

**K.L.E Society's
Raja Lakhamagouda Science Institute (Autonomous), Belagavi**

(PO's/PSO's/CO's)

Program: B. Sc. Mathematics & Statistics (UG01C05)

Programme Outcome

- PO1: Disciplinary knowledge and skills: Capable of demonstrating comprehensive knowledge and understanding of major concepts, theoretical principles and experimental findings in Mathematics & Statistics and its different subfields.
- PO2: Critical thinker and problem solver: Ability to employ critical thinking and efficient problem-solving skills in the four basic areas of Mathematics & Statistics.
- PO3: Sense of inquiry: Capability for asking relevant/appropriate questions relating to issues and problems in the field of Mathematics & Statistics, and planning, executing and reporting the results of an experiment or investigation.
- PO4: Lifelong learners: Capable of self-paced and self-directed learning aimed at personal development and for improving knowledge/skill development and reskilling.

Programme Specific Outcomes

- PSO1: Students will realize and develop an understanding of the impact of Mathematics & Statistics on society and apply conceptual understanding of the Mathematics & Statistics in real life.
- PSO2: Perform effectively with professional ethics in analytical, scientific and technical domains.
- PSO3: Demonstrate subject-related and transferable skills that are relevant to Mathematics & Statistics related job trades and employment opportunities.

Course Outcomes

Semester I

Course Type	Course Code	Course Title	Course Outcome
AECC	21EN101	Generic English-I	CO1: Learn to appreciate literary texts. CO2: Obtain the knowledge of literary devices and genres. CO3: Acquire the skills of creativity to express one's experiences. CO4: Be aware of their social responsibilities. CO5: Develop the critical thinking skills. CO6: Develop gender sensitivity. CO7: Increase reading speed, analytical skills and develop presentation skills. CO8: Become employable with requisite professional skills, ethics and values.
AECC	21KA101	Kannada	CO 1: Create appreciation for Kannada language and culture through Kannada literature CO 2: Creating environmental awareness. CO 3: Developing scientific perspective through science literature. CO 4: Know the importance and various forms of Kannada Language
AECC	21HI101	Hindi	CO1: Create interest among the students by reading story. CO2: Will be familiar with the development sequence of modern Hindi story. CO3: Interest towards linguistic correctness will be created. CO4: Will be able to acquire writing skills. CO5: Know the importance and various forms of Hindi Language.
SEC	21CS111	Digital fluency	CO1: Have an intelligent conversation on the key concepts and applications of artificial intelligence (AI), Big data analytics (BDA), internet of things (IOT), Cloud computing, and cyber security. CO2: Develop holistically by learning essential skills such as effective communication, problem solving, design thinking, and team work. CO3: Build his or her personal brand has an agile and expensive learner-one who is interested in horizontal and vertical growth?

DSC	21MA101	Algebra-I and Calculus-I	<p>CO1: Learn about conservation laws in different frames of reference</p> <p>CO2: Know how g can be determined experimentally and derive satisfaction.</p> <p>CO3: Come to know how various elastic moduli can be determined.</p> <p>CO4: Measure surface tension and viscosity and appreciate the methods adopted.</p>
OEC	21MA111	Algebra and Partial derivatives	<p>CO1: Link the fundamental concepts of groups and symmetries of geometrical objects.</p> <p>CO2: Recognize the mathematical objects called Groups. Explain the significance of the notions of Cosets, normal subgroups and factor groups.</p> <p>CO3: Understand the concept of differentiation and fundamental theorem sin differentiation and various rules. Find the extreme values of functions of two variables.</p>
DSC	21MA102	Practical's on Algebra-I and Calculus-I	<p>CO1: Learn Free and Open-Source Software (FOSS) tools for computer programming</p> <p>CO2: Solve problem on algebra and calculus theory studied in 21MA101 by using FOSS software's.</p> <p>CO3: Acquire knowledge of applications of algebra and calculus through FOSS</p>
DSC	21ST101:	Descriptive Statistics	<p>CO 1: Acquire knowledge of introductory statistics, its scope and importance in various areas such as Medical, Engineering, Agricultural and Social Sciences etc.</p> <p>CO2: Get knowledge of various types of data, their organization and evaluation of summary measures such as measures of central tendency and dispersion etc.</p> <p>CO3: Perceive the knowledge of correlation, regression analysis, regression diagnostics, partial and multiple correlations.</p> <p>CO4: Learn different of types of data reflecting independence and association between two or more attributes.</p> <p>CO5: Develop ability to critically assess a standard report having graphics, probability statements.</p>

DSC	21ST102:	Statistics Practical I	<p>CO1: Acquire knowledge of introductory statistics, its scope and importance in various areas such as Medical, Engineering, Agricultural and Social Sciences etc.</p> <p>CO2: Get knowledge of various types of data, their organization and evaluation of summary measures such as measures of central tendency and dispersion etc.</p> <p>CO3: Perceive the knowledge of correlation, regression analysis, regression diagnostics, partial and multiple correlations.</p> <p>CO4: Learn different of types of data reflecting independence and association between two or more attributes.</p> <p>CO5: Develop ability to critically assess a standard report having graphics, probability statements.</p>
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Semester II

Course Type	Course Code	Course Title	Course Outcome
AECC	21EN201	Generic English-II	<p>CO1: Learn to appreciate literary texts.</p> <p>CO2: Obtain the knowledge of literary devices and genres.</p> <p>CO3: Acquire the skills of creativity to express one's experiences.</p> <p>CO4: Be aware of their social responsibilities.</p>
AECC	21BO311	Environmental Studies	<p>CO1: define environmental study and ecology with basic principles.</p> <p>CO2: To examine the natural recourses their types and utility.</p> <p>CO3: To identify the environmental usages, types of pollutions and their impact.</p> <p>CO4: To outline the diversity and explain the conservations and its significance.</p>
AECC	21KA201	Kannada-II	<p>CO 1: A good personality is formed by literature based on life values.</p> <p>CO 2: Students become ambitious to build a better life by achieving specific goals.</p> <p>CO 3: Inspiring to always be enthusiastic in life.</p> <p>CO 4: You will get complete knowledge of modern Kannada poetry.</p>
AECC	21HI201	Hindi-II	<p>CO1: Create interest among the students by reading story.</p> <p>CO2: Will be familiar with the development sequence of modern Hindi story.</p> <p>CO3: Interest towards linguistic correctness will be created.</p>

			<p>CO4: Will be able to acquire writing skills.</p> <p>CO5: Know the importance and various forms of Hindi Language.</p>
DSC	21MA201	Algebra-II and Calculus-II	<p>CO1: Link the fundamental concepts of groups and symmetries of geometrical objects.</p> <p>CO2: Recognize the mathematical objects called Groups. Explain the significance of the notions of Cosets, normal subgroups and factor groups.</p> <p>CO3: Understand the concept of differentiation and fundamental theorems in differentiation and various rules.</p> <p>CO4: Find the extreme values of functions of two variables.</p>
OEC	21MA211	Algebra and Partial derivatives	<p>CO1: Link the fundamental concepts of groups and symmetries of geometrical objects.</p> <p>CO2: Recognize the mathematical objects called Groups. Explain the significance of the notions of Cosets, normal subgroups and factor groups.</p> <p>CO3: Understand the concept of differentiation and fundamental theorem sin differentiation and various rules. Find the extreme values of functions of two variables.</p>
DSC	21MA202	Algebra-II and Calculus-II	<p>CO1: Learn Free and Open-Source Software (FOSS)tools for computer programming</p> <p>CO2: Solve problem on algebra and calculus by using FOSS software's.</p> <p>CO3: Acquire knowledge of applications of algebra and calculus through FOSS</p>
DSC	21ST201	Probability and Distributions	<p>CO1: Conceptualize the probabilities of events including frequentist and axiomatic approach. Simultaneously, they will learn the notion of conditional probability including the concept of Bayes theorem.</p> <p>CO2: Get knowledge related to concept of discrete and continuous random variables and their probability distribution including expectations and moments.</p> <p>CO3: Learn knowledge of important discrete and continuous distribution such as Binomial, Poisson, Normal distributions.</p> <p>CO4: Acquire knowledge on R-programming in the descriptive statistics and probability models.</p>
DSC	21ST202	Statistics Practical II	<p>CO1: Conceptualize the probabilities of events including frequentist and axiomatic approach. Simultaneously, they will learn the notion of conditional probability including the concept of Bayes theorem.</p>

			<p>CO2: Get knowledge related to concept of discrete and continuous random variables and their probability distribution including expectations and moments.</p> <p>CO3: Learn knowledge of important discrete and continuous distribution such as Binomial, Poisson, Normal distributions.</p> <p>CO4: Acquire knowledge on R-programming in the descriptive statistics and probability models.</p>
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Semester III

Course Type	Course Code	Course Title	Course Outcome
AECC	21EN301	Generic English-III	<p>CO1: Acquired enhanced LSRW (Listening, Speaking, Reading, Writing) skills</p> <p>CO2: Equipped themselves with interpersonal communication skills</p> <p>CO3: Augmented presentation and analytical skills</p> <p>CO4: Ability to critically analyses, interpret and appreciate literary texts</p> <p>CO5: An awareness of social, cultural, religious and ethnic diversities</p>
AECC	21KA301	Kannada-III	<p>CO 1: By knowing about Bhakti Sahitya, you will have the quality of humanity.</p> <p>CO 2: Through travel literature, people will learn about the life and culture of different regions</p> <p>CO 3: The study of ideological literature will lead to revolution.</p> <p>CO 4: Know the importance and various forms of Kannada Language.</p>
AECC	21HI301	Hindi-III	<p>CO1: Able to understand One Act plays</p> <p>CO2: Learn to write various types of Letters</p>
SEC-2		Constitution of India	<p>CO1: To realise the significance of constitution of India to students from all walks of life and help them to understand the basic concepts of Indian constitution.</p> <p>CO2: To identify the importance of fundamental rights as well as fundamental duties.</p> <p>CO3: To understand the functioning of Union, State and Local Governments in Indian federal system.</p>
DSC	21MA301	Ordinary Differential Equations and Real	<p>CO1: Solve first-order non-linear differential equations and linear differential equations.</p> <p>CO2: To model problems in nature using Ordinary Differential Equations.</p>

		Analysis – I	<p>CO3: Formulate differential equations for various mathematical models</p> <p>CO4: Apply these techniques to solve and analyze various mathematical models.</p> <p>CO5: Understand the fundamental properties of the real numbers that lead to define sequence and series, the formal development of real analysis.</p>
OEC	21MA311	Ordinary Differential Equations	<p>CO1: Understand the concept of the differential equation and their classification</p> <p>CO2: Know the meaning of the solution of a differential equation.</p> <p>CO3: Solve first-order ordinary differential equations.</p> <p>CO4: Solve exact differential equations and convert to separable and homogeneous equations to exact differential equations by integrating factors.</p> <p>CO5: Solve Bernoulli differential equations.</p> <p>CO6: Find the solution to higher-order linear differential equations.</p>
DSC	21MA302	Practicals: Ordinary Differential Equations and Real Analysis – I	<p>CO1: Free and Open-Source software (FOSS) tools or computer programming.</p> <p>CO2: Solving exact differential equations</p> <p>CO3: Plotting orthogonal trajectories.</p> <p>CO4: Finding complementary function and particular integral of linear and homogeneous differential equations.</p>
DSC	21ST301	Distribution Theory	<p>CO1: Understand the axiomatic formulation of modern probability theory and think of random variables as an intrinsic need for the analysis of random phenomena.</p> <p>CO2: To fit probability distributions such as Negative binomial, Normal, to carry out large sample and small sample tests of significance.</p> <p>CO3: Find sampling distributions of functions of random variables and explore their applications.</p> <p>CO4: Able to learn different mathematical models and their application in simulation.</p>
DSC	21ST 302	Practical's	<p>CO1: Practical's on probability distribution used to describe the likelihood of obtaining the possible values that a random variable can assume.</p> <p>CO2: Probability distributions help to forecast power failures and network outages.</p> <p>CO3: Practical's on continuous distribution used if the variable can assume an infinite number of values between any two values.</p> <p>CO4: Probability distribution used widely in the study of large sample theory where normality is involved.</p>

Semester IV

Course Type	Course Code	Course Title	Course Outcome
AECC	21EN401	Generic English-IV	<p>CO1: Acquired creative, interpretative and critical thinking</p> <p>CO2: Skills to communicate confidently and effectively</p> <p>CO3: Obtained persuasive and creative social media writing skills</p> <p>CO4: Developed analytical and evaluative skills</p> <p>CO5: Learnt to identify and understand social contexts and ethical frameworks in the texts</p>
AECC	21KA401	Kannada-IV	<p>CO 1: Learn to live in harmony by learning about the oppressed race.</p> <p>CO 2: students will live in tolerance with each other.</p> <p>CO 3: By understanding the life of common people, one will know the essence of simple life</p> <p>CO 4: Know the importance and various forms of Kannada Language</p>
AECC	21HI401	Hindi-III	<p>CO1: Able to understand Hindi Novels</p> <p>CO2: Able to understand the importance of Mass Media and Communication</p>
SEC-2		Artificial Intelligence	<p>CO1: To get introduce about the concept of artificial intelligence and machine learning.</p> <p>CO2: Understanding data analysis process i.e. preparation, modelling, visualization.</p> <p>CO3: It is to learn about the robotics, types of robots and also components of robots.</p>
DSC	21MA401	Partial Differential Equations and Integral Transforms	<p>CO1: Solve the Partial Differential Equations of the first order and second order.</p> <p>CO2: Formulate, classify and transform partial differential equations into canonical form.</p> <p>CO3: Solve linear and non-linear partial differential equations using various methods. and apply these methods to solving some physical problems.</p> <p>CO4: Able to take more courses on wave equation, heat equation, and Laplace equation.</p> <p>CO5: Solve PDE by Laplace Transforms and Fourier Transforms. and gamma function.</p>
OEC	21MAT411	Partial Differential Equation	<p>CO1: Explain the concept of the differential equation.</p> <p>CO2: Classifies the differential equations concerning their order and linearity.</p>

			<p>CO3: Explains the meaning of the solution of a differential equation.</p> <p>CO4: Solve first-order ordinary differential equations.</p>
DSC	21MA402	Practical: Complex Analysis, Improper integrals and Beta and Gamma Function	<p>CO1: Free and Open-Source software (FOSS) tools or computer programming.</p> <p>CO2: Acquire knowledge about Fundamentals of Complex analysis using Sci-Lab.</p> <p>CO3: Plot the Complex functions by their images over concentric circles.</p> <p>CO4: Able to write the programs to find the analytic function using C-R equation.</p>
DSC	21ST401	Statistical Inference-I	<p>CO1: Carryout statistical analysis by identifying families of distributions and the use of order statistics.</p> <p>CO2: To find estimators using different methods of estimation and compare estimators.</p> <p>CO3: To carry out statistical inference using different tests of hypotheses under different scenarios.</p> <p>CO4: Generate random variables and use this generated random variable for illustration of concepts studied in this course.</p>
DSC	21ST 402	Statistics Practical IV	<p>CO1: Practical's on statistical inference consists in the use of statistics to draw conclusions about some unknown aspect of a population based on a random sample from that population.</p> <p>CO2: Practical's on point estimation methods which consist of assigning a value to each unknown parameter.</p> <p>CO3: Regression models are the most commonly used method in medicine and the biological sciences to describe the relationship between an outcome variable and one or more exposure variables.</p> <p>CO4: Statistical inference is used to examine gene expression data across biological replicates to isolate significant changes, beyond what would be expected by random chance.</p>