



Kuvempu University

SAHYADRI SCIENCE COLLEGE, SHIMOGA-577 203

(A Constituent College of Kuvempu University)

Phone:08182-240435

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Web: www.kussc.ac.in

COURSE OUTCOME

(SAMPLES)



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BIOCHEMISTRY

SEMESTER -1

Course Out come : This will inculcate confidence and clarity of mind in students to understand the chemistry of Biomolecules, and Biological reactions.

Course Outcome: This course aims to familiarize students with the principles of analytical chemistry and basic analytical techniques such as volumetric analysis. Course Objective is to provide experimental practice of quantitative volumetric analysis. Upon successful completion students should be able to make solutions of various molar, normal concentrations and determine the amount of a substance in a given sample.

SEMESTER - II

Course Outcome: These topics will enable students to understand the fundamentals of chemical processes in biological systems

Course Outcome: The Course Objective is to provide experimental practice of quantitative and qualitative analysis. Also it provides training in physical chemistry laboratory techniques. Upon successful completion, students should develop skills in handling instruments and understand its application in research work.

used in health and disease conditions; Difference between communicable & non-communicable diseases; Health promotion & treatments for various diseases & disorders.

BIOTECHNOLOGY

SEMESTER – I& II

Course Outcomes (COs): At the end of the course the student should be able to:

1. Would be able to comprehend the structure of a cell with its organelles

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2. *Can explain the organization of genes and chromosomes, chromosome morphology and its aberrations.

SEMESTER III

Course outcome: These topics will enable students to understand the fundamentals of organic chemistry pertinent to their importance in understanding biochemical reactions.

PRACTICALS III- Course outcome: This course aims to familiarize students with the principles of organic chemistry and basic qualitative analysis of organic compounds. Course objective is to provide experimental practice of preparation of organic compounds and extraction of biologically important compounds.

SEMESTER IV

Course outcome: These topics will enable the students to Understand the concept of biological sample preparation• Appreciate chemistry and application of analytical instruments. • Get acquainted with care and maintenance of equipment and chemicals. • Understand clinically relevant biochemical analysis of all biochemical components i.e., proteins, • electrolytes, hormones etc., Have basic knowledge of clinical and forensic analytical methods and their principles.

SEMESTER V

Course Outcomes: 1. Demonstrate a thorough understanding of the fundamental principles and techniques of genetic engineering. 2. Apply the knowledge of genetic engineering to diverse applications in agriculture, medicine, biotechnology, and environmental science. 3. Perform laboratory procedures and develop practical skills in genetic engineering techniques. CO4: Explain gene expression regulation mechanisms and apply genetic modification methods effectively. 4. Analyse and interpret genetic data using bioinformatics tools for a comprehensive understanding of gene function and evolutionary relationships. 5. Evaluate genetic engineering's ethical, social, and legal implications and propose responsible solutions. 6. Stay updated with recent

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advancements in genetic engineering, critically evaluate emerging trends, and assess their potential impact on various fields.

Course Outcomes: After completing this course, the student is expected to learn the following: 1. Demonstrate a comprehensive understanding of plant biology, physiology, genetics, and molecular biology. 2. Apply biotechnological tools and techniques used in plant research and agriculture, such as plant tissue culture, genetic engineering and transgenics. 3. Execute plant tissue culture techniques for callus induction, somatic embryogenesis, and micropropagation, and apply them in plant breeding and propagation. 4. Perform plant transformation methods and demonstrate the ability to introduce foreign genes into plants using different techniques. 5. Utilize molecular markers and genomic approaches for genetic mapping, marker-assisted selection, and plant breeding programs. 6. Apply molecular biology techniques, including PCR, DNA sequencing, and gene expression analysis, to investigate and analyze plant genetic information. 7. Utilize bioinformatics tools and databases to analyze and interpret plant genomic and transcriptomic data. 8. Apply knowledge about ethical considerations and regulatory frameworks associated with plant biotechnology and genetically modified crops. 9. Apply acquired knowledge and problem-solving skills to address real-world challenges in agriculture, food security, and environmental sustainability using plant biotechnology approaches.

SEMESTER VI

Course Outcomes: After completing this course, the student is expected to learn the following: 1. Understanding the basics of genetic information responsible for disease development 2. Understanding the classical and advanced methods used for the diagnosis of various diseases 3. Students will have a clear understanding of microbial diseases, host pathogen interactions, and the issues associated with drug-resistant microorganisms. 4. Students also comprehend the significance of normal flora associated with human health. 5. They will also learn about drug-Receptor interactions, drug toxicology and its pharmacological significance, conducting clinical



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trials, ethical issues in clinical research and a preliminary idea about artificial intelligence and personalized medicine as highly emerging areas in medical science.

Course outcome: At the end of the course, the student should be able to: 1. Students can understand the exploitation of microorganisms for industrial use and their improvement, stoichiometric analysis, and formulation of media for efficient growth and production of microbial or cell-based products. 2. Students will also have an idea about the design, operation, and specific applications of various bioreactors. 3. Graduates acquire professional leadership roles in bioprocess engineering and related fields leading to successful career. 4. Graduates establish commitment and contribute toward sustainable and bio-based economic development for a better society. 5. Graduates engage in lifelong learning by conducting practical engineering tasks. 6. Able to acquire a sound knowledge in mathematics and natural science and apply engineering principles in determining and solving contemporary and complex problems related to bioprocessing. Able to formulate and operate conversion processes of biological resources into bio-based value-added materials related to food, feed, fuels, pharmaceutical, nutraceutical, biomaterials, or biochemicals. 7. Able to design biological reactions and reactors including their materials, instrumentation, control, and modeling. 8. Able to communicate a creative idea and works effectively within the professional community and larger society. 9. Able to demonstrate an ability to work in multidisciplinary and multicultural teams in developing innovative engineering solutions using complex problem-solving skills. 10. Able to conduct practice-based tasks related to bioprocessing in a responsible, safe, voluntary, self-motivated, and ethical manner. 11. Able to appraise bioprocessing and bioproducts manufacturing and valorization using entrepreneurship principles.

CHEMISTRY

1. The concepts of chemical analysis, accuracy, precision and statistical data treatment 2. Prepare the solutions after calculating the required quantity of salts in preparing the reagents/solutions and dilution of stock solution. 3. The concept of volumetric and gravimetric analysis and deducing the conversion factor for determination 4. Handling of toxic chemicals, concentrated acids and organic

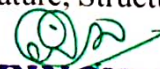

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solvents and practice safety procedures. 5. The concepts of Organic reactions and techniques of writing the movement of electrons, bond breaking, bond forming 6. The Concept of aromaticity, resonance, hyper conjugation, etc. 7. Understand the preparation of alkanes, alkenes and alkynes, their reactions, etc. 8. Understand the mechanism of nucleophilic, electrophilic reactions

Course outcomes: After the completion of this course, the student would be able to 1. Predict the nature of the bond formed between different elements 2. Identify the possible type of arrangements of ions in ionic compounds 3. Write Born - Haber cycle for different ionic compounds 4. Relate different energy parameters like, lattice energy, entropy, enthalpy and solvation energy in the dissolution of ionic solids 5. Explain covalent nature in ionic compounds 6. Write the M.O. energy diagrams for simple molecules 7. Differentiate bonding in metals from their compounds 8. Learn important laws of thermodynamics and their applications to various thermodynamic systems 9. Understand adsorption processes and their mechanisms and the function and purpose of a catalyst 10. Apply adsorption as a versatile method for waste water purification. 11. 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 12. Know different types of electrolytes, usefulness of conductance and ionic mobility measurements 13. Determine the transport numbers

Course outcomes (V-Semester): After the completion of this course, the student would be able to, 1. Predict bonding in molecules/compounds/ions, multi centered bonds. 2. Understand the properties of ionic compounds, like, Lattice energy and also the MO diagrams of different types of molecules. 3. Learn the important features of some of the compounds of main group elements. 4. Know the HSAB Concepts of acid, bases and they will learn the basics of nanomaterials and polymers. 5. Develop a thorough knowledge on the fundamentals bonding in metal atom clusters, various concepts/models in nuclear chemistry and radioactivity. 6. Explain the broad and balanced ideas on the important concepts in Co-ordination Chemistry, application of theories to the complex compounds. 7. Predict the key concepts about the Classification, nomenclature, preparation, reactions of alcohols and phenols. 8. Acquire the thorough knowledge on Nomenclature, Structure



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and reactivity of carbonyl groups in aldehydes, ketones and certain rearrangement reactions. 9. Give the classification and properties of amino acids, structure properties and reactions of peptides and Proteins. 10. Understand the concept of stereochemistry and its importance will be taught with respect to the structural analysis. 11. Explain the fundamentals of structure, reactions and synthesis of Carbohydrates. 12. Learn general terms and guidelines for disconnection approach in retrosynthesis. 13. Develop an idea about the nomenclature, Structure, reactivity and synthesis of various heterocyclic compounds. 14. Acquire the ability to plan and carryout experiments on Gravimetric and Volumetric Analysis and Preparation of various co-ordination complexes under different conditions and using specific reagents independently and assess the significance of outcomes. 15. To plan and carryout the experiments on Practical knowledge on one step preparation of important organic compounds and Quantitative analysis/estimation of organic compounds and to cater to the demands of chemical Industries of well-trained graduates.

Course outcomes (VI-Semester): After the completion of this course, the student would be able to,

1. Understand the electrochemical aspects types of electrodes, their construction and working, liquid junction potentials and potentiometric titrations.
2. Learn the fundamentals of Quantum Mechanics, application of the Schrödinger equation to various systems.
3. Understand the concepts of macroscopic and microscopic kinetics, thermodynamical formulation of reaction rates, steady state kinetics and fast reactions.
4. Acquire a thorough knowledge on the topics on Kinetics of homogeneous catalysis, theories involved and the various concepts in surface chemistry.
5. Know the basic concepts of entropy and the Third law of thermodynamics, partial molar properties and their applications in problem solving skills.
6. Understand the Phase rule and to distinguish between phase diagrams of various systems consisting of one, two and three pairs of partially miscible liquids.
7. Explain the concepts in statistical thermodynamics, derivation of statistical equations of distribution laws, partition functions and their applications, develop problem solving skills.
8. Develop an idea of various concepts in Symmetry and Group Theory, including definitions, symmetry elements, symmetry operations and group multiplication tables with specific examples (as Symmetry and Group Theory is the basis for many spectroscopic studies).
- 9.

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Understand and to explain the fundamentals of Molecular spectroscopy, which involves the Interaction of electromagnetic radiation with molecules explanation about different types of molecular spectra like Rotation spectroscopy, Raman spectroscopy and Vibrational spectroscopy. 10. Explain the general principles, Introduction to absorption and emission spectroscopy, particularly about the fundamentals of UV Spectroscopy and IR Spectroscopy. 11. Utilize the concepts in Nuclear magnetic resonance (NMR) spectroscopy, magnetic nuclei, NMR signals of simple molecules and also the fundamental knowledge of Atomic spectroscopy. 12. Know the important principles involving, theory of mass spectrometry, instrumentation, mass spectrum, the molecular ion peak, determination of molecular formula, important features of mass spectra of some molecules. 13. Understand the basic principles, selection rules, intensity, width, position of spectral line, multiplet structure of EPR spectra, instrumentation and applications. 14. Learn the fundamentals of NQR, NQR experiment, structural information from NQR spectra. 15. To plan and carryout experiments on Conductometric titration and potentiometric titrations involving neutralization and redox reactions, Abbes refractometry, pH metry and colorimetry and to understand the basic knowledge on these experiments. 16. Obtain the ability to plan and carryout experiments independently on Separation techniques involving chromatography and to cater to the demands of chemical Industries.

COMPUTER SCIENCE

Course Outcomes (COs): After completing this course satisfactorily, a student will be able to: • Describe how arrays, records, linked structures, stacks, queues, trees, and graphs are represented in memory and used by algorithms • Describe common applications for arrays, records, linked structures, stacks, queues, trees, and graphs • Write programs that use arrays, records, linked structures, stacks, queues, trees, and graphs • Demonstrate different methods for traversing trees • Compare alternative implementations of data structures with respect to performance • Describe the concept of recursion, give examples of its use • Discuss the computational efficiency of the principal algorithms for sorting and searching.

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Course Outcomes (COs): After completing this course satisfactorily, a student will be able to: 1. Introduction to computers, classification of computers, anatomy of computer, constituents and architecture, microcontrollers 2. Operating systems, functions of operating systems, classification of operating systems, kernel, shell, basics of Unix, shell programming, booting 3. Databases, why databases are used, users, SQL, data types in SQL, introduction of queries - select, alter, update, delete, truncate, using where, and or in not in 4. Internet basics, features, applications, services, internet service providers, domain name system, browsing, email, searching 5. Web Programming basics, introduction of HTML and CSS programming 6. Introduction of computers, classification of computers, anatomy of computer, constituents and architecture, microcontrollers.

OPEN ELECTIVES IN COMPUTER SCIENCE:

Course Outcomes (COs): After completing this course satisfactorily, a student will be able to: • Introduction to computers, classification of computers, anatomy of computer, constituents and architecture, microcontrollers • Operating systems, functions of operating systems, classification of operating systems, kernel, shell, basics of Unix, shell programming, booting • Databases, why databases are used, users, SQL, data types in SQL, introduction of queries - select, alter, update, delete, truncate, using where, and or in not in • Internet basics, features, applications, services, internet service providers, domain name system, browsing, email, searching • Web Programming basics, introduction of HTML and CSS programming • Introduction of computers, classification of computers, anatomy of computer, constituents and architecture, microcontrollers.

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ELECTRONICS – I/II

Course Outcomes At the end of this course, students will be able to Study and analyze basic networks using network theorems in a systematic manner. Build simple electronic circuits used in various applications. • Describe the behavior of basic semiconductor devices. • Reproduce the I-V characteristics of diode/BJT devices. • Describe the frequency response of BJT amplifiers. • Explain the behavior, characteristics and applications of Varactor diode, • Schottky diode, Tunnel diode, LED, LCD and solar cells. Apply standard device models to explain/calculate critical internal parameters of semiconductor devices. Understand and represent numbers in powers of base and converting one from the other, carry out simple arithmetic operations. Understand the basic knowledge of Digital system building blocks, • effectively can construct simple digital designs with the knowledge of Boolean algebra.

ELECTRONICS – III

Course Outcomes (COs): After the successful completion of the course, the student will be able to: CO1. Apply the acquired knowledge of digital circuits in different levels of modeling using Verilog HDL. CO2. Apply the acquired knowledge of digital circuits in different levels of modeling using Verilog HDL. CO3. Design and verify the functionality of digital circuit/system using test benches. CO4. Develop the programs more effectively using directives, Verilog tasks and constructs. CO5. Design and analyze algorithms for solving simple problems. CO6. Write and execute and debug C codes for solving problems.

ELECTRONICS – IV

Course Outcomes (COs): After the successful completion of the course, the student will be able to: CO1. Know the basic concept of Analog Communication, means and medium of communication. CO2. Understand the principle of Analog and digital modulation. CO3. Familiar

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with “AM” and “FM “techniques. CO4. Understand the basic concept of Pulse Modulation, Carrier Modulation for digital transmission and able to construct simple pulse modulation. CO5. Understand the basic concept of Satellite Communication CO6. Understand the basic concept of Optical Fibre Communication.

ELECTRONICS – V

Course Outcomes: ➤ Know the various microwave devices, their working and applications. ➤ Understand the principle and working of different RADAR Systems. ➤ Familiar with ASK, FSK, PSK, BPSK, QPSK Digital modulation techniques. ➤ Understand the basic concept of cell phone hand set, working principle of cellular communication and wireless technologies.

Course Outcomes: ➤ Identify and understand function of different blocks of 8051 microcontrollers. ➤ Develop program for I/O port operations, Timers, Serial port and Interrupts using C. ➤ Gain the knowledge to interface LCD, Keyboard, ADC, DAC, DC motor, etc. ➤ Design and develop small scale embedded systems.

ELECTRONICS – VI

Course Outcomes: ➤ Distinguish between continuous-time and discrete-time signals and systems ➤ Do basic operations on signals ➤ Apply Laplace transform technique ➤ Find DTFS and IDTFS of the Signals



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Course Outcomes At the end of this course, students will be able to Reproduce the I-V characteristics of various MOSFET devices,• Apply standard device models to explain/calculate critical internal• parameters of semiconductor devices. Explain the behavior and characteristics of power devices such as UJT,• SCR, Diac, Triac etc. Perform experiments for studying the behavior of semiconductor devices.• Calculate various device parameters' values from their IV characteristics.• Interpret the experimental data for better understanding the device behaviour.• Understand basic logic gates, concepts of Boolean algebra and• techniques to reduce/simplify Boolean expressions Analyze combinatorial and sequential circuits•

Course Outcomes: ➤ Explain the fundamental concepts, techniques, and applications of artificial intelligence. ➤ Apply problem-solving and search algorithms to solve simple AI problems. ➤ Implement basic machine learning algorithms for classification and clustering tasks. ➤ Understand and apply natural language processing techniques for text analysis. ➤ Understand and apply computer vision techniques for image analysis. ➤ Recognize ethical considerations and societal impacts of artificial intelligence.

MATHEMATICS

SEMESTER – I

Course Learning Outcomes: This course will enable the students to Learn to solve system of linear equations.• Solve the system of homogeneous and non homogeneous linear of m equations in n• variables by using concept of rank of matrix, finding Eigen values and Eigen vectors. Sketch curves in Cartesian, polar and pedal equations.• Students will be familiar with the techniques of integration and differentiation• of function with real variables. Identify and apply the intermediate value theorems and L'Hospital rule.•

Course Learning Outcomes: This course will enable the students to Learn Free and Open Source Software (FOSS) tools for computer programming. • Solve problem on algebra and calculus theory



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studied in MATDSCT 1.1 by using• FOSS softwares. Acquire knowledge of applications of algebra and calculus through FOSS.●

Course Learning Outcomes: This course will enable the students to Translate the real word problems through appropriate mathematical modelling.● Explain the concepts and use equations, formulae and mathematical expression● and relationship in a variety of context. Finding the extreme values of functions.● Analyze and demonstrate the mathematical skill require in mathematically● intensive areas in economics and business.

SEMESTER – II

Course Learning Outcomes: This course will enable the students to Recognize the mathematical objects called Groups.● Link the fundamental concepts of groups and symmetries of geometrical objects.● Explain the significance of the notions of Cosets, normal subgroups and factor● groups. Understand the concept of differentiation and fundamental theorems in● differentiation and various rules. Find the extreme values of functions of two variables.●

Course Learning Outcomes: This course will enable the students to Learn Free and Open Source Software (FOSS) tools for computer programming● Solve problem on algebra and calculus by using FOSS software's.● Acquire knowledge of applications of algebra and calculus through FOSS●

SEMESTER- III

Course Learning Outcomes: This course will enable the students to Understand the concept of differential equation. Classifies the differential equations with respect to their order and linearity. Demonstrate skills in constructing rigorous mathematical arguments. Demonstrate skills in communicating mathematics. Understand and be able to apply basic definitions and concepts of convergence. To prove simple statements involving convergent arguments. Learn to solve differential equation using Scilab/Maxima.

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SEMESTER- IV

Course Learning Outcomes: This course will enable the students to Understand the concept of Partial differential equation. Classifies the Partial differential equations with respect to their order and linearity. Understand and be able to apply various methods to solve Partial Differential Equations. Learn to solve Integral Equations and differential equations using Laplace Transforms.

SEMESTER – V

Course Learning Outcomes: The overall expectation from this course is that the student builds a basic understanding on Riemann integration and elementary complex analysis. The broader course outcomes are listed as follow. At the end of this course, the student will be able to: 1. Carry out certain computations such as computing upper and lower Riemann sums as well as integrals. 2. Describe various criteria for Integrability of functions. 3. Exhibit certain properties of mathematical objects such as integrable functions, analytic functions, harmonic functions and so on. 4. Prove some statements related to Riemann integration as well as in complex analysis. 5. Carry out the existing algorithms to construct mathematical structures such as analytic functions. 6. Applies the gained knowledge to solve various other problems.

Course Learning Outcomes: This course will enable the students to: 1. Identify and analyze different algebraic structures such as normal subgroups, rings, integral domains, division ring and fields. 2. Explore the properties of the above mentioned algebraic structures. 4. Prove various statements related to algebraic structures . 5. To solve isomers using isomorphism concept. 6. Apply the gained knowledge to solve various other problems. 7. Get introduced to fundamentals of vector calculus. 8. Get familiar with the various differential operators and their properties. 9. Learn the applications of vector calculus. 10. Learn about the applications of Serret-frenet formulae.



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SEMESTER – VI

Course Learning Outcomes: The overall expectation from this course is that the student will build a basic understanding in few areas of linear algebra such as vector spaces, linear transformations and inner product spaces. Some broader course outcomes are listed as follows. At the end of this course, the student will be able to 1. Understand the concepts of Vector spaces, subspaces, bases, dimension and their properties. 2. Learn properties of inner product spaces and determine orthogonality in inner product spaces. 3. Prove various statements in the context of vector spaces. 4. Realize importance of adjoint of a linear transformation and its canonical form. 5. Know about difference between even and odd functions. 6. Find the period of any trigonometric functions. 7. To expand any periodic function as a Fourier series.

Course Learning Outcomes: This course will enable the students to 1. Learn Free and Open Source Software (FOSS) tools for computer programming 2. Solve problem on Linear Algebra studied in MATDSCT 6.1 by using FOSS software's. 3. Acquire knowledge of applications of Linear Algebra through FOSS. Practical/Lab Work to be performed in Computer Lab (FOSS) Suggested Software's: Maxima/Scilab /Python

Course Learning Outcomes: The overall expectation from this course is that the student will get equipped with certain numerical techniques for various computations such as finding roots, finding the integrals and derivatives, and finding solutions to differential equations. Some broader course outcomes are listed as follows. At the end of this course, the student will be able to 1. Describe various operators arising in numerical analysis such as difference operators, shift operators and so on. 2. Articulate the rationale behind various techniques of numerical analysis such as in finding roots, integrals and derivatives. 3. Reproduce the existing algorithms for various tasks as mentioned previously in numerical analysis. 4. Apply the rules of calculus and other areas of mathematics in justifying the techniques of numerical analysis. 5. Solve problems using suitable numerical technique. 6. Appreciate the profound applicability of techniques of numerical analysis in solving real life problems and also appreciate the way the techniques are modified to improve the accuracy.


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Course Learning Outcomes: This course will enable the students to 1. Learn Free and Open Source Software (FOSS) tools for computer programming. 2. Solve problem on numerical Analysis studied in MATDSCT 6.2 by using FOSS software's. 3. Acquire knowledge of applications of Numerical Analysis through FOSS.

MICROBIOLOGY

Course Outcomes (COs): At the end of the course the student should be able to: 1.Thorough knowledge and understanding of concepts of microbiology. 2. Learning and practicing professional skills in handling microbes. 3.Thorough knowledge and application of good laboratory and good manufacturing practices in microbial quality control.

PHYSICS

Course Outcomes (COs):After the successful completion of the course, the student will be able to Understand the concepts of special theory and general theory of relativity. • Get familiarized with Lagrangian formulation and apply it to few common problems. • Explain variational principle and deduce Hamilton's equations from it. • Define canonical transformations and Poisson Brackets, and explain their importance. • Identify the failure of classical physics at the microscopic level. • Concept of matter waves and its experimental verification. • Find the relationship between the normalization of a wave function and the ability to correctly calculate expectation values or probability densities. Explain the minimum uncertainty of measuring both observables on any quantum state. • Describe the time-dependent and time-independent Schrödinger equation for simple potentials like for instance one-dimensional potential well and Harmonic oscillator. Apply Hermitian operators, their eigenvalues and eigenvectors to find various commutation and uncertainty relations.

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Course Outcomes (COs): After the completion of the course, the student will be able to • Describe atomic properties using basic atomic models. • Interpret atomic spectra of elements using vector atom model. • Interpret molecular spectra of compounds using basics of molecular physics. • Explain laser systems and their applications in various fields.

Course Outcomes (COs): After the successful completion of the course, the student will be able to: Explain the basic properties of nucleus and get the idea of its inner information. • Understand the concepts of binding energy and binding energy per nucleon v/s mass number graph. • Describe the processes of alpha, beta and gamma decays based on well-established theories. • Explain the basic aspects of interaction of gamma radiation with matter by photoelectric effect, Compton scattering and pair production. Explain the different nuclear radiation detectors such as ionization chamber, Geiger-Mueller counter etc. • Explain the basic concept of scintillation detectors, photo-multiplier tube and semiconductor detector •

Course Outcomes (COs): After the successful completion of the course, the student will be able to: Identify different types of tests and measuring instruments used in practice and understand their basic • working principles. Get hands on training in wiring a circuit, soldering, making a measurement using an electronic circuit used in • instrumentation. Have an understanding of the basic electronic components viz., resistors, capacitors, inductors, discrete and • integrated circuits, colour codes, values and pin diagram, their practical use. Understanding of the measurement of voltage, current, resistance value, identification of the terminals of a • transistor and ICs. Identify and understand the different types of transducers and sensors used in robust and hand-held • instruments. Understand and give a mathematical treatment of the working of rectifiers, filter, data converters and • different types of transducers. Connect the concepts learnt in the course to their practical use in daily life. • Develop basic hands-on skills in the usage of oscilloscopes, multimeters, rectifiers, amplifiers, oscillators and • high voltage probes, generators and digital meters. Servicing of simple faults of domestic appliances: Iron box, immersion heater, fan, hot plate, battery charger, • emergency lamp and the like.

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ZOOLOGY

Course Outcomes (COs):At the end of the course the student should be able to understand: 1. The structure and function of the cell organelles. 2. The chromatin structure and its location. 3. The basic principle of life, how a cell divides leading to the growth of an 4. Organism and also reproduces to form a new organisms. 5. How a cell communicates with its neighboring cells. 6. The principles of inheritance, Mendel's laws and the deviations. 7. How environment plays an important role by interacting with genetic factors. 8. Detect chromosomal aberrations in humans and study of pedigree analysis.

Course Outcomes (COs):At the end of the course the student should be able to: 1. To use simple and compound microscopes. 2. To prepare stained slides to observe the cell organelles. 3. To be familiar with the basic principle of life, how a cell divides leading to the growth of an organism and also reproduces to form new organisms. 4. The chromosomal aberrations by preparing karyotypes. 5. How chromosomal aberrations are inherited in humans by pedigree analysis in families. The antigen-antibody reaction.

Course Outcomes (COs):At the end of the course the student: 1. Understands the importance of earthworms in maintaining soil quality. 2. Learns that the vermicomposting is an effective organic solid waste management method. 3. Gets acquainted with the importance of earthworms in agro-based economic activity. 4. Vermicomposting leads to organic farming and healthy food production. 5. Vermicomposting may be taken up as a small scale industry by the farmers and unemployed youth. 6. Get jobs in teaching institutions or vermiculture units as technicians. 7. Learn the concept of vermicomposting as bio fertilizers thus student can become an entrepreneur after completion of the course. 8. Best opportunity for self-employment and lifelong learning with farmers.

Course Outcomes (COs): The student at the completion of the course will learn: 1. To develop a deep understanding of structure of biomolecules like proteins, lipids and carbohydrates. 2. How simple molecules together form complex macromolecules. 3. To understand the thermodynamics of enzyme catalyzed reactions. 4. Mechanisms of energy production at cellular and molecular

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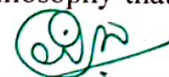
levels. 5. To understand various functional components of an organism. 6. To explore the complex network of these functional components. 7. To comprehend the regulatory mechanisms for maintenance of function in the body.

Course Outcomes (COs): After the successful completion of the course, the student will be able to: CO1. Group animals on the basis of their morphological characteristics/structures. CO2.Demonstrate comprehensive identification abilities of Non Chordate diversity CO3.Explain structural and functional diversity of Non-Chordates CO4.Develop understanding on the diversity of life with regard to protists, non chordates and chordates. CO5.Examine the diversity and evolutionary history of a taxon through the construction of a basic phylogenetic/cladistics tree.

Course Outcomes (COs): After the successful completion of the course, the student will be able to: CO1.To demonstrate comprehensive identification abilities of chordate diversity CO2. Able to explain structural and functional diversity of chordate diversity CO3. To understand evolutionary relationship amongst chordates CO4.To take up research in biological sciences. CO5. To realize that very similar physiological mechanisms are used in very diverse organisms. CO6.To Get a flavor of research by working on project besides improving their writing skills. It will further enable the students to think and interpret individually.

BOTANY

Course outcomes as per NEP 2020 The framework of curriculum for the Bachelor's program in Botany aims to transform the course content and pedagogy to provide a multidisciplinary, student-centric, and outcome-based, holistic education to the next generation of students. Aside from structuring the curriculum to be more in-depth, focused, and comprehensive with significant skill-set for all exit levels; keeping in mind the job prospects; the emphasis has been to maintain academic coherence and continuum throughout the program of study and help build a strong footing in the subject, thereby ensuring a seamless transition into their careers. Special attention is given to eliminate redundancy, discourage rote learning, and espouse a problem-solving, critical thinking, and inquisitive mindset among learners. The curriculum embraces the philosophy that



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science is best learned through experiential learning, not limited to the confines of a classroom but rather through hands-on training, projects, field studies, industrial visits, and internships. This updated syllabus, with modern technology, helps students stay informed on the leading edge developments in plant sciences and promotes curiosity, innovation, and a passion for research, that will serve them well in their journey into scientific adventure and discovery beyond graduation. The goal is to equip students with holistic knowledge, competencies, professional skills, and a strong positive mindset that they can leverage while navigating the current stiff challenges of the job market.

ENGLISH

Course Outcomes: The course will enable students to: CO1. Learn to appreciate and obtain the knowledge of literary devices and genres. CO2. Acquire skills of creativity and critical thinking to express one's experiences. CO3. Be aware of one's social responsibilities. CO4. Acquire and develop students' ability on logical reasoning, comprehension and translation. CO5. Enable students to increase reading speed, use correct and appropriate English.

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BACHELOR OF COMPUTER APPLICATION

Course Outcomes (COs):

- Introduction to computers, classification of computers, anatomy of computer, constituents and architecture, microcontrollers • Operating systems, functions of operating systems, classification of operating systems, kernel, shell, basics of Unix, shell programming, booting • Databases, why databases are used, users,SQL, data types in SQL, introduction of queries - select, alter, update, delete, truncate, using where, and or in not in • Internet basics, features, applications, services, internet service providers, domain name system, browsing, email, searching • Web Programming basics, introduction of HTML and CSS programming • Introduction of computers, classification of computers, anatomy of computer, constituents and architecture, microcontrollers.
- Confidently operate Desktop Computers to carry out computational tasks • Understand working of Hardware and Software and the importance of operating systems • Understand programming languages, number systems, peripheral devices, networking, multimedia and internet concepts • Read, understand and trace the execution of programs written in C language • Write the C code for a given problem • Perform input and output operations using programs in C • Write programs that perform operations on arrays.

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