“I’VE HAD FANTASTIC HELP AND SUPPORT FROM MY TUTOR FROM DAY ONE. SHE WAS ALWAYS AVAILABLE AND WOULD SOMETIMES ANSWER QUESTIONS LITERALLY WITHIN MINUTES. SHE HELPED GIVE ME THE CONFIDENCE TO DO MY PAPER WHICH, AS AN UNDERGRADUATE, I NEVER THOUGHT I’D BE ABLE TO DO. I WOULDN’T HAVE THOUGHT IT POSSIBLE, BUT FOR THE GUIDANCE AND ENCOURAGEMENT I HAD FROM MY TUTOR. TO HAVE A PAPER PUBLISHED AT INTERNATIONAL CONFERENCE IS AMAZING.”

Zeki Turedi
BSc (Hons) Computer Forensics and Security

I made it to Mcr Met.
You can too!
Computer technology powers the digital world around us. It’s part of our everyday lives and provides structure for everything from communication and transport, to finance, leisure and much more.

Make it in **Computing**

A degree level qualification in computing will give you the analytical, programming, web development, problem-solving and professional skills necessary to embark on a challenging career with the potential for excellent progression and salaries in a wide variety of interesting sectors.

Technologies like artificial intelligence, big data, computer animation, cyber security, the Internet of Things, smart cities, robotics and virtual reality can transform lives for the better and generate economic success. With growth in IT and technical jobs at an all time high and continued reports of a skills shortage in the UK, there’s never been a better time to consider a degree in computing and digital technology.

Make it at **Manchester Met**

The School of Computing, Mathematics and Digital Technology has a reputation for excellent academic programmes, high student satisfaction, internationally-recognised research and strong industry links. Our work in the sector helps shape the curriculum, ensures graduates are ready for the workplace and are actively sought after by employers.

Our computing degrees encompass everything from computing science, information systems, software engineering and artificial intelligence to multimedia, e-commerce systems and internet computing. We’re an educational affiliate of the BCS, the Chartered Institute for IT, a member of the Oracle Academy and an academic partner of the Institute of Information Security Professionals. We’re also an Academy of the Computer Technology Industry Association (CompTIA), delivering its partner programme which provides a pathway for students towards a rewarding, high-growth IT career.

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* Based on data from the Times Higher top ranking universities globally 2016-17.
** Research Excellence Framework (REF) 2014.
† DLHE survey 2015, for all respondents available for employment or further study and whose destinations are known.
Which course to study at Mcr Met

Our suite of courses will give you the specific skills to start your career with confidence, delivered by academics with enthusiasm and expertise.

Your first year

Most of our Computing degrees share a common first year, allowing you to transfer between programmes at the end of Year 1. This flexibility gives you the choice to specialise in your preferred route as you develop your interests.

The following courses are part of the first year Computing network:

**Computer Science** MComp (Hons)
**Computer Science** BSc (Hons)
**Computing** BSc (Hons)
**Software Engineering** BSc (Hons)

For information about the **BSc (Hons) Computer Forensic and Security** first year, see page 14.
Computer Systems Fundamentals
This unit provides an introduction to the fundamental principles and mathematics underpinning the design and construction of computer systems, including:

• Digital Logic and Boolean Algebra: digital logic gates and circuits, Karnaugh maps, use of a digital logic circuit simulator, components of a CPU, processor model, Fetch execute cycle, hardware interrupts
• Assembly Language Programming: relationship between high level languages and assembler, instruction sets, registers, debugging
• Discrete Mathematics: matrices and vectors, matrices as linear transforms
• Functions: definition, properties
• Sets: subsets, set algebra
• Logic: propositions, predicates, propositional algebra, proof of simple results.

Information Systems
An introduction to the use of information systems in organisations which will show you how to develop key systems analysis techniques to be applied to information systems built on a commercial Relational Database Management System (RDBMS). You will also develop essential communication and teamworking skills. Topics include:

• Business activities supported by information systems including case studies and examples
• Use of information systems for management information and decision making, business operations and data processing
• E-commerce theory, information systems and society
• Systems analysis and design techniques including UML use cases
• Database management systems and database design/development: entity relationship diagrams (ERDs), normalisation, SQL.

Introduction to Web Design and Development
Introduces the modern context of web design and development, the core development technologies and standards and design methods that cater for different current platforms. The key theme of the unit is the efficient design and development of effective and robust websites for the range of popular platforms using the most modern technologies and techniques. Topics include:

• Introduction to the client-server model, web standards, HTML5 semantic mark up, control of presentation via style sheets, interactivity via JavaScript on the client side and PHP on the server side
• The use of high-level tools for design and development
• DOM element selection and manipulation via script libraries such as jQuery
• The production of standards compliant HTML5 video. Students will create dynamic web pages with AMP systems and script on the server side using PHP with MySQL. The key theme for scripting will be the understanding and development of readable code that listens for and responds to browser and user events by manipulating DOM elements.

Programming (Java)
This unit introduces computer programming in a high level programming language and includes principles and practice in problem solving, program design, solution implementation and testing, including:

• Introduction to programming using Java
• Software life cycle: importance of correctly identifying the problem, iterative nature of software development, software maintenance
• Design methodology: the application of the top-down design method using step-wise refinement to produce pseudo-code solutions to problems, incorporating constructs for sequence selection, iteration, abstraction and re-use
• Verification and testing: the use of desktop execution, simple debugging strategies and more formal approaches to testing e.g. black box white box boundary analysis and equivalence classes
• Applications of standards and conventions: software maintenance and developing a professional approach to coding
• Constructs and features of a structured high level programming language: control constructs, operators, procedural abstraction, simple I/O and use of libraries
• Data types – primitive types: constants, variables, arrays and simple structured data
• Object orientated design and implementation: inheritance and polymorphism
• Software support environment: use of an IDE, compilers, debuggers, and operating systems.
This course is an integrated four-year undergraduate Masters degree based on the first three years of our highly successful BSc (Hons) Computer Science degree. It will enable you to gain a balanced understanding of the major areas of computer science with sufficient flexibility each year to select areas of study that will develop your knowledge, experience and skills appropriate to a range of computing based careers.

Typical areas of study include programming in a variety of languages, operating systems, networks, security and emergent technologies – Android for example – as well as the commercial and business context of computer systems. These study areas are complemented by our strong focus on practical problem solving skills throughout the course.

The MComp route includes advanced professional studies as you undertake a major independent professional standard project in a chosen specialism that may include a high level professional work-based component.

Typical units of study may include the following but may be subject to change.

### Year 1

You will study the common first year units detailed on page 5

### Year 2

You will study four, 30 credit units

**Advanced Programming**

This unit covers concepts relating to object-oriented program design, the use of framework libraries, web server and mobile application development.

The unit covers object-oriented concepts: introduction to object-oriented concepts including class, object, instantiation, attributes, constructor, methods, overloading, inheritance, overriding, polymorphism and design techniques using Unified Modeling Language (UML).

Testing of object-oriented programs. Advanced topics: interfaces, inner classes, collections, exception handling, stream based file input/output, building a Graphical User Interface (GUI) using libraries, event handling, graphics and threads. Implementation: practical application and implementation of concepts studied above.


### Algorithms and Data Structures


### Computer Networks and Operating Systems

The unit provides an introduction to the operation of computer networks operating systems theory and practice.

Concurrency: the solutions to and the problems of concurrency, race conditions, livelock deadlock starvation and priority inversion. The use of semaphores and/or monitors in solving classical problems such as: i) the bounded buffer and ii) multiple readers and writers. Computer Networks: network components – repeaters, hubs, switches, routers, gateways; protocol stacks – OSI TCP/IP; basic network performance characteristics. Process management: processes and threads, performance benefits of multiprogramming, scheduling algorithms, two-level schedulers. Input/Output: principles of I/O hardware; devices and controllers; principles of I/O software – device drivers, device interrupt, handlers device, independent software. Memory Management: evolution of physical and virtual memory management, algorithms and computer architecture for memory management. File systems: structure and organisation of the file system; disk space storage allocation using contiguous linked indexed and inode based schemes.

£300k invested in hardware upgrades

Our usability laboratory uses eye-tracking technology to capture and analyse how we interact with digital content.
Professional Development
The unit covers the related areas of professional and legal issues and professional and career development and includes a pathway-specific group project.

The current legal framework of computing e.g. data protection legislation, intellectual property rights, e-waste recycling law, computer misuse, freedom of information, computer contracts and employment contracts. Overview and comparison of workable ethical theories e.g. utilitarianism and duty based approaches. Professional bodies in computing – role, structures, codes of conduct and practice. Employment application process and continuing professional development. Themed case study mini-project linked to subject pathway which may include the following elements: project planning and control concepts, planning techniques (e.g. Gantt/PERT charts) and monitoring, individual reflective diary/log book, academic research, software prototype and project report.

Year 3
With placement year

Placement option

In your third year you will have the choice to either go on a placement, where you’ll work for a year in industry or continue directly into your final year of study.

Year 3 / Year 4
Without/With placement year

You will study four, 30 credit units

Artificial Intelligence
This unit looks at the underlying theory and industrial applications of Artificial Intelligence paradigms. It includes the underlying philosophy and principles behind AI software, artificial neural networks, image processing, rule-based systems, knowledge engineering, game theory, Minmax and Alphabeta searches, logic and reasoning, ontologies, natural language processing and grammar checkers. Learning will be integrated via a large-scale case study, building and evaluating a range of AI classifiers for two real-world datasets (e.g. Mammography, US Census Data). This will develop transferrable skills in experiment design and evaluation.

Programming Languages: Principles and Design
The unit examines the design and evolution of programming languages with a researched introduction to compilation and computer architecture. It includes evolution of programming language paradigms and language design. Comparative analysis and critical evaluation of programming language concepts and paradigms concerning procedural, object-oriented, functional, logic-based and the concepts of variable type and binding.

The software structure and phases of a simple compiler, processor microarchitecture and cache memory architectures.

Project
Provides experience in the critical review of literature and the design, implementation, evaluation and writing up. Working with your supervisor, you will develop your project description and specify aims, objectives, methodology and timetable for completion. Final year projects are normally pathway-specific. For group projects, individual and collective aims, objectives and plans are specified.

Option units (indicative and may be subject to change year on year):
- Information and Network Security
- Mobile Application Development
- Software Agents and Optimisation

For in-depth unit information, see mmu.ac.uk/courses

Final year
You will study two, 30 credit units and one, 60 credit unit

Advanced Computer Networks and Operating Systems
The unit covers advanced topics in computer networks and operating systems. It focuses on principles, architectures, and protocols used in modern large scale networked systems.

High Performance Computing and Big Data
The aim of this unit is to develop students’ knowledge in the areas of parallel and distributed processing, machine learning approaches for handling big data and current parallel programming models for high-performance computing and big data processing, such as MPI and MapReduce.

Masters Project
This unit will involve practical system creation or experimentation work in an area of computing other than digital media. The curriculum is specific to the project you choose but it will include seminars on skills and techniques required for successful design and implementation of research resources, time management, research presentation (oral, written, posters) and professional, legal and ethical issues in computing. Examination of a case study or project in an area appropriate to your intended dissertation work. Where appropriate, the implementation or experimentation may be work-based.

The latest information about our courses, including the most up-to-date list of units, can be found online at mmu.ac.uk/courses
Computer Science BSc (Hons)

The focus of this degree is on the theoretical foundations of computing. The course encourages a general and abstract understanding of the underlying principles of computing with an emphasis on data structures, algorithms, networks and operating systems.

You will study a curriculum designed in conjunction with industry to equip you with the range of skills and strengths that employers demand. You will cover the fundamental areas of computing such as programming, web development, computer architecture, information systems and databases, as well as more specialised areas such as artificial intelligence, computer mathematics and software engineering.

In your final year, you will study cutting-edge topics with guidance from research leaders and undertake a large-scale project.

Typical units of study may include the following but may be subject to change.

**Year 1**

You will study the common first year units detailed on page 5.

**Year 2**

You will study four, 30 credit units.

**Advanced Programming**

This unit covers concepts relating to object-oriented program design, the use of framework libraries, web server and mobile application development.

The unit covers object-oriented concepts: introduction to object-oriented concepts including class, object, instantiation, attributes, constructor, methods, overloading, inheritance, overriding, polymorphism and design techniques using Unified Modeling Language (UML).

Algorithms and Data Structures

Computer Networks and Operating Systems
The unit provides an introduction to the operation of computer networks operating systems theory and practice.
Concurrency: the solutions to and the problems of concurrency, race conditions, livelock deadlock starvation and priority inversion. The use of semaphores and/or monitors in solving classical problems such as: i) the bounded buffer and ii) multiple readers and writers. Computer Networks: network components – routers, hubs, switches, routers, gateways; protocol stacks – OSI TCP/IP, basic network performance characteristics. Process management: processes and threads, performance benefits of multiprogramming, scheduling algorithms, two-level schedulers. Input/Output: principles of I/O hardware; devices and controllers; principles of I/O software – device drivers, device interrupt, handlers device, independent software. Memory Management: evolution of physical and virtual memory management, algorithms and computer architecture for memory management. File systems: structure and organisation of the file system; disk space storage allocation using contiguous linked indexed and inode based schemes.

Professional Development
The unit covers the related areas of professional and legal issues and professional and career development and includes a pathway-specific group project.
The current legal framework of computing e.g. data protection legislation, intellectual property rights, e-waste recycling law, computer misuse, freedom of information, computer contracts and employment contracts. Overview and comparison of workable ethical theories e.g. utilitarianism and duty based approaches. Professional bodies in computing – role, structures, codes of conduct and practice. Employment application process and continuing professional development. Themed case study mini-project linked to subject pathway which may include the following elements: project planning and control concepts, planning techniques (e.g. Gantt/PERT charts) and monitoring, individual reflective diary/log book, academic research, software prototype and project report.

Year 3
With placement year
Placement option
In your third year you will have the choice to either go on a placement, where you’ll work for a year in industry or continue directly into your final year of study.

Final year
You will study four, 30 credit units

Artificial Intelligence
This unit looks at the underlying theory and industrial applications of Artificial Intelligence paradigms. It includes the underlying philosophy and principles behind AI software, artificial neural networks, image processing, rule-based systems, knowledge engineering, game theory, Minmax and Alphabeta searches, logic and reasoning, ontologies, natural language processing and grammar checkers. Learning will be integrated via a large-scale case study, building and evaluating a range of AI classifiers for two real-world datasets (e.g. Mammography, US Census Data). This will develop transferrable skills in experiment design and evaluation.

Programming Languages: Principles and Design
The unit examines the design and evolution of programming languages with a research-led introduction to compilation and computer architecture. It includes evolution of programming language paradigms and language design. Comparative analysis and critical evaluation of programming language concepts and paradigms concerning procedural, object-oriented, functional, logicbased and the concepts of variable type and binding. The software structure and phases of a simple compiler, processor microarchitecture and cache memory architectures.

Project
Provides experience in the critical review of literature and the design, implementation, evaluation and writing up. Working with your supervisor, students develop their project description and specify aims, objectives, methodology and timetable for completion. Final year projects are normally pathway-specific. For group projects, individual and collective aims, objectives and plans are specified.

Option units (indicative and may be subject to change year on year):
• Information and Network Security
• Mobile Application Development
• Software Agents and Optimisation
For in-depth unit information, see mmu.ac.uk/courses

FACT FILE

YEAR 1
STUDY
Classes
Independent Study
Coursework
ASSESSMENT
YEAR 2
STUDY
Classes
Independent Study
Coursework
YEAR 3
STUDY
Classes
Independent Study
Coursework
Exams
ASSESSMENT
See Fact File on page 31 for more course information.

The latest information about our courses, including the most up-to-date list of units, can be found online at mmu.ac.uk/courses
Computing BSc (Hons)

This degree aims to give you a broad grounding in all principal areas of computing including programming, application development, information systems, computer hardware, web development and networks. Designed to give you flexibility in the units you study, you can shape the course to suit your own interests, areas of specialisation and career aspirations.

You will study a curriculum designed in conjunction with industry to equip you with the range of skills and strengths that employers demand. You will cover areas such as databases and business information systems throughout the course and in Years 2 and 3, you will choose option units in order to further develop your skills in your chosen area. You will also have the opportunity to engage in report writing, research-based activities and undertake a large-scale supervised project. Our BSc (Hons) Computer Science, BSc (Hons) Software Engineering and BSc (Hons) Computing degree share a common first year allowing you to transfer between courses after Year 1.

Typical units of study may include the following but may be subject to change.

Year 1

You will study the common first year units detailed on page 5

Year 2

You will study four, 30-credit units

Database Systems
This unit explores the theory and practice of the modelling, specification and querying of relational databases and aspects of implementation of database management systems. You will cover:

- Database modelling: advanced UML with class diagrams and inheritance; mapping UML diagrams to relational schemas
- Database implementation and querying: creating and maintaining relational databases with SQL; indices; advanced SQL queries; triggers; views
- Relational algebra: operators: project, select, join, union, intersection, set difference; different types of join; writing algebraic expressions; properties of operators (e.g., associative, distributive)
- Physical aspects: data structures (e.g., hash tables); buffers; different types of storage (e.g., primary, secondary); blocks as storage units; trade-offs in random and sequential access and network traffic
- Query processing and optimisation: alternative implementations of relational algebra operators; rewriting of relational algebraic expressions to improve efficiency
- Concurrency control: locking, 2-phased locking systems, resolving conflicts, writing transaction-aware SQL scripts
- Interfacing with programming languages and environments: embedded queries; cursors; data access patterns.

Professional Development
The unit covers the related areas of professional and legal issues and professional and career development and includes a pathway-specific group project.

The current legal framework of computing e.g. data protection legislation, intellectual property rights, e-waste recycling law, computer misuse, freedom of information, computer contracts and employment contracts. Overview and comparison of workable ethical theories e.g. utilitarianism and duty based approaches. Professional bodies in computing – role, structures, codes of conduct and practice. Employment application process and continuing professional development.

Themed case study mini-project linked to subject pathway which may include the following elements: project planning and control concepts, planning techniques (e.g. Gantt/PERT charts) and monitoring, individual reflective diary/log book, academic research, software prototype and project report.

Web Based Business Systems
You will critically evaluate different technologies and providers for taking payments online or using mobile devices; use contemporary off-the-shelf e-commerce packages to sell goods or services online; apply understanding of the fundamentals of online and multi-channel marketing to promote online businesses; and demonstrate understanding of the technical, legal and organisational challenges posed to new and existing businesses by a business marketplace increasingly dominated by the web.

Option units (indicative and may be subject to change year on year):

- Advanced Programming
- Introduction to Data Science
- Web Design and Development

For in-depth unit information, see mmu.ac.uk/courses

Salaries for Computing graduates range from £18,000 to £30,000
Year 3
With placement year

Placement option

In your third year you will have the choice to either go on a placement, where you will work for a year in industry or continue directly into your final year of study.

Final year
You will study four, 30 credit units

Data Engineering
The aim of this unit is to develop knowledge in the areas of advanced database system development, business intelligence, analytical data analysis and data mining. It includes current trends in the database market from a business perspective, PL/SQL concepts, data warehousing and big data, advanced data analytics, data mining algorithms and techniques, analysis and validation, applications and computational intelligence techniques for data engineering.

Information Systems Strategy
This module focuses on the interface between information systems and business organisations. It focuses on the specification, design, representation and management of socio-technical systems with many users and stakeholders with conflicting goals. Includes UML Class, state and sequence diagrams, stakeholder identification and dependency modelling, elicitation of stakeholder goals and operationalisations, softgoals, imperfect/partial satisfaction. Modelling decision alternatives, selection rationale and outcome. Project management. Information systems management and strategy.

Project
Provides experience in the critical review of literature and the design, implementation, evaluation and writing up. Working with your supervisor, students develop their project description and specify aims, objectives, methodology and timetable for completion. Final year projects are normally pathway-specific. For group projects, individual and collective aims, objectives and plans are specified.

Option units (indicative and may be subject to change year on year):
- Advanced Web Development
- Enterprise Programming
- Mobile Application Development
- Software Agents and Optimisation
- User Experience and Interaction Design

For in-depth unit information, see mmu.ac.uk/courses

“I’VE HAD THE OPPORTUNITY TO WORK WITH REAL CLIENTS ON LIVE PROJECTS AND SUCCESSFULLY SECURED AN INTERNSHIP IN DIGITAL MARKETING AND WEB DEVELOPMENT.”

Arsalan Khan
BSc (Hons) Computing

FACT FILE

DURATION
3 years full-time
4 years full-time with sandwich year

YEAR 1
STUDY
Classes
Independent Study
ASSESSMENT
Coursework
Exams

YEAR 2
STUDY
Classes
Independent Study
ASSESSMENT
Coursework
Exams

YEAR 3
STUDY
Classes
Independent Study
ASSESSMENT
Coursework
Exams

See Fact File on page 31 for more course information.
Software Engineering BSc (Hons)

This course provides a broad education in all phases of software development, support and management with particular focus on the methodical approach to error-free design and the building of software. A large-scale team software project aims to develop your teamwork and communication skills and give you a sound understanding of the role of software development tools within the software life cycle.

You will study a curriculum designed in conjunction with industry to equip you with the range of skills and strengths that employers demand. Typical areas of study include programming, multimedia and internet development, information systems, databases, computer hardware and computing mathematics. We aim to develop your knowledge of information management and database development, advanced programming and website development. You will complete a software engineering team project in your final year.

Our BSc (Hons) Computer Science, BSc (Hons) Software Engineering and BSc (Hons) Computing degree share a common first year allowing you to transfer between courses after Year 1.

“THE COURSE PUT EMPHASIS NOT ONLY ON LEARNING FUNDAMENTAL COMPUTER SCIENCE AND PROGRAMMING BUT ALSO UPON LOTS OF TEAM WORK. SOFTWARE DEVELOPMENT TEACHES OTHER SKILLS SUCH AS PROJECT MANAGEMENT AND MODELLING TECHNIQUES AND I KNEW THESE SKILLS WOULD HELP ME GET A JOB.”

Sarah Carswell
BSc (Hons) Software Engineering

Typical units of study may include the following but may be subject to change.

Year 1

You will study the common first year units detailed on page 5

Year 2

You will study four, 30 credit units

Web Design and Development
Students will build robust, maintainable web applications using a variety of current client-server techniques for web application development, including:
• jQuery, Ajax and other APIs to create rich media or interactive content e.g. slideshows and media galleries
• HTML5 Canvas for bitmap graphics and animations
• Retrieval, manipulation and display of geographical data for client-side devices
• Client and server side validation of form data
• Select, update, delete SQL table data on server using double validated form data
• Session/cookie management
• Request/response header management
• Structured data transmission in request/response e.g. xml and json
• Client/server side programming techniques to create web applications.

Advanced Programming
This unit covers concepts relating to object-oriented program design, the use of framework libraries, web server and mobile application development.

The unit covers object-oriented concepts: introduction to object-oriented concepts including class, object, instantiation, attributes, constructor, methods, overloading, inheritance, overriding, polymorphism and design techniques using Unified Modeling Language (UML).

Testing of object-oriented programs. Advanced topics: interfaces, inner classes, collections, exception handling, stream based file input/output, building a Graphical User Interface (GUI) using libraries, event handling, graphics and threads. Implementation: practical application and implementation of concepts studied above.

**Database Systems**
This unit explores the theory and practice of the modelling, specification and querying of relational databases and aspects of implementation of database management systems. You will cover:

- Database modelling: advanced UML with class diagrams and inheritance; mapping UML diagrams to relational schemas
- Database implementation and querying: creating and maintaining relational databases with SQL; indices; advanced SQL queries; triggers; views
- Relational algebra: operators: project, select, join, union, intersection, set difference; different types of join; writing algebraic expressions; properties of operators (e.g., associative, distributive)
- Physical aspects: data structures (e.g., hash tables); buffers; different types of storage (e.g., primary, secondary); blocks as storage units; trade-offs in random and sequential access and network traffic
- Query processing and optimisation: alternative implementations of relational algebra operators; rewriting of relational algebraic expressions to improve efficiency
- Concurrency control: locking, 2-phased locking systems, resolving conflicts, writing transaction-aware SQL scripts
- Interfacing with programming languages and environments: embedded queries; cursors; data access patterns.

**Professional Development**
The unit covers the related areas of professional and legal issues and professional and career development and includes a pathway-specific group project.

The current legal framework of computing e.g. data protection legislation, intellectual property rights, e-waste recycling law, computer misuse, freedom of information, computer contracts and employment contracts. Overview and comparison of workable ethical theories e.g. utilitarianism and duty based approaches. Professional bodies in computing – role, structures, codes of conduct and practice. Employment application process and continuing professional development. Themed case study mini-project linked to subject pathway which may include the following elements: project planning and control concepts, planning techniques (e.g. Gantt/PERT charts) and monitoring, individual reflective diary/log book, academic research, software prototype and project report.

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**Year 3**
**With placement year**

**Placement option**
In your third year you will have the choice to either go on a placement, where you’ll work for a year in industry or continue directly into your final year of study.

**Final year**
**You will study four, 30 credit units**

**Enterprise Programming**
Students will build secure, robust, maintainable enterprise level applications using a variety of current distributed programming techniques. Includes use of common enterprise design patterns and implementation in a suitable language, professional programming techniques, distributed programming creation and analysis of distributed applications in a high level language, web service architectures e.g. web services, WSDL, SOAP, XML/JSON processing, current techniques in enterprise application development e.g. Hadoop, cloud computing, reference architectures, models and frameworks and enterprise frameworks e.g. Hibernate, Struts.

**Programming Languages and Software Engineering Frameworks**
This unit will compare and contrast a range of programming language that covers the major programming paradigms such as functional, imperative and declarative. The unit will also critically evaluate the architecture of large scale software. Includes: an overview of the evolution of programming language paradigms and language design. A comparative analysis and critical evaluation of programming language concepts and paradigms, concepts of variable type and binding, design patterns and software architectures. A critical study of software engineering frameworks and build systems.

**Project**
Provides experience in the critical review of literature and the design, implementation, evaluation and writing up. Working with your supervisor, you will develop your project description and specify aims, objectives, methodology and timetable for completion. Final year projects are normally pathway-specific. For group projects, individual and collective aims, objectives and plans are specified.

**Option units (indicative and may be subject to change year on year):**

- Advanced Web Development
- Mobile Application Development
- Software Agents and Optimisation

For in-depth unit information, see mmu.ac.uk/courses
This degree focuses on the key elements of computer forensics and security, namely principles and practices, information and network security, file system based forensics and analysis, network and internet forensics and the legal and ethical issues involved in any digital investigation. You will gain a broad understanding of the phases of a forensic investigation and of computing in general. Extensive group work will develop your ability to think logically and use your initiative to critically analyse problems in the forensic domain.

Typical areas of study include programming, computer hardware and fundamentals, computing mathematics, computer networks and operating systems alongside specialist subjects such as forensics and security of file systems, networks and the internet.

The School is an academic partner of the Institute of Information Security Professionals. This partner status recognises our expertise in the field of information and cyber security.

**Year 1**

**You will study four, 30-credit units**

**Computer Forensics and Security Fundamentals**

The aim of this unit is to introduce students to the fundamental concepts of digital forensics and computer security, including:

- Forensic Process: types of investigations, role of investigator, processes, toolkits, legal aspects, ACPO, case studies, incident response cycle
- Data forms, bits, bytes, decimal, hexadecimal, files
- Scripting for digital forensics
- Security principles, incident response strategy, security roles and responsibilities, types of security policies, security culture, security certifications
- Information security management: threats, vulnerabilities, risk concepts, handling risk, threat landscape, security standards (e.g. ISO/IEC 27000), understanding auditability, internal audit processes.

Other core units include:
- Computer Systems Fundamentals
- Information Systems
- Programming (Java)

For more information on these units, see page 4.

**Year 2**

**You will study four, 30 credit units**

**Advanced Programming**

This unit covers concepts relating to object-oriented program design, the use of framework libraries, web server and mobile application development. The unit covers object-oriented concepts: introduction to object-oriented concepts including class, object, instantiation, attributes, constructor, methods, overloading, inheritance, overriding, polymorphism and design techniques using Unified Modeling Language (UML).

Testing of object-oriented programs. Advanced topics: interfaces, inner classes, collections, exception handling, stream based file input/output, building a Graphical User Interface (GUI) using libraries, event handling, graphics and threads. Implementation: practical application and implementation of concepts studied above.

**Computer Networks and Operating Systems**

The unit provides an introduction to the operation of computer networks operating systems theory and practice. Concurrency: the solutions to and the problems of concurrency, race conditions, livelock deadlock starvation and priority inversion. The use of semaphores and/ or monitors in solving classical problems such as: i) the bounded buffer and ii) multiple readers and writers. Computer Networks: network components – repeaters, hubs, switches, routers, gateways; protocol stacks – OSI TCP/IP, basic network performance characteristics. Process management: processes and threads, performance benefits of multiprogramming, scheduling algorithms, two-level schedulers. Input/Output: principles of I/O hardware; devices and controllers; principles of I/O software – device drivers, device interrupt, handlers device, independent software. Memory Management: evolution of physical and virtual memory management, algorithms and computer architecture for memory management. File systems: structure and organisation of the file system; disk space storage allocation using contiguous linked indexed and inode based schemes.

**File Systems Forensics and Analysis**


**Professional Development**

The unit covers the related areas of professional and legal issues and professional and career development and includes a pathway-specific group project. The current legal framework of computing e.g. data protection legislation, intellectual property rights, e-waste recycling law, computer misuse, freedom of information, computer contracts and employment contracts. Overview and comparison of workable ethical theories e.g. utilitarianism and duty based approaches. Professional bodies in computing – role, structures, codes of conduct and practice. Employment application process and continuing professional development. Themed case study mini-project linked to subject pathway which may include the following elements: project planning and control concepts, planning techniques (e.g. Gantt/PERT charts) and monitoring, individual reflective diary/log book, academic research, software prototype and project report.

**Year 3 With placement year**

**Placement option**

In your third year you will have the choice to either go on a placement, where you’ll work for a year in industry or continue directly into your final year of study.

**Final year**

**You will study four, 30-credit units**

**Information and Network Security**

This unit will cover a diverse set of topics related to information and network security with emphasis on cryptographic methods and security protocols. It includes an overview of security, cryptography and encryption algorithms e.g. DES, RSA, AES. Access control and multilevel security, internet security protocols and firewalls.

**Network and Internet Forensics**

The unit builds on forensic evidence and analysis and provides content on network forensics, internet forensics and latest developments in the area. Network traffic monitoring and analysis: sniffers, events, trap and trace, full content, session data, reassembling sessions, filters, router investigation, routing tables, access control lists, monitoring and network intrusion detection. Internet Forensics: internet threats, addresses and domain names, email structure and routing, URL obfuscation, HTTP transactions, log analysis, browser history, cookie storage, temporary files. Recent Developments: latest developments in the field; topics such as anti-forensics and anti-forensic countermeasures.

**Project**

Provides experience in the critical review of literature and the design, implementation, evaluation and writing up. Working with your supervisor, you will develop your project description and specify aims, objectives, methodology and timetable for completion. Final year projects are normally pathway-specific. For group projects, individual and collective aims, objectives and plans are specified.

**Option units (indicative and may be subject to change year on year):**

- Enterprise Programming
- Mobile Application Development
- Software Agents and Optimisation

For in-depth unit information, see [mmu.ac.uk/courses](http://mmu.ac.uk/courses)

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**FACT FILE**

<table>
<thead>
<tr>
<th>YEAR</th>
<th>DURATION</th>
<th>STUDY</th>
<th>ASSESSMENT</th>
</tr>
</thead>
<tbody>
<tr>
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<td>2</td>
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<td>3 years full-time</td>
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</tbody>
</table>

See Fact File on page 31 for more course information.

mmu.ac.uk/scmdt | 15
The Degree Apprenticeship in Digital & Technology Solutions

Please note that applications for apprenticeships are not made via UCAS and you should apply directly to one of our employer partners. For the latest information about apprenticeship vacancies register online at mmu.ac.uk/apprenticeships/register-interest

The Degree Apprenticeship in Digital & Technology Solutions is an industry driven and government supported route where students can gain a degree while working for an employer at the same time. Apprentices will work full-time with their employer, while studying part time towards a Digital & Technology Solutions Degree at Manchester Met Business School.

Successful applicants will have the opportunity to enter the digital or technology profession as an apprentice, earn while training and join the rising number of apprentices employed in these high-growth sectors. You’ll also study a specialist pathway, which will complement the work you’re undertaking with an employer.

These specialist pathways include:
- IT consultancy
- software engineering
- cyber security analysis
- data analysis.

Apprenticeship benefits include:
- no student loan required
- on-the-job-training
- opportunity to gain a BSc degree part-time
- tuition-fees paid by employer/Government
- enjoy all the benefits of being a student at Manchester Met
- enhanced career prospects at the end of the apprenticeship.

What qualification will I receive?
An Honours Degree: BSc in Digital & Technology Solutions from Manchester Metropolitan University.

How much does it cost?
You will not have to pay any tuition fees. The government and your employer pay these costs.

How much will I get paid?
There is a national minimum wage for apprentices. However, we’re hopeful employers will pay a minimum of £12,000 per year.

When does it start?
There is an annual intake each September.

How long does it take?
This will depend upon your individual study pathway, but it is expected you will complete the programme in four years.

I’m already working in IT can I go on an apprenticeship with my present employer?
Yes, your employer should contact apprenticeships@mmu.ac.uk

What are the entry criteria?
Prospective candidates should have Maths and English GCSE grade A-C or equivalent, and a minimum of 104 – 112 UCAS tariff points at A2 (Grades BCC) or acceptable alternatives. However, we will interview and assess individually those who do not have these qualifications but who have relevant work experience.

Applications for this apprenticeship route are not made via UCAS.

Visit our website to find out more. Find out more mmu.ac.uk/apprenticeships/students
Email: apprenticeships@mmu.ac.uk
Why did you decide to do a degree apprenticeship?
I wanted to increase my skill set, in a way that would allow me to learn while working and earning a full-time wage. The degree apprenticeship with Manchester Met allows me to understand the context of what I’m learning and also the chance to apply it.

How does the degree apprenticeship work?
I attend Manchester Met every Monday during term times, and work Tuesday to Friday. It works out that I attend university for 30 days a year. It works well because the course allows us to tailor our assignments around the projects we are doing at work.

We have two assignments per module and there are three modules per year. At work, I have many responsibilities within my team and love that we are given the opportunity to contribute to really valuable pieces of work and projects.

What do you enjoy about your degree apprenticeship?
I enjoy being able to learn knowledge and skills, for example gaining experience of the technical aspects and learning to code. It’s great that I am able to put my learning in to practice almost immediately. At work I am a very valued member of the team and massively supported by my peers.

What advice would you give to anyone planning on doing an apprenticeship?
I think degree apprenticeships are a great way to develop yourself and build on your skills and confidence. I don’t think you should be afraid to take risks and try new things, it is about building and managing your career and it’s okay to say what you enjoy and what you don’t.

Ellie Warburton
Digital & Technology Solutions Degree Apprenticeship at AstraZeneca in conjunction with Manchester Metropolitan University
Each Foundation Year is an integral part of a specific degree course. The content of the Foundation Year is tailored to prepare you for your chosen degree so that you start Year 1 of your linked Honours degree with confidence.

Successful completion of the Foundation Year guarantees automatic progression onto Year 1 of the degree you have chosen to study.

If you choose the foundation year route, you will apply for a four-year course or five year course with a placement year. Once you have passed your foundation year you will progress directly onto Year 1 of your linked degree and you will be able to apply to Student Finance each year for a tuition fee loan (UK students can also apply for a maintenance loan) for the full duration of your course.

For more information on about student finance and the range of scholarships and bursaries the University offers visit mmu.ac.uk/money matters and for funding information visit gov.uk/student-finance. Different fee rates apply for international students and further details can be found at mmu.ac.uk/international

The following courses are available with a Foundation Year:

- BSc (Hons) Computer Forensics and Security
  UCAS code G552
- BSc (Hons) Computer Science
  UCAS code G402
- BSc (Hons) Software Engineering
  UCAS code G608

For those with degree-level potential, but without the qualifications to apply directly for an Honours course, a Foundation Year is the perfect way to prepare for future success.

Course structure

All Foundation Year students study the academic skills for higher education unit, which will help you to develop the academic and study skills required for degree-level work. You will also study an additional three units relating to your chosen subject.

Academic Skills for Higher Education

This unit covers topics such as academic skills: HE terminology, independent study, time management, note taking, reading techniques, academic writing, critical thinking and writing, referencing methods, exam techniques and oral presentations. Research skills: conducting a research project, research design and methodology, analysing and presenting research data. Personal development planning: reflection, skills profiling and action planning. Basic number work: basic arithmetic and mental calculations.

Foundation Computing

The aim of the unit is to introduce you to the range of computing topics that will be included in your degree. It covers topics such as computer systems: logic gates, truth tables, Boolean notation, components of a computer and I/O devices. Multimedia and the web: HTML, web editors, CSS, web MM, vector graphics and search engines. Systems development life cycle: identification of problem, feasibility study, information collection and analysis and design of systems in the engineering and computing areas.

Foundation Data Analysis

This unit will develop the critical thinking and data analysis skills required by students on their linked degrees. It covers areas such as descriptive statistics, probability, statistical inference and visual representation of data.

Foundation Mathematics

This unit teaches basic mathematics in a style that will prepare students for the mathematics required on their linked degree. It covers topics such as algebra, straight lines and quadratics, sets and functions.
Entry requirements
The typical minimum entry requirements for a degree that includes a Foundation Year are 72-80 UCAS tariff points. The points must come from full A levels (not AS) or equivalent qualifications, for example BTEC Level 3 Diploma/Extended Diploma, CACHE Level 3 Diploma.

If you have other qualifications that are not included in the UCAS tariff we are happy to consider the suitability of these qualifications. You will also need to have a grade D or above (or an acceptable alternative) in GCSE English language and mathematics. For the most up-to-date information on 2018 entry requirements visit mmu.ac.uk/courses

If English is not your first language you will also need to have IELTS 5.5 (or an equivalent English language qualification). You will be placed on our Foundation Year International Route which provides additional English language, study skills and tutor support through the English for Academic Study Unit.

Applying for a Foundation Year
You will need to apply via UCAS. Degrees with a Foundation Year have their own unique UCAS codes which can be found on the UCAS website or by using Find a Course on our website at mmu.ac.uk/courses

“THE SCIENCE & ENGINEERING FOUNDATION YEAR AIMS TO GIVE THE FUNDAMENTAL ACADEMIC SKILLS AND KNOWLEDGE REQUIRED FOR SUCCESSFUL TRANSITION INTO DEGREE-LEVEL STUDY. OUR ACADEMIC AND PERSONAL SUPPORT HELPS TO BUILD YOUR CONFIDENCE AND STRENGTH IN YOUR OWN ABILITIES AND ADJUST TO UNIVERSITY LIFE AND STRUCTURE.”

Dr Saeed Abu-Zour
Foundation Year Coordinator, Faculty of Science and Engineering
Managing your time

You’ll typically study four units per year, though this can vary for some courses. Study is made up of three elements, so you’ll need to factor time into your weekly schedule for each.

1. Attendance at classes
This could include lectures, seminars, practical classes and tutorials.

2. Independent study
This is work you do on your own or in groups away from classes.

3. Assessment
This is the time you spend on preparing for, and participating in, assessments.

Modes of study

Teaching techniques vary from formal lectures to practical sessions, presentations and group activity, supported by the use of our online Moodle system which will also give you access to your own personalised timetable so you know where you’re supposed to be and when. You may find that this is a big shift from sixth form and A level study: the emphasis at University is on your management of your working week, though we are here to help and guide you.

Feedback

We have been quick to embrace latest technologies to enhance students’ learning. Our courses use the University’s virtual learning environment, Moodle. The system has a simple user interface and allows you to submit assignments, see your grades, receive feedback and access teaching materials, lecture notes and other resources. Some lecturers even provide quizzes for you to test your knowledge.

Assessment

You will be assessed by examinations and a range of continuous assessment including coursework assignments, in-class tests, oral presentations, reports on case studies, group work and online tests.
Where you will learn

The School of Computing, Mathematics and Digital Technology is part of the Faculty of Science and Engineering. Our home is the John Dalton building which is located in the centre of Manchester at our All Saints campus. We are a large School with our own teaching and research laboratories offering a fantastic working and learning environment for students.

Dedicated computer suites
The School has ten state-of-the-art teaching laboratories equipped with high-end PCs, Apple Macs and specialist software tools which work on the three main operating systems Windows, Linux and Mac OS. We also have a dedicated project laboratory with specialised software and equipment for advanced work in computer games, mobile computing and internet development.

Teaching facilities
You will be taught in specialist teaching facilities in environmentally sustainable buildings that are amongst the best of any university in the UK.

Our spacious lecture theatres and seminar rooms are equipped with the latest teaching and learning resources. Teaching takes place in specialist engineering labs and workshops, reinforcing the practical nature of the subject.

Usability lab
A unique facility which captures and analyses human behaviour as we interact with computers, mobile devices, websites, gadgets and video game consoles. The laboratory comprises of a mock living room, so users feel relaxed, and an observation suite. Video data is digitised in real-time and observed behaviours including user engagement are measured using heart rate monitors. Remote eye tracking hardware and software enables a range of data to be recorded from the fixation point of a user’s gaze to pupil dilation and scan paths.

“MY PLACEMENT AT ASTRAZENECA WAS TO DEVELOP AN INTERNAL PLATFORM USING JAVA AND C-SHARP TO MANAGE AND SHARE INFORMATION BETWEEN CHEMISTS. NOT ONLY WAS I ABLE TO DEVELOP MY PROGRAMMING SKILLS, I WAS ABLE TO IMPROVE MY COMMUNICATION SKILLS AS I REGULARLY HAD TO REPORT BACK TO SENIOR MANAGERS AND PRESENT TO THEM.”

David Crhonek
BSc (Hons) Software Engineering

COMPUTING ACCREDITATIONS

We are an educational affiliate of the British Computing Society (BCS), the Chartered Institute for IT in the UK.

The School of Computing, Mathematics and Digital Technology is an academic partner of the Institute of Information Security.

The School of Computing, Mathematics and Digital Technology is a member of the Oracle Academy.

We are an Academy of the Computer Technology Industry Association (CompTIA) and deliver their partner programme which provides a pathway for students towards a rewarding, high-growth IT career.

Information on accreditation correct at the time of print.
Kick-start your future career

At the heart of our curriculum and student support lies a real focus on developing skills to make you highly employable and an asset to any organisation.

Placements
Our placement years offer students the opportunity to increase practical and professional skills.

Many of our courses offer an industrial placement, an opportunity to be employed by an organisation for a minimum of 36 weeks. Placement years are undertaken between the second and final year of an undergraduate degree.

Doing a placement develops expertise and allows skills learned in the first years of your degree to be applied to solving a practical problem. A placement allows you to demonstrate that you are able to work and progress in a professional environment and apply the skills and knowledge learned in an academic environment to a practical situation.

Graduate employers also report that students who have been on a sandwich placement tend to be more mature, better organised and better able to apply their skills in a more structured way.

Studying and working abroad
Working and studying abroad can enhance your employability, helping you to develop your skills whilst experiencing other cultures and perspectives. Many of our courses offer an option to study abroad for three, six or ten months, at partner universities across the world including Europe, Australia, China and the USA. There may also be opportunities to undertake a work placement abroad as part of your degree. There are also summer exchange opportunities open to students of any discipline. For more information visit mmu.ac.uk/outgoingexchange

Skills for Employment
You will study a curriculum designed in conjunction with industry to equip you with the range of skills and strengths that employers demand. We have strong industry links and the four year sandwich route provides the opportunity to spend your third year on industry placement, boosting your employment prospects on graduation. You can also get involved with extracurricular activities to apply your skills, such as gaming events, hackathons and the Computing Society.
Studying in Manchester
Manchester is the birthplace of the UK computer industries and has made a name for itself as home to a number of famous inventors and innovators over the last 200 years. In the 19th Century, renowned mathematician, logician and computer scientist, Alan Turing developed the world’s first stored programmed computer in the city. With Manchester being a key player in the Northern regeneration agenda and a thriving centre for innovation, there has simply never been a better time for science in the city than today.

Employability Hub
A dedicated hub for careers and employability information to help you kick start your career thinking, research different career paths and make first-class applications.

Futures Skills Award
Discover new opportunities, sell your skills and stand out from the crowd with the Futures Skills Award, which gives you recognition for all of the extra-curricular activity you do.

Jobs4Students
Temporary, paid, on-campus work opportunities through the Jobs4Students service. Just sign up to the mailing list when you arrive and receive alerts when roles come up.

Global network
Leverage connections and develop professional relationships with our 270,000 alumni-strong network, spanning all professions and thousands of UK organisations.

“MY YEAR PLACEMENT IN INDUSTRY HELPED ME TO GET MORE EXPERIENCE AND WAS DEFINITELY THE RIGHT THING TO DO FOR ME. YOU COME BACK TO THE FINAL YEAR FEELING MORE REFRESHED AND READY TO MOVE ON WITH RENEWED ENTHUSIASM TO DO YOUR VERY BEST. THE SANDWICH YEAR GIVES YOU COMMERCIAL EXPERIENCE BUT ALSO A CHANGE OF SCENE.”

Mike Stephens
BSc (Hons) Computer Science

mmu.ac.uk/careers
Supporting your studies

We’re here to help you get the most out of your studies, with advice and guidance from specialist support staff and outstanding learning facilities.

**Student Hubs**
Student Hubs across our campus offer a first port of call for face-to-face guidance on course-related matters, as well as information about university services and facilities.

**Student support officers**
Student support officers provide support through group workshops and individual sessions, advising on everything from managing your time to revision techniques.

**Academic support**
Course unit leaders, programme leaders and personal tutors will give you all the course-specific help and guidance you need throughout your time here.

**Library**
A newly-refurbished, five-storey library open 24/7 during term time means access to over a million books, journals and e-resources whenever you need them. There’s also a helpdesk, technical and digital equipment to loan, electronic book returns and a café on site too.

**MyMMU**
Sector-leading virtual learning through Moodle, which brings together your student email, course timetable, teaching materials, reading lists, assessment marks and feedback accessed via the MyMMU app from your phone, laptop or tablet.

“**I DID A WORKSHOP TO HELP ME WITH MY REFERENCING AND ACADEMIC WRITING WHEN I FIRST STARTED UNIVERSITY. DOING THIS REALLY IMPROVED MY CONFIDENCE.”**

Aimee Cooper
BA (Hons) Inclusive Education and Disability Studies

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08:00 **Alarm**
Check Moodle for today’s timetable and try not to get too distracted by social media.

09:30 **First lecture**
Guest speaker provides plenty for us to think about over a coffee in the Hub Café afterwards.

11:30 **Meet with personal tutor**
Discuss latest assignment and chat about how I’m settling into life at uni... leaving plenty of time to meet friends for lunch at The Union.
14:00 Visit the library
Borrow a new textbook from the course reading list... and a laptop for 24 hours so I can make a few notes.

16:00 Hockey practice
Practice session with uni hockey team ready for next week's game.

20:00 Quiz night!
Off to The Union for a few drinks and maybe even finish the night with a win on the quiz!

Disability Service
Support for disabled students and students with specific learning difficulties, with Disability Service Advisers working with both current and prospective students. Our advisers can help with any screenings, assessments or funding you might need, or provide access to a host of internal and external resources.

Counselling and wellbeing
Talk to a professionally trained counsellor, in confidence, about any personal problems you may have. The team also runs workshops and courses on themes such as relaxation, stress management and confidence building.

Students' Union
Experienced, trained staff offering specialist, student-centred advice when you need it most. This includes practical help and support with academic issues, housing and finance. It's also free and independent.

mmu.ac.uk/students
Our courses are designed, led and taught by some of the UK’s leading academics. This means you’ll learn directly from passionate, knowledgeable individuals.

**Teaching expertise**
You will be taught and supervised by research-active academic staff, most of whom are at the forefront of their specialist field.

Many of the staff who teach in the School have experience of working in industry and have well-established links and contacts in their industry sector, ensuring your education and training is relevant for future employment.

Our teaching and research is supported by dedicated teams of highly skilled technical staff across all our subject specialisms in the Faculty of Science and Engineering.

[mmu.ac.uk/our-teaching](mmu.ac.uk/our-teaching)

("THE SCHOOL OF COMPUTING, MATHEMATICS AND DIGITAL TECHNOLOGY IS A VIBRANT COMMUNITY OF STAFF AND STUDENTS. WE PRIDE OURSELVES ON WORKING WITH STUDENTS AND EXTERNAL COLLABORATORS ON A PERSONAL LEVEL AND ARE COMMITTED TO DELIVERING HIGH-QUALITY TEACHING AND RESEARCH."

Keith Miller
Head of School of Computing, Mathematics and Digital Technology)
“I HAVE BEEN THE ADMISSIONS TUTOR FOR THE SCHOOL’S COMPUTING AND DIGITAL TECHNOLOGY COURSES AND THE LEADER OF THE BSC (HONS) COMPUTING DEGREE FOR SEVERAL YEARS. AS A RESULT OF THESE ROLES AND THROUGH MY TEACHING I’VE BEEN ABLE TO FOLLOW THE STUDENTS’ PROGRESS FROM THEIR ARRIVAL AT MANCHESTER MET THROUGH TO GRADUATION. SEEING THEIR HARD WORK AND DEVELOPMENT IS EXTREMELY GRATIFYING AS IS HEARING ABOUT THE CAREERS THAT STUDENTS HAVE BUILT AFTER LEAVING UNIVERSITY.”

Dr Andrew Schofield
BSc (Hons) Computing Course Leader & Computing & Digital Technology Admissions Tutor

“AM A READER IN COMPUTATIONAL INTELLIGENCE AND ALTHOUGH RESEARCH IS A BIG PART OF WHAT I DO, I HAVE ALSO TAUGHT AT ALL LEVELS IN THE SCHOOL OF COMPUTING, MATHEMATICS AND DIGITAL TECHNOLOGY. TEACHING AND SUPPORTING STUDENTS AND HELPING THEM PROGRESS IN THEIR CAREER TO FIND THEIR DREAM JOBS IS AMAZINGLY REWARDING AS THEY NOT ONLY DEVELOP THEIR COMPUTING SKILLS, BUT ALSO BECOME YOUNG PROFESSIONALS WHO MAKE A DIFFERENCE IN OUR SOCIETY.”

Dr Keeley Crockett
Reader in Computational Intelligence

Research
We conduct high quality research in areas such as intelligent systems, image and sensory computation, logic, peer-to-peer computing, computation, novel and natural computing, informatics and computational fluid dynamics, all of which adds to the resources and knowledge you can benefit from as an undergraduate.

Our research was rated ‘internationally excellent’ with some rated ‘world-leading’ in the most recent research assessment exercise. It helps to ensure that your teaching remains up-to-date in the latest developments in computing.

Our research is organised around broad, over-arching themes:
• Research in knowledge engineering covers artificial neural networks, machine learning, computational and fuzzy logic and conversational agents
• The novel computation theme includes molecular computing, synthetic computation and collective dynamics
• Researchers in networks and distributed systems focus on the intelligent management and optimisation of large-scale distributed systems and data-centric computing
• Work in image and sensory computation includes face and voice interpretation, human motion analysis and reconstruction, feature-based algorithms, 3D modelling and visualisation, computer animation, games technology and novel data analysis.
Greater Manchester has one of the largest student populations in Europe and we welcome international students from 120 countries to our University every year.

**Come and meet us**
Staff from our international office regularly visit countries across the world to meet students and provide advice about studying at the University and life in Manchester. You can also meet us online at our virtual events at [mmu.ac.uk/international](http://mmu.ac.uk/international).

**International qualifications**
You will be required to show you have a good level of English for entry to all courses. For most undergraduate courses, you will need to reach IELTS 6.0 or above with no less than 5.5 in any component. You can find country-specific information about many international qualifications at [mmu.ac.uk/international/your-country](http://mmu.ac.uk/international/your-country).

If you need to improve your English before you start your course, we can help. There are courses in general and academic English to help you reach the level you need. See [mmu.ac.uk/englishlanguagecourses](http://mmu.ac.uk/englishlanguagecourses).

**Making your application**
Applications are submitted through the Universities and Colleges Admissions Service (UCAS) at [ucas.com](http://ucas.com).

Many international and EU students use a recruitment consultant or education adviser. They will be able to tell you more about the University, offer support with your applications, and some will offer assistance with your visa and provide pre-departure briefings.

To check if there is a University-appointed education adviser in your country please visit our website.

**Your arrival**
We want to make sure your arrival at Manchester Met goes as smoothly as possible so we run a free airport pick-up scheme, which is available all year round. All new international students arriving at Manchester Airport when beginning their studies are eligible, but you may need to book depending on when you arrive.

Every September we run welcome events for international students, designed to help you meet other students and settle in at the University.

**Help when you need it**
The University’s student services team offers international students career advice, counselling and learning support. The Immigration and Welfare team provide confidential advice and guidance as well as regular workshops to help with renewing your visa.

**English language support**
We provide free English language support workshops. These will help improve your language skills, your confidence in classes and seminars, and help you achieve better results in projects and exams.

**International student tuition fees and scholarships**
Our international fees are competitive and the cost of living in the region is much lower than London and many other world cities. Tuition fees remain the same for each year of your degree and the University offers competitive scholarships for international students.

For up-to-date information, please visit our website: [mmu.ac.uk/international](http://mmu.ac.uk/international).
“STUDYING AT MANCHESTER METROPOLITAN UNIVERSITY HAS GIVEN ME THE OPPORTUNITY TO EXPERIENCE STUDENT LIFE IN A METROPOLITAN CITY AND IMMERSE MYSELF IN A COMPLETELY DIFFERENT CULTURE.”

“The campus is in a great location, close to the city centre and within walking distance of the train stations and university accommodation. Manchester Metropolitan has an Employability Hub, which provides many services such as CV writing workshops and the opportunity to meet employers. In addition, there are part-time job opportunities available on campus, which have helped me improve my CV.”

Wan Ling Lee
BA (Hons) Business and Spanish
Malaysia

I made it to Mcr Met. You can too!
It is important to find out as much as you can about our University and our courses and we look forward to meeting you at one of our Open Days and Applicant Visit Days.

**Open Days**
Open Days are your opportunity to get a feel for our campus and find out what University life is really like. We hold open days each year in June, October and November. These events provide you with the opportunity to meet current students, speak to tutors from the courses you are interested in, and see our superb university facilities for yourself. To ensure you get the most from your Open Day we recommend that you book a place in advance.

Watch our Open Day video at [mmu.ac.uk/study/undergraduate/visit](mmu.ac.uk/study/undergraduate/visit)

**Applicant Visit Days**
Once you have received an offer of a place from us, we will invite you to attend one of our Applicant Visit Days. These usually take place on Saturdays and Wednesdays from February to April. You can find out more about your courses, have tours to see where you will be taught, and meet subject tutors and current students for the course you have applied for. It is an important opportunity for you to find out anything else you would like to know before you make your decision.

**Online**
You’ll find lots of useful information on our website. You can ask us about our courses using our online course enquiry form or visit our Frequently Asked Questions section, which should answer many of the queries you have; or phone us on +44 (0)161 247 6969.

**Connect with us**
Facebook, Twitter, Instagram, YouTube, Snapchat

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“OPEN DAYS ARE GREAT FOR TALKING TO STUDENTS WHO ALREADY STUDY AT MANCHESTER METROPOLITAN. YOU CAN GET FIRST-HAND EXPERIENCE ABOUT WHAT IT IS LIKE TO STUDY YOUR SUBJECT, NOT JUST READ ABOUT IT.”

Todd Lewis-Ryan
BSc (Hons) Mathematics
Fact file

The information in this fact file is intended for courses starting in the 2018 academic year. The information in the online prospectus is the most detailed and up-to-date so make sure you check there when choosing which course to apply for.

The way in which GCSE qualifications are graded is changing. If you are expecting your GCSE English or mathematics qualification from a school or college in England from 2017 onwards and are unsure about any of the tariff points advertised in our course materials, please visit mmu.ac.uk/gcseadvice for more information.

<table>
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<tr>
<th>Degree title</th>
<th>Years of study</th>
<th>UCAS code</th>
<th>Typical entry requirements</th>
<th>Additional entry requirements</th>
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<tr>
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<td>4 full-time</td>
<td>L962</td>
<td>122-120</td>
<td>BCC-BBB, DMM. GCSE grade C or 4 in English language, science and mathematics. A-levels to include IT, Computing, Mathematics or Science related subject at minimum grade C. BTECs preferably IT, Computing or Science related with a merit grade achieved in key units. Applicants who do not meet the subject knowledge requirement may be offered the opportunity to sit an admissions test.</td>
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<td>G401</td>
<td>104-112</td>
<td>BCC-BBC, DMM. As above.</td>
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<tr>
<td>BSc (Hons) Computer Science with placement year</td>
<td>4 full-time</td>
<td>G401</td>
<td>104-112</td>
<td>BCC-BBC, DMM. As above.</td>
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<td>104-112</td>
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<td>4 full-time</td>
<td>G400</td>
<td>104-112</td>
<td>BCC-BBC, DMM. As above.</td>
</tr>
<tr>
<td>BSc (Hons) Software Engineering</td>
<td>3 full-time</td>
<td>G600</td>
<td>104-112</td>
<td>BCC-BBC, DMM. As above.</td>
</tr>
<tr>
<td>BSc (Hons) Software Engineering with placement year</td>
<td>4 full-time</td>
<td>G600</td>
<td>104-112</td>
<td>BCC-BBC, DMM. As above.</td>
</tr>
<tr>
<td>BSc (Hons) Computer Forensics and Security</td>
<td>3 full-time</td>
<td>G551</td>
<td>104-112</td>
<td>BCC-BBC, DMM. As above.</td>
</tr>
<tr>
<td>BSc (Hons) Computer Forensics and Security with placement year</td>
<td>4 full-time</td>
<td>G551</td>
<td>104-112</td>
<td>BCC-BBC, DMM. As above.</td>
</tr>
</tbody>
</table>

Selected degrees are available with a Foundation Year. For further information visit mmu.ac.uk/foundationyear

Check UCAS.com for the most up-to-date 2018 entry requirements.
APPLICATION PROCESS
We understand there can be a lot to think about when applying to university, so follow the steps outlined below and make a note of key dates and events to keep on track.

<table>
<thead>
<tr>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>WELCOME WEEK</strong></td>
</tr>
<tr>
<td><strong>MONDAY 17 SEPTEMBER</strong></td>
</tr>
<tr>
<td>Join us for Welcome Week and the start of term.</td>
</tr>
<tr>
<td><strong>APPROVAL FOR ACCOMMODATION</strong></td>
</tr>
<tr>
<td><strong>MARCH – SEPTEMBER</strong></td>
</tr>
<tr>
<td>Visit UCAS fairs and ucas.com</td>
</tr>
<tr>
<td><strong>CONFIRMATION RESULTS</strong></td>
</tr>
<tr>
<td><strong>OPEN DAY</strong></td>
</tr>
<tr>
<td><strong>WEDNESDAY 21 JUNE</strong></td>
</tr>
<tr>
<td>Secure your place at mmu.ac.uk/openday</td>
</tr>
<tr>
<td><strong>WRITE PERSONAL STATEMENT</strong></td>
</tr>
<tr>
<td><strong>SEPTEMBER – DECEMBER</strong></td>
</tr>
<tr>
<td>Put your UCAS application form together, taking time to create a great personal statement that really makes it stand out.</td>
</tr>
<tr>
<td><strong>APPLICATION PROCESS</strong></td>
</tr>
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<tr>
<td><strong>2018</strong></td>
</tr>
<tr>
<td><strong>UCAS DEADLINE</strong></td>
</tr>
<tr>
<td><strong>MONDAY 15 JANUARY</strong></td>
</tr>
<tr>
<td>Deadline for UCAS applications to guarantee your application will be considered. Courses may accept late applications.</td>
</tr>
<tr>
<td><strong>APPLY FOR STUDENT FINANCE</strong></td>
</tr>
<tr>
<td><strong>FROM JANUARY</strong></td>
</tr>
<tr>
<td>Apply for student finance. Visit gov.uk/student-finance for more information.</td>
</tr>
<tr>
<td><strong>APPLICANT VISIT DAYS</strong></td>
</tr>
<tr>
<td><strong>FEBRUARY – APRIL</strong></td>
</tr>
<tr>
<td>If we make you an offer you’ll be invited to attend an Applicant Visit Day to learn more about the course and facilities.</td>
</tr>
<tr>
<td><strong>RESPONSE TO APPLICATIONS</strong></td>
</tr>
<tr>
<td><strong>END MARCH</strong></td>
</tr>
<tr>
<td>We aim to respond to applications made by Monday 15 January by the end of March.</td>
</tr>
<tr>
<td><strong>APPLY FOR ACCOMMODATION</strong></td>
</tr>
<tr>
<td><strong>EARLY APRIL</strong></td>
</tr>
<tr>
<td>As soon as you’ve firmly accepted an Unconditional or Conditional offer of a place with us, you can apply for student accommodation.</td>
</tr>
<tr>
<td><strong>WELCOME WEEK</strong></td>
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<td><strong>MONDAY 17 SEPTEMBER</strong></td>
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<tr>
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<tr>
<td><strong>ACCOMMODATION CONFIRMATION</strong></td>
</tr>
<tr>
<td><strong>FRIDAY 31 AUGUST</strong></td>
</tr>
<tr>
<td>We’ll let you know if your accommodation application has been successful (and for which type of accommodation).</td>
</tr>
<tr>
<td><strong>RESULTS</strong></td>
</tr>
<tr>
<td><strong>JULY – AUGUST</strong></td>
</tr>
<tr>
<td>If you have a Conditional offer, your results will confirm if you’ve secured a place. Still looking for a place? Visit mmu.ac.uk/clearing</td>
</tr>
<tr>
<td><strong>DEADLINE FOR ACCEPTING PLACE</strong></td>
</tr>
<tr>
<td><strong>THURSDAY 31 MAY</strong></td>
</tr>
<tr>
<td>Deadline for accepting your place with us, if you received your last decision by 31 March.</td>
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<td>Deadline for applying for student finance via gov.uk/student-finance</td>
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<tr>
<td><strong>OPEN DAY</strong></td>
</tr>
<tr>
<td><strong>SATURDAY 21 OCTOBER</strong></td>
</tr>
<tr>
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<tr>
<td><strong>OPEN DAY</strong></td>
</tr>
<tr>
<td><strong>SATURDAY 14 OCTOBER</strong></td>
</tr>
<tr>
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</tr>
</tbody>
</table>

For information on the process for international students visit mmu.ac.uk/international