MODULE SPECIFICATION PROFORMA

Module Code:	COM740

Module Title:	Network Protocols and Algorithms

Level:	7	**Credit Value:**	20

Cost Centre(s):	GACP	JACS3 **code**: HECoS code:	I120 100365

Faculty :	Arts, Science and Technology	**Module Leader:**	Nigel Houlden

Scheduled learning and teaching hours	21 hrs
Guided independent study	179 hrs
Placement	0 hrs
Module duration (total hours)	200 hrs

Programme(s) in which to be offered (not including exit awards)	Core	Option
MSc Computer Networking	✓	☐

Pre-requisites
None

Office use only
Initial approval: 28/11/2019 Version no:1
With effect from: 01/09/2019
Date and details of revision: Version no:

Module Aims

This module builds on the foundation from COM741 “Network Techniques and Technologies” in giving students the opportunity to work extensively with VLSM, private IP addressing and NAT to optimise address usage. It provides extensive and in-depth coverage of advanced routing protocols such as RIPv2, EIGRP, multi-area OSPF, IS-IS and BGP. Evolving protocols such as VoIP will also be introduced. In addition, students work with advanced techniques such as route filtering and redistribution. In addition to this experience, students will be required to undertake a research-based assignment into a topic or topics in Science protocols. The analysis, supported by the expertise within the associated research centre of the delivery team, will be at the cutting-edge of existing research. Suitable topics could include various forms of protocol optimisation or considering shortcomings in existing protocols.

Intended Learning Outcomes

Key skills for employability

KS1	Written, oral and media communication skills
KS2	Leadership, team working and networking skills
KS3	Opportunity, creativity and problem solving skills
KS4	Information technology skills and digital literacy
KS5	Information management skills
KS6	Research skills
KS7	Intercultural and sustainability skills
KS8	Career management skills
KS9	Learning to learn (managing personal and professional development, self-management)
KS10	Numeracy

At the end of this module, students will be able to		Key Skills	
1	Use advanced techniques for designing and building scalable networks	KS3	KS10
		KS2	KS7
2	Evaluate and make judgements on the suitability of advanced routing protocols and algorithms for a variety of tasks	KS6	
		KS1	
3	Discuss the limitations of conventional protocol solutions and engage in useful research into new possibilities	KS4	
		KS5	
		KS6	
4	Plan strategies for the implementation of advanced route management techniques	KS3	
		KS9	

Transferable skills and other attributes

Derogations

None

Assessment:

Indicative Assessment Tasks:

Students will be assessed using a combination of theory and practical tests (35%) and a research-based assignment into a topic or topics in networking protocols. Suitable topics could include various forms of protocol optimisation or considering shortcomings in existing protocols.

Assessment number	Learning Outcomes to be met	Type of assessment	Weighting (%)	Duration (if exam)	Word count (or equivalent if appropriate)
1	2	In-class test	15	1.15 hours	
2	1,4	Practical	20	2 hours	
3	2,3	Coursework	65		3000

Learning and Teaching Strategies:

Students will have access to fully-equipped state-of-the-art networking laboratories and an e-learning tool supporting a full blended-learning environment including interactive formative assessment, allowing them 24-hour access to certain materials. They will also have conventional lectures, tutorials, demonstrations and practical sessions.

Syllabus outline:

A broad outline of the module content (approximately in this order – allowing for overlap) is as follows:

- Principles of scalable networks
- Advanced IP address management
- Advanced routing principles
- Routing Information Protocol version 2 (RIPv2)
- Advanced Enhanced Interior Gateway Routing Protocol (EIGRP) routing
- Multi-area Open Shortest Path First (OSPF)
- The Intermediate System to Intermediate System (IS-IS) protocol
- Route Optimisation
- The Border Gateway Protocol (BGP)
- IP Telephony/VoIP
- Multicast Routing

However, this is a fast-moving subject and the actual content of this module will be kept under constant review. Older, less relevant material will gradually make way for the newer,

more relevant.

Indicative Bibliography:

Essential reading

Wallace, K. and Odom, W. (2014), *CCNP Routing and Switching ROUTE 300-101 Official Cert Guide*. Indianapolis: Cisco Press.

Other indicative reading

Fordham, S.A. (2014), *BGP for Cisco Networks: A CCIE v5 guide to the Border Gateway Protocol*. CreateSpace.

Voutsinas, D. (2012), *BGP and the Internet (The Basics)*. Independently Published.

Journals

ACM Digital Library (available electronically through the library)
Computer Networks and Computer Communications (journals available electronically via Science Direct through the Library