

### Subject Description Form

<b>Subject Code</b>	EIE3333
<b>Subject Title</b>	Data and Computer Communications
<b>Credit Value</b>	3
<b>Level</b>	3
<b>Pre-requisite/ Co-requisite/ Exclusion</b>	Nil
<b>Objectives</b>	<ol style="list-style-type: none"> <li>1. To provide solid foundation to students about the architectures and operations of communication networks.</li> <li>2. To enable students to master the knowledge about computer networking in the context of real-life applications.</li> <li>3. To prepare students to learn and to critically evaluate new knowledge and emerging technology in communication networks.</li> </ol>
<b>Intended Subject Learning Outcomes</b>	<p><b>Upon completion of the subject, students will be able to:</b></p> <p><u>Category A: Professional/academic knowledge and skills</u></p> <ol style="list-style-type: none"> <li>1. Understand the services, functions, and inter-relationship of different layers in communication network models</li> <li>2. Describe how components in different layers inter-operate and analyze their performance.</li> <li>3. Understand and apply the principles and practices of communication networks.</li> <li>4. Learn new techniques and to align new technologies to existing network infrastructure.</li> </ol> <p><u>Category B: Attributes for all-roundedness</u></p> <ol style="list-style-type: none"> <li>5. Present ideas and findings effectively.</li> <li>6. Learn independently.</li> </ol>
<b>Subject Synopsis/ Indicative Syllabus</b>	<p><b>Syllabus:</b></p> <ol style="list-style-type: none"> <li>1. <u>Computer Networks, Services, and Layered Architectures</u> Evolution of networking and switching technology. Protocol and services. Layered network architectures: OSI 7-layer model, TCP/IP architecture.</li> <li>2. <u>Digital Transmission and Protocols in Data Link Layer</u> Line coding techniques, error detection and correction. Automatic Repeat Request (ARQ) protocol and reliable data transfer service. Sliding-window flow control. Framing and point-to-point protocol, flow control and error controls. High level data link control (HDLC) protocol and point-to-point protocol (PPP).</li> <li>3. <u>Local Area Networks (LANs) and Wireless LANs</u> Media Access Control (MAC) protocols: the IEEE802.3 Ethernet and IEEE802.11 wireless LAN standards. Interconnection of LANs: bridge, switch, and virtual LAN.</li> <li>4. <u>Network Layer Protocols</u> Network layer operations, connection oriented and connectionless services. Internet protocol (IP): IP datagram format, IP addressing, subnetting, IP routing and router operations. Internet control message protocol (ICMP), dynamic host configuration protocol (DHCP), network address translation (NAT).</li> <li>5. <u>Transport Layer Protocols</u> Transmission control protocol (TCP) and user datagram protocol (UDP)</li> </ol>

	<b>Possible Laboratory Experiments:</b> 1. Cisco router configuration and programming. 2. Static and Dynamic routing. 3. Network monitoring and analysis 4. Address resolution, ARP, IP, and TCP.							
<b>Teaching/ Learning Methodology</b>	<b>Teaching and Learning Method</b>	<b>Intended Subject Learning Outcome</b>	<b>Remarks</b>					
	Lectures	1, 2, 3, 4	Fundamental principles and key concepts of the subject are delivered to students.					
	Tutorials	1, 2, 3, 4, 5	Supplementary to lectures. Students will be able to clarify concepts and to have a deeper understanding of the lecture material; Problems and application examples are given and discussed.					
	Laboratory sessions	5, 6	Students will conduct practical exercises to reinforce concepts and techniques learned.					
<b>Alignment of Assessment and Intended Subject Learning Outcomes</b>	<b>Specific Assessment Methods/ Task</b>	<b>% Weighting</b>	<b>Intended Subject Learning Outcomes to be Assessed (Please tick as appropriate)</b>					
			<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
	1. Continuous Assessment	40%						
	• Tests		✓	✓	✓	✓	✓	
	• Assignments		✓	✓	✓	✓	✓	
	• Laboratories				✓		✓	✓
	2. Examination	60%	✓	✓	✓	✓	✓	
	Total	100%						
	The continuous assessment will consist of a number of assignments, laboratory reports, case study reports (administered in tutorial sessions), and two tests.							

	<b>Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:</b>	
	<b>Specific Assessment Methods/ Tasks</b>	<b>Remark</b>
	Assignments, Tests and examination	These can measure the students' understanding of the theories and the concepts of the subject. End-of-chapter type problems used to evaluate students' ability in applying concepts and skills learnt in the classroom; Assignments of reading report type to assess students' ability in acquiring new knowledge related to communication networks; Students need to think critically and creatively in order to come with an alternate solution for an existing problem.
	Laboratory sessions	Each group of students is required to complete work-sheets, to indicate their understanding and correct completion of the laboratories. Accuracy and the presentation of the work-sheets will be assessed;
<b>Student Study Effort Expected</b>	<b>Class contact (time-tabled):</b>	
	• Lecture	24 Hours
	• Tutorial/Laboratory/Practice Classes	15 hours
	<b>Other student study effort:</b>	
	• Lecture: preview/review of notes; homework/assignment; preparation for test/quizzes/examination	36 Hours
	• Tutorial/Laboratory/Practice Classes: preview of materials, revision and/or reports writing	30 Hours
	<b>Total student study effort:</b>	<b>105 Hours</b>
<b>Reading List and References</b>	<b>Textbook :</b> 1. Behrouz A. Forouzan, <i>Data Communications &amp; Networking</i> , 5 <sup>th</sup> ed., McGraw-Hill, 2012.  <b>Reference Books:</b> 1. Behrouz A. Forouzan, <i>Computer Networks: A Top-Down Approach</i> , McGraw-Hill, 2012. 2. William Stallings, <i>Data and Computer Communications</i> , 9 <sup>th</sup> ed., Pearson/Prentice-Hall, 2012. 3. Douglas Comer, <i>Computer Networks and Internets</i> , 5 <sup>th</sup> ed., Pearson/Prentice-Hall, 2009.	
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