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

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

Program: B. Sc. Physics & Mathematics (UG01C02)

Programme Outcome

PO1: Disciplinary knowledge and skills: Capable of demonstrating comprehensive knowledge and understanding of major concepts, theoretical principles and experimental findings in Physics & Mathematics 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 Physics & Mathematics.

PO3: Sense of inquiry: Capability for asking relevant/appropriate questions relating to issues and problems in the field of Physics & Mathematics, 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 Physics & Mathematics on society and apply conceptual understanding of the Physics & Mathematics 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 Physics & Mathematics 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	**21PH101**	**Mechanics and Properties of Matter**	**CO1:** Learn about conservation laws in different frames of reference **CO2:** Know how g can be determined experimentally and derive satisfaction. **CO3:** Come to know how various elastic moduli can be determined. **CO4:** Measure surface tension and viscosity and appreciate the methods adopted.
OEC	**21PH111**	**Energy Sources**	**CO1:** To understand the fundamental concepts of reflection, refraction and dispersion of Light. **CO2:** To explain the fundamentals of instruments based on optical phenomenon. **CO3:** To describe the working of optical components in various instruments. **CO4:** To explain the applications of various types of optical components in instruments.
DSC	**21PH102**	**Physics practical**	**CO1:** Will get hands on experience of different equipment. **CO2:** Will see the difference between simple and torsional pendulum and their use in the determination of various physical parameters. **CO3:** Will measure surface tension and viscosity and appreciate the methods adopted. **CO4:** Will know how g can be determined experimentally and derive satisfaction. **CO5:** Will measure Moment of Inertia of Fly wheel and verify perpendicular and parallel axis theorem for Circular disc. **CO6:** Will learn fixing units, tabulation of observations, analysis of data

			CO7: Will Develop basic communication skills through working in groups in performing the laboratory experiments.
DSC	**21MA101**	**Algebra-I and Calculus–I**	**CO1**: Learn to solve system of linear equations and solve the system of homogeneous and non-homogeneous linear of m equation sin$n$. And Variables by using concept of rank of matrix, finding eigen values and eigen vectors. **CO2:** Sketch curves in Cartesian, polar and pedal equations. **CO3:** Students will be familiar with the techniques of integration and differentiation of function with real variables. **CO4:** Identify and apply the intermediate value theorems and L'Hospital rule.
OEC	21MA111	**Algebra and Partial derivatives**	**CO1:** Link the fundamental concepts of groups and symmetries of geometrical objects. **CO2:** Recognize the mathematical objects called Groups. Explain the significance of the notions of Cosets, normal subgroups and factor groups. **CO3:** Understand the concept of differentiation and fundamental theorem sin differentiation and various rules. Find the extreme values of functions of two variables.
DSC	**21MA102**	**Practicals on Algebra-I and Calculus–I**	**CO1:** Learn Free and Open-Source Software (FOSS) tools for computer programming **CO2:** Solve problem on algebra and calculus theory studied in **21MA101** by using FOSS software's. **CO3:** Acquire knowledge of applications of algebra and calculus through FOSS

Semester II

Course Type	Course Code	Course Title	Course Outcome
AECC	21EN201	Generic English-II	**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.
AECC	21BO311	Environmental Studies	**CO1:** define environmental study and ecology with basic principles. **CO2:** To examine the natural recourses their types and utility. **CO3:** To identify the environmental usages, types of pollutions and their impact. **CO4**: To outline the diversity and explain the conservations and its significance.
AECC	21KA201	Kannada-II	**CO 1: A** good personality is formed by literature based on life values. **CO 2: Students** become ambitious to build a better life by achieving specific goals. **CO 3:** Inspiring to always be enthusiastic in life. **CO 4: You** will get complete knowledge of modern Kannada poetry.
AECC	21HI201	Hindi-II	**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.
DSC	21PH201	Physics	**CO1:** Know the vocabulary and concept of physics as it applies to Principal of Electric Field,Gauss's law Electric potential, Capacitance and Dielectrics, current and resistance, direct current circuits, Magnetic Fields, Source of Magnetic Fields, Faraday's Law, Inductance, Alternating current circuits and Electromagnetic waves

			CO2: Apply Gauss's law of electrostatics to solve a variety of problems. CO3: Describe the magnetic field produced by magnetic dipoles and electric currents. CO4: Explain gradient, curl & divergence concepts and Maxwell laws to articulate the relationship between electric and magnetic fields.
OEC	21PH211	OPTICAL INSTRUMENTS	CO1: To understand the fundamental concepts of reflection, refraction and dispersion of Light. CO2: To explain the fundamentals of instruments based on optical phenomenon. CO3: To describe the working of optical components in various instruments. CO4: To explain the applications of various types of optical components in instruments
DSC	21PH202	Physics practical	CO1: Will get hands on experience of different electrical equipment. CO2: Will have achieved the ability to Choosing testing and experimental procedures on different types of electrical circuit and analyze their operation with different operating conditions. CO3: Will learn fixing units, tabulation of observations, analysis of data (graphical/analytical) CO4: Apply knowledge of electricity and magnetism to explain natural physical processes and related technological advances.
DSC	21MA201	Algebra-II and Calculus–II	CO1: Link the fundamental concepts of groups and symmetries of geometrical objects. CO2: Recognize the mathematical objects called Groups. Explain the significance of the notions of Cosets, normal subgroups and factor groups. CO3: Understand the concept of differentiation and fundamental theorems in differentiation and various rules. CO4: Find the extreme values of functions of two variables.

Course Type	Course Code	Course Title	Course Outcome
OEC	21MA211	Algebra and Partial derivatives	**CO1:** Link the fundamental concepts of groups and symmetries of geometrical objects. **CO2:** Recognize the mathematical objects called Groups. Explain the significance of the notions of Cosets, normal subgroups and factor groups. **CO3:** Understand the concept of differentiation and fundamental theorem sin differentiation and various rules. Find the extreme values of functions of two variables.
DSC	21MA202	Algebra-II and Calculus–II	**CO1:** Learn Free and Open-Source Software (FOSS)tools for computer programming **CO2:** Solve problem on algebra and calculus by using FOSS software's. **CO3:** Acquire knowledge of applications of algebra and calculus through FOSS

Semester III

Course Type	Course Code	Course Title	Course Outcome
AECC	21EN301	Generic English-III	**CO1:** Acquired enhanced LSRW (Listening, Speaking, Reading, Writing) skills **CO2:** Equipped themselves with interpersonal communication skills **CO3:** Augmented presentation and analytical skills **CO4:** Ability to critically analyses, interpret and appreciate literary texts **CO5:** An awareness of social, cultural, religious and ethnic diversities
AECC	21KA301	Kannada-III	**CO 1**: By knowing about Bhakti Sahitya, you will have the quality of humanity. **CO 2:** Through travel people will learn about the life and culture of different regions **CO 3:** The study of ideological literature will lead to revolution. **CO 4:** Know the importance and various forms of Kannada Language.

AECC	21HI301	Hindi-III	**CO1**: Able to understand One Act plays **CO2**: Learn to write various types of Letters
SEC-2		**Constitution of India**	**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. **CO2**: To identify the importance of fundamental rights as well as fundamental duties. **CO3**: To understand the functioning of Union, State and Local Governments in Indian federal system.
DSC	21PH301	Physics-III	**CO1**: Give an analytical treatment of resonance in the case of open and closed pipes in general andHelmholtz resonators in particular. **CO2**: Describe the different parameters that affect the acoustics in a building, measure it and controlit. **CO3**: Give the Interference phenomenon and measure the parameters like the wavelength of light using experiments like Michelson interferometer,and thin films. **CO4**: Explain diffraction due to multiple slits, and polarization phenomenon using quarter and half wave plate.
DSC	21PH302	Physics practical	**CO1**: Improves the skill of handling optical equipments. **CO2**: Learns the calibration of Spectrometer
DSC	21MA301	**Ordinary Differential Equations and Real Analysis – I**	**CO1**: Solve first-order non-linear differential equations and linear differential equations. **CO2**: To model problems in nature using Ordinary Differential Equations. **CO3**: Formulate differential equations for various mathematical models **CO4**: Apply these techniques to solve and analyze various mathematical models.

Course Type	Course Code	Course Title	Course Outcome
			CO5: Understand the fundamental properties of the real numbers that lead to define sequence and series, the formal development of real analysis.
OEC	21MA311	Ordinary Differential Equations	CO1: Understand the concept of the differential equation and their classification CO2: Know the meaning of the solution of a differential equation. CO3: Solve first-order ordinary differential equations. CO4: Solve exact differential equations and converts to separable and homogenousequations to exact differential equations by integrating factors. CO5: Solve Bernoulli differential equations. CO6: Find the solution to higher-order linear differential equations.
DSC	21MA302	**Practical - Ordinary Differential Equations and Real Analysis – I**	CO1: Free and Open-Source software (FOSS) tools or computer programming. CO2: Solving exact differential equations CO3: Plotting orthogonal trajectories. CO4: Finding complementary function and particular integral of linear and homogeneousdifferential equations.

Semester IV

Course Type	Course Code	Course Title	Course Outcome
AECC	21EN401	Generic English-IV	CO1: Acquired creative, interpretative and critical thinking CO2: Skills to communicate confidently and effectively CO3: Obtained persuasive and creative social media writing skills CO4: Developed analytical and evaluative skills CO5: Learnt to identify and understand social contexts and ethical frameworks in the texts

AECC	21KA401	Kannada-IV	CO 1: Learn to live in harmony by learning about the oppressed race. CO 2: students will live in tolerance with each other. CO 3: By understanding the life of common people, one will know the essence of simple life CO 4: Know the importance and various forms of Kannada Language
AECC	21HI401	Hindi-III	CO1: Able to understand Hindi Novels CO2: Able to understand the importance of Mass Media and Communication
SEC-2		**Artificial Intelligence**	CO1: To know about the concept of artificial intelligence & machine learning. CO2: Understanding data analysis process CO3: It is to learn about the robotics, types of robots and also components of robots.
DSC	21PH401	Physics-III	CO1: Explain the laws of thermodynamics and analyze the thermal system CO2: Apply the laws of kinetic theory and radiation laws to the ideal and practical thermodynamicssystems through derived thermodynamic relations. CO3: Use the concepts of semiconductors to describe different Semiconductor devices such asdiode transistors, BJT, FET etc CO4: Describe the functioning of OP-AMPS and use them as the building blocks of logic gates.
DSC	21PH402	Practical's	CO1: Verifies the Stefan's law using black body radiation. CO2: Gives the practical knowledge about working of Operational amplifier
DSC	21MA401	Partial Differential Equations and Integral Transforms	CO1: Solve the Partial Differential Equations of the first order and second order. CO2: Formulate, classify and transform partial differential equations into canonical form. CO3: Solve linear and non-linear partial differential equations using various methods. and apply these methods to solving some physical problems.

			CO4: Able to take more courses on wave equation, heat equation, and Laplace equation.
			CO5: Solve PDE by Laplace Transforms and Fourier Transforms and gamma function.
OEC	21MAT411	Partial Differential Equation	CO1: Explain the concept of the differential equation.
			CO2: Classifies the differential equations concerning their order and linearity.
			CO3: Explains the meaning of the solution of a differential equation.
			CO4: Solve first-order ordinary differential equations.
DSC	21MA402	Practical: Complex Analysis, Improper integrals and Beta and Gamma Function	CO1: Free and Open-Source software (FOSS) tools or computer programming.
			CO2: Acquire knowledge about Fundamentals of Complex analysis using Sci-Lab.
			CO3: Plot the Complex functions by their images over concentric circles.
			CO4: Able to write the programs to find the analytic function using C-R equation.