PROGRAMME SPECIFICATION

Master of Science in Cyber Security

Awarding institution	Liverpool John Moores University
Teaching institution	Oryx Universal College WLL
JACS Code	
Programme Duration	Full-Time: 1 Year
Language of Programme	All LJMU programmes are delivered and assessed in English
Subject benchmark statement	QAA Subject Benchmarks, Masters in Computing
Programme accredited by	
Description of accreditation	
Validated target and alternative exit awards	Master of Science in Cyber Security Postgraduate Diploma in Cyber Security Postgraduate Certificate in Cyber Security
Link Tutor	Syed Naqvi

Educational aims of the programme

The overall aim of the programme is to provide people of graduate status working, or planning to work, in a computing environment with the opportunity to enhance their skills relating to cyber security in terms of research, analysis and practice, as well as to enhance career prospects or to become cyber security professionals by gaining additional knowledge and skills in the areas of cyber security. The specific aims of the programme are as follows:

-To provide students with a fuller, systematic understanding of current and emerging cyber security threats, vulnerabilities and attacks.

-To provide students with advanced practical skills for cyber defence, including secure software engineering and network defence.

-To enable students to explore the issues surrounding information security management in industrial/enterprise contexts, including risk management, legal issues, ethics and privacy.

-To facilitate the development of expertise in specific topic areas of cyber security.

-To encourage students to become advanced autonomous learners.

-To provide students with a comprehensive understanding, critical awareness and ability to conduct evaluation of current and emerging cyber security research issues.

-To further develop students' originality in applying analytical, creative, problem solving and research skills.

-To provide advanced, conceptual understanding, underpinning career development, innovation and further study such as PhD.

Alternative Exit/ Interim Award Learning Outcomes - Postgraduate Certificate

A student who is eligible for this award will be able to:

For the award of Postgraduate Certificate, students will be able to engage with advanced levels of theoretical and practical aspects in a range of topics of Cyber Security. Students will be able to engage with advanced methods and concepts in relation to cyber security, demonstrating appropriate levels of critical analysis and contextual awareness within the discipline.

Alternative Exit/ Interim Award Learning Outcomes - Postgraduate Diploma

A student who is eligible for this award will be able to:

For the award of Postgraduate Diploma, in addition to the outcomes for Postgraduate Certificate, students will be capable of taking an innovative and informed position in relation to Cyber Security. Students will be capable of identifying and applying appropriate research methodologies as well as plan relevant research and/or development projects. Students will also be able to demonstrate creativity in critical analysis, reflection and contextual awareness in a wide range of topics associated with Cyber Security.

Target award Learning Outcomes - Master of Science

A student successfully completing the programme of study will have acquired the following subject knowledge and understanding as well as skills and other attributes.

A student who is eligible for this award will be able to:

1. Critically apply current and emerging principles and practices of cyber security technologies.

2. Demonstrate deep conceptual and practical knowledge and skills in the areas of cyber security and its applications.

3. Critically select a range of tools and techniques currently being used in the development of secure complex networked applications/systems.

4. Critically analyse and develop a major piece of work in the area of cyber security.

5. Have deployed complex tools to effectively and creatively manage the security of a networked computer system.

6. Contribute to complex discussions around issues such as ethics, IT security law, and privacy.

7. Comprehensively and critically review current research issues in the relevant aspects of cyber security technologies.

8. Study independently at an advanced level and have developed effective methodology skills for original research.

9. Demonstrate systematic and comprehensive knowledge of cyber security concepts, principles and theories.

10. Perform original modelling, requirements analysis, design and implementation of secure software systems/applications.

11. Engage with complex debates around ethical, legal, social and professional issues regarding information security.

12. Deploy appropriate methods and tools creatively for the protection of a complex networked system.

13. Specify, design and construct programs to be used for the purpose of information security.

14. Analyse evidence data for an investigation.

15. Evaluate investigation methodologies in terms of general attributes.

16. Work professionally on complex problems as a part member of a team.

17. Identify appropriate tools and techniques to be used for an investigation.

18. Conduct research into Cyber Security and related topics.

19. Use information technology, e.g. Web and internet, for effective information retrieval.

20. Apply numerical skills to cases involving a quantitative dimension.

21. Communicate effectively by written or verbal means.

22. Plan and manage learning and development.

Teaching, Learning and Assessment

The methods used to enable outcomes to be achieved and demonstrated are as follows:

Acquisition of 1 - 8 is through a combination of lectures, tutorials, practical sessions and laboratory work. Throughout the learner is encouraged to undertake independent reading both to supplement and consolidate what is being taught/learnt and to broaden their individual knowledge and understanding of the subject.

Assessment methods are specified in module specifications. Each module is assessed by examination and/or coursework. Specifically the assessment takes the form of written examinations, laboratory work, coursework reports and presentations.

Skills 9 - 12 are taught through lectures and developed through tutorial and lab work throughout the course.

Cognitive skills are partly assessed via formal examinations, but mainly through coursework assessment. The

Level 7 projects allow a student to demonstrate his/her cognitive skills.

Practical skills 13-18 are developed throughout the programme. Coursework and projects are designed to provide practical opportunities for students to work independently and in groups.

Assessment is normally by coursework and projects.

Key skills 19-22 are developed throughout the programme in a variety of forms. Specifically through a combination of research related coursework, guided independent study and projects, examinations, group work and presentations.

Key skills are assessed as part of coursework, projects, written examinations and presentations

Programme structure - programme rules and modules

For an MSc award, students are required to attain 180 credits at Level 7. 120 credits from taught modules, and 60 credits from the project dissertation;

For a PG Diploma award, 120 credits of taught modules at Level 7 are required;

For a PG Certificate award, 60 credits of taught modules at Level 7 are required.

7501CYQR Research Methods must be passed prior to the submission of the Project Dissertation (7536CYQR Project Dissertation).

Level 7	Potential Awards on completion	Master of Science
Core	Option	Award Requirements
7501CYQR RESEARCH METHODS (20 credits) 7531CYQR COMPUTER SECURITY (20 credits) 7533CYQR NETWORK SECURITY (20 credits) 7536CYQR PROJECT DISSERTATION (60 credits) 7539CYQR INFORMATION SECURITY MANAGEMENT (20 credits) 7541CYQR ETHICAL HACKING (20 credits) 7542CYQR SECURE SYSTEMS (20 credits)		180 core credits at level 7 0 option credits at level 7

Information about assessment regulations

All programmes leading to LJMU awards operate within the University's Academic Framework. https://www.ljmu.ac.uk/about-us/public-information/academic-quality-and-regulations/academic-framework

Opportunities for work-related learning (location and nature of activities)

Self-knowledge: Students reflect on their strengths and skills to select their project. With support of project supervisor;

Project and time management skills, during Coursework, including groupwork and Project Dissertation;

Oral presentation skills, in seminars and project presentation;

Professional networking skills, during school research seminars;

Coursework based on real-world industrial case studies/applications;

Industrial guest speakers;

Learning about Intellectual Property and Copyright, during Research Methods;

Application of a wide range of ICT tools and techniques;

Learning statistical tools for data analysis;

Development of Interpersonal skills and knowledge of group dynamics, during group coursework and workshops.

Criteria for admission

Other
Applicants should normally have one of the following qualifications:

Degree, in Computing or a related subject, or

Degree equivalent professional qualifications, e.g. BCS Professional Graduate Diploma in IT

Students with non-standard entry qualifications, relevant industry experience or certification are also encouraged to apply. Admission for these candidates will be at the discretion of the Programme Leader.

Applicants with non-standard qualifications may be required to submit a CV and references.

Overseas qualifications
Where candidate's first degree was not taught and assessed in English, a minimum IELTS 6 is required (with a minimum of 5.5 on each component) or equivalent.

External Quality Benchmarks

All programmes leading to LJMU awards have been designed and approved in accordance with the UK Quality Code for Higher Education, including the Framework for Higher Education Qualifications in the UK (FHEQ) and subject benchmark statements where applicable.

The University is subject to periodic review of its quality and standards by the Quality Assurance Agency (QAA) Published review reports are available on the QAA website at www.qaa.ac.uk

Programmes which are professionally accredited are reviewed by professional, statutory and regulatory bodies (PSRBs) and such programmes must meet the competencies/standards of those PSRBs.

Support for students and their learning

The University aims to provide students with access to appropriate and timely information, support and guidance to ensure that they are able to benefit fully from their time at LJMU. All students are assigned a Personal Tutor to provide academic support and when necessary signpost students to the appropriate University support services.

Students are able to access a range of professional services including:

- Advice on practical aspects of study and how to use these opportunities to support and enhance their personal and academic development. This includes support for placements and careers guidance.
- Student Advice and Wellbeing Services provide students with advice, support and information, particularly in the areas of: student funding and financial matters, disability, advice and support to international students, study support, accommodation, health, wellbeing and counselling.
- Students studying for an LJMU award at a partner organisation will have access to local support services

Methods for evaluating and improving the quality and standards of teaching and learning

Student Feedback and Evaluation

The University uses the results of student feedback from internal and external student surveys (such as module evaluations, the NSS and PTES), module evaluation questionnaires and meetings with student representatives to improve the quality of programmes.

Staff development

The quality of teaching is assured through staff review and staff development in learning, teaching and assessment.

Internal Review

All programmes are reviewed annually and periodically, informed by a range of data and feedback, to ensure quality and standards of programmes and to make improvements to programmes.

External Examining

External examiners are appointed to programmes to assess whether:

- the University is maintaining the threshold academic standards set for awards in accordance with the FHEQ and applicable subject benchmark statements
- the assessment process measures student achievement rigorously and fairly against the intended outcomes of the programme(s) and is conducted in line with University policies and regulations
- the academic standards are comparable with those in other UK higher education institutions of which external examiners have experience
- the achievement of students are comparable with those in other UK higher education institutions of which the external examiners have experience

and to provide informative comment and recommendations on:

- good practice and innovation relating to learning, teaching and assessment observed by external examiners
- opportunities to enhance the quality of the learning opportunities provided to students

Please note:

This specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. More detailed information on the learning outcomes, content, teaching, learning and assessment methods of each module can be found in module and programme guides.