PROGRAMME: BSC.,

PROGRAMME OUTCOMES

PO1: Scientific Knowledge and Critical Thinking - Apply Scientific principles and analytical thinking to understand, Investigate and solve problems in relevant areas of science.

PO2: Effective Communication - Communicate Scientific concepts, Experimental findings and technical information effectively through oral, written and digital media in English and any Indian language.

PO3: Use of Modern Tools and techniques - utilize modern laboratory instruments, computational tools, digital technologies and science software/platforms effectively for experimentation, data analysis and research.

PO4: Impact of Science on Society - To prepare competent human resource and to develop scientific attitude at local and global levels for social benefits.

PO5: Responsible Citizenship - Apply Scientific Knowledge for Societal development with awareness of constitution, fundamental rights and duties of citizens, public health and safety, Sustainable usage of natural resources, environmental protection and national priorities.

PO6: Ethics and Professional Responsibility - Demonstrate ethical conduct, biosafety practices, integrity and respect for diversity while working individually and collaboratively.

PO7: Communication and Leadership - Communicate scientific concepts effectively through oral, written and digital media, demonstrate leadership quality and work effectively in multidisciplinary teams.

PO8: Lifelong Learning, Innovation and Employability - Engage in lifelong learning, entrepreneurship and professional development to pursue higher education, research and careers in science and technology while contributing to national and global development.

Program matrix: Bachelor of Science (Botany, Chemistry, Biotechnology)

I Semester			
Course type	**Course code**	**Course title**	**Course Outcomes**
DSC	DSC-1		**CO1:** Explain fundamental concepts of atomic structure including wave nature of electrons, quantum numbers, electronic configuration, and apply Slater's rules to calculate effective nuclear charge. **CO2:** To analyze the periodic properties such as atomic and ionic radii, ionization enthalpy, electron gain enthalpy, and electronegativity, and interpret their trends across periods and groups. **CO3:** To understand the basic concepts of organic chemistry including reaction mechanisms, intermediates, electronic effects, and evaluate the relative strength of organic acids and bases. **CO4:** Application of the principles of physical chemistry to describe gaseous behavior, critical phenomena, liquefaction of gases, and adsorption isotherms, including solving related numerical problems.
DSC	DSC-1	Diversity of Microbes, Algae, Fungi & Phytopathology	**CO1**: Explain the diversity, classification, general characteristics, and economic importance of Mollicutes, Viruses, Bacteria, Cyanobacteria, Algae, Fungi, and Lichens. **CO2**: Describe and compare the structure, life cycles, and reproductive mechanisms of the microorganisms and lower plant groups in the course. **CO3:** Identify, analyze, and recommend appropriate management practices for common plant diseases based on their symptoms, causal organisms, and modes of transmission. **CO4**: Different habitats of microbes, density and the role of microbes in their habitats.
DSC	DSC-1	Biomolecules and Microbiology	**CO1:** Describe the structure, classification, properties and biological functions of carbohydrates, lipids, proteins, nucleic acids, vitamins and minerals. **CO2:** Explain the structural organization and biological significance of major biomolecules and their interactions in living systems.

			CO3: Explain the classification, morphology, physiology, growth and reproduction of major groups of microorganisms and their significance in biotechnology. **CO4:** Apply basic microbiological techniques such as sterilization, staining, microscopy and microbial culturing and analyze the beneficial and harmful roles of microorganisms in health, agriculture, food and the environment.
EVS			**CO1:** Explain the fundamental concepts of environmental studies, sustainability, ecosystems, biodiversity and natural resources. **CO2:** Analyze the causes, impacts and control measures of environmental pollution and asses environmental health risks. **CO3:** Demonstrate knowledge of environmental policies, legislations, international agreements and conservation practices relevant to environmental protection. **CO4:** Evaluate the impact of human activities, population growth, disasters and environmental movements on society and propose sustainable solutions for environmental conservation.
AECC	AECC-1	Symphony I	**CO1**: Interpret and appreciate literary elements in selected poems. **CO2**: Analyse the narrative techniques and themes in short stories. **CO3**: Evaluate perspectives in essays on science and human values. **CO4**: Apply grammar rules in punctuation, articles, prepositions, and subject-verb agreement.
AECC	AECC-1	ಬಿ.ಎಸ್‌ಸಿ ಪತ್ರಿಕೆ-೧ ವಿಜ್ಞಾನ ಕನ್ನಡ-೧	**CO1**. ಭಾಷೆಯ ಸಾಧ್ಯತೆಗಳ ಅರಿವು ಮೂಡಿಸುವುದು. **CO2**. ಮಾತೃಭಾಷೆಯನ್ನು ಅಭಿವ್ಯಕ್ತಿ ಪಡಿಸುವ ಸಾಮರ್ಥ್ಯ ವೃದ್ಧಿಸ¬ಲು ಸಹಕರಿಸುವುದು. **CO3**. ಬರವಣಿಗೆಯ ಕೌಶಲ್ಯ ಹೆಚ್ಚಿಸುತ್ತದೆ. **CO4**. ಸ್ವತಂತ್ರವಾಗಿ ಅಭಿಪ್ರಾಯ ವ್ಯಕ್ತಪಡಿಸುವ ಆತ್ಮವಿಶ್ವಾಸ ಮೂಡಿಸಲು ಸಹಕಾರಿ.
AECC	AECC-1	Sabha Parva & Nalopakhyana Sangraha (Lakshmana Suri), Ajanta Shabda, Swara Sandhi,	**CO1:** Analyze classical epic prose style and extract moral values from the stories of the Mahabharata.

		Samasa (Tatpurusha, Karmadharaya, Dvigu).	**CO2:** Identify key cheracters, plotlines, and significant events from sabha parva and Nalopakyana sangraha. **CO3:** Recognize the rules of Swara Sandhi, the declensions of Ajantha Shabda, and the structures of Tatpurusha, Karmadharaya, and Dvigu Samasa. **CO4:** Formulate grammatically correct Sanskrit sentences and accurately analyze structural components in classical prose texts.
AECC	AECC-1	गद्य साहित्य एवं आधुनिक कविता तथा विज्ञान और तकनीकी हिन्दी	**CO1:** विद्यार्थी हिंदी एकांकी साहित्य के माध्यम से सामाजिक, नैतिक एवं मानवीय मूल्यों को समझते हुए पात्रों, कथानक तथा संवाद शैली का विश्लेषण करने में सक्षम होंगे। **CO2:** विद्यार्थी आधुनिक हिंदी कविता की भाषा, भाव, शैली एवं काव्य-सौंदर्य का अध्ययन कर कविताओं का भावार्थ तथा आलोचनात्मक विवेचन प्रस्तुत कर सकेंगे। **CO3:** विद्यार्थी निबंध, व्यंग्य एवं कहानी साहित्य के माध्यम से जीवन-दर्शन, सामाजिक यथार्थ तथा मानवीय संवेदनाओं को समझने और अभिव्यक्त करने में सक्षम होंगे। **CO4:** विद्यार्थी विज्ञान एवं तकनीकी क्षेत्रों में हिंदी भाषा के प्रयोग, वैज्ञानिक शब्दावली, सूचना-प्रौद्योगिकी तथा नागरी लिपि की तकनीकी सुविधाओं का ज्ञान प्राप्त कर व्यावहारिक उपयोग में सक्षम होंगे।

Program matrix: Bachelor of Science (Botany, Chemistry, Biotechnology)

II Semester			
Course type	**Course code**	**Course title**	**Course Outcomes**
DSC	DSC-2		**CO1:** Understanding the chemical bonding, prediction of 3-dimensional shape, geometry and magnetic properties of covalent molecule. **CO2:** Understand the chemistry of cycloalkanes and its aromaticity. **CO3:** Understanding electrophilic and nucleophilc aromatic substitution, predicting regioselectivity in the synthesis of substituted aromatic compounds, enhancing synthetic planning and skills in reactivity analysis.

			CO4: Understanding the crystal structure, physical properties of molecules, applications of distribution law and mechanism of catalysis in industrial process, analytical techniques and problem solving.
DSC	DSC-2	Bryophytes, Pteridophytes, Gymnosperms, Palaeobotany & Anatomy of Angiosperms	**CO1**: Classify and explain the salient features, classification and economic importance of Bryophytes, Pteridophytes and Gymnosperms. **CO2**: Describe and compare the morphology, anatomy and reproductive characteristics of Bryophytes, Pteridophytes, Gymnosperms and fossil plants. **CO3**: Explain the geological time scale, the process of fossilization and identify different types of fossils. **CO4**: Identify, classify and explain different plant tissues and relate their structure to their functions and differentiate the anatomical structures of roots, stems and leaves of dicotyledonous and monocotyledonous plants.
DSC	DSC-2	Cell Biology and Genetics	**CO1:** Describe the structure, organization and functions of prokaryotic and eukaryotic cells and their cellular organelles. **CO2:** Explain the mechanisms of cell division, cell cycle regulation, cell signalling and cellular communication. **CO3:** Analyze the principles of Mendelian and non-Mendelian inheritance, linkage, crossing over and chromosomal variations. **CO4:** Apply genetic principles to solve basic problems related to inheritance, mutations, genetic disorders and chromosome abnormalities.
EVS			**CO1:** Understand the evolution, making, features and core values of the Indian Constitution. **CO2:** Analyze Fundamental Rights, Duties, DPSP and provisions relating to equality and social justice.

			CO3: Analyze the structure, powers and functions of the Legislature, Executive and Judiciary. **CO4:** Evaluate the role of constitutional institutions in upholding democracy and constitutional values.
AECC	AECC-2	Symphony II	**CO1**: Examine poetic expressions of human emotions and global concerns. **CO2**: Understand the humour, irony, and moral themes in short fiction. **CO3**: Explore philosophical and intellectual insights through essays. **CO4**: Use adjectives, adverbs, conjunctions, and commonly confused words accurately.
AECC	AECC-2	ಬಿ.ಎಸಿ , ಪತ್ರಿಕೆ-೨ ವಿಜ್ಞಾನ ಕನ್ನಡ-೨	**CO1:** ಮಾತೃಭಾಷೆಯ ಮೇಲೆ ಗೌರವ, ಅಭಿಮಾನ ಮೂಡಿಸಲು ಸಹಕಾರಿ. **CO2:** ವೈಜ್ಞಾನಿಕ ಸಂಗತಿಗಳ ಬಗ್ಗೆ ಕನ್ನಡದಲ್ಲಿ ಮಾತನಾಡುವ ಕೌಶಲ್ಯ ವೃದ್ಧಿಸುತ್ತದೆ. **CO3:** ಸುತ್ತಮುತ್ತಲಿನ ವಿದ್ಯಮಾನಗಳನ್ನು ಶಕ್ತವಾಗಿ ವ್ಯಕ್ತಪಡಿಸಲು ಧೈರ್ಯ ತುಂಬುತ್ತದೆ **CO4:** ವೈಜ್ಞಾನಿಕ ವಿಚಾರಗಳನ್ನು ಕನ್ನಡದಲ್ಲಿ ತಿಳಿದುಕೊಳ್ಳುವ ಆಸಕ್ತಿ ಮೂಡಿಸಲು ಪ್ರೇರಣೆ ನೀಡುತ್ತದೆ.
AECC	AECC-1	Valmiki Ramayana (Balakanda Canto 1: 1–50 Shlokas), Selected Subhashitas (1–20), Vyanjana Sandhi, Samasa (Dvandva, Bahuvrihi, Avyayibhava), Bhashantara.	**CO1:** Differentiate between various styles, meters,and genres of poetic texts within classical Sanskrit literature **CO2:** Interpret the cultural values, ideal character attributes, and poetic meter of Sage Valmiki's verses. **CO3:** Translate verses accurately and identify structural differences between Sanskrit and regional languages. **CO4:** Apply grammatical principles to correctly combine the split words, identify compound structures in texts, and translate passages accurately.
AECC	AECC-2	गद्य विधाएँ, कविता साहित्य तथा अनुवाद	**CO1:** विद्यार्थी गद्य साहित्य की प्रमुख विधाओं एवं रचनाकारों के विचारों को समझ सकेंगे। विद्यार्थी सामाजिक एवं सांस्कृतिक मूल्यों से संबंधित गद्य रचनाओं का विश्लेषण कर सकेंगे। **CO2:** विद्यार्थी हिंदी कविता के भाव, भाषा एवं काव्य-सौंदर्य की पहचान कर सकेंगे। विद्यार्थी कविताओं में निहित राष्ट्रीयता, प्रकृति एवं मानवीय संवेदनाओं को स्पष्ट कर सकेंगे।

			CO3: विद्यार्थी एकांकी साहित्य की विशेषताओं एवं नाटकीय तत्वों को समझ सकेंगे। विद्यार्थी एकांकी के माध्यम से मानवीय संबंधों एवं सामाजिक समस्याओं का विवेचन कर सकेंगे। **CO4:** विद्यार्थी अनुवाद के अर्थ, स्वरूप एवं उपयोगिता का ज्ञान प्राप्त करेंगे। विद्यार्थी अंग्रेज़ी से हिंदी में सरल एवं प्रभावी अनुवाद करने में सक्षम होंगे।

Program matrix: Bachelor of Science (Botany, Chemistry, Biotechnology)

III Semester			
Course type	**Course code**	**Course title**	**Course Outcomes**
DSC	DSC-3		**CO1:** To explain the chemistry of *p-block elements*, transition elements, lanthanides, and actinides, including structure, bonding, properties, and separation techniques. **CO2:** To understand preparation methods, properties, mechanisms, and applications of organic compounds such as alcohols, phenols, ethers, and carbonyl compounds. **CO3:** To understand organic reaction mechanisms (rearrangements, condensations, substitutions) and apply them to solve structural and conversion-based problems. **CO4:** Apply thermodynamic principles, phase rule, and partial molar properties to explain chemical processes, equilibrium systems, and solve numerical problems.
ELE	ELE-1		**CO1:** Explain the fundamental concepts, classification, preparation, structures, properties, and applications of inorganic polymers, including silicones, phosphazenes, and crystalline polymetaphosphates. **CO2:** Describe the role of metal ions in biological systems, with emphasis on Fe, Na^{+}, K^{+}, Mg^{2+}, and Ca^{2+}, and explain their functions in biological processes such as oxygen transport, energy production, ion transport, blood clotting, and structural stabilization.

			CO3: Explain the toxicity of metal ions such as Hg, Pb, and As, and discuss the principles and applications of chelating agents in medicine for the treatment of metal-ion toxicity. **CO4:** Analyze the advantages, limitations, and applications of electroless copper plating in engineering and industrial fields.
DSC	DSC-3	Reproductive Biology, Plant Ecology, Biodiversity & Conservation	**CO1**: Apply the principles of angiosperm reproduction to explain gametophyte development, fertilization, embryogenesis and seed formation. **CO2:** Analyze the structure and functioning of ecosystems by interpreting interactions between biotic and abiotic components. **CO3:** Evaluate ecological processes, succession, biogeochemical cycles, pollution and plant adaptations to assess ecosystem sustainability. **CO4:** Develop appropriate strategies for biodiversity conservation by evaluating threats, conservation approaches, environmental legislation and the roles of national and international organizations.
DSE		Mushroom culture technology & Biofertilizers	**CO1**: Explain the principles of mushroom cultivation by identifying edible and poisonous mushrooms, cultivation methods, and infrastructure requirements for commericial production. **CO2:** Apply appropriate techiniques for spawn production, substrate/bed preparation, pest and disease management and post- harvest handling to ensure quality mushroom production. **CO3:** Evalute the role, production methods and agricultural applications of biofertilizer microorganisms for sustainable crop productivity. **CO4:** Develop sustainable crop production strategies by integrating mycorrhizal associations, Biofertilizers and organic farming practices to enhance crop growth and yield.
DSC	DSC-3	Enzymology and Cellular Metabolism	**CO1:** Explain the classification, structure, properties, mechanism of action and biological significance of enzymes.

			CO2: Analyze enzyme kinetics, enzyme inhibition and factors affecting enzyme activity using appropriate concepts and equations. **CO3:** Describe the major metabolic pathways involved in carbohydrate, lipid, protein and nucleic acid metabolism. **CO4:** Analyze the regulation, integration and energy-yielding mechanisms of major cellular metabolic pathways.
AECC	AECC-3	*Romeo and Juliet* and Language Component	**CO1:** Explain the events, characters, and major themes in **Acts I and II** of *Romeo and Juliet*. **CO2:** Analyze the plot development, conflicts, and key themes in **Acts III and IV** of *Romeo and Juliet*. **CO3:** Evaluate the tragic ending and the major themes in **Act V** of *Romeo and Juliet*. **CO4:** Develop language skills through reading comprehension, essay writing, précis writing, and dialogue writing.
AECC	AECC-3	ಬಿ.ಎಸ್‌ಸಿ ಪತ್ರಿಕೆ-೩ ವಿಜ್ಞಾನ ಕನ್ನಡ-೩	**CO1:** ವೈಜ್ಞಾನಿಕ ಲೇಖನಗಳನ್ನು ಬರೆಯಲು ಪ್ರೇರಣೆ ನೀಡುತ್ತದೆ. **CO2:** ವೈಜ್ಞಾನಿಕ ಮನೋಭಾವವನ್ನು ಉತ್ತೇಜಿಸುತ್ತದೆ. **CO3:** ಸುತ್ತಲಿನ ಪರಿಸರದ ವಿವರಗಳನ್ನು ಲೇಖನವಾಗಿಸಲು ಪ್ರೋತ್ಸಾಹ ನೀಡುತ್ತದೆ. **CO4:** ವೈಜ್ಞಾನಿಕ ಚಟುವಟಿಕೆಗಳಿಗೆ ಪ್ರೇರಣೆ ನೀಡುತ್ತದೆ.
AECC	AECC-3	Neelakanta Vijaya Champu (3rd Adhyaya), Alankaras (Upama, Roopaka, Utpreksha, Ananvaya), Prayoga, Bhashantara.	**CO1**: Distinguish the structural characteristics of Champu Kavya from pure prose (Gadya) and pure poetry (Padya). **CO2**: Appreciate the complex structural synthesis and aesthetic richness of mixed prose and verse compositions. **CO3:** key characters, narrative sequences, and contextual vocabulary within the third chapter (3rd Adhyaya) of Neelakanta Vijaya Champu. **CO4:** Identify and distinguish major figures of speech (Alankaras) to critically analyze creative writing formats.

AECC	AECC-3	गद्य विधाएँ, कविता साहित्य तथा अनुवाद	**CO1:** विद्यार्थी गद्य साहित्य की प्रमुख विधाओं एवं रचनाकारों के विचारों को समझ सकेंगे। विद्यार्थी सामाजिक एवं सांस्कृतिक मूल्यों से संबंधित गद्य रचनाओं का विश्लेषण कर सकेंगे। **CO2:** विद्यार्थी हिंदी कविता के भाव, भाषा एवं काव्य-सौंदर्य की पहचान कर सकेंगे। विद्यार्थी कविताओं में निहित राष्ट्रीयता, प्रकृति एवं मानवीय संवेदनाओं को स्पष्ट कर सकेंगे। **CO3**: विद्यार्थी एकांकी साहित्य की विशेषताओं एवं नाटकीय तत्वों को समझ सकेंगे। विद्यार्थी एकांकी के माध्यम से मानवीय संबंधों एवं सामाजिक समस्याओं का विवेचन कर सकेंगे। **CO4**: विद्यार्थी अनुवाद के अर्थ, स्वरूप एवं उपयोगिता का ज्ञान प्राप्त करेंगे। विद्यार्थी अंग्रेज़ी से हिंदी में सरल एवं प्रभावी अनुवाद करने में सक्षम होंगे।

Program matrix: Bachelor of Science (Botany, Chemistry, Biotechnology)

IV Semester			
Course type	**Course code**	**Course title**	**Course Outcomes**
DSC	DSC-4		**CO1:** To understand radioactive decay, analyse nuclear reactions and applications of radioisotopes. **CO2:** To develop theoretical understanding and developing practical quantitative skills. **CO3:** Understanding the chemistry synthesis and 3-dimensional structure of organic compounds. **CO4:** Understand the reaction rate and determine the rate laws ,analyzing the factors affecting rate of reactions. **CO5:** To understand principles, instrumentation and application of spectrophotometry, analyzing light induced chemical changes.

DSC	DSC-4	Molecular Biology and Genetic Engineering	**CO1:** Explain the molecular organization of DNA and RNA and the mechanisms of DNA replication, transcription and translation. **CO2:** Analyze the regulation of gene expression, genetic mutations, DNA repair and recombinant DNA processes. **CO3:** Apply molecular biology techniques and genetic engineering tools for DNA isolation, amplification, cloning and analysis. **CO4:** Evaluate the applications of recombinant DNA technology and genetic engineering in healthcare, agriculture, industry and research.
DSC	DSC-4	Plant Physiology & Metabolism, Cell Biology & Molecular Biology	**CO1**: Apply the principles of plant water relations, mineral nutrition, phytohormones and photoperiodism to explain plant growth and physiological responses. **CO2:** Analyze the mechanism of photosynthesis, respiration, nitrogen metabolism and biomolecule metabolism in plants. **CO3:** Analyze the organization and functions of cells, organelles, chromosomes and polyploidy in relation to cellular processes and inheritance. **CO4:** Evaluate the structure and function of nucleic acids, DNA replication, gene expression, protein synthesis and cell division to interpret molecular and cellular processes.
DSE		Medicinal Plants & Herbal Technology	**CO1:** Analyze the history, scope, classification and significance of medicinal plants in traditional and modern health care systems. **CO2:** Apply the principles of pharmacognosy to identify medicinal plants and explain the applications of important herbal drugs. **CO3:** Evalute the active phytochemical constituents of medicinal plants and correlate their therapeutic properties with healthcare applications.

			CO4: Demonstrate the use of analytical and quality evalution techniques for the screening, standardization and authentication of herbal drugs.
DC	HMD 256P	Nursery, Gardening & Landscaping	**CO1:** Apply nursery management practices and propagation media techniques for the successful production of healthy planting materials. **CO2:** Demonstrate plant propagation methods and bonsai training techniques using appropriate horticultural practices. **CO3:** Analyze horticultural plant characteristics and select suitable species for different garden types and environmental conditions. **CO4:** Design sustainable landscape plants by integrating garden design principles, CAD tools and eco – friendly landscaping practices.
AECC	AECC-4	*The Bachelor of Arts* and Language Component	**CO1:** Explain the events, characters, and themes in **Part I** of *The Bachelor of Arts*. **CO2:** Analyze the character development, conflicts, and themes in **Part II** of *The Bachelor of Arts*. **CO3:** Evaluate the resolution, character transformation, and central themes in **Part III** of *The Bachelor of Arts*. **CO4:** Develop effective written communication skills through emails, job application letters with CV/resume, bank correspondence, and business correspondence**.**
AECC	AECC-4	ಬಿಎಸ್‌ಸಿ ಪತ್ರಿಕೆ-೪ ವಿಜ್ಞಾನ ಕನ್ನಡ-೪	**CO1:** ನಾಡಿನ ಪರಂಪರೆ ಮತು ೆತ ಸಂಸ್ಕೃತಿ ಬಗ್ಗೆ ಗೌರವ ಮೂಡಿಸುತ್ತದೆ. **CO2:** ಸ್ಪರ್ಧಾತ್ಮಕ ಪರೀಕ್ಷೆಗಳನ್ನು ಎದುರಿಸುವ ಕೌಶಲ್ಯವನ್ನು ವೃದ್ಧಿಸುತ್ತದೆ. **CO3:** ಸಾಮಾಜಿಕ ಸಂಗತಿಗಳ ಬಗ್ಗೆ ಅರಿವು ಮೂಡಿಸುತ್ತದೆ. **CO4:** ಅಭಿವ್ಯಕ್ತಿಯ ಸ್ವರೂಪವನ್ನು ಸ್ಪಷ್ಟಗೊಳಿಸುತ್ತದೆ.
AECC	AECC-4	Kalidasa's Abhijnana Shakuntalam (Acts 4 to 6), Nataka & Drishya Kavya Itihasa, Kriyapada (Verbs), Prayoga, Bhashantara.	**CO1:** Outline the historical origin, classification, and evolution of Sanskrit drama (Nataka) and theatrical poetry (Drishya Kavya). **CO2:** Analyze the emotional depths, character arcs, and aesthetic design within Kalidasa's masterpiece drama.

			CO3: Master verbal conjugations (Kriyapada) and execute sentence structural conversions accurately. **CO4:** Recall the structural rules of voice/usage (Prayoga), conjugation of verb forms (Kriyapada), and basic principles of translation (Bhashantara).
AECC	AECC-4	हिंदी गद्य एवं पद्य साहित्य तथा जनसंचार माध्यम	**CO1:** कथासाहित्य की समझ और सामाजिक यथार्थ का विश्लेषणI कहानी के कथानक, पात्र, भाषा-शैली और भाव-तत्वों का विश्लेषण कर सकेंगे। सामाजिक अन्याय, मानवीय संवेदना, अपराध-चेतना और नैतिक प्रश्नों की गहन समझ प्राप्त करेंगे। **CO2:** आधुनिक कविता की भाव-भूमि, शैली और विचारधारा को समझनाI समकालीन मुद्दों, संघर्ष, श्रमजीवी जीवन, स्त्री-दृष्टि और सामाजिक सरोकारों पर आधारित कविताओं का विश्लेषण करेंगे। विभिन्न कवियों की भाषा, बिंबों, प्रतीकों और काव्यशैली को समझ सकेंगे। **CO3:** गद्य की विविध विधाओं और उनके सामाजिक-सांस्कृतिक संदर्भों की समझI रेखाचित्र, निबंध और एकांकी की विशेषताएँ, शैली, उद्देश्य और संरचना को समझ सकेंगे। महादेवी वर्मा, नामवर सिंह और सेठ गोविन्द दास की रचनाओं के माध्यम से संवेदना, हास्य-व्यंग्य, सामाजिक चेतना और मानवीय संबंधों का विश्लेषण कर पाएँगे। **CO4:** संचार और जनसंचार के सिद्धांतों की मूलभूत समझI संचार की परिभाषा, प्रक्रिया और तत्वों को समझेंगे। जनसंचार माध्यमों का वर्गीकरण, संरचना और कार्यप्रणाली जान पाएँगे। समाज में मीडिया की भूमिका, प्रभाव और महत्व को समझ सकेंगे।

Program matrix: Bachelor of Science (Botany, Chemistry, Biotechnology)

V Semester			
Course type	**Course code**	**Course title**	**Course Outcomes**
DSC	DSC-5		**CO1:** Understand the principles of coordination chemistry, metal–ligand equilibria, stability of complexes, and metal–ligand bonding, and to apply Valence Bond Theory to predict the geometry and magnetic properties of coordination complexes. **CO2:** Explain the structure, classification, synthesis, reactions, and biological importance of carbohydrates, heterocyclic compounds, alkaloids, terpenes, and vitamins.

			CO3: Understand the principles of parachor, dipole moment, polarisation, and molecular spectroscopy, and apply them to interpret molecular structure and properties. **CO4:** Apply the principles of microwave, vibrational, Raman, and electronic spectroscopy to analyse molecular energy levels, bonding, geometry, and spectroscopic transitions.
DSC	DSC-6		**CO1:** Understand the principles of non-aqueous solvents, HSAB concept, and metallurgical processes, and apply them to explain acid–base reactions, metal extraction, purification, refining, and powder metallurgy. **CO2:** Understand and apply the principles of active methylene compounds, polymers, biomolecules, oils and fats, soaps, detergents, and waxes, including their preparation, reactions, structures, properties, and applications. **CO3:** Understand the principles of colligative properties and apply them to determine molar masses, osmotic pressure, abnormal molecular masses, and related solution properties. **CO4:** Understand ionic equilibria, activity, activity coefficients, ionic strength, and salt hydrolysis, and apply these concepts to calculate hydrolysis constants, degree of hydrolysis, and pH of salt solutions.
DSC	DSC-5	Plant and Animal Biotechnology	**CO1:** Describe the principles and techniques of plant tissue culture, micropropagation, callus culture, somatic embryogenesis and plant regeneration. **CO2:** Apply plant biotechnology techniques for crop improvement, production of transgenic plants and conservation of plant genetic resources.*)* **CO3:** Explain the principles of animal cell culture, cell lines, hybridoma technology and assisted reproductive technologies.

			CO4: Evaluate the applications of plant and animal biotechnology in agriculture, medicine, industry and research, considering ethical and biosafety aspects.
DSC	DSC-6	Immunology and Medical Biotechnology	**CO1:** Explain the components and mechanisms of innate and adaptive immune responses, including the roles of antibodies, immune cells and complement. **CO2:** Analyze antigen–antibody interactions, hypersensitivity, autoimmunity, immunodeficiency and transplantation-related immune responses. **CO3:** Apply immunological principles and techniques such as ELISA, immunoassays and related diagnostic methods in medical biotechnology. **CO4:** Evaluate the applications of biotechnology in disease diagnosis, vaccine development, therapeutic products and personalized medicine.
DSC	DSC-5	Morphology of angiosperms, Taxonomy, Economic Botany and Ethnobotany	**CO1:** Analyze morphological diversity and diagnostic characteristics of angiosperms and apply taxonomic principles to identify and interpret plant diversity. **CO2:** Apply botanical nomenclature, identification methods and classification systems to analyze and establish taxonomic relationships among angiosperms using scientific evidence. **CO3:** Conduct systematic investigations using herbarium techniques, taxonomic keys, digital resources and appropriate scientific tools to identify, classify and document angiosperms. **CO4:** Evaluate the economic, medicinal and ethnobotanical importance and promote ethical, sustainable utilization, biodiversity conservation and societal well-being.
DSC	DSC-6	Plant Breeding and Phytogeography	**CO1**: Explain the principles, objectives, methods, genetic resources and acclimatization involved in plant breeding for crop improvement.

			CO2: Apply the principles of hybridization, selection, heterosis, mutation breeding, polyploidy and Biotechnology in developing improved crop varieties **CO3:** Analyze and evaluate the achievements of plant breeding, crop improvement programmes and the contributions of major plant breeding institutes in India. **CO4:** Analyze the principles of phytogeography, centres of origin, patterns of plant distribution and the vegetation types of India and Karnataka and interpret their significance in plant conservation and biodiversity management
DC		Nursery, Gardening & Landscaping	**CO1**: Apply nursery management practices and propagation media techniques for the successful production of healthy planting materials. **CO2:** Demonstrate plant propagation methods and bonsai training techniques using appropriate horticultural practices. **CO3:** Analyze horticultural plant characteristics and select suitable species for different garden types and environmental conditions. **CO4:** Design sustainable landscape plants by integrating garden design principles, CAD tools and eco – friendly landscaping practices.

Program matrix: Bachelor of Science (Botany, Chemistry, Biotechnology)

VI Semester			
Course type	**Course code**	**Course title**	**Course Outcomes**
DSC	DSC-7		**CO1:** Explain the concepts of coordination chemistry including isomerism, crystal field theory, molecular orbital theory, and magnetic properties of coordination compounds, and apply these principles to predict geometry, bonding, stability and magnetic behaviour of metal complexes.

			CO2: Understand the principles of photochemistry, pericyclic reactions and spectroscopy, and apply UV, IR and NMR spectroscopic techniques for the analysis, identification and structural elucidation of organic compounds. **CO3:** Explain the principles of electrochemical conduction, ionic mobility, transport numbers, Kohlrausch law and conductometric measurements, and apply them for determination of conductivity parameters, ionization constants and solubility products. **CO4:** Understand the principles of electrochemical cells, electrode potentials, Nernst equation, EMF measurements and potentiometric methods, and apply them for determination of pH, equilibrium constants, solubility products and analysis of chemical reactions.
DSC	DSC-8		**CO1:** Explain the structure, classification, properties and applications of silicates and silicones, and describe the composition, manufacture, processing and properties of different types of glass and surface coatings. **CO2:** Understand the principles of nanotechnology and nanomaterials, including carbon nanotubes and nanowires, and relate their properties, preparation methods and applications to modern industrial and technological developments. **CO3:** Explain the electronic structure, band theory, electrical and optical properties of metals, insulators and semiconductors, and apply these concepts to understand junctions, transistors and magnetic materials used in technological applications. **CO4:** Explain the principles and properties of colloids, emulsions, gels and buffer solutions, and apply concepts such as electrical double layer, zeta potential, coagulation, protective action and buffer action to understand their stability and industrial applications.
DSC	DSC-7	Microbial and Agricultural Biotechnology	**CO1:** Explain the principles and applications of microbial biotechnology in agriculture, including biofertilizers, biopesticides and plant growth-promoting microorganisms.

			CO2: Apply microbial techniques for the production and utilization of biofertilizers, biopesticides, composting agents and other agricultural products. **CO3:** Analyze the role of microorganisms in soil fertility, nutrient cycling, plant growth and sustainable agricultural practices. **CO4:** Evaluate the applications of microbial and agricultural biotechnology for crop improvement, disease management, sustainable agriculture and environmental protection.
DSC	DSC-8	Environmental Biotechnology	**CO1:** Explain the principles of environmental biotechnology and the role of microorganisms in the degradation and transformation of environmental pollutants. **CO2:** Apply biotechnological approaches for the treatment of wastewater, solid waste, industrial effluents and other environmental pollutants. **CO3:** Analyze the microbial processes involved in bioremediation, biodegradation, composting, biogas production and other waste-management practices. **CO4:** Evaluate the potential of environmental biotechnology in pollution control, resource recovery, sustainable development and conservation of natural resources.
DSC	DSC-7	Genetics, Genetic Engineering, Plant Biotechnology and Evolution	CO 1: Analyze the principles of mendelian genetics and Non- mendalian inheritance and patterns of inheritance to solve genetic problems and predict outcomes in organisms. CO 2: Apply the principles and techniques of genetic engineering and evaluate their applications, benefits, limitations and biosafety and ethical implications in agriculture and biotechnology. CO 3: Demonstrate and evaluate plant tissue culture techniques and molecular techniques, analyze experimental outcomes and apply appropriate biotechnological approaches for crop improvement and sustainable agricultural practices.

			CO 4: Analyze and evaluate the theories, evidences, mechanism of evolution and speciation using scientific patterns of biological diversity
DSC	DSC-8	Phytochemistry and Herbal Technology	CO 1: Explain the principles of photochemistry, primary and secondary metabolites, medicinal plants and their standardization. CO 2: Apply appropriate extraction, isolation and purification methods to obtain phytochemicals from plant materials. CO 3: Analyze phytochemicals using appropriate chromatographic, spectroscopic and analytical techniques for qualitative and quantative evaluation. CO 4: Evaluate phytochemical findings and herbal products with respect to medicinal applications, quality, ethical practice and sustainable utilization of plant resources
DC		Nursery, Gardening & Landscaping	CO 1: Apply nursery management practices and propagation media techniques for the successful production of healthy planting materials. CO 2: Demonstrate plant propagation methods and bonsai training techniques using appropriate horticultural practices. CO 3: Analyze horticultural plant characteristics and select suitable species for different garden types and environmental conditions. CO 4: Design sustainable landscape plants by integrating garden design principles, CAD tools and eco – friendly landscaping practices.