COURSE SYLLABUS
(Bachelor of Electrical & Electronic Engineering (Communication))

FACULTY OF ENGINEERING NATIONAL DEFENCE UNIVERSITY OF MALAYSIA **NAME DAN COURSE CODE :** DATA COMMUNICATION & MULTIMEDIA SYSTEM (EEC 4113)	**Page :** 1 / 5

Lecture Hours : 3 hrs x 14 weeks **Tutorial / PBL Hours :** 1 hr x 14 weeks **LECTURER:** 1. ENGR.MUHAZAM BIN MUSTAPHA Bistari | muhazam@upnm.edu.my	**Revision :** B **Date of Issue :** June 30th 2009 **Last Amendment :** September 20th 2011 **Edition :** 5 **Procedure No:** PK (O). UPNM.AKAD.01

PRE REQUISITE: NONE

SYNOPSIS:

This subject covers all layers of OSI Model of data communication system. It explains the basic process of data communication, protocol, interfacing and internetworking between computer networks and switching components in telecommunication system. At the end of the course, the students should be able to understand the system used in representation, distribution, transmission and reception of data. The students are also equipped with basic digital multimedia knowledge. They will be taught about the way multimedia data being send over the network especially over the internet. As a hands-on skill of the application layer of ISO Model, the students are also given some skills on web server administration and web development.

OBJECTIVES:

This subject aims to give students *wide breadth* and *surface depth* knowledge of OSI Model of data communication system. The students are also expected to have some beginner's skills on web server administration and web development.

COURSE OUTCOMES:

Having successfully completed the course, the students are able to:

Course Outcome 1:	Explain the concepts of data communication using layered approach based OSI and TCP/IP and their applications	PO2, PO3, PO4
Course Outcome 2:	Analyze certain problems in data communication and perform the required solutions	PO2, PO3, PO4
Course Outcome 3:	Synthesize, practice and maintain application layer OSI as web application	PO2, PO3, PO4

MAIN REFERENCES:

1. William Stallings, "*Data and Computer Communications, Prentice Hall, 6/7th edition"* 2000
2. Jerry Fitzgerald, Alan Dennis, "*Fundamentals of Business Data Communications, 10th edition*" 2010
3. James F. Kurose, Keith W. Ross, "*Computer Networking, Addison Wesley, 4th edition"* 2008
4. Nigel Chapman, Jenny Chapman, "*Digital Multimedia, John Wiley & Sons, 3rd edition"* 2009

OTHER REFERENCES:

1. B. A. Forouzon, "*Data and Computer Network*", McGraw Hill, 2000
2. F. Hallsall," *Data Communication, Computer Network and Open System, Addison Wesley, 6th Edition"* 1998

Prepared by ; Name: **ENGR. MUHAZAM BIN MUSTAPHA** Signature: Date:	Certified by ; Name: **ASSOC. PROF. NIK GHAZALI BIN NIK DAUD** Signature: Date:

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SYLLABUS & CONTACT HOURS:

Week	Topics / Contents	Hours
1	**Introduction:** Communication models, architecture & protocols (TCP/IP and OSI Reference Model) **Physical Layer (Baseband Coding):** NRZ, NRZI, Manchester Bipolar (MB), Differential MB, On-Off Keying Pulse Width Modulation, Binary with 8 Zeroes Substitution	3
2	**Physical Layer (Broadband Coding)** Amplitude/Frequency Shift/Phase Keying, Quadrature Amplitude Modulation, FHSS, DSSS	3
3	**Datalink Layer (Flow Control):** Stop & Wait, pipeline, piggyback / no-piggyback protocols, sliding windows, line utilization	3
4	**Datalink Layer (Error Control):** Error detection via Parity, Longitudinal/Vertical/Cyclic Redundancy Checks, Effect of window size on error correction, Error Correction via ARQ, self-correcting codes, HDLC.	3
5	**Datalink Layer (MAC):** Channel Allocation problem, Multiple Access Protocols: ALOHA-based schemes, IEEE 802.x: Ethernet, Token Ring & Token Bus, MAC in WLANs, topology	3
6	**Network Layer:** circuit & packet Switching: concepts, Space division switch, signaling	3
7	**Transport Layer:** X.25, frame relay, ATM, shortest path routing, congestion detection and control, internetworking, IP address	3
8	**Session Layer:** models for cryptography: symmetric key, public key; authentication, firewalls, steganography	3
9	**Test 1:** Covers up to Network Layer, and web development exercises and progresses up to the same week	3
10	**Presentation Layer:** ASN.1, XML, XML formatted data, XML defined language, SVG	3
11	**Application Layer (Networked Multimedia):** Application layer protocols, HTTP, FTP, SMTP, POP, representation, audio, video, stored, live, applications: IPTV, YouTube, Flash, Internet Radio, VoIP, Skype, multimedia transfer technique, data compression, packet jitter, delay, loss, end-to-end, interleaving, RTSP, MPEG	3
12	**Application Layer (Text-based Multimedia):** Web services, SOAP, RESTful, .NET support, other platform support, applications, images, RIFF, file formats, headers, MIME, RSS feed, MathML, Web 2.0	3
13	**Assignment Defense:** Demo and viva on web application assignment	3
14	**Test 2:** Covers Transport Layer and web development till the end	3

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STUDENT LEARNING TIME (SLT)

	Teaching and Learning Activities (Format JPT)	Hours
	Face to Face	
1	Lecture	42
2	Tutorial	14
3	Activity SCL / PBL etc	0
	Self Learning	
4	Individual Assignments / Group Assignment / Project Implementation etc	14
5	Revision / Self-learning / Lecture preparation	32
6	Preparation for test / exam / presentation	10
	Formal Assessment	
7	Continuous Assessment / Quiz / Test / Presentation	5
8	Final exam	3
	Total T&L Hours	**120**

Course credit for 'Data Communication & Multimedia System' is 120 hrs. / 40 = 3.00 (3 credit)

TEACHING METHODOLOGY:

1. Students exposed to the fundamental concepts in engineering and given as many examples as possible on the application of such principles to solve related problems.
2. Students are required to go through the tutorial sets and group discussion.
3. Students are encouraged to expose themselves to problems from various other sources.

COURSE ASSESSMENTS:

Assessments	%	**COs**	**POs**
Quizzes	10	CO1, CO2	PO2, PO3, PO4
Assignments	20	CO3	PO2, PO3, PO4
Midterm Test	20	CO1, CO2, CO3	PO2, PO3, PO4
Final Exam	50	CO1, CO2	PO2, PO3, PO4
Total	100		

***** Additional tests, if taken will be averaged out.
***** Passing marks is 40%.

Rules and Regulations: Refer to ***Peraturan Akademik UPNM***

Notes: Program Learning Outcome (PO) for;
Bachelor of Electrical & Electronic Engineering (Communication)

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Relationship Between Programme Learning Outcome (PO) and Course Learning Outcome (CO)

	Course Learning Outcome (CO)			Relatioship with Programme Learning Outcome (PO) (To cover 8 domains in MQF)									Delivery	Assessment
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11		
1	Explain the concepts of data communication using layered approach based OSI and TCP/IP and their applications		3	3	3								Lecture & Tutorial	Quiz, Midterm & Final Exam
2	Analyze certain problems in data communication and perform the required solutions		3	3	3								Lecture & Tutorial	Midterm & Final Exam
3	Synthesize, practice and maintain application layer OSI as web application		3	3	3								Tutorial	Assignment & Midterm

CO Contribution to PO:
1= Very insignificant and not being assessed. **2=** Moderate contribution with indirect assessment
3= Significant contribution with comprehensive assessment.

Relationship between CO and Generic Skills

Generic Skills	CO1	CO2	CO3			Assessment
Communication						
Critical Thinking and Problem Solving	3	3	3			Assignment, Midterm, Final Exam
Team work						
Life-Long Learning and Information Management	3	3	3			Assignment, Midterm, Final Exam
Ethics and Morale						
Leadership						

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Program Learning Outcome is the ability of the student to adapt all learning domains to show their proof of competency. This ability includes 8 domains in Malaysian Qualification Agency (MQA) and they are:

i. Knowledge;
ii. Practical skills;
iii. Social skills and responsibilities;
iv. Values, attitudes and professionalism;
v. Communication, leadership and team skills;
vi. Problem solving and scientific skills;
vii. Information management and lifelong learning skills; and
viii. Managerial and entrepreneurial skills.

PO	Definition	MQF PO	Taxonomy
PO1	Ability to acquire and apply knowledge of sciences, electrical and electronic engineering principles.	PO1	C
PO2	Ability to apply techniques, skills and use modern engineering tools.	PO2	P
PO3	Ability to identify, formulate and solve electrical and electronic engineering related problems.	PO6	C
PO4	Ability to utilize systems approach to design and evaluation of operational performance.	PO2, PO6	C, P
PO5	Ability to communicate effectively and with confidence not only with engineers but also with the community at large.	PO5	A
PO6	Ability to respond and adapt to changing situations with special attention toward sustainable development or defense applications.	PO7	A
PO7	Ability to function effectively as an individual and/or in group with the capacity to be a leader/manager to achieve common goals.	PO5	A
PO8	Ability to adopt of professional ethical responsibilities and commitment to them.	PO4	A
PO9	Ability to incorporate the social, cultural, global and environmental responsibilities of a professional engineer in civilian and military context.	PO3	A
PO10	Ability to seek and acquire contemporary knowledge including defense matters.	PO7	A
PO11	Ability to possess entrepreneurship qualities.	PO8	A