

H8FMC: Fundamentals of Mobile Communications

Module Code:	H8FMC
Long Title	Fundamentals of Mobile Communications APPROVED
Title	Fundamentals of Mobile Communications
Module Level:	LEVEL 8
EQF Level:	6
EHEA Level:	First Cycle
Credits:	5
Module Coordinator:	CRISTINA HAVA MUNTEAN
Module Author:	CRISTINA HAVA MUNTEAN
Departments:	School of Computing
Specifications of the qualifications and experience required of staff	<p>Master's degree or PhD in a computing or cognate discipline. May have industry experience also.</p> <p>Proposed Lecturer: Mr. Vikas Sahni, Dr. Paul Hayes</p>
Learning Outcomes	
<i>On successful completion of this module the learner will be able to:</i>	
#	Learning Outcome Description
LO1	Assess the fundamental theory, concepts and principles behind wireless and mobile communications.
LO2	Contrast different communication technologies used in wireless and mobile networks.
LO3	Evaluate and apply knowledge to a range of contexts and problems in the 'real world' of mobile communications.
LO4	Specify, design and construct efficient and secure applications using Java's networking packages.
LO5	Distinguish and evaluate security issues in wireless and mobile networks
Dependencies	
Module Recommendations	
No recommendations listed	
Co-requisite Modules	
No Co-requisite modules listed	
Entry requirements	

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Module Content & Assessment			
Indicative Content			
Introduction to Wireless and Mobile Networking • Introduction. • Definition of Terms. • History of Wireless Communication. • Wireless and Mobile Applications • Machine to Machine (M2M) Communication • Internet of Things (IoT)			
Wireless Network Applications • Examine wireless technology and its applications • Assess wireless networking technologies • Review wireless network applications • Discuss the issues and constraints of a wireless network			
Wireless Transmission • Frequencies Allocation • Regulations • Signal Propagation • Modulation of Digital Data • Narrowband and Wideband Modulation			
Wireless LANs: Basics • Infrastructure versus adhoc LANs • Project 802.11 • 802.11 MAC Layer • DCF versus PCF • CSMA versus CDMA • Scanning, Authentication and Association • Encryption, Handshaking, Fragmentation & Power Conservation • Hidden Station Problem			
Wireless LAN Standards • IEEE 802.11 Wireless LAN Specification • IEEE 802.11b • IEEE 802.11a • IEEE 802.11g • IEEE 802.11as			
Bluetooth and Wireless PAN • PAN Technologies • Bluetooth • Zigbee • RFID Technology			
Satellite Communication • Positioning Systems and Technologies • Satellite Communication and Orbits • Global Positioning System (GPS) • Location-Based Services (LBS)			
Wireless Broadband • 2nd Generation -GSM • 2.5 Generation -GPRS and EDGE • 3rd Generation - UMTS • HSPA • Business Drivers • Emerging Technologies and Standards • 4th Generation Technologies • WiMAX • Long-Term Evolution (LTE) • Integration and Convergence • Future Trends			
Mobile IP Protocol • Motivation and Requirements • Data Transfer using Tunnelling • Encapsulation • Optimisation of Packet Forwarding • Reverse Tunnelling • Mobile IP and IPv6 • Problems with Mobile IP • Mobility in Cellular Networks			
Security Issues • Wireless Security Principles • Wireless LAN Threats • Wireless Authentication • 802.1X Security • GSM, UMTS and LTE Security • Secure Mobile Commerce • Browsing and Download Threats (Viruses etc.)			
Network Programming 1 • Communication and Synchronisation • URLs and URIs: Description, URL and URI class, Communication with Server-side programs through GET, • URLConnections class: Opening URLConnections, Configuring the Connection Reading data from a Server, Reading the header, Writing data to a Server • TCP Sockets for Clients: Using Sockets classUsing ServerSockets class, Logging, Constructing Server Sockets, Getting information about Server Socket, Socket options			
Network Programming 2 Secure Sockets: Creating Secure Client Sockets, Creating Secure Server Sockets, Event Handlers, Configuring SSLServerSockets, Configuring SSLServerSockets • UDP Datagrams and Sockets: UDP Clients, UDP Servers The DatagramPacket Class, The DatagramSocket Class, Socket Options • Design, implementation and testing of mobile applications that use Sockets for Client-Server communication			
Assessment Breakdown			%
Coursework			40.00%
End of Module Assessment			60.00%
Assessments			
Full Time			
Coursework			
Assessment Type:	Continuous Assessment	% of total:	40
Assessment Date:	n/a	Outcome addressed:	1,2,4
Non-Marked:	No		
Assessment Description: Assessment 1 (20%): Written assessment to assess the fundamental theory, concepts and principles behind wireless and mobile communications and apply the knowledge to contrast different communication technologies used in wireless and mobile networks. Assessment 2 (20%): Assessment for learners to demonstrate proficiency in specifying, designing and constructing efficient and secure applications using Java's networking packages.			
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: End-of-Semester Final 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	No Description	24	Per Semester	2.00
Tutorial	No Description	12	Per Semester	1.00
Independent Learning	No Description	89	Per Semester	7.42
Total Weekly Contact Hours				3.00
Workload: Part Time				
Workload Type	Workload Description	Hours	Frequency	Average Weekly Learner Workload
Independent Learning Time	No Description	89	Every Week	89.00
Tutorial	No Description	12	Every Week	12.00
Lecture	No Description	24	Every Week	24.00
Total Weekly Contact Hours				36.00

Module Resources	
<i>Recommended Book Resources</i>	
<p>William Stallings. (2013), <i>Wireless Communications and Networks</i>, 2nd.</p> <p>Harold, E.R.. (2013), <i>Java Network Programming: Developing Networked Applications</i>, 4th Edition,. O'Reilly.</p>	
<i>Supplementary Book Resources</i>	
<p>Forouzan, B.. (2012), <i>Data Communications and Networking</i>., 5th Edition. McGraw-Hill Education,.</p> <p>Forouzan, B.. (2010), <i>TCP/IP Protocol Suite</i>., 4th Edition.. McGraw-Hill Education,.</p> <p>Calvert. (2008), <i>TCP/IP Sockets in Java: Practical Guide for Programmers</i>, 2nd Edition. Morgan Kaufmann.</p> <p>Price, R.. (2006), <i>Fundamentals of Wireless Networking</i>., McGraw-Hill Higher Education.</p> <p>Jim Geier.. (2015), <i>Designing and deploying 802.11 wireless networks</i>, Indianapolis, IN; Cisco Press, p.600., [ISBN: 1587144301].</p> <p>Jan Høller...[et al.]. (2014), <i>From machine-to-machine to the Internet of things</i>, Amsterdam; Elsevier Academic Press, p.xix, 331 :, [ISBN: 012407684X].</p>	
<i>This module does not have any article/paper resources</i>	
<i>This module does not have any other resources</i>	
Discussion Note:	