UNIVERSITY OF EXETER

MODULE TITLE	**Network and Computer Security**	**CREDIT VALUE**	**15**
MODULE CODE	**ECM2426**	**MODULE CONVENER**	**Prof Achim D. Brucker (Coordinator)**

DURATION: TERM	**1**	**2**	**3**
DURATION: WEEKS	**11**	**0**	**0**

Number of Students Taking Module (anticipated)	**150**

DESCRIPTION - summary of the module content

Network and computer security is now widely recognized as a vital aspect in the design, development, and implementation of today's computer systems. Billions have been spent on strengthening the security of computer systems to defend against hacking, malicious code, data theft, denial-of-service attacks, etc. This module will provide a solid understanding of the main issues related to security in modern computer systems and networks. You will learn the foundations of computer security, techniques to secure complex systems, and gain practical skills in assessing the threats to the security of networked computer systems.

Pre-requisites:
ECM1400 OR ECM1417 (Understanding a programming language (e.g., Python) and web technologies (e.g., HTML/JavaScript, HTTP, SQL), e.g., as taught in ECM1400 or ECM1417)
ECM1415/ECM1416 OR MTH1001/2 (Algebra, Logic, and basic probability theory, e.g., as taught in ECM1415 and ECM1416 or MTH1001/2)

If you obtained the required knowledge using an alternative pathway, please contact the module for waiving the required module.

AIMS - intentions of the module

This module aims to create awareness of the need for security and introduce security mechanisms in modern computer systems. We will explore topics such as fundamentals of computer security, technology and principles of network security, cryptography, authentication and digital signatures, access control mechanisms and software security. The module gives you practical hands-on experience of testing security applications, applying security methods, and protecting networked systems.

INTENDED LEARNING OUTCOMES (ILOs) (see assessment section below for how ILOs will be assessed)

On successful completion of this module ***you should be able to***:

Module Specific Skills and Knowledge:

1. Demonstrate understanding of the concepts, issues, and theories of cryptography and security;

2. Demonstrate theoretical and practical knowledge of security technologies, tools, and services;

3. Gain practical experience of developing solutions to networks and computer security challenges.

Discipline Specific Skills and Knowledge:

4. Show an awareness of the need for network and computer security;

5. Demonstrate good design and development skills.

Personal and Key Transferable / Employment Skills and Knowledge:

6. Demonstrate practical knowledge of current security methods and tools.

SYLLABUS PLAN - summary of the structure and academic content of the module

Security Fundamentals and Access Control:
- Integrity, reliability, availability;
- Authentication & identification;
- Access control models.

Introduction into Cryptography:
- Symmetric and asymmetric encryption;
- Attacking encryption;
- Signatures.

Security Protocols:
- Authentic and secure communication;
- Formal modelling of security protocols;
- Formal analysis of security protocols.

Software Security:
- Software vulnerabilities;
- Secure software development;
- Security testing.

LEARNING AND TEACHING

LEARNING ACTIVITIES AND TEACHING METHODS (given in hours of study time)

Scheduled Learning & Teaching Activities	72.00	**Guided Independent Study**	78.00	**Placement / Study Abroad**	0.00

DETAILS OF LEARNING ACTIVITIES AND TEACHING METHODS

Category	Hours of study time	Description
Scheduled learning & Teaching activities	22	Lectures
Scheduled learning & Teaching activities	50	Workshops/tutorials
Guided independent study	50	Individual assessed work
Guided independent study	28	Guided Independent study

ASSESSMENT

FORMATIVE ASSESSMENT - for feedback and development purposes; does not count towards module grade

Form of Assessment	Size of Assessment (e.g. duration/length)	ILOs Assessed	Feedback Method
Laboratory exercises	10 x 15 minutes	All	Oral

SUMMATIVE ASSESSMENT (% of credit)

Coursework	30	**Written Exams**	70	**Practical Exams**	0

DETAILS OF SUMMATIVE ASSESSMENT

Form of Assessment	% of Credit	Size of Assessment (e.g. duration/length)	ILOs Assessed	Feedback Method
Written exam	70	90 min Winter Examination	1,2,4,5	Oral on request
Coursework	30	50 hours	1, 2, 3, 4, 5	Written

DETAILS OF RE-ASSESSMENT (where required by referral or deferral)

Original Form of Assessment	Form of Re-assessment	ILOs Re-assessed	Time Scale for Re-assessment
Written exam - closed book	Written exam- closed book (90 mins)	All	August Ref/Def Period
Coursework	Coureswork	All	Augus Ref/Def Period

RE-ASSESSMENT NOTES

Reassessment will be by coursework and/or written exam in the failed or deferred element only. For referred candidates, the module mark will be capped at 40%. For deferred candidates, the module mark will be uncapped.

RESOURCES

INDICATIVE LEARNING RESOURCES - The following list is offered as an indication of the type & level of information that you are expected to consult. Further guidance will be provided by the Module Convener

Basic reading:

ELE: http://vle.exeter.ac.uk/

Web based and Electronic Resources:

Other Resources:

Reading list for this module:

Type	Author	Title	Edition	Publisher	Year	ISBN	Search
Set	R.J. Anderson	Security Engineering: A Guide to Building Dependable Distributed Systems	1st	John Wiley	2001	0471389226	[Library]
Set	Bishop, Matt	Computer Security: Art and Science	2nd	Addison Wesley	2018	978-0321712332	[Library]
Set	B. Chess and J. West	Secure Programming with Static Analysis	1st	Addison Wesley	2007		[Library]
Set	N. Daswani, C. Kern and A. Kesavan	Foundations of Security: What Every Programmer Needs to Know		Apress	2007		[Library]
Set	Michael T. Goodrich and Roberto Tamassia	Introduction to Computer Security		Addison Wesley	2011	0-32-151294-4	[Library]
Set	A.J.Menezes, S.A. Vanstone and P.C.V. Oorschot	Handbook of Applied Cryptography	5th	CRC Press	2001	0849385237	[Library]
Set	Pfleeger, C. P., Pfleeger, S. L., Margulies, J	Security in Computing	5th	Prentice Hall	2015	978-0-13-408504-3	[Library]
Set	D. Stuttard and M. Pinto	The Web Application Hacker's Handbook: Finding and Exploiting Security Flaws		O'Reilly	2011		[Library]
Set	John R. Vacca	Computer and Information Security Handbook	2nd		2013		[Library]

CREDIT VALUE	15	**ECTS VALUE**	7.5

PRE-REQUISITE MODULES	ECM1400, ECM1417, ECM1415, ECM1416, MTH1001, MTH1002
CO-REQUISITE MODULES	

NQF LEVEL (FHEQ)	6	**AVAILABLE AS DISTANCE LEARNING**	No
ORIGIN DATE	Tuesday 10 July 2018	**LAST REVISION DATE**	Wednesday 08 February 2023

KEY WORDS SEARCH	Network, computer security, confidentiality, cryptography