

# Programme Specification and Curriculum Map for MSc Computer Networks



1. Programme title	MSc Computer Networks
2. Awarding institution	Middlesex University
3. Teaching institution	Middlesex University
4. Programme accredited by	BCS – CITP & CSI
5. Final qualification	Masters of Science
6. Academic year	2014-2015
7. Language of study	English
8. Mode of study	Full-time and Part-time

## 9. Criteria for admission to the programme

A minimum of a second-class Honours degree (UK), or an equivalent overseas qualification – in computer science or in a science or engineering subject. Candidates with other degrees but with relevant work experience will also be considered and are encouraged to apply. **International students** whose first language is not English or who have not been taught in the English medium throughout, and whose first degree is not from a British university, must achieve an IELTS score of 6.5 or TOEFL 575 (paper based) 233 (computer based).

**Note:** University policies supporting students with disabilities apply, as described in the University Regulations, 'Information for Students with Disabilities'.

## 10. Aims of the programme

The programme aims to:

- A rigorous theoretical knowledge and understanding of current research issues as well as detailed practical experience of network design, development, implementation, operations, applications, systems and services. Skills that will enable students to contribute to future developments in the field of Network design and implementation.
- The ability to make a critical evaluation of the theories, techniques and systems used in planning, design, implementation, security and

disaster discovery of modern communication networks as well as the services they support.

- Skills required in developing research as well problem-solving techniques through practical project experience. By extending students knowledge and skills in a specialized area they will be prepared for careers in advanced research and/or industry
- The ability to involve both management and user in the process of awareness, decision and implementation with regard to computer Networks as well as evaluating the security risks.
- The ability to evaluate the performance of wired and wireless computer networks using analytical and/or simulation tools and manage the implementation of a complete communication design project.
- Knowledge and understanding of the legal, social, ethical and professional issues related to network design and development

## **11. Programme outcomes**

### **A. Computing-related cognitive abilities**

On completion of this programme the successful student will be able to

1. Critically evaluate the communication needs of an organisation and apply both formal and informal methods to the design of a computer network to meet the requirement specification
2. Understand, design and evaluate the performance of a communication network using modelling and simulation techniques
3. Apply network management concepts to real world systems
4. Analyse and formulate solutions to the security threats of complex distributed networks
5. Provide a critical analysis and understanding of key concepts in the operation and deployment of network systems and services.
6. Understand and use advanced routing protocols and route optimization techniques
7. Critically evaluate the legal, social, ethical and professional implications of network design and development in general and in specific context.
8. Use a combination of general and specialist computer communications knowledge and understanding to apply an existing or emerging technology to the solution of a practical problem through the completion of an individual project

## **Teaching/learning methods**

Students learn knowledge, gain understanding and develop cognitive skills and abilities through self directed study, resource based learning, small group discussions, small group and individual exercises, laboratory sessions, demonstration software, on-line examples and research project. Weekly seminar sessions that provide students with the opportunity to address questions, queries and problems.

- Traditional lecture delivery (outcomes 1-7),
- Group and individual research, presentations and written reports (outcomes 1-8),
- Laboratory sessions (outcome 2, 5 & 6),
- Individual and group design work (outcomes 3, 4, 5, and 8),
- Individual project. Throughout the students are encouraged to undertake independent reading both to supplement and consolidate what is being taught/learned and to broaden their individual knowledge and understanding of the subject (outcomes 1-8).

## **Assessment**

Group and individual coursework, presentations, group and individual reports, and the unseen examination and the project thesis assess students' knowledge and understanding.

- Outcomes 1-7 assessed by examination.
- Outcomes 2,5 and 6 are assessed by laboratory sessions and practical assignments

Outcome 1-8 is assessed by individual essay and final project thesis.

## **B. Computing-related practical abilities**

On completion of this programme the successful student will be able to

1. Design, implement and configure computer networks
2. Draw up system level agreements for computer networks
3. Critically evaluate computer communication system performance and recommend improvements supported with evidence/arguments
4. Simulate an existing/proposed computer communication system and propose improvements
5. Design and build usable computer communication systems using a methodological approach
6. Develop security plans and policies and deploy appropriate safeguards for networked systems.

### **Teaching/learning methods**

Students gain practical skills through

- Group and individual research, presentations and written reports (outcomes 1-6)),
- Small group and individual exercises (outcomes 1-6),
- Laboratory sessions (outcome 1, 4-5),
- Individual project (outcomes 1-6: depending on project title).

Analysis, design and problem solving skills are further developed through various design activities as well as case studies, and extensive computer laboratory sessions. Feedback is given to students on all assessed coursework as well as written exams (in the form of exam reports produced each term).

### **Assessment**

Students' practical abilities are assessed through

- Group and individual coursework (outcomes 1-6)
- Laboratory tests (outcome 1, 4-5),
- The unseen examination (outcomes 1-6), and
- The project thesis (outcomes 1-6 depending on project title).

### **C. Additional Transferable Skills**

On completion of this programme the successful student will be able to

1. Understand and apply mathematical techniques in relevant context.
2. analyse a problem systematically and implement an effective solution both individually and within a group
3. Communicate effectively (in writing, verbally and through graphical notations)
4. Effectively manage resources and time
5. Learn independently in familiar and unfamiliar situations with open-mindedness and in the spirit of critical enquiry
6. Learn effectively for the purpose of continuing professional development in a wider context throughout their career
7. Take personal responsibility for a range of activities and make decisions within an individual or group task context.
8. Understand the legal, social, ethical and professional issues related to network design and development.

#### **Teaching/learning methods**

Students gain transferable skills through the teaching and learning programme outlined above. These skills are also nurtured through

- Small group and individual presentations and exercises (outcome 3-8),
- Laboratory sessions (outcomes 1, 4, and 7)
- The individual project (outcomes 1-8)

#### **Assessment**

Students' transferable skills are generally assessed through coursework reports and the thesis report

- Skills 1-8 are assessed through coursework and written exam (seminars)
- Skills 2-4 and 7 are assessed by laboratory sessions.

## **12. Programme structure (levels, modules, credits and progression requirements)**

### **12. 1 Overall structure of the programme**

The programme is designed as a full-time course including industrial placement where applicable, or as a part-time programme. The normal University year is split into two terms of approximately 24 weeks each and students can start the programme in either Autumn term (September) or winter term (Late January/February).

The programme conforms to the requirements of the New Academic Learning Framework (NLF) of Middlesex University and comprises four taught modules (each worth 30cps), a project research method module, and a final project module (worth 60cps). Each 30cps module involves approximately 180 hours of study. This includes attendance at lectures, tutorials, laboratory activities and study at home or in industry. All modules on the programme are compulsory.

1. Full-time students joining the programme in September pursue the following study schedule:

- ❖ Four modules (totalling 120cps) for Autumn Term start (September)
- ❖ One research skill module (0 cps) for Autumn/Winter terms (weeks 6 to 18)
- ❖ Undertake the postgraduate project module (60cp) in the Summer Term

Students who enrol in September may be able to complete their project over the following Spring term, thereby completing the programme in one year.

2. Full-time students joining the programme in January pursue the following study schedule:

- ❖ Four modules (totalling 120cps) For Winter start Term (January)
- ❖ One research skill module (0 cps) for Winter/Spring terms (weeks 6 to 18)
- ❖ Undertake the postgraduate project module (60cp) in the Autumn Term

Students who enrol in January may be able to complete their project over the following Autumn, thereby completing the programme in one year.

3. Part-time students joining the programme in September pursue the following study schedule:
  - ❖ Two module (60cps) in the Autumn Term of the 1<sup>st</sup> year
  - ❖ Two module (60cps) in the Autumn Term of the 2<sup>nd</sup> year
  - ❖ One research skill module (0 cps) for Autumn/Winter terms (weeks 6 to 18) of 2<sup>nd</sup> year
  - ❖ Undertake the postgraduate project module (60cp) in the Spring and Autumn Terms of the 2<sup>nd</sup> year
  
4. Part-time students joining the programme in January pursue the following study schedule:
  - ❖ Two module (60cps) in the Winter Term of the 1<sup>st</sup> year
  - ❖ Two module (60cps) in the Spring Term of the 2<sup>nd</sup> year
  - ❖ One research skill module (0 cps) for Winter/Spring terms (weeks 6 to 18) of 2<sup>nd</sup> year
  - ❖ Undertake the postgraduate project module (60cp) in the Spring and Autumn Terms of the 2<sup>nd</sup> year

Students must successfully complete all the modules of the taught part of the programme before they can register for the Project Module.

Examinations for taught modules take place at the end of the Winter and Spring Terms only, with a reassessment opportunity before the start of the Autumn Term. There are no examinations at the end of the Autumn Term.

The duration of postgraduate project is one term for full-time and two terms for part-time students.

The general teaching and learning strategy for taught modules is a lecture programme, with a module handbook, handouts and tutorial material supported by seminar sessions and practical laboratory activities and extended exercises for private study.

Projects should be appropriate to the Programme studied (i.e. Computer Networks) and supervised accordingly. All project proposals must be approved by the project supervisor assigned by project module leader or a member of the academic team delegated by him/her.

Details of each module can be found on Unihub or in relevant module handbook, accessible from School or in the Science and Technology Subject Handbook.

**12.2 Levels and modules**  
 Starting in academic year 2010/11 the University is changing the way it references modules to state the level of study in which these are delivered. This is to comply with the national Framework for Higher Education Qualifications. This implementation will be a gradual process whilst records are updated. Therefore the old coding is bracketed below.

**Level 7 (4)**

<b>COMPULSORY</b>	<b>OPTIONAL</b>	<b>PROGRESSION REQUIREMENTS</b>
<p>Students must take all of the following:</p> <p><b>CCM4300</b> (30cps) Computer Networks, Wireless and Mobile Communication Systems</p> <p><b>CCM4310</b> (30cps) Network Design, Modelling and Simulation</p> <p><b>CCM4320</b> (30cps) Network Systems and Services</p> <p><b>CCM4332</b> (30cps) Network Security</p> <p><b>CCM4901</b> (0cps) Project Research and Communication Skills</p> <p><b>CCM4902</b> (60cps) Postgraduate Project in Computer Communications</p>	<p><b>NONE</b></p>	<p><b>Students must <u>pass all the taught modules and including CCM4901</u> before they can progress onto the project.</b></p> <p><b>To pass a module, students must pass all components of assessment (i.e. examinations, coursework)</b></p>

**12.3 Non-compensatable modules (note statement in 12.2 regarding FHEQ levels)**

<b>Module Level</b>	<b>Module Code</b>
Level 7	CCM4901
Level 7	CCM4902



## 14. Information about assessment regulations

Compulsory modules are those that must be taken; that is, the qualification cannot be made unless these modules have been successfully completed.

Each of these modules makes a unique contribution to the learning objectives of the programme or subject major/minor.

<sup>1</sup>Optional modules are modules that may be taken at the discretion of the student. It is not necessary to complete optional modules to achieve the award (assuming other awarding conditions are met). Optional modules make a non-unique contribution to the achievement of the learning objectives of the programme or subject major/minor.

- Information on how the University formal assessment regulations work, including details of how award classifications are determined, can be found in the University Regulations at [www.mdx.ac.uk/regulations/](http://www.mdx.ac.uk/regulations/).
- Modules are assessed in accordance with the School of Engineering and Information Sciences' assessment strategy. Most modules adhere to a standard pattern of final grades being made up of 70% from examination and 30% coursework. Different patterns are permitted if approved by the School Academic Planning Committee.
- Practical aspects of the programme are often assessed via coursework that may be carried out using specialist software and may include lab tests.
- Theoretical material is normally assessed by coursework only at levels 0 and 1 and normally by a combination of both coursework and examination at levels 2, 3 and 4.
- Grades are awarded on the standard University scale of 1–20, with Grade 1 being the highest. To pass a module all components, both coursework and examination, must be passed individually with a minimum grade of 16. Failure in one of the components will result in the failure of the module.

For additional information on assessment and how learning outcomes are assessed please refer to the individual module narratives for this programme.

### **15. Placement opportunities, requirements and support (if applicable)**

- Industrial placement is an option available for students who wish to work in industry for a maximum period of 12 weeks. During this period students are expected to work on their project, part of which should be relevant to the company where the placement is arranged.
- Industrial placement is conditional on the successful completion of all taught modules. Therefore 120 credits at level four need to be successfully completed before embarking on an industrial placement.
- The campus Placement Office manages University-industry relations and assists students in obtaining industrial placements. Further information on placement opportunities can be obtained there. Students are visited by an academic from the programme team at least once.

Postgraduate placements are normally a student initiated process for which the University will provide support

### **16. Future careers (if applicable)**

All programmes in the School of Science & Technology – their curricula and learning outcomes – have been designed with an emphasis on currency and the relevance to future employment.

- Campus Careers Offices can be found on each campus for advice, support and guidance.
- The majority of graduates are employed in IT posts relevant to the subject.
- Over 20% of students pursue further postgraduate study or research.
- The School has an Industrial Advisory Group which meets to advise and inform the School.

The employer links with the School are encouraged and take part in a number of ways: by inviting practitioners from industry as guest speakers in lectures; through links with companies where students are employed as part of their Industrial placement and alumni both in the UK and overseas.

## 17. Particular support for learning (if applicable)

The School's Teaching and Learning Strategy is compliant with that of the University; it aims to develop learner autonomy and to encourage resource-based learning.

In support of the student learning experience:

- All new students go through an induction programme and some have early diagnostic numeric and literacy testing before starting their programme. Learning Resources provide workshops for those students needing additional support in these areas.
- Students are allocated a personal email account, secure networked computer storage and dial-up facilities.
- New students are provided with a CD containing the schools Subject Handbook at enrolment (electronic copies for all students can also be found on Unihub).
- Each term new and existing students are given module handbooks for each module they study. Soft copies of all module handbooks on a CD will also be provided to students at enrolment. Web-based learning materials are provided to further support learning
- Extensive library facilities are available on all campuses. WebCT pages are available as learning resources through the Oasis system.
- Campus Student Offices offer advice and support to students through their Student Advice Centres.
- A Dean of Students for general academic advice is available on each campus.
- High quality specialist laboratories equipped with industry-standard software and hardware are available for formal teaching and personal study.
- To provide assistance and guidance in support of particular learning needs, campus-based, drop-in sessions are arranged by the School as needed.
- School Academic Advisors for each subject are available to offer personal academic advice and help. Rotas for the operation of Academic Advice Rooms at each campus can be found at the Unihelp.
- Tutorial sessions for each module, organised for groups of up to 20 students, are provided for additional teaching support.
- Formative feedback is given on completion of student coursework.
- Past exam papers with solutions and marking schemes for all modules are available for students in module handbooks and on the

Unihub.

- In undergraduate programmes students can exercise choice and take responsibility for their particular learning: at level 1 (in the second term of study) an elective module can be taken from another subject; at levels 2 and 3 there are options for choosing specialist modules with some forming a pathway that forms part of the degree title.

Research activities of academic staff feed into the teaching programme, which can provide individual students with ad hoc opportunities to work with academics on some aspect of research.

Middlesex University encourages and supports students with disabilities. Some practical aspects of Engineering and Information Systems programmes may present challenges to students with particular disabilities. You are encouraged to visit our campuses at any time to evaluate facilities and talk in confidence about your needs. If we know your individual needs we'll be able to provide for them more easily. For further information contact Sobia Hussain at the Disability Support Service (email: [s.hussain@mdx.ac.uk](mailto:s.hussain@mdx.ac.uk))

<b>18. JACS code (or other relevant coding system)</b>	G420
<b>19. Relevant QAA subject benchmark group(s)</b>	Computing

## **20. Reference points**

The following reference points were used in designing and reviewing the programme:

- QAA Framework for Higher Education Qualification in England, Wales and Northern Ireland
- QAA Computing subject benchmarks
- QAA/QAAS guidelines for programme specification
- QAA Code of Practice for the assurance of academic quality and standards in HE
- University' Policy, Regulations and guidelines
- British Computer Society (BCS) Guidelines for Exemption and Accreditation
- Module Narratives
- Middlesex University and School of Science & Technology
- Teaching Learning and Assessment policies and strategies
- University policy on equal opportunities

**21. Other information**

Middlesex University has formal links with 250 institutions world-wide, including student exchange agreements with more than 100 institutions. Currently a number of students both from the UK/EU and overseas take part in such exchanges.

Please note programme specifications provide a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve if s/he takes full advantage of the learning opportunities that are provided. More detailed information about the programme can be found in the student programme handbook and the University Regulations