

Subject Description Form

Subject Code	COMP312
Subject Title	Computer Communications Networks
Credit Value	3
Level	3
Pre-requisite / Co-requisite/ Exclusion	Pre-requisite: COMP201 Co-requisite/Exclusion: Nil
Objectives	The key objective 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) realize network communication skills through programming;</p> <p><i>Attributes for all-roundedness</i></p> <p>(d) follow trends of computer networks;</p> <p>(e) build up on team work, presentation and technical writing skills.</p> <p>Alignment of Programme Outcomes:</p> <p>Programme Outcome 1: This subject contributes to having students practice their writing skills with report writing.</p> <p>Programme Outcome 4: This subject contributes to developing student critical thinking through tutorial and lab exercises on solving problems. They will also practice more in written assignments and a project.</p> <p>Programme Outcome 5: This subject contributes to problem solving with programming skills through lab exercises and a project.</p> <p>Programme Outcome 7: This subject contributes to team work with a project for students to work in a team.</p>

Subject Synopsis/ Indicative Syllabus	Topic																																																		
	<p>1. Fundamentals Networking basics; layering concept; protocols; data encapsulation; OSI reference model; TCP/IP reference model; performance evaluation.</p> <p>2. Data link and MAC sublayer Data link layer basics; framing; error detection; automatic repeat request protocols; LAN; link layer and MAC protocols.</p> <p>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.</p> <p>4. Transport layer User Datagram Protocol (UDP); Transmission Control Protocol (TCP).</p> <p>5. Application layer Networking applications.</p>																																																		
	<p>Laboratory Experiment: Laboratory exercises on networking such as socket programming and IP-based applications.</p> <p>Case Study: Networking technologies and applications.</p>																																																		
Teaching/Learning Methodology	<p>The teaching and learning process will focus on the general principles of the development of the Internet. Networking foundations and Internet practice will be discussed in detail. The course will also provide the students with on hand experience of each individual technique taught in class.</p>																																																		
Assessment Methods in Alignment with Intended Learning Outcomes	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2" style="width: 25%;">Specific assessment methods/tasks</th> <th rowspan="2" style="width: 10%;">% weighting</th> <th colspan="6">Intended subject learning outcomes to be assessed (Please tick as appropriate)</th> </tr> <tr> <th style="width: 5%;">a</th> <th style="width: 5%;">b</th> <th style="width: 5%;">c</th> <th style="width: 5%;">d</th> <th style="width: 5%;">e</th> <th style="width: 5%;"></th> </tr> </thead> <tbody> <tr> <td>1. Assignments</td> <td rowspan="3" style="text-align: center; vertical-align: middle;">55%</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">✓</td> <td></td> <td style="text-align: center;">✓</td> <td></td> <td></td> </tr> <tr> <td>2. Project</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">✓</td> <td></td> </tr> <tr> <td>3. Mid-term</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">✓</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>4. Examination</td> <td style="text-align: center; vertical-align: middle;">45%</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">✓</td> <td></td> <td style="text-align: center;">✓</td> <td></td> <td></td> </tr> </tbody> </table>							Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)						a	b	c	d	e		1. Assignments	55%	✓	✓		✓			2. Project	✓	✓	✓	✓	✓		3. Mid-term	✓	✓					4. Examination	45%	✓	✓		✓		
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4. Examination	45%	✓	✓		✓																																														

	Total	100 %	
Student Study Effort Expected	<p>Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:</p> <p>The assessment is appropriate. More specifically, this course is heavy-weighted with the principles and foundations of networking and its real-world practice, i.e., the Internet. The exams and assignments will evaluate the student the knowledge they learned and the skills to solve problems independently. The labs and projects are the best for the individual techniques learned and group collaborations.</p>		
	Class contact:		
	▪ Lecture	39 Hrs.	
	▪ Lab	13 Hrs.	
	Other student study effort:		
	▪ Self-study/assignments/project	39 Hrs.	
	▪	Hrs.	
	Total student study effort		91 Hrs.
Reading List and References	<p>Textbook:</p> <ol style="list-style-type: none"> 1. J. Kurose and K. Ross, Computer Networking: A Top Down Approach, Fourth Edition, Addison Wesley, 2007. <p>Reference Books:</p> <ol style="list-style-type: none"> 1. L. Peterson and B. Davie, Computer Networks: A Systems Approach, Fourth Edition, Morgan Kaufmann, 2007. 2. W. R. Stevens, TCP/IP Illustrated Volume I, The Protocols, Addison Wesley, 1994. 3. A. S. Tanenbaum, Computer Networks, Fourth Edition, Prentice Hall, 2003. 4. D. E. Comer, Internetworking with TCP/IP: Volume I - Principles, Protocols, and Architecture, Fifth Edition, Prentice Hall, 2006. 5. S. Keshav, An Engineering Approach to Computer Networking: ATM Networks, the Internet, and the Telephone Network, Addison Wesley Longman, 1997. 6. W. Stallings, High-speed Networks and Internets: Performance and Quality of Service, Second Edition, Prentice Hall, 2002. 7. W. Stallings, Network and Internetwork Security: Principles and Practice, IEEE Press, 1995. 8. W. R. Stevens, UNIX Network Programming (Volume 1) - Networking APIs: Sockets and XTI, Second Edition, Prentice Hall, 1998. 		