

Taranath Shikshana Samsthe



LAXMI VENKATESH DESAI COLLEGE, RAICHUR-584103.
(Affiliated to Raichur University, Raichur)



UG & PG
PROGRAMME OUTCOMES,
PROGRAMME SPECIFIC OUTCOMES
&
COURSE OUTCOMES

UG AND PG PROGRAMMES IN LVD COLLEGE
RAICHUR

<u>UG PROGRAMMES</u>	
1	Physics
2	Chemistry
3	Mathematics
4	Electronics
5	Botany
6	Zoology
7	Biotechnology
8	Microbiology
9	Computer Science
10	Computer Application (BCA)
11	Education
12	Political Science
13	Sociology
14	History
15	Economics
16	Kannada
17	English
18	Hindi
19	Physical Education
20	Music
<u>PG PROGRAMMES</u>	
21	M.Sc Physics
22	M.Sc Chemistry


PRINCIPAL
L.V.D. College, RAICHUR-03.

DEPARTMENT OF PHYSICS (UG)

Physics

PROGRAMME OUTCOMES

PO1: The Objective of the Department is educating students on various areas of both theoretical and practical aspects of Physics, such that employment in the industries is possible. Students are also encouraged to pursue further studies or go for research.

PO2: The main aim of the department is to provide high quality learning in physics, grooming bright undergraduates who will push frontiers of knowledge in physics and its related disciplines through scholarly activities.

PO3: Students studying physics are set to work on newest ideas in science and technology, in academia, the government, or the private sector.

PO4: A physicist can opt for basic research in astrophysics, cosmology, particle physics, atomic physics, photonics or condensed matter physics, renewable energy, quantum information science, materials development, biophysics or medical physics.

PO5: The physicists are in the forefront of all technical adventures in science and technology. Careers include teaching, medicine, law (especially intellectual property or patent law), science writing, history of science, philosophy of science, science policy, energy policy, government, or management in technical fields.

PO6: Study of Physics prepares the students for almost any career, because students learn how to analyze complex frustrating problems and they are equipped with a strong quantitative background that can be applied in any technical field.

PROGRAMME SPECIFIC OUTCOMES

The completion of this Under Graduate programme will

PSO1: Provide a fundamental knowledge in the core areas of Physics supported by the interdisciplinary courses.

PSO2: Deliver an effective knowledge in the fundamental areas of Physics with a clear and a potential understanding of the integrated approach of Theory with Practicals.

PSO3: Facilitate in acquiring intrinsic skills in the relevant Core areas to progress towards Higher education and Research.

PSO4: Accomplish the individual with employable skills thus evolving one as a self-disciplined personality committed to serve the society with an environment friendly attitude.

Head of the
Department of Physics

PRINCIPAL

L.V.D. College, RAICHUR-03

COURSE OUTCOMES


Class	Course/Paper	Course Learning outcomes
B. Sc.I Semester (CBCS)	DSC1- PHYT:104T Mechanics	<p>CO1. To understand the Newtonian mechanics and solve the problems related to the motion of system of particles.</p> <p>CO2. To understand basic theories related with properties of matter and its application to determine values of various physical quantities associated with matter.</p> <p>CO3. To understand frames of reference and Newton's laws and apply them in calculations of the motion of simple Systems.</p> <p>CO4. To acquire the knowledge of linear and angular momenta and apply them in solving physical problems.</p> <p>CO5. To understand the Newtonian relativity, Michelson Morley experiment and concepts of special theory of relativity.</p> <p>CO6. To understand the concepts - gravitation, elasticity.</p> <p>CO7. To study the Block diagram of CRO and functions of various control knobs of front panel, explanation of waveform display and uses of CRO.</p>
	DSC-PHYP:104P Practicals	<p>CO1. Solve problems and perform experiments in the topics related to moment of inertia, young's modulus, rigidity modulus, Poisson's ratio, Torsional pendulum, Bar pendulum, Parallel axes theorem and Use of CRO.</p>
B. Sc.II Semester (CBCS)	DSC-PHYT:201 Thermal Physics and Fluid Mechanics	<p>CO1. To qualitatively understand distribution functions in case of Maxwell-Boltzmann statistics, Bose Einstein statistics and Fermi-Dirac statistics and the comparison between them. Bose-Einstein and Fermi-Dirac distributions.</p> <p>CO2. To understand Carnot's ideal heats engine, Carnot cycle and its efficiency, Carnot's theorem, Otto and Diesel engines with their efficiencies.</p> <p>CO3. The course will also develop understanding of fundamental laws of thermodynamics.</p>

		<p>CO4. To learn the concept of radiations, Stefan's law & its derivation using radiation pressure. Determination of Stefan's constant. Wein's displacement law, Rayleigh-Jeans's law, Planck's law of radiation, Ferry's total radiation Pyrometer.</p> <p>CO5. To understand H-R diagrams. To qualitatively understand the formation and evolution of stars.</p> <p>CO6. Analyze the viscous nature of the fluids and to determine the property of the liquids. Basics of Surface Tension, Determine the surface tension of different liquids and correlate the property with different natural phenomena</p>
	<p>DSC-PHYP:202 Practicals</p>	<p>CO1. Perform experiment with appropriate equipments and procedures for the determination of particular physical parameter.</p> <p>CO2. Draw the electrical circuit, select the appropriate meters, perform the experiments, record and interpret the results</p>
<p>B. Sc.III Semester</p>	<p>PHY 3.1 : Geometrical Optics and Electricity</p>	<p>CO1. Understand the properties of light like reflection, refraction, Understand the Fermat's Principle and Lagrange's law. Understand the natural behavior of aberration in lens</p> <p>CO2. Gain Knowledge on the basic concepts of electric and magnetic fields. concept of conductors, dielectrics, Understand the polarization in dielectrics. Clausius-Mosotti equation and limitations, the concept of electric Images and its uses.</p> <p>CO3. Learn Biot-savart's law and its applications, theory of Helmholtz Galvanometer. Ampere's circuital law & its applications to solenoid and toroid, the concept of time constant in transient circuits (RC,RL)</p> <p>CO4. To learn the concept of 'j' operator to analyze AC series and parallel resonant circuits. Q factor, sharpness of resonance.</p> <p>CO5. Understand the theory of B.G capacitance of</p>

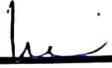
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Head of the
Department of Physics

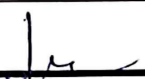
		capacitor using BG by absolute method, self inductance by Rayleigh's method and mutual inductance by direct method. Theory of earth inductor.
	PHY 3.2 : Physics Lab – III Practicals	CO1. Use optical sources and lasers for the determination of optical parameters with appropriate procedure, tabulate the findings and analyze the results. CO2. Connect the electrical circuit, select the appropriate meters, perform the experiments, record and interpret the results.
B. Sc.IV Semester	PHY 4.1 : Physical Optics, Thermoelectricity and Electromagnetic theory	CO1. Study the theory & relevant experiments of interference using Biprism, air wedge, Newton's rings and michelson interferometer CO2. Study the theory and experimental past of diffraction by fresnels and fraunhoffer methods CO3. Study the theories for production of polarization of light CO4. Understand the resolving power of different optical instruments. CO5. Understand different types of thermoelectricity and thermoelectric diagrams CO6. Gain knowledge on Mathematical background – gradient of scalar, divergence and curl of a vector, their physical significance, Gauss', Stoke's and Green's theorems, EM waves, propagation and their properties. Maxwell's equations in differential forms, integral forms & their physical significance. Poynting theorem
	PHY 4.2 : Physics Lab – IV Practicals	CO1. Use optical instruments- spectrometer, biprism, polarimeter, telescopes, sources and lasers for the determination of optical parameters with appropriate procedure, tabulate the findings and analyze the results. CO2. Connect the electrical circuit, select the appropriate meters, performs the experiments, record and interprets the results.


 Head of the
 Department of Physics

B. Sc.V Semester	PHY 5.1 : Classical Mechanics, Quantum Mechanics and Atomic Spectra	<p>CO1.To understand the Newtonian mechanics and solve the problems related to the motion of system of particles different types of Constraints, degrees of freedom, virtual work. Familiarize with Lagrangian and Hamiltonian formulations of classical mechanics</p> <p>CO2. To study the fundamentals of Quantum Physics, the uncertainty principle. Schrodinger time dependent and time independent wave equation, Understand physical interpretation of wave function, dual nature of matter</p> <p>CO3. To study Bose-Einstein and Fermi-Dirac statistics.</p> <p>CO4. Understand different models of atom, different types of interactions, familiar with LS and jj coupling schemes.</p> <p>CO5. To learn Normal and Anomalous Zeeman effects. energy level diagram of sodium</p>
	PHY 5.2 : Molecular Spectra, Lasers, Relativity and Electronics	<p>CO1. To study different kinds of motions in molecules and to understand rotational spectra.</p> <p>CO2. To understand Rayleigh and Raman scattering.</p> <p>CO3. To describe the theory and working of Gas and Diode lasers.</p> <p>CO4. To understand the Newtonian relativity, Michelson Morley experiment and concepts of special theory of relativity.</p> <p>CO5. To study Thevenin's and Norton's theorems.</p> <p>CO6. Analyze the characteristics of transistor and FET, transistor and FET biasing circuits, working of single stage and multistage amplifiers using, transistor and FET. the relationship between amplifier and oscillators</p>
	PHY 5.3 : Physics Lab –V Practicals	CO1. Draw the electrical circuit, select the appropriate meters, performs the experiments, record and interprets the results.
	PHY 5.4 : Physics Lab –VI Practicals	CO1. Draw the electrical circuit, select the appropriate meters, performs the experiments, record and interprets the results.


 Head of the
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B. Sc.VI Semester	PHY 6.1: Solid State Physics, Nuclear Physics, and Nanoscience	<p>CO1. To study the crystal systems and understand different crystal structures, thermal and electrical properties in the free-electron model.</p> <p>CO2. Know the fundamental principles of semiconductors, including pn-junctions, the charge carrier mobility and density. Fermi surface, basic models of magnetism, Occurrence of superconductivity, destruction of superconductivity by magnetic field, Meissner effect, isotope effect and applications</p> <p>CO3. To understand the liquid drop model and shell model, particle detectors and accelerators.</p> <p>CO4. To study about nanomaterials, their properties quantum structures: quantum wells, wires and dots; nanomaterials; synthesis, characterization, properties and applications.</p>
	PHY 6.2: Astrophysics, Computational Physics, Electronics and Communication	<p>CO1. To understand H-R diagrams, the formation and evolution of stars. End stages of stars – white dwarfs, neutron stars and black holes. Different types of telescopes and their characteristics.</p> <p>CO2. To study the basics of C-Programming. Write C program for problem based on numerical analysis and mathematical concepts, execute it for its output.</p> <p>CO3. To describe the workings of DTL gates.</p> <p>CO4. To learn about Operational amplifiers and different types of filters.</p> <p>CO5. To understand the necessity of modulation and demodulation.</p>
	PHY 6.3 : Physics Lab –VII Practicals	<p>CO1. Draw & connect the electrical circuit, select the appropriate meters, perform the experiments, record and interpret the results</p>
	PHY 6.4 : Physics Lab –VIII Practicals	<p>CO1. Draw & connect the electrical circuit, select the appropriate meters, perform the experiments, record and interpret the results.</p> <p>CO2. Executing C Programs for period of a simple pendulum and range & height of a projectile.</p>


 Head of the
 Department of Physics

SCIENCE STREAM DEPARTMENT OF PHYSICS (UG NEP)

PROGRAMME OUTCOMES

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PO4: A physicist can opt for basic research in astrophysics, cosmology, particle physics, atomic physics, photonics or condensed matter physics, renewable energy, quantum information science, materials development, biophysics or medical physics.

PO5: The physicists are in the forefront of all technical adventures in science and technology. Careers include teaching, medicine, law (especially intellectual property or patent law), science writing, history of science, philosophy of science, science policy, energy policy, government, or management in technical fields.

PO6: Study of Physics prepares the students for almost any career, because students learn how to analyze complex frustrating problems and they are equipped with a strong quantitative background that can be applied in any technical field.

PROGRAMME SPECIFIC OUTCOMES

PSO1: To understand the basic laws and explore the fundamental concepts of physics To understand the concepts and significance of the various physical phenomena.

PSO2: To carry out experiments to understand the laws and concepts of Physics

PSO3: To apply the theories learnt and the skills acquired to solve real time problems.

PSO4: To acquire a wide range of problem solving skills, both analytical and technical.

PSO5: To enhance the student's academic abilities, personal qualities and transferable skills.

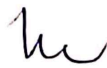
PSO6: This will give them an opportunity to develop as responsible citizens.

PSO7: To produce graduates who excel in the competencies and values required for leadership to serve a rapidly evolving global community. To motivate the students to pursue PG courses in reputed institutions.



Head of the
Department of Physics

Semester	Paper Code	Paper Code	Course Outcomes
Semester-I (NEP)	DSC-A1	Mechanics and Properties of matter	<p>CO-1 Will learn fixing units, tabulation of observations, Analysis of data (Graphical /analytical).</p> <p>CO-2 Will learn about accuracy of measurement and sources of errors, importance of significant figures.</p> <p>CO-3 Will know how g can be determined experimentally and derive satisfactorily.</p> <p>CO-4 Students will see the difference between simple and torsional pendulum and their use in the determination of various physical parameters.</p> <p>CO-5 Students will come to know how various elastic modules can be determined.</p> <p>CO-6 Students will measure surface tension and viscosity and appreciate the methods adopted.</p>
Semester-II (NEP)	DSC-A2	Electricity and magnetism	<p>CO-1 Demonstrate Gauss law, Coulomb's law for the electric field and apply it to systems of point charges as well as line, surface and volume distributions of charges.</p> <p>CO-2 Explains and differentiates the vector (electric fields, Coulomb's law) and scalar (electric potential, electric potential energy) formalisms of electrostatics.</p> <p>CO-3 Applies Gauss's law of electrostatics to solve a variety of problems.</p> <p>CO-4 Describes the magnetic field produced by magnetic dipoles and electric currents.</p> <p>CO-5 Explain Faraday-Lenz and Maxwell laws to articulate the relationship between electric and magnetic fields.</p> <p>CO-6 Describe how magnetism is produced and list examples where its effects are observed.</p>


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Semester-III (NEP)	DSC3	Thermal Physics and statistical mechanics	<p>CO-1 Students will learn kinetic theory of gases in detail with examples.</p> <p>CO-2 Students are able to understand and identify in detail with application of thermal conductivity and theory of radiation.</p> <p>CO-3 Students will learn classification characteristics of laws of thermodynamics.</p> <p>CO-4 Students will learn about reversible and irreversible process.</p> <p>CO-5 Students will understand classification and characteristics of entropy and thermodynamic potential.</p>
Semester-IV (NEP)	DSC 4	Waves and Optics	<p>CO-1 Students will learn in detail with application, superposition of simple harmonic motion.</p> <p>CO-2 Students are able understand in detailed application of wave motion.</p> <p>CO-3 Deliberate in detail with examples sound wave optics and transducers.</p> <p>CO-4 They learn details of interference, diffraction and polarization.</p> <p>CO-5 They learn in detail with the application of acoustics.</p>
SemesterV (NEP)		Classical Mechanics and Quantum Mechanics -I	<p>After the successful completion of the course, the student will be able to</p> <p>CO1: Identify the failure of classical physics at the microscopic level.</p> <p>CO2: Find the relationship between the normalization of a wave function and the ability to correctly calculate expectation values or probability densities.</p> <p>CO3: Explain the minimum uncertainty of measuring both observables on any quantum state.</p> <p>CO4: Describe the time-dependent and time-independent Schrödinger equation for simple potentials like for instance one-dimensional</p>

			<p>potential well and Harmonic oscillator.</p> <p>CO5: Apply Hermitian operators, their eigenvalues and eigenvectors to find various commutation and uncertainty relations.</p>
Semester V (NEP)		<p>Elements of Atomic, Molecular & Laser Physics</p>	<p>CO1: Describe atomic properties using basic atomic models.</p> <p>CO2: Interpret atomic spectra of elements using vector atom model.</p> <p>CO3: Interpret molecular spectra of compounds using basics of molecular physics.</p> <p>CO4: Explain laser systems and their applications in various fields.</p>
Semester VI (NEP)		<p>Elements of condensed Matter and Nuclear Physics</p>	<p>CO1: Explain the basic properties of nucleus and get the idea of its inner information.</p> <p>CO2: Understand the concepts of binding energy and binding energy per nucleon v/s mass number graph.</p> <p>CO3: Describe the processes of alpha, beta and gamma decays based on well-established theories.</p> <p>CO4: Explain the basic aspects of interaction of gamma radiation with matter by photoelectric effect, Compton scattering and pair production.</p> <p>CO5: Explain the different nuclear radiation detectors such as ionization chamber, Geiger-Mueller counter etc.</p> <p>CO6: Explain the basic concept of scintillation detectors, photo-multiplier tube and semiconductor detectors</p>
			<p>CO1: Identify different types of tests and measuring instruments used in practice and understand their basic working principles.</p> <p>CO2: Get hands on training in wiring a circuit, soldering, making a measurement using an electronic circuit used in instrumentation.</p> <p>CO3: Have an understanding of the basic</p>

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Semester VI
(NEP)

Electronic
Instrument
ation &
Sensors

electronic components viz., resistors, capacitors, inductors, discrete and integrated circuits, colour codes, values and pin diagram, their practical use.

CO4: Understanding of the measurement of voltage, current, resistance value, identification of the terminals of a transistor and ICs.

CO5: Identify and understand the different types of transducers and sensors used in robust and hand-held instruments.

CO6: Understand and give a mathematical treatment of the working of rectifiers, filter, data converters and different types of transducers



Head of the
Department of Physics

Taranath Shikshana Samsthe

Chemistry

LAXMI VENKATESH DESAI COLLEGE, RAICHUR-584103.

DEPARTMENT OF CHEMISTRY (UG)

PROGRAMME OUTCOMES:

- PO1:** Acquire the knowledge with facts and figures related to Organic, Physical, Inorganic and other branches of Chemistry.
- PO2:** Understand the basic concepts, fundamental principles, and the scientific theories related to various scientific phenomena and their relevancies in the day-to-day life.
- PO3:** Acquire the skills in handling scientific instruments, planning and performing in laboratory experiments.
- PO4:** Demonstrate, solve and an understanding of major concepts in all disciplines of chemistry.
- PO5:** Solve the problem and also think methodically, independently and draw a logical conclusion.
- PO6:** Employ critical thinking and the scientific knowledge to design, carry out, record and analyze the results of chemical reactions.
- PO7:** Create an awareness of the impact of chemistry on the environment, society, and development outside the scientific community.
- PO8:** Find out the green route for chemical reaction for sustainable development.
- PO9:** To inculcate the scientific temperament in the students and outside the scientific community.
- PO10:** Use modern techniques, decent equipments and Chemistry software's.
- PO11:** Be able to think creatively to propose novel ideas
- PO12:** Realize how interdisciplinary approach in chemistry helps in providing better solutions and new ideas for the sustainable development.

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Head, Dept. of Chemistry
L.V.D. College, RAICHUR.

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PROGRAMME SPECIFIC OUTCOMES:

PSO1: B.Sc. Chemistry provides backbone in all the traditional branches of Physical, Inorganic, organic and Analytical chemistry.

PSO2: The experimental work will be continues throughout the session to develop the theoretical knowledge and practical as well.

PSO3: Graduates from this course will be better prepared to understand the new environment friendly systems and can understand the processes that the chemical industry is adopting.

PSO4: The course has been designed to have insight in almost all the aspects of chemistry and to build a solid foundation in the subject to choose a career in industry or academics or research.

PSO5: The syllabus very well designed and it covers the spectroscopy, Analytical Chemistry, Industrial Chemistry, Pharmaceutical compounds, Principles of Volumetric and Gravimetric estimations.

PSO6: The employment areas for the B.Sc. Chemistry graduates include pharmaceutical industries, chemical manufactures, forensic science department, plastic industries, agro industries etc. apart from these they are also recruited in the field such as oil, gas and power sectors, defence services.

COURSE OUTCOMES:

Class	Course/Paper	Course learning outcomes
B. Sc.I Semester (CBCS)	DSC-CHT-1A: Inorganic & Organic chemistry.	<p>CO-1: Knows the idea of de-Broglie equation and Heisenberg's uncertainty principle.</p> <p>CO-2: To understand the quantum numbers and principle of extra stability.</p> <p>CO-3: To understand the periodic properties of elements in periodic table.</p> <p>CO-4: Nucleophiles and electrophiles. Reactive Intermediates: Carbocations, Carbanions and free radicals.</p> <p>CO-5: To learn the comparison between Conformations and Configurational isomers.</p> <p>CO-6: Study the concept of conformations with respect to ethane, butane and cyclohexane.</p> <p>CO-7: Students will be able to learn preparation and reactions & mechanisms of alkanes, alkenes and alkynes.</p>
	DSC-CHP-1A: Practicals:	<p>CO-1: Estimation of sodium carbonate and sodium hydrogen carbonate present in a mixture.</p> <p>CO-2: Estimation of Fe (II) by dichromate using internal indicator.</p> <p>CO-3: Estimation of oxalic acid by titrating it with KMnO_4 6) Determination of zinc by complexometric titration with EDTA.</p> <p>CO-4: Detection of extra elements in organic compounds (containing up to two Extra elements).</p>

		<p>distillation and determination of melting point of the crystallized solid & boiling point of the liquid.</p> <p>CO2: To learn preparation of organic compounds and confirmation through determination of melting points.</p> <p>CO1: To learn the various terms, laws, differentiate ideal and no-ideal solutions.</p>
<p>B. Sc.III Semester (CBCS)</p>	<p>DSC-CHT-1C: Physical, Inorganic & Organic chemistry.</p>	<p>To know the thermodynamic aspects of Ideal solutions-Gibbs free energy change, Volume change, Enthalpy change and entropy change of mixing of Ideal solution.</p> <p>CO2: To know the terms in phase equilibria such as- system, phase in system, components in system, degree of freedom, one / two component system, phase rule, etc.</p> <p>CO3: To understand the meaning and types of equilibrium such as true or static, metastable and unstable equilibrium. And meaning of phase, component and degree of freedom.</p> <p>CO4: Students will be able to learn different terms in conductometry such as electrolytic conductance, resistance, conductance, Ohm's law, cell constant, specific and equivalent conductance, molar conductance, Kohlrausch's law, etc</p> <p>CO5: To identify and draw the structures of amines from their names or from structure name can be assigned.</p> <p>CO6: To understand the synthesis of carboxylic amines & its mechanism</p>

	<p>DSC-CHP-1C: Practicals :</p>	<p>CO1: Students understand applications of conductometric titrations in the determination of solubility, solubility product, and equivalent conductance of strong electrolytes, precipitation titrations and dissociation constant of weak acids.</p> <p>CO2: Students understand applications of potentiometric (acid-base and redox) titrations.</p> <p>CO3: Students learn to demonstrate the determination pH of biological fluids using pH meter.</p> <p>CO4: Students will learn to verify Beer-Lambert's law and determine the concentration of unknown solution of copper sulphate.</p> <p>CO5: To learn and analyze organic compounds through systematic qualitative analysis.</p>
<p>B.Sc.IV Semester (CBCS)</p>	<p>DSC-CHT-1D: Coordination chemistry, States of matter & chemical kinetics.</p>	<p>CO1: To learn about the principles and applications of crystal field theory.</p> <p>CO2: The students are expected to learn the qualitative treatment of the structure of liquid along with the physical properties of liquid, viz, vapour pressure, surface tension and viscosity.</p> <p>CO3: To learn the Determination of surface tension using stalagmometer (drop weight and drop number method). Viscosity of a liquid and determination of coefficient of viscosity using Ostwald</p>

		<p>viscometer.</p> <p>CO4: To learn The concept of reaction rates. Effect of temperature, pressure, catalyst and other factors on reaction rates.</p> <p>CO5: To know the Concept of Order and molecularity of a reaction and their applications.</p> <p>CO6: To learn about Half-life of a reaction.</p>
	<p>SC-CHP-1D: Practicals :</p>	<p>CO1: To understand the concepts of surface tension, viscosity, and solubility.</p> <p>CO2: To develop the skills for doing chemical kinetics titrations.</p> <p>CO3: To understand on how to use a stalagmometer and Ostwald's viscometer.</p> <p>CO4: To develop skills in the identification and analysis of cations and anions.</p> <p>CO5: To perform gravimetric, volumetric and colorimetric experiments for quantitative interpretation of substances/metal ions.</p> <p>CO6: To Carry out quantitative estimations of various metal ions.</p>

<p>B.Sc.V Semester (CBCS)</p>	<p>DSE-CHT-1: Analytical methods in chemistry.</p>	<p>CO1: To Classify and explain different types of errors & methods of reporting analytical data.</p> <p>CO2: To learn about precipitation, co-precipitation & post-precipitation, digestion, filtration, & weighing of the product precipitate in gravimetric analysis.</p> <p>CO3: To study the fundamental laws of spectroscopy and Selection rules, to know the basic principles of Instrumentation for UV-visible spectroscopy and Infra-red spectroscopy.</p> <p>CO4: To apply the organometallic & Organo sulphur compounds in preparation of different functional groups.</p> <p>CO5 : To study about chemistry of some common hetrocyclic compounds like Synthesis of Furan, Thiophene, Pyrrole & Pyridine.</p> <p>CO6: To realize the importance of colligative properties.</p> <p>CO7: To learn about Second law of thermodynamics, different statement of the law, Carnot cycle and its efficiency, Carnot theorem, Concept of entropy.</p>
	<p>DSE-CHP-1: Practicals :</p>	<p>CO1: To understand the principles behind the gravimetry and to apply it in quantitative analysis.</p> <p>CO2: To understand the principles of Potentiometry, Polarimetry, Refractometry and Conductometry.</p>

		<p>CO3: To develop analytical skills in inorganic quantitative and qualitative analysis.</p> <p>CO4: To determine the concentration of coloured compounds using the colorimetric technique.</p> <p>CO5: To develop skill in setting up a experimental methods to determine the physical properties.</p>
	SEC-CHT-2: Pharmaceutical chemistry:	<p>CO-1: Helps to understand about the drug discovery, design and development of representative drugs of the following classes: Antipyretic, Analgesics, Antiinflammatory, Anti-bacterial, Antifungal, Antiviral, Antibiotics, Anti-laprosy, Central Nervous System agents, HIV-AIDS related drugs.</p> <p>CO-2: To know about aerobic and anaerobic fermentation, importance of Vitamins and Amino acids, synthesis of Penicillin, Cephalosporin, Chloromycetin, Streptomycin and their role as an antibiotic.</p>
	Practicals:	<p>CO1: To learn experimentally how to prepare aspirin in the laboratory and how to analyze it.</p> <p>CO2: To learn experimentally how to prepare magnesium bisilicate in the laboratory.</p>
	DSE-CHT2: Industrial chemistry & Environment.	<p>CO1: To study about the properties of inorganic material of industrial importance such as glass, refractories, ceramic, cement, chemical explosives etc.</p> <p>CO2: To learn about the raw materials and</p>

		<p>manufacturing processes involved in preparation of various inorganic material of industrial importance.</p> <p>CO3: To study Biological significance, source and structure of Vitamin A, B1(thiamine), B2(riboflavin), B6(pyridoxine), a-tocopherol, K1 (phylloquinone), C (ascorbic acid).</p> <p>CO4: To learn about Hormones, functions and deficiency diseases of hormones, synthesis of adrenaline and thyroxine.</p> <p>CO5: To study different energy conversion processes including chemical as well as electrochemical energy systems.</p> <p>CO6: To study fundamental and applications of various energy systems especially battery, fuel cells, solar cells etc.</p>
<p>B.Sc.VI Semester (CBCS)</p>	<p>DSE-CHP2: Practicals :</p>	<p>CO1: To learn and analyze organic compounds through systematic qualitative analysis</p> <p>CO2: To learn the preparation of organic compounds and confirmation through determination of melting points.</p> <p>CO3: Students are able to understand principles and applications of conductometric titrations.</p> <p>CO4: Students will be able to verify Beer-Lambert's law and determine the concentration of unknown solution of Fe³⁺ using Colorimeter.</p>

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		<p>CO5: To determine the percentage composition of unknown mixture of A and B liquids using Abbe's refractometer (formula and graphical method).</p> <p>CO6: To determine the pKa of acetic acid by potentiometrically.</p>
	SEC-CHT-3: Fuel chemistry	<p>CO1: The course aims to provide students with a basic scientific and technical understanding of the production, behaviour and handling of hydrocarbon fuels, petrochemicals and lubricants.</p> <p>CO2: This will enable them to be industry ready to contribute effectively in the field of petroleum chemistry and technology.</p>

DEPARTMENT OF CHEMISTRY (UG) AS PER NEP

PROGRAMME OUTCOMES

- PO1:** Acquire the knowledge with facts and figures related to Organic, Physical, Inorganic and other branches of Chemistry.
- PO2:** Understand the basic concepts, fundamental principles, and the scientific theories related to various scientific phenomena and their relevancies in the day-to-day life.
- PO3:** Acquire the skills in handling scientific instruments, planning and performing in laboratory experiments.
- PO4:** Demonstrate, solve and an understanding of major concepts in all disciplines of chemistry.
- PO5:** Solve the problem and also think methodically, independently and draw a logical conclusion.
- PO6:** Employ critical thinking and the scientific knowledge to design, carry out, record and analyze the results of chemical reactions.
- PO7:** Create an awareness of the impact of chemistry on the environment, society, and development outside the scientific community.
- PO8:** Find out the green route for chemical reaction for sustainable development.
- PO9:** To inculcate the scientific temperament in the students and outside the scientific community.
- PO10:** Use modern techniques, decent equipments and Chemistry software's.
- PO11:** Be able to think creatively to propose novel ideas.
- PO12:** Realize how interdisciplinary approach in chemistry helps in providing better solutions and new ideas for the sustainable development.

Programme Specific Outcome (PSO):

On completion of the 03 years Degree in Chemistry students will be able to:

PSO1: Demonstrate, solve and an understanding of major concepts in all the disciplines of chemistry.

PSO2: Provide students with broad and balanced knowledge and understanding of key chemical concepts.

PSO3: Understand practical skills so that they can understand and assess risks and work safely and competently in the laboratory.

PSO4: To apply standard methodology to the solutions of problems in chemistry.

PSO5: Provide students with knowledge and skill towards employment or higher education in chemistry or multi-disciplinary areas involving chemistry.

PSO6: Provide students with the ability to plan and carry out experiments independently and assess the significance of outcomes.

PSO7: Develop in students the ability to adapt and apply methodology to the solution of unfamiliar types of problems.

PSO8: Employ critical thinking and the scientific knowledge to design, carry out, record and analyze the results of chemical reactions.

PSO9: To prepare students effectively for professional employment or research degrees in chemical sciences.

PSO10: To build confidence in the candidate to be able to work on his own in industry and institution of higher education.

PSO11: To develop an independent and responsible work ethics.

COURSE OUTCOMES:

Class	Course/Paper	Course learning outcomes
B.Sc.I Sem(NEP)	DSC-CHT-1: Analytical & Organic chemistry-I	<p>CO1: To understand the concept of chemical analysis, accuracy, precision & statistical data treatment.</p> <p>CO2: To Understand the principles of titrimetric analysis.</p> <p>CO3: To Understand the principles of different type's of titrations. Titration curves for all types of acids – base titrations.</p> <p>CO3: Gain knowledge about balancing redox equations, titration curves, theory of redox indicators and applications.</p> <p>CO4: To Understand titration curves, Indicators for EDTA titrations - theory of metal ion indicators.</p> <p>CO5: Students able to understand bond properties, electron displacement effects (inductive effect, electrometric effect, resonance effect and Hyper conjugation effect). steric effect and their applications.</p> <p>CO6: To understand about basic concept of organic reaction mechanism, types of organic reactions,</p> <p>CO7: Able to draw energy profile diagrams & factors affecting nucleophilic substitution reactions.</p>
	DSC-CHP-1: Practicals;	<p>CO1: Understand and practice the calibration of glasswares (burette, pipette, volumetric flask).</p>

		<p>CO2: Learn about basic concepts involved in titrimetric analysis, primary standard substances, preparation of standard solutions.</p> <p>CO3: Based on principles of titrimetric analysis student can perform.</p> <p>CO4: To understand the principles behind the gravimetry and to apply it in quantitative analysis.</p>
B.Sc.I Sem(NEP)	OE-CHT-1: Chemistry in daily life:	<p>CO1: Learn the analysis of fat contents, minerals in milk butter & caffeine in coffee & tea.</p> <p>CO2: To Understand the chemical constituents and applications in Food additives, adulterants and contaminants, Artificial food colorants.</p> <p>CO3: To understand the sources & deficiency of different vitamins.</p> <p>CO4: To learn about manufacture of Soaps and detergents.</p> <p>CO5: To Understand the applications of polymers in different fields.</p>
B.Sc.II Sem(NEP)	DSC-CHT-2: Inorganic & Physical chemistry-I	<p>CO1 : To understand the dual nature of radiation, de Broglie's equations, Heisenberg uncertainty principle and their related problems & Derivation of Schrodinger's wave equation.</p> <p>CO2 : To learn about the orbital shapes of s, p, d and f atomic orbitals,</p> <p>CO3: To learn about the periodic properties of the elements according to</p>

		<p>their electronic configuration, atomic radii, ionisation energy, electron affinity and electronegativity.</p> <p>CO4: To study the postulates of kinetic theory of gases and understand the deviations of real gases from ideal behaviour.</p> <p>CO5: To understand the properties of liquids such as surface tension and viscosity and the methods to measure them.</p> <p>CO6: To understand the laws governing behavior of ideal gases and real gases.</p> <p>CO7: Evaluation of properties and applications of liquid crystals.</p>
	DSC-CHP-2: Practicals:	<p>CO1: To develop analytical skills of determination through titrimetry & gravimetry.</p> <p>CO2: Students able to learn precipitation, filtration, drying & ignition.</p> <p>CO3: Understand how viscosity & surface tensions of liquids can be determined.</p> <p>CO4: Learn the concept of distribution coefficient & dissociation in a layer.</p>
	OE-CHT-2: Molecules of life.	<p>CO1: Acquire the knowledge about different types of sugars & their chemical structures.</p> <p>CO2: Identify different types of amino acids.</p> <p>CO3: Depict the importance of lipids</p>

		<p>in the metabolism.</p> <p>CO4: Differentiate the RNA & DNA & their replication.</p> <p>CO5: Acquire the knowledge of production of energy in our body.</p>
B.Sc.III Sem(NEP)	DSC-CHT-3: Analytical & Organic chemistry-II	<p>After the completion of this course, the student would be able to</p> <p>CO1: Understand the importance of fundamental law and validation parameters in chemical analysis.</p> <p>CO2: Know how different analytes in different matrices (water and real samples) can be determined by spectrophotometric, nephelometric and turbidometric methods.</p> <p>CO3: Understand the requirement for chemical analysis by paper, thin layer and column chromatography.</p> <p>CO4: Apply solvent extraction method for quantitative determination of metal ions in different samples.</p> <p>CO5: Utilize the ion-exchange chromatography for domestic and industrial applications</p> <p>CO6: Explain the importance of reactive intermediates role and techniques of generating such intermediates.</p> <p>CO7: Predict the configuration of an organic molecule and able to designate it.</p> <p>CO8: Identify the chiral molecules and predict its actual configuration.</p>

	<p>DSC-CHP-3: Practicals:</p>	<p>After the completion of this course, the student would be able to</p> <p>CO1: Understand the importance of instrumental methods for quantitative applications.</p> <p>CO2: Apply colorimetric methods for accurate determination of metal ions and anions in water or real samples.</p> <p>CO3: Understand how functional groups in a compound is responsible for its characteristic property.</p> <p>CO4: Learn the importance of qualitative tests in identifying functional groups.</p> <p>CO5: Learn how to prepare a derivative for particular functional groups and how to purify it.</p>
<p>B.Sc.IV Sem(NEP)</p>	<p>DSC-CHT-4: Inorganic & Physical chemistry-II</p>	<p>After the completion of this course, the student would be able to</p> <p>CO1: Predict the nature of the bond formed between different elements</p> <p>CO2: Identify the possible type of arrangements of ions in ionic compounds.</p> <p>CO3: Write Born - Haber cycle for different ionic compounds</p> <p>CO4: Write the M.O. energy diagrams for simple molecules.</p> <p>CO5: Differentiate bonding in metals from their compounds</p> <p>CO6: Learn important laws of thermodynamics and their applications to various thermodynamic systems.</p>

		<p>CO7: Apply adsorption as a versatile method for waste water purification.</p> <p>CO8: Know different types of electrolytes, usefulness of conductance and ionic mobility measurements.</p>
	DSC-CHP-4: Practicals:	<p>At the end of the course student would be able to</p> <p>CO1: Understand the chemical reactions involved in the detection of cations and anions.</p> <p>CO2. Explain basic principles involved in classification of ions into groups in semi-micro qualitative analysis of salt mixture.</p> <p>CO3: Analyse a simple inorganic salt mixture containing two anions and cations.</p> <p>CO4: Use instruments like conductivity meter to obtain various physicochemical parameters</p> <p>CO5: Apply the theory about chemical kinetics and determine the velocity constants of various reactions.</p> <p>CO6: Learn to fit experimental data with theoretical models and interpret the data.</p>
B.Sc.V Sem(NEP)	DSC-CHT-5: Inorganic chemistry-III (Paper-1)	<p>After the completion of this course, the student would be able to,</p> <p>CO1: Predict bonding in molecules/compounds/ions, multi centered bonds.</p> <p>CO2: Understand the properties of ionic compounds, like, Lattice energy and also the MO diagrams of different</p>

	<p>DSC-CHP-5: Practicals:</p>	<p>types of molecules</p> <p>CO3: Develop a thorough knowledge on the fundamentals bonding in metal atomclusters.</p> <p>CO4: Explain the broad and balanced ideas on the important concepts in Co-ordination Chemistry, application of theories to the complex compounds.</p> <p>CO1: Acquire the ability to plan and carryout experiments on Gravimetric and Volumetric Analysis.</p> <p>CO2: Aquire the ability to Prepare the various co-ordination complexes under different conditions and using specific reagents independently and assess the significance of outcomes.</p>
	<p>DSC-CHT-5: Organic chemistry-III (Paper-2)</p>	<p>CO1: Predict the key concepts about the Classification, nomenclature, preparation, reactions of alcohols and phenols.</p> <p>CO2: Acquire thE knowledge on Nomenclature, Structure and reactivity of carbonyl groups in aldehydes, ketones and certain rearrangement reactions.</p> <p>CO3: Give the classification and properties of amino acids, structure properties and reactions of peptides and Proteins.</p> <p>CO4: Explain the fundamentals of structure, reactions and synthesis of Carbohydrates.</p> <p>CO5: Learn general terms and guidelines for disconnection approach in retrosynthesis.</p>

		CO6: Develop an idea about the nomenclature, Structure, reactivity and synthesis of various heterocyclic compounds.
	DSC-CHP-5: Practicals:	CO1: To plan and carryout the experiments on Practical knowledge on one step preparation of important organic compounds. CO2: To learn Quantitative analysis/estimation of organic compounds and to cater to the demands of chemical Industries of well-trained graduates.
B.Sc.VI Sem(NEP)	DSC-CHT-6: Physical chemistry III: (Paper 1)	After the completion of this course, the student would be able to, CO1: Understand the electrochemical aspects types of electrodes, their construction and working, liquid junction potentials and potentiometric titrations. CO2: Learn the fundamentals of Quantum Mechanics, application of the Schrödinger equation to various systems. CO3: Understand the concepts of macroscopic and microscopic kinetics, thermodynamical formulation of reaction rates, steady state kinetics and fast reactions. CO4: Acquire a thorough knowledge on the topics on Kinetics of homogeneous catalysis, theories involved and the various concepts in surface chemistry.

		<p>CO5: Know the basic concepts of entropy and the Third law of thermodynamics, partial molar properties and their applications in problem solving skills.</p> <p>CO6: Explain the concepts in statistical thermodynamics, derivation of statistical equations of distribution laws, partition functions and their applications, develop problem solving skills.</p>
	DSC-CHP-6: Practicals:	<p>CO1: To plan and carry out experiments on Conductometric titration and potentiometric titrations involving neutralization and redox reactions.</p> <p>CO2: To carry out experiments on Abbes refractometry, pH metry and colorimetry and to understand the basic knowledge on these experiments.</p>
	DSC-CHT-6: Spectroscopy : (Paper 2)	<p>CO1: Develop an idea of various concepts in Symmetry and Group Theory, including definitions, symmetry elements, symmetry operations and group multiplication tables with specific examples.</p> <p>CO2 : To understand the basic concepts of spectroscopic techniques.</p> <p>CO3: Explain the general principles, Introduction to absorption and emission spectroscopy, particularly about the fundamentals of UV Spectroscopy and IR Spectroscopy.</p>


		<p>CO4: Utilize the concepts in NMR spectroscopy, magnetic nuclei, NMR signals of simple molecules and also the fundamental knowledge of Atomic spectroscopy.</p> <p>CO5: Understand the basic principles, selection rules, intensity, width, position of spectral line, multiplet structure of EPR spectra, instrumentation and applications.</p> <p>CO6: Learn the fundamentals of NQR, NQR experiment, structural information from NQR spectra.</p>
	<p>DSC-CHP-6: Practicals:</p>	<p>CO1: Obtain the ability to plan and carryout experiments independently on Separation techniques involving chromatography and to cater to the demands of chemical Industries.</p>

MATHEMATICS

After successful completion of three years degree program in mathematics with physics and chemistry or physics and electronics or physics and computer science or electronics and computer science combination a student will be able

- PO-01 To get a relational understanding of mathematical concepts and concerned topics like algebraical, trigonometrical and matrix based problems and they will be able to follow the patterns and methods involved in mathematical reasoning
- PO-02 To create awareness of the subject mathematics in the society and for the sustainable development and to inculcate the mathematical temperament in the students
- PO-03 To use various modern mathematical techniques, recent equipment's and mathematics software's to solve highly difficult problems
- PO-04 To understand concepts of geometry of scalars, vectors, divergence mathematically and to assess the properties of the numbers, sequence and series theory with summation of trigonometric series
- PO-05 Students will be aware of and able to develop solution oriented towards various social and environmental issues
- PO-06 To made aware of past ,present and future role as a part of their life, culture by studying history of mathematics and to employ mathematical knowledge to design ,carryout, analysis and conclude the result they option in their higher study



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Specific Course Outcomes:

Sem	Paper Code	Paper Name	Specific Course outcomes
Sem-I	MATDSCT 1.1	Algebra-I & Calculus-I	Students will get the knowledge to solve the System of Linear Equations such as <ul style="list-style-type: none"> * Finding unknown age. * Finding unknown angles in geometry. * For calculation of speed, distance or time. * Problems based on force and pressure.
Sem-II	MATDSCT 2.1	Algebra-II & Calculus-II	<ul style="list-style-type: none"> • Group theory has applications in physics, chemistry, and computer science, and even puzzles like Rubik's Cube can be represented using group theory. • Integrals to determine the shape of building constructions or length of power cable required to connect the two substations etc.
Sem-III	MATDSCT 3.1	Ordinary Differential Equations & Real Analysis-I	<ul style="list-style-type: none"> • Ordinary Differential Equations are used to calculate the movement or flow of electricity, motion of an object to and fro like a pendulum, to explain thermodynamics concepts. • Sequence & Series help us to predict, evaluate and monitor the outcome of a situation or event and help us a lot in decision making problems.
Sem-IV	MATDSCT 4.1	Partial Differential Equations & Integral transforms	<ul style="list-style-type: none"> • Partial Differential Equations are used to mathematically formulate, and thus aid the solution of, physical and other problems involving functions of several variables, such as the propagation of heat or sound, fluid flow, elasticity, electrostatics, electrodynamics, thermodynamics, etc
Sem-V	BMSEC5C	Linear Algebra (SEC)	<ul style="list-style-type: none"> • Linear Algebra is used to calculate the speed, distance, or time.
Sem-V & VI	BMDSE5CT	Numerical Analysis (DSE)	<ul style="list-style-type: none"> • Numerical Analysis is needed to solve engineering problems that lead to equations that cannot be solved analytically with simple formulas. For example the solutions of large systems of algebraic equations, evaluation of integrals and solution of differential equations.
Sem-V	BMSEC5B	Laplace Transform (SEC)	<ul style="list-style-type: none"> • The concepts of Laplace Transforms are applied in the area of science and technology such as Electric circuit analysis, Communication engineering, Control engineering and Nuclear physics etc.
Sem-V & VI		Graph Theory	<ul style="list-style-type: none"> • Graph theory and probability make it possible to guarantee a reliable service, for example by finding diversions when a particular connection is busy. All roads and motorways also form a large network, which is used by navigation services like Google Maps when working out the shortest route between two given points.

Sem- VI	BMSEC6B	Fourier Series & Fourier Transforms (SEC)	<ul style="list-style-type: none"> The Fourier series Fourier Transform has many such applications in electrical engineering, vibration analysis, acoustics, optics, signal processing, image processing, quantum mechanics, econometrics, shell theory, etc.
Sem- VI	BMSEC6D	Vector Calculus (SEC)	<ul style="list-style-type: none"> Vector Calculus is used extensively in physics and engineering, especially in the description of electromagnetic fields, gravitational fields, and fluid flow.


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MATHEMATICS:

Course Outcomes:

Sem	Paper Code	Paper Name	Course outcomes	
Sem-I	MATDSCT 1.1	Algebra-I & Calculus-I	CO:1 CO:2 CO:3 CO:4	Learn to solve system of linear equations. Solve the system of homogeneous and non-homogeneous system of m -equations in n -variables by using concept of rank of matrix. Sketch curves in Cartesian, Polar and Pedal equations. Identify and apply the intermediate value theorems and L-Hospital rule. Students will be familiar with the techniques of n^{th} -differentiation of standard functions with real variables.
Sem-II	MATDSCT 2.1	Algebra-II & Calculus-II	CO:1 CO:2 CO:3 CO:4	Understanding the basic concept of Real number system. Link the fundamental concept of groups, symmetries of geometrical objects, notions of cosets, normal subgroups, factor group and Euler's theorem. Find the extreme values of functions of two variables. Students will come to know about application of integration in finding Areas and Volumes of some solids.
Sem-III	MATDSCT 3.1	Ordinary Differential Equations & Real Analysis-I	CO:1 CO:2 CO:3 CO:4	Solve First order linear & nonlinear differential equations. Orthogonal trajectories of Cartesian and Polar curves. Solve linear differential equations of n^{th} -order with constant as well as variable coefficients. Understand the concept of Sequences, Limits of Sequences, A Discussion about Proofs, Limit Theorems for Sequences, Monotone Sequences, Cauchy Sequences and earns Problem solving procedure Understand the concept of Subsequences, Lim sup and Lim. Understanding the concept of De-Alembert's Ratio test, Cauchy's Root test, P-series, Alternating series, Limit comparison tests for Convergence and absolute convergence of an infinite series.
Sem-IV	MATDSCT 4.1	Partial Differential Equations & Integral transforms	CO:1 CO:2 CO:3 CO:4	Solve the Partial Differential Equations of I & II order, Linear & non Linear Partial Differential Equations by using different methods & applying these methods to solve some physical problem. Solve Homogeneous Linear Partial Differential Equations with constant coefficients. Solutions of Hyperbolic, Parabolic, Elliptic, Heat equations, Wave equations & Laplace equations using separations of variables. Solve Partial Differential Equations by using Laplace Transforms. Solve Partial Differential Equations by using Fourier Transforms.

Sem- V	BMSEC5C	Linear Algebra (SEC)	CO	Understand the combination of two important aspects of modern mathematics via Linear Algebra. Linear Algebra emphasizes the concept of vector spaces and linear transformations which are essential in simplifying various scientific problems.
Sem- V	BMDSE5CT	Numerical Analysis (DSE)	CO:1 CO:2 CO:3 CO:4	Understand the concept of Number Theory Systems, Errors, Numerical methods, such as Bisection, False Position, Newton Raphson & Secant methods. To solve System of Equations by using Gauss-Elimination, Gauss-Jacobi's & Gauss-Seidal methods. Students will learn the concepts of Finite Difference methods of Forward & Backward Differences and Shifting operator, relation between Forward, Backward & Shifting Operator. Students will learn the concepts of Interpolation with Equal and Unequal Intervals such as Newton Gregory Forward & Backward Interpolation formula, Newton's Divided Difference, Lagrange's Interpolation & Inverse Interpolation.
Sem- V	BMSEC5B	Laplace Transform (SEC)	CO	To solve Ordinary Differential Equations & Standard Integrals by using Laplace Transform.
Sem- V		Graph Theory-I	CO:1 CO:2 CO:3 CO:4	To understand meaning and concept of graphs, different types of graphs, and minimum and maximum degree of graphs. To understand sub graphs, shortest path problems and characterization of bipartite graphs. To understand Matrix representation of graphs and vertex and edge connectivity. Understanding the concept of Trees and some different types of trees and there properties.
Sem- VI	BMSEC6B	Fourier Series & Fouries Transforms (SEC)	CO	To solve Partial Differential Equations & Standard Integrals by using Fourier Transform.
Sem- VI	BMSEC6D	Vector Calculus (SEC)	CO	Applications of line & double integrals, students obtain knowledge on how to find areas and surfaces with the use of integrals. Students learn how to find the volume of a solid region by using Green's Theorem, Gauss Divergence Theorem & stokes Theorem.

BMDSE6CT

Numerical
Analysis-II

CO:1

To solve Numerical Differentiation by using Newton Gregory Forward & Backward Interpolation Formula.

CO:2

To solve Trapezoidal rule, Simpson's $1/3^{rd}$, Simpson's $3/8^{th}$ and Weddle's rule by using General Quadrature formula.

CO:3

To solve Initial Value Problems by using Picard's method, Taylor's Series method, Euler's method & Runge-Kutta II & IV order method.

CO:4

To solve Boundary Value Problems by using Adam's-Bashforth & Milne's Predictor & Corrector formula, Finite Difference method & Shooting method.

Sem-
VI

Graph
Theory-II

CO:1

To understand Eulerian, Hamiltonian graphs and some applications of graphs in electric networks.

CO:2

To understand the theory of Planar graphs, its characterization and Crossing numbers with examples.

CO:3

To know coloring of a graph, chromatic numbers of some familiar graphs.

CO:4

To understand meaning & kinds of Digraphs along with strong and weak Digraphs.


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Department of Economics**B.A. Economics****Programme Outcome:**

Each programme vividly explains its nature and promises the outcomes that are to be accomplished by studying the courses. The Bachelor of Arts (Programme) with Economics state the attributes that it aims to inculcate at the point of graduation. These attributes encompass values related to wellbeing, emotional stability, critical thinking, social justice and skills for employability. On completion of the programme students are expected to have learnt the skills of effective communication, critical thinking, social research methods and social outreach. The qualities expected from the graduates of B.A. (Programme) with Economics as subject are:

PO 1: A holistic knowledge and understanding of basic concepts in economics and will be exposed to the real-world data related to industries and society, identifying the problems and working towards their solutions through various analytical and statistical techniques.

PO 2: The capacity to identify, understand and solve the problems of society.

PO 3: The ability to collect, analyse, interpret and present the data and bring out the meaning, correlations and interrelationships.

PO 4: Team building and leadership skills, communication, creative and critical thinking skills and innovative problem-solving skills.

Objectives of the Programme

1. To imbibe strong foundation of economics in students.
2. To update students with statistical tools that aid in economic theory.
3. To teach/strengthen students' concepts related to Microeconomics and Macroeconomics.
4. To promote application-oriented pedagogy by exposing students to real world data.
5. to prepare students for projects which form them for jobs.

PROGRAMME SPECIFIC OUTCOME B.A(P) ECONOMICS

PSO 1: To be able to understand basic concepts of economics.

PSO 2: To understand the economic way of thinking.

PSO 3: To create an ability to write clearly expressing an economic point of view.

PSO 3: To be exposed to alternative approaches to economic problems through exposure to coursework in allied fields.

Course Outcome for B.A. (Economics)

B.A. Semester –I (CBCS)

D.S. Core: Micro Economic Theory

CO 1	This course intends to expose the students to the basic principles in Microeconomics and their applications.
CO 2	It illustrates how microeconomic concepts can be applied to analyze real-life economic situations.
CO 3	The students learn some basic principles of microeconomics and interactions of supply and demand, characteristics of perfect competition, efficiency and welfare.

B.A. Semester –II (CBCS)


D.S. Core: Macro Economic Theory

CO 1	The objective of the course is to introduce the students to different forms of market imperfections and market failures, input demand, factor incomes and international trade
CO 2	This course helps the students to understand different forms of market imperfections and market failures observed in real life situations
CO 3	They develop a sense of how the production is distributed among the different factors of production and the demand for inputs
CO 4	Some preliminary concepts of international trade are also covered in this course

B.A. Semester –III (CBCS)

D.S. Core: Public Finance

CO 1	It will help in understanding and analyzing the impact of public policy on the allocation of resources and the distribution of income in the economy
CO2	It helps for analysis of public expenditures, taxation, budgetary procedures, stabilization instruments, debt issues.


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B.A. Semester –III (CBCS)

Generic Elective: Indian Economy

CO1	It will result in comprehensive understanding of Indian Economy
CO2	Student will be able to understand govt policies and programs
CO3	It helps in developing understanding of the students related to different sectors of Indian Economy

B.A. Semester –IV (CBCS)

D.S. CORE: Statistical Methods for Economics

CO1	This course will help the students understand the issues regarding data collection, processing organizing and presentation and the issues involved therein.
CO2	It will help the students to formulate complete, concise and correct mathematical proofs

B.A. Semester –IV (CBCS)


GENERIC ELECTIVE: Monetary Economics

CO1	Understand various concepts of money and money substitutes
CO2	Explain and anticipate the consequences of changes in the quantity of money on such economic variables as interest rates, inflation, the exchange rate, and unemployment

B.A. Semester –V (CBCS)

SEC: Financial Economics

CO1	be exposed to the classical finance model that underpins modern finance.
CO2	understand the role played by time, uncertainty, information and inflation in evaluating financial instruments.
CO3	know the role played by arbitrage in finance markets and its impact on security prices.


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B.A. Semester –V (CBCS)

D.S. CORE: Indian Economy-I

CO 1	To enable the students to have an overview of the working of Indian economy.
CO 2	To enlighten the student about the changing trends in Indian economy.
CO 3	To enable the students to study leading issues in India's economic development.
CO 4	To study about population, poverty and unemployment concepts and their trends in Indian economy.

B.A. Semester –V (CBCS)

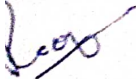
D.S.E: 1. Economics of Growth and Development

CO 1	The course equips students with the understanding of concepts and approaches in Economic Development and Economic Growth.
CO 2	The course is designed to develop keen interest in various aspects of Economic Development, as well develop their theoretical, empirical and analytical skills.
CO 3	The Course enables critical understanding of key theories of economic development.
CO4	The Syllabus emphasizes on conceptual understanding and some applications of important growth models

B.A. Semester –V (CBCS)

D.S.E: 2. Economic Thought

CO 1	Develop a chronological understanding of the development of economic thought Relate the developments in different schools of thought with contemporary issues.
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B.A. Semester -VI(CBCS)

SEC: Environmental Economics

CO 1	Discuss the environmental issues in relation to the theory of externalities, public goods, and welfare.
CO 2	Illustrate and examine economic principles concerning the choice of instruments for controlling pollution and the relative strength and weaknesses of environmental policies based on command-and-control vis-à-vis market-based instruments.
CO 3	Discuss various approaches and methods developed for valuing environmental goods and services.

B.A. Semester -VI(CBCS)

Core Paper: Indian Economy -II

CO 1	To enable the students to study about Indian agricultural problems and remedial measures.
CO 2	To enlighten the student about the role of industries, Problems and future prospects. Sources of industrial finance
CO 3	To have an overview of the working of Indian financial system and d public finance.

B.A. Semester -VI(CBCS)

DSE: 1. Karnataka Economy

CO 1	Evaluate the nature of economic growth and problems of Karnataka state.
CO 2	Explain the process of structural growth in the Karnataka economy.
CO 3	Evaluate the policies and programmes undertaken by the Govt. of Karnataka for bringing about socio-economic development

B.A. Semester -VI(CBCS)

DSE: 2. Rural Development

CO 1	To impart better education with values and transformation of knowledge from class room to common man.
CO 2	To attain inclusive growth and reduce regional imbalances and income inequalities.
CO 3	Inculcate critical thinking to carry out scientific investigation objectively without being biased with preconceived notions.
CO4	Equip the student with skills to analyse problems, formulate a hypothesis, evaluate and validate results, and draw reasonable conclusions thereof.
CO5	Continue to acquire relevant knowledge and skills appropriate to professional activities.

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Department of Economics

B.A. Economics

Programme Outcome:

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PO 2: The capacity to identify, understand and solve the problems of society.

PO 3: The ability to collect, analyse, interpret and present the data and bring out the meaning, correlations and interrelationships.

PO 4: Team building and leadership skills, communication, creative and critical thinking skills and innovative problem-solving skills.

Objectives of the Programme

1. To imbibe strong foundation of economics in students.
2. To update students with statistical tools that aid in economic theory.
3. To teach/strengthen students' concepts related to Microeconomics and Macroeconomics.
4. To promote application-oriented pedagogy by exposing students to real world data.
5. to prepare students for projects which form them for jobs.

PROGRAMME SPECIFIC OUTCOME B.A(P) ECONOMICS

PSO 1: To be able to understand basic concepts of economics.

PSO 2: To understand the economic way of thinking.

PSO 3: To create an ability to write clearly expressing an economic point of view.

PSO 3: To be exposed to alternative approaches to economic problems through exposure to coursework in allied fields.



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Course Outcome for B.A. (Economics)

B.A. I Semester (NEP)

DSC 1.1: Basic Economics -1 (Economic Analysis -1)

By the end of the course students will be able to:

CO1	Identify the facets of an economic problem
CO2	Learn basic economic concepts
CO3	Explain the operation of a market system
CO4	Analyse the production and cost relationships
CO5	Evaluate the pricing decisions under different market structures
CO6	Use basic cost – benefits calculations as a means of decision making.

B.A. I Semester (NEP)

DSC 1.2: Contemporary Indian Economics

By the end of the course students will be able to:


CO 1	Understand the current problems of Indian Economy
CO 2	Identify the factors contributing to the recent growth of the Indian economy
CO 3	Evaluate impact of LPG policies on economic growth in India
CO 4	Analyse the sector specific policies adopted for achieving the aspirational goals
CO 5	Review various economic policies adopted

B.A. I Semester (NEP)

OEC 1.5: Pre-Reforms Indian Economy (OEC)

By the end of the course students will be able to:

CO 1	Trace the evolution of Indian Economy.
CO 2	Identify the structural features and constraints of the Indian Economy.
CO 3	Evaluate planning models and strategy adopted in India.
CO 4	Analyse the sector specific problems and contributions towards overall economic growth.
CO 5	Review various economic policies adopted.


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B.A. I Semester (NEP)

OEC 1.5: Development Studies (OEC)

By the end of the course students will be able to:

CO 1	Graduates will be able to excel in higher studies and to succeed in profession
CO 2	Graduates will get a solid foundation of fundamentals required to solve socio economic problems and also pursue higher studies.
CO 3	. Graduates will demonstrate knowledge to appreciate of the dimensions of contemporary development issues to generate sensitivity to problems concerning ethics and human values to develop orientation towards effective communication and critical analysis and to appreciate the interrelationships among disciplines as they relate to everyday realities.
CO 4	Graduates for cultivate professional and ethical attitudes effective communication skills teamwork skills multidisciplinary approach and to facilitate and advanced understanding and appreciation of the principles methodologies value systems and thought process employed in human enquiries.

B.A. II Semester (NEP)

DSC 2.2: Basic Economics II

By the end of the course students will be able to:

CO 1	Understand the operation of the overall economic system.
CO 2	Calculate national income and related aggregates.
CO 3	Explain the relationship between macroeconomic aggregates.
CO 4	Analyse the nature of business cycles and policies towards controlling them.
CO 5	Evaluate the macroeconomic policies for solving major problems like poverty and unemployment.

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B.A. II Semester (NEP)

DSC 2.3: Karnataka Economy

By the end of the course students will be able to:

CO 1	Understand the nature of economic growth and problems of Karnataka state.
CO 2	To explain the process of structural growth in Karnataka economy.
CO 3	Evaluate the policies and programmes undertaken by the government of Karnataka for bringing about socio-economic development.

B.A. II Semester (NEP)

OEC 2.5: Contemporary Indian Economy

By the end of the course students will be able to:

CO 1	Understand the current problems of Indian economy to identify the factors contributing to the recent growth of the Indian economy.
CO 2	Evaluate impact of LPG policies on economic growth in India for analysis the sector specific policies adopted for achieving the aspirational goals.
CO 3	Review various economic policies adopted.

B.A. II Semester (NEP)

OEC 2.5: Sustainable Development Goals

By the end of the course students will be able to:

CO 1	Understand the basic concepts of sustainable development the environmental social and economic dimensions
CO 2	Know the history of the sustainable development idea
CO 3	Be able to discuss the conflicts which are involved in the sustainable development concept on the national as well as on the global scale
CO 4	Be able to discuss the disadvantages of instruments for social sustainable development
CO 5	Evaluate the sustainable development goals and their attainments.

B.A. II Semester (NEP)

OEC 2.5: Business Environment

By the end of the course students will be able to:

CO 1	Explain the elements of business environment
CO 2	To identify the environmental constraints in the growth of business firm
CO 3	Analyse the ways to utilise the current environmental conditions to achieve higher business growth

BA III Semester

DSC 3.1: Microeconomics

By the end of the course students will be able to:

CO 1	Understand introductory economic concepts
CO 2	Recognise basic supply and demand analysis
CO 3	Recognise the structure and the role of costs in the economy
CO 4	Describe using graphs the various market models perfect competition monopoly monopolistic competition and oligopoly
CO 5	Explain how equilibrium is achieved in the various market models
CO 6	Identify problem areas in the economy and possible solutions using the analytical tools developed in course

BA III Semester

DSC 3.2: Mathematics for Economics

By the end of the course students will be able to:

CO 1	Perform basic operations in sets and functions and matrix algebra
CO 2	To calculate limits derivatives of economic functions and identify the nature of relationship
CO 3	Calculate maxima and minima of function


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BA III Semester

OE 3.1: Rural Economics

By the end of the course students will be able to:

CO 1	One to understand the basics of rural development
CO 2	To study the characteristics problems and programs of rural development
CO 3	To study the trends and patterns of economic activities in rural areas
CO 4	To study the role of infrastructural facilities and governance in rural development
CO 5	To enable the students to know about significance of rural enterprises and agricultural allied activities

BA III Semester

OE- 3.2: Economics of Insurance

By the end of the course students will be able to:

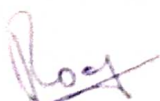
CO 1	Gain knowledge relating to the importance of the insurance in the life of human beings
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BA IV Semester

DSC 4.1: Micro Economics

After the successful completion of the course, the student will be able to

CO 1	Understand the theories of national income accounting
CO 2	Explain the process of consumption and investment functions
CO 3	Evaluate the concepts of multiplier and inflation


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BA IV Semester

DSC 4.2: Statistics for Economics

After the successful completion of the course, the student will be able to

CO 1	Understand the nature of data and their presentation
CO 2	Calculate descriptive statistics like measures of central tendency and dispersion
CO 3	Apply statistical techniques like correlation and regression in economic analysis.

BA IV Semester

OE 4.1 Karnataka Economy

After the successful completion of the course, the student will be able to

CO 1	Understand the nature of economic growth and problems of Karnataka state
CO 2	Explain the process of structural growth in Karnataka economy
CO 3	Evaluate the policies and programmes undertaken by the government of Karnataka for bringing about socio-economic development.

BA IV Semester

OE 4.2: Entrepreneurial Economics

After the successful completion of the course, the student will be able to

CO 1	Start own business as entrepreneur
CO 2	Enabling the students to find career opportunities in business
CO 3	To enable the students to gain knowledge and skills needed to run a business successfully.

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BA IV Semester

OE 4.3: Economics and Law

After the successful completion of the course, the student will be able to


CO 1	comprehend the basic economic issues affecting the economy along with the related legal provisions
CO 2	Acquire knowledge on the basic provisions of law relating to consumer activities business organizations environment
CO 3	To appreciate the understanding the law framework in order to frame the economics model closer to reality
CO 4	To enable the students to understand the consequences of legal rules primarily as an exercise in applied microeconomics macroeconomics industrial and international economics.

BA V Semester

C9: Public Economics

After the successful completion of the course, the student will be able to

CO 1	Understand introductory public finance concepts
CO 2	Study the causes of market failure and corrective actions
CO 3	Understand the impact incidence and shifting of tax
CO 4	Study the economic effects of tax on production distribution and other effects
CO 5	Enable the students to know the principles and effects of public expenditure
CO 6	Understand the economic and functional classification of the budget balanced and unbalanced budget
CO 7	Understand the burden of public debt and know the classical ricardian views Keynesian and post Keynesian views
CO 8	To acquaint with the advantages and disadvantages of deficit financing.


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BA V Semester

C10: Development Economics

After the successful completion of the course, the student will be able to

CO 1	Understand the basic concepts and measurements of development
CO 2	Learn some classical and partial theories of development economics and identify the difference.
CO 3	Identify the difference between developed and developing countries
CO 4	Analyse and tackle the development issues effectively.

BA V Semester

C11: Economics of Human Resource Management

After the successful completion of the course, the student will be able to

CO 1	Understand the meaning nature scope and value of the contemporary approach to human resource management with reference to economics
CO 2	To describe an organization of human resource management functionary in an establishment and to identify attributes of successful personnel manager
CO 3	To impart knowledge and techniques in human resource planning job analysis and job design
CO 4	To explain various methods of recruitment selection induction and placement
CO 5	To develop the importance of methods adopted for training and development of employees in two days environment in the workplace.



BA VI Semester

C13: International Economics

After the successful completion of the course, the student will be able to

CO 1	Understand the international trade theories and their application in international trade
CO 2	Explain the concept of terms of trade and demonstrate the effect of trade barriers and display the ability to analyse the stages of economic integration
CO 3	Understand the concept of bop and assess the bop position and examine the changes in forex rate
CO 4	Analyse the role of international trade and financial institutions
CO 5	Demonstrate good interpersonal and communication skills through class participation and contributing to critical discussion on trade issues.

BA VI Semester

C 14: Indian Public Finance

After the successful completion of the course, the student will be able to

CO 1	To understand the structure of Indian public finance
CO 2	Enable students to know the source and nature of public revenue and expenditure
CO 3	Understand the budget and different concepts of deficit
CO 4	Know the public debt and its management
CO 5	Understand the fiscal and monetary policy and their tools and importance
CO 6	To enable the students to know the Indian federal financing system and financial commissions.

BA VI Semester

C 15: Economic Thoughts of Doctor BR Ambedkar

After the successful completion of the course, the student will be able to

CO 1	Derive inspiration from the life and works of doctor BR Ambedkar
CO 2	Appreciate the socio-economic scenario during Ambedkar. And compare it with present day
CO 3	Comprehend the contributions of Ambedkar on various economic aspects
CO 4	Assess the economic views of Ambedkar in the light of present-day socio-economic problems
CO 5	Develop this trait of critical thinking and critiquing

BA VI Semester

C 16: Environmental Economics

After the successful completion of the course, the student will be able to

CO 1	Understand how economic methods can be applied to environmental issues facing society
CO 2	Examine the linkage linkages between environmental degradation and economic development
CO 3	Develop an informed view regarding the potential of economics to help societies achieve their environmental goals
CO 4	Demonstrate good interpersonal and communication skills through writing an essay and contributing to critical discussion
CO 5	Analyse environmental problems and to assess environmental policies.



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DEPARTMENT OF BOTANY

PROGRAMME OUTCOME/COURSE OUTCOME (NEP)

Programme Name: BSc in Botany

Semester: I

Course Title: Microbial diversity and Technology (Theory)

Course Code: DSCC-BOT-A-1

No. of Credits : 04

Contact hours: 56 hours

Duration of SEA/Exam : 3hours

Course outcome (COs) : After the successful completion of the course the student will be able to

- CO1.** Skill development for the proper description using botanical terms, identification, naming and classification of the life forms specially plants and microbes.
- CO2.** Acquisition of knowledge on structure life cycle and life process that exit among plants and microbial diversity through certain model organism studies.
- CO3.** Understanding of various interactions that exit among plants and microbes to develop the curiosity on the dynamicity of nature.
- CO4** To enable the graduates to prepare for national as well as international level comitative examinations like UGC- CSIR, UPSC, KPSC etc.
- CO5** the graduates should be able to demonstrate sufficient proficiency in the hands on experimental techniques for their area of specialization with in biology during research and in the professional carrier.

Programme Name: BSc in Botany

Semester: I

Course Title: Plants and Human welfare (Theory)

Course Code: OE -BOT-1.1

No. of Credits : 03

Contact hours: 39 hours

Duration of SEA/Exam : 3hours

Course outcome (COs) : After the successful completion of the course the student will be able to

- CO1.** To make students familiar with economic importance of diverse plants that offer resources to human life
- CO2.** To make the students known about the plants used as- food, medicinal values and Also plant sources of different economic value.
- CO3.** To generate interest among the students on plants importance in day to day life, conservation, ecosystem and sustainability.

Programme Name: BSc in Botany

Semester: I

Course Title: Botany for the Bignners (Theory)

Course Code: OE -BOT-1.2

No. of Credits : 03

Contact hours: 39 hours

Duration of SEA/Exam : 3hours

Course outcome (COs) : After the successful completion of the course the student will be able to

- CO1.** To make students familiar with importance of botany, plants as natural resources
- CO2.** To make the students known about the plants used as- food, medicinal values and economic values for sustainable development


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CO3. To generate interest among the students to know the importance of plants in day to day life, ecosystem restoration.

Programme Name: BSc in Botany

Semester: I

Course Title: Mushroom Cultivation (Theory)

Course Code: OE -BOT-1.3

No. of Credits : 03

Contact hours: 39 hours

Duration of SEA/Exam : 3hours

Course outcome (COs) : After the successful completion of the course the student will be able to

CO1. To make students familiar with mushroom cultivation for commercial exploitation

CO2. To make the students known about the agaricus (Mushroom) used as- food, medicinal values and economic values for sustainable development.

PROGRAMME OUTCOME/COURSE OUTCOME (Academic Year 2021-22) (NEP)

Programme Name: BSc in Botany

Semester: II

Course Title: Diversity of Non-flowering plants (Theory)

Course Code: DSCC-BOT-A- 2

Contact hours: 56 hours

Duration of SEA/Exam : 3hours

Course outcome (COs) : After the successful completion of the course the student will be able to

CO1. Skill development for the proper description using botanical terms, identification, naming and classification of the life forms specially plants

CO2. Acquisition of knowledge on structure life cycle and life process that exist among plants through certain model organism studies.

CO3. Understanding of various interactions that exist among plants and develop the curiosity on the dynamicity of nature.

CO4 To enable the graduates to prepare for national as well as international level competitive examinations like UGC- CSIR, UPSC, KPSC etc.

CO5 The graduates should be able to demonstrate sufficient proficiency in the hands on experimental techniques for their area of specialization with in biology during research and in the professional carrier.

Programme Name: BSc in Botany

Semester: II

Course Title: Plant propagation, Nursery management and Gardening (Theory)

Course Code: OE-BOT-2.1

Contact hours: 39 hours

Duration of SEA/Exam : 2 hours

Course outcome (COs) : After the successful completion of the course the student will be able to

CO1. To gain knowledge of gardening, cultivation, multiplication, raising of seedlings of garden plants

CO2. To get knowledge of new and modern techniques of plant propagation

CO3. To develop interest in nature and plant life.

Programme Name: BSc in Botany

Semester: II

Course Title: Biofuels (Theory)

Course Code: OE-BOT-2.2

Contact hours: 39 hours


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Duration of SEA/Exam : 2 hours

Course outcome (COs) : After the successful completion of the course the student will be able to

- CO1. To make the students familiar with Bio-fuel plant species cultivation for commercial exploration.
- CO2. To make the student known about the Bio-fuel used as a automobile industries and solving fuel problem in nature.
- CO3. To generate interest amongst the students to know the importance of Bio-fuel in day to day life and economic wellbeing.

Programme Name: BSc in Botany

Semester: II

Course Title: Biofertilizers (Theory)

Course Code: OE-BOT-2.3

Contact hours: 39 hours

Duration of SEA/Exam : 2 hours

Course outcome (COs) : After the successful completion of the course the student will be able to

- CO1. To make the students familiar with Bio-fertilizer plant species cultivation for commercial exploration.
- CO2. To make the student known about the Bio-fertilizer used in agriculture forming and industries and solving problems erupted by synthetic fertilizers.
- CO3. To generate interest amongst the students to know the importance of Bio-fertilizer in day to day agricultural practices and economic wellbeing.

PROGRAMME OUTCOME/COURSE OUTCOME (Academic Year 2022-23) (NEP)

Programme Name: BSc in Botany

Semester: III

Course Title: Plant Anatomy and Developmental Biology (Theory)

Course Code: DSCC-BOT-A-3

No. of Credits : 04

Contact hours: 56 hours

Duration of SEA/Exam : 3 hours

Course outcome (COs) : After the successful completion of the course the student will be able to

- CO1. Observation of variation in internal structure of various parts of plants and as well as different plant groups in support for the evolutionary concept
- CO2. Skill development for the proper discription of internal structure using terms their identification and further classification
- CO3. Induction of the enthusiasm on internal structure of locally available plants.
- CO4 Understanding various levels of organisation in a plant body with an outlook in the relationship between the structure and function through comparative studies.
- CO5 Observation and classification of the floral variations from the premises of college and house
- CO6 Understanding the various reproductive methods sub-stages in the life cycle of plants
- CO7 Observation and classification of the embryological variations in angiosperms
- CO8 Enthusiasm to understand evolution based on the variation in reproduction among plants.


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COURSE OUTCOME (Academic Year 2022-23) (NEP)

Programme Name: BSc in Botany

Semester: IV

Course Title: Ecology and Conservation Biology (Theory)

Course Code: DSCC-BOT-A- 4

No. of Credits : 04

Contact hours: 56 hours

Duration of SEA/Exam : 3hours

Course outcome (COs) : After the successful completion of the course the student will be able to

- CO1. Understanding the fundamental concepts in ecology, environmental science and Phytogeography
- CO2. Concept development in conservation, global ecological crisis sustainable development and pros and cons of human intervention.
- CO3. Enable the students to appreciate biodiversity and the importance of various conservation strategies, laws and regulatory authorities and global issues related to climate change and sustainable development.

PROGRAMME OUTCOME/COURSE OUTCOME (Academic Year 2023-24) (NEP)

Programme Name: BSc in Botany

Semester: V

Course Title: Plant morphology and Taxonomy (Theory)

Course Code: DSC-BOT-C9-T

No. of Credits : 04

Contact hours: 60 hours

Duration of SEA/Exam : 2hours

Course outcome (COs) : After the successful completion of the course the student will be able to

- CO1. Understanding the main features in the angiosperm evolution
- CO2. Ability to identify, classify and describe a plant in scientific terms, thereby, identification of plants using dichotomes keys, skill development in identification and classification of flowering plants.
- CO3. Interpret the rules in ICN in botanical nomenclature
- CO4. Classify plant systematic and recognise the importance of herbarium and virtual herbarium, evaluate the important herbaria and botanical gardens.
- CO5. Recognition of locally available angiosperm families of the plants and economically important plants. Appreciation of human activities in conservation of useful plants from the past to the present


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Programme Name: BSc in Botany
Semester: V
Course Title: Genetics and Plant Breeding (Theory)
Course Code: DSC-BOT-C11-T
No. of Credits : 04
Contact hours: 60 hours
Duration of SEA/Exam : 2hours

Course outcome (COs) : After the successful completion of the course the student will be able to

- CO1. Understanding the basics and plant breeding
- CO2. Ability to identify, calculate and describe crossing over, allelic generations and frequencies of recombination
- CO3. Interpret the results of mating and pollinations
- CO4. Classify plant pollination methods
- CO5. Recognition of modes of inheritance of traits/phenotypes and phenotype-genotype Correlation.

PROGRAMME OUTCOME/COURSE OUTCOME (Academic Year 2023-24) (NEP)

Programme Name: BSc in Botany
Semester: VI
Course Title: Plant Physiology and Biochemistry (Theory)
Course Code: DSC-BOT-C15-T
No. of Credits : 04
Contact hours: 60 hours
Duration of SEA/Exam : 2hours

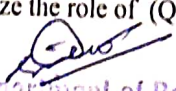
Course outcome (COs) : After the successful completion of the course the student will be able to

- CO1. Impact of water and mechanism of transport
- CO2. To understand biosynthesis and breakdown of biomolecules
- CO3. Role of plant hormones in plant development and secondary metabolites
- CO4. Preliminary understanding of the basic function and metabolism in a plant body
- CO5. To understand the importance of nutrients in plant metabolism and crop yield

Programme Name: BSc in Botany
Semester: VI
Course Title: Bioinformatics (Theory)
Course Code: DSC-BOT-C17-T
No. of Credits : 04
Contact hours: 45 hours
Duration of SEA/Exam : 2hours

Course outcome (COs) : After the successful completion of the course the student will be able to

- CO1. Understanding the concept of data bases and use of different public domain for DNA and protein sequence retrieval
- CO2. Understand the concept of pair wise alignment of DNA sequence using algorithms
- CO3. Explain the structure of protein homology modelling approach using SWISS MODEL and SWISS-PDB
- CO4. Reflect upon the role various models in molecular evolution
- CO5. Analyze the role of (QSAR) techniques in drug design


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(Affiliated to Raichur University)
Ph: (08532)-240286, 240707, Fax: +918532 240707

DEPARTMENT OF BOTANY

Beneficial to those students who
capabilities of students in our
can go for higher studies in per.
can also become professionals an.
position to appreciate the rich
alization by the students

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DEPARTMENT OF BOTANY

COURSE OUTCOME (CBCS)

Programme Name: BSc in Botany

Semester: I

Course Title: Biodiversity: Microbes, Algae, Fungi and Archegoniate (Theory)

Course Code: CC-BOT-1

No. of Credits : 04

Contact hours: 60 hours

Duration of SEA/Exam : 3hours

Course outcome (COs) : After the successful completion of the course the student will be able to

- CO1. Skill development for the proper description using botanical terms, identification, naming and classification of the life forms specially plants and microbes.
- CO2. Introduction about lower plants and microorganisms to understand the distribution, structure, reproduction, life cycle patterns and economic importance.
- CO4. Acquisition of knowledge on life process and life cycle that exist among plants and microbial diversity through certain model organism studies.
- CO3. Understanding of various interactions that exist among plants and microbes to develop the curiosity on the dynamicity of nature.
- CO4 To enable the graduates to prepare for national as well as international level competitive examinations like UGC- CSIR, UPSC, KPSC etc.
- CO5 The graduates should be able to demonstrate sufficient proficiency in the hands on experimental techniques for their area of specialization with in biology during research and in the professional carrier.

Programme Name: BSc in Botany

Semester: II

Course Title: Plant Ecology and Taxonomy (Theory)

Course Code: CC-BOT-2

No. of Credits : 04

Contact hours: 60 hours

Duration of SEA/Exam : 3hours

Course outcome (COs) : After the successful completion of the course the student will be able to

- CO1. To make students familiar with morphological, taxonomical and also economic importance of diverse plants that offer resources to human life.
- CO2. Students could identify the plant families of major flowering plants and their diagnostic features and acquire basic knowledge on the principles of phylogeny.
- CO3. Students could understand about *in situ* and *ex situ* conservation of plants.
- CO4. To understand the economic value of forest and its importance to the society and also to know the principles of ecosystem and also to acquire basic knowledge about community succession.

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COURSE OUTCOME (Academic Year 2019-20) (CBCS)

Programme Name: BSc in Botany

Semester: III

Course Title: Plant Anatomy and Embryology (Theory)

Course Code: CC-BOT-3

No. of Credits : 04

Contact hours: 60 hours

Duration of SEA/Exam : 3 hours

Course outcome (COs) : After the successful completion of the course the student will be able to

- CO1. To impart knowledge on the key aspects of reproductive systems of flowering plants.
- CO2. It deals with the techniques of temporary microscopic slide preparations to study the histology and anatomy of plants.
- CO3. Imply the anatomical and embryological knowledge to understand the mechanism of tissue differentiation and development of organs such as root, stem, flower, fruit and seeds.
- CO4 To make the students to understand the reproductive structures in plant.

Programme Name: BSc in Botany

Semester: IV

Course Title: Plant Physiology and Metabolism (Theory)

Course Code: CC-BOT-4

No. of Credits : 04

Contact hours: 60 hours

Duration of SEA/Exam : 3 hours

Course outcome (COs) : After the successful completion of the course the student will be able to

- CO1. To study the metabolism and also to examine the physiological process that occur in plants
- CO2. Students can understand the nature of enzymes, mode and mechanism of enzyme action.
- CO3. To understanding the physiological mechanisms involved in the uptake and transport of water.
- CO4. To acquire knowledge on physiological mechanisms of growth regulators in plants.
- CO5. To understand application of mineral nutrients and growth regulators for the development of plants.


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COURSE OUTCOME (Academic Year 2020-21) (CBCS)

Programme Name: BSc in Botany

Semester: V

Course Title: Cytology, Genetics and Molecular biology (Theory)

Course Code: DSE-BOT-1

No. of Credits : 04

Contact hours: 60 hours

Duration of SEA/Exam : 3hours

Course outcome (COs) : After the successful completion of the course the student will be able to

- CO1. To study and acquire the knowledge about cellular details, cell organelles, cell divisions and their significances.
- CO2. Students can understand DNA, RNA, genes and their interactions.
- CO3. To understand the scientific principles behind nature and function of genes and their process of inheritance.
- CO4. To acquire knowledge on characters exchanges among the individuals due to linkage and crossing over.
- CO5. Students are able to understand gene expressions in prokaryotes and eukaryotes.

Programme Name: BSc in Botany

Semester: V

Course Title: Analytical Techniques in Plant Sciences (Theory)

Course Code: DSE-BOT-2

No. of Credits : 04

Contact hours: 60 hours

Duration of SEA/Exam : 3hours

Course outcome (COs) : After the successful completion of the course the student will be able to

- CO1. To study and acquire the knowledge about the Chromatography
- CO2. Students can understand the descriptive statistics and graphical tools.
- CO3. To understand and acquire the knowledge about different types of centrifugation
- CO4. To acquire knowledge on working principle of HPLC
- CO5. Students obtain the knowledge on the working principles of Microscope.

Programme Name: BSc in Botany

Semester: V

Course Title: Biofertilizer

Course Code: SEC-BOT-1

No. of Credits : 02

Contact hours: 30 hours

Duration of SEA/Exam : 2hours

Course outcome (COs) : After the successful completion of the course the student will be able to

- CO1. Students can understand the association between plants roots and fungi
- CO2. To acquire the knowledge on different types of bacteria.
- CO3. To understand the importance of ecofriendly organic fertilizers.
- CO4. Skill the students to diagnose the plant diseases caused by pathogens.

Programme Name: BSc in Botany

Semester: V

Course Title: Herbal Technology

Course Code: SEC-BOT-2

No. of Credits : 02

Contact hours: 30 hours

Duration of SEA/Exam : 2hours

Course outcome (COs) : After the successful completion of the course the student will be able to

- CO1. Students understand the value of medicinal plants used for curing diseases.
- CO2. To acquire the knowledge on Ayurveda and Siddha system of medicine for good health.
- CO3. To understand the methods of identification and isolation of secondary metabolites.
- CO4. Skills the students to find out the genuine drugs of plants from the collection of drugs.


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Programme Name: BSc in Botany

Semester: VI

Course Title: Plant Pathology and Plant Protection (Theory)

Course Code: DSE-BOT-3

No. of Credits : 04

Contact hours: 60 hours

Duration of SEA/Exam : 3hours

Course outcome (COs) : After the successful completion of the course the student will be able to
CO1.Developing the skill for identification of plant diseases based on symptoms caused by various pathogens.

CO2.To understand the physical, chemical and biological preventive measures to reduce the risk of plant diseases

CO3.Students acquire the skill to conduct accurate diagnostic test to confirm plant disease causing agents.

CO4. To understand the antagonistic effect of microorganisms.

Programme Name: BSc in Botany

Semester: VI

Course Title: Economic Botany and Plant Biotechnology (Theory)

Course Code: DSE-BOT-4

No. of Credits : 04

Contact hours: 60 hours

Duration of SEA/Exam : 3hours

Course outcome (COs) : After the successful completion of the course the student will be able to
CO1. To understand the recognition and classification plants based on economic importance

CO2. To acquire knowledge on utilization of economic plants based on nutrient content.

CO3. To understand the procedure for designing the transgenic plants.

CO4. To gain the skill on developing high quality varieties through plant breeding

CO5. Developing the plants through Tissue Culture Technique.

Programme Name: BSc in Botany

Semester: VI

Course Title: Nursery and Gardening

Course Code: SEC-BOT-3

No. of Credits : 02

Contact hours: 30 hours

Duration of SEA/Exam : 2hours

Course outcome (COs) : After the successful completion of the course the student will be able to
CO1.To Understand the process of sowing seeds/Propagation technique to grow a plant

CO2.Students acquire technique to prepare soil for planting

CO3.Skill the students in planting and transplanting seedlings and also proper spacing and maintenance of depth.

CO4.To understand different methods of irrigation and adoption of efficient irrigation system.

CO5 To acquire the knowledge on various methods of plant propagation.

Programme Name: BSc in Botany

Semester: VI

Course Title: Floriculture

Course Code: SEC-BOT-4

No. of Credits : 02

Contact hours: 30 hours

Duration of SEA/Exam : 2hours

Course outcome (COs) : After the successful completion of the course the student will be able to
CO1.Develop conceptual understanding of gardening from historical perspective

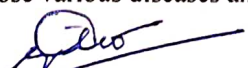
CO2.Analyse various nursery management practices with routine garden operation

CO3.Distinguish among the various ornamental plants and their cultivation.

CO4.Evaluate garden design of different countries

CO5 Appraise the landscaping of public and commercial places for floriculture. .

CO6 Diagnose various diseases and uses of pests for ornamental plants.


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B.Sc ZOOLOGY (NEP)

Program Outcomes:

POs1-The Programme offers both classical as well as modern concepts of Zoology in higher education.

POs2-It enables the students to study animal diversity in both local and global environments.

POs3-To make the study of animals more interesting and relevant to human studies more emphasis is given to branches like behavioural biology, evolutionary biology and economic zoology.

POs4-More of upcoming areas in cell biology, genetics, molecular biology, biochemistry, genetic engineering and bioinformatics have been also included.

POs5-Equal importance is given to practical learning and presentation skills of students.

POs6-The lab courses provide the students necessary skills required for their employability.

POs7-Skill enhancement courses in classical and applied branches of Zoology enhance enterprising skills of students.

POs8-The global practices in terms of academic standards and evaluation strategies.

POs9- Provides opportunity for the mobility of the student both within and across the world.

POs 10-The uniform grading system will benefit the students to move across institutions within India to begin with and across countries.

POs11-It will also enable potential employers in assessing the performance of the candidates across the world.

Programme specific outcome:

PSO1. Understand the nature and basic concepts of cell biology, genetics, taxonomy, physiology, ecology and applied Zoology

PSO2. Analyse the relationships among animals, plants and microbes

PSO3. Perform procedures as per laboratory standards in the areas of Taxonomy, Physiology, Ecology, Cell biology, Genetics, Applied Zoology, Clinical science, tools and techniques of Zoology, Toxicology, Entomology, Nematology Sericulture, Biochemistry, Fish biology, Animal biotechnology, Immunology and research methodology

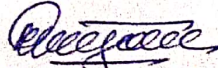
PSO4. Understand the applications of biological sciences in Apiculture, Aquaculture, Agriculture and Medicine

PSO5. Gains knowledge about research methodologies, effective communication and skills of problem solving method.

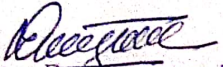

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Head of the Department Zoology

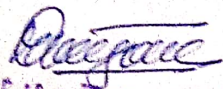
	Paper Code	Paper Name	Course outcomes	
Sem-I	DSCC5Z00T1	Cytology, Genetics and Infectious Diseases	CO:1 CO:2 CO:3 CO:4 CO:5	To use simple and compound microscopes. To prepare stained slides to observe the cell organelles. To be familiar with the basic principle of life, how a cell divides leading to the growth of an organism and also reproduces to form new organisms. The chromosomal aberrations by preparing karyotypes. How chromosomal aberrations are inherited in humans by pedigree analysis in families. The antigen-antibody reaction.
SemI (OE)	OEC5ZOOT1	Economic Zoology	CO:1 CO:2 CO:3 CO:4 CO:5 CO:6 CO:7 CO:8	Gain knowledge about silkworms rearing and their products. Gain knowledge in Bee keeping equipment and apiary management. Acquaint knowledge on dairy animal management, the breeds and diseases of cattle and learn the testing of egg and milk quality. Acquaint knowledge about the culture techniques of fish and poultry. Acquaint the knowledge about basic procedure and methodology of vermiculture. Learn various concepts of lac cultivation. Students can start their own business i.e. self-employments. Get employment in different applied sectors
Sem-II	DSCC5Z00T2	Biochemistry and Physiology	CO:1 CO:2 CO:3 CO:4 CO:5 CO:6 CO:7	To develop a deep understanding of structure of biomolecules like proteins, lipids and carbohydrates. How simple molecules together form complex macromolecules. To understand the thermodynamics of enzyme catalyzed reactions. Mechanisms of energy production at cellular and molecular levels. To understand various functional components of an organism. To explore the complex network of these functional components. To comprehend the regulatory mechanisms for maintenance of function in the body.


 Head of the Department Zoology

	DSCC5ZOOT2	Parasitology	<p>CO:1 Know the stages of the life cycles of the parasites and infective stages.</p> <p>CO:2 Develop ecological model to know population dynamics of parasite, establishment of parasite population in host body, adaptive radiations and methods adopted by parasite to combat with the host immune system.</p> <p>CO:3 Develop skills and realize significance of diagnosis of parasitic infection and treatment.</p> <p>CO:4 Understand about diseases caused by Protozoa, Helminthes, Nematodes and Arthropods at molecular level.</p> <p>CO:5 Develop their future career in medical sciences and related administrative services.</p>
Sem-III	DSCC5ZOOT3	Molecular Biology, Bioinstrumentation & Techniques in Biology	<p>CO:1 After successful accomplishment of the course, the learners will be able to acquire better understanding and comprehensive knowledge regarding most of the essential aspects of Molecular Biology subject which in turn will provide a fantastic opportunity to develop professional skill related to the field of molecular biology.</p> <p>CO:2 The course will mainly focus on the study of principal molecular events of cell incorporating DNA Replication, Transcription and Translation in prokaryotic as well as eukaryotic organisms.</p> <p>CO:3 Acquiring knowledge on instrumentation and techniques in biology.</p>
Sem-IV	DSCC5ZOOT4	Gene Technology Immunology and Computational Biology	<p>CO:1 Acquaint knowledge on versatile tools and techniques employed in genetic engineering and recombinant DNA technology.</p> <p>CO:2 An understanding on application of genetic engineering techniques in basic and applied experimental biology</p> <p>CO:3 To acquire a fundamental working knowledge of the basic principles of immunology.</p> <p>CO:4 To understand how these principles, apply to the process of immune function.</p> <p>CO:5 Use, and interpret results of, the principal methods of statistical inference and design; helps to communicate the results of statistical analyses accurately and effectively; helps in usage of appropriate tool of statistical software.</p>


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	C-9 T	Non-Chordates and Economic Zoology	<p>CO:1 Group animals on the basis of their morphological characteristics/ structures.</p> <p>CO:2 Demonstrate comprehensive identification abilities of Non-Chordate diversity.</p> <p>CO:3 Explain structural and functional diversity of Non-Chordates</p> <p>CO:4 Develop understanding on the diversity of life with regard to protests, non-chordates and chordates. Examine the diversity and evolutionary history of a taxon through the construction of a basic phylogenetic/ cladistics tree</p>
Sem-V	ZOO C-11-T	Chordates and Comparative Anatomy	<p>CO:1 To demonstrate comprehensive identification abilities of chordate diversity</p> <p>CO:2 Able to explain structural and functional diversity of chordate diversity</p> <p>CO:3 To understand evolutionary relationship amongst chordates</p> <p>CO:4 To take up research in biological sciences.</p> <p>CO:5 To realize that very similar physiological mechanisms are used in very diverse organisms.</p> <p>CO:6 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.</p>
Sem-VI	ZOOC15-T	Evolutionary & Developmental Biology	<p>CO:1 Understand that by biological evolution we mean that many of the organisms that inhabit the earth today are different from those that inhabited it in the past.</p> <p>CO:2 Understand that natural selection is one of several processes that can bring about evolution, although it can also promote stability rather than change.</p> <p>CO:3 Understand how the single cell formed at fertilization forms an embryo and then a full adult organism.</p> <p>CO:4 Integrate genetics, molecular biology, biochemistry, cell biology, anatomy and physiology during embryonic development.</p> <p>CO:5 Understand a variety of interacting processes, which generate an organism's heterogeneous shapes, size, and structural features.</p> <p>CO:6 Understand how a cell behaves in response to an autonomous determinant or an external signal, and the scientific reasoning exhibited in experimental life science.</p>


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	C17-T	Environmental Biology, Wildlife Managemet & Conservations	CO:1 CO:2 CO:3 CO:4 CO:5	<p>Develop an understanding of how animals interact with each other and their natural environment.</p> <p>Develop the ability to use the fundamental principles of wildlife ecology to solve local, regional and national conservation and management issues.</p> <p>Develop the ability to work collaborative team-based projects.</p> <p>Gain an appreciation for the modern scope of scientific inquiry in the field of wildlife conservation management.</p> <p>Develop an ability to analyze, present and interpret wildlife conservation management information.</p>
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Head of the Department Zoology

PROGRAM OUTCOME AND COURSE OUTCOMES OF UNDERGRADUATE COURSE

B.Sc. ZOOLOGY(CBCS)

Programme Outcomes (POs) :

PO1. Critical Thinking:Take informed actions after identifying the assumptions that frame our thinking and actions, checking out the degree to which these assumptions are accurate and valid, and looking at our ideas and decisions (intellectual, organizational, and personal) from different perspectives.

PO2. Problem Solving:Understand and solve the problems of relevance to society to meet the specified needs using the knowledge, skills and attitudes acquired from humanities/ sciences/mathematics/social sciences.

PO3. Effective Communication:Speak, read, write and listen clearly in person and through electronic media in English and in one Indian language, and make meaning of the world by connecting people, ideas, books, media and technology.

PO4. Effective Citizenship:Demonstrate empathetic social concern and equity centered national development, and the ability to act with an informed awareness of issues and participate in civic life through volunteering.

PO5. Environment and Sustainability:Understand the issues of environmental contexts and sustainable development.

Program Specific Outcomes (PSO):

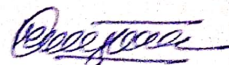
PSO1: The students will acquire a broad understanding of animal diversity, including knowledge of the scientific classification and evolutionary relationships of major groups of animals. Students should be able to identify, classify and differentiate diverse chordates and non-chordates based on their morphological, anatomical and systemic organization.

PSO2: The students will understand the basic concepts of cell biology, genetics, animal physiology and biochemistry, ecology, evolutionary biology, developmental biology, immunology and biostatistics.

PSO3: The students will recognize how organisms function at the level of the gene, genome, cell, tissue, organ and organ-system. This will help them to gather knowledge on the physiological adaptations, development, reproduction and behaviour of different forms of life.

PSO4: The students will be acquiring basic experimental skills in various techniques in the fields of cell biology and genetics, molecular biology; biotechnology and analytical biochemistry. These methodologies will provide an extra edge to our students, who wish to undertake higher studies.

PSO5: The skill enhancement courses like aquaculture, sericulture and apiculture will inculcate skills involved in rearing fish, bees and silk moth which would help them in generating self-employment making them successful entrepreneurs. Acquired skills in medical diagnosis, haematology, histopathology, staining procedures etc. used in clinical and research laboratories will provide them opportunity to work in diagnostic or research laboratory.



Head of the Department Zoology



COURSE OUTCOMES (CO)

CORE COURSES (CC)

1 Semester— DSC — IZ

ANIMAL DIVERSITY:

CO1:An introduction to the vast diversity of non-chordates gaining knowledge on their general characteristics, classification, life-cycle pattern of representative animals of non-chordates.

CO2: Hands-on training on Identification, mounting and staining of some non-chordate specimen

CO:3To demonstrate comprehensive identification abilities of chordate diversityAble to explain structural and functional diversity of chordate diversity

CO:4To understand evolutionary relationship amongst chordates

11 Semester - DSC - 2Z

COMPARATIVE ANATOMY AND DEVELOPMENTAL BIOLOGY OF VERTEBRATE:

CO:3 To define vertebrate structural principles by studying all body systems of vertebrates in an evolutionary perspective.

CO:2 To compare and contrast the anatomical systems of different vertebrates and identify common traits across species and groups.

CO:3Illustrate the early developmental process of egg in Amphioxus, frog, chick and man.

CO:4 Explain fate map construction, Spemann's constriction experiments on amphibian embryos, organizers in development, embryonic induction.

111 Semester - DSC - 3Z

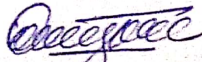
PHYSIOLOGY AND BIOCHEMISTRY:

CO:1 Describe the regulation of digestion in man, nutrition in pregnancy and infancy, nutritional disorders, balanced diet, starvation, fasting and obesity.

CO:2 Understand the mechanism of transport and exchange of respiratory gases and its neurophysiological control and physiological problems in diving mammals, new-born and aged individuals.

CO:3 Enumerate the properties and classification of amino acids and their standard abbreviations; hierarchical levels of protein structure, classification, separation, purification and sequencing of proteins.

CO:4 Explain the classification and functions of lipids and fatty acids; chemistry and structure of nucleic acids and sequencing of DNA.


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IV Semester - DSC -4Z

GENETICS AND EVOLUTION:

CO:1 Illustrate multiple allelism and solve problems related to blood group inheritance.

CO:2 Explain characteristics of linkage groups and linkage map; crossing over and calculation of recombination frequency; sex-linked, sex-influenced and sex-limited characters; sex differentiation and disorders of sexual development.

CO:3 Describe the mechanisms of sex determination including chromosomal, genic, haploiddiploid mechanisms; the hormonal and environmental influence on sex determination and gynandromorphism.

CO:4 Describe the evidences for evolution and its required corollaries.

CO:5 Explain the various theories of evolution.

CO:6 Describe the mechanisms by which evolution occurs.

V Semester

SKILL ENHANCEMENT COURSES

SEC 1 APICULTURE:

SEC- 3Z

IMMUNOLOGY:

SEC-4Z

MEDICAL DIAGNOSTICS:

SEC - 4Z

INSECT VECTORS AND DISEASES:

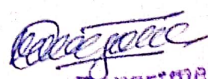
Vth Semester

DSE-1Z CELL AND MOLECULAR BIOLOGY:

CO:1 Perform experiments in cell biology and genetics including demonstration of Barr body in buccal epithelial cells of man, polytene chromosome in the salivary glands of *D. melanogaster* larva, mitotic division in onion root tip cells, micrometry of microscopic objects, prepare whole mounts of microscopic objects, and calculate mitotic and metaphase index from slides.

CO:2 Describe the mechanism of DNA duplication and the role of enzymes.

CO:3 Understand the concept of gene and gene expression; genetic code and wobble hypothesis.

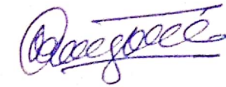

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VI Semester

DSE-2ZECOLOGY, WILDLIFE BIOLOGY & ANIMAL BEHAVIOUR:

- CO:1** Explain the structure of ecosystem and its functioning through energy flow and nutrient cycling.
- CO:2** Enumerate biogeochemical cycles and understand the concept of limiting factors.
- CO:3** Describe the ecology of population, community and habitat as a self-regulating system.
- CO:4** Explain levels of biodiversity, threats to biodiversity, biodiversity hotspots, importance and strategies for conservation of wildlife and sustainable development.
- CO:5** Describe the patterns and mechanisms of animal behaviour.
- CO:6** Illustrate biological rhythms and the chemical basis of communication.



Head of the Department Zoology

DEPARTMENT OF BIOTECHNOLOGY

PROGRAM OUTCOMES

Upon completion of the Biotechnology program at RCTC, students will achieve the following outcomes:

- Explain and properly apply the scientific method by developing valid hypotheses, designing experiments, gathering relevant data using current technology, and interpreting quantitative and qualitative data.
- Prepare written and oral scientific communications that use tables and graphs to report results, that describe detailed experimental procedures, and that clearly explain conclusions.
- Critically evaluate contributions to science reported in all forms of media, and be able to identify valid approaches to scientific problem solving and reporting.
- Exhibit growth in academic performance and personal and professional responsibility.
- Exhibit an ability to work independently and collaboratively.
- Demonstrate proficiency in basic laboratory skills common to clinical and non-clinical research laboratories, including aseptic technique, making accurate and precise measurements using balances and macro- and micro-pipetting, using a microscope, preparing solutions, operating current instrumentation, preparing samples for various analyses, and maintaining a proper scientific laboratory notebook.
- Design, perform, and analyze results of experiments using basic molecular biology methodologies and recombinant DNA techniques, including agarose and polyacrylamide gel electrophoresis, restriction enzyme digestion, bacterial transformations, plasmid DNA protein expression, PCR, and tissue culture.
- Apply the fundamentals of molecular biology theories, methodologies, and techniques by critically analyzing, interpreting, and presenting a recent and relevant scientific research paper that has been published in a refereed scientific journal.
- Understand the foundational concepts of molecular biology, and how these impact biotechnology research and development in the diverse fields that span healthcare and agriculture.

PROGRAM SPECIFIC OUTCOMES (PSOS)

- PSO 1 To impart an ability to apply biotechnology skills (including molecular & micro biology, immunology & genetic engineering, bioprocess & fermentation, enzyme & food technology and bioinformatics) and its applications in core and allied fields.
- PSO 2 To provide students with the concepts and research approaches for their higher career in the field of biotechnology and develop their scientific interest.
- PSO 3 To impart in-depth practical oriented knowledge to students in various thrust areas of biotechnology, so as to meet the demands of industry and academia.

Course Outcomes:

Sem	Paper Code	Paper Name	Course outcomes	
Sem-I	DSC-1T, BTC 101	Cell Biology and Genetics	<p>CO:1 Learn concept and Historical perspectives of Biotechnology. Would be able to comprehend the structure of cell and cell organelles.</p> <p>CO:2 Understand morphology and structural organization of Chromosomes, explain Cell Division and Cell cycle.</p> <p>CO:3 Able to explain History of Genetics, Laws of inheritance and Gene interaction.</p> <p>CO:4 Enable students to classify linkage, describe Crossing over, Mutations, Chromosomal variations, Sex determination, Human Genetics.</p>	
Sem-II	DSC-2, BTC 102	Microbiological Methods.	<p>CO:1 Learning the working principles of instruments used in Biotechnology Lab, and develop skills in analytical techniques.</p> <p>CO:2 Learn terms used in sterilization and understand sterilization methods.</p> <p>CO:3 Brief overview of culture media and Pure culture methods, develop skills of staining techniques.</p> <p>CO:4 Understand mode of action of antimicrobial agents, explain antifungal, antiviral agents and antibiotic resistance. Able to develop the skill in antibiotic sensitivity testing methods.</p>	
Sem III	CCBTT -3	Microbial Biotechnology and Immuno Technology	<p>CO1 Overview of microorganism and classification</p> <p>CO2 Understand morphology and cell structure of major groups of microorganisms.</p> <p>CO3 Learn nutritional categories of microorganisms methods of isolation, and preservations</p> <p>CO4 Understand Immune system, types of Immune response</p> <p>CO5 To learn Vaccines and vaccination, and antigen and antibody reactions</p>	

Sem IV	CCBTT -3	Genetic Engineering	<p>CO1 Understand the detailed steps of recombinant DNA technology and tools used in genetic engineering.</p> <p>CO2 Students practically can understand the process of isolation of genomic DNA from plant, animal and microbial source.</p> <p>CO3 Throws light on applications of genetic engineering including gene libraries, DNA sequencing, DNA mapping and human genome project, application in human health.</p> <p>CO4 Students will gain awareness on biosafety and rules and regulations of genetically modified organisms.</p>
Sem V	DSEBT T-1	Plant and Animal Biotechnology	<p>CO1 Overview of methods in plant tissue culture and sterilization techniques</p> <p>CO2 Understand micro propagation and haploid plant production.</p> <p>CO3 Attain skills of Genetic Engineering in plants</p> <p>CO4 Understand animal tissue culture techniques and learn gene transfer methods in animals</p> <p>CO5 Explain hybridoma technology and its applications .</p>
	SECBT T-1	Forensic Science and Environmental Monitoring	<p>CO1 Understand the principles of forensic science and service tools and techniques in forensic science.</p> <p>CO2 To know fundamental principles of fingerprinting, principles of DNA finger printing, application of DNA finger printing in forensic medicine.</p> <p>CO3 Overview of modern fuels and their environmental impact bioremediation of soil and water , solid waste disposal and monitoring methods.</p>

	SECBT 2	Vermitechnology	CO1 CO2 CO3	<p>Overview of vermiculture earthworm distribution, influence of soil organism in vermitechnology.</p> <p>Understanding ecological classification of earthworms</p> <p>To learn types of earthworms, selection of earth worms, methodology of vermicomposting</p>
Sem VI	DSEBT T-2	Project Work	CO1 CO2 CO3 CO4 CO5	<p>Able to learn to analyze the researchable problems and devised strategies to overcome in project mode.</p> <p>Formulate project proposal and monitor the progress</p> <p>Learn to execute the project and perform midterm corrections as alternative strategies</p> <p>Help students to learn general conduct and discipline of working team environment in lab.</p> <p>Inculcate creativity in the execution of the project and the presentation.</p>
	SECBT T-3	Industrial Biotechnology	CO1 CO2 CO3	<p>Understand the principles of fermentation technology , and learn fermentation media and develop skills of sterilization techniques,</p> <p>Attain skills to design fermentor, learn its types and explain production of microbial products</p> <p>Understand the techniques of mass culture of algae, explain downstream processing</p>
	SECBT -4	Food and Dairy Technology	CO1 CO2 CO3	<p>To learn food as a substrate for microbial growth</p> <p>To learn principles and methods of food contamination spoilage and preservation</p> <p>Overview of Bacterial food poisoning and non bacterial food poisoning and intoxication</p>

MICROBIOLOGY -

B.Sc Course with Microbiology

Choice Based Credit System(CBCS)

B.Sc I-semester

Course : Introduction to microbiology and microbial diversity

Course Outcome

1. Learning the scientific methods and the history of science is the embodiment of scientific knowledge .
2. As an introductory part of Microbiology, students will get the basic ideas and practices from the contribution of several Microbiologists in the field of microbiology.
3. They will have to know the diversity of microbial world like algae, fungi, protozoa and their general characteristics and importances.
4. They will be understood various laboratory practices, biosafety and also know the applications of important instruments like biological safety cabinets, autoclave, incubator, BOD incubator, hot air oven, light microscope, pH meter.

Programme outcomes

- Microorganisms exist virtually everywhere life is possible. The total complement of microbial cells in and on our body—microbiome—contains thousands of species each adapted to grow best in a particular part of our body.

B.Sc II-semester

Course : Instrumentation & Biotechniques

Course Outcome


1. This skill based course will teach the students the various instrumentations that are used in the analytical laboratories.
2. This course covers both fundamental and applications of the instruments that are routinely used for the characterization of biomolecules
3. At the end of the course, the student has the basic knowledge on the theory, operation and function of analytical instruments.


Programme outcomes

1. The students will be able to communicate scientific concepts, experimental results and analytical arguments clearly and concisely, both verbally and in writing.
2. The course is reasoning and application based, making the students eligible for higher studies, jobs in various sectors and entrepreneurship abilities.

B.Sc III-semester

Course : Microbial Genetics and Recombinant DNA Technology


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Department of Microbiology
L.V.D. COLLEGE,
RAICHUR-584 103.

Course Outcome

1. Through the course students will be acquainted with genome organization and mutations, different plasmids, mechanisms of genetic exchange, phage genetics and transposable elements
2. Through completion the course the students will capable the acquire the knowledge about the genetic engineering, different methods in molecular cloning, DNA amplification, DNA sequencing, Construction and Screening of Genomic and cDNA libraries and its applications.

Programme outcomes

1. They will be well-informative about the integral role of microorganisms associated with specific disease, vital role of microorganisms in biotechnology, fermentation, medicine, and other industries important to human well being.
2. The skill enhancement elective course is designed to provide students with an opportunity to gain hands on experience in state-of-the-art laboratory equipments that could enrich them to perform high throughput research on microorganisms and execute diagnostic procedures required in food, dairy and pharmaceutical industries.

B.Sc IV-semester

Course : Microbial physiology metabolism and Biochemistry

1. Students will have to acquire the clear cut knowledge of microbial growth and effect of environmental factors (like pH, temperature, salt concentration etc.) on microbial growth, nutrient uptake and transport, aerobic, anaerobic respiration, fermentation and at the same time phototrophic metabolism and nitrogen metabolism.
2. Here students will have to know the Properties of water, Concept of pH and buffers, preparation of buffers and Numerical problems on calculations of Standard Free Energy Change and Equilibrium constant and also Standard Free Energy Change of coupled reactions.
3. Students will have to acquire the clear cut knowledge regarding the properties, functions, structures of different bio-molecule like Carbohydrates, Lipids, Proteins, Enzymes and Vitamins.
4. Students will be able to run various biochemical tests like qualitative or quantitative tests for carbohydrates, reducing sugars, non reducing sugar, Lipids, and proteins.
5. They will have to study the protein secondary, tertiary structures, enzyme kinetics – calculation of V_{max} , K_m , K_{cat} values and effect of temperature, pH and heavy metals on enzyme activity.

Programme outcomes

1. The course will help them to impart the knowledge of the basic principles of bacteriology, virology, mycology, immunology and parasitology including the nature

- of pathogenic microorganisms, pathogenesis, laboratory diagnosis, transmission, prevention and control of diseases common in the country,
2. They will acquire the ability to function effectively on teams to accomplish a common goal

B.Sc V-semester

Course : Food , Dairy Microbiology and industrial microbiology

1. By the study of food & dairy microbiology the students are able to know the principles and methods of food preservation, production of different fermented foods, different food borne diseases;
2. Their causative agents, foods involved, symptoms and preventive measures.
3. They will have the know food sanitation and control.
4. The students will know about the cultural and rapid detection methods of food borne pathogens in foods and introduction to predictive microbiology.
5. Student will be able to isolate the industrially important microbial strains and fermented media.
6. They also have the knowledge about the fermentation processes, bio-reactors and measurement of fermentation parameters.
7. They also well-known about microbial production of industrial products & enzyme immobilization.

Programme outcomes

1. The students will be able to acquire, retain and apply specialized concept and knowledge relevant to plethora of microbiological field.
2. They will also acquire knowledge in laboratory safety and in routine and specialized microbiological skills applicable to clinical research, including accurately reporting observations and analysis.

B.Sc VI-semester

Course : Environmental Microbiology

1. Students will be able to know about water potability, microbial bioremediation, waste management, biogeochemical cycling and different microbial interactions.

Course : Medical Microbiology, Immunology and Agricultural Microbiology

1. Students will acquire a thorough knowledge about the diseases caused by various bacteria, virus, protozoa and fungi.
2. They also enrich about the antimicrobial agents, their characteristics, mode of action etc.



3. Through the study of immunology the students will aware of antigens, antibodies, complement System, major histocompatibility Complex, different immune cells and organs.
4. They will also able to know about the generation of immune response, immunological disorders and tumor immunity. By practically they will capable to perform different immunological techniques like-,Immunodiffusion, Immunoelectrophoresis, ELISA, Western blotting etc.
5. They will acquire a clear understanding about host pathogen interaction, normal microflora in human body, different sample collection & diagnosis.
6. They will also enrich by hands on training about this techniques through these practical classes.
7. student will gain knowledge on the basic structure and functions of prokaryotes
8. Students learn about various recombination and reproduction methods of prokaryotes
9. Students gain knowledge on screening and isolation of of beneficial microbes
10. Students gain knowledge on the importance and applications of biofertilizers and beneficial microbes
11. Students understand the role of microorganisms in biodegradation

Programme outcomes

1. Knowledge Enhancement : Demonstrate knowledge and understanding of essential facts, concepts, principles and theories relating to Soil Science, Agronomy, Horticulture, Genetics and Plant Breeding, Plant Pathology, Entomology and other such areas of agriculture.
2. Professional Enhancement : Understanding the value and processes of life-long learning and professional development.
3. Entrepreneurship Skills : Understanding the processes of setting up and managing viable business ventures.
4. Communication & Extension Skills : Developing appropriate communication skills for effective transfer of knowledge and technologies through extension programs.
5. Team Work : Play effective roles in multidisciplinary teams.



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L.V.D. COLLEGE,
RAICHUR-584 103.

DEPARTMENT OF COMPUTER SCIENCE (UG)

PROGRAMME OUTCOMES B.Sc

PO1. Scientific knowledge: Apply the knowledge of mathematics, science, and computing to the solution of complex scientific problems.

PO2. Problem analysis: Identify, formulate, research literature, and analyze complex scientific problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and applied sciences.

PO3. Design/development of solutions: Design solutions for complex problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5. Modern tools usage: Create, select, and apply appropriate techniques, resources, and modern computing and IT tools including prediction and modeling to complex scientific activities with an understanding of the limitations.

PO6. The software engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional practice.

PO7. Environment and sustainability: Understand the impact of the professional software engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the scientific practice.

PO9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10. Communication: Communicate effectively on complex activities with the scientific community and with the society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11. Project management: Demonstrate knowledge understanding of the scientific and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change through scholarly activities.

PROGRAMME SPECIFIC OUTCOMES

The completion of this Under Graduate programme will

PSO1: Apply fundamental principles and methods of Computer Science to a wide range of applications.

PSO2: Design, correctly implement and document solutions to significant Computational problems.

PSO3: Impart an understanding of the basics of our discipline. PSO4: Prepare for continued professional development.

PSO5: Develop proficiency in the practice of computing.

Syllabus for Bsc(Basic and Honors), Semesters I and II

Course Code: DSC-1	Course Title: Computer Fundamentals and Programming in C
Course Credits: 04	Hours/Week: 04
Total Contact Hours: 52	Formative Assessment Marks: 30
Exam Marks: 70	Exam Duration: 03 hours

Course Outcomes (COs):

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, and 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.

Course Code: OE1	Course Title: Office Automation
Course Credits: 03	Hours/Week: 03
Total Contact Hours: 42	Formative Assessment Marks: 30
Exam Marks: 70	Exam Duration: 03 hours

Course Outcomes (COs):

Students will be able to create various documents newsletters, brochures, making documents using photographs, charts, presentations, documents, drawings and other graphic images.

To work with worksheet and presentation software.

After completion of the course, students would be able to:

Compare and contrast various types of computers

Explain the purpose of CPU and how it works.

Describe how information is stored in memory.

Know the basics of computers and prepare documents, spreadsheets, make small presentations with audio, video and graphs and would be acquainted with internet.

Create, edit, save and print documents with list tables, headers, footers, graphic, spellchecker, mail merge and grammar checker.

Attain the knowledge about spreadsheet with formula, macros spell checker etc.

Course Code: SEC-1(A)	Course Title:Soft Skills and Personality Development
Course Credits: 02	Hours/Week: 01 hr Theory & 02 hrs Practical
Total Contact Hours: 16T+26P	Formative Assessment Marks: 15
Exam Marks: 35	Exam Duration:

Course Outcomes (COs):

To understand the key concepts of Computer Graphics.

To introduce the Basic Transformations, Computer Animation and Application.

Course Code: SEC-1(B)	Course Title: Search Engine Optimization(SEO)
Course Credits: 02	Hours/Week: 01 hr Theory & 02 hrs Practical
Total Contact Hours: 16T+26P	Formative Assessment Marks: 15
Exam Marks: 35	Exam Duration:

Course Outcomes (COs):

Define search engine marketing.

Describe the history of search engine marketing plan.

Identify the elements of search engine marketing plan.

Generate the words that highly relevant to Web site.

Construct search engine-friendly Web sites.

Attract inbound Links from other Web sites.

SEMESTER-II

Course Code: DSC-2	Course Title:Data Structures using C
Course Credits: 04	Hours/Week: 04
Total Contact Hours: 52	Formative Assessment Marks: 30
Exam Marks: 70	Exam Duration: 03 hours

Course Outcomes (COs):

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 travelling 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, searching, and hashing.

Course Code: OE2	Course Title: E-Commerce
Course Credits: 03	Hours/Week: 03
Total Contact Hours: 42	Formative Assessment Marks: 30
Exam Marks: 70	Exam Duration: 03 hours

Course Outcomes (COs):

To become familiar with the mechanism for conducting business transactions through electronic means.

Course Outcomes:

Semester III

Problem solving techniques using 'C'

CO1	Explain about the basic concepts of program development statements and its syntax.
CO2.	Explain the various types of arrays and its structure.
CO3	Discuss about the various types of Functions and String handling mechanisms.
CO4.	Explain the Concepts of structures and Unions.
CO5.	Illustrates the various operations performed on different types of files.

Digital Electronics

CO1	Convert different type of codes and number systems which are used in digital communication and computer systems.
CO2.	Employ the codes and number systems converting circuits and Compare different types of logic families which are the basic unit of different types of logic gates in the domain of economy, performance and efficiency.
CO3	Analyze different types of digital electronic circuit using various mapping and logical tools and know the techniques to prepare the most simplified circuit using various mapping and mathematical methods.
CO4.	Apply the fundamental knowledge of analog and digital electronics to get different types analogto digitalized signal and vice-versa converters in real world with different changing circumstances.

CO5.	Design different types of with and without memory element digital electronic circuits for particular operation, within the realm of economic, performance, efficiency, user friendly and environmental constraints.
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Semester IV

Data Structures

CO1	To access how the choices of data structure & algorithm methods impact the performance of program.
CO2.	To solve problems based upon different data structure & also write programs.
CO3	Choose an appropriate data structure for a particular problem.
CO4.	Be capable to identify the appropriate data structure for given problem.
CO5.	Have practical knowledge on the application of data structures.

Object Oriented Programming

CO1	Explain the top-down and bottom-up programming approach and apply bottom up approach to solve real world problems.
CO2.	Explain the difference between static and dynamic binding. Apply both techniques to solve problems.
CO3	Describe the concept of inheritance and apply real world problems.
CO4.	Discuss the generic data type for the data type independent programming which relate it to reusability.
CO5.	Explain to design of handling large data set using File I/O.

Semester V

Discrete Mathematics

CO1	Basic idea of Permutations and Combinations, and Probability Concepts.
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CO2.	Calculate the number of samples needed to construct confidence levels on the mean and variance of a normal distribution.
CO3	Evaluate the probabilities and conditional probabilities.
CO4.	Understand the concept of Set Theory.
CO5.	Understand the concept of relations and functions.

VISUAL BASIC

CO1	Explain the basic Concepts of Program building block control statements and the basic concepts of function and procedure.
CO2.	Describe the functionality and properties of GUI based ActiveX Control with example programs
CO3	Discuss about graphics handling related control and properties.
CO4.	Discuss about the fundamental functions and properties of Advanced ActiveX Control.
CO5.	Describe the concepts of database handling using DAO, ADO and RDO control with data report concepts.

Semester VI

Paper I-JAVA PROGRAMMING

CO1	Explain about basic Java language syntax and semantics to write Java programs.
CO2.	Describe the concepts of variables, conditional and iterative execution methods etc.
CO3	Discuss the fundamentals of object-oriented programming in Java, including defining classes, objects, invoking methods

CO4.	Explain the various methodologies to handle the exception mechanisms and the principles of inheritance, packages and interfaces
CO5.	Demonstrate the programming concepts for applet and graphics.

Paper II: Database Management System

CO1	Describe the fundamentals of File processing and database processing system.
CO2.	Explain the various data model and its application.
CO3	Explain the various normal forms and its role in DBMS.
CO4.	Explain the fundamental concepts of SQL programs.
CO5.	Describe the concepts of function, procedure, package, trigger and exception handling.

BACHELOR OF COMPUTER APPLICATION (BCA)

PROGRAMME OUTCOME :

At the end of the three year BCA programme the students will be able to:

- Understand, analyze and develop computer programs in the areas related to algorithm, web design and networking for efficient design of computer-based system.
- Work in the IT sector as system engineer, software tester, junior programmer, web developer, system administrator, software developer etc.
- Apply standard software engineering practices and strategies in software project development using open-source programming environment to deliver a quality of product for business success.

PROGRAM SPECIFIC OUTCOMES :

- Equip themselves to potentially rich & employable field of computer applications.
- Pursue higher studies in the area of Computer Science/Applications.
- Take up self-employment in Indian & global software market.
- Meet the requirements of the Industrial standards.

COURSE OUTCOMES:

BCA SEMESTER -1

Course Code: CAC01	Course Title: Fundamentals of Computers
Course Credits: 03	Hours/Week: 03
Total Contact Hours: 42	Formative Assessment Marks: 30
Exam Marks: 70	Exam Duration: 03 hours

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 basic, introduction of HTML and CSS Programming.
- Introduction and architecture, microcontrollers.

Course Code: CAC02	Course Title: Programming in C
Course Credits: 03	Hours/Week: 03
Total Contact Hours: 42	Formative Assessment Marks: 30
Exam Marks: 70	Exam Duration: 03 hours

Course Outcomes (COs):

- 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, and 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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Course Code: CAC03(a)	Course Title: Mathematical Foundation
Course Credits: 03	Hours/Week: 03
Total Contact Hours: 42	Formative Assessment Marks: 30
Exam Marks: 70	Exam Duration: 03 hours

Course Outcomes (COs):

- Study and solve problems related to connectives, predicates and quantifiers under different situations.
- Develop basic knowledge of matrices and to solve equations using Cramer's rule.
- Know the concept of Eigen values.
- To develop the knowledge about derivatives and know various applications of differentiation.
- Understand the basic concepts of Mathematical reasoning, set and functions.

Course Code: CAC03(b)	Course Title: Accountancy
Course Credits: 03	Hours/Week: 03
Total Contact Hours: 42	Formative Assessment Marks: 30
Exam Marks: 70	Exam Duration: 03 hours

Course Outcomes (COs):

- Study and understand Accounting, systems of Book, Branches of accounting, advantage and limitations.
- Know the concept of accounting, financial accounting process and Journalization.
- Maintenance of different account books and reconciliations.
- Preparations of different bills, and trial balance.

Course Code: CAO E1	Course Title: Office Automation
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Course Credits: 03	Hours/Week: 03
Total Contact Hours: 42	Formative Assessment Marks: 30
Exam Marks: 70	Exam Duration: 03 hours

Course Outcomes (COs):

- Students will be able to create various documents newsletters, brochures, making documents using photographs, charts, presentations, documents, drawings and other graphic images.
- To work with worksheet and presentation software.
- After completion of the course, students would be able to:
 - Compare and contrast various types of computers
 - Explain the purpose of CPU and how it works.
 - Describe how information is stored in memory.
 - Know the basics of computers and prepare documents, spreadsheets, make small presentations with audio, video and graphs and would be acquainted with internet.
 - Create, edit, save and print documents with list tables, headers, footers, graphic, spellchecker, mail merge and grammar checker.
 - Attain the knowledge about spreadsheet with formula, macros spell checker etc.

Course Code: CASEC-1(A)	Course Title: Soft Skills and Personality Development
Course Credits: 02	Hours/Week: 01 hr Theory & 02 hrs Practical
Total Contact Hours: 16T+26P	Formative Assessment Marks: 15
Exam Marks: 35	Exam Duration:

Course Outcomes (COs):

- To understand the key concepts of Computer Graphics.
- To introduce the Basic Transformations, Computer Animation and Application.


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Course Code: CASEC-1(B)	Course Title: Search Engine Optimization(SEO)
Course Credits: 02	Hours/Week: 01 hr Theory & 02 hrs Practical
Total Contact Hours: 16T+26P	Formative Assessment Marks: 15
Exam Marks: 35	Exam Duration:

Course Outcomes (COs):

- Define search engine marketing.
- Describe the history of search engine marketing plan.
- Identify the elements of search engine marketing plan.
- Generate the words that highly relevant to Web site.
- Construct search engine-friendly Web sites.
- Attract inbound Links from other Web sites.

BCA SEMESTER -2

Course Code: CACO4	Course Title:Data Structures using C
Course Credits: 03	Hours/Week: 03
Total Contact Hours: 42	Formative Assessment Marks: 30
Exam Marks: 70	Exam Duration: 03 hours

Course Outcomes (COs):

- 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 travelling 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, searching, and hashing.

Course Code: CAC05	Course Title: Object Oriented Programming with JAVA
Course Credits: 03	Hours/Week: 03
Total Contact Hours: 42	Formative Assessment Marks: 30
Exam Marks: 70	Exam Duration: 03 hours

Course Outcomes (COs):

- Understanding the features of Java and the architecture of JVM.
- Write, compile, and execute Java Programs that may include basic data types and control flow constructs and how type casting is done.
- Identify classes, objects, members of a class and relationship among them needed for a specific problem and demonstrate the concept of polymorphism and inheritance.
- Demonstrate the programs based on interfaces and threads and explain the benefits of Java's exceptional handling mechanism compared to other Programming languages.
- Write, compile, execute Java programs that include GUIs and Event driven programming and also programs based on files.

Course Code: CAC06	Course Title: Discrete Mathematical Structure.
Course Credits: 03	Hours/Week: 03
Total Contact Hours: 42	Formative Assessment Marks: 30
Exam Marks: 70	Exam Duration: 03 hours


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Course Outcomes (COs):

- To understand the basic concepts of Mathematical reasoning, set and functions.
- To understand various counting techniques and principle of inclusion and exclusions.
- Understand the concepts of various types of relations, partial ordering and equivalence relations.
- Apply the concepts of generating functions to solve the recurrence relations.
- Familiarize the fundamental concepts of graph theory and shortest path algorithm.

Course Code: CAOE2	Course Title: E-Commerce
Course Credits: 03	Hours/Week: 03
Total Contact Hours: 42	Formative Assessment Marks: 30
Exam Marks: 70	Exam Duration: 03 hours

- Understand key mechanisms in design of operating systems modules

Course Outcomes (Cos):

- To become familiar with the mechanism for conducting business transactions through electronic means.

Semester III

Operating System

Upon completion of this course, students will be able to:

- * Gain extensive knowledge on principles and modules of operating systems.

- Understand key mechanisms in design of operating systems modules

- Understand process management, concurrent processes and threads, memory management virtual memory concepts, deadlocks. Compare performance of processor scheduling algorithms - produce algorithmic solutions

- to process synchronization problems.

Mathematics II

Upon completion of this course, students will be able to: Solve problems related to Matrix

- Solve simultaneous equations using Gauss elimination and Gauss Jordan method
- Understand the concept of Central tendency and solve problems related to Mean, Median
- and Mode.

Understand the concept of deviation and solve problems related to dispersion, range, • standard deviation, co-efficient of variation.

Understand the concept of Differential and Integral Calculus.

Computer Networks

Upon completion of this course, students will be able to:

Understand the data communication concepts.

- Understand the concept of Communication channel.
- Understand how the data is transmitted wirelessly.
- Understand the various layers of Network architecture.
- Understand and implement the switching techniques.
- Learn the need to create a Network.
- Learn about different layers and protocols present in those layers.
- Learn to configure the network devices
- Learn about IP -Addressing. • Learn about Network Security.


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Data Structures

Upon completion of this course, students will be able to:

- ❖ Learn about how data can be stored in memory.
- ❖ Learn and implement Arrays and various operations on array
- ❖ Learn and implement Stacks and Queues and various operations on them
- ❖ Learn and implement the concept of Linked List.
- ❖ Learn and implement the concept of various types of Trees
- ❖ Learn and implement various searching and sorting techniques alongwith their complexity
- ❖ Learn and implement Graph and Graph traversal techniques.

Introduction to Microprocessor

Upon completion of this course, students will be able to:

Know the historical background of Microprocessor and it's application

- Learn in deep about 8085 microprocessor and it's architecture.
- Learn about Instruction cycle of 8085.
- Learn in deep about 8086 microprocessor and it's architecture.
- Learn about 8086 addressing modes
- Learn about interrupts
- Learn how to simulate 8085 and 8086 operation on a simulator.

Semester IV

Computer System Architecture

Upon completion of this course, students will be able to:

- ❖ Understand about concepts of Computer Organization and design.
- ❖ Understand and implement Instruction codes and op-codes.
- ❖ Understand Registers, Computer Instructions, timing and control
- ❖ Understand CPU basics, Stack Organization, Instruction format, Addressing formats.
- ❖ Understand Memory system of a Computer.

Introduction to Database Management Systems

- ❖ Upon completion of this course, students will be able to:
- ❖ Understand the importance of Database.
- ❖ Understand the Architecture & Modeling of Database.
- ❖ Understand the concept of RDBMS.
- ❖ Learn brief introduction to Structured Query Language
- ❖ Learn and implement Backup and Recovery of databases.
- ❖ Learn and implement the Database Security.
- ❖ Design Commercial database applications
- ❖

Networking through Linux

- ❖ Upon completion of this course, students will be able to:
- ❖ Learn History and various distributions of Linux.
- ❖ Learn and perform Installation of Red Hat Linux.
- ❖ Learn and operate Red Hat Linux
- ❖ Learn and implement Linux System Administration.
- ❖ Learn and implement TCP/IP on Linux.

Network Security

Upon completion of this course, students will be able to:

- ❖ Learn basic terminologies of Networking
- ❖ Know about fundamentals of Information Security.
- ❖ Know and analyze the security threats and vulnerabilities.
- ❖ Learn and implement System & Network Administration and security.
- ❖ Learn about tools and technologies used for Network security.
- ❖ Learn and perform Security Audits.

Multimedia and Animation

Upon completion of this course, students will be able to:

- ❖ Learn and implement basics of Multimedia & Animation.
- ❖ Learn and implement Text editing, Image editing etc
- ❖ Learn basics of Computer Graphics.
- ❖ Learn and understand Digital audio, Digital video, animation and Special Effects


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SEMESTER V

Introduction to Internet and Java

Upon completion of this course, students will be able to:

- ❖ Understand the concept of Internet.
- ❖ Learn about various protocols
- ❖ .Learn about working on Internet.
- ❖ Learn and work on various Internet Applications.
- ❖ Learn about Java Basics.
- ❖ Learn about Network Programming
- ❖ .Develop Java Applications, applets etc.

Oracle & Developer 2000

Upon completion of this course, students will be able to:

- ❖ Manage data in Oracle. Manipulating data in SQL.
- ❖ Understand Developer 2000.
- ❖ Flash & Director

Multimedia Tools

Upon completion of this course, students will be able to:

- ❖ Understand Communication and Interactive Communication
- ❖ . Learn about creation and execution of Multimedia project
- ❖ .Work and create Multimedia Project with Director 11.
- ❖ Work and create Multimedia Project with Adobe Flash.

SEMESTER VI

Web Development Tools & Techniques Upon completion of this course, students will be able to:

- ❖ To develop Webpages, Static Websites, Dynamic Websites.
- ❖ To use ASP as Server Side Scripting Language.
- ❖ To use PHP as Server Side Scripting Language.

- ❖ To use JSP, JavaScript.
- ❖ To understand database and it's connectivity with Server Side Scripting language.
- ❖ To develop Web Applications with MySQL/SQL as backend

Advance Networking (BCA-602)

Upon completion of this course, students will be able to:

- ❖ Understand and manage internetworking.
- ❖ Understand bridging, switching.
- ❖ Understand Routing protocols and implement them.
- ❖ Understand and implement WAN Protocols.
- ❖ Understand Network Management.
- ❖ Setup and Manage Commercial Networks.


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