

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

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

Program: B. Sc. Physics & Chemistry (UG01C01)

Programme Outcome

- PO1: Disciplinary knowledge and skills: Capable of demonstrating comprehensive knowledge and understanding of major concepts, theoretical principles and experimental findings in Physics & Chemistry 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 & Chemistry.
- PO3: Sense of inquiry: Capability for asking relevant/appropriate questions relating to issues and problems in the field of Physics & Chemistry, 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 & Chemistry on society and apply conceptual understanding of the Physics & Chemistry 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 & Chemistry 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.
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.

			<p>C03: Come to know how various elastic moduli can be determined.</p> <p>C04: Measure surface tension and viscosity and appreciate the methods adopted.</p>
OEC	21PH111	Energy Sources	<p>C01: To understand the fundamental concepts of reflection, refraction and dispersion of Light.</p> <p>C02: To explain the fundamentals of instruments based on optical phenomenon.</p> <p>C03: To describe the working of optical components in various instruments.</p> <p>C04: To explain the applications of various types of optical components in instruments.</p>
DSC	21PH102	Physics practical	<p>After successful completion of the course, the student,</p> <p>C01: Will get hands on experience of different equipment.</p> <p>C02: Will see the difference between simple and torsional pendulum and their use in the determination of various physical parameters.</p> <p>C03: Will measure surface tension and viscosity and appreciate the methods adopted.</p> <p>C04: Will know how g can be determined experimentally and derive satisfaction.</p> <p>C05: Will measure Moment of Inertia of Fly wheel and verify perpendicular and parallel axis theorem for Circular disc.</p> <p>C06: Will learn fixing units, tabulation of observations, analysis of data (graphical/analytical)</p> <p>C07: Will Develop basic communication skills through working in groups in performing the laboratory experiments and by interpreting the results.</p>
DSC	21CH101	Fundamentals of Chemistry	<p>C01: Analyze the analytical methods, Errors and treatment of analytical data and gain knowledge about balance in redox equations, titration curves, theory of redox in metal-ion indicators and applications</p> <p>C02: Describe the dual nature of radiation and matter, Quantum mechanics, Orbital shapes, electronic configurations of the atoms and periodicity.</p>

			<p>CO3: Explain bond properties, electron displacement effects, organic reaction mechanism, configurationally and conformational isomers.</p> <p>CO4: Explain the existence of different states of matter, laws of ideal gases and real gases and understand cooling effect of gas.</p>
OEC	21CH111	Chemistry in Daily life-1	<p>CO1: Understand the chemical constituents in various day to day materials using by a common man.</p> <p>CO2: Understand the chemical Composition and analysis of milk and milk products, beverages, food preservatives and analysis of pesticides residue in food.</p> <p>CO3: Understand the chemical constituents in chemical fuels and polymers.</p>
DSC	21CH102	Chemistry Lab-1	<p>After successful completion of first semester in Chemistry a student should be able to;</p> <p>CO1: Understand principles of different type's titrations. Titration curves for all types of acids–base titrations.</p> <p>CO2: Gain knowledge about balance in redox equations, titration curves, theory of redox indicators and applications.</p> <p>CO3: Gain knowledge about estimation of some organic compounds such as Aniline and Amide</p>

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 resources their types and utility.</p> <p>CO3: To identify the environmental usages, types of pollutions and their impact.</p>

			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

			<p>procedures on different types of electrical circuit and analyze their operation with different operating conditions.</p> <p>CO3: Will learn fixing units, tabulation of observations, analysis of data (graphical/analytical)</p> <p>CO4: Apply knowledge of electricity and magnetism to explain natural physical processes and related technological advances.</p>
DSC	21CH201	Fundamentals of chemistry - 2	<p>CO1: Understand the chemical bonding, molecular structure & periodicity of elements.</p> <p>CO2: Explain the concepts of acidic strengths of organic compounds and stereochemistry.</p> <p>CO3: Describe the solids & liquid crystals-Forms of solids and classification of Liquid-Crystals.</p> <p>CO4: Understand the Chemical Kinetics, Liquid State, Surface tension, Viscosity and Refractive index.</p>
OEC	21CH211	Molecules of life	<p>CO1: Acquire knowledge about different types of sugars and their chemical structures and Identify different types of amino acids and determine the structure of peptides.</p> <p>CO2: Explain the actions of enzymes in our body and interpret enzyme inhibition, Predict action of drugs. Depict the biological importance of oils and fats.</p> <p>CO3: Understand the importance of lipids in the metabolism Differentiate RNA and DNA and their replication. Explain production of energy in our body.</p>
DSC	21CH202	Content of Chemistry Lab-2	<p>CO1: Understand the different type's titrimetric experiments</p> <p>CO2: Gain the knowledge about determination of Ba^{2+} and Cu^{2+} by gravimetric methods.</p> <p>CO2: Gain the knowledge about determination of Density, Viscosity and Surface tension.</p>

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	21PH301	Physics-III	<p>CO1: Give an analytical treatment of resonance in the case of open and closed pipes in general and Helmholtz resonators in particular.</p> <p>CO2: Describe the different parameters that affect the acoustics in a building, measure it and control it.</p> <p>CO3: Give the Interference phenomenon and measure the parameters like the wavelength of light using experiments like Michelson interferometer, and thin films.</p> <p>CO4: Explain diffraction due to multiple slits, and polarization phenomenon using quarter and half wave plate.</p>

DSC	21PH302	Physics practical	<p>CO1: Improves the skill of handling optical equipment's.</p> <p>CO2: Learns the calibration of Spectrometer</p>
DSC	21CH301	Fundamentals of chemistry - 2	<p>CO1: Understand the importance of fundamental law and validation parameters in chemical analysis Know how different analytes in different matrices (water and real samples) can be determined by spectrophotometric nephelometric and turbidimetric methods.</p> <p>CO2: Suggest the plausible structures and geometries of molecules using Radius Ratio Rules, VSEPR theory</p> <p>CO3: To understand the concept of mechanism for a given reaction and also to know the importance of reaction intermediates.</p>
OEC	21CH311	Fuel Chemistry and Environmental Chemistry	<p>CO1: Understand the concept of fuels, and their classifications.</p> <p>CO2: Learn the different types of fuels and their applications.</p> <p>CO3: Know the different types of pollution and their prevention.</p>
DSC	21CH302	Content of Chemistry Lab-2	<p>CO1: Understand the importance of instrumental methods for quantitative applications Apply colorimetric methods for accurate determination of metal ions and anions in water or real samples</p> <p>CO2: Able to evaluate acid- base titrations and generates the titration curves for strong acid and bases and also explain the reference and indicator electrodes.</p> <p>CO3: Understand how functional groups in a compound is responsible for its characteristic property</p> <p>CO4: Learn the importance of qualitative tests in identifying functional groups.</p> <p>CO5: Learn how to prepare a derivative for particular functional groups and how to purify it.</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	21PH401	Physics-III	<p>CO1: Explain the laws of thermodynamics and analyze the thermal system</p> <p>CO2: Apply the laws of kinetic theory and radiation laws to the ideal and practical thermodynamicsystems through derived thermodynamic relations.</p> <p>CO3: Use the concepts of semiconductors to describe different Semiconductor devices such as diode transistors, BJT, FET etc and explain their functioning.</p> <p>CO4: Describe the functioning of OP-AMPS and use them as the building blocks of logic gates.</p>

DSC	21PH402	Practical	<p>CO1: Verifies the Stefan's law using black body radiation.</p> <p>CO2: Gives the practical knowledge about working of Operational amplifier</p>
DSC	21CH401	Fundamentals of chemistry - IV	<p>CO1: Able to define chromatography and also know the steps involved in a chromatography investigation.</p> <p>CO2: Predict the nature of the bond formed between different elements Identify the possible type of arrangements of ions in ionic compounds. Write Born-Haber cycle for different ionic compounds Relate different energy parameters like, lattice energy, entropy, enthalpy and solvation energy</p> <p>CO3: To understand the concept of mechanism for a given reaction and also to know the importance of reaction intermediates,</p> <p>CO4: Understand the concept of rate of a chemical reaction, integrated rate equations, energy of activation and determination of order of a reaction based on experimental data and to Know the different types of electrolytes</p>
OEC	21CH411	Electrochemistry, Corrosion and Metallurgy	<p>CO1: Understand the concept of conductance in electrolytic solutions, electrolysis and redox reactions involved in electrode reactions.</p> <p>CO2: Able to understand the Different types of Batteries their principal construction and working, lead-acid storage and lithium-ion battery. Study of Fuels cells.</p> <p>CO3: Gain the knowledge of ores and minerals, extraction of metals from their ores, and purification.</p>
DSC	21CH402	Content of Chemistry Lab-IV	<p>CO1: Understand the chemical reactions involved in the detection of cations and anions.</p> <p>CO2: Explain basic principles involved in classification of ions into groups in semi-micro qualitative analysis of salt mixture to carry out the separation</p> <p>CO4: understand the use of instruments like conductivity meter to obtain various physicochemical parameters and also know the theory about chemical kinetics and determine the velocity constants of various reactions.</p> <p>CO5: Learn to fit experimental data with theoretical models and interpret the data</p>