

Subject Description Form

Subject Code	COMP2322					
Subject Title	Computer Networking					
Credit Value	3					
Level	2					
Pre-requisite / Co-requisite / Exclusion	Pre-requisite: COMP1011					
Objectives	The key objective of this subject is to acquire a foundational understanding of computer communications technologies. Emphasis will be on the link layer and above. Networking concepts will be illustrated using the TCP/IP and ATM networks.					
Intended Learning Outcomes	<p>Upon completion of the subject, students will be able to:</p> <p><i>Professional/academic knowledge and skills</i></p> <p>(a) acquire a good knowledge of the computer network, its architecture and operation;</p> <p>(b) understand and apply the principles and practices of computer networks;</p> <p>(c) realise network communication skills through programming;</p> <p><i>Attributes for all-roundedness</i></p> <p>(d) follow trends of computer networks; and</p> <p>(e) build up on team work, presentation and technical writing skills.</p>					
Subject Synopsis/ Indicative Syllabus	<table border="1" style="width: 100%;"> <thead> <tr> <th style="text-align: left;">Topic</th> </tr> </thead> <tbody> <tr> <td> 1. Fundamentals Networking basics; layering concept; protocols; data encapsulation; OSI reference model; TCP/IP reference model; performance evaluation. </td> </tr> <tr> <td> 2. Data Link and MAC Sublayer Data link layer basics; framing; error detection; automatic repeat request protocols; LAN; link layer and MAC protocols. </td> </tr> <tr> <td> 3. Network Layer Network layer basics; connection-oriented and connectionless networks; routing/forwarding mechanisms; distance vector and link state routing algorithms; IP basics; IP addressing and subnets; address resolution protocol. </td> </tr> <tr> <td> 4. Transport Layer User Datagram Protocol (UDP); Transmission Control Protocol (TCP). </td> </tr> </tbody> </table>	Topic	1. Fundamentals Networking basics; layering concept; protocols; data encapsulation; OSI reference model; TCP/IP reference model; performance evaluation.	2. Data Link and MAC Sublayer Data link layer basics; framing; error detection; automatic repeat request protocols; LAN; link layer and MAC protocols.	3. Network Layer Network layer basics; connection-oriented and connectionless networks; routing/forwarding mechanisms; distance vector and link state routing algorithms; IP basics; IP addressing and subnets; address resolution protocol.	4. Transport Layer User Datagram Protocol (UDP); Transmission Control Protocol (TCP).
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	<p>5. Application Layer Networking applications.</p>																																																							
	<p><u>Laboratory Experiment:</u> Laboratory exercises on networking such as socket programming and IP-based applications.</p> <p><u>Case Study:</u> Networking technologies and applications.</p>																																																							
<p>Teaching/ Learning Methodology</p>	<p>Teaching is mainly conducted through lectures. Learning is supplemented by exercises in labs/tutorials. Students are assessed through assignments, a project, a mid-term test and an examination.</p>																																																							
<p>Assessment Methods in Alignment with Intended Learning Outcomes</p>	<table border="1"> <thead> <tr> <th rowspan="2">Specific assessment methods/tasks</th> <th rowspan="2">% weighting</th> <th colspan="5">Intended subject learning outcomes to be assessed</th> </tr> <tr> <th>a</th> <th>b</th> <th>c</th> <th>d</th> <th>e</th> </tr> </thead> <tbody> <tr> <td>Continuous Assessment</td> <td rowspan="4">55%</td> <td colspan="5"></td> </tr> <tr> <td>1. Assignments</td> <td>✓</td> <td>✓</td> <td></td> <td>✓</td> <td></td> </tr> <tr> <td>2. Project</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>3. Mid-Term</td> <td>✓</td> <td>✓</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Examination</td> <td>45%</td> <td>✓</td> <td>✓</td> <td></td> <td>✓</td> <td></td> </tr> <tr> <td>Total</td> <td>100%</td> <td colspan="5"></td> </tr> </tbody> </table>					Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed					a	b	c	d	e	Continuous Assessment	55%						1. Assignments	✓	✓		✓		2. Project	✓	✓	✓	✓	✓	3. Mid-Term	✓	✓				Examination	45%	✓	✓		✓		Total	100%					
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<p>Student Study Effort Expected</p>	<p>Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:</p> <p>The project is used to assess all learning outcomes.</p> <p>The assignments and mid-term test are used as continuous assessment methods to assess students' knowledge and understanding about the subject.</p> <p>Finally, students are assessed by a formal examination.</p> <p>Class contact:</p> <table border="1"> <tr> <td>▪ Lecture</td> <td>39 Hrs.</td> </tr> <tr> <td>▪ Tutorial/Lab</td> <td>13 Hrs.</td> </tr> </table> <p>Other student study effort:</p> <table border="1"> <tr> <td>▪ Self-study</td> <td>53 Hrs.</td> </tr> </table>					▪ Lecture	39 Hrs.	▪ Tutorial/Lab	13 Hrs.	▪ Self-study	53 Hrs.																																													
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	Total student study effort	105 Hrs.
Reading List and References	<p>Textbook:</p> <ol style="list-style-type: none"> Peterson, L. and Davie, B., <i>Computer Networks: A Systems Approach</i>, 4th Edition, Morgan Kaufmann, 2007. <p>Reference Books:</p> <ol style="list-style-type: none"> Stevens, W. R., <i>TCP/IP Illustrated Volume I, The Protocols</i>, Addison Wesley, 1994. Tanenbaum, A. S., <i>Computer Networks</i>, 5th Edition, Prentice Hall, 2010. Comer, D. E., <i>Internetworking with TCP/IP: Volume I - Principles, Protocols, and Architecture</i>, 5th Edition, Prentice Hall, 2006. Keshav, S., <i>An Engineering Approach to Computer Networking: ATM Networks, the Internet, and the Telephone Network</i>, Addison Wesley Longman, 1997. Stallings, W., <i>High-speed Networks and Internets: Performance and Quality of Service</i>, 2nd Edition, Prentice Hall, 2002. Stallings, W., <i>Network and Internetwork Security: Principles and Practice</i>, IEEE Press, 1995. Stevens, W. R., <i>Unix Network Programming, Volume 1: The Sockets Networking API</i>, 3rd Edition, Addison-Wesley Professional, 2003. 	