Manchester Metropolitan University

Unit Specification (Collaborative/Postgraduate/Flexible Framework Use Only)

Unit Details & Outline

Unit Title	Advanced Computer Networks and Operating Systems		
Unit Code	6G7Z1004		
Unit Abbreviation	Adv. CN & OS		
Level of Study	7		
Credit Value	30	**ECTS Value**	15
Home Department	Division of Computer Science and Information Systems School of Computing, Mathematics and Digital Technology		
Home Faculty	Science and Engineering		
Unit Co-ordinator	Dr Mohammad Hammoudeh		
Key Words	computer networks, wireless and mobile networking, operating systems,		

Unit Description

Brief Summary	The unit covers advanced topics in computer networks and operating systems. It focuses on principles, architectures, and protocols used in modern large scale networked systems.
Indicative Content	**Wide area networks [10%]:** Compare the characteristics of WAN technologies, including their switching type, throughput, media, security, and reliability; Describe several WAN transmission and connection methods. **Virtual networking and remote access [10%]:** Explain virtualization and identify characteristics of virtual components; Understand VPNs (virtual private networks) and the protocols they rely on; Identify the features and benefits of cloud computing and NaaS (network as a service). **Wireless and mobile networking [20%]:** Wireless links and network characteristics; WiFi: 802.11 Wireless LANs; Cellular internet access; IoT, Sensor networks. **Network Management [10%]:** What Is Network Management? The Infrastructure for Network Management; The Internet-Standard Management Framework; Quality of Service; Performance and Planning.

	Classic Operating Systems [5%]: Comparing the features and tradeoffs of classic operating systems; **Virtual Machines [10%]:** Exploring the need for virtual machines and the means of their implementation; **File Systems [10%]:** Looking at strengths and weaknesses of different approaches to persistent storage; **Distributed and Scalable Systems [10%]:** In particular, focusing on issues related to cloud computing and grid computing; **Concurrency, Scheduling & Sharing [10%]:** Timing and scheduling, particularly in distributed systems; **Fault Tolerance [5%]:** Looking at managing failure in distributed systems.

Learning Outcomes

Unit Learning Outcomes	On successful completion of this unit students will be able to: 1. Critically assess the technologies and architectural principles of modern large-scale computer communications systems, both wired and wireless. 2. Critically assess the principles of modern operating systems, particularly with respect to distributed systems. 3. Analyse and evaluate real world networks and operating systems problems and draw on the technical and theoretical knowledge to develop solutions. 4. Research and critically reflect upon current challenges and future technological trends in the field of computer networking and operating systems.

Assessment

Summative Assessment

Element	Type	Weighting	Learning outcomes assessed
1	Coursework	40%	4
2	Examination	60%	1, 2, 3

	Outcomes	Element of Assessment
Employability and Sustainability Outcomes	Apply skills of critical analysis to real world situations within a defined range of contexts.	1, 2

	Demonstrate a high degree of professionalism.	1
	Express ideas effectively and communicate information appropriately and accurately using a range of media including ICT.	1
	Develop working relationships using teamwork and leadership skills, recognising and respecting different perspectives.	
	Manage their professional development reflecting on progress and taking appropriate action.	1
	Find, evaluate, synthesise and use information from a variety of sources.	1
	Articulate an awareness of the social and community contexts within their disciplinary field.	1
	Use systems and scenario thinking.	2
	Engage with stakeholder/interdisciplinary perspectives.	
Description of each element of Assessment	**Summative** **Element 1:** Students will produce a survey paper on a current research topic in the field of computer networks or operating systems. Students will also be required to deliver a short presentation on this research topic at a scheduled time. **Element 2:** This assessment will be a three hour examination. The examination will assess a student's knowledge of key elements within the curriculum. Students will be required to provide correct and comprehensive answers to questions and demonstrate correct and appropriate application of techniques. As a general guide, students awarded marks within the Distinction band will perform strongly against virtually all appropriate criteria. Students awarded a mark within the Merit band will perform well against most criteria. Students awarded a pass mark will perform adequately against most criteria. **Formative** Students receive formative feedback during supported weekly laboratory sessions.	
Mandatory Learning & Teaching Requirements	**N/A**	
Minimum Pass Mark	**N/A**	

Learning Activities

Breakdown of Student Learning Activity	Type of Activity	%
	Summative Assessment	25%
	Directed Study	25%
	Student-centred Learning	50%

Learning Resources

Books recommended for purchase by students	None
Essential Reading/ Resources	*Tamara D. (2013) Network+ Guide to Networks,* Cengage Learning, Delmar Cengage Learning, 6th Ed. ISBN13- 978-1133608257 Kurose J. F. and Ross K. W. (2013) *Computer Networking: A Top-Down Approach,* Pearson Education, 6 Ed. ISBN13- 978-0273768968 Comer, D. *Computer Networks and Internets*, Prentice Hall, 5th Ed. ISBN-13-978-0135045831 Silberschatz A. Gagne G and Galvin P. (2013) *Operating Systems Concepts,* John Wiley & Sons, 9th Ed. ISBN13-978-1118093757 Stallings, W., *Operating Systems: Internals and Design Principles*, 8/E, ISBN-10: 1-292-06135-9, Pearson (2015).
Further Reading/ Resources	Saltzer J. H. and Kaashoek M. F. (2009) *Principles of Computer Systems Design*, Morgan Kaufmann, ISBN13-978-0123749574 Research papers selected annually to reflect current trends. MMU's VLE will be used to deliver course materials, assessments, support blende learning and enhance communication.
Specialist ICTS Resources	Hardware and software requirements decided annually and communicated to specialist technical support.
Additional Requirements	None