

Kalinga University

Science

Bachelor Of Science

PO

S. No.	Program Outcome (PO) Description
1	Capability of demonstrating comprehensive knowledge of B.Sc. programme.
2	Ability to identify unethical behavior and adopting objective, unbiased and truthful actions in all aspects of their programme.
3	Ability to think, acquire knowledge and skills through logical reasoning and to inculcate the habit of self-learning.
4	Possess knowledge of the values and beliefs of multiple cultures and a global perspective; and capability to effectively engage in a multicultural society and interact respectfully with diverse groups.
5	Self-motivating and inspiring team members to engage with the team objectives by using management skills
6	Ability to communicate various concepts of B.Sc. programme effectively using examples and their geometrical visualizations.
7	Ability to analyze the results and apply them in various problems.
8	Ability to work independently and do in-depth study of various notions of courses.
9	Develop a sense of research to predict cause-and-effect relationships.
10	Create, select, and apply appropriate techniques, resources, and modern science and IT tools.
11	Capability to solve problems by using research-based knowledge and research methods.
12	This programme will also help students to enhance their employability for jobs in different sectors.
13	Aims to equip students with recent advances in Zoology from organismic to reductionist biology.

14	Demonstrate, solve and an understanding of major concept of all physiological activities in various disciplines of Zoology such as Entomology (study of insects) Ichthyology (detailed study of fishes including their habit and habitat) Ornithology (study of birds including migration of birds which fascinates the students).
15	To understand the plant kingdom and the relation between plants and animals
16	To equip students with recent advances in plant research and the values of it
17	Create an awareness of the impact of Zoology, Botany and Chemistry on the environment, society, and development outside the scientific community. To study the ecological phenomenon from ecosystem to protection of endangered species by in-situ and ex-situ conservation. The process of survival in different environment via adaptation.
18	To understand the chemical compositions of biological systems.

PSO

S. No.	Program Specific Outcome (PSO) Description
1	Students will be able to explain fundamental knowledge of chemistry, physics and mathematics.
2	To provide the professional services to industry, research organization and institutes.
3	Students will be able to identify chemical formulae and solve numerical problems.
4	To provide the Research ability & environment.
5	To opt for higher education, disciplinary & multi-disciplinary research and to be a life-long learner.
6	Students would sufficiently be skilled and empowered to solve the problems in the realms of Zoology and its allied areas.
7	Gain the knowledge of Zoology through theory and practical's.
8	Understand the testing of hypothesis and different physiological activities of plants and the diverse nature and mindboggling facts of plant kingdom
9	Use modern biological tools, Models, Charts and Equipment.

10	They would have plethora of job opportunities in the education, environment, agriculture-based, and health related sectors.
11	Understand good laboratory practices and safety.
12	The will understand that for every biological fact there is a chemistry beneath. They will understand the chemical biology or biochemistry which is the most necessitated science in today's world of research.
13	The bright and ignited mind may enter into research in the contemporary areas of Zoological/Botanical/chemical Sciences.



KALINGA UNIVERSITY

CO

S.No.	Course Code	Course Name	Course Outcome (CO's) - Description
1	BPCM101A	English	CO1: To enable the learner to communicate effectively and appropriately in real life situation.
			CO2: To use English effectively for study purpose across the curriculum.
			CO3: To develop interest in and appreciation of literature.
			CO4: To develop and integrate the use of the four language skills i.e. Reading, listening, speaking and writing.
			CO5: To revise and reinforce structure already learnt.
2	BPCM102	Mechanics and Oscillations	CO1: To introduce basic mathematical background for expressing and understanding physical laws and principles.
			CO2: Acquiring the in theory and practice the intricacies of mechanics which starts from velocity, acceleration and ends with the motion of system of particles.
			CO3: To realize the concepts of relativistic mechanics and going through the developments in physics up-to 19th century.
			CO4: Performing laboratory experiments/project as per the course content.
			CO5: To introduce basic mathematical background for expressing and understanding physical laws and principles.
3	BPCM104	Calculus	CO1: Find the expansions of various functions using McLaurin and Taylor theorems.
			CO2: Trace the curves of simple types of curves.
			CO3: Apply the definite integral in quadrature and rectification.
			CO4: Find the solutions of linear differential equations.
			CO5: Find the solutions of differential equations of second order.
4	BPCM201A	Environmental Science	CO1: Students will understand the complex interactions within ecosystems and the Interdependence of living things and the physical environment
			CO2: Energy flow, nutrient cycling, biodiversity, and keystone species will be Explained and how they affect ecosystem stability
			CO3: Students will examine human activities like deforestation, pollution, climate Change, and resource depletion through case studies and analyses.
			CO1: Learning basics of electrostatics starting from Coulomb's law to the concepts of capacitors and explaining the relations between D, E and P.

5	BPCM202	Electricity, Magnetism and Electromagnetic Theory	CO2: Understanding basic concepts of magneto statics and realizing the relationship between B, H and M. CO3: Analyzing growth and decay of current in LCR circuits and understanding elementary concepts of bioelectricity. CO4: Explaining the fundamental concepts/applications associated with motion of charged particles in electric and magnetic fields. CO5: Describing electromagnetic induction, Faraday's laws, self and mutual induction, transformers, Maxwell's equations, Poynting vector and understanding finally the propagation of electromagnetic waves in diverse media. CO6: Realizing sophisticated experiments/project to observe the practical application of above concepts.
6	BPCM203	Physical Chemistry for the Sciences	CO1: Grasp thermodynamics, standard enthalpies, bond energies, and Third Law principles. CO2: Understand chemical equilibrium, Le Chatelier's principle, and ionic equilibria concepts. CO3: Analyze reaction rates, order, and activation energy. Study enzyme kinetics. CO4: Explore spectroscopy: IR, electronic, and UV spectroscopy for structure elucidation. CO5: Study PMR spectroscopy, chemical shifts, spin-spin coupling, and NMR interpretation. Introduction to photochemistry, laws, quantum yields, and processes.
7	BPCM204	Differential Equations	CO1: Formulate and solve differential equation problems. CO2: Use the applications of Laplace transform. CO3: Understand the concept of Partial differential equation and its applications. CO4: Solve the Partial differential equations with various types of methods. CO5: Understand the concept of variation problem with calculus of variations.
8	BPCM302	Thermal Physics and Statistical Mechanics	CO1: Developing the concepts of basic thermo dynamical laws and processes to study different heat/steam engines and their efficiencies. CO2: Understanding the concept of entropy and its variation in different thermo dynamical processes to further study diverse temperature scales and Maxwell' thermo dynamical relations. CO3: Explaining thermo dynamical Potential using tools of statistically physics. CO4: To establish the concepts of Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac statistics for understanding various thermodynamically systems.

			CO5: To explain block radiation and its laws. CO6: Explain the transport of mass and energy, and principal and various laws. CO7: Familiarization with probability, entropy, statistical mechanics and its postulate.
9	BPCM303	Chemical Bonding, Transition Metal & Coordination Chemistry	CO1: Grasp covalent bonds, resonance, hybridization, Bent's rule, and VSEPR model for molecular shapes. CO2: Explore molecular orbital approach, LCAO method, and symmetry considerations in diatomic molecules. CO3: Understand intermolecular forces: van der Waals, hydrogen bonding, and their effects on properties. CO4: Study transition elements, their properties, variable valence, and coordination chemistry. Lanthanides and actinides' characteristics. CO5: Analyze coordination chemistry via Valence Bond Theory and Crystal Field Theory, focusing on octahedral, tetrahedral, and square planar geometries.
10	BPCM304	Real Analysis	CO1: Understand the concept of Riemann integrability and partial differentiability. CO2: Understand the improper integral and solve the problem from Fourier series. CO3: Understand the concept of complex function and conformal mapping. CO4: State the metric space and basic theorems. CO5: Understand the extension theorem, connectedness, compactness
11	BPCM401B	Basic Analytical Chemistry	CO1: Understand fundamentals of analytical chemistry, significance of accuracy, precision, and errors in measurements. CO2: Analyze soil composition, pH measurement, complex metric titrations, and chelation. CO3: Study water analysis, pH determination, acidity, alkalinity, and dissolved oxygen estimation. CO4: Examine food product analysis, identify adulterants, analyze preservatives, and colorants. CO5: Explore chromatography principles, practice paper and TLC chromatography, and ion-exchange techniques.
12	BPCM401B	Boolean Algebra	CO1: Understand the basic ideas of Boolean algebra and its properties. CO2: Describe the normal form of Boolean algebra. CO3: Design the Boolean functions in switching circuits. CO4: Discuss the Posets and their properties. CO5: Explain the Lattice and its various types.

13	BPCM402	Waves and Optics	CO1: Understanding wave, type of waves, production of ultra-sonic waves, and its reflection and diffraction.
			CO2: Learning the basic principles of geometrical optics, image formation and working of optical instruments.
			CO3: Describing interference, interferometers and their application in determination of wavelength, wavelength difference and spectral widths.
			CO4: Understanding diffraction, diffraction gratings, dispersive and resolving powers.
			CO5: Conceptualizing polarization of light, and Laser and its application.
14	BPCM403	Molecules of Life	CO1: Students will gain a comprehensive understanding of carbohydrates, including their classification, properties, and biological significance, as well as the structure of glucose and fructose.
			CO2: Students will classify amino acids, understand protein structure, analyze peptides, and synthesize simple to dipeptides using N-protection and C-activating group
			CO3: Students will comprehend the mechanism of enzyme action, its specificity, and the role of coenzymes and cofactors, as well as the concept of drug action and receptor theory.
			CO4: Students will learn about nucleic acids, DNA, RNA, and their roles in replication, transcription, and translation, as well as the classification and biological importance of lipids.
			CO5: Students will understand food's calorific value, cellular energy, ATP's role, catabolic pathways, and interrelationships in energy production and cellular function.
15	BPCM404	Abstract Algebra	CO1: Understand the fundamental of group theory.
			CO2: Describe the rings and fields with their properties.
			CO3: Get the basic knowledge of vector space.
			CO4: Discuss the Linear transformations and basic properties.
			CO5: Explain Inner Product Spaces and its properties.
16	BPCM501A	Basic Instrumentation Skills	CO1: Understand measurement basics: instrument accuracy, precision, sensitivity, errors, and loading effects. Learn about multimeters and their specifications.
			CO2: Explore electronic voltmeters and their advantages, focusing on voltage measurement principles. Study AC millivoltmeters and their types.
			CO3: Familiarize with cathode ray oscilloscope (CRO): construction, electron gun, time base operation, synchronization, and front panel controls.

			CO4: Analyze CRO specifications, dual trace, digital oscilloscopes, and probes. Study digital storage oscilloscope principles and signal generators. CO5: Examine impedance bridges, Q-meters, and their block diagrams. Learn about digital instruments, digital meters, digital voltmeters, and digital multimeters.
17	BPCM501C	Graph Theory	CO1: Explain the basic of graph and its types. CO2: Describe the different types of circuits. CO3: Represent the graph in matrix form. CO4: Find the shortest path using algorithms. CO5: Explain the tree and its properties.
18	BPCM502A	Solid State Physics	CO1: Understanding the general properties of matter which includes the basic concepts of elasticity, surface tension and viscosity and oscillations and motion of rigid bodies CO2: Realizing the concepts of crystal structure and binding in solids to understand band theory and related physics. CO3: Understanding the theories behind specific heat, electrical resistivity and magnetism in solids. CO4: Explain crystal structure of solid and its application CO5: Describing the theory of magnetism and dielectric, and their various applications.
19	BPCM502B	Quantum Mechanics	CO1: Understanding Origin, basic postulates of quantum mechanics and the formalism of Schrodinger's equation. CO2: Formulation of time independent Schrodinger wave equation to study different quantum mechanical problems. CO3: Introduction of hydrogen atom and its Schrodinger equation solution. CO4: Study of atomic spectrum and its modification in the presence of Electric and Magnetic field.
20	BPCM502C	Nuclear and Particle Physics	CO1: Have a basic knowledge of nuclear size, shape, binding energy etc. and also the characteristics of nuclear force in detail. CO2: Be able to gain knowledge about various nuclear models and potentials associated. CO3: Acquire knowledge about nuclear decay processes and their outcomes. Have a wide understanding regarding beta and gamma decay. CO4: Grasp knowledge about Nuclear reactions, Fission and Fusion and their characteristics

			CO5: Study the basic features and classification of Elementary particles
21	BPCM503A	Polymer Chemistry	CO1: Explore polymer classifications, nomenclature, and molecular bonding in polymers.
			CO2: Study polymer functionality, formation criteria, classification, and polymerization kinetics.
			CO3: Examine crystallization, crystallinity determination, and structure-property relationships.
			CO4: Analyze molecular weight determination, glass transition temperature, and Tg factors.
			CO5: Understand polymer solutions, solubility, thermodynamics, and properties. Learn about various polymer types and applications
22	BPCM503B	Analytical Methods in Chemistry	CO1: Explore sampling, data evaluation, errors, accuracy, precision, and statistical tests
			CO2: Learn optical methods: UV-Visible Spectrometry, Infrared Spectrometry, and Atomic Absorption Spectrometry.
			CO3: Delve into electroanalytical methods: pH metric, potentiometric, and conductometric titrations
			CO4: Study separation techniques: solvent extraction, chromatography (IC, GLC, GPC, TLC, HPLC), and stereochemical analysis.
			CO5: Understand the role of computers in instrumental methods of analysis.
23	BPCM503C	Inorganic Materials of Industrial Importance	CO1: Study glass properties, types, manufacture, and glass composition variations.
			CO2: Explore ceramics, clays, feldspar, manufacturing, and advanced applications.
			CO3: Learn about fertilizers, production of urea, ammonium nitrate, phosphates, and compounds.
			CO4: Understand surface coatings, paints, pigments, metallic coatings, and anodizing.
			CO5: Gain insights into batteries, alloys, steel manufacturing, catalysis, and chemical explosives.
24	BPCM504A	Linear Programming	CO1: Discuss the basics of Operations Research and its applications..
			CO2: Explain the Linear Programming Problems.
			CO3: Find the solutions of Linear Programming Problems.
			CO4: Understand the transportation problem and its applications..
			CO5: Explain the Assignment Problems.
			CO1: Understand the concept of sequences and series

25	BPCM504B	Advanced Calculus	CO2: Solve the continuity of single variables and its applications. CO3: Understand the concept of partial differentiation and its application. CO4: Solve the optimization problems involving more than two variables. CO5: Apply the use of double and triple integrations to find the areas and volumes
26	BPCM504C	Logic and Set	CO1: Understand the concept Relations and functions. CO2: Describe the Posets and properties. CO3: Understand the Propositions and properties. CO4: Explain the basics of number theory. CO5: Solve the difference equations
27	BPCM506A	Polymer Chemistry-Lab	CO1: Explore polymer classifications, nomenclature, and molecular bonding in polymers CO2: Study polymer functionality, formation criteria, classification, and polymerization kinetics. CO3: Examine crystallization, crystallinity determination, and structure-property relationships CO4: Analyze molecular weight determination, glass transition temperature, and Tg factors. CO5: Understand polymer solutions, solubility, thermodynamics, and properties. Learn about various polymer types and applications.
28	BPCM506B	Analytical Methods in Chemistry-Lab	CO1: Understand fundamentals of analytical chemistry, significance of accuracy, precision, and errors in measurements. CO2: Analyze soil composition, pH measurement, complexometric titrations, and chelation. CO3: Study water analysis, pH determination, acidity, alkalinity, and dissolved oxygen estimation. CO4: Examine food product analysis, identify adulterants, analyze preservatives, and colorants. CO5: Explore chromatography principles, practice paper and TLC chromatography, and ion-exchange techniques.
29	BPCM506C	Inorganic Materials of Industrial Importance-Lab	CO1: Study glass properties, types, manufacture, and glass composition variations. CO2: Explore ceramics, clays, feldspar, manufacturing, and advanced applications. CO3: Learn about fertilizers, production of urea, ammonium nitrate, phosphates, and compounds.

		importance-Lab	CO4: Understand surface coatings, paints, pigments, metallic coatings, and anodizing. CO5: Gain insights into batteries, alloys, steel manufacturing, catalysis, and chemical explosives
30	BPCM601A	Renewable Energy and Energy harvesting	CO1: Students learn about energy sources, their limitations, and the need for renewable energy. They explore various renewable sources like wind, solar, biomass, and hydroelectricity. CO2: Explore solar energy basics, storage, and applications like solar water heaters and greenhouses. Study photovoltaic (PV) systems, including models, equivalent circuits, and sun tracking systems. CO3: Students learn about wind energy, ocean energy, and geothermal and hydro energy, discussing their fundamentals, turbines, electrical interfaces, and grid interconnection topologies. CO4: Students are covers the concepts of piezoelectric energy harvesting, electromagnetic energy harvesting, and carbon capture and sustainability in renewable energy sources CO5: Students will gain practical experience in solar, wind, and thermoelectric energy conversion, while also discussing environmental issues and sustainability in renewable energy production.
31	BPCM601B	Fuel and Pesticide Chemistry	CO1: Explore fuel sources, classification, and calorific values of various fuels. CO2: Study coal: composition, carbonization, coal gas, producer gas, water gas, and coal tar. CO3: Understand petroleum, its composition, refining, and different petroleum products. CO4: Discover fractional distillation, cracking, reforming, and alternative fuels. CO5: Delve into petrochemicals, lubricants, modern fuels, and their properties. CO6: Investigate pesticides: types, benefits, structure-activity relationship, synthesis, and uses.
32	BPCM601C	Integral Calculus	CO1: To learn basic properties of real numbers and its subsets which is backbone of Real Analysis. CO2: To study functions in detail which is a fundamental structure in all sciences, and to be able to check continuity of a function. CO3: To apply notion of derivative in mean value theorem and also in higher order derivatives which arise in all applied sciences CO4: To be able to solve first order and first degree differential equations.

			CO5: To study functions and several variables
33	BPCM602A	Digital, Analog and Instrumentation	CO1: To understand the analog and digital signals and logic gates.
			CO2: To learn Boolean Algebra and their application to solve digital circuits.
			CO3: Familiarize with basic semiconductor devices such as Diodes, Transistors and Amplifiers.
			CO4: To study the characteristic and properties of operational amplifiers and their application as a oscillator.
			CO5: To familiarize with components of a Electronic Circuit such as power supply, ICs,
34	BPCM602B	Elements of Modern Physics	CO1: To study the inadequacies of Classical Mechanics, origin of Quantum theory, dual nature of wave and particles, various model of atomic structure.
			CO2: Understand the inherent properties of particles associated with wave nature.
			CO3: Understand the central concepts, principles in Quantum Mechanics- Wave function and its probabilistic interpretation, Schrodinger's Equation
			CO4: Application of Quantum Mechanics such as 1D- potential box, Tunneling effect, size and structure of atomic nucleus
			CO5: Understand nuclear phenomenon such as radioactivity, particle decay, fission and fusion processes using Quantum mechanics.
35	BPCM602C	Embedded System: Introduction to Microcontroller	CO1: Review of Microprocessor and Microcontroller
			CO2: To study the architecture of Microcontroller 8051 and its family. Learn assembly language programming
			CO3: To study the Pin diagram of 8051 microcontroller, learn to make basic programs in assembly language and in C for I/O operations.
			CO4: To demonstrate the limitations and strength of different type of microcontroller and their comparison
			CO5: Design different interfacing applications using microcontroller. Build system using microcontroller for real time application.
36	BPCM603A	Instrumental Methods of Analysis	CO1: Understand spectroscopic methods: classification, electromagnetic radiation, error analysis.
			CO2: Study molecular spectroscopy: IR, UV-Visible, Near IR, and their applications.
			CO3: Explore separation techniques: chromatography, electrophoresis, mass spectrometry.
			CO4: Learn about elemental analysis: mass spectrometry, atomic spectroscopy (absorption, emission, fluorescence).

			CO5: Gain insights into NMR spectroscopy, electro analytical methods, and radiochemical methods.
			CO6: Dive into X-ray analysis and electron spectroscopy for surface analysis
37	BPCM603B	Novel Inorganic Solids	CO1: Explore synthesis and modification of inorganic solids using various methods.
			CO2: Study inorganic solids of technological importance: solid electrolytes, inorganic pigments, molecular materials.
			CO3: Learn about nanomaterial's, including metallic nanoparticles, carbon nanotubes, and bio-inorganic nanomaterial's.
			CO4: Understand engineering materials for mechanical construction: cast irons, steels, alloys, super alloys, composites.
			CO5: Dive into specialty polymers: conducting polymers, ion-exchange resins; ceramic and refractory materials.
			CO6: Examine industrial gases: production, uses, storage, hazards; and inorganic chemicals: manufacture, application, analysis, hazards.
38	BPCM603C	Organometallics, Bioinorganic chemistry, Polynuclear hydrocarbons and UV, IR Spectroscopy	CO1: Explore oxidation states of 3d metals and study compounds like $K_2Cr_2O_7$, $KMnO_4$, $K_4[Fe(CN)_6]$.
			CO2: Understand organometallic compounds with examples like methyl lithium and ferrocene, focusing on bonding and structure.
			CO3: Delve into bio-inorganic chemistry, highlighting metal ions' roles in biological systems.
			CO4: Study polynuclear and heteronuclear aromatic compounds, including their properties and substitution reactions.
			CO5: Learn about active methylene compounds, their preparation, reactions, and synthetic
39	BPCM604A	Vector Calculus	CO1: Manipulate vectors to perform geometrical calculations in three dimensions.
			CO2: Find the derivatives of vector point functions in up to three dimensions.
			CO3: Integrate functions of several variables over curves and surfaces.
			CO4: Express the properties of cone and cylinders.
			CO5: Apply the concept of conicoids and its properties.
40	BPCM604B	Probability and Statistics	CO1: Distinguish between stable and unstable equilibrium states.
			CO2: Get the Null lines and Poinot's central axis.
			CO3: Understand the concept Simple Harmonic motions and its applications.
			CO4: Understand the motion of the particle in different types of mediums.



			CO5: Solve the some numerical problem regarding central orbits.
41	BPCM604C	Network Analysis and Decisions Theory	CO1: Use network techniques, like node analysis and loop analysis, to write equations for large linear circuits
			CO2: Apply the venin and Norton theorems to analyze and design for maximum power transfer.
			CO3: Apply the concept of linearity and the associated technique of superposition to circuits and networks.
			CO4: Explain the concept of steady state.
			CO5: Students can learn Critical path Analysis (CPM) and Project Evaluation and review techniques (PERT).
42	BPCM606A	Instrumental Methods of Analysis -Lab	CO1: Understand spectroscopic methods: classification, electromagnetic radiation, error analysis.
			CO2: Study molecular spectroscopy: IR, UV-Visible, Near IR, and their applications.
			CO3: Explore separation techniques: chromatography, electrophoresis, mass spectrometry.
			CO4: Learn about elemental analysis: mass spectrometry, atomic spectroscopy (absorption, emission, fluorescence).
			CO5: Gain insights into NMR spectroscopy, electro analytical methods, and radiochemical methods.
43	BPCM606B	Novel Inorganic Solids -Lab	CO6: Dive into X-ray analysis and electron spectroscopy for surface analysis.
			CO1: Explore synthesis and modification of inorganic solids using various methods.
			CO2: Study inorganic solids of technological importance: solid electrolytes, inorganic pigments, molecular materials.
			CO3: Learn about nanomaterial's, including metallic nanoparticles, carbon nanotubes, and bio-inorganic nanomaterial's.
			CO4: Understand engineering materials for mechanical construction: cast irons, steels, alloys, super alloys, composites.
			CO5: Dive into specialty polymers: conducting polymers, ion-exchange resins; ceramic and refractory materials.
			CO6: Examine industrial gases: production, uses, storage, hazards; and inorganic chemicals: manufacture, application, analysis, hazards.
			CO1: Explore oxidation states of 3d metals and study compounds like K ₂ Cr ₂ O ₇ , KMnO ₄ , K ₄ [Fe(CN) ₆].

44	BPCM606C	Organometallics, Bioinorganic chemistry, Polynuclear hydrocarbons and UV, IR Spectroscopy-Lab	CO2: Understand organometallic compounds with examples like methyl lithium and ferrocene, focusing on bonding and structure. CO3: Delve into bio-inorganic chemistry, highlighting metal ions' roles in biological systems. CO4: Study polynuclear and heteronuclear aromatic compounds, including their properties and substitution reactions. CO5: Learn about active methylene compounds, their preparation, reactions, and synthetic applications
45	BZBC101A	English	CO1: It will enhance Language of communication, various speaking skills such as personal communication, social interactions and communication in professional situations such as interviews, group discussions and office environments, important reading skills as well as writing skills such as report writing, notetaking etc. While, to an extent, the art of communication is natural to all living beings, intoday's world of complexities, it has also acquired some elements of science. It is hoped that after studying this course, students will find a difference in their personal and professional interactions.
46	BZBC102	Plant Diversity	CO1: Understand the diversity among Algae, Fungi, Bryophytes, Pteridophytes and Gymnosperms. CO2: Understand the life cycle pattern of plant diversity. CO3: Know the Economic Importance of plant diversity.
47	BZBC104	Animal Diversity	CO1: The students will appreciate evolutionary changes and environmental adaptations in different taxa of invertebrates. They will be able to demonstrate comprehension of invertebrate evolution beginning with the ancestral protozoans. Differentiate between the various invertebrate phyla and classes based on morphology, physiology, reproduction, development, behaviour and habitat. Correctly identify representative species of invertebrates from select phyla. CO2: After going through this course, the students have a good understanding of how vertebrate animals work and how these animals biology is influenced by the different environments of their niches. The students will be able to explore an original query in animal anatomy. The students will appreciate evolutionary changes and environmental adaptations in different taxa of vertebrates CO1: knowledge about cell and its function.

48	BZBC202	Cell Biology & Genetics	CO2: Understand ultra structure of cell wall, plasma membrane and cell organelles.
			CO3: The eukaryotic cell cycle and mitotic and meiotic cell division.
			CO4: Structure and organization of cell membrane.
			CO5: To study the phenomenon of dominance, laws of segregation, independent assortment of genes.
49	BZBC204	Comparative Anatomy and Developmental Biology of Vertebrates	CO1: Developmental Biology enquires about the fundamental processes that underpin the fertilization of an egg cell and its step-by-step transformation into the fascinating complexity of a whole organism. Students learn best by doing and by having the opportunity to put what they have learned into practice. Through the comparison of anatomical structures and developmental processes, students will develop their critical thinking skills, enabling them to draw meaningful conclusions about the relationships and adaptations of vertebrates. Overall, the course aims to provide students with a deep appreciation for the diversity of vertebrates, their evolutionary history, and the underlying developmental mechanisms that have contributed to their form and function.
50	BZBC302	Diversity of Angiosperms: Systematics Development & Reproduction	CO1: Understand various rules, principles and recommendations of plant nomenclature produces in plant identification.
			CO2: Understand major evolutionary trends in various parts of angiospermic plants.
			CO3: Know the methods of pollination and fertilization.
51	BZBC304	Physiology and Biochemistry	CO1: Encourage students to apply their knowledge to analyze and solve physiological and biochemical problems, fostering critical thinking skills. Overall, the course aims to provide students with a strong foundation in the principles of animal physiology and biochemistry, enabling them to understand the complexities of life processes and their molecular underpinnings. They will understand the connections between physiological and biochemical processes and their implications for health and disease. Students will understand about common physiological disorders and biochemical imbalances.
52	BZBC401A	Herbal Technology	CO1: Knowledge about herbal medicine.
			CO2: Understand phytochemistry and pharmacognosy of herbal plants.
53	BZBC402	Plant Physiology and Metabolism	CO1: Learn and understand about mineral nutrition in plants.
			CO2: Understand the growth and developmental processes in plants.
			CO3: Know about Photosynthesis and Respiration in plants.
			CO4: Understand the process of translocation of solutes in plants 5) Know the nitrogen metabolism and its importance.

54	BZBC404	Genetics and Evolutionary Biology	CO1: It is expected that a student after completing this course would have fairly good understanding of evolution of genetic material and the design of functional modules (Unit) in the whole genome settings. The student would be able to structurally and functionally annotate a gene from the genomic database. Also, they should be able to design experiments for understanding the advanced functional genomics.
55	BZBC501A	Ethanobotany	CO1: Bring out the relevance of ethnobotany in the present context Know about the major and minor ethnic groups or Tribals of India, and their life styles. CO2: Learn about the Methodology of Ethnobotanical studies. CO3: Gain knowledge on the role of Role of ethnobotany in modern Medicine.
56	BZBC501B	Intellectual Property Rights (IPR)	CO1: The students once they complete their academic projects, shall get an adequate knowledge on patent and copyright for their innovative research works. CO2: During their research career, information in patent documents provide useful insight on novelty of their idea from state-of-the art search. This provide further way for developing their idea or innovations. CO3: Pave the way for the students to understand the role of Intellectual Property(IP) in a. R&D b. Government Jobs – Patent Examiner c. Private Jobs d. Patent agent and Trademark agent e. Entrepreneur.
57	BZBC501C	Aquarium Fish Keeping	CO1: Promote an understanding of the educational and psychological benefits of aquarium keeping. Incorporate practical hands-on sessions to allow students to gain experience in tasks such as water testing, feeding, and maintenance. The course aims to empower individuals with the skills to create and maintain a thriving aquarium ecosystem, promoting the well-being of the fish and enhancing their own enjoyment and appreciation of aquatic life.
58	BZBC502A	Plant Pathology	CO1: Learn about classification, characteristics, ultra structure of Prokaryotic and Eukaryotic microbes. CO2: Know about organisms and causal factor responsible for plant diseases & methods of studying plant diseases . CO3: Familiarize with some common plant diseases. CO4: Gain knowledge on Host parasite interaction process. CO5: Know the prevention and control measures of plant diseases and its effect on economy of crops.
59	BZBC502B	Plant Ecology and Taxonomy	CO1: Know the biotic and abiotic components of ecosystem. CO2: Understand plant community & ecological adaptation in plants.

			CO3: Scope , importance and management of biodiversity.
60	BZBC504A	Applied Zoology	CO1: The study of culture techniques of various aquatic organisms helps in the production of healthy food for human consumption in a sustainable manner and also in employment generation. The course aims to equip students with the knowledge and skills to effectively apply zoological concepts and methods to address real-world challenges, contributing to advancements in science, conservation, and sustainable practices.
61	BZBC504B	Animal Biotechnology	CO1: Gain knowledge about scopes and applications of animal biotechnology. CO2: Understanding how animal biotechnology and genetics and molecular biology are interconnected. CO3: Students will learn techniques involving nucleic acids. CO4: Students will gain knowledge about various diseases transgenic and genetically modified animals. CO5: Understand the molecular basis of various diseases.
62	BZBC504C	Aquatic Biology	CO1: Gain knowledge about aquatic ecosystems. CO2: Understanding the relevance of water quality parameters and the basis of aquatic ecosystem functioning. CO3: Students will learn about marine ecosystem functioning and its structural variations. CO4: Students will gain knowledge about various sources and modes of aquatic pollution.
63	BZBC601A	Biofertilizer	CO1: To aquiant with the importance of bio-fertilizers in present scenario. CO2: To educate about concept and classification of bio-fertilizers. CO3: Role of bio-fertilizers in quality parameters of various agricultural products and key role of bio-fertilizer in maintain soil health.
64	BZBC601C	Sericulture	CO1: Encourage students to explore entrepreneurial opportunities in the silk industry, from setting up sericulture farms to starting silk-based businesses. By the end of the course, students should have a comprehensive understanding of sericulture practices, from the biological aspects of silkworm rearing to the economic and environmental considerations of silk production. They should also be prepared to engage in various roles within the sericulture industry, ranging from practical production to research and development.
65	BZBC602A	Plant Tissue Culture	CO1: Understand tissue culture techniques. CO2: Know the application of plant tissue culture.

66	BZBC602B	Economic Botany and Biotechnology	CO1: Brief studied the economic products with special reference to the Botanical name, family, morphology of useful part and the uses.
			CO2: Know about the biotechnological Techniques.
67	BZBC604A	Immunology	CO1: By the end of the course, students will have a solid understanding of the immune system's complexities, its role in health and disease, and its applications in medical research, diagnostics, and treatment strategies.
68	BZBC604B	Reproductive Biology	CO1: Students learn best by doing and by having the opportunity to put what they have learned into practice. Therefore, using various model organism as a learning tool in Developmental Biology, students will learn how a cell behaves in response to an autonomous determinant or an external signal depends on the combination of transcriptional and posttranscriptional regulators, signaling pathway components, cytoskeletal elements, and other proteins and RNAs that it has synthesized earlier: i.e., on its developmental history. Students will also understand that cells only express a proportion of their genome, and that differential gene expression underlies cell differentiation and any alteration in the entire process of development leads to devastating diseases.
69	BZBC604C	Insect, Vector and Diseases	CO1: Students will be updated regarding the ongoing research efforts aimed at understanding vector biology, developing new control methods, and improving disease diagnostics and treatment. By the end of the course, students will have a comprehensive understanding of the complex interactions between insect vectors, pathogens, and hosts in disease transmission. They will be equipped with knowledge of strategies to control vector-borne diseases and promote public health.

