BSc Honours Computer Networks

Programme Specification

1. Programme title	BSc Honours Computer Networks
2. Awarding institution	Middlesex University
3. Teaching institution	Middlesex University: Hendon Middlesex University: Malta Hong Kong University: SPACE Middlesex University: Mauritius
4. Details of accreditation by professional/statutory/regulatory body	
5. Final qualification	BSc Honours, DipHE and CertHE
6. Year of validation **Year of amendment**	2018/19 2019/20
7. Language of study	English
8. Mode of study	Full Time & Part Time

9. Criteria for admission to the programme

Student should have the equivalent of 96 UCAS Tariff points to gain entry to level 4. All candidates should possess at least grade C in GCSE Maths and English language, or equivalent. For direct entry to levels 5 & 6 the student is required to pass the equivalent of 120 credits specified in the programme at levels 4 & 5, respectively. You will be expected to demonstrate the programme learning outcomes have been met at these levels, for example by attainment of industrially based qualifications such as Cisco Certified Network Associate/ Professional.

Mature applicants with relevant work experience are also welcome to apply for Direct entry at levels 4 and 5. These applicants are required to submit a portfolio of work experience to show evidence of achieving relevant learning outcomes, and these will vary depending on both the programme and level the student is applying for. Evidence should comprise the applicant's own work and may include documents they have written, procedures they have designed, proposals they have drafted, electronic resources, photographs, video and/or information gathered from others about you such as statements from employers, certificates of in-house courses completed.

Further guidance may be obtained from the Programme Leader or Director of Programmes.

International students who have not been taught in the English medium must show evidence of proven ability in English such as IELTS grade 6.0. The University provides pre-sessional English language courses throughout the year for candidates who do not meet the English requirements. University policies supporting students with disabilities apply, as described in the University Regulations

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10. Aims of the programme

The programme aims to:
allow students to develop a significant range of networking skills highly valued and sought-after by the international network sector. These skills include the creation of networks meeting specific needs and purposes, and configuration of a variety of networks for secure operation. Students will also learn about the fundamentals of data communications theory and practice. Wherever appropriate, modern laboratories equipped with industry-standard equipment and network development tools will support the development of these skills. Access to the laboratories may be restricted as a result of Covid-19, but where this is the case and where possible, practicals will be delivered online via live demonstrations.

The primary educational aim is to produce graduates fully prepared for a range of careers in network technology and network deployment, and capable of progressing to postgraduate study in networking.

11. Programme outcomes*

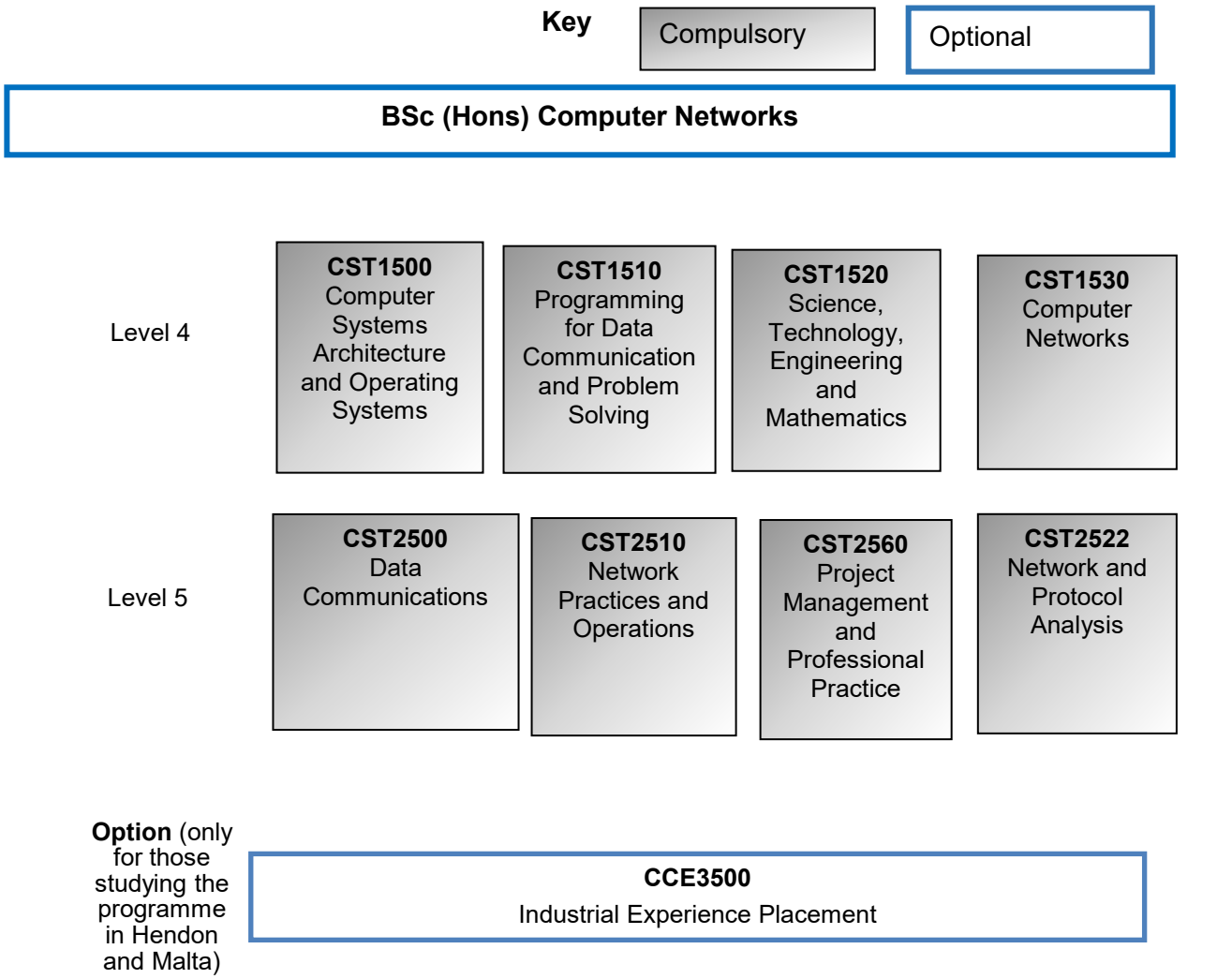
A. Knowledge and understanding	**Teaching/learning methods**
On completion of this programme the successful student will have knowledge and understanding of : 1. Mathematics, physics, wireless, and communication principles relevant to the analysis and solution of a range of digital and computer communication, wireless networking and telecommunication systems. 2. The principal, computational concepts, scientific and engineering principles required to analyse and model routine networked systems, products and processes. 3. Criteria of quality and performance relevant to networked systems applications, design, construction or operational contexts	The curriculum has been designed to offer the opportunity of an orderly academic progression between levels of study within identifiable computer network and related themes. At Level 4, modules address the conceptual, technical and mathematical underpinnings of the study of computer networks using SOBs (Students' Observable Behaviour). A1 and A2 are introduced in contexts relating to networks and computer communication by means of lectures, seminars and laboratories will be delivered online and or on campus depending on campus access. Set tasks are used to engender confidence and proficiency within the particular topics addressed. Elements of A3, A4 and A6 are addressed to motivate initial understanding and to place technical topics into a wider context. Wherever case studies or problems concerning networks at system- (rather than topic-level) are

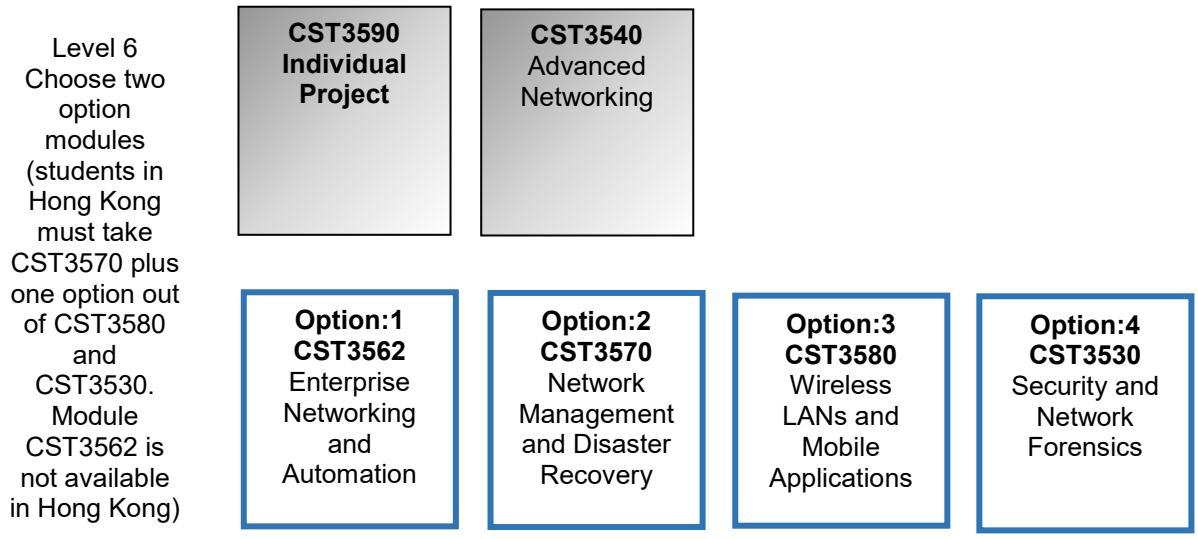
4. The relevance and ramifications of a *range* of professional, legal, managerial, business, organisational, ethical, social and sustainability considerations relevant to the practice of the network based systems professional. 5. The significance, role and function of networked systems within society and the operational, material environment within which they will be expected to practise. 6. The business, organisational and management techniques relevant to those engaging in enterprise and the production of network systems, products and processes, and evaluation of the security of a networked system. 7. The core principles, processes and methods of design and how to apply these in the design of specific computer communication and network systems and processes.	addressed, additional learner support is offered by tutors. Problem solving and design tasks are used in seminars to reinforce and deepen understanding, and students are given the opportunity of practically applying theory in laboratory tasks and seminars. At Level 5, there is significant horizontal integration of learning materials; for example networking concepts and terminology are introduced in one module, and in another real life scenarios (such as error correction and control) are used to deepen and refine understanding. At Level 5, further material addressing A1, A2 and A5 is introduced. Topics introduced typically involve an increasingly systems level content and orientation as modules progress and there is an increasing emphasis on design, problem solving and analysis. Progressively increasing levels of appreciation of quality (A3) and performance aspects of products and processes is also encouraged and expected in seminar work and coursework at Levels 5 & 6. Students undertake group project work addressing the development of A4, A5 and A7 in focussing on aspects of the project life cycle of a specific network system. The project is designed to allow students to integrate and contextualise their A1, A2 and A5 understanding and abilities in a supportive and semi-structured environment. At Level 6, students are expected to consolidate their understanding of new material and to take greater responsibility for the selection of methodology needed to analyse, synthesise and evaluate particular systems, processes and products in a range of contexts (A5, A6 & A7). **Assessment methods** Students' knowledge and understanding is assessed by Outcomes A1, A2, A5 are assessed using SOBs and coursework assignments involving a range of problem-solving, design, analysis, modelling, and simulation tasks. Individual and group work (including presentations and formal

	reports of work undertaken) is increasingly framed at system level. Throughout the programme multiple choice questions, presentations of work-in-progress and unseen written examinations (at Levels 5 and 6) are used for assessing knowledge and understanding. Typically a module will involve a variety of assessment types to target students' differing learning styles.
B. Skills On completion of this programme the successful student will be able to: 1. Use specialist digital, wireless and network laboratory equipment safely and effectively in all phases of network systems development. 2. Conduct experiments, simulation and modelling tasks with minimal guidance, and report effectively on findings; 3. Use technical literature effectively and conduct a specialist literature review; plan and conduct a technical investigation using a wide range of technical literature 4. Model hardware systems and component functionality, and prototype a range of digitally-based computer communication systems or processes 5. Use a range of software and hardware design/engineering tools, and environments effectively. 6. Document the development of design and analytical work appropriately; commission, research, and sustain individual project activity and to report on findings in a defensible fashion relying on minimal supervision; 7. Develop and evaluate a range of network-oriented applications or products typically involving the substantive integration of hardware and software components and fulfilling a given set of requirements.	**Teaching/learning methods** Students learn cognitive skills through Transferable skills are developed initially at Level 4 where communication skills, basic research skills and skills in using mathematical principles and concepts are developed. The ability to work effectively both as an individual and as a group member is summatively assessed at Level 4 both in seminars and laboratories, students will be divided into small groups using virtual platforms to carry out assigned activities. At Level 4 students become involved in many different activities requiring the exercise of B1-B5 and are supported by regular and frequent formative feedback in laboratories and seminars The development of transferable skills B6 and B7 is progressed at Level 5 in the contexts of group project work and, at Level 6, in that of individual project work and other Level 6 modules. At all levels students are taught how to operate specialist equipment effectively and safely and to respect rules of conduct in laboratories, will be delivered online via live demos. **Assessment methods** Students' cognitive skills are assessed by combinations of practical assignments, group and individual presentations, laboratory exercises, production of design documentation and specific demonstration of work, and unseen written examination. Formative feedback is given with returned assessed coursework.

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

12. 1 Overall structure of the programme (all modules are 30cps)





12.2 Levels and modules .		
COMPULSORY	OPTIONAL	PROGRESSION REQUIREMENTS
Level 4 (1)		
COMPULSORY	OPTIONAL	PROGRESSION REQUIREMENTS
Students must take all of the following for the BSc Computer Networks: **CST1500** - Computer Systems Architecture and Operating Systems **CST1510** - Programming for Data Communications and Networks **CST1520 -** Science, Technology, Engineering and Mathematics (STEM) **CST1530 -** Computer Networks	None	Students must pass 120 credit points to progress to level 5 full-time study or level 5 part-time study
Level 5 (2)		

COMPULSORY	OPTIONAL	PROGRESSION REQUIREMENT
Students must take all of the following: **CST2560** - Project Management and Professional Practice **CST2500 -** Data Communications **CST2522 –** Network and Protocol Analysis **CST2510 -** Network Practices and Operations	None	Students must pass at least 210 credit points (including 90 at level 5) in order to be eligible to enrol on modules at level 6, and at least 240 credits (including 90 at level 5) in order to be eligible to enrol on the level 6 Computer Communications project module (**CST3590**).
Level 6 (3)		
COMPULSORY	OPTIONAL	PROGRESSION REQUIREMENTS
Students must take all of the following: **CST3590 -** Individual Project **CST3540 -** Advanced Networking	**Students must also choose at least 2 from the following:** **CST3580 -** Wireless LANs and Mobile Applications **CST3530 -** Security and Network Forensics **CST3570** - Network Management and Disaster Recovery **CST3562** – Enterprise Networking and Automation	In order to graduate with an honours degree i.e. with a BSc Hons Computer Networks award, students must have achieved 360 credit points, or to graduate with an ordinary degree, 300 credit points with a minimum of 60 credit points at Level 6

12.3 Non-compensatable modules (note statement in 12.2 regarding FHEQ levels)	
Module level	**Module code**
Level 6	CST3540
Level 6	CST3590

13. Curriculum map
See attached.

14. Information about assessment regulations

- 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/.
- Practical aspects of the programme are often assessed via coursework that may be carried out using specialist software and may include lab tests. These may be carried out online due to Covid-19 restrictions.
- Theoretical material is assessed by coursework and examinations.
- 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

All Undergraduate students have the opportunity to go on Industrial Placement. Industrial Placements are encouraged as this valuable experience enhances a student's future career prospects. Additionally students normally achieve better results in their final year. In brief:

- The placement provides a years' experience as an appropriately paid graduate trainee.
- Industrial placement is conditional on the successful completion of all modules at Level 4 and Level 5; therefore students need 240 credits before they are able to embark on an industrial placement.
- Obtaining a placement is co-ordinated through the Campus Placement Office.
- For Undergraduate programmes, students wishing to undertake a placement position must register for CST3500.
- Each placement will be assigned to an industrial tutor who will visit the student on placement.
- On graduation the degree will be qualified with the term "…with approved industrial experience".

Note: The placement option is not available to direct-entry students into level 6

Placements will be subject to Covid-19 restrictions.

16. Future careers (if applicable)

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

- The majority of graduates are employed in IT posts relevant to the subject.
- Over 20% of students pursue further postgraduate study or research.

The employer links with the School are encouraged in a number of ways e.g. 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 through alumni both in the UK and overseas

Campus Careers Offices can be found on each campus for advice, support and guidance.

17. Particular support for learning (if applicable)

- 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. Learning Resources (LR) 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 and existing students are given module handbooks for each module they study. Soft copies of all module handbooks can be found on Oasis. Web-based learning materials are provided to further support learning
- Extensive library facilities are available on all campuses. Visit http://unihub.mdx.ac.uk/study/library/index.aspx for pages on learning resources. Students can access advice and support on a wide range of issues from the UniHelp Student Information Desk.
- Placements are supported by Campus Placement Offices and School academics; please refer to section 15 of this programme specification
- High-quality specialist network, software, digital and wireless laboratories equipped with industry standard software, hardware and tools as appropriate, for formal teaching as well as self-study. Middlesex University is a Cisco Local Academy and a Xilinx University partner
- Teaching staff are available for each subject offering personal academic advice and help if needed. Staff availability for this purpose is posted outside staff office doors. 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.

- 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.

Access to some of the above resources may be restricted as a result of Covid-19.

18. JACS code (or other relevant coding system)	144I120
19. Relevant QAA subject benchmark group(s)	Computing Benchmark

20. Reference points

The following reference points were used in designing the programme:

• QAA Computing subject benchmark statements, Computing (2007) and Engineering (2010)

• QAA Framework for Higher Education Qualifications in England, Wales and Northern Ireland

• QAA guidelines for programme specifications

• QAA Code of Practice for the assurance of academic quality and standards in HE

• CBI - Future Fit: Preparing graduates for the world of work, 2009. Available at: http://www.cbi.org.uk/media-centre/news- articles/2009/03/future-fit/

• UK Standard for Professional Engineering Competence; Chartered Engineer and Incorporated Engineer Standard, Engineering Council UK, 2010

• UK Standard for Professional Engineering Competence; The Accreditation of Higher Education Programmes, Engineering Council UK, 2008

• Middlesex University Learning Teaching and Assessment Strategy (2012 – 2014) • University Regulations

• Module Narratives

Middlesex University and Faculty of Science and Technology Teaching Learning and Assessment policies and strategies.

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. For further details please visit http://www.europe.mdx.ac.uk/

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.

APPENDIX: CURRICULUM MAP FOR BACHELOR OF SCIENCE WITH HONOURS IN COMPUTER NETWORKS

Curriculum map for BSc Hons Computer Networks 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	Mathematics, physics, and communication principles relevant to the analysis of a range of computer communication, wireless networking and telecommunication systems.
A2	The principal computational concepts, scientific and engineering principles required to analyse and model networked systems, products and processes.
A3	Criteria of quality and performance relevant to networked systems applications, design, construction or operational contexts.
A4	The relevance and ramifications of a range of professional, legal, managerial, business, organisational, ethical, social and sustainability considerations relevant to the practice of the network based systems professional;
A5	The significance, role and function of networked systems within society and the operational, material environment within which they will be expected to practise.
A6	The business, organisational and management techniques relevant to those engaging in enterprise and the production of network systems, products and processes and evaluation of the security of a networked system.
A7	The core principles, processes and methods of design and how to apply these in the design of specific computer communication and network systems and processes.
Skills	
B1	Use specialist digital, wireless and network laboratory equipment safely and effectively in all phases of network systems development.
B2	Conduct experiments, simulation and modelling tasks with minimal guidance, and report effectively on findings;
B3	Use technical literature effectively and conduct a specialist literature review; plan and conduct a technical investigation using a wide range of technical literature
B4	Model hardware systems and component functionality, and prototype a range of digitally-based computer communication systems or processes
B5	Use a range of software and hardware design/engineering tools, and environments effectively.
B6	Document the development of design and analytical work appropriately; commission, research, and sustain individual project activity and to report on findings in a defensible fashion relying on minimal supervision;
B7	Develop and evaluate a range of network-oriented applications or products typically involving the substantive integration of hardware and software components and fulfilling a given set of requirements;

Programme outcomes														
A1	A2	A3	A4	A5	A6	A7	B1	B2	B3	B4	B5	B6	B7	
Highest level achieved by all graduates														
6	6	6	6	6	6	6	6	6	6	6	6	6	6	

Module Title	Module Code by Level	A1	A2	A3	A4	A5	A6	A7	B1	B2	B3	B4	B5	B6	B7	
Computer Systems Architecture & Operating Systems	CST1500	✓	✓		✓		✓	✓		✓	✓		✓	✓	✓	
Programming for Data Communications & Networks	CST1510		✓			✓		✓			✓		✓			
Science, Technology, Engineering and Mathematics	CST1520	✓	✓		✓		✓	✓	✓		✓	✓		✓		
Computer Networks	CST1530	✓		✓		✓		✓	✓	✓	✓		✓		✓	
Data Communications	CST2500	✓	✓		✓		✓		✓			✓				
Network Practices & Operations	CST2510	✓	✓	✓		✓		✓		✓			✓		✓	
Network & Protocol Analysis	CST2522		✓	✓			✓		✓		✓					
Project Management & Professional Practice	CST2560		✓	✓		✓		✓		✓		✓		✓		
Security & Network Forensics	CST3530		✓		✓		✓		✓	✓		✓		✓		
Advanced Networking	CST3540	✓	✓	✓		✓		✓			✓		✓			
Network Management & Disaster Recovery	CST3570	✓	✓	✓		✓		✓		✓		✓		✓		
Wireless LANs & Mobile Applications	CST3580	✓		✓	✓		✓		✓		✓		✓		✓	
Individual Project	CST3590	✓		✓		✓	✓		✓	✓		✓	✓	✓	✓	