PROGRAMME SPECIFICATION

Bachelor of Science with Honours (SW) in Computer Security

Awarding institution	Liverpool John Moores University
Teaching institution	Liverpool John Moores University
JACS Code	I100
Programme Duration	
Language of Programme	All LJMU programmes are delivered and assessed in English
Subject benchmark statement	Computing (2007)
Programme accredited by	
Description of accreditation	
Validated target and alternative exit awards	Bachelor of Science with Honours in Computer Security Bachelor of Science with Honours (SW) in Computer Security Bachelor of Science in Computer Security Bachelor of Science (SW) in Computer Security Diploma of Higher Education in Computer Security Certificate of Higher Education in Computer Security
Programme Leader	Thomas Berry

Educational aims of the programme

The two principal themes in the programme are the development of computer science skills relating to information security, and the associated software engineering, management and analysis skills required to enact successful information security within networked computing environments. This is underpinned by themes of computing, networking and software engineering. The main aims are:

-To provide students with the technical skills required for the development of computer security software solutions.

-To enable the student to acquire the skills needed in the investigation of user requirements and the development of a suitable software design using the appropriate specifications and design methodologies.

-To prepare students with the management skills required to implement computer security.

-To provide students with the knowledge of the wide range of issues involved in the implementation of computer security, such as legal, ethical and privacy requirements.

-To encourage students to fully engage with the World of Work programme, including World of Work Skills Certificate and, as a first step towards this, to complete Bronze (Self Awareness) Statement.

Alternative Exit/ Interim Award Learning Outcomes - Certificate of Higher Education

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

Develop computer programs using elementary programming constructs. Apply a variety of tools and techniques for website design including Human-Computer Interaction (HCI) principles. Discuss the technical challenges of social computing and investigate the ethical, commercial and economic issues within this field. Discuss a range of practical aspects of computing and apply the associated tools and techniques used in them. Discuss computer architecture at the hardware and software levels and basic security concepts. On the completion of

Level 4 of the programme, the student will have a good understanding of the basics of the field of computing. They will understand the different approaches required to solve computer-based problems. They will have the skills and ability to communicate their ideas and take personal responsibility for their learning.

Alternative Exit/ Interim Award Learning Outcomes - Diploma of Higher Education

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

Use object-oriented design in formulating an implementation. Analyse the structure of computer networks, architectures and their protocols. Identify software security requirements and use secure development methods in an implementation. Provide evidence of experience in a number of information assurance methods (e.g. risk analysis).

Target award Learning Outcomes - Bachelor of Science with Honours (SW)

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. Computer Programming as applied to medium to large systems.
2. The software development process, including secure software development.
3. Awareness of professional and ethical issues.
4. Networking: Internet protocol, networking, network investigations.
5. Programming Fundamentals: Software development process, syntax and semantics, problem analysis, testing, debugging.
6. Professionalism: organisational theory, management theory, professional ethics.
7. IT infrastructure: hardware / network configurations, communication, types of systems, development tools, developing technologies.
8. Security: Physical and logical security, legal issues, privacy, internet security, protection including forensics.
9. Knowledge and understanding of facts, concepts, principles and theories relating to computer security.
10. Collect and synthesise information from a variety of sources.
11. Utilise methods and skills to solve well-defined computer-based problems.
12. Reflection of the impact of new technologies / standards / legal requirements in the area.
13. Critical evaluation and testing of theories, concepts and systems.
14. Demonstrate the skills necessary to plan, conduct and report a research project.
15. Specify, design and construct programs to be used for the purpose of computer security.
16. Analyse security from the point of view of an attacker and an administrator.
17. Evaluate investigation methodologies in terms of general attributes.
18. The ability to work as a member of a team.
19. Identify appropriate security tools and techniques.
20. Use information technology, e.g. Web and internet, for effective information retrieval.
21. Apply numerical skills to cases involving a quantitative dimension.
22. Communicate effectively by written or verbal means.
23. Plan and manage learning and development.

Teaching, Learning and Assessment

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

Core knowledge and understanding (skills A1-A8) is acquired via lectures, tutorials, practicals and guided independent study. Independent study is used where appropriate resource material is available and increases as the programme progresses.

Acquisition of A1-A8 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.

Skills 1 - 6 are taught through lectures and developed through tutorial work throughout the course.

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

The final year project allows a student to demonstrate his/her cognitive skills.

Practical skills are developed throughout the programme. The basic skills are provided at the lower levels.

These are supplemented at higher levels by more advanced tools and techniques. Some of these skills are practised in the placement year. Specialist software is available in School labs or from specified PCs in the Library.

Assessment is normally by coursework.

The placement year is assessed on a pass/fail basis dependent on satisfactory Company and University Supervisor reports and the students own report.

Key skills 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

The programme is modular in construction. Modules normally are 24 credits (equivalent to 240 hours of study) with a 12 credits option at level 6 alongside a 36 credit Project. Students study 120 credits per Level. There are core (compulsory) modules at each level, plus a number of options at levels 6. Students will undertake a placement year between levels 5 and 6. Students successfully completing the assessment of the placement year are eligible for a Sandwich award.

At level 6 students must select one 12 credit option from the following:

6037COMP COMPUTING IN EDUCATION

6038COMP WORK PLACEMENT EVALUATION

6046COMP CLOUD COMPUTING

6053COMP EMPLOYABILITY AND THE WORKPLACE

6055COMP GREEN AND SUSTAINABLE COMPUTING

6061COMP TECHNOLOGY ENTREPRENEURSHIP

6067COMP MAINFRAME COMPUTING

Level 6	Potential Awards on completion	Bachelor of Science with Honours (SW)
Core	Option	Award Requirements
6000PROJ PROJECT (36 credits) 6063COMP COMPUTER AND NETWORK FORENSICS (24 credits) 6064COMP CYBER HACKING AND DEFENCE (24 credits) 6066COMP NETWORK SECURITY (24 credits)	6037COMP COMPUTING IN EDUCATION (12 credits) 6038COMP WORK PLACEMENT EVALUATION (12 credits) 6046COMP CLOUD COMPUTING (12 credits) 6053COMP EMPLOYABILITY AND THE WORKPLACE (12 credits) 6055COMP GREEN AND SUSTAINABLE COMPUTING (12 credits) 6061COMP TECHNOLOGY ENTREPRENEURSHIP (12 credits) 6067COMP MAINFRAME COMPUTING (12 credits)	108 core credits at level 6 12 option credits at level 6

Level 5	Potential Awards on completion	
Core	Option	Award Requirements
5019COMP DATABASE DESIGN, APPLICATIONS AND		120 core credits at level 5 0 option credits at level 5

MANAGEMENT (24 credits) 5041COMP COMPUTER NETWORKS (24 credits) 5063COMP INFORMATION ASSURANCE (24 credits) 5064COMP SECURE SOFTWARE DEVELOPMENT (24 credits) 5069COMP COMPUTER SCIENCE FOR SECURITY (24 credits)		

Level 4	Potential Awards on completion	
Core	Option	Award Requirements
4000COMP WEB DESIGN AND HCI (24 credits) 4001COMP INTRODUCTION TO COMPUTER PROGRAMMING (24 credits) 4004COMP COMPUTING AND SOCIETY (24 credits) 4005COMP COMPUTING IN PRACTICE (24 credits) 4008COMP COMPUTER SYSTEMS (24 credits)		120 core credits at level 4 0 option credits at level 4

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)

Industrial Placement - Students are encouraged to undertake a 12 month placement (including statutory holiday entitlement) in the programme-related area that is part of the Sandwich degree.

To pass the industrial placement:

-The University Tutor must award at least a pass grade (the mid-point on a five point scale)

-The Company Tutor must award at least a pass grade (the mid-point on a five point scale)

-The University Tutor must award at least a pass grade (the mid-point on a five point scale) to the Professional Placement Report written by the student

-The student must complete a period of no less than 12 continuous months (including statutory holiday entitlement) of approved professional training.

Level 6:- 6038COMP Computing in Education (Option) - Students who are interested in a career in teaching can apply for consideration at a position with a local school or college, attending one half day per week. This gives them first-hand experience of teaching computing in schools or colleges and allows them to develop their World of Work skills.

Level 6:- 6037COMP Work Placement Evaluation (Option) - This option module allows the student to reflect on their work placement in greater depth than their placement report, evaluate their development of graduate skills during the placement year, and plan their future learning requirements to enhance their employability.

Level 6:- 6053COMP Employability and the Workplace (Option) - LJMU's WoW initiative has been recognised as an innovative approach to improving the employability skills of graduates. This module operates in conjunction with a development programme at LJMU's Graduate Development Centre and enables students to critically evaluate their own employability skills and further improve on these via the GDC WoW certification process if desired.

Level 6:- 6061COMP Technology Entrepreneurship (Option) - This module prepares those students who wish to enter the world of self-employment upon graduation by examining the production of a business plan to support their own idea. With on-going support from the team at the University's Centre for Entrepreneurship, students will be guided in developing their idea through the initial stages of business development.

Level 6:- 6067COMP Mainframe Computing (Option) - This module prepares those students who wish to undertake possible future professional accreditation in the field of mainframe computing. Delivered in conjunction with IBM, this module provides hands-on theory and experience in using mainframe technologies and follows the IBM certificated curriculum.

Further information about Graduate Skills can be found at:

http://www.ljmu.ac.uk/worldofwork/123832.htm (The World of Work Careers Centre website)

http://www.ljmu.ac.uk/eaqs/128262.htm (Methods of Practice - Section 5 Work Related Learning and Additional Information)

Criteria for admission

A/AS Level
280 UCAS points to include 2 A-levels or Double Award

BTEC National Diploma
280 UCAS points

AVCE
280 UCAS points

Irish Leaving Certificate
280 UCAS points

Scottish Higher
280 UCAS points

International Baccalaureate
25 points

Access
Pass

Higher national diploma
Pass

Other
In addition to 280 UCAS points applicants should have five GCSEs at grade C or above including GCSE Mathematics grade C and English Language grade C

Mature entry
Without the necessary qualifications but relevant experience are encouraged to apply and may be requested to attend an interview and aptitude test.

Overseas qualifications
Offers will be based on individual qualifications and experience. All applicants should have achieved IELTS 6.0

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.