

Mathematics –III
(Integral Transform & Discrete Maths)
(To be offered to CE and Allied Branches CE/EV)

Subject Code	KAS303/KAS403					
Category	Basic Science Course					
Subject Name	MATHEMATICS-III (Integral Transform & Discrete Maths)					
Scheme and Credits	L-T-P	Theory Marks	Sessional		Total	Credit
			Test	Assig/Att.		
	3—1—0	100	30	20	150	4
Pre- requisites (if any)	Knowledge of Mathematics I and II of B. Tech or equivalent					

Course Outcomes

The objective of this course is to familiarize the students with Laplace Transform, Fourier Transform, their application, logic group, sets, lattices, Boolean algebra and Karnaugh maps. It aims to present the students with standard concepts and tools at B.Tech first year to superior level that will provide them well towards undertaking a variety of problems in the concern discipline.

The students will learn:

- The idea of Laplace transform of functions and their application
- The idea of Fourier transform of functions and their applications
- The basic ideas of logic and Group and uses.
- The idea s of sets, relation, function and counting techniques.
- The idea of lattices, Boolean algebra, Tables and Karnaugh maps.

Laplace Transform (8)

Laplace transform, Existence theorem, Laplace transforms of derivatives and integrals, Initial and final value theorems, Unit step function, Dirac- delta function, Laplace transform of periodic function, Inverse Laplace transform, Convolution theorem, Application to solve simple linear and simultaneous differential equations.

MODULE II

Integral Transforms (9)

Fourier integral, Fourier Transform , Complex Fourier transform, Inverse Transforms, Convolution Theorems, Fourier sine and cosine transform, Applications of Fourier transform to simple one dimensional heat transfer equations, wave equations and Laplace equations, Z-Transform and its application to solve difference equations.

Module- III**(8)**

Formal Logic ,Group, Ring and Field: Introduction to First order logic, Proposition, Algebra of Proposition, Logical connectives, Tautologies, contradictions and contingency, Logical implication, Argument, Normal form, Rules of inferences, semi group, Monoid Group, Group, Cosets, Lagrange's theorem , Congruence relation , Cyclic and permutation groups, Properties of groups, Rings and Fields (definition, examples and standard results only)

Module- IV**(10)**

Set, Relation, function and Counting Techniques - Introduction of Sets, Relation and Function, Methods of Proof, Mathematical Induction, Strong Mathematical Induction, Discrete numeric function and Generating functions, recurrence relations and their solution , Pigeonhole principle.

Module- V**(10)**

Lattices and Boolean Algebra: Introduction, Partially ordered sets, Hasse Diagram, Maximal and Minimal element, Upper and Lower bounds, Isomorphic ordered sets, Lattices, Bounded Lattices and , Distributive Lattices.

Duality, Boolean Algebras as Lattices, Minimization of Boolean Expressions, prime Implicants, Logic Gates and Circuits, Truth Table, Boolean Functions, Karnaugh Maps.

Text Books

1. E. Kreyszig: Advanced Engineering Mathematics; John Wiley & Sons.
2. R.K. Jain & S.R.K. Iyenger: Advanced Engineering Mathematics, Narosa Publishing House.
3. C.L.Liu: Elements of Discrete Mathematics; Tata McGraw- Hill Publishing Company Limited, New Delhi.
4. S. Lipschutz, M.L. Lipson and Varsha H. Patil: Discrete Mathematics; Tata McGraw- Hill Publishing Company Limited, New Delhi
5. B. Kolman , Robert C. Busby & S. C. Ross: Discrete Mathematical Structures' 5th Edition, Pearson Education (Singapore), Delhi, India.

Reference Books

1. B.S. Grewal: Higher Engineering Mathematics; Khanna Publishers, New Delhi.
2. B.V. Ramana: Higher Engineering Mathematics; Tata McGraw- Hill Publishing Company Limited, New Delhi.
3. Peter V.O' Neil. Advanced Engineering Mathematics, Thomas (Cengage) Learning.
4. Kenneth H. Rosem: Discrete Mathematics its Application, with Combinatorics and Graph Theory; Tata McGraw- Hill Publishing Company Limited, New Delhi
5. K.D. Joshi: Foundation of Discrete Mathematics; New Age International (P) Limited, Publisher, New Delhi.

COURSE OUTCOMES

	Course Outcome (CO)	Bloom's Knowledge Level (KL)
At the end of this course, the students will be able to:		
CO 1	Remember the concept of Laplace transform and apply in solving real life problems.	K ₁ & K ₃
CO 2	Understand the concept of Fourier and Z – transform to evaluate engineering problems	K ₂ & K ₄
CO 3	Remember the concept of Formal Logic ,Group and Rings to evaluate real life problems	K ₁ & K ₅
CO 4	Apply the concept of Set, Relation, function and Counting Techniques	K ₃
CO 5	Apply the concept of Lattices and Boolean Algebra to create Logic Gates and Circuits, Truth Table, Boolean Functions, Karnaugh Maps	K ₃ & K ₆

K₁ – Remember, K₂ – Understand, K₃ – Apply, K₄ – Analyze, K₅ – Evaluate, K₆ – Create

Evaluation methodology to be followed:

The evaluation and assessment plan consists of the following components:

- a. Class attendance and participation in class discussions etc.
- b. Quiz.
- c. Tutorials and assignments.
- d. Sessional examination.
- e. Final examination.

Award of Internal/External Marks:

Assessment procedure will be as follows:

1. These will be comprehensive examinations held on-campus (Sessionals).
2. Quiz.
 - a. Quiz will be of type multiple choice, fill-in-the-blanks or match the columns.
 - b. Quiz will be held periodically.
3. Tutorials and assignments
 - a. The assignments/home-work may be of multiple choice type or comprehensive type at least one assignment from each Module/Unit.
 - b. The grades and detailed solutions of assignments (of both types) will be accessible online after the submission deadline.
4. Final examinations.

These will be comprehensive external examinations held on-campus or off campus (External examination) on dates fixed by the Dr. APJ Abdul Kalam Technical University, Lucknow.