

# Proposal for New Degree Programmes

Stage 2

# Contents

1

- PROGRAMME SPECIFICATIONOVERVIEWEXTERNAL SUMMARYEDUCATIONAL AIMS OF THE PROGRAMMEPROGRAMME OUTCOMESPROGRAMME STRUCTURE AND FEATURESTEACHING AND LEARNING METHODS AND STRATEGIESTEACHING AND LEARNING WORKLOADASSESSMENT METHODS AND STRATEGIESASSESSMENT METHOD BALANCECAREER OPPORTUNITIESOTHER ITEMS
- 2 ABOUT THE PROGRAMME

ADDITIONAL REQUIREMENTS CONSULTATION ADDITIONAL DOCUMENTS

# 3 <u>APPROVAL</u>

STAGE 1: SCHOOL BOARD OF STUDIES REVIEW AND APPROVAL STAGE 2: HEAD OF SCHOOL REVIEW AND APPROVAL STAGE 3: COLLEGE CURRICULUM APPROVAL BOARD REVIEW AND OUTCOME

4 DOCUMENT CHECKLIST



# THE UNIVERSITY OF EDINBURGH

PROGRAMME SPECIFICATION FOR [*INSERT NAME OF PROGRAMME OF STUDY, e.g.* M.A. Honours in Ancient History *or* M.Sc. in Public Health]<sup>1</sup>

## PROGRAMME SPECIFICATION

Grey text has been added to provide guidance. Please delete as you add your own text, remove italics, and change the font colour to black.

OVERVIEW		
Awarding Institution	The University of Edinburgh	
Teaching Institution	The University of Edinburgh	
Programme accredited by		
Final Award	MSc/Diploma	

1 The information contained in this Programme Specification should be used as a guide to the content of a degree programme and should not be interpreted as a contract.

Programme Title	Cyber Security, Privacy, and Trust
UCAS Code	
Relevant QAA Subject Benchmarking Group(s)	Computing
Postholder with overall responsibility for QA	Prof. David Aspinall
Date of Production/revision	May 2018

#### EXTERNAL SUMMARY

Our societies are critically dependent on computer software. Electronic systems are everywhere, and governments, financial and transport organisations, or telecommunication companies all possess and manage huge amounts of sensitive information concerning all of our everyday activities. Indeed, with the emergence of new systems and services like electronic IDs and passports, electronic payment systems and loyalty schemes, electronic tickets like the Oyster card in London, or telecommunication systems like mobile phones, every aspect of our life is relying on / recorded by some computerised system. As such, we have been witnessing a significant increase in attacks targetting computing infrastructure. The cyber security threat has been characterised as serious as terrorism by the GCHQ. So, there is an ever-growing need for graduates with highly specialised training in this area. Cyber security and privacy is the study of the computational principles, methods and mechanisms for safe-guarding these sensitive applications. Graduates of the programme will learn how to evaluate, design, and implement secure and trustworthy systems in complex distributed systems.

Many research areas have tackled parts of this problem – students on this degree will experience training from academic experts in a uniquely broad combination of theory and practice: Secure Software, Cryptography, Secure Hardware, Verification, Post Quantum, Data Privacy, Usability, Fintech, Health, Smart Contracts, Distributed Ledgers, Privacy Preserving Data Mining. The teaching team of the MSc in Cyber Security, Privacy and Trust is lined up with world class researchers and educators. In particular, the University has been recognised by GCHQ/NCSC as an Academic Centre of Excellence in Cyber Security Research, in recognition of its critical mass in leading edge cyber security research.

The overall programme delivers intellectual and practical experience in all aspects of cyber security, privacy, and trust: dealing with real-world applications; applying and extending state of the art defense mechanisms; engineering end-to-end secure and trustworthy systems; communicating results through oral and written reports.

#### EDUCATIONAL AIMS OF THE PROGRAMME

- Develop graduates possessing a thorough understanding of cyber security, privacy and trust;
- Equip students with advanced computer-based scientific and engineering skills;
- Provide a programme of study that benefits from our research strengths across the disciplines;

- Enable students to develop communication skills, initiative, professionalism and the ability to work independently as well as with others; and
- Provide graduates with the knowledge and skills necessary for professional careers or for postgraduate research.

PROGRAMME OUTCOMES			
Knowledge and Understanding	• Understand security-related risk in a broad context and the means to mitigate such risk.		
	<ul> <li>Understand the process of building a secure application in all its levels and stages and be able to demonstrate this understanding in supervised system building efforts.</li> </ul>		
	• Have advanced knowledge of the state of the art in research in cyber security, privacy and trust, and its applications.		
	• Understand research methodologies relating to cyber security, privacy, and trust, at a level that permits the student to engage in future doctoral research.		
	Know the main research methodologies used in cyber security, privacy, and trust.		
Graduate Attributes: Skills and abilities in Research and Enquiry	Advanced literature review and analysis skills.		
	• The ability to specify a research question and identify the relevant background literature.		
	<ul> <li>Deploy logical, analytical, and problem solving skills and to synthesise solutions.</li> </ul>		
	Undertake a substantive project (3-4 months) on the proposed topic		
	<ul> <li>Develop skills needed for undertaking extended projects, including reviews, time management and writing extended reports.</li> </ul>		
Graduate Attributes: Skills and abilities in Personal and	<ul> <li>Show self-direction and time management skills when working independently.</li> </ul>		
Intellectual Autonomy	• Make effective use of learning materials and to acquire and apply knowledge from a variety of sources.		
	The ability to work to strict deadlines and employ effective time management.		
Graduate Attributes: Skills and abilities in	Develop proposal writing skills		
Communication	Write an extended research-style report.		
	Communicate effectively through a variety of media including oral, written, diagrammatic and on-line		

Graduate Attributes: Skills and abilities in Personal Effectiveness	• The ability to work effectively as a team member with people from different cultural contexts.
Technical/practical skills	• Evaluate the level of risk associated with a deployed system and be capable of deploying a wide range of mitigating mechanisms to reduce that risk.
	design and conduct experiments and evaluate their results
	<ul> <li>operate computing equipment and software systems effectively</li> </ul>
	<ul> <li>master new programming languages and technologies quickly as the need arises</li> </ul>
	<ul> <li>make effective use of a wide range of state-of-the-art technologies (e.g. in relation to Secure Software, Cryptography, Secure Hardware, Verification, Post Quantum, Data Privacy, Usability, Fintech, Health, Smart Contracts, Distributed Ledgers, Privacy Preserving Data Mining)</li> </ul>

## **PROGRAMME STRUCTURE AND FEATURES**

For formal definitions, including details of compulsory and optional course choices, consult the University Degree Programme Table. The list of Informatics courses links courses to subject area.

This one-year degree consists of two components: (1) approximately 7 months of taught courses in 2 semesters; (2) up to 4 months of project work leading to a dissertation. During the first taught part of the course, September to March, students attend lectures, tutorials and group practicals and acquire the theoretical foundation to enable them to engage in independent research. 120 taught course credit points are expected during the course of the year. Between May and August, students complete the degree by making a practical application of their knowledge by undertaking a major individual research project on which they write a dissertation. The project is normally supervised by a member of academic staff as one of his/her research interests, with assistance from his/her research team.

Applicants are normally expected to have achieved a first-class or strong upper second-class undergraduate degree with honours (or equivalent international qualifications), as a minimum, in a related subject, such as computer science, informatics, engineering, mathematics, or physics. Applicants whose first language is not English are usually required to provide evidence of proficiency in English at the higher level required by the University.

Students need to achieve an average from the combined exam and coursework results of at least 50% to proceed to the dissertation phase. Those with an average of at least 40% exit with a Diploma and those below 40% Fail.

There are three possible degree classifications:

• MSc with Distinction: requires an average of at least 70% across all taught courses and a dissertation mark of at least 70%;

- MSc: average of at least 50% across all taught courses and a dissertation mark of at least 50%
- Diploma: average of at least 40% across all taught courses.

### TEACHING AND LEARNING METHODS AND STRATEGIES

Teaching and learning methods include traditional lecture-style teaching, interactive sessions (tutorials and seminars), group practical work (labs, supervised practical sessions, coursework) and supervised, self-directed study (private study, preparation of literature reviews, research proposals, dissertation preparation). Coursework is submitted periodically throughout the semesters. Exams on the coursework normally occur at the end of semesters 1 and 2.

Normally full time. Suitably qualified candidates may be permitted to study for an MSc on a part-time basis over a maximum period of three years. Part-time students must satisfy the same course requirements as full-time students. Subject to timetabling constraints, locally resident part-time candidates will normally take two lecture courses per semester, which typically requires attendance for one and a half days per week. Part time candidates resident elsewhere are required to study full-time for one semester (thirteen weeks) per year. A candidate whose work is judged to be satisfactory may be permitted to pursue his/her dissertation project work at their sponsoring company during his/her third year, subject to satisfactory supervision arrangements being made.

#### **TEACHING AND LEARNING WORKLOAD**

Start Year	Time in scheduled teaching (%)	Time in independent study (%)	Time on placement (%)
Year 1	49	51	0
			Add rows as necessary

#### **ASSESSMENT METHODS AND STRATEGIES**

Coursework is submitted periodically throughout the semesters. Exams on the coursework normally occur at the end of semesters 1 and 2. Students need to achieve an average from the combined exam and coursework results of at least 50% to proceed to the dissertation phase. Those with an average of at least 40% exit with a Diploma and those below 40% Fail.

There are three possible degree classifications:

- MSc with Distinction: requires an average of at least 70% across all taught courses and a dissertation mark of at least 70%;
- MSc: average of at least 50% across all taught courses and a dissertation mark of at least 50%

• Diploma: average of at least 40% across all taught courses.

#### **ASSESSMENT METHOD BALANCE**

Please indicate the typical assessment methods for a student on this programme for each year of study. Additionally please complete the Assessment matrix.

Start Year	Assessment by written exams (%)	Assessment by practical exams (%)	Assessment by coursework (%)
Year 1			
			Add rows as necessary

#### **CAREER OPPORTUNITIES**

This degree will put you at the cutting edge of the field of cyber security, privacy, and trust, opening a host of opportunities in the commercial sector, public and academic sectors.

The graduates will have the necessary background to keep up with developments in cyber security, both in research and engineering. Typical areas to pursue a career include: Security Analyst, Security Architect, Security Engineer, Security Administrator, Cyber Risk Analyst, Cryptographer, Cryptanalyst, Security Consultant, Security Auditor, Secure Software Developer, Penetration Tester, Ethical Hacker, Security Researcher (in academia or industry), as well as security officers of various kinds in government and public sector positions (the National Cyber Security Centre has explicitly expressed interest in collaborating with our program). There are well established career development paths and certification schemes including CISSP (Certified Information Systems Security Professional) run by ISC2 (International Information System Security Certification Consortium). There is a new UK government-sponsored initiative delivering a new Cyber Security Body of Knowledge (https://www.cybok.org/) which is intended to describe curricula frameworks for the future, to inform and underpin education and professional training for the cyber security sector.

"There is zero percent unemployment in cyber security and opportunities are endless" says Herjavec from Cybersecurity Ventures.

#### **OTHER ITEMS**

# ABOUT THE PROGRAMME

ADDITIONAL REQUIREMENTS		
PRSB Accreditations (where relevant)	Please note accreditations awarded or planned	
Admissions requirements Before completing this section please contact a member of the Recruitment and Admissions team for further guidance.	To be demonstrated through certificated or experiential learning (around 100 words). English language requirements across the accepted tests should also be included.	
To be completed by R & A Team	Please select to confirm that a member of the R & A section have consulted on the Admissions requirements. $\Box$	
Work experience/work based learning opportunities	Details of organised work experience / work based learning opportunities available during the programme (if applicable)	

CONSULTATION			
Student body	In addition to the consultation process at Stage 1 please provide a full summary of the consultation undertaken and the impact this has had on the development of the programme		

External Review/Critical Friend	In addition to the consultation process at Stage 1 please provide a full summary of the consultation undertaken and the impact this has had on the development of the programme

ADDITIONAL DOCUMENTS	
Memorandum of Agreement (if applicable)	
Award letter (if applicable)	
DPT (please use your current template)	Attached with the Case for support
ΔΡΡΒΟΥΔΙ	

Programme Title:	
Programme Proposer:	

#### STAGE 1: SCHOOL BOARD OF STUDIES REVIEW AND APPROVAL

Confirmation of approval of the proposal at the School Board of Studies should be entered below.

Date of BoS: 02/05/2018

Convener Name: Alan Smaill

Comment and Approval (BoS Minute):

https://web.inf.ed.ac.uk/infweb/admin/committees/bos/meetings-directory/02-may-2018-minutes

#### STAGE 2: HEAD OF SCHOOL REVIEW AND APPROVAL

Head of School:	Professor Johanna	Moore
	Troicssor Jonanna	10001C

Please print name

Comment and Approval:

Signature:

Jhanna Kl Moore

STAGE 3: COLLEGE CURRICULUM APPROVAL BOARD REVIEW AND OUTCOME	
DOCUMENT CHECKLIST	
Document	Completed
DPT	
Memorandum of Agreement (if applicable)	
Assessment Matrix	
Award letter (if applicable)	