MSc Computer Networks and Network Design

Programme Specification

1. Programme title	MSc Computer Networks and Network Design
2. Awarding institution	Middlesex University
3. Teaching institution	Middlesex University: London Middlesex University: Mauritius
4. Details of accreditation by professional/statutory/regulatory body	
5. Final qualification	MSc Computer Networks and Network design, PGDip Computer Networks and Network design & PGCert Computer Networks and Network design
6. Year of validation **Year of amendment**	2019/20
7. Language of study	English)
8. Mode of study	Full-Time & 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 related subjects. Candidates with other degrees but with relevant work experience may also be considered and are encouraged to apply.

Whilst consideration of Recognition of Prior Learning (RPL) has been given, the programme team decided that it will not be accepted for candidates admitted onto this programme.

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 with a minimum score of 6 in each band.

10. Aims of the programme

The programme aims to equip students with:

- 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 network systems as well as the services they support.

- The skills required in developing research as well problem-solving techniques through practical project experience. By extending students' knowledge and skills in a specialised area they will be prepared for careers in advanced research and/or industry

- The ability to involve both management and users in the process of awareness, decision and implementation with regard to Computer Networks and Network Design 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.

- The knowledge and understanding of the legal, social, ethical and professional issues related to network design and development

11. Programme outcomes*

A. Knowledge and understanding	**Teaching/learning methods**
On completion of this programme the successful student will have knowledge and understanding of : 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	Students gain knowledge and understanding 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.

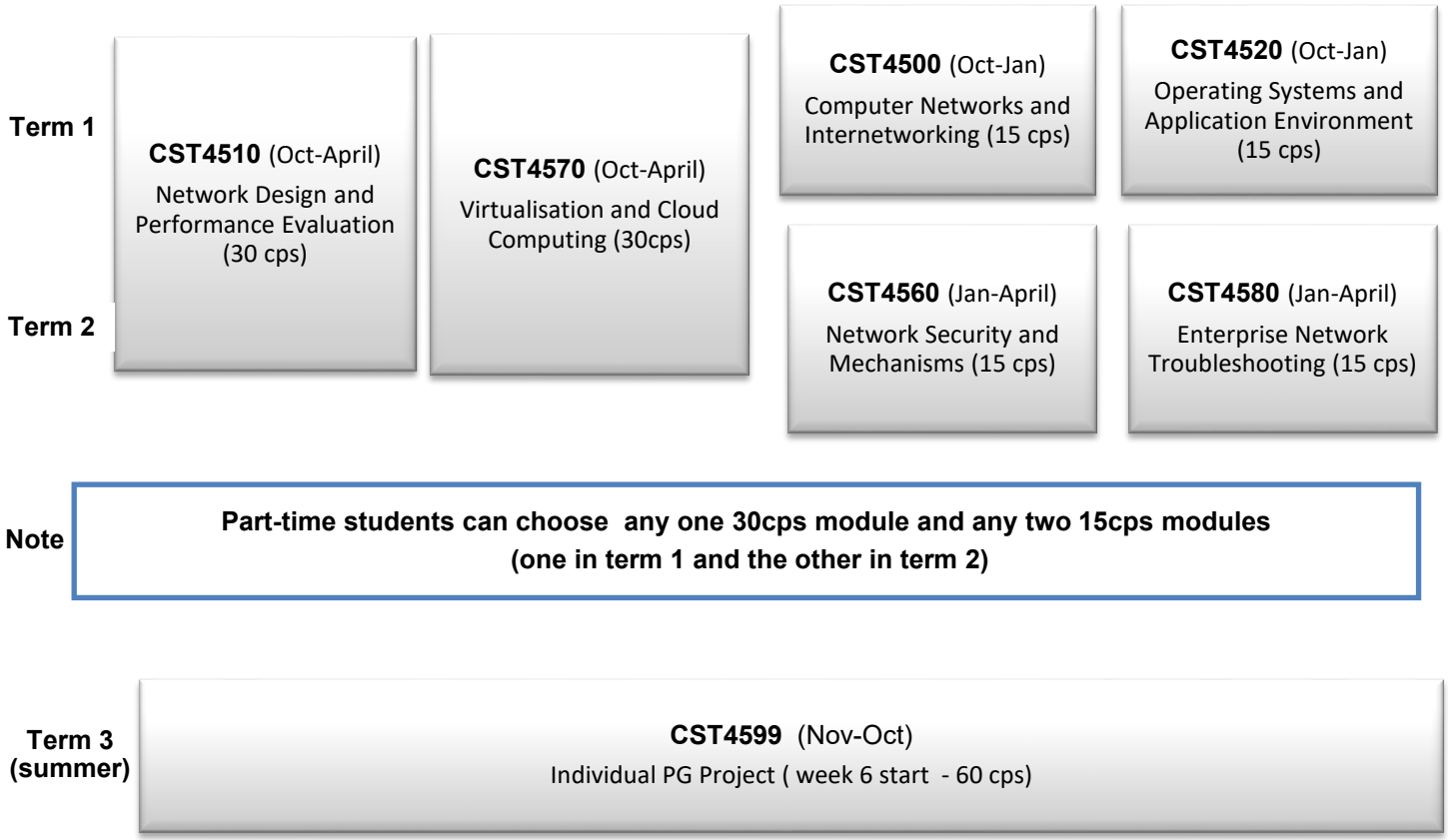
2. understanding, designing and evaluating the performance of a communication network using modelling and simulation techniques 3. applying network management concepts to real world systems 4. analysing and formulating solutions to the security threats of complex distributed networks 5. providing a critical analysis and understanding of key concepts in the operation and deployment of network systems and services. 6. understanding and using advanced routing protocols and route optimisation techniques 7. critically evaluating the legal, social, ethical and professional implications of network design and development in general and in specific context. 8. understanding and applying mathematical techniques in relevant context. 9. using 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 10. to apply technical strategies, tools and techniques to design, test and evaluate networks	• Traditional lecture delivery (outcomes 1-7), • Group and individual research, presentations and written reports (outcomes 1-9), • Laboratory sessions (outcome 2, 5 & 6), • Individual and group design work (outcomes 3, 4, 5, 8 and 9), • 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 1-10). **Assessment methods** Students' knowledge and understanding is assessed by: 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, 6 and 9 are assessed by laboratory sessions and practical assignments Outcome 1-8 is assessed by individual essay and final project thesis.
B. Skills On completion of this programme the successful student will be able to:	**Teaching/learning methods** Students learn cognitive skills through

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. 7. Analyse a problem systematically and implement an effective solution both individually and within a group 8. Communicate effectively (in writing, verbally and through graphical notations), 9. Effectively manage resources and time 10. Learn effectively for the purpose of continuing professional development in a wider context throughout their career 11. Take personal responsibility for a range of activities and make decisions within an individual or group task context.	• Group and individual research, presentations and written reports (outcomes 1-11), • Small group and individual exercises (outcomes 1-9), • Laboratory sessions (outcome 1, 7-11), • Individual project (outcomes 1-11: 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 methods** Students' cognitive skills are assessed by: • 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) • Skills 7-11 are assessed through coursework and written exam (seminars) • Skills 8-11 are assessed by laboratory sessions.

12. Programme structure (levels, modules, credit points (CPS) and progression requirements)

12. 1 Overall structure of the programme

Your Modules
Full-Time/ Part-Time



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)

COMPULSORY	OPTIONAL	PROGRESSION REQUIREMENTS
Students must take all of the following: **CST4500:** Computer Networks and Internetworking **CST4510:** Network Design and Performance Evaluation **CST4520:** Operating Systems and Application Environment **CST4570:** Virtualisation and Cloud Computing **CST4560:** Network Security and Mechanisms **CST4580:** Enterprise Network Troubleshooting **CST4599:** Individual PG Project	NONE	**Students must pass all the taught modules and submit a formal proposal before they can progress onto the project.** **To pass a module, students must pass all components of assessment (i.e. examinations, coursework)**

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

Module level	Module code
7	CST4510: Network Design and Performance Evaluation
7	CST4599: Individual PG Project

13. Curriculum map

See attached.

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.

- 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/.
- Modules are assessed in accordance with the Faculty of Science and Technology assessment strategy. Most modules adhere to a standard pattern of final grades being made up of examinations and/or coursework.
- 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 a combination of both coursework and examination at level 7.
- Grades are awarded on the standard University scale of 1–20, with Grade 1 (80-100%) being the highest. To pass a module all components, both coursework and examination, must be passed individually with a minimum grade of 16 (40%). 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

- 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 7 need to be successfully completed before embarking on an industrial placement.
- The campus Placement Office manages University-industry relations will assist 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.

Note: Placements are normally a student initiated process for which the University will provide support.

16. Future careers (if applicable)

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

- Campus Career Offices can be found on 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 Faculty has an Industrial Advisory Group which meets to advise and inform the department and the faculty.

The employer links with the faculty 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)

In support of the student learning experience:
please check this link: http://unihub.mdx.ac.uk/study

- The Faculty's teaching and Learning Strategy is compliant with those of the University, in seeking to develop learner autonomy and resource-based learning. In support of the students learning experience:

- All new students go through an induction programme and some have early diagnostic numeric and literacy testing before starting their programme. The Learner Development Unit (LDU) provides one-to- one tutorials and 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
- A programme handbook is made available to students at enrolment (electronic copies for all students are available via virtual learning environment).
- New and existing students are given module handbooks for each module they study. Soft copies of all module handbooks can be found on Unihub. Web-based learning materials are provided to further support learning.
- Extensive library facilities are available at the base campus.
- Students can access advice and support on a wide range of issues from the Student Services Counter and the Student Information Desk. Student Advisers aligned to subject areas offer confidential one to one advice and guidance on programme planning (if applicable) and regulations.
- High quality specialist laboratories equipped with industry standard software and hardware where appropriate, for formal teaching as well as self-study.
- 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 for all modules (which are assessed by examination) are available for students via Unihub.
- Research activities of academic staff feed into the teaching programme, which can, on some occasions, provide an opportunity for students to work with academics on some aspect of research.

Middlesex University encourages and supports students with disabilities. Some practical aspects of Faculty of Science & Technology 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 the Disability Support Service (email: disability@mdx.ac.uk).

18. JACS code (or other relevant coding system)	011I107
19. Relevant QAA subject benchmark group(s)	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
- Middlesex University and School of Science & Technology
- Teaching Learning and Assessment policies and strategies
- University policy on equal opportunities.

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 rest of your programme handbook and the university regulations.

Curriculum map for *[MSc Computer Networks and Network Design Programme]*

This section shows the highest level at which programme outcomes are to be achieved by all graduates, and maps programme learning outcomes against the modules in which they are assessed.

Programme learning outcomes

Knowledge and understanding	
A1	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
A2	Understand, design and evaluate the performance of a communication network using modelling and simulation techniques
A3	Apply network management concepts to real world systems
A4	Analyse and formulate solutions to the security threats of complex distributed networks
A5	Provide a critical analysis and understanding of key concepts in the operation and deployment of network systems and services.
A6	Understand and use advanced routing protocols and route optimization techniques
A7	Critically evaluate the legal, social, ethical and professional implications of network design and development in general and in specific context.
A8	Understand and apply mathematical techniques in relevant context.
A9	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
A10	to apply technical strategies, tools and techniques to design, test and evaluate networks
Skills	
B1	Design, implement and configure computer networks

B2	Draw up system level agreements for computer networks
B3	Critically evaluate computer communication system performance and recommend improvements supported with evidence/arguments
B4	Simulate an existing/proposed computer communication system and propose improvements
B5	Design and build usable computer communication systems using a methodological approach
B6	Develop security plans and policies and deploy appropriate safeguards for networked systems.
B7	Analyse a problem systematically and implement an effective solution both individually and within a group
B8	Communicate effectively (in writing, verbally and through graphical notations),
B9	Effectively manage resources and time
B10	Learn effectively for the purpose of continuing professional development in a wider context throughout their career
B11	Take personal responsibility for a range of activities and make decisions within an individual or group task context.

Programme outcomes																				
A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11
Highest level achieved by all graduates																				
7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7

Module Title	Module Code by Level	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11
Computer Networks and Internetworking	CST4500	✓	✓	✓					✓	✓		✓	✓				✓	✓	✓	✓		
Network Design and Performance Evaluation	CST4510	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓		✓		✓
Operating Systems and Application Environment	CST4520	✓	✓	✓		✓	✓			✓	✓	✓	✓	✓		✓		✓			✓	✓
Network Security and Mechanisms	CST4560	✓		✓	✓		✓		✓								✓	✓				
Virtualisation and Cloud Computing	CST4570		✓			✓		✓		✓				✓			✓	✓		✓	✓	✓
Enterprise Network Troubleshooting	CST4580				✓	✓					✓	✓	✓	✓	✓		✓		✓			
Individual PG Project	CST4599	✓	✓			✓		✓	✓	✓	✓				✓	✓	✓	✓	✓	✓	✓	✓