

Subject Description Form

Subject Code	COMP207
Subject Title	Discrete Structures and Data Model
Credit Value	3
Level	4
Pre-requisite / Co-requisite/ Exclusion	Pre-requisite/Co-requisite: Nil Exclusion: COMP210
Objectives	<ul style="list-style-type: none"> • To introduce students to the concepts and applications of discrete mathematical structures, probability and statistics. • To help students attain the fundamental mathematical knowledge and reasoning skills they need to be successful in upper-level computing subjects.
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) apply discrete structures knowledge and skills to solve real world problems using computers;</p> <p>(b) possess the capability to read research papers in which concepts are expressed formally in terms of probability and statistics;</p> <p>(c) acquire skills to compute probabilities of events in the reality;</p> <p><i>Attributes for all-roundedness</i></p> <p>(d) acquire mathematical knowledge and skills required to further study other more advanced computing-related subjects;</p> <p>(e) relate learned mathematical knowledge to other computing subjects.</p> <p>Alignment of Programme Outcomes:</p> <p>Programme Outcome 1: This subject contributes to having students practice their writing skills in English to mathematically formulate a technical problem;</p> <p>Programme Outcome 2: This subject contributes to making students to describe a system from a global view;</p> <p>Programme Outcome 4: This subject contributes to developing student critical thinking through lecture, tutorial and assignment exercises on solving problems;</p> <p>Programme Outcome 5: This subject contributes to problem solving with reasoning skills through tutorial exercise, quiz and exams.</p>

Subject Synopsis/ Indicative Syllabus	Topic		Duration of Lectures																																																						
	1. Set, relations and functions Sets; relations and functions; equivalence; cardinality; order relations.		4																																																						
	2. Propositional and predicate logic Logical expressions; truth tables; Karnaugh maps; tautologies; formal reasoning; predicates; quantifiers.		4																																																						
	3. Graph and Tree Graph, digraph, isomorphism; connectivity; Euler and Hamilton Path; shortest path problems; planar graphs; graph coloring; trees and tree traversal; spanning trees and minimum spanning trees.		10																																																						
	4. Probability Conditional probability; Bayes's rules; random variables; expectation; stochastic process; Poisson and exponential distributions.		6																																																						
	5. Statistics Sampling; sample mean and variance; normal, χ -squared, t - and F -distributions; statistical inference and estimation methods; hypothesis testing.		4																																																						
		Total		28																																																					
Teaching/Learning Methodology	<ul style="list-style-type: none"> Lectures are designed to clearly explain mathematical topics included in the subject. Tutorials are set in the class to assist students to solve related questions. Appropriate assignments and quiz are given to encourage student learning of mathematical knowledge. 																																																								
Assessment Methods in Alignment with Intended Learning Outcomes	<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 (Please tick as appropriate)</th> </tr> <tr> <th>a</th> <th>b</th> <th>c</th> <th>d</th> <th>e</th> </tr> </thead> <tbody> <tr> <td>1. Assignments</td> <td rowspan="4">55%</td> <td>✓</td> <td></td> <td>✓</td> <td>✓</td> <td></td> </tr> <tr> <td>2. Tutorial exercises</td> <td></td> <td>✓</td> <td>✓</td> <td></td> <td></td> </tr> <tr> <td>3. Quiz</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>4. Mid-term</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td></td> </tr> <tr> <td>5. 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 (Please tick as appropriate)					a	b	c	d	e	1. Assignments	55%	✓		✓	✓		2. Tutorial exercises		✓	✓			3. Quiz	✓	✓	✓	✓	✓	4. Mid-term	✓	✓	✓	✓		5. Examination	45%	✓	✓	✓	✓		Total	100 %					
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	<p>Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:</p> <p>Assignments and quiz can assist students in the learning of mathematics knowledge and extending their study to computing-related subjects. Quiz, mid-term and examination can force students to independently acquire required mathematical knowledge to attain the learning outcomes.</p>	
<p>Student Study Effort Required</p>	<p>Class contact:</p>	
	<ul style="list-style-type: none"> ▪ Lecture 	<p>28 Hrs.</p>
	<ul style="list-style-type: none"> ▪ Tutorial 	<p>14 Hrs.</p>
	<p>Other student study effort:</p>	
	<ul style="list-style-type: none"> ▪ Assignment 	<p>10 Hrs.</p>
	<ul style="list-style-type: none"> ▪ Review 	<p>18 Hrs.</p>
	<p>Total student study effort</p>	<p>70 Hrs.</p>
<p>Reading List and References</p>	<p>Reference Books:</p> <ol style="list-style-type: none"> 1. Richard Johnsonbaugh, Discrete Mathematics, 7th Edition, Prentice-Hall, 2008, ISBN: 0131593188. 2. Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers and Keying Ye, Probability & Statistics for Engineers & Scientists, 8th Edition, Prentice Hall, 2007, ISBN: 0-13-204767-5. 3. Rosen, K. H. Discrete Mathematics and Its Applications, Fifth Edition, McGraw Hill, 2003. 4. Kolman, B., Busby, R.C. and Ross, S.C., Discrete Mathematical Structures, Fourth Edition, Prentice Hall, 2000. 5. Ross, S.M., Introduction to Probability Models, Eighth Edition, Academic Press, 2003. 	