

Subject Description Form

Subject Code	EIE3333
Subject Title	Data and Computer Communications
Credit Value	3
Level	3
Pre-requisite/ Co-requisite/ Exclusion	Nil
Objectives	<ol style="list-style-type: none"> 1. To provide solid foundation to students about the architectures and operations of communication networks. 2. To enable students to master the knowledge about computer networking in the context of real-life applications. 3. To prepare students to learn and to critically evaluate new knowledge and emerging technology in communication networks.
Intended Subject Learning Outcomes	<p>Upon completion of the subject, students will be able to:</p> <p><u>Category A: Professional/academic knowledge and skills</u></p> <ol style="list-style-type: none"> 1. Understand the services, functions, and inter-relationship of different layers in communication network models 2. Describe how components in different layers inter-operate and analyze their performance. 3. Understand and apply the principles and practices of communication networks. 4. Learn new techniques and to align new technologies to existing network infrastructure. <p><u>Category B: Attributes for all-roundedness</u></p> <ol style="list-style-type: none"> 5. Present ideas and findings effectively. 6. Learn independently.
Subject Synopsis/ Indicative Syllabus	<p>Syllabus:</p> <ol style="list-style-type: none"> 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. 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). 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. 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). 5. <u>Transport Layer Protocols</u> Transmission control protocol (TCP) and user datagram protocol (UDP)

	<p>Possible Laboratory Experiments:</p> <ol style="list-style-type: none"> 1. Cisco router configuration and programming. 2. Static and Dynamic routing. 3. Network monitoring and analysis 4. Address resolution, ARP, IP, and TCP. 																																																																				
<p>Teaching/ Learning Methodology</p>	<table border="1"> <thead> <tr> <th data-bbox="480 349 703 488">Teaching and Learning Method</th> <th data-bbox="703 349 895 488">Intended Subject Learning Outcome</th> <th colspan="6" data-bbox="895 349 1390 488">Remarks</th> </tr> </thead> <tbody> <tr> <td data-bbox="480 488 703 600">Lectures</td> <td data-bbox="703 488 895 600">1, 2, 3, 4</td> <td colspan="6" data-bbox="895 488 1390 600">Fundamental principles and key concepts of the subject are delivered to students.</td> </tr> <tr> <td data-bbox="480 600 703 813">Tutorials</td> <td data-bbox="703 600 895 813">1, 2, 3, 4, 5</td> <td colspan="6" data-bbox="895 600 1390 813">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.</td> </tr> <tr> <td data-bbox="480 813 703 925">Laboratory sessions</td> <td data-bbox="703 813 895 925">5, 6</td> <td colspan="6" data-bbox="895 813 1390 925">Students will conduct practical exercises to reinforce concepts and techniques learned.</td> </tr> </tbody> </table>							Teaching and Learning Method	Intended Subject Learning Outcome	Remarks						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.																																			
Teaching and Learning Method	Intended Subject Learning Outcome	Remarks																																																																			
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.																																																																			
<p>Alignment of Assessment and Intended Subject Learning Outcomes</p>	<table border="1"> <thead> <tr> <th data-bbox="480 992 794 1149" rowspan="2">Specific Assessment Methods/ Task</th> <th data-bbox="794 992 986 1149" rowspan="2">% Weighting</th> <th colspan="6" data-bbox="986 992 1390 1104">Intended Subject Learning Outcomes to be Assessed (Please tick as appropriate)</th> </tr> <tr> <th data-bbox="986 1104 1054 1149">1</th> <th data-bbox="1054 1104 1123 1149">2</th> <th data-bbox="1123 1104 1192 1149">3</th> <th data-bbox="1192 1104 1260 1149">4</th> <th data-bbox="1260 1104 1329 1149">5</th> <th data-bbox="1329 1104 1390 1149">6</th> </tr> </thead> <tbody> <tr> <td data-bbox="480 1149 794 1227">1. Continuous Assessment</td> <td data-bbox="794 1149 986 1227">40%</td> <td data-bbox="986 1149 1054 1227"></td> <td data-bbox="1054 1149 1123 1227"></td> <td data-bbox="1123 1149 1192 1227"></td> <td data-bbox="1192 1149 1260 1227"></td> <td data-bbox="1260 1149 1329 1227"></td> <td data-bbox="1329 1149 1390 1227"></td> </tr> <tr> <td data-bbox="480 1227 794 1283">• Tests</td> <td data-bbox="794 1227 986 1283"></td> <td data-bbox="986 1227 1054 1283">✓</td> <td data-bbox="1054 1227 1123 1283">✓</td> <td data-bbox="1123 1227 1192 1283">✓</td> <td data-bbox="1192 1227 1260 1283">✓</td> <td data-bbox="1260 1227 1329 1283">✓</td> <td data-bbox="1329 1227 1390 1283"></td> </tr> <tr> <td data-bbox="480 1283 794 1339">• Assignments</td> <td data-bbox="794 1283 986 1339"></td> <td data-bbox="986 1283 1054 1339">✓</td> <td data-bbox="1054 1283 1123 1339">✓</td> <td data-bbox="1123 1283 1192 1339">✓</td> <td data-bbox="1192 1283 1260 1339">✓</td> <td data-bbox="1260 1283 1329 1339">✓</td> <td data-bbox="1329 1283 1390 1339"></td> </tr> <tr> <td data-bbox="480 1339 794 1395">• Laboratories</td> <td data-bbox="794 1339 986 1395"></td> <td data-bbox="986 1339 1054 1395"></td> <td data-bbox="1054 1339 1123 1395"></td> <td data-bbox="1123 1339 1192 1395">✓</td> <td data-bbox="1192 1339 1260 1395"></td> <td data-bbox="1260 1339 1329 1395">✓</td> <td data-bbox="1329 1339 1390 1395">✓</td> </tr> <tr> <td data-bbox="480 1395 794 1451">2. Examination</td> <td data-bbox="794 1395 986 1451">60%</td> <td data-bbox="986 1395 1054 1451">✓</td> <td data-bbox="1054 1395 1123 1451">✓</td> <td data-bbox="1123 1395 1192 1451">✓</td> <td data-bbox="1192 1395 1260 1451">✓</td> <td data-bbox="1260 1395 1329 1451">✓</td> <td data-bbox="1329 1395 1390 1451"></td> </tr> <tr> <td data-bbox="480 1451 794 1485">Total</td> <td data-bbox="794 1451 986 1485">100%</td> <td colspan="6" data-bbox="986 1451 1390 1485"></td> </tr> </tbody> </table> <p data-bbox="480 1507 1390 1597">The continuous assessment will consist of a number of assignments, laboratory reports, case study reports (administered in tutorial sessions), and two tests.</p>							Specific Assessment Methods/ Task	% Weighting	Intended Subject Learning Outcomes to be Assessed (Please tick as appropriate)						1	2	3	4	5	6	1. Continuous Assessment	40%							• Tests		✓	✓	✓	✓	✓		• Assignments		✓	✓	✓	✓	✓		• Laboratories				✓		✓	✓	2. Examination	60%	✓	✓	✓	✓	✓		Total	100%						
Specific Assessment Methods/ Task	% Weighting	Intended Subject Learning Outcomes to be Assessed (Please tick as appropriate)																																																																			
		1	2	3	4	5	6																																																														
1. Continuous Assessment	40%																																																																				
• Tests		✓	✓	✓	✓	✓																																																															
• Assignments		✓	✓	✓	✓	✓																																																															
• Laboratories				✓		✓	✓																																																														
2. Examination	60%	✓	✓	✓	✓	✓																																																															
Total	100%																																																																				

	<p>Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:</p>	
	<p>Specific Assessment Methods/ Tasks</p>	<p>Remark</p>
	<p>Assignments, Tests and examination</p>	<p>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;</p> <p>Assignments of reading report type to assess students' ability in acquiring new knowledge related to communication networks;</p> <p>Students need to think critically and creatively in order to come with an alternate solution for an existing problem.</p>
	<p>Laboratory sessions</p>	<p>Each group of students is required to complete work-sheets, to indicate their understanding and correct completion of the laboratories.</p> <p>Accuracy and the presentation of the work-sheets will be assessed;</p>
<p>Student Study Effort Expected</p>	<p>Class contact (time-tabled):</p>	
	<ul style="list-style-type: none"> • Lecture 	<p>24 Hours</p>
	<ul style="list-style-type: none"> • Tutorial/Laboratory/Practice Classes 	<p>15 hours</p>
	<p>Other student study effort:</p>	
	<ul style="list-style-type: none"> • Lecture: preview/review of notes; homework/assignment; preparation for test/quizzes/examination 	<p>36 Hours</p>
	<ul style="list-style-type: none"> • Tutorial/Laboratory/Practice Classes: preview of materials, revision and/or reports writing 	<p>30 Hours</p>
	<p>Total student study effort:</p>	
<p>Reading List and References</p>	<p>Textbook :</p> <ol style="list-style-type: none"> 1. Behrouz A. Forouzan, <i>Data Communications & Networking</i>, 5th ed., McGraw-Hill, 2012. <p>Reference Books:</p> <ol style="list-style-type: none"> 1. Behrouz A. Forouzan, <i>Computer Networks: A Top-Down Approach</i>, McGraw-Hill, 2012. 2. William Stallings, <i>Data and Computer Communications</i>, 9th ed., Pearson/Prentice-Hall, 2012. 3. Douglas Comer, <i>Computer Networks and Internets</i>, 5th ed., Pearson/Prentice-Hall, 2009. 	
<p>Last Updated</p>	<p>December 2016</p>	
<p>Prepared by</p>	<p>Dr K.T. Lo</p>	