

Shri G. S. Institute of Technology and Science
Department of Applied Mathematics and Computational Science
M.SC-III Semester
MA94303: Functional Analysis And Integral Equations.
LECTURE PLAN

Total no. of Units: 5

Total No. of Lectures:40

<u>S.No.</u>	<u>Topic</u>	<u>No. of Lecture No.</u>
	UNIT-1	
1	Topological space: Open set, Closed set, Neighbourhood, filter	2
2	Countable Space, Separation Axioms, Continuous mapping	3
3	Homomorphism, Connectedness, and Compactness	3
	UNIT-II	
4	Normed linear space: Bnacch space, Quotient space,linear transformation	3
5	Hahn Banach theorem and its consequences, Conjugate space, separability	3
6	The Natural imbedding of the normed linear closed graph theorem, The uniform boundedness principle.	2
	UNIT-III	
7	Hilbert spaces and some properties, orthonormal complements, orthonormal sets	3
8	The projection theorem, Bessel's inequality, Fourier expansion	3
9	Parseval's equation, Riesz representation theorem	2
	UNIT-IV	
10	Finite dimensional spectral theory,adjoint operator, self adjoint operator	3
11	Normal and Unitary operators and their properties,projection the spectral theorem	3
12	Fixed-point theory and its applications.	2
	UNIT-V	
13	Formulation of integral equation and classification, integral differential equation	1
14	Conversions of ordinary differential equation to integral equation	1
15	Solutions of integral equation with separable kernals, characteristics number	2

	and eigen functions	
16	Fredholm determinant method, Construction of Green's function, reduction of B.V problems to integral equation.	2
17	Resolvent kernel of the integral equations, method of successive approximation, convolution type kernels integral transform method.	2

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Lecture Plan

MA 94304: Object Oriented Programming Systems

Total No. Of Units : 5

Total No. Of Lectures : 40

Unit No.	No. of Lectures	Intended Topic Covered
I	2	Introduction to Object Oriented Programming fundamentals
	2	Basic concepts of object oriented programming
	1	Merits and demerits of OO methodology
	2	Elements of the object model
II	2	Concepts of objects and classes, attributes and methods, Access modifiers,
	1	Static member of a class, Instances, Message passing
	2	Constructors and Destructor
	2	Data abstraction , Encapsulation and data hiding.
III	2	Inheritance: purpose and its types
	4	Polymorphism: Introduction, Method of overriding and overloading, compile time and run time polymorphism
IV	3	Introduction to object oriented analysis
	3	Object oriented design: Design concepts
	3	Class diagrams, State Transition diagrams, object diagrams
V	2	Rapid prototyping: Overview, method process and techniques
	5	Object oriented testing: Concepts, methods
	4	UML pattern.

Shri G. S. Institute of Technology and Science
 Department of Applied Mathematics and Computational Science
 M.Sc. Applied Mathematics, Semester III
 MA 94352: STATISTICAL QUALITY CONTROL, STOCHASTIC PROCESS AND RELIABILITY

Total No. of Units: 5

Total No. of Lectures: 40

LECTURE PLAN

S.No.	TOPICS	No. of Lectures
UNIT – I		
1.	Reliability: Basic Concepts, Failure law, Bath Tub Curve, Evaluation of Reliability of a component from Test Data.	03
2.	System Reliability: Components in Series and parallel, Redundancy, Non-Series Parallel System, Markovian approach for Reliability Evaluation and applications	03
UNIT – II		
3.	Sample, population, the principle of sample surveys, types of sampling. Random sampling with and without replacement	02
4.	Hypothesis, errors in hypothesis, testing of hypothesis	02
5.	Large sample test and small sample tests: Z-test, t-test, F-test and Chi-square test.	04
UNIT – III		
6.	Definition of quality, statistical quality and total quality control, aims and objectives of total quality control, statistical quality control and its advantages. Causes of variation in quality of a product, techniques of statistical quality control.	02
7.	Control charts, types of control charts: charts for variables: Sample mean and sample range charts	03
8.	Control charts for attributes: p-chart, np-chart and C-chart	03
9.	Process capability to check how well a process performs.	01
UNIT – IV		
10.	Acceptance sampling, advantages of sampling inspection, limitations, symbols used in relation to acceptance sampling	02
11.	The operating characteristics curve, producer's and consumer's risks, and quality indices for acceptance sampling plan.	02
12.	Types of acceptance sampling: single sampling plan and double sampling plan.	02

13.	Types of acceptance sampling: multiple sampling plans and Taguchi method.	02
UNIT – V		
14.	Random variables: discrete and continuous, probability mass function, probability density function, cumulative distribution function, its properties.	02
15.	Two-dimensional random variables, joint distributions, marginal and conditional distributions	02
16.	Classification of stochastic process, auto covariance or covariance of a random process.	02
17.	Queuing process, Birth and death process, Markovian process	03

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MA 94371/MA 94370: MATHEMATICAL AND STATISTICAL MODELLING

Total No. of Units: 5

Total No. of Lectures:40

LECTURE PLAN

<u>S.No.</u>	<u>Topic</u>	<u>No. of Lectures</u>
UNIT-I		
1	Definition of simulation, Advantages and disadvantages of Simulation, Areas of application. Simulation Technique: Monte Carlo Simulation, Advantages and disadvantages and applications of Monte Carlo Simulation Technique.	02
2	Definition of random numbers, Properties of random numbers, Generation of pseudo-random numbers, Techniques for generating random numbers.	02
3	Illustration of examples based on simulation , random numbers generators. Introduction to evolutionary techniques.	03
UNIT-II		
5	Markov Chain: Probability Vector, Stochastic Matrix, Fixed Point of a Matrix, and Definition of Markov Chain, Transition Matrix, Some Theorems and problems.	03
6	Reliability: Basic Concepts, Failure law, Bath Tub Curve, Evaluation of Reliability of a component from Test Data.	02
7	System Reliability: Components in Series and parallel, Redundancy, Non-Series Parallel System, Markovian approach for Reliability Evaluation and examples illustration.	03
UNIT-III		
9	Neural Network: Basic Idea, Artificial neural network and its building blocks, Terminologies learning rules	03

10	back propagation network and its rule, feedback network, Adaline and madaline network	02
11	Neurons as function of signal monotocity, single and multiplayer neural network, neural dynamical systems and state spaces, neural dynamic, activation models, additive neuronal dynamics	03
UNIT-IV		
12	Passive membrane decay, Perceptrons LMS Algorithms	03
13	linear stochastic approximation and back propagation network	03

14	Functional link network	02
	UNIT-V	
15	Fuzzy System: Definition of Fuzzy sets and set operations	01
16	Brief idea of theory of possibility	03
17	Fuzzy Algebra, Brief idea of fuzzy statistics	02
18	Brief idea of modeling of system under uncertain environments.	02

