PROBABILITY STATISTICS AND QUEUING THEORY
[As per Choice Based Credit Sys tem (CBCS) scheme]
(Effective from the academic year 2016 -2017)
SEMESTER – I

Subject Code	16LNI14 / 16SCN14/**16SCS14**/ 16SSE14 / 16SIT14 /16SCE14 / 16SFC14	IA Marks	20
Number of Lecture Hours/Week	04	Exam Marks	80
Total Number of Lecture Hours	50	Exam Hours	03

CREDITS – 04

Course objectives: This course will enable students to

- Develop analytical capability and to impart knowledge of Probability, Statistics and Queuing.
- Apply above concepts in Engineering and Technology.
- Acquire knowledge of Hypothesis testing and Queuing methods and their applications so as to enable them to apply them for solving real world problems

Module 1	**Teaching Hours**
Axioms of probability, Conditional probability, Total probability, Baye's theorem, Discrete Random variable, Probability mass function, Continuous Random variable. Probability density function, Cumulative Distribution Function, and its properties, Two-dimensional Random variables, Joint pdf / cdf and their properties	**10 Hours**
Module 2	
Probability Distributions / Discrete distributions: Binomial, Poisson Geometric and Hyper-geometric distributions and their properties. Continuous distributions: Uniform, Normal, exponential distributions and their properties.	**10 Hours**
Module 3	
Random Processes: Classification, Methods of description, Special classes, Average values of Random Processes, Analytical representation of Random Process, Autocorrelation Function, Cross-correlation function and their properties, Ergodicity, Poisson process, Markov Process, Markov chain.	**10 Hours**
Module 4	
Testing Hypothesis: Testing of Hypothesis: Formulation of Null hypothesis, critical	**10 Hours**

region, level of significance, errors in testing, Tests of significance for Large and Small Samples, t-distribution, its properties and uses, F-distribution, its properties and uses, Chi-square distribution, its properties and uses, $\chi 2$ – test for goodness of fit, $\chi 2$ test for Independence	
Module 5	
Symbolic Representation of a Queuing Model, Poisson Queue system, Little Law, Types of Stochastic Processes, Birth-Death Process, The M/M/1 Queuing System, The M/M/s Queuing System, The M/M/s Queuing with Finite buffers.	**10 Hours**

Course Outcomes

The students should be able to:

- Demonstrate use of probability and characterize probability models using probability mass (density) functions & cumulative distribution functions.
- Explain the techniques of developing discrete & continuous probability distributions and its applications.
- Describe a random process in terms of its mean and correlation functions.
- Outline methods of Hypothesis testing for goodness of fit.
- Define the terminology &nomenclature appropriate queuing theory and also distinguish various queuing models.

The question paper will have ten questions.
There will be 2 questions from each module.
Each question will have questions covering all the topics under a module. The students will have to answer 5 full questions, selecting one full question from each module.

1. Probability, Statistics and Queuing Theory, V. Sundarapandian, Eastern Economy Edition, PHI Learning Pvt. Ltd, 2009.

Reference Books:

1. Probability & Statistics with Reliability, Queuing and Computer Applications, 2nd Edition by Kishor. S. Trivedi , Prentice Hall of India ,2004.
2. Probability, Statistics and Random Processes, 1st Edition by P Kausalya, Pearson Education, 2013.