*BSc (Hons) Computer Networks and Security*

# Programme specification

| 1. Programme title | BSc (Hons) Computer Networks and Security; BSc (Hons) Computer Networks and Security with Foundation Year |
|---|---|
| 2. Awarding institution | Middlesex University |
| 3a. Teaching institution | Middlesex University: Hendon<br><br>Hong Kong University: SPACE |
| 3b. Language of study | English |
| 4a. Valid intake dates | September |
| 4b. Mode of study | FT/PT/TKSW (Hendon only for TKSW) |
| 4c. Delivery method | ☒ On-campus/Blended<br><br>☐ Distance Education |
| 5. Professional/Statutory/Regulatory body | N/A |
| 6. Apprenticeship Standard | N/A |
| 7. Final qualification(s) available | BSc (Hons) Computer Networks and Security<br><br>BSc (Hons) Computer Networks and Security with Foundation Year<br><br>BSc Computer Networks and Security<br><br>DipHE Computer Networks and Security<br><br>CertHE Computer Networks and Security |
| 8. Academic year effective from | **2024/25** |

| 9. | Criteria for admission to the programme |
|---|---|

Student should have the equivalent of 112 UCAS Tariff points to gain entry to level 4. All candidates should possess at least grade 4 or above in GCSE Maths and English language, or equivalent. For direct entry to levels 5 & 6 the candidate is required to pass the equivalent of 120 credits specified in the programme at levels 4 & 5, respectively. Students are expected to demonstrate that 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.

Please refer to the [programme specification for the Foundation Year](#) for criteria for admission to the BSc (Hons) Computer Networks and Security with Foundation Year programme

Mature applicants with relevant work experience are also welcomed to apply for Direct entry at levels 3, 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 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 with a minimum requirement of 5.5 in each band. 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.

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:
enable 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.

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

## 11. Programme outcomes*

**A. Knowledge and understanding**

On completion of this programme the successful student will have knowledge and understanding of:
1. Mathematics, physics and communication principles relevant to the analysis of a range of computer communication, networking and telecommunication systems security.

2. The principal computational concepts, scientific and engineering principles required to secure, analyse and model networked systems, products and processes.

3. Criteria of quality and performance relevant to networked systems applications, design, construction and operation.

4. The relevance and ramifications of a *range* of professional, legal, managerial, business, security, organisational, ethical, social and environmental considerations relevant to the practice of network security and network-based systems professional.

5. The significance, role and function of networked systems and its security aspects 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 secure networks, 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, secure networks and network systems.

**Teaching/learning methods**

A2 are introduced in contexts relating to networks and computer communication. 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 and Security using SOBs (Students' Observable Behaviour). A1 are delivered through seminars and laboratories. 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 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. All supported with key concept videos available on VLE.

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).

**Employability**

At all levels there is an emphasis on preparing for employment in the Cyber Security and Digital Forensics sectors. This is different from sectors that do not require security clearance.

The issues of knowledge and confidence is instilled in the syllabus. Students will be gaining a professional understanding of the employability sectors via the successful completion of authentic coursework.

There will be opportunities to engage with prospective employees throughout the programme. In particular, there will be guest lectures organised.

Leadership and Project Management are important issues in any modern organisation and are reflected by the level 5 module on project management.

Opportunities to engage with MDXWorks will be encouraged throughout all levels

**Assessment methods**
Students gain knowledge and comprehension through a combination of:

- Closely supervised laboratories and various exercises
- Encouragement to raise questions and be open minded to suggestions from other team members when seeking practical solutions.
- Supervised seminars
- Open-ended practical sessions
- Formative and Summative feedback on assignments
- Laboratory Experimentation
- Guest Lectures
- Key concept videos
- Debates/Arguments
- Interviews
- Modelling
- Authentic Coursework
- Essays/Reports
- Guided and independent research
- Directed reading
- Independent study
- Academic Advisor support

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 (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 securely networked systems development.

2. Conduct experiments, simulation and modelling tasks with *minimal* guidance, risk analysis relating to network security and report effectively on findings.

3. Use technical literature effectively and conduct a *specialist* literature review of information security management audit and assurance techniques, networking protocols, and project management techniques; 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; select security controls for maintenance of secure networked systems.

5. Use a range of software and hardware design/engineering tools, security tools, and environments effectively.

6. Document design and analytical work appropriately for gathering security threats; commission, research, and sustain individual project activity and to report on findings in a defensible fashion relying on minimal supervision.

7. Develop and evaluate skills in network security in 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.

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.

**Sustainability**
Where possible the use of open access books are recommended and their use is encouraged. This enables students to reach a broad and diverse number of authors, practitioners and policymakers that promote the Sustainability Development Goals throughout the curriculum.
Where possible digital poverty has been keenly avoided in all areas of the programme by encouraging the use of open-source. Proprietary and specialist software is made available remotely for students who are off-campus.
ISO26000 is taught in level 5. This module covers other issues related to Sustainability Development Goals and how organisations can embed and integrate these practices as standard, including diversity, inclusivity and environmental considerations.

**Assessment methods**

Students' skills are assessed by a mixture of coursework, practical tests and essays. There are no examinations and skills are assessed by a combination of:

- Authentic Coursework
- Project work and management
- Multiple choice questions
- Student observable behaviour
- Modelling and programming
- Supervised laboratory exercises
- Practical Laboratory tests
- Writing-up experiments into a report and taking contemporaneous notes
- Dissertation

All students have the opportunity to consult their Academic Advisor throughout the year and each module will have opportunities for formative feedback.

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

## 12.1 Structure of the programme

Please refer to the [programme specification for the Foundation Year](#) for the modules to be taken during the foundation year of the BSc (Hons) Computer Networks and Security with Foundation Year programme.

All modules are 30 credits.

Optional modules at level 6 will only run if 15 or more students are registered.

**Full-Time Mode**

**Year 1 (Level 4)**

- **Semester 1:**
  Computer Systems Architecture & Operating Systems (CST1500), Programming for Data Communication & Networks (CST1510)

- **Semester 2:**
  Foundations of Computing (CST1133), Computer Networks (CST1530)

**Year 2 (Level 5)**

- **Semester 1:**
  Internet of Things (CST2590), Network & Protocol Analysis (CST2522)

- **Semester 2:**
  Network Practices & Operations (CST2510), Project Management & Professional Practice (CST2560)

**Year 3 (Level 6)**

- **Semester 1:**
  Advanced Networking (CST3540), *Choose 1 from the following 2 options:*

  - Computer Security & Ethical Hacking (CST3535)

  - Network Management & Disaster Recovery (CST3570)

- **Semester 2:**
  Individual Project (CST3590), Network Security (CST3577)

**Thick-Sandwich Mode**

**Year 1 (Level 4)**

- **Semester 1:**
  Computer Systems Architecture & Operating Systems (CST1500), Programming for Data Communication & Networks (CST1510)

- **Semester 2:**
  Foundations of Computing (CST1133), Computer Networks (CST1530)

**Year 2 (Level 5)**

- **Semester 1:**
  Internet of Things (CST2590), Network & Protocol Analysis (CST2522)

- **Semester 2:**
  Network Practices & Operations (CST2510), Project Management & Professional Practice (CST2560)

**Year 3**

- **Industrial Placement:**
  Supervised Industrial Placement (CST3500)

**Year 4 (Level 6)**

- **Semester 1:**
  Advanced Networking (CST3540), *Choose 1 from the following 2 options:*

  - Computer Security & Ethical Hacking (CST3535)

  - Network Management & Disaster Recovery (CST3570)

- **Semester 2:**
  Individual Project (CST3590), Network Security (CST3577)

**Part-Time Mode**

**Year 1 (Level 4)**

- **Semester 1:**
  Computer Systems Architecture & Operating Systems (CST1500)

- **Semester 2:**
  Foundations of Computing (CST1133)

**Year 2 (Level 4)**

- **Semester 1:**
  Programming for Data Communication & Networks (CST1510)

- **Semester 2:**
  Computer Networks (CST1530)

**Year 3 (Level 5)**

- **Semester 1:**
  Internet of Things (CST2590)

- **Semester 2:**
  Network Practices & Operations (CST2510)

**Year 4 (Level 5)**

- **Semester 1:**
  Network & Protocol Analysis (CST2522)

- **Semester 2:**
  Project Management & Professional Practice (CST2560)

**Year 5 (Level 6)**

- **Semester 1:**
  Advanced Networking (CST3540)

- **Semester 2:**
  Network Security (CST3577)

**Year 6 (Level 6)**

- **Semester 1:**
  *Choose 1 from the following 2 options:*

    o   Network Management & Disaster Recovery (CST3570)

    o   Computer Security & Ethical Hacking (CST3535)

- **Semester 2:**
  Individual Project (CST3590)

This is an indicative programme structure for part-time students.

---

**12.2  Levels and modules**

Level 4

**Compulsory**
Students must take all of the following:
- **CST1500** - Computer Systems Architecture and Operating Systems
- **CST1510** - Programming for Data Communication and Networks
- **CST1133** – Foundations of Computing
- **CST1530 -** Computer Networks

**Optional**
None

**Progression requirements**
Students must pass at least 90 credits to progress to Level 5. To achieve Honours, failed credit will need to be repeated.

Level 5

**Compulsory**
Students must take all of the following:
- **CST2560** - Project Management and Professional Practice
- **CST2590 –** Internet of Things
- **CST2522–** Network and Protocol Analysis
- **CST2510 -** Network Practices and Operations

**Optional**
None

**Progression requirements**
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 individual project module (**CST3590**).

Level 6
**Compulsory**
Students must take all of the following:
- **CST3590 -** Individual Project
- **CST3540 -** Advanced Networking
- **CST3577 –** Network Security

**Optional**

Students must also choose at least 1 from the following:
- **CST3570** - Network Management and Disaster Recovery
- **CST3535** – Computer Security & Ethical Hacking

Optional modules at level 6 will only run if 15 or more students are registered.

**Progression requirements**
In order to graduate with an honours degree i.e. with a BSc Hons Computer Networks and Security 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 | |
| --- | --- |
| **Module level** | **Module code** |
| 6 | CST3540 |
| 6 | CST3577 |
| 6 | CST3590 |

| 13. | 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 https://www.mdx.ac.uk/about-us/policies

- 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 assessed by coursework .

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

| 14. | Placement opportunities, requirements and support (if applicable) |
|---|---|

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.

- Students who complete the Supervised Industrial Placement module on TKSW mode will receive an additional qualification referred to as a Diploma of Industrial Studies

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

| 15. | Future careers / progression |
|---|---|

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.

The employer links with the Faculty 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.

| 16. | Particular support for learning |
| --- | --- |

Students will be supported throughout their programme of study by academic experts in the appropriate fields. In addition, students will be supported by a Learning Resource Centre that works closely with academics in order to offer the most up-to-date resources. Some of the modules on this programme are supported by a team of Student Learning Assistants, Graduate Teaching Assistants and Technical Tutors who work with academic colleagues to ensure that labs are resourced, materials are available, and feedback is provided.

| 17. | HECos code(s) | 100365 |
| --- | --- | --- |

| 18. | Relevant QAA subject benchmark(s) | Computing (March 2022) |
| --- | --- | --- |

| 19. | Reference points |
| --- | --- |

- QAA Subject Benchmark: Computing (2022)
- 2031 Learning Framework Principles
- Computing Curricula – The Overview Report - ACM CC2020: Computing Curricula 2020: Paradigms for Global Computing Education
- ISO2700X, ISO17025 & ISO26000
- [University Regulations](#)
- [Learning and Quality Enhancement Handbook (LQEH)](#)
- [Curriculum Design Policy](#)

| 20. | 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 they take 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.

### 21. Curriculum map for *BSc Computer Networks and Security*

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, networking and telecommunication systems security. |
| A2 | The principal computational concepts, scientific and engineering principles required to secure, analyse and model networked systems, products and processes. |
| A3 | Criteria of quality and performance relevant to networked systems applications, design, construction and operation. |
| A4 | The relevance and ramifications of a *range* of professional, legal, managerial, business, security, organisational, ethical, social and environmental considerations relevant to the practice of network security and network-based systems professional |
| A5 | The significance, role and function of networked systems and its security aspects 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 secure networks, 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, secure networks and network systems. |
| | Skills |
| B1 | Use specialist digital, wireless and network laboratory equipment safely and effectively in all phases of securely networked systems development. |
| B2 | Conduct experiments, simulation and modelling tasks with *minimal* guidance, risk analysis relating to network security and report effectively on findings. |
| B3 | Use technical literature effectively and conduct a *specialist* literature review of information security management audit and assurance techniques, networking protocols, and project management techniques; 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; select security controls for maintenance of secure networked systems |
| --- | --- |
| B5 | Use a range of software and hardware design/engineering tools, security tools, and environments effectively. |
| B6 | Document design and analytical work appropriately for gathering security threats; commission, research, and sustain individual project activity and to report on findings in a defensible fashion relying on minimal supervision |
| B7 | Develop and evaluate skills in network security in 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 Communication & Networks | CST1510 |  | ✔ |  |  | ✔ |  | ✔ |  |  | ✔ |  | ✔ |  |  |
| Foundations of Computing | CST1133 |  | ✔ |  |  |  |  | ✔ | ✔ |  | ✔ | ✔ |  |  |  |
| Computer Networks | CST1530 | ✔ |  | ✔ |  | ✔ |  | ✔ | ✔ | ✔ | ✔ |  | ✔ |  | ✔ |
| Internet of Things | CST2590 |  | ✔ |  |  |  |  | ✔ | ✔ | ✔ |  |  | ✔ |  |  |
| Network Practices & Operations | CST2510 | ✔ | ✔ | ✔ |  | ✔ |  | ✔ |  | ✔ |  |  | ✔ |  | ✔ |
| Network & Protocol Analysis | CST2522 |  | ✔ | ✔ |  |  | ✔ |  | ✔ |  | ✔ |  | ✔ |  |  |
| Project Management & Professional Practice | CST2560 |  | ✔ | ✔ |  | ✔ |  | ✔ |  | ✔ | ✔ | ✔ | ✔ | ✔ |  |
| Supervised Industrial Placement | CST3500 | ✔ |  | ✔ | ✔ | ✔ |  |  | ✔ | ✔ |  | ✔ | ✔ | ✔ |  |
| Network Security | CST3577 |  | ✔ |  | ✔ |  | ✔ |  |  | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ |
| Individual Project | CST3590 | ✔ | ✔ | ✔ |  | ✔ | ✔ |  | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ |
| Advanced Networking | CST3540 | ✔ | ✔ | ✔ |  | ✔ |  | ✔ |  |  | ✔ |  | ✔ |  |  |
| Network Management & Disaster Recovery | CST3570 | ✔ | ✔ | ✔ | ✔ | ✔ |  | ✔ |  | ✔ | ✔ | ✔ | ✔ | ✔ |  |
| Computer Security & Ethical Hacking | CST3535 | ✔ |  |  | ✔ |  | ✔ |  |  | ✔ |  |  |  |  | ✔ |