems. You will be provided with the necessary knowledge and tools to confidently design and manage a communication system. Specific topics include Systems Management, Network Security Techniques and Network Design & Modelling.

Object Oriented Applications Development

The primary aim of this module is to provide students with a good grounding in the full software lifecycle as applied to the development of object oriented software.

The module will expose you to the issues associated with progressing an identified given problem into an object oriented software solution. This will include; identifying a process and procedure to approach the solution, eliciting and capturing software requirements in a standard format, design of a solution based on given requirements, implementation of the design, testing of the developed solution and deployment of the tested solution. The particular emphasis will be on developing graphical data access intensive solutions (using GUIs and relational databases).

Specific topics include object-based software applications development lifecycles, OOAD techniques for business analysis, requirements capture, and software modelling, design patterns and software architectures, Object Oriented programming for development of applications, evaluation of object-based deployment platforms and enterprise application architectures.

Disclaimer

This information is intended as a general guide to the University's (Faculty's) courses and facilities and forms no part of any contract between students and the University. Although reasonable steps are taken to provide the courses as described, the University cannot guarantee the provision of any course or facility. Any course may be altered or withdrawn owing to circumstances beyond the University's control. It is strongly recommended that prospective students contact the (relevant) faculty to obtain the most up-to-date course information. For full terms and conditions please log on to www.bcu.ac.uk/misc/legal.html

All courses described as being delivered by Birmingham City University include those provided or delivered by the University and by companies within the Birmingham City University group.

Disability Services

Birmingham City University's Disability Service aims to enable students with disabilities or learning support needs to make the most of their time at university. We regard disclosure of a disability as a positive thing and think it is important that students feel they can tell us about any disability they may have so we can try to support their individual needs. If students have not made us aware of their disability or they feel they may have a disability please contact the Disability Service on 0121 331 5128, or email disability@bcu.ac.uk

Equal Opportunities

Birmingham City University promotes equality of opportunity in respect of every aspect of its provision. University policy and practice will seek to provide an environment that is free from discrimination against students, staff and others. The University and its staff will ensure that all prospective students are treated solely on the basis of their merits, abilities and potential.

The University will seek to prevent discrimination on the grounds of race, colour, ethnic origin, nationality, religious belief, gender, sexual orientation, disability, age, marital status, family circumstances, citizenship, social and economic status, or any other irrelevant individual differences. For full details of the University's Equal Opportunities Policy please log on to www.bcu.ac.uk

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A member of the Birmingham City University Group

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