Wireless Networking

13.24 Description of Module: 24
13.24.1 Code: ITU07430
13.24.2 Name: Wireless Networking
13.24.3 Number of Credits: 8
13.24.4 Sub-Enabling Outcomes:
6.2.1 Evaluate types of broadband technology and wireless systems in designing communication networks
6.2.2 Apply different protocols in designing wireless communication networks
6.2.3 Use mobile wireless and cellular radio principles in analysing system capacity
6.2.4 Perform configuration of mobile wireless systems in real world environment
6.2.5 Employ channel coding, modulation techniques and multiple access techniques in determining propagation loss
13.24.5 Pre-requisite Modules: NIL
13.24.6 Learning Context:
This module will be taught through lectures, practices, exercises, assignments.
13.24.7 Teaching and Learning Materials:
Flip charts, marker pens, handouts, computer and multimedia projector, text books.
13.24.8 Integrated Method of Assessment:
Continuous Assessment: 50%
Semester Exam: 50%
13.24.9 Required References:
Makaya, C. & Pierre, S. (eds) (2011). Emerging Wireless Networks: Concepts, Techniques and Applications. Boca Raton, FL: CRC Press
Kennington, J., Olinick, E. & Rajan, D.. (eds) (2011). Wireless Network Design: Optimization Models and Solution Procedures. New York, NY: Springer
13.24.10 Recommended References:
Gi Lee, B. & Choi, S. (2008). Broadband Wireless Access & Local Networks: Mobile Wimax and Wifi. Norwood, MA: Artech House, Inc.
Hellberg, C., Greene, D. & Boyes, T. (2007). Broadband Network Architectures: Designing and Deploying Triple-Play Services. Upper Saddle River, NJ: Prentice Hall
Liu, H. & Li, G. (2005). OFDM-Based Broadband Wireless Networks: Design and Optimization. Hoboken, NJ: John Wiley & Sons.

Sub-Enabling Outcome	Related Tasks	Assessment Criteria	Assessment Methods	Assessment Instruments
6.2.1 Evaluate types of broadband technology and wireless systems in designing computer networks	(a) Explain types of wireless technologies (b) Discuss the broadband technologies (c) Differentiate between broadband and wireless systems	Types of broadband technology and wireless systems are correctly evaluated in designing computer networks	Written test End of semester examination Assignment Presentation	Model answers Question papers Assignment reports Checklist

	(d) Discuss the use of each type of wireless and broadband technologies			
6.2.2 Apply different protocols in designing wireless computer networks	(a) Explain various wireless protocols (e.g. WiFi, Zigbee, Bluetooth, LiFi) (b) Describe how each wireless network protocol works. (c) Illustrate the best environment each protocol is best applicable (d) Explain the merits and demerits of each wireless technology (e) Identify the data rate and coverage range of various wireless technologies	Different protocols are correctly applied in designing wireless computer networks	Written test End of semester examination Assignment Presentation	Model answers Question papers Assignment reports Checklist
6.2.3 Use mobile wireless and cellular radio principles in analysing system capacity	(a) Explain the classes of antennae structures (e.g. SIMO, MISO, MIMO) (b) Describe various generations of cellular networks (c) Analyse performance of various cellular networks	Mobile wireless and cellular radio principles are properly used in analysing the system capacity	Written test End of semester examination Assignment Presentation	Model answers Question papers Assignment reports Checklist

	using network simulations (d) Discuss the mobility of wireless node and handoff feature (e) Describe how Mobile IP works			
6.2.4 Perform configuration of mobile wireless systems in real world environment	(a) Apply orthogonal frequency-division multiplexing and modulation performance in fading and multipath channels (b) Use multiple access technologies (time, frequency, packet reservation and space division multiple access, wireless LAN protocols, system capacity comparison) in designing broadband technologies c) Illustrate speech coding and channel coding (linear predictive coding, block codes, convolution codes and interleaving) in configuring mobile and wireless	Mobile wireless systems are properly configured in real world environment	Practical test Assignments	Checklist Assignment reports

	system (d) Use of network simulator tools in demonstrating mobile wireless configurations			
6.2.5 Employ channel coding, modulation techniques and multiple access techniques in determining propagation loss	(a) Explain the modulation and multiple Access techniques (b) Calculate the propagation loss of signal transmission (c) Explain the causes of the multipath propagation (d) Compare the capacity of the different wireless communication systems in terms of bandwidth, area coverage, modulation, mobility and speed (e) Analyse the Quality of service of different fixed and mobile wireless networks	Coding channel, modulation techniques and multiple access techniques are correctly employed to determine propagation loss	Written test End of semester examination Assignment Presentation	Model answers Question papers Assignment reports Checklist