

H7ACN: Advanced Computer Networks

Module Code:	H7ACN
Long Title	Advanced Computer Networks APPROVED
Title	Advanced Computer Networks
Module Level:	LEVEL 7
EQF Level:	6
EHEA Level:	First Cycle
Credits:	5
Module Coordinator:	
Module Author:	Alex Courtney
Departments:	School of Computing
Specifications of the qualifications and experience required of staff	Master's degree in computing or cognate discipline. May have industry experience also.
Learning Outcomes	
<i>On successful completion of this module the learner will be able to:</i>	
#	Learning Outcome Description
LO1	To explain, analyse and program with the advanced topics in the application and transport layer
LO2	To identify, discuss and practically experiment with the concepts underlying IPv4 and IPv6 protocol, and their main characteristics and functionality
LO3	To assess and experiment the current QoS architectures and mechanisms, and the QoS support challenges in future networks
LO4	To analyse and evaluate the performance of different wired and wireless media access control protocols.
LO5	Compare and contrast different mobile communications generations
Dependencies	
Module Recommendations	
No recommendations listed	
Co-requisite Modules	
No Co-requisite modules listed	
Entry requirements	Learners should have attained the knowledge, skills and competence gained from stage 2 of the BSc (Hons) in Computing.

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Module Content & Assessment			
Indicative Content			
Advanced Topics in Application Layer Application Layer Principles. DNS. HTTP and Web			
Advanced topics in transport Layer Multiplexing and Demultiplexing. Flow Control in TCP. Congestion Control in TCP Tahoe, TCP Reno, TCP NewReno and TCP Vegas.			
Socket Programming TCP Socket Programming			
Advanced topics in transport layer (continued) TCP Sync Attack. SCTP Overview: multi-streaming and multi-homing			
IPv6 Internetworking and Mobility Internetworking with IPv6. IPv6 extensions and functionality			
IPv6 Internetworking and Mobility (continued) Routing advances. Mobile IP networking. Micro and macro mobility			
IP Convergence and QoS Service integration. Quality of Service (QoS): IntServ, DiffServ and end-to-end QoS. Service contracts. Services specification, configuration and management.			
Self-Organizing Networks Ad-hoc, sensors and mesh networks; . MAC protocols in wireless networks			
Self-Organizing Networks (continued) Transport protocols, quality of service and security mechanisms for Self-Organizing Networks			
Mobile Communications Systems 2nd Generation - GSM • 2.5 Generation – GPRS and EDGE • 3rd Generation – UMTS and HSPA• 4th Generation – WiMAX, Long-Term Evolution (LTE) • 5th Generation			
Next generation networking: Motivation and Challenges Emerging topics in next generation networking such as Software defined networking (SDN), Network function virtualization (NFV), Information Centric Networking (ICN), cloud and fog computing			
Revision Week Revision of all the above topics			
Assessment Breakdown			%
Coursework			40.00%
End of Module Assessment			60.00%
Assessments			
Full Time			
Coursework			
Assessment Type:	Formative Assessment	% of total:	Non-Marked
Assessment Date:	n/a	Outcome addressed:	1,2,3,4,5
Non-Marked:	Yes		
Assessment Description: Formative assessment will be provided on the in-class individual or group activities.			
Assessment Type:	Continuous Assessment	% of total:	40
Assessment Date:	n/a	Outcome addressed:	1,2,3
Non-Marked:	No		
Assessment Description: Students will be presented with a number of in-class lab problems and will be required to apply advanced computer networking principles and techniques to solve the problems			
End of Module Assessment			
Assessment Type:	Terminal Exam	% of total:	60
Assessment Date:	End-of-Semester	Outcome addressed:	1,2,3,4,5
Non-Marked:	No		
Assessment Description: The students have to appear for the final terminal examination.			
No Workplace Assessment			
Reassessment Requirement			
Repeat examination <i>Reassessment of this module will consist of a repeat examination. It is possible that there will also be a requirement to be reassessed in a coursework element.</i>			
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Module Workload				
Module Target Workload Hours 0 Hours				
Workload: Full Time				
Workload Type	Workload Description	Hours	Frequency	Average Weekly Learner Workload
Lecture	Classroom & Demonstrations (hours)	24	Every Week	24.00
Tutorial	Other hours (Practical/Tutorial)	12	Every Week	12.00
Independent Learning	Independent learning (hours)	89	Every Week	89.00
Total Weekly Contact Hours				36.00

Module Resources	
<i>Recommended Book Resources</i>	
Kurose, J. R.. (2016), Computer Networking: A Top-Down Approach, Global Edition, Harlow, United Kingdom.	
<i>Supplementary Book Resources</i>	
K. Daniel Wong. (2012), Fundamentals of Wireless Communication Engineering Technologies, John Wiley & Sons, p.540, [ISBN: 9780470565445].	
James Kurose,Keith Ross. Computer Networking, [ISBN: 9781292153599].	
<i>This module does not have any article/paper resources</i>	
<i>This module does not have any other resources</i>	
Discussion Note:	