Module Title: Discrete Mathematics and Statistics
Module Code: CMM1313
Module Value: 1.0
Duration: 30 weeks
Class-Contact Hours: Lecture 30 hours.
Tutorial 30 hours.
Assessment Scheme: Continuous Assessment 30%
Examination 70%

Module Rationale/Aims:
· to introduce, at an elementary level, the foundation topics in Discrete Mathematics and Statistics which are of significant relevance to computing in general.
Learning Objectives:
Students will be able to:
· understand the mathematics of elementary Discrete Mathematics and Statistics;
· apply knowledge in Discrete Mathematics and Statistics to solve computing problems.
Syllabus Keywords:
set, Venn diagram, subset, empty set, power set, set operation, modular arithmetic, random numbers, truth table, proposition, predicate, inference, proof, matrix, Cartesian product, binary relation, graph, digraph, shortest path, tree, spanning tree, histogram, stem-and-leaf, frequency distribution, mean, standard deviation, variance, permutation, combination, inclusion-exclusion, sample space, event, random variable, expectation, distribution.
Recommended Textbooks/References:
Stephen Barnett, Discrete Mathematics – Numbers and Beyond, Addison-Wesley, 1998. Lipschutz, S. and Lipson, M., Discrete Mathem atics, 2nd. ed., McGraw Hill, 1997. Mendendall, W., Breaver, R.J., and Beaver B.M., Introduction to Probability and Statistics, 10th ed., Duxbury Press, 1998. Freund, J.E. and Simon, G.A., Modern Elementary Statistics, 9th ed., Prentice Hall, 1997.Key Content Area:

Content Lecture Tutorial

1 Sets and numbers

a Notion of a set

b Sets of numbers

c Set operations

d Mathematical induction

e Modular arithmetic

2 Logic and proof

a Truth tables

b Propositional logic

c Predicates and quantifiers

d Proof techniques

3 Matrices and relations

a Matrix arithmetic

b Defining relations

c Representing relations

d Properties of binary relations

4 Graphs and trees

a Types of simple graphs

b Shortest path algorithm

c Properties of trees

d Spanning trees

5 Descriptive statistics

a Graphical representation

b Measures of central tendency

c Measures of variability

6 Counting and probability

a Sum rule, product rule, inclusion-exclusion principle

b Permutations

c Combinations

d Events and probability

e Conditional probability

7 Probability distributions

a Random variables

b Mathematical expectation

c The Binomial distribution

d The Poisson distribution

e The Normal distribution