KALPATARU FIRST GRADE SCIENCE COLLEGE, TIPTUR

QUALITY INDICATOR FRAMEWORK (QIF)

CRITERION-2

2.6.1.

PROGRAMME OUTCOME and COURSE OUTCOME

File contains the. Program outcomes and Course Outcomes of different Subjects

KALPATARU FIRST GRADE SCIENCE COLLEGE

PROGRAM OUTCOMES and COURSE OUTCOMES

Each Department develops course-specific programme outcomes in tune with the Board of Studies of Tumkur University.

PHYSICS:

I BSc I SEMESTER

COURSE OUTCOMES: Mechanics and Properties of Matter.

	COURSE OUTCOMES
MECHANICS AND PROPERTIES OF MATTER	➢ Understand fundamental and derived units used for the measurement of various physical quantities. ➢ Get knowledge of error analysis and its application in the laboratory. ➢ Understand the concepts of momentum and energy and the motion of rockets. ➢ Learn basic concepts of the particular theory of relativity and its applications to length contraction and time dilation. ➢ Understand applications of Newton's laws of motion to solve various problems related to day-to-day life. ➢ Understand the concepts of rigid body dynamics regarding the moment of inertia. ➢ Acquire the knowledge of gravitation and its importance, Kepler's laws, and the motion of a satellite in a circular orbit. ➢ Gain a basic idea of simple harmonic oscillations. Understand the concept of elasticity and various elastic moduli along with their relations. ➢ Understand concepts of surface tension and its applications in daily life. ➢ Understand the basic concepts of fluid motion, including streamlined and turbulent flow. ➢ Determine the viscosity coefficient of liquid by Poiseuille's and Stoke's methods.

I BSc II SEMESTER

COURSE OUTCOMES: Electricity and Magnetism

After completing this course, students will be able to:	
COURSE	**COURSE OUTCOMES**
ELECTRICITY AND MAGNETISM	➢ Understand Coulomb's Gauss law and its applications to calculate electric field due to various charge distributions. ➢ Understand the concept of electric potential and calculations due to point charge, solid sphere, infinite line charge, and an infinite plane sheet of charge. ➢ Determine potential energy due to a system of charges ➢ Understand electrostatic properties exhibited by a conductor when placed in an electric field. ➢ Understand the dielectric phenomenon and the effect of electric fields on dielectrics. ➢ Acquire knowledge about the capacitor, and derive the formula for capacitance for various capacitors, including parallel plate capacitors, spherical capacitors, and cylindrical capacitors. ➢ Explain Gauss's law in dielectrics. ➢ Understand electrical conductivity and Ohm's law in metals and semiconductors. ➢ Find the equivalent resistance of multiple resistors connected in series and parallel. ➢ Find equivalent capacitance and equivalent inductance in series and parallel combinations. ➢ Study the concepts of the magnetic field, Ampere circuital law, Biot-savart law, and its applications. ➢ Understand magnetic force and its effect on moving charge and current-carrying conductor. ➢ Learn Faraday's law and Lenz's law in electromagnetic induction. ➢ Understand mutual inductance and self-inductance. ➢ Derive an expression for energy stored in the coil ➢ Understand the RC, RL, LC, and LCR circuit response to AC. ➢ Understand Impedance, Admittance, Resonance, Quality factor, Power and Energy in AC circuits. ➢ Derive Maxwell's equations. ➢ Understand displacement current, the Nature of electromagnetic waves and their propagation through different media. ➢ Derive the Poynting theorem. Understand Diamagnetic, paramagnetic and ferromagnetic materials, B-H hysterias curves.

II BSc III SEMESTER

COURSE OUTCOMES: Thermal physics, Radiation, Vacuum Physics, and Physical Optics.

After completing this course, students will be able to:	
COURSE	**COURSE OUTCOMES**
THERMAL PHYSICS	➢ Describe the assumptions made in the kinetic-molecular theory and use the theory to explain the nature of gas pressure and temperature. ➢ Understand the fundamental physics of heat and temperature and their relation with energy, work, radiation, and matter. ➢ Learn how laws of thermodynamics are used in a heat engine to transform heat into work. ➢ Understand the interrelationship between thermodynamic functions and the ability to use such relationships to solve practical problems. ➢ Gain knowledge about reversible and irreversible processes and calculate the change in entropy for various functions. ➢ Realise the importance of Thermodynamical functions and applications of Maxwell's relations. ➢ Learn about the Joule -Thomson effect and how it produces low temperature. ➢ Apply the concept of low-temperature Physics to produce liquid hydrogen and oxygen. ➢ Understand how cryogenic engines of rocket work after studying low-temperature Physics.
RADIATION	➢ Explain the basics of heat transfer. ➢ Decide which coloured cloth is suitable for summer and winter. ➢ Understand which coloured flame is ideal for cooking. ➢ Apply Kirchhoff's, Stefan's, and Wien's laws to analyse and measure celestial bodies' temperature in Astronomy.

	➢ Do some basic experiments in thermal Physics, viz., determinations of Stefan's constant, coefficient of thermal conductivity, and temperature coefficient of resistance. ➢ Derive classical laws of black body radiation—Wiens law, Rayleigh-Jeans law, ultraviolet catastrophe. ➢ Understand how Max Planck develops quantum mechanics.
VACUUM PHYSICS	➢ Understand the basics of Pressure. ➢ Understand the working of vacuum pumps. ➢ Understand Vacuum Generation - Low Range Pumps. ➢ Apply the concepts learnt during the course in everyday life. ➢ Apply vacuum Physics in medical, industrial, electronics, and research fields.

II BSc IV SEMESTER COURSE OUTCOMES: Oscillations, Waves, Sound, Fluids, Physical

After completing this course, students will be able to:	
COURSE	**COURSE OUTCOMES**
OSCILLATIONS and WAVES	➢ Recognise and use wave equations and derive these equations for specific physical systems. ➢ Gain knowledge on applications of transverse and longitudinal waves. ➢ Understand the principle of superposition of waves, so thus describe the formation of standing waves ➢ Understand the principle of superposition of waves, so thus describe the appearance of Lissajous figures ➢ The motion of coupled oscillators, the study of Lissajous figures, and the behaviour of transverse and longitudinal waves can be learnt in this laboratory course
SOUND	➢ Understanding concepts of intensity and loudness of sound, decibels, Intensity, Levels-Musical Notes-Musical scales are helpful for students to construct several musical instruments and their work. ➢ Understand the application of sawtooth waves. ➢ Understanding Knowledge of the Acoustics of buildings helps in constructing an auditorium.
FLUIDS	➢ Explain the fundamental properties of liquids, including viscosity. ➢ Analyse microscopic fluid mechanics where the continuity equation governs flow. ➢ Apply knowledge of fluid mechanics in developing hydroelectric power plants, thermal power plants, and hydraulic machines. ➢ Analyse systems using macroscopic fluid mechanics, using the integral form of the conservation equations (Bernoulli's equation). Compare turbulent flow with those laminar flow.
PHYSICAL OPTICS	➢ Build their career in various branches of science and engineering, especially in photonic engineering. ➢ Get skills to identify and apply formulas of Physical optics. ➢ Understand the events like reflection, refraction, interference, diffraction, Polarisation, etc. ➢ Understand the applications of interference, diffraction, and Polarization.

	➢ Analyse light intensity variation due to Polarisation, interference, and diffraction. ➢ Realise the importance of interference in thin films. ➢ Understand the working of selected optical instruments like biprism, interferometer, diffraction grating, and holograms. ➢ Gain hands-on experience using various optical devices and making finer light wavelength measurements using Newton rings experiment, Fresnel biprism, etc. ➢ Know about light and its importance in life, its characteristics, properties, and use in various instruments ➢ To study the theory and experiment of interference using air wedge, Newton's rings, and Michelson interferometer. ➢ To learn the theory and experimental part of diffraction by Fresnel's and Fraunhofer's methods.
STATISTICAL MECHANICS	➢ Study of basic postulates, application of classical distribution to ideal gases, imperfect gases, quantum statistics, and black body radiation. ➢ Understand the dynamics of the bulk material at macroscopic as well as microscopic levels. ➢ Know Identical particles and their statistics is the fundamental description of quantum mechanical particles. ➢ Study the Maxwell - Boltzmann statistics, Fermi-Dirac statistics, and Bose-Einstein statistics. ➢ Study the analytical, mathematical concept, and statistical behaviour of the tiny bodies and are developed them thoroughly.

III BSc V SEMESTER

COURSE OUTCOMES: Semiconductor Devices, Digital Electronics LASER, and Fiber Optics

After completing this course, students will be able to:

COURSE	**COURSE OUTCOMES**
Semiconductor Devices and Amplifiers	➢ Gain knowledge about basic electronics. ➢ Understand p-type and n-type semiconductors- Barrier Formation in PN junction. ➢ Gain knowledge about LED, LDR, and Solar cells. ➢ Understand the basics of Bipolar Junction transistors, Characteristics of CB, CE, and CC Configurations. ➢ Understand Transistor biasing, h-parameters, and Hybrid Equivalent circuits of a CE amplifier. ➢ Derive an expression for Input impedance, Output admittance, Current gain, Voltage gain, and Power Gain using the h-parameter.
Digital Electronics	➢ Understand the difference between Analog and Digital Circuits, Numbers systems, and conversions. ➢ Explain logic Gates which are building blocks of digital circuits. ➢ Understand Boolean Algebra, and simplify Boolean expressions using the Sum of products method and Karnaugh Map. ➢ Understand Binary Addition and Binary Subtraction using 2's compliment Method. ➢ Gain knowledge of Adders and Subtractors. ➢ Explain the Block Diagram of CRO—application of CRO to measure Voltage, Frequency, and Phase difference.
Laser and Fiber optics	➢ Understand general Principles of laser action. ➢ Derive Einstein's constants. ➢ Understand the construction and working of Ruby laser, He-Ne Laser, and applications of Laser. ➢ Understand the concept of holography, production, and analysis of hologram and its applications. ➢ Understand different types of Optical fibres, Construction and Working of Multimode step-index optical fibre, acceptance angle, and attenuation in multimode optical fibre.

III BSc V SEMESTER

COURSE OUTCOMES: Quantum Mechanics - I Astrophysics, and Nuclear Physics - I

After completing this course, students will be able to:	
COURSE	**COURSE OUTCOMES**
Quantum Mechanics - I	➢ Understand Planck's quantum theory. ➢ Understand the Failure of classical physics and the success of quantum mechanics to explain the phenomena such as the stability of an atom, atomic spectra, black body radiation, photoelectric effect, Compton effect, and specific heat of solids. ➢ Get to know about de Broglie's hypothesis of matter Waves, Thomson's and Davisson Germer's experiment to prove the existence of matter waves. ➢ Understand the concept of wave packets, phase velocity, and Group velocity. Relation between group velocity and phase velocity. ➢ Understand Heisenberg's uncertainty principle and the Gamma-ray microscope experiment.
Astrophysics	➢ Understand parallax and stellar distances, star luminosity, Stellar classification, Pressure and Temperature of a Star, Gravitational potential energy, and mass-luminosity relation for a star. ➢ Study the evolution of stars.
Nuclear Physics - I	➢ Understand Rutherford's experiment of alpha particle scattering, derive Rutherford's scattering formula, ➢ Gain knowledge about the available Properties of available Nucleus. ➢ Explain the Liquid drop model, Fermi gas model, Shell model, and magic numbers.

COURSE OUTCOMES: Solid State' Molecular Physics and Nuclear Physics - II

After completing this course, students will be able to:	
COURSE	**COURSE OUTCOMES**
Quantum Mechanics- II	➢ Understand the concept of the wave function and its physical significance. ➢ Develop Time-dependent and Time independent Schrodinger's wave equations. ➢ Know about Quantum Mechanical Operators, Eigen values, and Eigen Functions. ➢ Set up Schrodinger's Equation for a particle in a box.
Atomic Spectra	➢ Understand Bohr's and Somerfield's atomic models, Variation of Rydberg constant with nuclear mass. ➢ Understand the Frank-Hertz experiment. ➢ Understand the vector atom model. Pauli's Exclusion Principle, Spectra of Alkali elements (Sodium-D lines), Stern-Gerlach experiment, and Zeeman effect.
Operational Amplifier	➢ Understand the Basic production process of Monolithic IC and Discrete ICS ➢ Learn the techniques of manufacturing thin film and thick film ICs. ➢ Understand Characteristics of Ideal and practical op-Amp and linear applications of op-Amp. ➢ Understand the concept of feedback, types of feedback, and Barkhuizen's criterion. ➢ Know about phase-shift oscillators and Wein bridge oscillators using Op-Amp.

III BSc VI SEMESTER

COURSE OUTCOMES: Quantum Mechanics-II, Atomic Spectra, and Operational

After completing this course, students will be able to:

COURSE	COURSE OUTCOMES
Free electron theory of metal	➢ Understand Classical free electron theory and Drude-Lorentz theory. ➢ Derive Expression for electrical conductivity, Thermal conductivity, Weidman-Franz's law. ➢ Understand the density of states for free electrons, the Fermi energy Hall Effect in semiconductors and its importance.
Crystal Structure and Molecular Physics	➢ Gain Knowledge about X –rays, lattice, seven crystal systems, Bravais lattice and Brag's law. ➢ Find the orientation of crystal planes using Miller indices and the distance between crystal planes ➢ Understand the Tyndall, Rayleigh and Raman scattering. Students can explain the blue colour of the sky and the red colour of setting the sun. ➢ Gain knowledge about the applications of the Raman effect.
Radioactivity	➢ Understand the basics of the alpha decay process, alpha particle spectra, and Gamow's theory of α-decay Geiger-Nuttal law. ➢ Understand types of β –decay, energy kinematics, Q value, and Pauli's neutrino theory of β- decay. ➢ Know about Gamma rays' emission, kinematics, and internal conversion.
Nuclear Detectors	➢ Gain knowledge of nuclear radiation detectors. ➢ Understand the construction and working of the G M counter, Scintillation Counter, and semiconductor detector.
Nuclear Reactions and Particle Physics	➢ Understand types of nuclear reactions, Conservation laws. ➢ Derive of Q -value for reactions. ➢ Understand exoergic and endoergic reactions.
Elementary Particles	➢ Classify elementary particles. ➢ Understand Symmetries and Conservation Laws ➢ Understand the Concept of the Quark Model, Colour quantum number, and gluons.

Programme Outcomes of ELECTRONICS

The syllabus of Electronics under the CBCS scheme is designed to provide basic and advanced knowledge of Electronics and Electronic hardware. It is studied as a combination of three significant subjects Physics, Mathematics, and Electronics (PME).

Programme Outcome 1:

After completing three years of the B.Sc. programme, the students can pursue their Masters's degree in Physics, Mathematics, Electronics, computer applications (MCA), business administration (MBA)

Programme Outcome 2:

They can opt for a Bachelor's degree in Education (B.Ed.) to be eligible to teach at High School Level.

Programme Outcome 3:

Students can also directly go to the job market with career opportunities in the electronic industry, IT, and IT-related services. Taking up a few relevant additional courses, they can find a job as a software developer in network maintenance and software testing.

New Educational Policy (NEP 2020) is incorporated in the syllabus and modified accordingly. The syllabus is made learner-centric. Student can choose the subjects which he desires to study.

The following are the programme outcomes for the NEP syllabus.

Programme Outcome 1: In NEP, students can select two majors and one open elective subject. He can continue the master's degree in either of the two major subjects. Apart from this MBA, MCA degrees can also be studied.

Programme Outcome 2: In the fourth year of B.Sc., students can study a paper on research analysis and do minor research. It makes them eligible for one year M.Sc. in the related subject.

Programme Outcome 3: Students can also directly go to the job market with career opportunities in the electronic industry, IT, and IT-related services. Taking up a few relevant additional courses, they can find a job as a software developer in network maintenance, software testing, etc.

Programme Outcome 4: In Open Elective subject, various topics such as IoT, Machine learning, Robotics, maintenance of Electrical equipment, essential tools of communication,

Electrical basics, etc., are included, which can go a long way in pursuing a career or starting an own business (with the support of Govt. initiatives like skill enhancement programmes.

Department of Zoology, KFGSC, TIPTUR

Program BSc CBZ (CBCS)

Zoology is one of the most popular science branches that involves studying animals and their biological processes. Zoology courses are offered at the graduate and postgraduate levels. Candidates can also opt for PhD in Zoology after completing their post-graduation.

- On completing the programme, students learn Zoology's fundamentals.
- Gain knowledge of animals of different phyla and their relationship with the environment.
- Gain Knowledge of the Evolution of animals.
- Gain knowledge about Environmental conservation & its importance protection of endangered species.
- Gain knowledge about the development of empathy towards animals.
- Apart from developing an appreciation of animals and their behaviour, the students become up-to-date with the latest concepts of Cell Biology, Immunology, Molecular biology, Genetics, Biochemistry, Developmental biology, Physiology, Biophysics, Ethology, Evolution, Environmental biology, Zoogeography, Human anatomy, Comparative anatomy, Applied Zoology.
- The students also acquire skills in both theoretical and practical aspects.
- Field studies and excursion imprint concepts of teamwork and life in the outdoors.
- The specific outcomes of the programme are on several dimensions. They enhance the chances for students to progress to higher education like MSc, PhD.
- On the other hand, the programme is versatile enough to ensure students succeed in competitive examinations. The students can also be selected in various biotechnology and pharmaceutical industries.

Department of Zoology, KFGSC, TIPTUR

Course outcome BSc CBZ (CBCS)

Year /Semester	Syllabus	Outcome
I BSc /I sem	Animal Diversity	Students learn about Invertebrates and vertebrates, their habits, habitat, taxonomy, morphology, adaptation, life cycle, and developmental process.

Year /Semester	Syllabus	Outcome
I BSc /IIS	Comparative Anatomy and Developmental Biology	Students learn about the comparative anatomy of various systems of animals belonging to different groups. Gain knowledge about the Embryonic development of vertebrates.
Year /Semester	**Syllabus**	**Outcome**
II BSc /Eisen	Physiology and Human Anatomy	Students gain knowledge about the physiological functions of various organs of the body. Endocrine glands and their physiological processes and disorders A detailed account of Human Anatomy

Year /Semester	Syllabus	Outcome
II BSc /IVSem	Insect vectors and diseases	Insect vectors of human diseases burden health systems and cause millions of deaths yearly, particularly in developing countries. Many insects act as a vector to transmit disease-causing pathogens, which causes Malaria, Dengue, Chikungunya, Elephantiasis, Leishmaniasis, Plague, Typhus fever, and Relapsing fever. The study of insect vectors helps to prevent and control disease-causing pathogens by students can spread awareness to the public about insect vectors so that deaths of human beings can be prevented.

Year /Semester	Syllabus	Outcome
III BSc /V Sem	Genetics and Evolutionary Biology	Study of Genetics helps to Understand the Pre Mendelian genetic concepts, It helps to know the laws and concepts of Mendelian inheritance. Genetic disorders The study of Genetics helps to develop skills for applying Genetic technologies in industries related to Pharmaceuticals, Biotechnology The study of Evolution helps to understand the Origin of life on Earth with experimental evidence The study of evolution helps to understand the development of the Elephant, Camel, Horse, and Man The study of Zoogeography helps in understanding the distribution of animals on the Earth's surface.

Course Outcomes

Department of Botany.

IBSc CBZ- Subject –Botany

Year /sem	Syllabus	Outcome
I BSc/I Sem	BIODIVERSITY [ALGAE, FUNGI, AND BRYOPHYTES]	Students learn about the evolutionary relationship among plants, which will be helpful to explore them as medicine, food, and biofuel –Moss plant.

Year /sem	Syllabus	Outcome
IBSc /IISem	PLANT ECOLOGY, PHYTOGEOGRA[PHY AND PLANT PATHOLOGY	Stakeholders will be benefitted from maintaining ecological balance and sustainable development, crop protection at the grass root level

IIBSc CBZ- Subject –Botany

Year /sem	Syllabus	Outcome

IIBSc /III Sem	EMBRYOLOGY OF ANGIOSPERMS AND TISSUE CULTURE	Gain knowledge of the hybridisation of plants Mass cultivation and marketing of plants through tissue culture

Year /sem	**Syllabus**	**Outcome**
II BSc /I V Sem	PLANT ANATOMY, MORPHOLOGY OF ANGIOSPERMS, AND PLANT PROPAGATION	Learn to propagate through vegetative propagation

IIIBSc CBZ- Subject –Botany V Semester

Year /sem	**Syllabus**	**Outcome**
Paper V	TAXONOMY OF ANGIOSPERMS, ECONOMIC BOTANY, AND ETHNOBOTANY	Help complete to explore and exploit the wild plants as a nutritional, medicinal, and commercial one

Year /sem	**Syllabus**	**Outcome**
Paper VI	CYTOLOGY, GENETICS, PLANT BREEDING, AND EVOLUTION	Plant breeding techniques help to cross plants to get high-yielding ones

III BSc CBZ- Subject –Botany VI Semester

Year/sem	**Syllabus**	**Outcome**
Paper VII	PLANT PHYSIOLOGY AND METABOLISM	It enlightens the students to concentrate on stress physiology

Year/sem III BSc /VI Sem	**Syllabus**	**Outcome**
PAPER VIII	MOLECULAR BIOLOGY, GENETIC ENGINEERING, BIOINFORMATICS, AND BIOTECHNOLOGY	students acquire computer knowledge to explore and conserve the genome of plants for future use

Department of Botany :

Program BSc [CBZ]

Program outcomes:

A] Skill development for the proper description using botanical terms, identification, naming, and classification of life forms, predominantly plants, and microbes

B] Making aware of the scientific and technological advancements - information and communication, biotechnology, and molecular biology for further learning and research in all branches of botany

C] Skill development for the collection, preservation, and recording of information after observation and analysis from simple illustration to molecular database development

D] Acquisition of knowledge on the structure, life cycle, and life processes that exist among plant and microbial diversity through certain model organism studies

E] To enable the graduates to prepare for national and international level competitive examinations like UGC-CSIR, UPSC, KPSEC, etc.

F] To enable the students to practice the best teaching pedagogy as a biology teacher, including the latest digital modules

H] To understand the impact of plant diversity in societal and environmental contexts and demonstrate the knowledge of and need for sustainable development

I] Apply ethical principles and commit to environmental ethics, responsibilities, and norms of biodiversity conservation.

Year /Semester	Syllabus	Outcome
III BSc /V Sem	Cell Biology and Immunology	Gain knowledge about the working principle behind Microscopy, different types of microscopes Gain knowledge about the Ultrastructure of cell and cellular organelles, their composition, and their functions. Gain an understanding of Cancer Biology, Stem Cell culture, and Organ culture, and students can pursue further education in stem cell culture to become Tissue Engineer Gain knowledge about the human defence system lymphoid organs. Production of Monoclonal antibodies and Polyclonal antibodies, Organ transplantation, and Plastic surgery. Immunology has applications in various disciplines of Medicine: Virology, Organ transplantation, Dermatology, and Oncology.

Year /Semester	Syllabus	Outcome
III BSc /VI Sem	Applied Zoology	Students gain knowledge about Bacterial and Viral diseases. Students also learn about Sericulture, Pisciculture, Dairy farming, and Poultry farming so that students can take self-employment. Students also Gain knowledge about the production of Transgenic animals The student also learns about assisted reproductive technology and can pursue clinical embryology to become an Embryologist in IVF centres.

Year /Semester	Syllabus	Outcome
III BSc /VI Sem	Environmental Biology and Ethology	Gains knowledge about the nature of the ecosystem, food webs, energy flow, biogeochemical cycles, and ecosystem management. Natural resource management in changing environment. Global environmental issues, climate change, ozone depletion, wildlife management, biodiversity conservation. The student can pursue an MSc in environmental biology and has a career opportunity in the pollution board. They can become environmental auditors. Behavioural Biology is the interdisciplinary study of the relationship between the brain, behaviour, and evolution. It describes how different behavioural elements, such as mate choices, parental care, cooperation, and altruism, have been shaped through ecological pressures. This field focuses on an interdisciplinary approach that includes psychology, philosophy, biology, and Neuroscience to examine organisms' different behaviour and strategies. Students can pursue MSc in Ethology and become Behavioural biologists, zookeepers, Wildlife wardens, and Animal caretakers.

Program outcomes: **BCA** (3 years) **degree**

1. **Discipline knowledge:** acquiring knowledge of the basics of computer science and the ability to apply design principles in developing solutions for problems of varying complexity.

2. **Problem-solving:** Improve reasoning with a solid mathematical ability to identify, formulate and analyse computer science problems and exhibit a sound knowledge of data structures and algorithms.

3. **Design and development of solutions**: The ability to design and develop algorithmic solutions to real-world problems and acquire a knowledge of statistics and optimisation problems. Establishing excellent skills in applying various design strategies for solving complex problems.

4. **Programming a computer**: Exhibiting strong skills required to program a computer for various issues and problems of day-to-day applications with thorough knowledge of programming languages of multiple levels.

5. **Application systems knowledge:** Possesses a sound understanding of computer application software and the ability to design and develop an app for application problems.

6. **Modern tool usage:** Identifying, selecting and using a modern scientific IT tool or technique for modelling, prediction, data analysis and solving problems in computer science and making mobile-based applications software.

7. **Communication:** Focuses on good communication skills in speaking and writing.

8. **Project management**: Practising existing projects and becoming independent to launch own project by identifying a gap in solutions.

9. **Ethics on profession, environment and society:** Exhibiting professional ethics to maintain integrity in a working environment and concern towards societal impacts due to computer-based program solutions.

10. **Lifelong learning:** An independent learner.

11. **Motivation to take higher studies:** Inspiration to continue education towards advanced computer science and applications studies.

12. **Job Opportunities**: Jobs options are many. Computer degree professionals can explore job opportunities in the corporate world-software and hardware companies in various domains in the public and private sectors.

BSc and BCA

Languages – English, Kannada, Hindi, and Sanskrit - the window to the world.

Program Outcomes and Course Outcomes

From 2020, English is provided as a second language under the National Education Policy-the four-year multi-disciplinary Bachelor's programme with exit options was introduced. Apart from Generic English as a compulsory subject, students can opt for Open Elective Courses the University prescribes.

Under the four-year programme proposed in the new N.E.P., students can exit after one year with a certificate, two years with a diploma, and three years with a bachelor's degree. Finally, after four years, a student should be able to enter a research degree programme.

Poetry, Drama, Novel, Prose, Comprehension, Grammar, Communication skills, Letter writing, Summary Writing, and Essay Writing.

- Study various cultures, traditions, civilisations, literary genres, and societies. It caters to the betterment of society by acquiring a culture of mind and heart that can heal and transform our community. Literature has the most significant scope for the promotion of values, examination of conscience, power to heal and transform, inspire the mind, touch the heart, to seek and search for truth.
- To sensitise social, cultural, religious, and ethnic diversities.
- It facilitates English language skills among learners. The course encourages learners to explore different works of literature through English.
- To acquire and enhance listening, speaking, reading, and writing skills.
- Employability is one of the chief outcomes of all college programs.
- The course provides training in soft skills, group discussion, corporate culture, personality development, interview etiquette, interpersonal relationships, etc., and digital learning tools.
- The Department has been at the forefront of engaging, involving the outside world, and bringing it inside the classroom. The classroom is a forum for interaction with faculty members who encourage the students to question, analyse, criticise, and contemplate a topic. It aims to help students be empathetic to the world outside the classroom. It encourages the students to differ and deviate from the popular view.
- The fundamental belief is that all students can learn and improve their competence. The faculty can guide a large section of the student community.
- The mother tongue is vital to promote linguistic and cultural diversity.
- Mother tongue connects a bond between our heritage and socio-cultural identity.
- Kannada and Hindi Language have a unique way of looking at the world. Human evolution is an indication of diversity. Diversity is nature's regime. To keep the evolution process alive, we must keep diversity alive. Language diversity is as important as the diversity of plants, animal species, food habits, etc.
- The Department of Languages takes pride in encouraging its students to move beyond the syllabus. With this in mind, the department arranges a parallel pedagogic process of talks, lectures, seminars, film shows and interactive sessions with writers and critics.

- The teachers hone communication skills, encourage the habit of reading books, develop a passion for language and literature, and guide young minds to imbibe human values and a sense of social and moral responsibilities.
- Films are screened to create awareness of social issues, gender discrimination and other evils. Our students interpret the visual texts that depict the greatest cultural stories.

KALPATARU FIRST GRADE SCIENCE COLLEGE, TIPTUR.
DEPARTMENT OF CHEMISTRY
PROGRAM OUTCOMES AND COURSE OUTCOMES

PROGRAM OUTCOMES:

After successful completion of three year degree program in chemistry, a student should be able to:

PO1: Develop ability of scientific reasoning and analytical problem solving through theory and practical.

PO2: Create an awareness of the impact of chemistry on the environment, society and development.

PO3: Explore the jobs related to chemistry in public and private sectors such as chemist, food inspector, lab technician, medical representative, research assistant etc.

PO4: Continue higher studies.

PO5: To create enthusiasm among students for chemistry and its application in various fields of life.

PO6: To develop in students the ability to apply standard methodology to the solution of problems in chemistry.

1. COURSE OUTCOMES OF B.Sc Ist YEAR (I SEMESTER) [NEP]

After successful completion ofcourse,a student should be able to:

- Understand the Bohr's theory of atomic structure.
- Understand the concept of wave mechanics and wave functions.
- Learn the Basics of organic chemistry.
- Understand the nature of bonding in organic molecules.
- Learn the chemistry of aliphatic hydrocarbons.
- Understand the concept behind gaseous state and liquid state.
- Learn basic laboratory practices such as handling of instruments, calibration, Weighing, drying, dissolving and rules of work in analytical laboratory.
- Learn, how to handle toxic chemicals, concentrated acids and organic solvents.

2. COURSE OUTCOMES OF B.ScIst YEAR (II SEMESTER) [NEP]

- Understand the modern periodic table and periodic properties of elements.
- Learn the Trends in the chemistry of the compounds of groups 13 to 17.
- Understand the mechanisms of nucleophilic and electrophilic substitution reactions.
- Preparation of organic compounds and study of their properties.
- Understandvarious types of liquid crystals.
- The concept of unit cell, space lattice, symmetry elements and distribution law.
- Learn various types of titrimetric analysis and gravimetric analysis.

3. COURSE OUTCOMES OF B.ScIInd YEAR (III SEMESTER) [NEP]

- Learn ionic bond and general characteristics of ionic compounds.
- Learn covalent bond and co-ordinate bond, VBT and VSEPR theory.
- Understand different reaction intermediates, their stability and structures.
- Learn various reaction mechanisms of intermediates and methods for identifying reaction mechanisms.
- Understand concepts of thermodynamics (I,II and III law)

- Learn concept of adsorption and catalysis.
- Learn quantitative analysis and its applications.
- Understand concepts of Nephelometry and Turbidimetry.

4. COURSE OUTCOMES OF B.ScIInd YEAR (IVSEMESTER) [NEP]

- Understand Molecular orbital theory in detail.
- Learn properties of metals, VBT and MOT of solids.
- Gain of basic knowledge of stereochemistry of organic molecules.
- Understand Geometrical and optical isomerism.
- Learn basic concepts in chemical kinetics-rate, rate constant, order,molecularity etc.
- Understand Arrhenius theory of electrolytic dissociation and kohlraush'slaw of independent migration of ions.
- Gain the knowledge about separation techniques and its applications.
- Study the fundamentals of chromatography and its types.

5. COURSE OUTCOMES OF B.ScIIIrd YEAR (VSEMESTER) Paper-V [CBCS]

- Understand Geometrical isomerism and optical isomerism.
- Learnthe concept of chirality, Resolution, Racemic mixture etc.
- Study chemistry of carbohydrates. Structural elucidation of glucose and fructose. Structures of disaccharidesand their biological importance.
- Learn natural products like Terpenes and Alkaloids. Structural elucidation, Synthesis and uses of various natural products.
- Study chemistry of synthetic dyes, drugs, sulphonic acids, Pesticides and cosmetics.
- Understand the elucidation of structure of organic molecules by various spectroscopic techniques like UV, IR and NMR.
- Learn the different stereoisomerism and also determination of bond length, intermediates etc.

6. COURSE OUTCOMES OF B.ScIIIrd YEAR (VSEMESTER) Paper-VI [CBCS]

- Study the quantum mechanical operators, Schrodinger wave equation. Applications of Schrodingerwave equation to free particle and particle in a box.
- Learn the types of operators and their mathematical expressions.
- Study therigid rotator model of diatomic molecules.
- Understand the quantization of energy, Hooke's law and writing the expressions for potential energy.
- Learn the concept of covalent bonding, valence bond and molecular orbital approach.
- Understand zero point energy, quantization of energy levels. Probability distribution functions.
- Understand the Physical approach of different types of spectroscopy like rotational, vibrational, Raman, NMR and ESR.
- Learn laws of Photochemistry, Beer- Lambert's law and its applications,Quantum yield and role of photochemical reactions in biochemical process.

7. COURSE OUTCOMES OF B.ScIII[rd] YEAR (VI SEMESTER) Paper-VII [CBCS]

- Study structure and applications of Inorganic polymers.
- Learn the definition of organometallic compounds, their classification based on the nature of metal-carbon bond, structures of zeise's salt,methyl lithium andferrocene.
- Understand the stability of metal carbonyls based on EAN rule and its limitations.
- Understand the preparation, properties and structures of different types of metal carbonyls.
- Understand the definition of fertilizers, types and manufacture.
- Learn the composition, properties, manufacture and applications of Glass, Ceramics and cement.
- Understand the different types of paints, special paints and their uses.
- Learn the extraction of metals and their refining by different processes.
- Understand the preparation, properties and applications of various types of explosives like PETN, RDX and cyclonite.
- Understand the definition, types and manufacture of alloys.

8. COURSE OUTCOMES OF B.ScIII[rd] YEAR (VI SEMESTER) Paper-VIII [CBCS]

- Study the biochemistry of lipids, amino acids, peptides and proteins.
- Learn the types of nucleic acids- their structures and biochemical roles.
- Study the role of metal ions in the biological systems.
- Understand the enzymes-their characteristics, mechanism and factors affecting enzyme action.
- Understand the energy transformation in living systems, ATP as a high energy compound and ETC.
- Study the concept of energy in bio-systems. Metabolism of carbohydrates, lipids and amino acids.
- Gain the basic knowledge of Hormones- their characteristics, mechanism of hormonal action and biological importance.
- Gain the basic knowledge of vitamins-common sources and deficiency symptoms of vitamins.

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