

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

Program: B. Sc. Chemistry & Botany (UG01C9)

Programme Outcome

- PO1: Disciplinary knowledge and skills: Capable of demonstrating comprehensive knowledge and understanding of major concepts, theoretical principles and experimental findings in Chemistry & Botany 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 Chemistry & Botany.
- PO3: Sense of inquiry: Capability for asking relevant/appropriate questions relating to issues and problems in the field of Chemistry & Botany, 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 Chemistry & Botany on society and apply conceptual understanding of the Chemistry & Botany 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 Chemistry & Botany 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.
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 expansive learner- one who is interested in horizontal and vertical growth?
DSC	21CH101	Fundamentals of chemistry	CO1: 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>CO2: 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>
DSC	21B0101	Microbial diversity and Technology	<p>CO 1: Understand the fascinating diversity, history, evolution in microbes, Microscopy, staining skills and Microbiologists</p> <p>CO 2: Gain knowledge on types of microbial culture media, sterilization techniques, measurement of microbial growth and Nutritional types.</p> <p>CO 3: Gain laboratory skills such as microbial cultures, identification, preservation of microbes, collection for their applications in research and industry. Comprehend the systematic position, structure, physiology, significance and life cycles of Viruses.</p> <p>CO 4: Comprehend the systematic position, structure, physiology and life cycles of Bacteria, Fungi, significance and their impact on humans and environment.</p>

OEC	21B0111	Role of Plants in Human Welfare	<p>CO1: Understand the fascinating diversity of plants used as food.</p> <p>CO2: Gain knowledge on types of plant raw materials used in industries.</p> <p>CO3: Understand the medicinal aspects of plants.</p> <p>CO4: To bring in awareness on Conservation of Plant Resources and biodiversity in general.</p> <p>CO5: Recognize the various plants used to increase the aesthetic values and commercial fruit crops.</p>
DSC	21B0102	Microbial diversity and Technology	<p>CO1: To understand the morphological characters and life cycle of Viruses and Bacteria and Grams Staining</p> <p>CO2: To understand the vegetative and reproductive structures of various Algae and Fungi, Bryophytes, Pteridophytes and Gymnosperms.</p> <p>CO3: To understand the growth forms of various Fungal Fruiting bodies, lichens and Mycorrhiza.</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	21B0311	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> <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>CO3: Inspiring to always be enthusiastic in life.</p> <p>CO4: 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	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 Ba²⁺ and Cu²⁺ by gravimetric methods.</p> <p>CO2: Gain the knowledge about determination of Density, Viscosity and Surface tension.</p>
DSC	21BO201	Diversity of flowering plants	<p>CO1: Understand the diversity, morphology, anatomy, reproduction and life cycle of Algae, Algal cultivation and Algal products.</p> <p>CO2: Understand the diversity, morphology, anatomy, reproduction and life cycle of Bryophytes and Pteridophytes. Ecological and economic importance of Bryophytes and Bryophyte Fossils.</p> <p>CO3: Understand the diversity, morphology, anatomy, reproduction and life cycle of Gymnosperms. Affinities and evolutionary significance, economic importance of Pteridophytes and Gymnosperms.</p> <p>CO 4: Understand the evolution of plants through Geological Time scale and Palaeobotany.</p>

OEC	21BO211:	Biofertilizers and Organic Farming	<p>CO1: Comprehend the importance of Organic farming and various kinds of manures and bio-fertilizers.</p> <p>CO2: Identify with the methods of recycling of bio-degradable wastes.</p> <p>CO3: Recognize the microbes used as bio-fertilizers and culturing of the same.</p> <p>CO4: Understand the influence of bio-fertilizers on growth and yield of crop plants</p>
DSC	21BO202	Diversity of flowering plants	<p>CO1: To know the working mechanism of instruments used to measure microclimatic variables and find pH.</p> <p>CO2: To Understand the morphological adaptations of Hydrophytes and Xerophytes.</p> <p>CO3: To Understand the morphology of Angiospermic plant parts and its modification and to draw and formulate floral parts.</p> <p>CO4: To assign a specimen to Family using the Bentham & Hooker's system of classification and preservation of specimens via Herbarium.</p> <p>CO5: Study tour to know the Plant diversity and its habitat.</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>CO1: By knowing about Bhakti Sahitya, you will have the quality of humanity.</p> <p>CO2: Through travel literature, people will learn about the life and culture of different regions</p> <p>CO3: The study of ideological literature will lead to revolution.</p> <p>CO4: 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	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>
DSC	21BO301	Plant Anatomy and Developmental Biology	<p>CO1: Observation of variations that exist in internal structure of various parts of a plant and as well as among different plant groups in support for the evolutionary concept.</p> <p>CO2: Skill development for the proper description of internal structure using botanical terms, their identification and further classification.</p> <p>CO3: Understanding the basic concepts in plant morphogenesis, embryology and organ development.</p>

DSC	21BO302	Practical	<p>CO1: To study elements of Xylem & phloem maceration technique</p> <p>CO2: To understand Comparative Anatomy of primary & secondary structure of Dicot & monocot plant organs</p> <p>CO3: To study anomalous secondary growth in Dicots & monocots</p> <p>CO4: To study microsporogenesis, megasporogenesis, types of ovules & placentation</p>
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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	21CH401	Fundamentals of chemistry - IV	<p>CO1: Able to define chromatography and also know the steps involved in a chromatography investigation.</p> <p>CO 2: Predict the nature of the bond formed between different elements Identify the possible type of arrangements of ions in ionic compounds.</p> <p>CO 3: To understand the concept of mechanism for a given reaction and intermediates,</p>

			<p>CO 4: Understand the concept of rate of a chemical reaction, integrated rate equations, to Know the different types of electrolytes, usefulness of conductance and ionic mobility measurements Determine the transport numbers</p>
OEC	21CH411	Electrochemistry, Corrosion and Metallurgy	<p>CO 1: Understand the concept of conductance in electrolytic solutions, electrolysis and redox reactions involved in electrode reactions.</p> <p>CO 2: 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>CO 3: 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</p> <p>CO 1: 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>CO 3: Learn to fit experimental data with theoretical models and interpret the data</p>
DSC	21BO401	Ecology & Conservation Biology	<p>CO1: Understanding the fundamental concepts in ecology, environmental science and phytogeography.</p> <p>CO2: Concept development in conservation, global ecological crisis, Sustainable development and pros and cons of human intervention.</p> <p>CO3: Enable the student to appreciate bio diversity and the importance of various conservation strategies, laws and regulatory authorities and global issues related to climate change and sustainable development.</p>
DSC	21BO402	Practical-IV	<p>CO1: To Understand the morphological adaptations of Hydrophytes, Xerophytes, Epiphytes and Halophytes.</p> <p>CO2: To know to determine the moisture content and water holding capacity of soil and to analyze waste water for its physico-chemical properties, pH, turbidity, inorganic elements, alkalinity and hardness.</p> <p>CO3: To know the working mechanism of various Ecological instruments and evaluation of the Frequency and density of Plants by Quadrat & Transect method</p> <p>CO4: Project based learning on waste water treatment and pollution.</p>