

Mathematics-V

(B. Tech. Bio Technology/Agriculture Engineering)

(Effective from the Session: 2019-20)

Subject Code	KAS304/KAS404					
Category	Basic Science Course					
Subject Name	MATHEMATICS-V					
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 Elementary Mathematics I and II of B. Tech Bio Tech or equivalent					

Course Objectives:

The objective of this course is to familiarize the bio technological engineers with techniques of Integral transforms (Fourier and Z-Transforms), probability distribution, numerical computation, hypothesis testing and ANOVA, Design and Quality control and its applications in real world. It aims to equip the students with standard concepts and tools from B. Tech Bio. Technology/Agriculture Engineering. It aims to equip the students to deal with advanced level of mathematics and applications that would be essential for their disciplines

The students will learn:

- The idea of Fourier Transforms, Z- Transform and application to solve numerical problems.
- The concept of probability distribution and their application.
- The concepts of numerical techniques.
- The concept of hypothesis and ANOVA, t – test, and χ^2 - test.
- The idea of design ,statistical quality control and control charts

All India Council for Technical Education Mathematics Course (Agriculture Engineering and Bio-Technology)**MODULE I (8)**

Integral Transforms: Fourier integral, Fourier Transform, Complex Fourier transform, Inverse Transforms, Convolution Theorems (without proof), Fourier sine and cosine transform, Applications of Fourier transform to simple one dimensional heat equations, wave equations and Laplace equations, Z-Transform and its application to solve difference equation.

MODULE II (9)

Probability Distributions: Review of probability Random variable, Probability mass function, Probability Density Function, Binomial distribution, Poisson distribution, Normal distribution and their applications.

MODULE III (9)

Numerical Techniques: Zeroes of transcendental and polynomial equations, Bisection method, Regula-falsi method, Newton-Raphson method, Rate of convergence of above methods.

Interpolation: Finite differences, Newton's forward and backward interpolation. Lagrange's and Newton's divided difference formula for unequal intervals.

MODULE IV (10)

Tests of Hypothesis and ANOVA: Hypothesis tests, Level of significance, critical region, Student's t-test, Chi-square test, (χ^2 – test), F-test, one way and two way analysis of variance.

MODULE V (9)

Design and Quality control: Principles of experimental design and analysis, completely randomized design, Randomized block design, Latin square design, Statistical quality control, Types of quality control, Control chart for variables, and Control chart for attributes.

Text Books:

1. S.P.Gupta, Statistical Methods, Sultan Chand and Sons Publishers.
2. Geogr W. and William G., Statistical Methods, IBH Publication.
3. Ipsen J et al., Introduction to Biostatistics, Harper and Row Publication.
4. B.S. Grewal, Higher Engineering Mathematics, Khanna Publisher, 2005.

Reference Books:

1. N.T.J Baily, Statistical methods in Biology, English University Press.
2. R. Rangaswami, A text book of Agricultural Statistics, New Age Int. Publication.
3. P.S.S. Sundar Rao: An Introduction to Biostatistics, Prentice Hall.
4. Zar J, Biostatistics, Prentice Hall, London.

COURSE OUTCOMES

	Course Outcome (CO)	Bloom's Knowledge Level (KL)
At the end of this course, the students will be able to:		
CO 1	Understand the concept of Fourier Transform and Z- Transform to apply for solving with the help of transform problems.	K ₂ & K ₃
CO 2	Remember the concept of Probability to evaluate Probability distribution.	K ₁ & K ₃
CO 3	To analyze the concept of numerical techniques to evaluate the zero's of the function interpolation	K ₄ & K ₅
CO 4	Apply the concept of hypothesis to evaluate various hypothesis testing.	K ₃ & K ₅
CO 5	Remember the concept of design and statistical quality control to create control charts.	K ₁ & 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. Home-work 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 (Sessional)
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. Home works and assignments
 - a. The assignments/home-works may be of multiple choice types 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