TUMKUR UNIVERSITY

UNIVERSITY COLLEGE OF SCIENCE

DEPARTMENT OF STUDIES & RESEARCH CHEMISTRY

Course Outcomes And Objectives

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Action plans, course outcomes and objectives

The curriculum framed by the Department of Studies and Research Chemistry intends to improve the quality of students towards Chemistry and initiate students to enjoy Chemistry. It gives idea about chemistry to understand its importance, opportunities and the challenges. The curriculum also develops the skills like knowledge, experimental and teaching which are the essential and are the foundation for a strong student's carrier. It also meets the requirements to enable the students to qualify the national level examinations in the field of chemistry as well as other fields. The curriculum also provides platform to work towards the extension activities to address the social issues and also creates environmental consciousness.

Year-wise Action Plan

I year (I & II Semester)

I Semester Four Theory papers & Four Practical's

CPT-1.1	**Concepts of Inorganic Chemistry**
CPT-1.2	**Organic Reaction Mechanisms and Stereochemistry**
CPT-1.3	**Thermodynamics and Quantum Chemistry**
SPT-1.4.A	**Organic Synthesis**
SPT-1.4.B	**Automated, Electroanalytical Methods And Separation Technique**
CPP-1.5 (1.1)	**Practical Inorganic Chemistry - I**
CPP-1.6 (1.2)	**Practical Organic Chemistry - I**
CPP-1.7 (1.3)	**Practical Physical Chemistry - I**
SPP – 1.8 (1.4.A)	**Practical Organic Chemistry**
SPP – 1.8 (1.4.B)	**Practical Analytical Methods**

Objectives (CPT1.1-Concepts of Inorganic Chemistry)	Learning Outcomes
Students will learn about theory and practical's of • Bond types and their energy relations. • Theories of bonding and their limitation • Acidic and Basic nature of substances and their classification based on different theories • Data analysis • f-block elements, their properties-spectral & magnetic. Purification of important inner transitional elements • Quantitative Inorganic analysis of ores, alloys, mixtures using titrimetry and Spectrophotometric methods. • Demonstration of separation of mixture of ions using paper chromatography	The students will have a clear understanding of the fundamental aspects of • Ionic bond, covalent bond, periodic properties formation of ionic solids-lattice energy, Born-Haber cycle and their lattice structure. • Structural analysis of molecules by understanding concept of hybridization and bonding theories such as VSEPR theory, Molecular orbital theory. Fluxionality in molecules and drawbacks of theories. • Occurrence, extraction properties application as nuclear energy sources. Stability and magnetic properties. • Hands on skill on sample preparation and performing analysis and interpretation of results. • Handling of colorimeter and spectrophotometer, calibration, analysis of samples and validation of Beer-Lambert's law. • Practical skill on preparation of chromatographic paper,spotting and development, determining Rf favlue.

Objectives (CPT1.2- Organic Reaction Mechanisms and Stereochemistry)	Learning Outcomes
Students will learn about theory and practical's of • Structure and reactivity relations of organic substances. • Various reaction intermediates-generation, reactivity, stability and detection. • Methods of determining the reaction mechanism. • Specified Reduction and Oxidation reactions and some important reagents in organic synthesis • Stereochemistry-Optical & Geometrical isomerism • Stereospecific and stereoselective synthesis • Preparation of important organic	The students will become familiar with • Understanding concepts of acids and bases, factors affecting the molecular property. • Generation methods of various reactive intermediates like carbocation, carbanion etc and study of their stability, structure , identification and detection. • Principles of Kinetic and Non-Kinetic methods of analysis to predict the reaction mechanism. • Various reduction and oxidation methods, specificity of individual reagents useful in synthetic organic transformation. • Understanding 3D arrangement of atoms and molecules, their orientation. Rules for predicting the geometry and configuration of molecules. • Studying reactions involving stereochemical aspects and their effect, conformational analysis of

compounds through functional group inter-conversions related to theory paper	certain reactions. • Preparation and workup of organic compounds, understanding their mechanism, reaction conditions and determining their melting, boiling point.

Objectives (CPT1.3- Thermodynamics and Quantum Chemistry)	**Learning Outcomes**
Students will learn about theory and practical's of • Basic concepts of thermodynamics-entropy, free energy and their applications to thermodynamic systems • Partial molar properties and their significance • Fugacity, thermodynamics of dilute solutions-phase rule and its application • Quantum chemistry- to understand the matter in sub-atomic level. • Quantum chemical aspects of multi-electronic systems. • Experiment related to partial molar properties and colligative properties.	The students will Have a clear understanding of the fundamental aspects of • Thermodynamic systems, laws of thermodynamics, various thermodynamic parameters such as enthalpy, entropy, free energy etc, inter-relations b/w various thermodynamic parameters(Maxwell relation's) and effect of thermodynamic parameters on system properties. • Variation of thermodynamic parameters for multi component systems and their variation with other extensive properties, significance of partial molar properties, derivation of Gibb's equation. • Concept of fugacity, activity and activity coefficients, variation of these with concentration, temperature and pressure, heat capacity of solids and thermodynamic aspects of Colligative properties and phase rule studies, verification of Gibb's Phase rule. • Need of Quantum chemistry for the study of matter in sub-atomic level, Quantum mechanical operators, Schrodinger wave equation and its application to hydrogen & hydrogen like atoms. • Variation and Approximate methods for the study of multi-electronic systems, study of Slater orbitals and valance theory to multi-electronic system. • Understanding the concepts of partial molar properties and colligative properties through Practical studies and their effect in reality, solving with graphical plots.

Objectives (SPT1.4- Automated, Electroanalytical Methods And Separation Technique)	**Learning Outcomes**
Students will learn about theory and practical's of • Automated system- It's need, types, principles and applications • Electro-analytical method (Redox, potentiometry, electrogravimetry, polarography, cyclic voltametry)- principles, instrumentation and applications in anaylysis. • Chromatography-fundamental principles, theories. • Advanced chromatographic methods and their applications. • Experiment related elctroanalytical techniques.	The students will have knowledge and worth of • Need of automated systems and different kind of analysis involving automation technique their significant application in organic analysis, human health monitoring. • Principle, construction and significant uses of electro-analytical techniques in chemistry and other fields. • Principles and factors governing chromatographic techniques, improving method of separation. Construction and significance of Thin layer chromatography and its uses in both qualitative and quantitative analysis. • Principle, construction, working of advanced chromatographic techniques such as GC, HPLC, IEC,GFC and GPC and their uses in purification, detection and analysis of various organic and inorganic compounds. • Analysis of Pharmaceuticals, alloy, ores and fruit juice for the quantitative estimation of essential elements such as Cu^{2+}, Fe^{2+}, I^-_3 using titrimetry, potentiometry and conductometric analysis.

II Semester Four Theory papers & Four Practicals

CPT- 2.1	**Group Theory & Coordination Chemistry**
CPT- 2.2	**Reaction Mechanism, Photochemistry and Spectroscopy**
SPT- 2.3.A	**Statistical Mechanics, Electrochemistry and Spectroscopy**
SPT- 2.3.B	**Surface, Nuclear Chemistry**
OET – 2.4	**Fundamentals of Chemical Analysis & Chromatography**
CPP-2.5 (2.1)	**Practical Inorganic Chemistry - 2**
CPP-2.6 (2.2)	**Practical Organic Chemistry - 2**
SPP-2.7.A (2.3.A)	**Practical Physical Chemistry**
SPP-2.7.B (2.3.B)	**Practical Physical Chemistry**
OEP 2.8 (2.4)	**Quantitative analysis and Separation Techniques**

Objectives (CPT- 2.1 Group Theory & Coordination Chemistry)	**Learning Outcomes**
Students will learn about theory and practical's of • Concept of symmetry and group theory- classification of molecules into different group based on symmetry elements. Notations for representation of symmetry elements.	The students will understand • Imagination of concepts of rotation axis, different symmetry elements and symmetry operations associated with molecules. Concept of a group, definition of a point group, procedure for classification of molecules into point groups. Schoenflies and Hermann - Maugin symbols for point groups. Properties and definitions of group theory.
• Representation of groups and application of group theory.	• Applications of group theory to crystal field theory. Bonding in octahedral and tetrahedral complexes. Symmetry and dipole moments, symmetry and optical activity, symmetry and spectroscopy.
• Synthesis, stability and structure of coordination compounds and CFT.	• Preparation of coordination compounds. Geometries of metal complexes of higher coordination numbers. Stability of coordination compounds: factors influencing the stability of metal complexes with reference to the nature of metal ion and ligand, the Irving-William series, chelate effect. Crystal Field Theory: Salient features, d-orbital splitting in octahedral, tetrahedral, square planar and tetragonal complexes, measurement of 10Dq. Spectrochemical series, short comings of CFT.
• Electronic absorption spectra of transition metal complexes, and their magnetic properties.	• Selection rules, electronic –dipole transitions, magnetic-dipole transitions, term symbol for d^n ions. Effects of spin orbit coupling, energy level diagrams, Orgel, Correlation and Tanabe-Sugano diagrams, charge-transfer transitions.magnetic susceptibility and its measurements, spin cross over systems, ferromagnetism and antiferromagnetism.
• Semi-micro qualitative analysis	• Analysis of inorganic salt mixture containing rare earth cation using the principles of identifying anions by different reagents based on observation and cations using group reagents based on solubility, ionic product and colored complex formation.

Objectives (CPT- 2.2 Reaction Mechanism, Photochemistry and Spectroscopy)	**Learning Outcomes**
Students will learn about theory and practical's of • Mechanism of addition reactions, addition to carbon hetero multiple bonds, elimination reactions. • Stereochemistry of nucleophilic and electrophilic substitution reactions. • Photo chemistry and concerted reactions, Pericyclic reactions and cyclo[addition reactions. • NMR and Mass spectroscopy.	The students will conceptualize • Addition reactions to different functional groups, Oxymercuration and demercuration. Epoxidation of alkenes, addition to rigid bicyclic alkenes. Hydroboration reaction. Hoffmann and Saytzeff eliminations, Chugaev reaction. • To understand about stereochemistry of nucleophilic substitution reactions, neighboring group participation and anchimeric assistance. Mechanisms of aromatic nucleophilic substitution reactions, Mechanism and applications of aromatic electrophilic substitution reactions, Arenium ion mechanism, orientation and reactivity, energy profile diagram. The ortho/para ratio, ipso attack, orientation in other ring systems. Mannich reaction, chloromethylation, Vilsmeir-Haack reaction, Pechmann reaction and Fries rearrangement. • To know about the Jablonski diagram, intersystem crossing, energy transfer, sensitizers, quenchers Photochemistry of olefins, conjugated dienes, aromatic compounds, ketones, enones, photooxidations, photoreductions. Barton reaction, Di-pi-methane rearrangements, Stereochemistry, Symmetry and Woodward-Hofmann rules for electro cyclic reactions, FMO theory of electrocyclic reactions, correlation diagrams. • Theory of magnetic resonance-Magnetic shielding–chemical shift-coupling constant- splitting patterns, Proton decoupling- Broad band decoupling- Off resonance decoupling, Fourier transform NMR – time domain and frequency domain. Studies of nuclei other than protons ^{13}C, ^{19}F, ^{14}N and ^{31}P.

• Binary mixture analysis	• Principle, instrumentation, different methods of ionization of Mass spectroscopy. General rules for fragmentation patron hydrogen transfer rearrangement and McLafferty rearrangement. Structural information from fragmentation patterns. • Separation of Organic mixtures and analysis of individual based on solubility table and characteristic reactions.

Objectives (CPT- 2.3A Statistical Mechanics, Electrochemistry and Spectroscopy)	**Learning Outcomes**
Students will learn about theory and practical's of • Statistical mechanics, distribution equation. • Poison Boltzman's equation, transport numbers, electrodics. • Electrochemical power sources, primary cells, properties of electrochemical energy storage, fuel cells, solar energy conversion devices, corrosion and prevention.	The students will understand about the • Thermodynamic probability, relation between entropy and thermodynamic probability, principle of equipartition of energy, Maxwell-Boltzmann distribution equation, various partition functions, evaluation of various thermodynamic parameters, partition functions of atoms and diatomic molecules. • Bose-Einstein and Fermi-Dirac distribution equations. Free energy function and its use in evaluating the equilibrium constant, entropy of water and hydrogen. • Ion–cloud and chemical potential change; Electrical double layer and its thermodynamics. Perrin, Gouy - Champman and Stern electrical double layer, EMF cells Liquid Junction Potential and its determination. Debye-Huckel theory of strong electrolytes, Debye Huckel – Onsager equation, Debye - Huckel limiting equation for activity coefficients, • Determination of transport number by Hittorf method and e.m.f method. True and apparent transport numbers. • The basic electrodic equation: Butler–Volmer equation; overpotential; polarizable and nonpolarizable interfaces.

• Microwave and Vibrational spectroscopy, vibration of polyatomic molecules	• Various types, especially magnesium and aluminium based cells - magnesium reserve batteries. Measure of battery performance, Charging and discharging of a battery, Storage Density, Energy Density. Classical Batteries : (i) Lead Acid (ii) Nickel-Cadmium, (iii) Zinc manganese dioxide. • Classification - chemistry of fuel cells - detailed description of hydrogen/oxygen fuel cells, alkaline fuel cell. • Photovoltaic cells - semiconductor electrolyte junctions, photocatalytic modes for fuel conversion process. Thermodynamics and the stability of metals, Potential -pH (or Pourbaix) Diagrams; uses and abuses, Corrosion current and corrosion potential - Evans diagrams. Measurement of corrosion rate. Organic inhibitors, Passivation. • Classification of the molecules, pure rotation spectra of diatomic molecules-rigid rotor model, energy levels, rotational quantum number and the selection rule. Effect of isotopic substitution on rotation spectra. Applications-Principles of determination of bond length and Moment of inertia from Rotational spectra. Stark effect in rotation spectra and determination of dipole moments. • Vibration of diatomic molecules, simple harmonic oscillator- vibration spectra. Effects of anharmonic oscillation- the diatomic vibrating rotator – vibration rotation spectra of carbon monoxide. Influence of rotation on the spectra. Parallel and perpendicular vibrations (CO_2 and H_2O). The theory of infrared absorption and theoretical group frequency. Intensity of absorption band and types of absorptions. Correlation chart. Important spectral regions- Coordination chemistry (aqua, amino, nitrite, thiocyanate) - change in symmetry on coordination

• Experiments using potentiometer and conductometer	(nitrate, carbonate and sulphate complexes). • verify Ostwald‘s dilution law and calculate the dissociation constant of the acid. Validity of the Onsager’s theory as limiting law at high dilutions. • Determination of equivalent conductance, solubility product. Conductometric titrations of a mixtures. Determination of the dissociation constant, the solubility strength of acetic acid, electrode potentials of Zn and Ag

Objectives (OET- 2.4 Fundamentals of Chemical Analysis & Chromatography)	**Learning Outcomes**
Students will learn about theory and practical’s of • Statistical treatment of analytical data and sample.	The students will know about • Importance of limitations of analytical methods. Classifying errors, accuracy and precision. Reliability of results – confidence interval. Comparison of results – Student's t-test, F test, t-test and paired t-test. Rejection of a result – Q-test. Number of replicate determinations. Control charts. Correlation and regression. Detection limits. Sampling and sample handling – representative sample, sample storage, sample pretreatment and sample preparation. Hazards in sampling. Quality in analytical laboratories – quality control and quality assurance, accreditation system.
• Acid base titrations and its applications- acid base titration non aqueous solvents.	• Principles of titrimetric analysis, titration curves, theory of acid base indicators, colour change range of indicator, selection of proper indicator. Determination of nitrogen, sulphur, ammonium salts, nitrates and nitrites, carbonates and etc.,.
• Precipitation and complexometric titration.	• Role of solvent in Acid-base titrations, solvent systems, differentiating ability of a solvent, some selected solvents, titrants and

• Solvent extraction, fundamentals of chromatography. • Quantitative analysis using titrimetry	standards, titration curves, effect of water, determining the equivalence point, typical applications- determination of carboxylic acids, phenols and amines, • Titration curves for precipitation titrations, feasibility of precipitation titrations, factors affecting shape – titrant and analyte concentration, typical applications. • Definition, types, principle and efficiency of extraction, sequence of extraction process, factor affecting extraction. • general description, definition, terms and parameter used in chromatography, classification of chromatographic methods, criteria for selection of stationary phase, and mobile phase, nature of adsorbents, factor influencing the adsorbent, nature and type of mobile phases and stationary phases. • Van Deemter's equation, and its modern version, optimization column • **Acid – base titrations.** • **Precipitation titrations** • **Complexometric titrations**

III Semester Four Theory papers & Four Practicals

CPT- 3.1	**Reactions, Rearrangements and Heterocyclic chemistry**
CPT- 3.2	**Chemical Kinetics and Surface Phenomena**
SPT- 3.3.A	**Organometallic Chemistry & Inorganic spectroscopy**
SPT- 3.3.B	**Industrial and Materials Chemistry**
OET – 3.4	**Environmental Chemistry**
CPP-3.5 (3.1)	**Practical Organic Chemistry - 3**
CPP-3.6 (3.2)	**Practical Physical Chemistry - 3**
SPP-3.7.A (3.3.A)	**Practical Inorganic Chemistry**
SPP-3.7.B (3.3.B)	**Practical Inorganic Chemistry**
OEP-3.8 (OET-3.4)	**Practical Environmental Chemistry**

Objectives (CPT- 3.1 Reactions, Rearrangements and Heterocyclic chemistry)	**Learning Outcomes**
Students will learn: • **Free Radical Reactions Reactions of carboxylic acids and their derivatives.** • **Organic Name reactions**	The students will become familiar with • Types, mechanisms of free radical substitution reactions & neighboring group assistance. Reactivity for the aliphatic and aromatic substances at a bridgehead. Reactivity of attacking radical. Effect of solvent on reactivity. Auto-oxidation, coupling of alkynes. • Reactions, Mechanisms and synthetic uses of the following: Stolbe condensation, Darzen condensation, Gattermann-Koch reaction, Cannizzaro reaction, Chichibabin reaction, Benzoin condensation, Claisen-Schmidt condensation, Claisen reaction, Simon-Smith reaction, Stork Enamine reactions, Sharpless asymmetric epoxidation, Hofmann-Loffler-Freytag reaction, Prins reaction, Knoevenagel reaction, Sandmeyer reaction, Ullmann reaction, Paterno Buchi reaction, Wittig reaction-Mitsunobu reaction,

• **Molecular rearrangements** • **Chemistry of Heterocyclic Compounds**	Robinson annulation, Dickmann cyclisation and Diel's- Alder reactions. • Classification and general mechanistic treatment of nucleophilic, electrophilic and free radical rearrangements. Intermolecular and Intramolecular migration, nature of migration and migratory aptitudes. • Introduction, Classification, nomenclature and reactivity of Heterocyclic compounds. Five membered simple and fused heterocycles-synthesis & reactions of derivatives of furan, pyrrole and thiophene. Indole and its derivatives. Detail study of Fisher and Bischler syntheses. • Preparation of benzofurans (coumarins). Quinolines and Isoquinolines. Skraup synthesis. Friedlander and Pfintzinger methods for Quinoline derivatives. Preparation of isoquinolines using Bischler-Napieralski and Pictet methods. Chemical properties

Objectives (CPT- 3.2 Chemical Kinetics and Surface Phenomena)	**Learning Outcomes**
Students will learn • **Kinetics of complex reactions**	The students will conceptualize • Parallel, consecutive and reversible reactions. Determination of order of reaction. Arrhenius equation, energy of activation and its experimental determination. Simple collision theory-mechanism of bimolecular reaction. Lindemann's theory, Hinshelwood's theory for unimolecular reaction. • Activated complex theory of reaction rate, classical thermodynamic treatment, partition function, statistical thermodynamic treatment. Kinetics of reactions in solution-Salt effects, effect of dielectric constant (single sphere and double sphere mode), effects of pressure, volume

• **Fast reactions Chain reactions**	and entropy change on reaction rate. Cage effect with an example. • Study of kinetics by flow techniques, equation for constant time, stopped flow and continuous flow methods. Relaxation method, equation for relaxation time, temperature jump and pressure and pressure jump methods, flash photolysis, pulse radiolysis and shock tube method. • Rice-Herzfeld mechanism for the thermal decomposition of acetaldehyde, kinetics of explosive reactions, explosion limits (H_2 and O_2 reaction) Kinetics of autocatalytic and oscillatory chemical reactions, oscillatory chemical reaction of oxidation of malic acid by bromate ion catalyzed by Ce (III). Catalyzed and unanalyzed reaction: Ru (III) catalyzed oxidation reaction of primary amines by chloramine-T in HCl medium**.**
• **Kinetic methods of analysis**	• Rate of enzyme catalyzed reactions - effect of substrate concentration, pH and temperature on enzyme catalyzed reactions - inhibition of enzyme catalyzed reactions. • Analytical uses of reaction rates relative, basis of reaction rate methods, rate laws-first and second order reactions relative rates of reactions, analytical utility of first or pseudo first order reactions, determination of reaction rates, types of kinetic methods-differential methods, integral methods, multicomponent analysis-neglect of reaction of slow-reacting component, logarithmic extrapolation method, reaction rate method, applications-catalyzed reactions, measurement methods for catalyzed reactions, micro determination of inorganic species like iodine, selenium, cobalt and mercury in complex materials,

• **Surfaces and interfaces, Dispersed systems.**	determination of organic species, non-catalytic reactions. Applications of enzyme- catalyzed reactions for the analysis of substrates-stiochiometric and rate methods, determination of urea, uric acid, blood glucose. • Types of interfaces. Liquid surfaces: Microscopic picture of interfaces; curved interfaces; Young -Laplace and Kelvin equations; capillary condensation; surface tension; measuring surface tension. Solid-liquid interfaces: Contact angle and wetting, Gibbs adsorption isotherm. Solid surfaces: External and internal surfaces; Bulk and surface structure of FCC, BCC and HCP metals; Notation of surface structures; Relaxation and reconstruction of surfaces; homogeneous and heterogeneous surfaces. Solid-gas interfaces: Types of adsorption; Adsorption isotherms – Langmuir, Tempkin and BET. Determination of surface area of adsorbents; temperature dependence of adsorption isotherms. • Spontaneous self-organization; Surfactants: structure of surfactants in solution; critical micellation concentration (CMC); temperature dependence; influence of chain length and salt concentration; surfactant parameter. Emulsions: macro- and micro-emulsions; aging and stabilization of emulsions; Phase behaviour of microemulsions. Colloids, vesicles, lipid bilayer membrane: structure and properties, monolayers, liquid crystals, foams and aerosols.

Objectives (SPT- 3.3A Organometallic Chemistry & Inorganic spectroscopy)	**Learning Outcomes**
Students will learn • **Organometallic chemistry**	The students acquire knowledge of • Introduction, 16 and 18 electron rule, classification of organometallic compounds by bond type, nomenclature. synthesis and reactions of organozinc and organolithium reagents (n-BuLi, PhLi). Preparation, Structure, chemical bonding in metal carbonyls, physical evidence related to M-CO bonding. Preparation of anionic metal carbonyl complexes and substituted metal carbonyl complexes. Preparation, linear and bent nitrosyls. Preparation, structures of Cyclopentadienyl Metal Complexes. M. O diagram for ferrocene. Reactions and aromaticity of ferrocene. methods of preparation of arene complexes, reactions of metal –arene complexes Structure, chemical bonding in metal-arene complexes. preparation and propertmethods of preparation, structure and bonding metal olefin complexes.
• **Reaction kinetics of coordination compounds, Thermodynamic and related aspects of ligand fields**	• Preparation, structure and bonding. preparation, structure and bonding in acetylene complexes. Reactions of coordinated acetylene. • • Outer sphere reactions, the Marcus theory, ligand-bridged inner sphere reactions. • Mechanisms of ligand substitution reactions • Evidences and factors favouring of M-M bonding, metal clusters.Hydration**,** ligation and lattice energies.
• **ESR, NQR & Mossbauer Spectroscopy** • **UV-Visible Spectroscopy.**	• Principle, Instrumentaion and Structural elucidation using NQR, ESR and Mossbauer spectroscopy**.** • Quantitative aspects of absorption,. Theory of molecular absorption. Vibration-rotation fine structure of electronic spectra. C-T and ligand field. Empherical rules for predicting

	the wave length of maximum absorption of various organic compounds . Applications.

Objectives (OET – 3.4 Environmental Chemistry)	**Learning Outcomes**
Students will learn • **Atmospheric chemistry** • **Water pollution and analysis** • **Waste water treatment**	The students will become familiar with • The structure of the earth‘s atmosphere- chemistry of the lower and upper atmosphere. The chemistry of air pollution- oxides of nitrogen- hydrogen sulphide and oxides of sulphur- Aerosols – ozone depletion and consequences- dioxins burning plastics- other atmospheric chemicals- smog- Greenhouse effect- Global warming, oxides of carbon. • Water resources, origin of waste water, types of water pollutants of their sources and effects, chemical analysis for water pollution control - objectives of analysis, parameters of analysis, sample collection and preservation. • Environmental and public health significance and measurement of colour, turbidity, total solids, acidity, alkalinity, hardness chloride, residual chlorine, chlorine demand, sulphate, fluoride, phosphates and different forms of nitrogen in natural and waste/polluted waters, heavy metal pollution-public health significance of Pb, Cd, Cr, Hg, As, Cu, Zn, and Mn, general survey of the instrumental techniques for the analysis of heavy metals in aquatic systems, organic loadings-significance and measurement of DO, BOD, COD, TOD, and TOC, phenols, pesticides, surfactants and tannin and lignin as water pollutants and their determination. • Waste water characteristics, effluent standards, terminology in Waste

• **Soil analysis, Radioactive pollution Noise and Thermal Pollution**	water treatment. Treatment of domestic waste water - preliminary treatment, Nutrient removal- nitrogen and phosphorus removal, solids removal.Industrial waste water and its treatment. Inorganic and organic components of soil, collection and preparation of soil samples for analysis. Measurement of soil pH and conductivity. Determination of organic carbon, total nitrogen, available nitrogen, ammonia nitrogen, nitrite nitrogen and nitrate nitrogen. Available phosphorus and sulphur – their determination. Analysis of soil for sodium, potassium and calcium and magnesium. Micronutrient elements and their analysis. Pesticide residues in soil, their separation and determination. • Radioactive materials, Sources of radioactive pollutants, Effects of radioactive pollutants on living organism, Case study – Chernobyl disaster pollution – source, measurement, effects and control; Thermal pollution - causes, effects and control.

IV Semester Three Theory papers, Three Practicals & Core dissertation work

CPT- 4.1	**Bioinorganic Chemistry and Catalysis**
CPT- 4.2	**Macromolecules, Photochemistry and Solid State chemistry**
SPT- 4.3.A	**Chemistry of Natural Products**
SPT -4.3.B	**Medicinal chemistry**
CPD-4.4	**Core Paper Dissertation**
CPP-4.5 (4.1)	**Practical Inorganic Chemistry - 4**
CPP-4.6 (4.2)	**Practical Physical Chemistry - 4**
SPP- 4.7 (4.3.A)	**Practical Organic Chemistry –**
SPP- 4.7(4.3.B)	**Practical Organic Chemistry -**
Project 4.8	**Core Paper Dissertation Practical**

Objectives (CPT- 4.1 Bioinorganic Chemistry and Catalysis)	**Learning Outcomes**
Students will know about • **Bioenergetics, Bioinorganic aspects of various inorganic ions** • **Role of metal ions on the catalytic mechanism of enzyme and study of some metalloenzymes.**	The students will conceptualize • Energy in biology, energy transfer, standard free energy, entropy, the energy of ATP, kinetic stability of ATP. High energy compounds, mitochondrial flow of electrons from NADH to O_2.Phosphates and Bioenergetics. Phosphorylation, oxidative Phosphorylation,- substrate level Phosphorylation, respiratory chair Phosphorylation, mechanism of oxidative Phosphorylation. Sources, absorption, distribution and functions. The transport mechanism, Na^+, K^+ transporting ATP^{ase} (The Na^+/K^+ pump) ,Macrocyclic crown ether compounds, cryptands, spherands and ionophores. Binding, transport and accumulation of Ca^{2+}, calcium and muscle contraction, calcium in blood cloting mechanism. Chlorophyll and its role in photosynthesis.Structure of Vitamin B_{12}, Derivatives of B_{12}, Biochemical functions of B_{12} model compounds..Aspects of molybdenum chemistry, Molybdenum containing enzymes - xanthine oxidase, aldehyde oxidase, sulphite oxidase, nitrogenase and nitrate reductase. Nitrogen fixation. • Ligand bridge complex, metal bridge complex and enzyme bridge complex.Reactions of molecular oxygen, activation of dioxygen molecule in transition metal dioxygen complexes.Introduction to porphyrin system, substituent effects on porphyrin rings, hemoglobin and myoglobin, model compounds for oxygen carriers (cobalt, iridium, iron and nickel). Hemerythrin and hemocyanin.Ferretin, transferrin, phosvitin, and gastroferrin.Siderophores, *in vitro* microbial transport of iron.Iron-Sulphur proteins (rubredoxins and ferredoxins) and cytochromes including cytochrome P450.Catalase and peroxidase. Superoxide

• **Therapeutic uses of some metals and ligands.**	dismutase. • **Therapeutic uses of some metals and ligands**. **Metal complexes as drugs and therapeutic agents**: Introduction, antimicrobial agents, antiviral agents, antiarthritis agents and anticancer agents. **Treatment of toxicity due to inorganics**: Mechanism of (i) Antidote complexes with poison, rendering it inert (heavy metals, iron, copper and thallium) (ii) Antidote accelerated metabolic conversion of poison to non-toxic product (cyanide). (iii) Antidote cometes with poison for essential receptors (carbon monoxide, morphine and morphine like narcotics).
• **Catalytic and biological applications of Organometallic compounds**	• Homogeneous catalysis, hydrogenation of olefins, isomerization of olefins, oxo-process, Wacker process, Monsanto acetic acid process, Monsanto L-Dopa synthesis, water gas shift reaction, carbonylation, template synthesis, alkene hydrosilation.Introduction, Fischer-Tropsch reaction, Ziegler-Natta catalysis Introduction, organometallics in medicine, agriculture and in horticulture, and environmental aspects of organometallic compounds.

Objectives (CPT- 4.2 Macromolecules, Photochemistry and Solid State chemistry)	**Learning Outcomes**
• **Chemistry of Macromolecules and Raman spectroscopy**	• classification, nomenclature, molecular weights, molecular weight distribution, glass transition, degree of crystallinity, morphology, and viscosity-molecular weight, mechanical property - molecular weight relationships.Molecular weights and Methods of determination, molecular weight distribution, size and shape of macromolecules. Intrinsic viscosity, Mark-Houwink relationship.Chain

• **Photochemistry and it's Significance**	structure and configuration, conformation, size of an ideal chain (freely jointed chain and other models), Real chains, Flory theory.Molecular motion (self-diffusion, hydrodynamic radius, Rouse Model, Zimm Model, entangled polymer dynamics and de Gennes reptation model). elementary theories and methods of determination.Variation of glass transition with structure. Molecular weight distribution. Chain polymerization, controlled radical polymerizations (INIFERTER, ATRP, RAFT, SET). Introduction, Raman and Rayleigh scattering, stokes and anti-stokes lines, polarization of Raman lines, depolarization factor, polarizability ellipsoid. Theories of Raman spectra –classical and quantum theory. Rotation, vibration and rotation-vibration Raman spectra. Comparison of Raman and IR spectra, rule of mutual exclusion principle. Advantages of Raman spectra. Molecular data bond length and vibration determined by Raman spectroscopy. • Introduction to photochemistry, quantum yield and its determination, factors affecting quantum yield, experimental technique in photochemistry, Actinometry-Uranyloxalate and potassium ferrioxalate actinometers, acetone and diethylketone actinometers. by mercury, dissociation of H_2, sensitized isomerization. Photodimerization of anthracene, photochemical kinetics of: Decomposition of HI, CH_3CHO; formation of HCl, HBr and $COCl_2$; Chlorination of ZnO/TiO_2 in the photo degradation of dyes (IC), pesticides (DDT) and in industrial effluents. Effect of photodegradation on COD value. Direct spectroscopic

• **Crystal Defects and Non-Stoichiometry** • **Crystal geometry and X-ray diffraction studies**	identification of primary processes, use of free radical traps in the determination of primary photodecomposition modes. Photophysical properties: Fluorescence, characteristics of fluorescence, resonance fluorescence, sensitize. fluorescence, quenching of fluorescence, phosphorescence, characteristics, chemiluminescence - theory and applications, photochemistry of vision. • Perfect and imperfect crystals, intrinsic and extrinsic defects-point defects, line and plane defects, vacancies-Schotty defects and Frenkel defects, thermodynamics of Schotky and Frenkel defect formation, color centers, non-Stoichiometry and defects. Electrical conductivity, origin of valence and conduction band in solids, classification of material, types of semiconductor, time dependent of conductivity, mobility of charge carriers, metal-metal junction, metal–semiconductor junction, Diodes, p-n junction, transistor, superconductors, superconductivity: superconductivity, BCS theory, superconductors—Meissner effect. • Crystal system, lattices, Miller planes, crystal packing, symmetry elements for solids (including glide planes and screw axis). Introduction to space groups with examples. Fundamentals of X-ray crystallography, law of interfacial angles, laws of symmetry, X-ray diffraction, Bragg condition, miller indices, Laue method, Bragg method, Debye-Scherrer method, rotating crystal method of X-ray structural analysis of crystals, index reflections, identification of unit cells from systematic absences in diffraction pattern, structure of simple lattices and X-ray intensities, Atomic scattering factor, structure, structure

	factor and its relation to intensity and electron density, Fourier synthesis, phase problem, description of the procedure for an X-ray structure analysis, Electron diffraction of gases. Experimental technique, Scattering - Intensity curves, Wierl equation (no derivation), Radial distribution method, Determination of bond lengths and bond angles.Scattering of neutrons by solids and liquids, magnetic scattering, measurement, techniques, elucidation of structure of magnetically ordered unit cell. •
Objectives (SPT- 4.3A Chemistry of Natural Products)	**Learning Outcomes**
Students will learn about • **Carbohydrates** • **Steroids and Alkaloids**	The students will conceptualize • Introduction, Ring size determination of monosaccharides, Configuration and conformation of monosaccharides, anomeric effect, Hudsons rule, epimerization and mutarotation. Chemistry of important derivatives of monosaccharides-, carboxylic acids, dihydrosugars,deoxysugars, cyclitols, aminosugars and anhydrosugars., Isolation, Importence, synthesis and Structure elucidation of disaccharides- sucrose, maltose, cellobiose General methods of structural degradation of polysaccharides-methylation, partial hydrolysis, periodate oxidation, Smith degradation and alkaline degradation techniques. Structure and importance of cellulose, chitin, starch and glycogen. Separation of carbohydrates by TLC, HPLC and GLC methods. • **Steroids:** Introduction, Nomenclature, configuration of substitutents,Abosute configuration in the ring, configuration in the side chain, conformation of A/B,B/C and

	C/D rings. Improtance, and synthesis of cholesterol. Stucure and biological importance of Estrone, progesterone, testosterone, androsterone and carticosterone. Biosynthesis of cholesterol.Oral contraceptives. Introduction, classification. Isolation and general methods of structural elucidation. Biological importance of alkaloids. Structure and synthesis of qunine, morphine, reserpine.
• **Lipids, Prostaglandins and Enzymes**	• Nomenclature, occurrence of triglycerides,classification, purification, reactions of fatty acids, structure and synthesis of lipids, phospholipids, sphingolipids. Biological importance of lipids: Lecithin, sphingolipids, oils and fats. Introduction, classification and biological importance and mode of action of prostaglandins in biological system. Constitution of PGE1. Synthesis of PGE & F series. Introduction, nomenclature, classification, General characteristics, Theories of interaction : lock and key model, Koshland induced-fit theory , Coenzymes: coenzyme role of theanine, Riboflavin, Pantothenic acid. Mode action of enzymes in catalyzing the reaction (Chymotrypsin, Ribonuclease, Lysozyme) with examples and their functions.
• **Terpenoids, Anthocyanins, Porphyrins and Pheromone**	• Introduction, classification and general methods of structural elucidation. Biological importance of terpenoids. Structure elucidation, synthesis and imprtence of of pinene, camphor. Santonin, β-caryophyllene. Introduction, general nature of anthocyanin. Structure and synthesis of anthocyanidins, Flavones and isoflavones. Introduction, structure and synthesis of haemin. Vitamin B12 structure and as coenzyme in molecular rearrangement reactions: Chlorophyll: structure and biological

	importance. introduction, classification, source and uses. Synthesis of grandisol, brevicomin and bombykol.

- In 4th Semester Students of II M.Sc were allowed to do Dissertation work as part of their curriculum for 150 marks through which students will learn synthesis of new compounds, nano particles, metal complexes and degradation of toxic dyes and separation & characterization of newly synthesized compounds , nano-particles, materials using chromatographic techniques like TLC, Column Chromatography. Spectroscopic techniques/characterization likes FT-IR, HNMR, ^{13}CNMR, Mass, XRD, SEM & TEM and after the completion students were allowed to defend their dissertation work in open defense to learn all the aspects of research activities

UNIVERSITY COLLEGE OF SCIENCE

TUMKUR UNIVERSITY

DEPARTMENT OF B.VoC **(HARDWARE TECHNOLOGY & NETWORKING)**

Action plans course outcomes and objectives

The curriculum framed by the Department of B.VoC intends to improve the perspective of students towards computer science hardware and networking and to provide students with a thorough grounding in the theoretical and practical aspects of the hardware and networking necessary for successful careers as system designers in the continually developing hardware and networking technology environment. The major enables students to develop a strong foundation in the discipline as well as specialization in a particular area through a flexible curriculum.

Semester-wise Action Plan

1st Semester:

Sl No	Subject Name	Objectives	Outcome
1	**General English**	• To encourage the students to speak English • To enable students to use English in day-to-day communication • To build up their confidence in the usage of English • To expose them to light prose and poetry • To develop their written communicative competence • To prepare them for competitive exams	• Distinguish relevant from irrelevant information; • Identify the topic and main idea; • Comprehend relationships between ideas; and • Make inferences and predictions about spoken discourse. locate and select relevant information; • Take notes, paraphrase, synthesize and organize information; • Produce appropriate vocabulary; • Produce accurate grammatical forms; and • Give an oral presentation in class using effective delivery strategies
2	**Basics of Computer Systems**	• To study the basic organization and architecture of digital computers (CPU, memory, I/O, software). • Discussions will include digital logic and microprogramming.	• Better understanding and utilization of digital computers, • Used in the design and application of computer systems or as foundation for more advanced computer-related studies.
3	**Computer Hardware & Maintenance**	• To introduce PC maintenance, upgrading, repairing.	• Identify the main components for the PC. • Have an idea about the processor

		• To improve areas of system improvements, such as motherboards, processors, memory, and even case and power supply improvements. • For proper system and component care, specifies the most failure-prone items in various PC systems, and tells the student how to locate and identify a failing component. • Learn about powerful diagnostics hardware and software that enable a system to help them determine the cause of a problem and how to repair it	generations used in PCs starting from the first Intel generations to current CPU families. Also, will familiarize themselves with terms that are directly related to processors such as: caching, multi-threading, Dual-core technology, multi-processing, and pipelining. Computer faults that are related to CPU problems will also be familiar to students. • Familiarize themselves with PC memories such as RAM and ROM devices. • Know about motherboards and the various technologies connected to main boards such as Chipsets, Buses, and various BIOS types.
4	**Operating System**	• Understanding of structure of modern computers • Purpose, structure and functions of operating systems • Illustration of key OS aspects by example	• Describe the general architecture of computers • Describe, contrast and compare differing structures for operating systems • Understand and analyse theory and implementation of: processes, resource control (concurrency etc.), physical and virtual memory, scheduling, I/O and files
5	**Basics of Networking**	• To provide students with an overview of the concepts and fundamentals of data communication and computer networks • To familiarize with the basic taxonomy and terminology of computer networking area.	• Conceptualize all the OSI Layers • Use appropriate network tools to build network topologies • Install and configure an open source tool NS2

2nd Semester:

Sl No	Subject Name	Objectives	Outcome
1	**Applied Science**	• Technical knowledge and critical thinking • Manage a complex systems engineering project	• Know a broad knowledge of science, math and engineering. • Able to read, understand, and evaluate professional literature on applied science.

2	**Basics of Electronics and Measuring Instruments.**	• Introduction to the basics of biasing transistor circuits, feedback amplifiers, rectifiers, & analyzing different two terminal devices. • To develop the basic tools with which they can later learn about newly developed devices and applications.	• Identify proper use of power amplifier as per circuit requirement for different applications • Design and analyze operation of different Electronic circuit using various electronic devices . • Analyze and design amplifier circuits, Oscillators and filter circuits employing BJT, devices
3	**Hardware Concepts -I**	• Introduces the basic features of Microsoft Office, Windows basics, and file management. • Develops familiarity with Word, Excel, Access, PowerPoint, email, and Internet basics. Provides an overview of the Portal website. • Covers components of the Internet and Computing Core program content.	• Recognize when to use each of the Microsoft Office programs to create professional and academic documents. • Use Microsoft Office programs to create personal, academic and business documents following current professional and/or industry standards. • Apply skills and concepts for basic use of computer hardware, software, networks, and the Internet in the workplace
4	**Computer Network and Maintenance**	• Have knowledge of safety procedures and applying the same in practice • Develop computer system configuration Conduct diagnostics - testing and inspection • Have Knowledge of hardware components and latest development in the field	• learn essential operating systems skills including how to use, setup, configure, troubleshoot and maintain a current microcomputer operating system. • Proficiency in the following skill areas: Network Infrastructure Skills, System Administration Skills
5	**Basics of Windows server 2003**	• Understand Server Installation • Understand Server Roles • Understand Active Directory • Understand Storage	• Understanding Server Roles portion of Windows Server Administration • Understand Server Performance Management

3rd Semester:

Sl No	Subject Name	Objectives	Outcome
1	**GEC-3.1: Basics of Communication Skills**	• A knowledge of the basic theories of human	• An ability to successfully apply the above knowledge

		communication in rhetorical, group, and interpersonal settings. • A basic principles and techniques of persuasion in interpersonal, group, and public speaking contexts. • The ability to write a valid and well-supported analysis of communication problems encountered in real-world situations.	in actual small group, interviewing, business, public speaking, and interpersonal situations. • The ability to write well-worded and persuasive resumes and other business communication.
2	**GEC-3.2: Principles of Digital Electronics**	• To solve Boolean algebraic expressions , realization through the logic gates • To understand the working of the combinational circuits and sequential circuit	• Understand the functions of various hardware components and their building blocks • Realization Boolean algebraic expressions to digital design, sequential, Combinational circuits • To realization of different combinational/sequential circuits
3	**SDC-3.3: Hardware Concepts -2**	• learn essential IT support skills including installing, configuring, securing and troubleshooting operating systems and hardware • To learn essential systems administration skills related to server operating systems, system and network service administration, computer and information security	• to diagnose and solve operating system and hardware problems • solve network problems
4	**SDC-3.4: Networking Concepts –I Through Java Programming**	• Analysis and design of computer networks by focusing on computer network programming. • The Java programming language will be used. • To sufficient knowledge about computer networks, especially the Internet, and some good programming skills in Java.	• Type, compile, and execute example Java programs from key concepts of network programming. • Modify, create Java programs for concepts of network programming. • Create Java network programs that fulfill specific deliverables and provide significant network capability
5	**SDC-3.5: Micro processor 8085 and Its Applications**	• To introduce 8085 architecture and programming in assembly language • To introduce basic concepts	• Understand the 8085 architecture and instruction set. • Able to write programe in assembly language

		of interfacing memory and peripheral devices to a microprocessor. • To introduce serial and parallel bus standards.	• Interface and run the devices from the microprocessor.

4th Semester:

Sl No	Subject Name	Objectives	Outcome
1	**GEC-4.1: Basic ICT skills**	• in-depth understanding of why computers are essential components in business, education and society. • Provide hands-on use of Microsoft Office applications Word, Excel, Access and PowerPoint.	• Describe the usage of computers and why computers are essential components in business and society. • Utilize the Internet Web resources and evaluate on-line e-business system. • Solve common business problems using appropriate Information Technology applications and systems.
2	**GEC 4.2: Programming using Python**	• basic understanding of programming and the Python programming language. • Expose students to application development and prototyping using Python	• Understand principles of Python • Understand the pros and cons on scripting languages vs. classical programming languages (at a high level) • Understand object oriented programming
3	**SDC-4.3: Hardware Concepts -III**	• To implement, support, and troubleshoot computer and information technology systems	• To provide computer technology support, network and system administration, and web development
4	**SDC-4.4: Networking Concepts –II Through Java programming**	• Analysis and design of computer networks by focusing on computer network programming. • The Java programming language will be used. • To sufficient knowledge about computer networks, especially the Internet, and some good programming skills in Java.	• Type, compile, and execute example Java programs from key concepts of network programming. • Modify, create Java programs for concepts of network programming. • Create Java network programs that fulfill specific deliverables and provide significant network capability
5	**SDC-4.5: 8051 Micro Controllers and Its Interfacing**	• 8051 Microcontroller. Programming model and Instruction set of 8051 Microcontroller • Addressing mode	• Distinguish and analyze the properties of Microprocessors & Microcontrollers. • Assembly language programming

		supported by 8051 instruction set, Timer operation. • Serial data transfer using 8051. Interrupts in 8051.	• Analyze the data transfer information through serial & parallel ports.

5th Semester:

Sl No	Subject Name	Objectives	Outcome
1	**GEC-5.1 : BPO Skills**	• to the basic fundamentals of Customer Relationship Management • tend to describe specific, discrete units of knowledge and skill can be accomplished within a short timeframe	• Cost-saving measure for tasks that a company requires but does not depend upon to maintain their position in the marketplace. • Acceptance of the companies by virtue of their prior experience and possession of a qualification.
2	**GEC-5.2:** **LINUX System Monitoring and Performance Tuning**	• Describe 4 key performance tuning terms • Define a performance tuning strategy for your organization • Capture a baseline, and measure tuning increases / decreases against the baseline	• The best tried-and-true optimization performance tuning tools and techniques • Manually optimize the kernel's behavior • Tracing, profiling and instrumentation techniques across a wide range of conditions
3	**SDC-5.3: SDC-5.3 INSTALLING AND CONFIGURING WINDOWS SERVER 2012**	• Install and configure servers • Configure server roles and features • Configure Hyper-V • Deploy and configure core network services • Install and administer Active Directory	• Implement a core Windows Server 2012 infrastructure. • Design and implement an Active Directory Domain Services (AD DS) environment. • Configure and implement Windows Server 2012 networking services.
4	**SDC- 5.4: Certified Ethical Hacking(CEH)**	• Information Security Track which helps you master hacking technologies • evaluating not just logical, but physical security	• identify potential security weaknesses, • respond to malicious activity with experiential knowledge • secure systems with the best methods
5	**SDC- 5.5: Embedded Systems**	• Discuss the major components that constitute an embedded system • Implement small programs to solve well-defined problems on an embedded platform.	• Understand microcontroller, microcomputer, embedded system. • Become familiar with programming environment used to develop embedded systems

		• Develop familiarity with tools used to develop in an embedded environment.	• Understand key concepts of embedded systems like IO, timers, interrupts, interaction with peripheral devices • Learn debugging techniques for an embedded system

6th Semester:

Sl No	Subject Name	Objectives	Outcome
1	**GEC-6.1 :** **VLSI Design**	• To bring both Circuits and System views on design together. • It offers a profound understanding of the design of complex digital VLSI circuits, computer aided simulation and synthesis tool for hardware design	• To be aware about the trends in semiconductor technology, and how it impacts scaling and its effect on device density, speed and power consumption. • To understand MOS transistor as a switch and its capacitance. • Student will be able to design digital systems using MOS circuits (Static and Switching characteristics of inverters)
2	**GEC-6.2 :** **LINUX Enterprise Clustering and Storage Management**	• Knowledge, skills and ability to implement high-availability services on Enterprise Linux High Availability. • Number of systems administration tasks and are evaluated on whether they have met specific objective criteria.	• Configure a high-availability cluster, using either physical or virtual systems • Manage logical volumes in a clustered environment • Configure a GFS file system • Manage device configuration using udev
3	**SDC-6.3: LINUX Enterprise Deployment and Systems Management Course**	• Configuration management using CVS • Construction of custom RPM packages • Software management with Network Proxy Server • Assembling a host provisioning and management system • Performance tuning and analysis • High-availability network load-balancing clusters • High-availability application failover clusters	• Create and configure organizations and locations • Create and configure Red Hat Satellite users and roles • Create GNU Privacy Guard (GPG) keys to sign RPMs • Create and configure development life cycles • Create a Puppet product repository • Configure Satellite subscriptions, content, and content views • Create a Satellite activation key, host group • Define smart class parameters for a Puppet module

4	**SDC- 6.4: Internet of Things(IOT)**	• To identify the different technology. • To learn different applications in IOT. • To learn different protocols used in IOT. • To learn the concepts of smart city development in IOT. • To learn how to analysis the data in IOT	• Apply the concepts of IOT. • Identify the different technology. • Apply IOT to different applications. • Analysis and evaluate protocols used in IOT. • Design and develop smart city in IOT. • Analysis and evaluate the data received through sensors in IOT
5	**PD-6.5: Project & Dissertation**	• To offer students a glimpse into real world problems and challenges that need IT based solutions • To enable students to create very precise specifications of the IT solution to be designed. • To introduce students to the vast array of literature available of the various research challenges in the field of IT • To improve the team building, communication and management skills of the students	• Discover potential research areas in the field of IT • Conduct a survey of several available literature in the preferred field of study • Compare and contrast the several existing solutions for research challenge • Demonstrate an ability to work in teams and manage the conduct of the research study. • Formulate and propose a plan for creating a solution for the research plan identified • To report and present the findings of the study conducted in the preferred domain

TUMKUR UNIVERSITY

DEPARTMENT OF COMPUTER SCIENCE

Action plans course outcomes and objectives

The curriculum framed by the Department of Computer Science intends to improve the perspective of students towards computer science and to provide students with a thorough grounding in the theoretical and practical aspects of the computer science discipline necessary for successful careers as system designers in the continually developing information technology environment. The major enables students to develop a strong foundation in the discipline as well as specialization in a particular area through a flexible curriculum. Through a wide range of electives, students keep pace with the latest trends in computing technology.

Semester-wise Action Plan

1st Semester:

Course Title:1.1 Computer concepts & OOPs using C++

Objectives	Learning Outcomes
Students will: • Object-oriented programming (OOP) is a programming paradigm based on the concept of "objects", which may contain data, in the form of fields, often known as attributes; and code, in the form of procedures, often known as methods. • A feature of objects is that an object's procedures can access and often modify the data fields of the object with which they are associated. • Computer programs are designed by making them out of objects that interact with one another.	The students will • Describe the procedural and object oriented paradigm with concepts of streams, classes, functions, data and objects. • Understand dynamic memory management techniques using pointers, constructors, destructors, etc • Describe the concept of function overloading, operator overloading, virtual functions and polymorphism. • Classify inheritance with the understanding of early and late binding, usage of exception handling, generic programming. • Demonstrate the use of various OOPs concepts with the help of programs

2nd Semester:

Course Title:2.1 Data Structure Using C++

Objectives	**Learning Outcomes**
Students will: • To introduce the concepts of Abstract data Type, data structure, performance measurement, time and space complexities of algorithms. • To discuss the implementation linear data structures such as stacks, queues and lists and their applications. • To discuss the implementation of different non linear data structures such as trees and graphs. • To introduce various search data structures such as hashing, binary search trees, red black trees, splay trees and b-trees. • To introduce various internal sorting techniques and analyze their time complexities.	The students will • Understand the concept of Dynamic memory management, data types, algorithms, Big O notation. • Understand basic data structures such as arrays, linked lists, stacks and queues. • Describe the hash function and concepts of collision and its resolution methods • Solve problem involving graphs, trees and heaps • Apply Algorithm for solving problems like sorting, searching, insertion and deletion of data

3rd Semester:

Course Title: 3.1 Operating System & UNIX

Objectives	**Learning Outcomes**
Students will: • To learn the fundamentals of Operating Systems & UNIX. • To learn the mechanisms of OS & UNIX to handle processes and threads and their communication • To learn the mechanisms involved in memory management in contemporary OS & UNIX • To gain knowledge on distributed operating system concepts that includes architecture, Mutual exclusion algorithms, deadlock detection algorithms and agreement protocols	The students will • Understand the basics of operating systems like kernel, shell, types and views of operating systems • Describe the various CPU scheduling algorithms and remove deadlocks. • Explain various memory management techniques and concept of thrashing • Use disk management and disk scheduling algorithms for better utilization of external memory. • Recognize file system interface, protection and security mechanisms

4th Semester:

Course Title: 4.1 Software Engineering & Database Management System

Objectives	**Learning Outcomes**
Students will: • Differentiate database systems from file systems by enumerating the features provided by database systems and describe each in both function and benefit. • Define the terminology, features, classifications, and characteristics embodied in database systems. • Analyze an information storage problem and derive an information model expressed in the form of an entity relation diagram and other optional analysis forms, such as a data dictionary. • Demonstrate an understanding of the relational data model. • Transform an information model into a relational database schema and to use a data definition language and/or utilities to implement the schema using a DBMS.	The students will • Plan a software engineering process life cycle , including the specification, design, implementation, and testing of software systems that meet specification, performance, maintenance and quality requirements • Analyze and translate a specification into a design, and then realize that design practically, using an appropriate software engineering methodology. • Know how to develop the code from the design and effectively apply relevant standards and perform testing, and quality management and practice • Knowledge of DBMS, both in terms of use and implementation/design Experience with SQL Increased proficiency with the programming language C++ • Experience with analysis and design of (DB) software

5th Semester:

Course Title: 5.1 JAVA & PHP

Objectives	**Learning Outcomes**
Students will: • Java's Syntax and Program Structure. Procedural Programming • Objects, Classes and Object-Oriented Programming • Introductory Algorithms and Data Structures; Java Collections Framework • Graphical User Interface Programming: principles, event-driven programming, Model-View-Controller architecture, JavaFX Framework • Elements of Functional Programming with λ-expressions and streams API • Annotations and Self-Documentation of Java Programs • Good Programming Practices and Software Development Principles	The students will • Read and understand Java-based software code of medium-to-high complexity. • Use standard and third party Java's API's when writing applications. • Understand the basic principles of creating Java applications with graphical user interface (GUI). • Create rich user-interface applications using modern API's such as JAVAFX. • Understand the fundamental concepts of computer science: structure of the computational process, algorithms and complexity of computation. • Understand the basic approaches to the design of software applications.

5th Semester:

Course Title: 5.3 Computer Graphics

Objectives	**Learning Outcomes**
Students will: • To provide overview of basics principles of 2D and 3D computer graphics. • To get acquaint with the vector based object representation and drawing. • To learn methods of 2D objects rasterisation and clipping, 2D closed areas filling, 2D and 3D transformations, visibility problem solutions, lighting, shading and texturing. • To get acquaint with the basic principles of main 2D and 3D graphical interfaces. • To overrule the implementation issues in real graphical applications.	The students will • Understand the basics of computer graphics, different graphics systems and applications of computer graphics. • Discuss various algorithms for scan conversion and filling of basic objects and their comparative analysis. • Use of geometric transformations on graphics objects and their application in composite form. • Extract scene with different clipping methods and its transformation to graphics display device. • Explore projections and visible surface detection techniques for display of 3D scene on 2D screen.

6th Semester:

Course Title: 6.1 VB.NET & C#

Objectives	**Learning Outcomes**
Students will: • Programming in C # programming language, • knowledge of object-oriented paradigm in the C # programming language, • knowledge of VB.NET environments. • Basic programming techniques. • Abstraction with the help of the class • Inheritance and Polymorphism. • Processing errors. • Arrays and lists. Collections. • Strings. Files and streams. • XML. Database. Threads.	The students will • knowledge of the structure and model of the programming language VB.NET &C # • Use the programming language VB.NET & C # for various programming technologies • Develop software in VB.NET & C # • Propose the use of certain technologies by implementing them in the VB.NET & C # programming language to solve the given problem • Choose an engineering approach to solving problems, starting from the acquired knowledge of programming and knowledge of operating systems.

6th Semester:

Course Title: 6.3 Computer Networks

Objectives	**Learning Outcomes**
Students will: • To educate concepts, vocabulary and techniques currently used in the area of computer networks. • To study protocols, network standards, the OSI model, IP addressing, cabling, networking components, and basic	The students will • Understand the organization of computer networks, factors influencing computer network development and the reasons for having variety of different types of networks. • To identify main internal PC

LAN design. • To accumulate existing state-of-the-art in network protocols, architectures, and applications. • To be familiar with contemporary issues in networking technologies	components and connections. • To demonstrate proper placement of different layers of ISO model and illuminate its function. • To understand internals of main protocols such as HTTP, FTP, SMTP, TCP, UDP, IP

TUMKUR UNIVERSITY

UNIVERSITY COLLEGE OF SCIENCE, TUMKUR- 572 103

DEPARTMENT OF MICROBIOLOGY

ACTION PLAN AND ACHIEVEMENTS

Action plan for the year 2012 – 2013

- Planning to conduct Science exhibition on 28/02/2013.
- Planning to organize Industrial visit to J.P. Distilleries Kunigal III B.sc students
- Planning to write proposals for the organizing National conference/Seminars/Workshops
- Planning to write proposal for VGST,UGC and DST
- Planning to participate and present papers and publish in the National conferences/Seminars
- Planning to organize AIDS awareness program on World AIDS Day

Achievements:

- Science exhibition was conducted on 28th February 2013 and the experimental models were displayed by the students. Two best models were selected by the expert committee and the prizes were given to the winners on College Annual day.
- World AIDS day was celebrated in the Department on December 2012 and students were given necessary information on AIDS
- Final year students were taken to J.P. Distilleries Kunigal on 16/04/2013 as a part of their curriculum to learn more practical aspects and to motivate them further for job opportunities.
- Presented papers and got best papers presentation awards to Dr. Rashmi Hosamani at the National Conference on "Biotechnological approaches for sustainable environmental management" at Karnataka State Higher Education Council Bangalore on 22-01-2013.
- Best papers presentation awards to Dr. Rashmi Hosamani at National Conference on "Recent Discoveries in Protein Science"at Karnataka State Higher Education Council Bangalore on 31-01-2013.
- Best papers presentation awards to Dr. Rashmi Hosamani at National Conference on "Biotechnological approaches in medicinal and aromatic plants research" at Maharani's Science college for Women, Bangalore on 21st and 22nd March 2013.
- UGC minor project of Rs.1,72,500 was sanctioned to Mrs. Shabeena Anjum K.S
- Two papers were published at the conferences by Dr. Rashmi Hosamani.

HEAD OF THE DEPARTMENT
DEPT., OF MICROBIOLOGY
University College of Science

Action plan for the year 2013- 2014

- Planning to conduct Science exhibition on 28/02/2014.
- Planning to organize Industrial visit to Mallasandra dairy for III B.sc students
- Planning to write proposals for the organizing National conference/Seminars/Workshops
- Planning to write proposals for the UGC minor project
- Planning to participate and present papers in the National conferences/Seminars
- Planning to organize awareness on Global hand washing day.
- Planning to encourage students to involve students in extra curricular activities

Achievements:

- Science exhibition was conducted on 28th February 2014 and the experimental models were displayed by the students. Two best models were selected by the expert committee and the prizes were given to the winners on College Annual day.
- Students of final year Microbiology were taken to field visit to Mallasandra Dairy on 04-04-2014 to understand the practical skills in milk processing and preservation techniques.
- Global hand washing day was conducted to know the importance of hand washing in control of diseases.
- Dr. Rashmi Hosamani presented paper at National Seminar on "Applications of Biotechnology in Human Welfare" on 28th and 29th March 2014 at Davangere University.
- UGC minor project for Rs. 2 lakhs was sanctioned to Dr. Rashmi Hosamani
- UGC National conference of Rs.75,000/- was sanctioned to Dr. Rashmi Hosamani on "Emerging Protein technologies for formulation Solutions".
- One paper was published at Conference by Smt. Shabeena Anjum K.S

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Action plan for the year 2014-2015

- Planning to conduct Seminars and Quiz competition for students
- Planning to conduct Science exhibition on 28/02/2015.
- Planning to organize Industrial visit to Mallasandra dairy /United breweries for III B.sc students
- Planning to organize National conference by the Department of Microbiology
- Planning to encourage students to involve students in extra curricular activities
- Planning to participate and present papers in the National conferences/Seminars

Achievements:

- Science exhibition was conducted on 28th February 2015 and the experimental models were displayed by the students. Two best models were selected by the expert committee and the prizes were given to the winners on College Annual day.

- National Conference was organized by the Department of Microbiology on **"Emerging Protein technologies for formulation Solutions" on 16/10/2014.** Resource persons from Central Lab such as IICT Hyderabad, Chairman of P.G.Department from Karnatak Univesity Dharwad and Gulbarga University were invited for the Planery Lectures and also from the Industrial person was invited to create awareness about future job opportunities in concerned areas were invited.

- Students of final year Microbiology were taken to field visit to Mallasandra Dairy to understand the practical skills in milk processing and preservation techniques.

- Dr. Rashmi Hosamani presented paper at National Conference on "Aerobiological on Impact of Aerosols on Health, Heritage and Environment" organized by Dept. of Sciences, Tumkur University in association with Indian Aerobiological Society from 28th - 30th September, 2015.

- Students have also participated and represented the Department at various levels of competitions.

HEAD OF THE DEPARTMENT
DEPT., OF MICROBIOLOGY
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Tumkur University.

Action plan for the year 2015-2016

- Planning to take students to rural areas in concern with Science popularization programs
- Planning to conduct Science exhibition on 28/02/2016.
- Planning to organize Industrial visit to Mallasandra dairy /J.P. Distilleries for III B.Sc students
- Planning to organize National conference by the Department of Microbiology
- Planning to participate and present papers in the National conferences/Seminars
- Planning to encourage students to involve students in extracurricular activities
- Planning to conduct alumni meeting to know the whereabouts of the students
- Planning to organize Parent Teacher meeting especially for below average students
- Planning to conduct remedial classes to improve the academic performance.

Achievements:

- Visited Melekote village and conducted science popularization programs.
- Science exhibition was conducted on 28th February 2016 and the experimental models were displayed by the students. Two best models were selected by the expert committee and the prizes were given to the winners on College Annual day.
- UGC minor project has been completed by Mrs. Shabeena Anjum K.S
- Dr. Rashmi Hosamani participated as Chair person for the National Level Technical Symposium Biotechnology and Chemical Engineering Student's Seminar, BioChESS-2016 at Dept. of Biotechnology, Siddaganga Institute of Technology, Tumkur on March 13, 2016.
- Students were taken to MAllasandra Dairy to make awareness of milk production and processing and importance of Microbiology in fermented dairy products and future Job opportunities.
- Parent-Teacher meeting were conducted to make the parents aware of the students progress.
- Science exhibition was conducted and various models were displayed by the students and two best models were given prizes.

HEAD OF THE DEPARTMENT
DEPT., OF MICROBIOLOGY
University College of Science
Tumkur University

Action plan for the year 2016-2017

- Planning to conduct Science exhibition on 28/02/2017.
- Planning to organize Industrial visit to Mallasandra dairy/Liveon biolabs for III B.sc students
- Planning to organize National conference by the Department of Microbiology
- Planning to participate and present papers in the National conferences/Seminars

Achievements:

- Science exhibition was conducted on 28th February 2017 and the experimental models were displayed by the students. Two best models were selected by the expert committee and the prizes were given to the winners on College Annual day.
- Students visited J.P Distilleries as a part of curriculum and interaction with the industry authorities was done to get better employability facilities for the students after B.Sc degree.
- UGC minor project has been completed by Dr.Rashmi Hosamani
- Special lecture on Employable skills for Microbiology students by Envirocare labs was conducted on 30-06-2017.
- CPE sponsored Special lecture on "Prospects of Microbiology and Biostatistics" was conducted
- CPE sponsored Workshop on "Bioinformatics and microbial techniques" was conducted
- Dr. Rashmi Hosamani presented paper at International Symposium on Understanding the Molecules of Life in the Era of new Biology and 28th All India Congress of Zoology organized by Life sciences Departments, Davangere University, Davangere on 20th- 22nd October, 2016.
- Smt.Shabeena Anjum K.S has published paper in International Journal of Pharma and biosciences July; 8(3): (B) 796-804, 2017.
- Smt.Shabeena Anjum K.S has published paper in International Journal of Pharma and biosciences July; 8(3): (B) 854-860, 2017
- Dr. Rashmi Hosamani has published one paper in International Journal of Pharma and biosciences July; 8(3): (B) 114 - 121, 2017.
- Dr. Rashmi Hosamani has presented paper at National Seminar on "Recent advances & Developments in Microbial Technology" at Govt. College (Autonomous) Kalaburgi on 15th and 16th September, 2017 and got best paper presentation award certificate.
- Rashmi Hosamani has presented paper at International Conference on "Advances in Disease Management for Human Welfare" during 21st to 23rd November 2017 at Gulbarga University Kalaburagi.

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Action plan for the year 2017-2018

- Planning to organize Industrial visit to Mallasandra dairy/Liveon biolabs Pvt. Ltd. for III B.sc students
- Planning to conduct Science exhibition on 28/02/2018.
- Planning to organize National conference by the Department of Microbiology
- Planning to participate and present papers in the National conferences/Seminars/Workshops
- Planning to conduct more number of workshops
- Planning to conduct Essay and Quiz competitions
- Planning to conduct projects at the Department and presentation at the conferences

Achievements:

- Students visited Liveon Biolabs Pvt.Ltd. as a part of curriculum and interacted with the industry authorities was done to get better employability facilities for the students after B.Sc degree.
- Science exhibition was conducted on 28th February 2018 and the experimental models were displayed by the students. Two best models were selected by the expert committee and the prizes were given to the winners on College Annual day.
- National Conference on "Applications of Microbiology in Human welfare" was organized by the Department of Microbiology on 30-01-2018.
- Dr. Rashmi Hosamani guided student projects and the posters on the projects conducted in the Department and were presented in the National conference on 30-01-2018.
- Dr. Rashmi Hosamani presented papers at 16th National conference on "Indian association of applied Microbiologists (IAAM) Human Microbiome in Personel Medicine" on September 27th & 28th 2018.
- Smt.Shabeena Anjum K.S has guided student projects and the posters on the projects conducted in the Department and were presented in the National conference on 30-01-2018..
- Rashmi Hosamani has been given "Fellowship Award" by Indian Association of Applied Microbiologists, Tamil nadu on 27-28th September 2018 at JSS University, Mysore.
- Essay competition on Women empowerment was conducted for girl students
- Quiz competition and various other competitions were conducted for girl students by Women empowerment Cell.
- Dr. Rashmi Hosamani was made the Co-coordinator for Women empowerment Cell of the College.

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- Smt. Shabeena Anjum K.S was made Co-coordinator for Minority Cell of the College.
- Dr.Rashmi Hosamani organized skill development workshop on "Haematology and Diagnosis of infectious diseases" on 20-07-2018 and hands on training was given to the students by the experts Dr. Rakshith N.P, Administrative officer, DHO,Nagavalli,Tumkur.
- Smt. Shabeena Anjum K.S. organized skill development workshop on "Pre-clinical Microbial studies in drug discovery" on 30-07-2018 and hands on training was given to the students by Rajesh R. Scientist, Liveon Biolabs. Pvt.Ltd.Tumkur.

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Tumkur University

TUMKUR UNIVERSITY TUMKUR

UNIVERSITY COLLEGE OF SCIENCE

Department of English

1st and 3rd Semester Action Plan and Out Come 2013-14

Tumkur University For UG Syllabus prescribed ***General English*** as Text Book for General English 1st Semester. The book is divided into Two Parts. The First Part contained Poetry and Prose. Second Part contained Introduction to Communication Skills.

Tumkur University For UG Syllabus prescribed ***Contemplations-1*** a Novel by Mulk Raj Anand as Text Books for General English 3rd Semester. The book ***Invocation*** contained Poetry and Grammar.

The Action Plan is to make students learn world literature in English and also to enhance their communication skills. The Action Plan is formulated to benefit students through accomplishing different tasks. Such as:

Sl.No	Action Plan	Out Come/ End Result	Remarks
1	1.Presentations by every student in the class. 2. Literary Quiz Competition 3.Poetry recitation. 4.Debate and Discussion.	1. Completed the Syllabus keeping in mind the aspiration of the syllabus. 2. Taught the students about communication skills and interpersonal skills. 3. Gave students enough exposure to handle any day to day communication affairs. 4. Students became more sensitized about Symbiotic relationship of man and nature and their role and responsibility in the society.	Succeeded in translating the Action Plan into the reality.

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TUMKUR UNIVERSITY TUMKUR

UNIVERSITY COLLEGE OF SCIENCE

Department of English

2nd and 4th Semester Action Plan and Out Come 2013-14

Tumkur University For UG Syllabus prescribed ***General English*** as Text Book for General English 2nd Semester. The book is divided into Two Parts. The First Part contained Poetry and Essays. Second Part contained Grammar.

. Tumkur University For UG Syllabus prescribed ***Contemplations 2*** as Text Book for General English 4th Semester.

The Action Plan is to make students learn world literature in English and also to enhance their communication skills. The Action Plan is formulated to benefit students through accomplishing different tasks. Such as:

Sl.No	Action Plan	Out Come/ End Result	Remarks
1	1. Presentations by every student in the class. 2. Literary Quiz Competition 3. Poetry recitation. 4. Debate and Discussion.	1. Completed the Syllabus keeping in mind the aspiration of the syllabus. 2. Taught the students about communication skills and interpersonal skills. 3. Gave students enough exposure to handle any day to day communication affairs. 4. Students became more sensitized about Symbiotic relationship of man and nature and their role and responsibility in the society.	Succeeded in translating the Action Plan into the reality.

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TUMKUR UNIVERSITY TUMKUR

UNIVERSITY COLLEGE OF SCIENCE

Department of English

1st and 3rd Semester Action Plan and Out Come 2012-13

Tumkur University For UG Syllabus prescribed ***General English*** as Text Book for General English 1st Semester. The book is divided into Two Parts. The First Part contained Poetry and Prose. Second Part contained Introduction to Communication Skills.

Tumkur University For UG Syllabus prescribed ***Contemplations-1*** a Novel by Mulk Raj Anand as Text Books for General English 3rd Semester. The book ***Invocation*** contained Poetry and Grammar.

The Action Plan is to make students learn world literature in English and also to enhance their communication skills. The Action Plan is formulated to benefit students through accomplishing different tasks. Such as:

Sl.No	Action Plan	Out Come/ End Result	Remarks
1	1.Presentations by every student in the class. 2. Literary Quiz Competition 3.Poetry recitation. 4.Debate and Discussion.	1. Completed the Syllabus keeping in mind the aspiration of the syllabus. 2. Taught the students about communication skills and interpersonal skills. 3. Gave students enough exposure to handle any day to day communication affairs. 4. Students became more sensitized about Symbiotic relationship of man and nature and their role and responsibility in the society.	Succeeded in translating the Action Plan into the reality.

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TUMKUR UNIVERSITY TUMKUR

UNIVERSITY COLLEGE OF SCIENCE

Department of English

2nd and 4th Semester Action Plan and Out Come 2012-13

Tumkur University For UG Syllabus prescribed ***General English*** as Text Book for General English 2nd Semester. The book is divided into Two Parts. The First Part contained Poetry and Essays. Second Part contained Grammar.

. Tumkur University For UG Syllabus prescribed ***Contemplations 2*** as Text Book for General English 4th Semester.

The Action Plan is to make students learn world literature in English and also to enhance their communication skills. The Action Plan is formulated to benefit students through accomplishing different tasks. Such as:

Sl.No	Action Plan	Out Come/ End Result	Remarks
1	1. Presentations by every student in the class. 2. Literary Quiz Competition 3. Poetry recitation. 4. Debate and Discussion.	1. Completed the Syllabus keeping in mind the aspiration of the syllabus. 2. Taught the students about communication skills and interpersonal skills. 3. Gave students enough exposure to handle any day to day communication affairs. 4. Students became more sensitized about Symbiotic relationship of man and nature and their role and responsibility in the society.	Succeeded in translating the Action Plan into the reality.

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ತುಮಕೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯ ವಿಜ್ಞಾನ ಕಾಲೇಜು, ತುಮಕೂರು

ಕನ್ನಡ ವಿಭಾಗ

Course Objectives and Course Outcomes of Each Course

ಪಠ್ಯಕ್ರಮ : ಬಿಎಸ್.ಸಿ

ಪ್ರಥಮ ಸೆಮಿಸ್ಟರ್– ಕಾವ್ಯ ಕಿರಣ : ಹಳೆಗನ್ನಡ ಕಾವ್ಯಭಾಗಗಳ ಪ್ರಾತಿನಿಧಿಕ ಪಠ್ಯ.
ನಾಟಕ : ಯಯಾತಿ (ಲೇಖಕ: ಗಿರೀಶ್ ಕಾರ್ನಾಡ)
ದ್ವತೀಯ ಸೆಮಿಸ್ಟರ್– ಕಾವ್ಯ ಕಿರಣ ಭಾಗ ೨ : ಹೊಸಗನ್ನಡ ಕಾವ್ಯದ ಪ್ರಾತಿನಿಧಿಕ ಪಠ್ಯ.
ಕಥಾ ಕಿರಣ : ಆಧುನಿಕ ಸಣ್ಣಕತೆಗಳ ಪಾತಿನಿಧಿಕ ಪಠ್ಯ.
ತೃತೀಯ ಸೆಮಿಸ್ಟರ್– ವಿಚಾರ ಕಿರಣ : ವೈಚಾರಿಕ–ವೈಜ್ಞಾನಿಕ ಲೇಖನಗಳ ಸಂಗ್ರಹ.
ಬೆಳಕಿನೊಂದು ಕಿರಣ ಮೇರಿಕ್ಯೂರಿ, ಜೀವನ ಚರಿತ್ರೆ (ಲೇಖಕಿ ನೇಮಿಚಂದ್ರ)
ಚತುರ್ಥ ಸೆಮಿಸ್ಟರ್– ಭಾಷಾ ಕಿರಣ : ಭಾಷೆ–ಸಂವಹನ ಕುರಿತ ಲೇಖನಗಳ ಸಂಗ್ರಹ.
ಕಾದಂಬರಿ : ಕರ್ವಾಲೋ (ಲೇಖಕ: ಪೂರ್ಣಚಂದ್ರ ತೇಜಸ್ವಿ)

ಕಾವ್ಯ (ಹಳೆಗನ್ನಡ ಹಾಗೂ ಹೊಸಗನ್ನಡ)

Course Objectives : 'ಕಾವ್ಯ' ಈ ಪತ್ರಿಕೆಯನ್ನು ಬಿಎಸ್.ಸಿ ಮೊದಲನೇ ಸೆಮಿಸ್ಟರ್‌ನ ಹಾಗೂ ಎರಡನೇ ಸೆಮಿಸ್ಟರ್‌ನ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಬೋಧಿಸಲಾಗುತ್ತದೆ. ಸಿ.ಬಿ.ಎಸ್.ಸಿ ಪಠ್ಯಕ್ರಮಕ್ಕನುಗುಣವಾಗಿ ಈ ಪತ್ರಿಕೆಯನ್ನು ಸಿದ್ದಪಡಿಸಲಾಗಿದ್ದು, ೪೦ ಅಂಕಗಳನ್ನು ಇದಕ್ಕೆ ನಿಗದಿಪಡಿಸಲಾಗಿದೆ.

ಕಾವ್ಯವು ಭಾಷಿಕ ದಾಖಲೆಯೂ ಹೌದು, ಚಾರಿತ್ರಿಕ ದಾಖಲೆಯೂ ಹೌದು. ಕಾವ್ಯದ ಅನುಭೂತಿಯು ತನ್ನಷ್ಟಕ್ಕೆ ತಾನೇ ಪರಿಪೂರ್ಣವಾಗಿರುವಂತೆ ಕಾವ್ಯದ ಮೂಲಕ ಸಂಸ್ಕೃತಿ ಸಮಾಜಗಳನ್ನು ಅರಿಯುವ ದಾರಿಗಳು ಅನಂತವಾಗಿರುತ್ತವೆ. ಕನ್ನಡ ಜಗತ್ತಿನ ಚಾರಿತ್ರಿಕ ಬೆಳವಣಿಗೆ, ಸಾಮಾಜಿಕ ಪರಿವರ್ತನೆಗಳು ಸಾಂಸ್ಕೃತಿಕ ಪಲ್ಲಟಗಳು ಕನ್ನಡ ಮನೋಧರ್ಮದ ವಿಕಾಸ ಮುಂತಾದವುಗಳನ್ನು ಹಳೆಗನ್ನಡ ನಡುಗನ್ನಡ ಹೊಸಗನ್ನಡ ಕಾವ್ಯ ಪರಂಪರೆಯ ಮೂಲಕ ಅರ್ಥಮಾಡಿಕೊಳ್ಳುವುದು ಸಾಧ್ಯ. ಚಂಪೂ, ವಚನ, ರಗಳೆ, ಷಟ್ಪದಿ, ಸಾಂಗತ್ಯ, ತ್ರಿಪದಿ, ಜನಪದ ಮುಂದಾತ ಅಭಿವ್ಯಕ್ತಿ ಪ್ರಕಾರಗಳನ್ನು ಈ ಪತ್ರಿಕೆ ಪರಿಚಯಿಸುತ್ತಿದೆ.

ಹೊಸಗನ್ನಡ ಕಾವ್ಯವು ಇಪ್ಪತ್ತನೇ ಶತಮಾನದ ಆದಿಭಾಗದಿಂದ ಪ್ರಸ್ತುತ ಸಮಕಾಲೀನ ವೈಚಾರಿಕ ನಿಲುವುಗಳನ್ನು ಹಂತ ಹಂತವಾಗಿ ನಿರೂಪಿಸುವ ಮಾಧ್ಯಮವಾಗಿದೆ. ಕಾವ್ಯದ ಸೌಂದರ್ಯವನ್ನು ಪರಿಚಯಿಸುತ್ತಲೆ ಮನುಷ್ಯ ಲೋಕದ ಹಲವು ಸಂಗತಿಗಳನ್ನು ವೈಚಾರಿಕವಾಗಿ ಹಾಗೂ ಭಾವನಾತ್ಮಕವಾಗಿ ವಿಶ್ಲೇಷಿಸುವ ಸಾಮರ್ಥ್ಯವನ್ನು ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಸಾಧ್ಯವಾಗುವಂತೆ ಮಾಡುವುದು ಕಾವ್ಯದ ಓದಿನ ಉದ್ದೇಶ.

Course Outcomes : ವಿದ್ಯಾರ್ಥಿಗಳ ಗ್ರಹಿಕೆಯ ಸಾಮರ್ಥ್ಯದ ಹೆಚ್ಚಳ. ಮನುಷ್ಯನನ್ನು ವ್ಯಕ್ತಿಯಾಗಿ ಹಾಗೂ ಸಮಾಜದ ಸದಸ್ಯನಾಗಿ ಭಿನ್ನ ಆಯಾಮಗಳಲ್ಲಿ ಅರಿಯುವ ಸೂಕ್ಷ್ಮಜ್ಞತೆಯ ಸೃಷ್ಟಿ. ಬೇರೆ ಬೇರೆ ಕಾಲಘಟ್ಟದಲ್ಲಿ ನಡೆದ ವಿಚಾರ ಕ್ರಾಂತಿಯ ಪರಿಣಾಮವನ್ನು ಕಾವ್ಯದಲ್ಲಿ ವ್ಯಂಗ್ಯವಾಗಿಯೂ ಧ್ವನಿಪೂರ್ಣವಾಗಿಯೂ ರಸಪೂರ್ಣವಾಗಿಯೂ ಮನಮುಟ್ಟುವಂತೆ ಮಾಡುವುದು. ಭಾಷಾ ಶೈಲಿಯ ಸೂಕ್ಷ್ಮತೆಯನ್ನು ಹೆಚ್ಚಿಸುವುದು. ಆಳವಾಗಿ ಅರಿಯುವ ಸಾಮರ್ಥ್ಯವನ್ನು ಹೆಚ್ಚಿಸುವುದು.

ನಾಟಕ

Course Objectives : 'ನಾಟಕ' ಈ ಪತ್ರಿಕೆಯನ್ನು ಬಿಎಸ್.ಸಿ ಮೊದಲನೇ ಸೆಮಿಸ್ಟರ್‌ನ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಬೋಧಿಸಲಾಗುತ್ತದೆ. ಸಿ.ಬಿ.ಎಸ್.ಸಿ ಪಠ್ಯಕ್ರಮಕ್ಕನುಗುಣವಾಗಿ ಈ ಪತ್ರಿಕೆಯನ್ನು ಸಿದ್ದಪಡಿಸಲಾಗಿದ್ದು, ೪೦ ಅಂಕಗಳನ್ನು ಇದಕ್ಕೆ ನಿಗದಿಪಡಿಸಲಾಗಿದೆ.

ನಾಟಕ ಸಾಹಿತ್ಯ ಕನ್ನಡ ಸಾಹಿತ್ಯ ಪ್ರಕಾರಗಳಲ್ಲಿ ಒಂದು ಇದು ಇತರ ಪ್ರಕಾರಗಳಂತೆ ಕತೆ, ಕಾವ್ಯ, ಕಾದಂಬರಿ, ಜೀವನಚರಿತ್ರೆ, ಆತ್ಮಕತೆ, ವಿಚಾರಸಾಹಿತ್ಯ ಇತರ ಪ್ರಕಾರಗಳಿಗಿಂತ ಭಿನ್ನ ಮತ್ತು ವಿಶಿಷ್ಟವಾದದ್ದು. ಈ ಮೇಲಿನ ಪ್ರಕಾರಗಳು ಓದುಗನ ಮೇಲೆ ಅಂದರೆ ಪಂಚೇಂದ್ರಿಯಗಳಾ ಕಣ್ಣು ಕಿವಿಗಳ ಮೇಲೆ ಮಾತ್ರ ಪರಿಣಾಮ ಬೀರಬಲ್ಲವು. ಆದರೆ ನಾಟಕ ಇಡೀ ಪಂಚೇಂದ್ರಿಯಳನ್ನು ಆವರಿಸಿ ತುದಿಗಾಲಲ್ಲಿ ನಿಲ್ಲುವಂತೆ ಮಾಡುವ ಶಕ್ತಿ ನಾಟಕಗಳಿಗಿವೆ.

ನಾಟಕಗಳಿಂದ ಮನುಷ್ಯನ ಜಡತ್ವವನ್ನು ಹೋಗಲಾಡಿಸಿ ಮನಸ್ಸಿಗೆ ಮುದ ನೀಡುತ್ತಲೆ ಅಲ್ಲಿನ ಸಂಗೀತ ಸಂಭಾಷಣೆ ಹಾಡುಗಳು ವೇಷಭೂಷಣಗಳು ಬೆರಗುಗೊಳಿಸುತ್ತವೆ. ಜೊತೆಗೆ ನಮ್ಮನ್ನು ಚಿಂತನೆಗೀಡುಮಾಡುತ್ತವೆ. ಸೃಜನಶೀಲರಾಗುವಂತೆ ಮಾಡುತ್ತವೆ.

ನಾಟಕಗಳು ಆದರ್ಶಗಳನ್ನು ಬಿತ್ತಿ ನೋಡುವ ಮೇಲೆ ಧನಾತ್ಮಕ ಪರಿಣಾಮ ಬೀರುತ್ತವೆ. ಉದಾ: ಸತ್ಯಹರಿಶ್ಚಂದ್ರದಂತಹ ನಾಟಕ ಗಾಂಧೀಜಿಯ ಮೇಲೆ ಬೀರಿದ ಪರಿಣಾಮವೇ ಸತ್ಯಪರಿಪಾಲನೆಗೆ ಕಾರಣವಾಗುತ್ತದೆ.

ಒಟ್ಟಾರೆ ನಾಟಕ ಮನುಷ್ಯನಲ್ಲಿರುವ ಕೇಡನ್ನು ಇಲ್ಲವಾಗಿಸಿ ಪ್ರೀತಿಯನ್ನು ತುಂಬುವ ಸಾಧನ ಎನ್ನಬಹುದು. ಇಂಥಹ ನಾಟಕಗಳಲ್ಲಿ ಒಂದಾದ ಯಯಾತಿ' ನಾಟಕ ಡಾ.ಗಿರೀಶ ಕಾರ್ನಡ್‌ರು ರಚಿಸಿರುವ ಈ ನಾಟಕ ಮೊದಲನೇ ಸೆಮಿಸ್ಟರ್‌ಗೆ ಪಠ್ಯವಾಗಿದೆ.

Course Outcomes : ಸಾಹಿತ್ಯ, ಸಂಗೀತ, ಕಲೆ ಇತ್ಯಾದಿ ಪ್ರಕಾರಳು ಮನುಷ್ಯನನ್ನು ತಿದ್ದಿ ತೀಡುವ ಪ್ರಯತ್ನ ಮಾಡುತ್ತವೆ. ಇಲ್ಲಿನ ಪಾತ್ರಗಳು ವಿದ್ಯಾರ್ಥಿಗಳ ಮನಸ್ಸಿನ ಮೇಲೆ ಧನಾತ್ಮಕ ಪರಿಣಾಮ ಬೀರುತ್ತವೆ. ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಸಹನೆ, ಜೀವನ ಪ್ರೀತಿಯನ್ನು ಹೆಚ್ಚಿಸುತ್ತವೆ ಮತ್ತು ಆರೋಗ್ಯವಂತ ಮನಸ್ಥಿತಿಯನ್ನು ರೂಪಿಸುತ್ತವೆ. ಅಂಥಹ ಉದ್ದೇಶವನ್ನು ಈ 'ಯಯಾತಿ' ನಾಟಕ ಒಳಗೊಂಡಿದೆ.

ಭಾಷಾ ಕಿರಣ

Course Objectives : 'ಭಾಷಾ ಕಿರಣ' ಈ ಪತ್ರಿಕೆಯನ್ನು ಬಿಎಸ್.ಸಿ ನಾಲ್ಕನೇ ಸೆಮಿಸ್ಟರ್‌ನ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಬೋಧಿಸಲಾಗುತ್ತದೆ. ಸಿ.ಬಿ.ಎಸ್.ಸಿ ಪಠ್ಯಕ್ರಮಕ್ಕನುಗುಣವಾಗಿ ಈ ಪತ್ರಿಕೆಯನ್ನು ಸಿದ್ಧಪಡಿಸಲಾಗಿದ್ದು, ೫೦ ಅಂಕಗಳನ್ನು ಇದಕ್ಕೆ ನಿಗದಿಪಡಿಸಲಾಗಿದೆ.

ಪಠ್ಯಕ್ರಮದಲ್ಲಿ ಭಾಷಾ ರಚನೆಯ ಅಂಶಗಳನ್ನು ಬೋಧಿಸುವುದು ಪ್ರಮುಖ ಸಂಗತಿ. ಸಂವಹನದ ಮಾಧ್ಯಮವಾಗಿ ಭಾಷೆಯನ್ನು ಪರಿಣಾಮಕಾರಿಯಾಗಿ ಪ್ರಯೋಗಿಸುವುದನ್ನು ಕಲಿಸುವುದು ಭಾಷಾ ಕಲಿಕೆಯ ಬಹುಮುಖ್ಯ ಗುರಿಯಾಗಿದೆ. ಪರಿಣಾಮಕಾರಿ ಸಂವಹನ ವಿಧಾನಗಳನ್ನು ಈ ಪತ್ರಿಕೆಯಲ್ಲಿ ಕಲಿಸಲಾಗುತ್ತದೆ. ವಿಜ್ಞಾನ ವಿದ್ಯಾರ್ಥಿಗಳು ವಿಜ್ಞಾನ ಸಂವಹನವನ್ನು ಮಾತೃಭಾಷೆಯಲ್ಲಿ ಮಾಡಬಹುದಾದ ಸವಾಲನ್ನು ಸದಾ ಎದುರಿಸುತ್ತಾ ಬಂದಿದ್ದಾರೆ. ಕನ್ನಡದಲ್ಲಿ ವಿಜ್ಞಾನ ಸಂವಹನಕ್ಕೆ ತರಬೇತುಗೊಳಿಸುವುದು ಈ ಪತ್ರಿಕೆಯ ಉದ್ದೇಶ. ಅಂತೆಯೇ ಅನುವಾದಗಳ ಮೂಲಕ ಜಾಗತಿಕ ಜ್ಞಾನದ ಪರಿಭಾಷೆಯನ್ನು ಕನ್ನಡದಲ್ಲಿ ಪರಿಷಯಿಸುವುದೂ ಪತ್ರಿಕೆಯ ಉದ್ದೇಶ. ಆದ್ದರಿಂದ ಅನುವಾದದ

ಪ್ರಕ್ರಿಯೆಯನ್ನು ಕೂಡ ಈ ಪತ್ರಿಕೆ ಪರಿಷಯಿಸುತ್ತದೆ. ಭಾಷೆಗೆ ಸಾಮಾಜಿಕತೆ ಹಾಗೂ ಸಾಂಸ್ಕೃತಿಕತೆಯ ಆಯಾಮಗಳು ಮುಖ್ಯವಾದವುಗಳು. ಭಾಷೆಯೊಡನೆ ಅವುಗಳ ಸಂಬಂಧ ಪ್ರಭಾವ-ಪ್ರೇರಣೆಗಳನ್ನು ಭಾಷಾ ವಿಜ್ಞಾನ ನೆಲೆಯಲ್ಲಿಯೂ ಸಾಮಾಜಿಕ ನೆಲೆಯಲ್ಲಿಯೂ ಗ್ರಹಿಸುವ ದಾರಿಗಳನ್ನು ಈ ಪತ್ರಿಕೆಯಲ್ಲಿ ಪರಿಚಯಿಸಲಾಗಿದೆ.

Course Outcomes : ಭಾಷಾಕರಣ ಪತ್ರಿಕೆಯು ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಭಾಷೆಯ ಬಗೆಗಿನ ತಿಳುವಳಿಕೆಯನ್ನು ವಿಸ್ತರಿಸಿದೆ. ಸಂವಹನ ಕನ್ನಡದಲ್ಲಿ ಸಂವಹನ ಎಂದರೇನು? ಅದರ ಬಗೆಗಳು ಯಾವುದು? ಪರಿಣಾಮಕಾರಿ ಸಂವಹನ ಹೇಗಿರಬೇಕು ಎಂಬ ವಿಷಯಗಳನ್ನು ಅರಿಯುವ ಮೂಲಕ ವಿದ್ಯಾರ್ಥಿಗಳು ವಿಚಾರ ಮಂಡನೆಗೆ, ಪರಿಕಲ್ಪನೆಗಳ ಸ್ಪಷ್ಟ ನಿರೂಪಣೆ, ಆಕರ್ಷಕ ಶೈಲಿ ಭಾಷೆ, ಬರವಣಿಗೆಯ ಕೌಶಲ, ಪರಿಣಾಮಕಾರಿ ಬರವಣಿಗೆ, ಸಾರ್ವಜನಿಕ ಭಾಷಣಗಳು, ವೃತ್ತ ಸಂದರ್ಶನಗಳನ್ನು ಎದುರಿಸುವ ಬಗೆ ಮುಂತಾದ ಕೌಶಲಗಳನ್ನು ಅರಿತಿದ್ದಾರೆ.

ಈ ಪತ್ರಿಕೆಯನ್ನು ವಿಜ್ಞಾನ ವಿದ್ಯಾರ್ಥಿಗಳು ಓದುತ್ತಿರುವುದರಿಂದ ವಿಜ್ಞಾನದ ವಿಷಯಗಳನ್ನು ಕನ್ನಡದಲ್ಲಿ ನಿರೂಪಿಸಿವ ಕೌಶಲಗಳನ್ನು ಅರಿಯುತ್ತಾರೆ. ಅಂಥ ಲೇಖನಗಳನ್ನು ಇಲ್ಲಿ ಪ್ರಾಯೋಗಿಕವಾಗಿ ಬೋಧಿಸುವುದರಿಂದ ಕನ್ನಡದಲ್ಲಿ ವಿಜ್ಞಾನದ ವಿಷಯ ನಿರೂಪಣೆ, ಬರವಣಿಗೆ ಪದಕೋಶಗಳು, ಪದಸೃಷ್ಟಿ, ವಿಜ್ಞಾನ ಸಾಹಿತ್ಯದ ಚರಿತ್ರೆ ಭವಿಷ್ಯದ ಸವಾಲುಗಳನ್ನು ಎದುರಿಸುವ ಮಾಹಿತಿ ಬಡೆದು ಸ್ವತಃ ಈ ಕುರಿತು ಆಸಕ್ತಿ ತಾಳುತ್ತಾರೆ. ಭಾಷೆಯ ಸಾಮಾಜಿಕ, ಸಾಂಸ್ಕೃತಿಕ, ವೈಜ್ಞಾನಿಕ, ರಾಜನಿಕ ತಿಳುವಳಿಕೆ ಅವರ ಭಾಷಾ ಸಾಮರ್ಥ್ಯ, ಸಂವಹನ ಹಾಗೂ ಅಭಿವ್ಯಕ್ತಿ ಸಾಮರ್ಥ್ಯವನ್ನು ಹೆಚ್ಚಿಸುತ್ತದೆ.

ಸಣ್ಣಕತೆ:

Course Objectives : 'ಸಣ್ಣಕತೆ' ಈ ಪತ್ರಿಕೆಯನ್ನು ಬಿಎಸ್.ಸಿ ಎರಡನೇ ಸೆಮಿಸ್ಟರ್‌ನ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಬೋಧಿಸಲಾಗುತ್ತದೆ. ಸಿ.ಬಿ.ಎಸ್.ಸಿ ಪಠ್ಯಕ್ರಮಕ್ಕನುಗುಣವಾಗಿ ಈ ಪತ್ರಿಕೆಯನ್ನು ಸಿದ್ದಪಡಿಸಲಾಗಿದ್ದು, ೬೦ ಅಂಕಗಳನ್ನು ಇದಕ್ಕೆ ನಿಗದಿಪಡಿಸಲಾಗಿದೆ.

ಸಾಹಿತ್ಯಕ್ಕೆ ಸಮಾಜವನ್ನು ತಿದ್ದಿ ತೀಡುವ ಹೊಸದಾಗಿ ರೂಪಿಸುವ ಇರುವುದನ್ನು ಬದಲಾಯಿಸುವ ಶಕ್ತಿಯಿರುವಂಥದ್ದು ಇಂಥಹ ಸಾಹಿತ್ಯದ ಬಹು ಮುಖ್ಯವಾದ ಗುಣ. ಸಾಹಿತ್ಯ ಪ್ರಕಾರಳಲ್ಲಿ ಸಣ್ಣಕತೆ

ವಿಶಿಷ್ಟವಾದ ಸ್ಥಾನವನ್ನು ಪಡೆದಿದೆ. ಸಣ್ಣಕತೆಗೆ ಮನುಷ್ಯರ ಬದುಕನ್ನು ಬದಲಾಯಿಸಬಲ್ಲ ಪ್ರೇರೇಪಿಸಬಲ್ಲ ವಿಶಿಷ್ಟ ಶಕ್ತಿಯೊಂದಿದ್ದು ಭಾರತೀಯ ಕಥನ ಪರಂಪರೆಯನ್ನು ಗಮನಿಸಿದಾಗ ಇದು ಸ್ಪಷ್ಟವಾಗುತ್ತದೆ. ಅದು ಮಾನವನ ಮನಸ್ಸಿನ ಭಾವನೆಯ ಸೇತುವೆಯಾಗಿ ಮೊದಲಿನಿಂದಲೂ ವ್ಯವಹರಿಸುತ್ತ ಬಂದಿರುವಂಥಹದ್ದು. ವಡ್ಡಾರಾಧನೆಯ ಕತೆಗಳು, ಪಂಚತಂತ್ರದ ಕತೆಗಳನ್ನು ಗಮನಿಸಿದಾಗ ನೀತಿಬೋಧನೆಯನ್ನು ಉದ್ದೇಶವನ್ನಿಟ್ಟುಕೊಂಡಿರುವುದನ್ನು ಗಮನಿಸಬಹುದು. ರಾಮಾಯಣ, ಮಹಾಭಾರತ ಕತೆಗಳು ಮಾಡಲಾಗದ ಪರಿಣಾಮವನ್ನು ಒಂದು ಕತೆ ಮಾಡುತ್ತದೆ ಎನ್ನುವಷ್ಟರ ಮಟ್ಟಿಗೆ ಅದರ ಪರಿಣಾಮ ಗಾಢವಾಗಿರುವಂತದ್ದು. ಅದಕ್ಕಾಗಿ ಕತೆ ನೀತಿ ಬೋಧನೆಯ ಸಾಧನವಾಗಿ ಮನುಷ್ಯನ ಬದುಕನ್ನು ಸನ್ಮಾರ್ಗದತ್ತ ತಿರುಗಿಸುವಲ್ಲಿ ಪ್ರಮುಖ ಪಾತ್ರವಹಿಸಿತು.

Course Outcomes : ಈ ಹಿನ್ನೆಲೆಯಲ್ಲಿ ಪ್ರಥಮ ಬಿಎಸ್.ಸಿ ಎರಡನೇ ಸೆಮಿಸ್ಟರ್ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಆಧುನಿಕ ಕಥಾ ಸಾಹಿತ್ಯದ ಆಯ್ದ ಸಣ್ಣಕತೆಗಳನ್ನು ಪಠ್ಯವಾಗಿ ಬೋಧಿಸಲಾಗುತ್ತದೆ. ಬದಲಾದ ಸಾಮಾಜಿಕ ಯಾಂತ್ರಿಕ ಬದುಕಿನಲ್ಲಿ ಮನುಷ್ಯ ಎದುರಿಸುತ್ತಿರುವ ಹಲವಾರು ಸಮಸ್ಯೆಗಳು, ಜಂಜಡಗಳು, ಶೋಷಣೆಯ ಹಲವು ಮುಖಗಳು, ಇಲ್ಲಿನ ಹಲವು ಕಥೆಗಳಲ್ಲಿದ್ದು ಅವಕ್ಕೆ ಪರಿಹಾರ ರೂಪಕ ತೀರ್ಮಾನಗಳಿದ್ದು ಪ್ರಸ್ತುತ ಸಾಮಾಜಿಕ ಸಮಸ್ಯೆಗಳನ್ನು ಎದುರುಗೊಳ್ಳಲು ಬೇಕಾದ ಒಂದು ಅಂತಃಶಕ್ತಿಯನ್ನು ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ನೀಡುವಲ್ಲಿ ಪ್ರಸ್ತುತ ಕತೆಗಳು ಸಹಕಾರಿಯಾಗಿವೆ.

ಜೀವನ ಚರಿತ್ರೆ

Course Objectives : 'ಜೀವನಚರಿತ್ರೆ' ಈ ಪತ್ರಿಕೆಯನ್ನು ಬಿಎಸ್.ಸಿ ಮೂರನೇ ಸೆಮಿಸ್ಟರ್‌ನ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಬೋಧಿಸಲಾಗುತ್ತದೆ. ಸಿ.ಬಿ.ಎಸ್.ಸಿ ಪಠ್ಯಕ್ರಮಕ್ಕನುಗುಣವಾಗಿ ಈ ಪತ್ರಿಕೆಯನ್ನು ಸಿದ್ದಪಡಿಸಲಾಗಿದ್ದು, ೪೦ ಅಂಕಗಳನ್ನು ಇದಕ್ಕೆ ನಿಗದಿಪಡಿಸಲಾಗಿದೆ.

'ಜೀವನ ಚರಿತ್ರೆ'ಎಂಬ ಗದ್ಯ ಬರಹವು ಸಾಹಿತ್ಯದ ಮುಖ್ಯ ಪ್ರಕಾರಗಳಲ್ಲಿ ಒಂದಾಗಿದೆ. ಇದು ಒಬ್ಬ ಸಾಧಕನ ಬದುಕನ್ನು ಕುರಿತ ಚರಿತ್ರೆಯ ಬರಹ. ಇದು ಒಬ್ಬ ವ್ಯಕ್ತಿಯ ಬದುಕನ್ನು ಯತಾವತ್ತಾಗಿ ಚಿತ್ರಿಸುವ ಕೆಲಸ. ಇಂಗ್ಲೀಷ್‌ನಲ್ಲಿ ಇದನ್ನು 'ಬಯಾಗ್ರಫಿ' ಎಂದು ಕರೆಯುತ್ತಾರೆ. ಒಬ್ಬ ಸಾಧಕನ ಸಾರ್ಥಕ ಬದುಕಿನ ವಿಚಾರಗಳನ್ನು ತಿಳಿದುಕೊಳ್ಳಬೇಕೆಂಬ ಉದ್ದೇಶದಿಂದ ಇದು ರಚನೆಯಾಗುತ್ತದೆ. ಅವರ ಆದರ್ಶ ಬದುಕನ್ನು ಅನುಸರಿಸಬೇಕೆಂಬ ಕಾರಣಕ್ಕಾಗಿ ಈ ಸಾಹಿತ್ಯ ಪ್ರಕಾರಕ್ಕೆ ಹೆಚ್ಚಿನ ಮನ್ನಣೆ ಸಿಕ್ಕಿದೆ. ನಿಜ ಬದುಕಿನ ಚಾರಿತ್ರಿಕ ಸಂಗತಿಗಳನ್ನು ಕಥನ ರೂಪದಲ್ಲಿ ಕಟ್ಟಿಕೊಡುವುದು ಇದರ ಉದ್ದೇಶ.

ಇದು ಬದುಕಿರುವ ಅಥವಾ ಬದುಕಿಲ್ಲದ ವ್ಯಕ್ತಿಗಳ ಚಾರಿತ್ರಿಕ ಸಂಗತಿಗಳನ್ನು ಆಕರ್ಷಕವಾಗಿ ನಿರೂಪಿಸುತ್ತದೆ. ಇದು ದಾರ್ಶನಿಕರು, ಸಾಧುಗಳು, ಕವಿಗಳು, ರಾಜಕಾರಣಿಗಳು, ಹೋರಾಟಗಾರರು, ವಿಜ್ಞಾನಿಗಳು, ಸಿನಿಮಾ ನಟರು, ಸಂಗೀತಗಾರರು, ಚಿತ್ರ ಕಲಾವಿದರು, ಸೈನಿಕರು ಅಥವಾ ಯುದ್ಧವೀರರು ಮಾಡಿದ ಚಿರಕಾಲ ಉಳಿಯಬಹುದಾದ ಕೆಲಸಗಳನ್ನು ನೆನೆಯುವ ಕಾರಣಕ್ಕಾ ಅಂಥವರ ಜೀವನ ಚರಿತ್ರೆಗಳು ರಚನೆಯಾಗುತ್ತಿವೆ. ವಸ್ತುನಿಷ್ಠತೆ ಇದರ ಮುಖ್ಯ ಗುಣ. ಆ ಕಾರಣಕ್ಕಾಗಿ ವಿಜ್ಞಾನದ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಜಗತ್ಪಸಿದ್ಧ ವಿಜ್ಞಾನಿಯಾದ ಮೇರೀಕ್ಯೂರಿಯ ಜೀವನ ಚರಿತ್ರೆಯನ್ನು ಮೂರನೇ ಸೆಮಿಸ್ಟರ್ ವಿದ್ಯಾರ್ಥಿಗಿಳಿಗೆ ಪಠ್ಯವಾಗಿ ನಿಗದಿಮಾಡಲಾಗಿದೆ.

Course Outcomes : ಯಾವುದೇ ಸಾಹಿತ್ಯದ ಮುಖ್ಯ ಉದ್ದೇಶ ಸುಧಾರಣೆ. ಆ ಕಾರಣಕ್ಕಾಗಿಯೇ ಜನರ ಮನಸ್ಸನ್ನು ಸಾಧನೆಯ ಕಡೆ ಆಕರ್ಶಿಸುವ ಕಾರಣಕ್ಕಾಗಿ ಜೀವನ ಚರಿತ್ರೆಗಳು ಮುಖ್ಯವಾಗುತ್ತವೆ. ಒಬ್ಬ ಚಾರಿತ್ರಿಕ ಪುರುಷನ ಅಥವಾ ಮಹಿಳೆಯ ಆದರ್ಶಗುಣಗಳನ್ನು ಜನರ ಮುಂದೆ ಇಡುವುದರಿಂದ ಮುಂದಿನ ತಲೆಮಾರಿನ ಜನರು ಬದಲಾಗುತ್ತಾ ಸಮಾಜವೂ ಸುಧಾರಣೆಗೆ ಒಳಗಾಗುತ್ತದೆ ಎಂಬುದು ಜೀವನ ಚರಿತ್ರೆಯ ಓದಿನ ಒಂದ ಅಂಶ. ಇಂಥಹ ಮಹಾನ್ ಸಾಧಕರ ಜೀವನ ಚರಿತ್ರೆಗಳನ್ನು ವಿದ್ಯಾರ್ಥಿಗಳು ಓದುವುದರಿಂದ ವಿದ್ಯಾರ್ಥಿಗಳು ಕೂಡ ಸಾಧನೆಯ ಹಾದಿಯಲ್ಲಿ ಮುಂದುವರೆದು ಮಹತ್ವದ್ದನ್ನು ಸಾಧಿಸಲು ಇದು ಪ್ರೇರಣೆಯಾಗುತ್ತದೆ. ಜೀವನ ಚರಿತ್ರಯ ಓದು ಒಬ್ಬ ವ್ಯಕ್ತಿಯು ನನ್ನ ಬದುಕನ್ನೇ ಆತ್ಮ ವಿಮರ್ಶೆಗೆ ಒಡ್ಡಿಕೊಂಡು ಇರುವ ಬದುಕನ್ನು ಸಾರ್ಥಕ ಬದುಕನ್ನಾಗಿ ಮಾಡುಕೊಳ್ಳುವ ಸಾಧ್ಯತೆಯೂ ಇಲ್ಲಿದೆ. ಜೀವನ ಚರಿತ್ರೆಗಳನ್ನು ಓದುವುದರಿಂದ ಸಾಧಕರ ಸಂಯಮಶೀಲತೆ, ವಿವೇಕ ಗುಣಗಳು ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಹಲವು ಬದಲಾವಣೆಗಳನ್ನು ಮಾಡುತ್ತದೆ ಎಂಬ ಉದ್ದೇಶ ಇದೆ. ಚಾರಿತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಜೀವನ ಚರಿತ್ರೆಯ ಓದಿನಿಂದ ಆಯಾ ರಂಗದಲ್ಲಿನ ಅಧ್ಯಯನ ಮಾಡುತ್ತಿರುವ ಯುವಜನ ಮತ್ತು ವಿದ್ಯಾರ್ಥಿಗಳು ಅಂತಹ ಸಾಧಕರಿಂದ ಪ್ರಭಾವಗೊಂಡು ತಾವೂ ಕೂಡ ಸಾಧನೆಯ ಹಾದಿಯಲ್ಲಿ ನೆಡೆಯುತ್ತಾರಂಬ ಉದ್ದೇಶವನ್ನು ಇದು ಒಳಗೊಂಡಿದೆ.

ವಿಚಾರ ಸಾಹಿತ್ಯ

Course Objectives : 'ವಿಚಾರ ಸಾಹಿತ್ಯ' ಈ ಪತ್ರಿಕೆಯನ್ನು ಬಿಎಸ್.ಸಿ ಮೂರನೇ ಸೆಮಿಸ್ಟರ್‌ನ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಬೋಧಿಸಲಾಗುತ್ತದೆ. ಸಿ.ಬಿ.ಎಸ್.ಸಿ ಪಠ್ಯಕ್ರಮಕ್ಕನುಗುಣವಾಗಿ ಈ ಪತ್ರಿಕೆಯನ್ನು ಸಿದ್ಧಪಡಿಸಲಾಗಿದ್ದು, ೫೦ ಅಂಕಗಳನ್ನು ಇದಕ್ಕೆ ನಿಗದಿಪಡಿಸಲಾಗಿದೆ.

ವಿಚಾರ ಸಾಹಿತ್ಯವೆಂಬುದು ಸಾಹಿತ್ಯದ ಒಂದು ಪ್ರಕಾರವಾಗಿ ಪ್ರಾಚೀನ ಕಾಲದಿಂದಲೂ ಕನ್ನಡ ಬರಹಗಳಲ್ಲಿ ಕಾಣಿಸಿಕೊಳ್ಳುತ್ತದೆ. ಶಾಸ್ತ್ರ ವಿಷಯಗಳನ್ನು ಕಲಿಸುವುದು ಶಿಕ್ಷಣ ವ್ಯವಸ್ಥೆಯಲ್ಲಿ ಈಗ ವಿಚಾರ ಸಾಹಿತ್ಯವನ್ನು ಒಂದು ವಿಷಯವಾಗಿ ಬೋಧಿಸುತ್ತಿದ್ದಾರೆ. ವೈಚಾರಿಕತೆ ಅಥವಾ ವಿಚಾರ ಸಾಹಿತ್ಯವೆಂಬುದು ಎದ್ದು ಕಾಣುವ ಸಂಗತಿಯಾಗಿರುವುದಿಲ್ಲ. ಅದು ಸಾಹಿತ್ಯದ ಎಲ್ಲಾ ಬರಹಗಳಲ್ಲೂ ಬೆರೆತು ಹೋಗಿರುತ್ತದೆ. ವಿಚಾರ ಸಾಹಿತ್ಯವು ಉಂಟುಮಾಡುವ ಆನಂದಾನುಭವ ವಿಶಿಷ್ಟವಾದದ್ದು ಇದರ ಜೊತೆ ಓದುಗನ ಬುದ್ಧಿಯು ಚುರುಕಾಗುತ್ತದೆ. ಹೊಸದಾಗಿ ಆಲೋಚಿಸುವ ತರಬೇತಿಯನ್ನೂ ವಿಚಾರ ಸಾಹಿತ್ಯದ ಓದು ಒದಗಿಸುತ್ತದೆ. ವಿಚಾರ ಸಾಹಿತ್ಯ ಮುಖ್ಯವಾಗಿ ವಿಶ್ಲೇಷಣಾತ್ಮಕವಾದದ್ದು. ಯಾವುದೇ ವಿಷಯವನ್ನು ಕುರಿತಂತೆ ಅದು ಚಿಕಿತ್ಸಕ ಬುದ್ಧಿಯಿಂದ ನೋಡುತ್ತದೆ ಹಾಗೂ ಅದರ ಸತ್ವವನ್ನು ಹೊಳೆಯುವಂತೆ ಮಾಡುತ್ತದೆ. ಇದು ತನ್ನ ರಚನೆಯ ಒಳಗೆ ಸಮಾಜ, ವಿಜ್ಞಾನ, ಮಾನವಿಕ ಮುಂತಾದ ಎಲ್ಲಾ ಕ್ಷೇತ್ರಗಳ ವಿವರಗಳನ್ನೂ ಒಳಗೊಂಡಂತೆ ರೂಪುಗೊಂಡಾಗ ರಚನೆಯಾದದ್ದರಿಂದ ವಿಚಾರ ಸಾಹಿತ್ಯದ ಅಧ್ಯಯನ ಅತೀ ಅಗತ್ಯವಾದದ್ದು ಎನ್ನಿಸಿಕೊಂಡಿದೆ. ವಿಚಾರವು ಇಂದ್ರಿಯಗಳಿಂದ ಗ್ರಹಿಸಿ, ಗ್ರಹಿಸಿದ್ದನ್ನು ವಿಂಗಡಿಸಿ, ವಿಂಗಡಿಸಿದ್ದನ್ನು ಸಮಗ್ರವಾಗಿ ನೋಡುವ ಉದ್ದೇಶವನ್ನು ಒಳಗೊಂಡಿರುತ್ತದೆ. ಹೊಸ ಆಲೋಚನೆಗೆ ತೆರೆದುಕೊಳ್ಳು ಕಾರಣಕ್ಕಾಗಿ ಇಂದು ಶಾಲಾ ಕಾಲೇಜುಗಳಲ್ಲಿ ಪಠ್ಯಕ್ರಮದಲ್ಲಿ ವಿಚಾರ ಸಾಹಿತ್ಯದ ಓದು ಅಗತ್ಯವಾಗಿದೆ.

Course Outcomes : ಇದು ವ್ಯಕ್ತಿಯ ಚಿಂತನ ಶೀಲ ಸ್ವಭಾವವನ್ನು ಚುರುಕುಗೊಳಿಸುತ್ತದೆ. ಶಾಸ್ತ್ರ ವಿಚಾರಗಳ ಓದು ಶಿಕ್ಷಿತರಿಗೆ ಮಾತ್ರ ಸೀಮಿತವಾಗಿರುತ್ತದೆ. ಆದರೆ ಸಾಮಾನ್ಯ ಓದು ಬರಹ ಬಲ್ಲ ಎಲ್ಲರೂ ವಿಚಾರ ಸಾಹಿತ್ಯವನ್ನು ಓದುವುದರಿಂದ ಇದಂ ಇತ್ತಂ ಎಂಬ ಸಂಗತಿಗಳನ್ನು ಹೊಸದಾಗಿ ಕಾಣಿಸುವ ತರಬೇತಿಯನ್ನು ವಿಚಾರ ಸಾಹಿತ್ಯದ ಓದು ಒದಗಿಸುತ್ತದೆ. ವಿಚಾರ ಸಾಹಿತ್ಯದ ಓದಿನಿಂದ ಸಮಾಜ ಜಡವಾಗಿ ಉಳಿಯದೆ ಸದಾ ಚಟುವಟಿಕೆಯಿಂದ ಕೂಡಿರುವಂತೆ ಮಾಡುತ್ತದೆ. ವಿಚಾರ ಸಾಹಿತ್ಯದ ಓದಿನಿಂದ ಹಲವು ಸಾಮಾಜಿಕ ಅಸಮಾನತೆಗಳನ್ನು ವೈಜ್ಞಾನಿಕ ತಳಹದಿಯ ಮೇಲೆ ತಿಳಿದುಕೊಳ್ಳುವಂತೆ ಪ್ರೇರೇಪಿಸುತ್ತದೆ. ಮೂಢನಂಬಿಕೆಗಳಂಥಹ ಅನಿಷ್ಟಪದ್ಧತಿಗಳನ್ನು ವಿಚಾರ ಸಾಹಿತ್ಯ ಸಾರಾಸಗಟಾಗಿ ನಿರಾಕರಿಸುವುದರಿಂದ ಸಮಾಜ ವೈಚಾರಿಕ ಮತ್ತು ವೈಜ್ಞಾನಿಕ ತಳಹದಿಯ ಮೇಲೆ

ವಿಕಾಸ ಹೊಂದುವಂತೆ ತನ್ನ ಓದುಗರನ್ನು ಪ್ರೇರೇಪಿಸುತ್ತದೆ. ಪೂರ್ವಕರಿಂದ ಸಾಂಪ್ರದಾಯಿಕವಾಗಿ ಸಾಗಿಬಂದ ಎಲ್ಲಾ ಸಂಗತಿಗಳನ್ನು ಸಾಂಪ್ರದಾಯಿಕ ಚೌಕಟ್ಟಿನಿಂದ ಹೋರಗೆಳೆದು ಪರಿಶೀಲಿಸಿ ಹೊಸ ಉತ್ತರಗಳನ್ನು ಕಾಣಿಸುವುದು ಇದರ ಬಹುದೊಡ್ಡ ಉಪಯೋಗವಾಗಿದೆ. ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ವಿಚಾರ ಸಾಹಿತ್ಯದ ಓದು ತಾರ್ಕಿಕ ಬುದ್ದಿಯನ್ನು ಚುರುಕುಗೊಳಿಸುವ ತರಬೇತಿಯನ್ನು ನೀಡುತ್ತದೆ. ಇದೇ ಕಾರಣಕ್ಕಾಗಿ ಇದನ್ನು ಬಿಎಸ್.ಸಿ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಪಠ್ಯವಾಗಿ ಬೋಧಿಸಲಾಗುತ್ತಿದೆ.

ಕಾದಂಬರಿ

Course Objectives : 'ವಿಚಾರ ಸಾಹಿತ್ಯ' ಈ ಪತ್ರಿಕೆಯನ್ನು ಬಿಎಸ್.ಸಿ ನಾಲ್ಕನೇ ಸೆಮಿಸ್ಟರ್‌ನ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಬೋಧಿಸಲಾಗುತ್ತದೆ. ಸಿ.ಬಿ.ಎಸ್.ಸಿ ಪಠ್ಯಕ್ರಮಕ್ಕನುಗುಣವಾಗಿ ಈ ಪತ್ರಿಕೆಯನ್ನು ಸಿದ್ಧಪಡಿಸಲಾಗಿದ್ದು, ೫೦ ಅಂಕಗಳನ್ನು ಇದಕ್ಕೆ ನಿಗದಿಪಡಿಸಲಾಗಿದೆ.

ಜನಪ್ರಿಯ ಸಾಹಿತ್ಯ ಪ್ರಕಾರಗಳನ್ನು ಕಾದಂಬರಿಯೂ ಒಂದು. ಕಾದಂಬರಿ ಒಂದು ವಸ್ತುವಿನ ವಿಸ್ತಾರದ ಬೆಳವಣಿಗೆಯಲ್ಲಿ ರಚನೆಯಾಗಿರುತ್ತದೆ. ಕಾದಂಬರಿ ರಚನೆಯ ಹಿನ್ನೆಯು ಮನುಷ್ಯನನ್ನೇ ಕೇಂದ್ರವನ್ನಾಗಿಟ್ಟುಕೊಂಡಿರುತ್ತದೆ. ಅಲ್ಲಿ ಒಂದು ಸಾಮಾಜಿಕ ವ್ಯವಸ್ಥೆ, ಒಂದು ರಾಜಕೀಯ ವ್ಯವಸ್ಥೆ, ಆರ್ಥಿಕ ವ್ಯವಸ್ಥೆ, ಸಾಂಸ್ಕೃತಿಕ ವ್ಯವಸ್ಥೆಗಳನ್ನು ತನ್ನೊಳಗೆ ಇಟ್ಟುಕೊಂಡು ಓದುಗನಿಗೆ ವಿವರವಾಗಿ ತಿಳಿಸುತ್ತದೆ. ಕಾದಂಬರಿ ಸೃಜನಶೀಲ ಕೃತಿಯಾಗಿದ್ದರೂ ಅದರೊಳಗಿನ ಅನಂತ ವಿವರಗಳು ಹೊಸ ಅನುಭವವನ್ನು ಒದಗಿಸುತ್ತವೆ. ಕಾದಂಬರಿ ಒಂದು ಪ್ರಕಾರವಾದರೂ ವೈವಿದ್ಯತೆಯನ್ನು ಹೊಂದಿದೆ. ಸಾಮಾಜಿಕ ಕಾದಂಬರಿ, ಐತಿಹಾಸಿಕ ಕಾದಂಬರಿ, ಪ್ರಾದೇಶಿಕ ಕಾದಂಬರಿ, ವೈಜ್ಞಾನಿಕ ಕಾದಂಬರಿ ಹೀಗೆ ವಿಸ್ತಾರವನ್ನು ಹೆಚ್ಚಿಸಿಕೊಂಡಿದೆ. ಕಾದಂಬರಿಕಾರ ಏನನ್ನೂ ನೇರವಾಗಿ ಹೇಳದೆ ಎಲ್ಲವನ್ನೂ ಪಾತ್ರಗಳ ಮೂಲಕ ಅಭಿವ್ಯಕ್ತಿಪಡಿಸುತ್ತಾನೆ. ಇದರಿಂದ ಕಾದಂಬರಿಯು ಒಂದು ಕಾಲದ ಮನುಷ್ಯನ ಜೀವನ ಕ್ರಮವನ್ನು ತೋರಿಸುತ್ತದೆ.

Course Outcomes : ಕಾದಂಬರಿಯ ಓದು ಸಾಮಾಜಿಕ ಪಲ್ಲಟವನ್ನು ಅಪೇಕ್ಷಿಸುತ್ತಿರುತ್ತದೆ. ಕಾದಂಬರಿ ಬೆಳವಣಿಗೆಯಲ್ಲಿ ಪಾತ್ರ ಚಿತ್ರಣ ಮುಖ್ಯವಾಗಿರುವುದರಿಂದ ಅದು ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಬದಲಾವಣೆಯನ್ನು ಉಂಟುಮಾಡುತ್ತದೆ. ಎಲ್ಲಾ ಕಾದಂಬರಿಗಳ ಓದು ಮಾನವೀಯತೆಯ, ತಾರತಮ್ಯ ರಹಿತವಾದ ಸಾಮಾಜಿಕ ವ್ಯವಸ್ಥೆಯನ್ನು ಅಪೇಕ್ಷಿಸುತ್ತವೆ. ಕಾದಂಬರಿಯಲ್ಲಿ ರೋಮಾಂಚಕತೆ ಇರುತ್ತದೆ ಜೊತೆಗೆ ವೈಚಾರಿಕ ತಿಳುವಳಿಕೆಯನ್ನು ಅದು ತನ್ನ ಅಂತರಂಗದಲ್ಲಿ ಇಟ್ಟುಕೊಂಡಿರುತ್ತದೆ. ಇದು ವಿದ್ಯಾರ್ಥಿಗಳ ಅರಿವನ್ನು ವಿಸ್ತರಿಸುತ್ತವೆ. ಕಾದಂಬರಿಯ ರಚನೆಯು ತಂತ್ರಗಾರಿಕೆಯನ್ನು ಒಳಗೊಂಡಿದೆ. ಯಾವ ವಿಷಯಗಳು ಮುಖ್ಯ ಯಾವುದು ಅಮುಖ್ಯ ಎಂಬುದನ್ನು ವಿದ್ಯಾರ್ಥಿಗಳ ವಿವೇಚನೆಗೆ ಹೊಳೆಯುವಂತೆ ಮಾಡುತ್ತದೆ. ಇದರ ಜೊತೆಗೆ ಐತಿಹಾಸಿಕ ವಿವರಗಳನ್ನು, ವೈಜ್ಞಾನಿಕ ವಿವರಗಳನ್ನು, ಸಾಮಾಜಿಕ ವಿವರಗಳನ್ನು ಇವು ಒಳಗೊಂಡಿರುವುದರಿಂದ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಒಂದೇ ಕಾಲಕ್ಕೆ ಹಲವು ಜ್ಞಾನ ಶಾಖೆಗಳ ತಿಳುವಳಿಕೆ ಸಾಧ್ಯವಾಗುವುದರ ಜೊತೆಗೆ ರಸಾನುಭವವೂ ಉಂಟಾಗುತ್ತದೆ. ಕಾದಂಬರಿ ಸಾಹಿತ್ಯವನ್ನು ಓದುವ ವಿದ್ಯಾರ್ಥಿಗಳು ಕೂಡ ತಮ್ಮ ವಿಶಿಷ್ಟ ಅನುಭವಗಳನ್ನು ಕಥನ ರೂಪದಲ್ಲಿ ಕಟ್ಟಕೊಡುವಲ್ಲಿ ಪ್ರೇರಕ ಶಕ್ತಿಯಾಗಿ ಕೆಲಸ ಮಾಡುತ್ತದೆ.

TUMKUR UNIVERSITY

UNIVERSITY COLLEGE OF SCIENCE

DEPARTMENT OF BOTANY

Action plans, course outcomes and objectives

The curriculum framed by the Department of Botany intends to improve the perspective of students towards Botany and initiate students to enjoy study of plants, to use abstraction to perceive relationships & structure and to make the learning process student-friendly by having focus in Botany teaching, especially in the plants nature learning environment. Keeping this in mind, a lab component has been introduced in the curriculum to inculcate practical approach to know about knowledge on plants.

Subject-wise Action Plan

1st Semester:

Course Title: BIODIVERSITY (ALGAE, FUNGI and ARCHEGONIATE)

Objectives	Learning Outcomes
Students will: • Get introduced to Study of microbes which includes virus and bacteria. • Learning of characters, classification structure and importance of different forms of algae. • Study on fungi includes general characters, classification and life cycle of well-known fungi. • Get introduction on archegoniate. • Get introduced to study of bryophytes morphology, anatomy and reproduction. • Learn pteridophytes characters, classification and stelar evolution.	The students will • Have a clear understanding of common viral and bacterial disease over plants and their controlling measure. • Know on identification and economic importance of algae • Be able to know on common members and their lifecycle where they were found. • Be able to know on archegoniate. • Be able to use the morphological study in the nature. • Have a clear understanding on stelar evolution in pteridophytes.

2nd Semester:

Course Title: PLANT ECOLOGY, PHYTOGEOGRAPHY AND PLANT PATHOLOGY

Objectives	Learning Outcomes
Students will: • Get introduced on scope of ecology • Learn ecological factors which are impact on vegetation. • Learn the structure of ecosystem and biological cycles. • Learn Ecological adaptations, succession, and pollution in the ecosystem. • Get introduced on plant biodiversity and phytogeography. • Learn plant pathology includes classification of plant diseases	The students will • Be able to know the significance of study of ecology. • Be able to know on ecological factors and how they are important for environment. • Know the organisms are interconnected in the environment and balance of ecological pyramid • Be able to learn the adaptation of plants to the corresponding environment. • Be able to know plant diversity of surrounding environment and distribution of species. • Get knowledge on plant diseases.

3rd Semester:

Course Title: EBRYOLOGY OF ANGIOSPERMS AND TISSUE CULTURE

Objectives	Learning Outcomes
Students will: • Get introduced to some of the fundamental aspects embryology. • Learn about angiospermic flower which includes structure of flower pollination and palynology. • Get knowledge on megasporangium, includes plancentation, ovule and megasporogenisis • Get introduced to pollination and fertilization in plants. • Get introduction on embryo and endosperm. • Learn on plant tissue culture which includes totipotency, sterilization technics and application. • Get introduced brief account on apomixes	The students will • Know on contributors of embryologist to embryology. • Be able to know the structure of flower and significance of pollination. • Have a good knowledge about the development of megasporangium. • Be able to obtain the knowledge on pollination in occur in different mode. • Know the structure and development of dicot and monocot embryo. • Be able to use plant tissue culture and get knowledge on its application. • get knowledge on apospory, polyembryony, parthenocarpy and controle of fertilization.

4th Semester:

Course Title: PLANT ANOTOMY, MORPHOLOGY OF ANGIOSPERM, PLANT PROPAGATION

Objectives	Learning Outcomes
Students will: • Get introduced to meristamatic tissues and permanent tissues includes study of tissue structure and functions. • Learn about the structure of dicot and monocot root, stem and leaf. • Get introduced to secondary growth in dicot stem, anomalous growth in Dracena and Boerhavia • Learn morphology of angiosperms includes root system, stem, leaf and inflorescense and its modifications. Study of floral morphology and fruits. • Get introduced to plant propagation includes vegetative propagation.	The students will • Learn to get knowledge on meristamatic theories and their functions • Have a clear knowledge on structure of root, stem and leaf. • Be able to know brief account on wood anatomy. • Have clear knowledge on modifications of root, stem and leaf. Types of inflorescence and fruits. • Have knowledge on propagation of plants through various kinds like tubers, corm, bulb, sucker, stolon and by stem cutting, grafting and layering.

5th Semester: paper-V

i) Course Title: TAXONOMY OF ANGIOSPERMS, ECONOMIC BOTANY AND ETHNOBOTANY

Objectives	Learning Outcomes
Students will: • Get introduced to Plant Taxonomy consist systems of classification and plants nomenclature. • Learn on herbarium technics, botanical gardens and floras and their importance. • Get formally introduced to the concept of angiospermic families according to Engler and prantle system of classification. Families from archichlamydae and metachlamydae. • Get familiarized with economic botany includes study of economically important plants with botanical name • Get introduced to ethno botany with respect to study of medicinal plants and their medicinal values.	The students will • Learn about the various aspects different system of taxonomy and classification of plants. • Have a clear knowledge on herbarium technics. Botanical gardens and floras. • Learn the classification of plants through engler and prantle system. Know about botanical description of families with reference to key characters. • Have a clear knowledge on economically important plants with respect to families and their part used and uses. • Have a clear knowledge on medicinal plants and their therapeutic uses.

5th Semester: PAPER-VI

ii) Course Title: CYTOLOGY, GENETICS, PLANT BREEDING AND EVOLUTION

Objectives	Learning Outcomes
Students will: • Be introduced to cell and cell organelles especially prokaryotic and eukaryotic cell. • Get introduced on chromosomes with respect to chromosome morphology and chromosomal aberrations. • Be introduced to cell cycle includes mitosis and meiosis. • Learn on Genetics which includes terminologies, mendelism. • Get introduced to interaction of genes. supplementary, complementary and epistatic gene interaction and genetic problems, linkage and crossing over and cytoplasmic male sterility. • Learn on the aspects of plant breeding with respect to methods involved in plant breeding. • Get introduced to evolution	The students will • Get knowledge on cell organelles like cell wall, cell membrane, Golgi, mitochondria, ER and peroxisomes and their functions. • Be able to know about the structure of chromosome broadly and structural and numerical aberrations. • Get knowledge on cell division stages of mitosis and meiosis and stage characters. • Get complete knowledge on genetic terminologies, in mendelism laws of hereditary and deviations from mendelism. • Have a clear knowledge on supplementary, complementary and epistatic gene interaction and genetic problems, linkage and crossing over and cytoplasmic male sterility. • Be able to get knowledge on hybridization technics and quarantine process. • Be able to learn theories of evolution include Lamarckism. Darwinism and Neo-Darwinism.

6th Semester: PAPER-VII

ii) Course Title: PLANT PHYSIOLOGY AND METABOLISM

Objectives	Learning Outcomes
Students will: • Get introduced to plant water relation include water potential and its components. • Get introduction on mineral nutrition with reference to essential elements. • Learn on photosynthesis and photosynthetic apparatus, pigments. • Learn on Genetics which includes terminologies, mendelism. • Get introduced to plant respiration consist structure of mitochondria, glycolysis and TCA. • Learn on the aspects of enzymes structure, nomenclature properties and classification. • Get introduced to nitrogen metabolism • Get introduced to plant growth regulators. • Get introduce on plant response to light and temperature. Plant Dormancy • Get introduction to Plant movements	The students will • Get knowledge on absorption of water and transpiration with respective theories. • Be able to know about the micro and macro nutrients with respect to their functions and deficiencies. • Get knowledge on photosynthesis and photosynthetic pathways include electron transport, C_3, C_4 and CAM • Get complete knowledge on plant respiration with reference to glycolysis, anaerobic respiration, TCA, phosphorylation and pentose pathway. • Have knowledge on mechanism on enzyme action. • Learn especially biological nitrogen fixation and assimilation • Know on plant growth promoters and regulators role in agriculture and horticulture. • learn on photoperiodism and phytochromes and vernalisation. • Have clear knowledge on Photoperiodism geotropism, hydrotropism seismonasty

6th Semester: PAPER-VIII

ii) Course Title: MOLECULAR BIOLOGY, GENETIC ENGEINEERING, BIOINFORMATICS AND BIOTECHNOLOGY

Objectives	Learning Outcomes
Students will: • Be introduced to molecular biology includes genetic material, chemical nature of genetic material and regulation of gene expression. • Be introduced to bio molecular technics. • Learn on Genetic engineering • Get introduced to bioinformatics • Learn on the aspects of biotechnology • Get introduced to evolution	The students will • Get knowledge on molecular biology with respect to study of DNA nad RNA genetic material and biosynthesis of protein. • Be able to know about the blotting technics and DNA finger printing. • Get knowledge on methods used in recombinant DNA technology, tools and applications. • Get complete knowledge on biological data basis, brief account on NCBI • Have a clear knowledge on fermentation and environment technology.

Department of Physics

Action plan

Semester – wise course objectives and outcomes

During the bridge course course at the beginning of the academic year, the Head of the department and faculty members explain to the students regarding the vision, mission, objectives, core values and Course Outcome. The faculty conveys the Course Specific Outcome and Course Outcome to the students. The faculty members also convey the students regarding the evaluation pattern, weightage and other course-related information in the classrooms and laboratories. The mentors discuss regarding the Course Outcome, Course Specific Outcome and Course Outcome with the mentees.

The course outcome and course specific outcome are measured on the basis of performance of students in internal theory and practical exams. The evaluation modes include assignments, written tests and objective type questions. The faculty guide and help students to improve their performances. The faculty members have adopted individual mechanism to improve the course outcome and course specific outcome.

Sl. No	Semester	Course Objective	Course Outcome (Students will learn)
1	**I Semester**	Laws of motion, Momentum and Energy	Apply Newton's laws of motion to realistic situations with free body diagrams. Conservation theorems and their applications
		Rotational Motion and Gravitation	Fundamentals of rotational motion and Moment Inertia. Laws of gravitation and basics related to the satellite orbits.
		Oscillations and Elasticity	Kinetic energy, Potential energy and total energy of oscillations. Laws of elasticity and determination of elastic constants
		Special theory of Relativity	Frame of references, Lorentz transformations, Variation of length, time and mass with velocity. Mass and energy conversion
2	**II Semester**	Vector analysis and Electrostatics	Line integration surface integral and volume integral and gauss divergence theorem and stokes theorem
		Magnetism	Magnetostatics, magnetic fields and electromagnetic induction

		Magnetic Properties of materials	Magnetic susceptibility, paramagnetic, diamagnetic and ferro-magnetic materials. Maxwells equations and electromagnetic wave propogation
		Transient current, Alternating current and Network theorem	CR Circuits and LCR circuits, series and parallel LCR circuits Q factor and band width of LCR filter
2	**III Semester**	Kinetic Theory of Gases	Maxwells – Boltzmann distribution of velocity, Expressions for thermal conductivity and viscosity. Application to the real gases.
		Thermodynamics	Laws of thermodynamics, Basics and working of heat engines. Maxwells relations between thermodynamic quantities.
		Low temperature and Radiations	Production and measurement of low temperature. Laws of radiation and determination of Stefan's constant
		Optics	Wave optics, interference and its applications.

			Michelson's Interferometer.
	IV Semester	Superposition of two collinear harmonic oscillations and perpendicular waves and wave motion	Linearity and superposition of two waves. Graphical analytical methods. Lissajous figures and determination of unknown frequency
		Sound and Fluids	Simple harmonic oscillations, Fourier theorem, Acoustics, reverberation, Sabines formula
		Diffraction	Fraunhofer diffraction, polarization , linearly, circular and elliptically polarized polarized lights.
		Statistical Mechanics	Phase space, Microstate and macrostate, Entropy and thermodynamic probability, qQuantum Statistics, Fermi energy, Fermi sphere, and Fermi gas.
	V Semester (Paper V)	Digital Circuits and Introduction to CRO	Difference between analog and digital circuits, Number systems, logic gates and Boolean algebra. Applications of CRO

		Semiconductor devices and amplifiers	Physics of semiconductor devices LED, LDR and solar cells. Basics of transistors, and applications of transistor as an amplifier and switch.
		Embedded Systems and Microprocessors	Introduction to embedded systems and architecture. Elementary ideas of embedded processors and microcontrollers.
	Semester V (Paper VI)	Modern Physics	Phtoelectric effect, Compton effect, de Broglie wavelength and experimental evidence. Bohr quantization rule and calculation of energy levels of hydrogen atoms and its study of spectra. Uncertainty principle, Estimating minimum energy of a confined particle using uncertainty principle and Energy-time uncertainty principle.
		Astrophysics	Basics of Astronomical units and luminosity of stars. Sequence of stars and

			their general characteristics, gravitational potential energy, statement of virial theorem. Expressions for average temperature, core temperature hydrostatic equilibrium and core pressure, Luminosityrelation and lifetime of star.
	VI Semester (paper - 07)	Integrated circuits and operational amplifiers, oscillators	Description ICand description of discrete IC, Characteristics and OPAMP, Applications of OPAMP, Feedback concepts and feedback amplifiers, Phaseshift and Weinbridge oscillator
		8051 Microcontroller and I/O port programming	Block diagram, of 8051 microcontroller, architecture of 8051, assembly level language.
		Quantum Mechanics	Fundamentals of quantum mechanics, time dependent and time independent

			shrodinger equation. Operators and expectation values
	Paper VIII	Nuclear models	Liquid drop models, semiempirical mass formula and evidence for nuclear shell model.
		Radiactivity decay , Detector foe Nuclear radiations	Alpha decay, Beta decay and gamma decay, Ionization chamber and GM counter, Scintillation detector and contruction of PMT
		Solid state Physics and molecular physics	Crystal Systems and x-rays, Free electron theory, rotational and vibrational motions . Raman scattering (lassical and Quantum Theory)

TUMKUR UNIVERSITY

UNIVERSITY COLLEGE OF SCIENCE

DEPARTMENT OF MATHEMATICS

Action plans, course outcomes and objectives

The curriculum framed by the Department of Mathematics intends to improve the perspective of students towards mathematics and initiate students to enjoy mathematics, to use abstraction to perceive relationships & structure and to make the learning process student-friendly by having a shift in focus in mathematical teaching, especially in the mathematical learning environment. Keeping this in mind, a lab component has been introduced in the curriculum to inculcate practical approach to solve mathematical problems.

Subject-wise Action Plan

1st Semester:

Course Title: 1.1 Algebra and Calculus 1

Objectives	Learning Outcomes
Students will: • Learn to obtain the nth derivatives of some standard functions and some rules associated. • Get introduced to the polar co-ordinate system • Learn the technique of integrating various trigonometric functions of higher degree with/without limits • Get introduced to partial differentiation and rules associated with it • Learn the method of solving a system of homogeneous/non-homogeneous linear equations using matrices. • Learn the method of findingeigen values and eigen vectors of a square matrix • Learn the basics of Scilab and Maxima softwares	The students will • Have a clear understanding of the fundamental aspects of successive differentiation • Understand the significance of reduction formulae • Be able to solve a general system of linear equations • Know the importance of the rank of a matrix and its properties • Be able to use Scilab/Maxima to solve some of the fundamental mathematical problems and to plot 2D curves and 3D surfaces

2nd Semester:

Course Title: 2.1 Differential Equations

Objectives	Learning Outcomes
Students will: • Learn various methods of solving first/higher order ordinary differential equations • Learn a few applications of ordinary differential equations • Learn the technique of constructing partial differential equations by eliminating arbitrary parameters /functions • Learn methods of solving some particular types of partial differential equations	The students will • Be able to know the significance of solving ordinary/partial differential equations • Know how to solve differential equations using Scilab/Maxima • Get to know the geometrical interpretation of the solution of first order differential equations using Maxima

3rd Semester:

Course Title: 3.1 Real Analysis

Objectives	Learning Outcomes
Students will: • Get introduced to some of the fundamental aspects of set theory such as countability, extremum and neighborhood • Learn about infinite sequences and series and get introduced to some methods of determining their nature, i.e., convergence/divergence/oscillatory nature • Revisit the fundamentals of calculus, i.e., limits, continuity and differentiability • Get introduced to mean-value theorems and series expansion of functions	The students will • Have a solid foundation in set theory • Be able to test the nature of infinite sequences/series using various techniques • Have a good knowledge about the basics of differential calculus • Be able to obtain the series expansion of differentiable functions • Know the application of L'Hospital's rule to evaluation of limits in indeterminate forms • Be able to use Scilab/Maxima to solve some of the problems pertaining to real analysis

4th Semester:

Course Title: 4.1 Algebra and Calculus 2

Objectives	Learning Outcomes
Students will: • Get introduced to some branches of Mathematics such as Groups, Vector Calculus and Multiple Integrals • Learn about the various aspects of scalar and vector differential operators and their geometrical aspects • Get themselves familiarized with different types of groups and subgroups • Learn some of the looping structures in Maxima such as for, if then and while	The students will • Learn to appreciate the application of Vector Calculus pertaining to various physical problems • Be enabled to evaluate various types of double and triple integrals • Develop a strong foundation in the fundamental aspects of algebra • Be able to use Scilab/Maxima to solve many problems related to multiple integrals and fundamental algebra

5th Semester: i) Course Title: 5.1 Advanced Algebra and Numerical Methods
ii) Course Title: 5.2a Analysis and Integral Transforms

Objectives	Learning Outcomes
Students will: • Get introduced to two of the core topics of Algebra namely Ring Theory and Linear Algebra • Discover some of the interesting theorems/results in Algebra • Get formally introduced to the concept of Numerical Methods • Get familiarized with two improper integrals namely Beta and Gamma functions • Get introduced to Laplace Transforms and Fourier Transforms	The students will • Learn about the various aspects of Advanced Algebra pertaining to Rings and Vector Spaces • Be able to use various numerical methods to solve some of the important problems such as finding roots of equations, solving systems of linear equations and first order differential equations. • Learn the importance of Beta and Gamma functions to evaluate various improper integrals • Learn about integral transforms and Fourier series expansion of periodic functions • Writing programs using Maxima to solve some of the Mathematical problems

6th Semester: i) Course Title: 6.1 Complex Analysis and Numerical Methods

ii) Course Title: 6.2a Number Theory

Objectives	Learning Outcomes
Students will: • Be introduced to two very important branches of Mathematics namely Number Theory and Complex Analysis • Be provided with some of the fundamental aspects of Complex Differentiation and Integration • Be introduced to some of the Numerical methods such as Interpolation and Numerical Integration • Get accustomed to various programming aspects to solve problems pertaining to Number Theory and Calculus of Complex Functions	The students will • Have a solid foundation in Number Theory • Be able to know about the subtle difference between Calculus of Real valued functions and Complex valued functions. • Be enabled to use numerical methods to solve different types of mathematical problems.

ಮುಖ್ಯಸ್ಥರು
ಗಣಿತಶಾಸ್ತ್ರ ವಿಭಾಗ
ವಿಶ್ವವಿದ್ಯಾನಿಲಯ ವಿಜ್ಞಾನ ಕಾಲೇಜು
ತುಮಕೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯ, ತುಮಕೂರು

Electronics

DEPARTMENT OF ELECTRONICS

UNIVERSITY COLLEGE OF SCIENCE, TUMKUR UNIVERSITY

Action plans, Course outcomes and Objectives

Electronics is a technical and scientific discipline that studies physical, non-linear, electric systems/components and the electronic circuits. Electronics has tremendous application in almost all fields. The curriculum framed by the Department of Electronics intends to improve the perspective of students towards Electronics and to create learning, development and testing environment to meet ever challenging needs of the electronic industry.

Semester-wise Action Plan

SEMESTER- I

Course Title: PAPER-I: NETWORK ANALYSIS, ANALOG and DIGITAL ELECTRONICS

Objectives	Learning Outcomes
• To acquire the basic knowledge about the circuit elements to understand electronics circuits and to analyze the circuits using different methods. • To get the thorough knowledge about PN junction diode, Zener diode and their applications • To study Transistor as amplifying device • To get the basic knowledge of Number systems, codes, digital logic levels and logic gates	The students will • Have a thorough understanding of the fundamental concepts and techniques used to analyze the electronic circuits • Have the ability to design power supply and amplifiers • Understand and get the ability to examine the structure of various number systems and its application in digital design.

SEMESTER- II

Course Title: PAPER-II: LINEAR AND DIGITAL INTEGRATEDCIRCUITS

Objectives	Learning Outcomes
• To acquire the knowledge about Operational Amplifiers, their	The students will • Be able to design op-amp circuits for the

Characteristics and their applications • To study multistage Amplifier and Feedback in Amplifier. • To study Sinusoidal Oscillators: • To study Unipolar Devices like JFET, UJT and their applications. • To study the combinational and sequential logic circuits and design. • To study IC 555 timer and its different modes	requirement. • Be able to design multistage amplifiers and design oscillators for the required frequency. • Be able to understand, analyze and design various combinational and sequential circuits. • Be able to design application circuits based on 555 timer.

SEMESTER- III

Course Title: PAPER-III: COMMUNICATION ELECTRONICS

Objectives	Learning Outcomes
• Get the knowledge about Electronic communication system • Get the knowledge about analog and digital modulation techniques. • Get the knowledge about Navigation systems, Satellite Communication and Mobile Telephony System.	The students will • Understand the principles of Electronic communication system

SEMESTER- IV

Course Title: PAPER-IV: MICROPROCESSOR AND C-PROGRAMMING

Objectives	Learning Outcomes
• To know about Microcomputer Organization • Get the knowledge about 8085 Microprocessor Architecture, Programming in Assembly level language.	The students will • Understand I/O Devices,. Data storage Computer memory organization, addressing, interfacing and expansion • Understand the architecture of 8085 and will be able to program the

• To provide knowledge of C language.	Microprocessor for the given requirement. • Understand the concepts of C Programming and will be able to write the program for the given problem

SEMESTER- V

Course Title: PAPER-V: 8051 MICROCONTROLLER AND INTERFACING

Objectives	Learning Outcomes
• Get the knowledge about 8051 Microcontroller Architecture and its memory organization and registers • To acquire the knowledge of Programming in both Assembly level language and high level language • Get the knowledge about interfacing and applications	• Understand the architecture of 8051 and will be able to program the Microcontroller for the given requirement.

SEMESTER- V

Course Title: Paper-VI: PHOTONIC DEVICES AND POWERELECTRONICS

Objectives	Learning Outcomes
• Get the knowledge about principle of Photonic devices, LED, LASERs, photodetectors, solar cells and LCD. • Acquire knowledge about Optical fiber communication. • Get the knowledge about Power electronic devices like SCR, TRIAC, DIAC, Power MOSFET and IGBT • Get the knowledge about applications of SCR, TRIAC, DIAC. • Get the knowledge about Inverters	The students will • Understand the working principles of Photonic devices and Optical fiber communication. • Be able to design power electronic circuits

SEMESTER- VI

Course Title: PAPER-VII: ELECTRONIC INSTRUMENTATION AND VERILOG

Objectives	Learning Outcomes
• To acquire knowledge about fundamentals of Measurement, Transducers and Measuring Instruments • To get knowledge of Verilog HDL	The students will • Understand the electronic measuring systems, performance characteristics, Signal conditioning circuits, different Electrical transducers and measuring instruments. • Understand the concepts of Verilog HDL Programming and will be able to write the program to implement given Boolean function/ digital logic circuit

SEMESTER- VI

Course Title: **PAPER-VIII: TRANSMISSION LINES, ANTENNA AND WIRELESS NETWORKS**

Objectives	Learning Outcomes
• To get knowledge of Propagation of Electromagnetic Wave • To acquire knowledge about Transmission Lines, Radiation of electromagnetic waves and Types of Antenna • To know about Wireless Networks and Modern Wireless Communication Systems • Carry out Electronic Project	The students will • Understand the concept of Propagation of Electromagnetic Wave • Know about Transmission Lines, understand the need for impedance matching, use of Smith Chart. • Understand wireless networks, Wireless Generation and Standards, and Modern Wireless Communication Systems • Get hands on experience through Electronic Project

DEPARTMENT OF ELECTRONICS

UNIVERSITY COLLEGE OF SCIENCE, TUMKUR UNIVERSITY

Action plans, Course outcomes and Objectives

Manjunatha D, Asst Professor, Dept of Electronics

Objectives	Learning Outcomes
SEMESTER- I To get the basic knowledge of Number systems, codes, digital logic levels and logic gates	The students will • Understand and get the ability to examine the structure of various number systems and its application in digital design.
SEMESTER- II • To study the combinational logic circuits and design.	The students will • Be able to understand, analyze and design various combinational logic circuits.
SEMESTER- III • Get the knowledge about Navigation systems and Mobile Telephony System.	The students will • Understand the principles of Electronic communication system
SEMESTER- IV • To know about Microcomputer Organization • Get the knowledge about 8085 Microprocessor Architecture, Programming in Assembly level language.	The students will • Understand I/O Devices,. Data storage Computer memory organization, addressing, interfacing and expansion • Understand the architecture of 8085 and will be able to program the Microprocessor for the given requirement.
SEMESTER- V • Get the knowledge about 8051 Microcontroller Architecture and its memory organization and registers • To acquire the knowledge of Programming in both Assembly level language and high level language • Get the knowledge about interfacing and applications	The students will • Understand the architecture of 8051 and will be able to program the Microcontroller for the given requirement.
SEMESTER- VI • To get knowledge of Verilog HDL	The students will • Understand the concepts of Verilog HDL Programming and will be able to write the program to implement given Boolean function/ digital logic circuit

DEPARTMENT OF ELECTRONICS

UNIVERSITY COLLEGE OF SCIENCE, TUMKUR UNIVERSITY

Action plans, Course outcomes and Objectives

Dr. Shwetha D, Asst Professor, Dept of Electronics

Objectives	Learning Outcomes
SEMESTER- I • To acquire the basic knowledge about the circuit elements to understand electronics circuits and to analyze the circuits. • To get the knowledge about PN junction diode, Zener diode and their applications	The students will • Have a thorough understanding of the fundamental concepts and techniques used to analyze the electronic circuits • Have the ability to design power supply
SEMESTER- II • To study the combinational and sequential logic circuits and design. • To study IC 555 timer	• Be able to understand, analyze and design various combinational and sequential circuits. • Be able to design application circuits based on 555 timer
SEMESTER- III • Get the knowledge about Electronic communication system • Get the knowledge about analog and digital modulation techniques.	• Understand the principles of Electronic communication system
SEMESTER- IV • To provide knowledge of C language.	• Understand the concepts of C Programming and will be able to write the program for the given problem
SEMESTER- V • Get the knowledge about principle of Photonic devices, LED, LASERs, photodetectors, solar cells and LCD. • Acquire knowledge about Optical fiber communication.	The students will • Understand the working principles of Photonic devices and Optical fiber communication.
SEMESTER- VI • To get knowledge of Propagation of Electromagnetic Wave • To acquire knowledge about Transmission Lines, Radiation of electromagnetic waves and Types of Antenna • To know about Wireless Networks and Modern Wireless Communication Systems	The students will • Understand the concept of Propagation of Electromagnetic Wave • Know about Transmission Lines; understand the need for impedance matching, use of Smith Chart. • Understand wireless networks, Wireless Generation and Standards, and Modern Wireless Communication Systems

DEPARTMENT OF ELECTRONICS

UNIVERSITY COLLEGE OF SCIENCE, TUMKUR UNIVERSITY

Action plans, Course outcomes and Objectives

Mahesh H, Lecturer, Dept of Electronics

Objectives	Learning Outcomes
SEMESTER- I • To study Transistor as amplifying device	The students will • Have the ability to design amplifiers
SEMESTER- II • To acquire the knowledge about Operational Amplifiers, their Characteristics and their applications • To study multistage Amplifier and Feedback in Amplifier. • To study Sinusoidal Oscillators: • To study Unipolar Devices like JFET, UJT and their applications.	The students will • Be able to design op-amp circuits for the requirement. • Be able to design multistage amplifiers and design oscillators for the required frequency.
SEMESTER- III • Get the knowledge about digital modulation techniques and Satellite Communication	The students will • Understand the principles of Electronic communication system
SEMESTER- V • Get the knowledge about Power electronic devices like SCR, TRIAC, DIAC, Power MOSFET and IGBT • Get the knowledge about applications of SCR, TRIAC, DIAC. Get the knowledge about Inverters	The students will • Be able to design power electronic circuits
SEMESTER- VI • To acquire knowledge about fundamentals of Measurement, Transducers and Measuring Instruments	The students will • Understand the electronic measuring systems, performance characteristics, Signal conditioning circuits, different Electrical transducers and measuring instruments.

DEPARTMENT OF PG STUDIES AND RESEARCH IN PHYSICS
UNIVERSITY COLLEGE OF SCIENCE
OBJECTIVES AND OUTCOMES

SEMESTER-I
CPT-1.1: CLASICAL MECHANICS

Unit	Objectives	Outcomes
I	• Constraints and their classifications. Generalized coordinates. • Virtual displacement, D'Alembert's principle and Lagrangian equations of the second kind. • Examples: (I) Single particle in (a) Cartesian coordinates, (b) Spherical polar coordinates and (c) Cylindrical polar coordinates, (II) Atwood's machine and (III) a bead sliding on a rotating wire in a force-free space. • (IV) Simple pendulum. Derivation of Lagrange equation from Hamilton principle. Importance and simple applications of Lagrangian formulism, Symmetry and conservation laws, cyclic coordinates.	After the completion of this unit the students will learn basics of classical mechanics with examples such as: (I) Single particle in (a) Cartesian coordinates, (b) Spherical polar coordinates and (c) Cylindrical polar coordinates, (II) Atwood's machine and (III) a bead sliding on a rotating wire.
II	• Motion of a particle in a central force field. • Conservation of energy and angular momentum, classification of orbits, stability of orbits, Kepler's laws of planetary motion. • Scattering in a central potential in Laboratory and centre of mass frames of reference, Impact parameter, Total and differential cross section, Rutherford scattering.	After the completion of this unit, the students will understand the nature of central force field, Conservation of energy and angular momentum, Kepler's laws of planetary motion and Scattering in a central potential.
III	• Hamilton's equations. Examples (i) the simple harmonic oscillator. (ii) Hamiltonian for a free particle in different coordinate system. • Cyclic coordinates. Physical significance of the Hamiltonian function. Derivation of Hamilton's equations from a variational principle. • Generating functions (Four basic types), examples of Canonical transformations, Poisson brackets; properties of Poisson brackets, angular momentum and Poisson bracket relations. • Equation of motion in the Poisson bracket notation. The Hamilton-Jacobi equation; the example of the harmonic oscillator treated by the Hamilton-Jacobi method.	After the completion of this unit, the students will understand the Physical significance of the Hamiltonian function, properties of Poisson bracket and Hamilton- Jacobi equation.

IV	• Degrees of freedom of a free rigid body, Angular momentum and kinetic energy of rigid body. • Fixed and moving coordinates, Coriolis force, coriolis force acting on falling body. • Moment of inertia tensor, principal moments of inertia, products of inertia, the inertia Tensor, Euler equations of motion for a rigid body. • Torque free motion of a rigid body. Precession of earth's axis of rotation, motion of symmetrical top-rotational motion.	After the completion of this unit, the students can capable to understand the Degrees of freedom of a free rigid body, coriolis force, Angular momentum and kinetic energy of rigid body, Moment of inertia tensor, Euler equations of motion for a rigid body and Torque free motion of a rigid body.

SEMESTER-I
CPT 1.2: MATHEMATICAL AND COMPUTATIONAL PHYSICS

Unit	Objectives	Outcomes
I	Linear dependence and independence of vectors. Dimension. Basis. Change of basis. Subspace. Isomorphism of vector spaces. Linear operators. Matrix representative of a linear operator in a given basis. Effect of change of basis. Invariant subspace. Eigen values and eigenvectors. Characteristic equation.. Schur's theorem.	After the completion of this unit, the students can capable of understanding the Linear vector space, Matrix representation of linear operator.
II	Orthogonal, Hermitian, and unitary matrices; eigenvectors and eigenvalues, diagonalization of matrices, Matrix representation of linear operators, eigenvalues and Curvilinear coordinates, Coordinate transformation in linear spaces, definition and types of tensors. Equality, addition and subtraction, tensor multiplication, outer product. Contraction of indices, inner product, quotient theorem, Kronecker delta, metric tensor, Christoffel symbols. Tensors in physics.	After the completion of this unit, the students will understand matrices, contravariant and covariant tensors, Equality, addition and subtraction, tensor multiplication, outer product.
III	Special functions- Differential equations. Helmholz equation in cylindrical and spherical polar coordinates. Differential equations- Regular and irregular singular points of a second order ordinary differential equation. Series solutions–Frobinius method. Linear independence of solutions-Wronskian. Hermite functions- Generating functions, Recurrence relations, Rodrigues representation, Orthogonality. Laguerre functions: Differential equation-Laguerre polynomials. Generating function, Recurrence relations, Rodrigues representation, Orthogonality, Associated Laguerre functions and its general properties. The gamma function and beta function.	After the completion of this unit, the students will understand Special functions, Hermite and Lagaurre functions and The gamma function and beta function.
IV	C-Language and Programming Constants and variables, arithmetic expressions, data Types,input and output statements, control statements, switch statements, the loop Statements, format specifications, arrays, functions and programming examples in C.	After the completion of this unit, the students will understand C-Language, and output statements, switch statement, arrays.

SEMESTER-I

CPT 1.3: ELECTRONIC, CIRCUITS, DEVICES AND COMMUNICATION

Unit	Objectives	Outcomes
I	• Biasing, Need for biasing, Methods of biasing-fixed bias, collector to base bias and voltage divider bias, DC and AC load line, Transistor small signal amplifiers: Single stage and multistage amplifier, frequency response, Push-pull amplifier, Multivibrators: Astable and Bistable, Voltage regulator using transistors. • Types of thyristors, Working and characteristics of SCR, TRIAC and UJT. • Parameters of an op-amp, Applications: Instrumentation amplifier, Square wave and sine wave generator, Active filters- First order Butterworth low pass and high pass filter.	After the completion of this unit, the students will understand Transistor configurations and characteristics, transistor biasing, transistor amplifier, voltage regulator, SCR and UJT. Operational amplifier, Square wave, sine wave generator, Active filters
II	• Principle and working of LDR, photodiode, LED, Phototransistor and semiconductor laser. • Principle of AM and FM, Block diagrams of AM and FM transmitters, Principle of AM and FM demodulation, comparison of AM and FM, Principle, Block diagram of super heterodyne receiver. • The general system, Advantages of OFC, Optical fibre wave guide, Theory of transmission: total internal reflection, acceptance angle, numerical aperture, Preparation techniques of optical fibres, Optical fibre connectors, Fibre splices.	After the completion of this unit, the students will understand Principle and working of LDR, photodiode, LED, Phototransistor and semiconductor laser. the Principle of Amplitude and frequency modulation, Optical fiber communication preparation Optical fibers, fibre connectors and joint losses
III	• Simplification of Boolean expression: SOP and POS. Karnaugh map: two, three and four variable map. Review of logic gates. • Latches, Flip-flops, SR, JK- Flip-flop, JK Master-Slave, D, T flip-flops, counters, synchronous and asynchronous counters, ripple counters, registers, shift registers. • Introduction, filtering and sampling, quantization, quantization error, Binary weighted converter, R-2R ladder converter.	After the completion of this unit, the students will know the Simplification of Boolean expression: SOP and POS, Karnaugh map, Flip-flops, A/D and D/A conversion circuits.
IV	• Introduction to embedded systems and general purpose computer systems, Architecture of embedded system, Classifications, Applications and purpose of embedded systems. • Architecture of 8085, addressing modes, Instruction set, Timing diagrams, pins and signals, Memory read and I/O read, Memory write and I/O write, Memory	After the completion of this unit, the students will understand embedded systems, Architecture of embedded system, Classifications, Applications and purpose of embedded systems, Architecture of 8085, Architecture of 8051 and industrial applications of microcontrollers.

	organization. • Architecture of 8051, Pin description, Memory organization, Addressing modes, Instruction set, Interfacing and industrial applications of microcontrollers: Interfacing of 7- segment LED and digital thermometer.	

SEMESTER-I
CPT 1.4A: CONDENSED MATTER PHYSICS

Unit	Objectives	Outcomes
I	• The Lattice, unit cell, Seven crystal systems, Fourteen Barvais lattice, Hexoganal, Trigonal and Rhombohedral systems- X ray, interference by one dimensional lattice, Laue equation-Lattice plane and *hkl*-indices. Bragg equation and quadratic Bargg equation. • The concept of Direct to reciprocal lattice and supporting theorems- Ewald construction- Atom form factors- Atom displacement form factors-structure Factors.- Simple symmetry in crystals-Coupling and combination of symmetry elements. The space group-notations and analysis.	After the completion of this unit, the students will understand The Lattice, unit cell, Seven crystal systems, Fourteen Barvais lattice, Laue equation-Lattice plane and *hkl*-indices. Bragg equation and quadratic Bargg equation, The concept of Direct to reciprocal lattice and supporting theorems- Ewald construction and The space group-notations and analysis.
II	• Rotation and Weissenberg method- Powder and Counter methods. Principles of X-ray powder diffraction method, interpretation of powder photographs. The single crystal diffractometer (Architecture). • Crystal growth from melt and zone refining techniques. Liquid crystals: Morphology. The smectic (A-H), nematic and cholesteric phases. Birefringence, texture and X-ray studies in these phases. Orientational order and its determination in the case of nematic liquid crystals. • Vibration of an infinite one-dimensional monatomic lattice, First Brillouin Zone. Group velocity. Finite lattice and boundary conditions. Vibrations of a linear diatomic lattice- optical and acoustical branches; relation.	After the completion of this unit, the students will understand Rotation and Weissenberg method, the single crystal diffractometer (Architecture), Crystal growth from melt and zone refining techniques, Vibration of an infinite one-dimensional monatomic lattice, First Brillouin Zone and Vibrations of a linear diatomic lattice- optical and acoustical branches; relation.
III	• Diamagnetism and its origin. Expression for diamagnetic susceptibility. Paramagnetism- Quantum theory of Paramagnetism. Brillouin function. • Experimental facts. Type I and type II semiconductors. Phenomena logical theory. London equations. Meissner effect. High frequency behavior. • Thermodynamics of superconductors. Entropy and Specific heat in the superconducting state. Qualitative ideas of the theory of superconductivity.	After the completion of this unit, the students will know the Diamagnetism and its origin, Paramagnetism- Quantum theory of Paramagnetism. Brillouin function, Thermodynamics of superconductors. Entropy and Specific heat in the superconducting state and Qualitative ideas of the theory of superconductivity
IV	• Intrinsic Semiconductors. Crystal structure and bonding. Expressions for carrier concentrations.	• After the completion of this unit, the students will understand Crystal

	Fermi energy, electrical conductivity and energy gap in the case of intrinsic semiconductors. • Extrinsic Semiconductors; impurity states and ionization energy of donors. Carrier concentrations and their temperature variation. • Qualitative explanation of the variation of Fermi energy with temperature and impurity concentration in the case of impurity semiconductors. • Brief discussion of the characteristics and applications of phototransistors, JFET, SCR and UJT.	structure and bonding. Expressions for carrier concentrations, impurity states and ionization energy of donors. Carrier concentrations and their temperature variation, the variation of Fermi energy with temperature and impurity concentration, the characteristics and applications of phototransistors, JFET, SCR and UJT.

SEMESTER-II
CPT 2.1: QUANTUM MECHANICS – I

Unit	Objectives	Outcomes
I	• Dual nature of matter and waves. • Fundamental Postulates of Quantum Mechanics. • Dirac Bra-Ket notation. Position and momentum representations. • Wave functions. Superposition principle. • Expectation values. Commutators. Eigenvalues and eigenvectors of a complete set of mutually commuting operators. • Wave packets, phase velocity and group velocity. Canonically conjugate variables, General uncertainty principle. • Hamiltonian and Schrodinger's equation. • Ehrenfest's Theorem and Continuity equation.	After the completion of this unit the students will learn Dual nature of matter and waves, Superposition principle, Wave packets, phase velocity and group velocity, Ehrenfest's Theorem and Continuity equation.
II	• Exactly solvable problems in one-dimension: Bound states, examples of particle in a box. • Simple Harmonic Oscillator: wave function and operator approach. • Particle in a spherically symmetric potential, Rigid rotator, hydrogen atom. • Scattering in one-dimension. Examples of scattering from a one-dimensional rectangular potential well and barrier, Tunneling, Transmission and Reflection co-efficients. • Ramsauer -Townsend effect, Alpha decay, cold emission of electron in a metal.	After the completion of this unit the students will learn Bound states, examples of particle in a box, Simple Harmonic Oscillator, Particle in a spherically symmetric potential, Rigid rotator, hydrogen atom, Scattering in one-dimension, Alpha decay and cold emission of electron in a metal.
III	• Angular Momentum and spin: Angular momentum operators and their Algebra. • Eigen functions and eigenvalues of L_2 and L_z using Schrodinger wave mechanics and matrix • Uncertainty relations. Stern-Gerlach experiment and the concept of spin, Pauli-spin matrices. • Addition of angular momentum of two or more particles.	After the completion of this unit the students will learn Angular momentum operators and their Algebra, Eigen functions and eigenvalues of L_2 and L_z, Uncertainty relations. Stern-Gerlach experiment and the concept of spin, Pauli-spin matrices.
IV	• Exactly solvable problems in three dimensions: Wave function of a free particle in Cartesian, cylindrical and spherical coordinates. • Bound state problems. Examples of a particle confined in a box, cylindrical and spherical well. • Simple harmonic oscillator in 3-dimensions. Two-particle bound state problems.. Schrodinger's equation for the hydrogen atom and its solution, properties of its wave functions.	After the completion of this unit the students will learn Wave function of a free particle in Cartesian, cylindrical and spherical coordinates, Two-particle bound state problems.. Schrodinger's equation for the hydrogen atom and its solution, properties of its wave functions.

SEMESTER-II
CPT 2.2 STATISTICAL MECHANICS

Unit	Objectives	Outcomes
I	• A brief overview of thermodynamics, Maxwell's relations, specific heats from thermodynamic relations, the third law of thermodynamics. • Thermodynamic description of phase transitions, Surface effects in condensation. • Classification of phase transitions; phase diagrams; Clausius-Clapeyron equation, Van der Wall's equation of state. • Irreversible thermodynamics—Onsager's reciprocal relation, Peltier effect, Seebeck effect, Thompson effect.	After the completion of this unit the students will learn Maxwell's relations, specific heats from thermodynamic relations, phase diagrams; Clausius-Clapeyron equation, Van der Wall's equation of state Onsager's reciprocal relation, application of Onsager reciprocity relation for explaining Peltier effect, Seebeck effect, Thompson effect
II	• The postulate of equal a priori probability. • The Liouville's theorem. • The microcanonical ensemble, canonical ensemble, Grand canonical ensemble, • Mean value and fluctuations. • Entropy of an ideal gas; Gibbs paradox. • Law of the equipartition theorem. • Molecular partition function, translational and rotational and vibrational partition function and applications to solids. Chemical equilibrium.	After the completion of this unit the students will learn The postulate of equal a priori probability, The Liouville's theorem, the microcanonical ensemble, canonical ensemble, Grand canonical ensemble, Mean value and fluctuations, Gibbs paradox and Molecular partition functions.
III	• The postulates of quantum statistical mechanics. Symmetry of wave functions. • The Liouville's theorem in quantum statistical mechanics. • Ensembles in quantum mechanics. • The quantum distribution functions. The derivation of the Fermi-Dirac and Bose-Einstien distribution functions.	After the completion of this unit the students will learn The postulates of quantum statistical mechanics, The Liouville's theorem in quantum statistical mechanics, Ensembles in quantum mechanics and the quantum distribution functions.
IV	• Equation of state of an ideal Fermi gas. • Application of Fermi-Dirac statistics to the theory of free electrons in metals, degeneracy and magnetic susceptibility. • Application of Bose statistics to the photon gas, derivation of Planck's law, comments on the rest mass of photons, Thermodynamics of Black body radiation. Bose-Einstein condensation.	After the completion of this unit the students will learn Application of Fermi-Dirac statistics to the theory of free electrons in metals, degeneracy and magnetic susceptibility, Application of Bose statistics to the photon gas, Thermodynamics of Black body radiation and Bose-Einstein condensation.

SEMESTER-II

SPT 2.3.A: CONDENSED MATTER PHYSICS –II (SPECIAL)

Unit	Objectives	Outcomes
I	• Review of Weiss theory of ferromagnetism, its successes and failures, Heisenberg exchange interaction, exchange integral, exchange energy, Ising model. • Excitation of magnons and Bloch T 3/2 law, specific heat using spin wave theory. • Band theory of ferromagnetism. Ferromagnetic domains, hysteresis curve, magneto crystalline anisotropy energy, Bloch wall. • Characteristic property of anti ferromagnetic substance, Neutron diffraction experiment. Two sub-lattice model molecular field theory of anti ferromagnetism, • Neel temperature, Susceptibility below and above Neel temperature. • Ferrimagnetic order, ferrites, Curie temperature.	After the completion of this unit the students will learn Weiss theory of ferromagnetism, Heisenberg exchange interaction, Ising model, specific heat using spin wave theory, Ferromagnetic domains, hysteresis curve, Characteristic property of anti ferromagnetic substance, Neutron diffraction experiment. Two sub-lattice model molecular field theory of anti ferromagnetism.
II	• Basic principles of paramagnetic resonance, spin-spin and spin–lattice relaxation, susceptibility in a.c. • Magnetic field power absorption, equations of Bloch, Paramagnetic resonance and nuclear magnetic resonance. • Spin- Hamiltonian and zero field splitting.	After the completion of this unit the students will learn Basic principles of paramagnetic resonance, Paramagnetic resonance and nuclear magnetic resonance.
III	• Review of basic formulae, dielectric constant and polarizability, local field. • Clausius-Mossotti relation, • Sources of polarizability. • Debye's equations, dielectric loss, dipolar polarization in solids, dielectric relaxation. • Ionic polarizability, Electronic polarizability • Interbands transitions in solids.	After the completion of this unit the students will learn Dielectric constant and polarizability, local field, Clausius-Mossotti relation, dielectric loss, dipolar polarization in solids, dielectric relaxation, Ionic polarizability and Electronic polarizability
IV	• General properties of ferroelectrics, classification and properties of representative ferroelectric crystals. • Dipole theory of ferroelectricity, dielectric constant near Curie temperature, microscopic source of ferroelectricity. • Thermodynamics of ferroelectric phase transition, ferroelectric domains, Piezoelectricity and its applications.	After the completion of this unit the students will learn properties of ferroelectrics, Dipole theory of ferroelectricity, dielectric constant near Curie temperature, microscopic source of ferroelectricity, Thermodynamics of ferroelectric phase transition, ferroelectric domains, Piezoelectricity and its applications

SEMESTER-II
OET 2.4: MODERN PHYSICS

Unit	Objectives	Outcomes
I	• Nature of Blackbody spectrum; classical radiation laws and their limitations; Planck's radiation law and quantum hypothesis. • Experimental arrangement of the Photoelectric Effect; laws of Photoelectric Effect, Einstein Photoelectric Equation. • X-Rays: Nature and production of X-rays; the Bragg law; Bragg X-ray crystal spectrometer. • The Compton Effect: Compton scattering from an electron; experimental set-up for Compton scattering..	After the completion of this unit the students will learn Nature of Blackbody spectrum, laws of Photoelectric Effect, Einstein Photoelectric Equation, Nature and production of X-rays and Compton scattering.
II	• Hydrogen spectrum-the Bohr atomic model, experimental measurement of the Rydberg constant; Franck-Hertz experiment. • The de Broglie wavelength and its relation with the Bohr model; Davisson-Germer experiment. Heisenberg Uncertainty principle: Momentum-position and Energy-time relations. • Quantum Physics: Idea of wave function and probability. One-dimensional Schrödinger wave equation and its application to the particle in a box and Hydrogen atom.	After the completion of this unit the students will learn Bohr atomic model, Franck-Hertz experiment, The de Broglie wavelength, Davisson-Germer experiment, Idea of wave function and probability, One-dimensional Schrödinger wave equation.
III	• Molecular Structure: Bonding mechanisms: Ionic bonds; Covalent bonds; the Hydrogen bond; Van der Waals bonds. • Molecular vibration and rotation spectra. • Ionic solids; covalent solids; metallic solids; molecular crystals; amorphous solids. • Classical models of electrical and heat conductivities in solids; Ohm's Law; Wiedemann- Franz law; the quantum view point. • Lasers: Absorption, Spontaneous and Stimulated emissions; Population inversion; laser action, Ruby Laser.	After the completion of this unit the students will learn, Bonding mechanisms, Ionic solids; covalent solids; metallic solids; molecular crystals; amorphous solids, Classical models of electrical and heat conductivities in solids, Wiedemann- Franz law, principle and working of Laser.
IV	• Magnetic moment, Hysteresis and Magnetization. Diamagnetic, paramagnetic and ferromagnetic materials. • Nuclear properties- Charge, Mass, Size and Structure; Nuclear spin and magnetic moment; Nuclear Magnetic Resonance (NMR) phenomenon. Binding energy and • Nuclear forces, the liquid drop model, Radioactivity. • Relativity: The Michelson-Morely experiment. Postulates of Special theory of Relativity, • Time dilation; Length contraction; Simultaneity of events; $E = mc^2$.	After the completion of this unit the students will learn Magnetic moment, Hysteresis and Magnetization. Diamagnetic, paramagnetic and ferromagnetic materials, Nuclear properties, Radioactivity and Postulates of Special theory of Relativity,

SEMESTER-III
CPT 3.1: QUANTUM MECHANICS –II

Unit	Objectives	Outcomes
I	• The Schrodinger equation in three dimentions: separation of Schrodinger equation in Cartesian coordinates. • Free particle in 3-d box – Effects of the exclusion principle on non-interacting fermions in a box. Central potential and consequences of rotational invariance – separation of variables r,Φ,Θ; radial equation. • The hydrogen atom – radial equation; energy spectrum; degeneracy of the spectrum; radial wave functions and probability density P(r) for finding the electron at a distance from the center.	After the completion of this unit the students will learn separation of Schrodinger equation in Cartesian coordinates, Central potential and consequences of rotational invariance, radial wave functions and probability density P(r) for finding the electron at a distance from the center.
II	• Symmetry in quantum mechanics: Spatial transition and conservation of linear momentum. • Discrete symmetries- parity and time reversal. symmetric and anti symmetric wave functions for two identical particles. Slater determinant and Pauli Exclusion Principle. Exited states of helium atom: ortho and para helium atom. • Approximation methods – I The variational method: variation theorem, application of variation theorem, application of variational approach to ground states of (i) Hydrogen atom and (ii) Helium atom. The WKB method: one dimensional case, approximate solutions turning pints and connection formulae, Tunneling through a barrier.	After the completion of this unit the students will learn symmetry in quantum mechanics, parity and time reversal. symmetric and anti symmetric wave functions for two identical particles, Approximation methods and the WKB method.
III	• Time independent perturbation theory: Perturbation theory for non degenerate states, examples: linear and quadratic stark effects (i) in hydrogen atom, (ii) a particle moving in a 1-d harmonic oscillator. • Degenerate perturbation theory, examples: linear stark effect, Normal Zeeman effect • Time dependent perturbation theory: Time dependent perturbation series. Harmonic perturbation. • Transition probability, Fermi golden rule, example: sinusoidal perturbation on 1-d simple harmonic oscillator. • Scattering experiments and cross sections: potential scattering, Born approximation, validity of Born approximation, Scattering in a central potential, examples: screened coulomb field	After the completion of this unit the students will learn time independent perturbation theory, Time dependent perturbation theory, Transition probability, Fermi golden rule, Born approximation and Scattering in a central potential.
IV	• Klein Gordan equation for a free particle and its drawbacks; probability density. • Dirac equation for free particle, properties of Dirac matrices, solutions of free particle Dirac equation- ortho normality and completeness, spin of the Dirac particle, negative energy sea, co variant form of Dirac equation. • Velocity operator of a free Dirac particle and Zitterbeagung. • Non relativistic limit of Dirac equation for a free particle moving in a central potential, spin – orbit energy. Dirac particle under the influence of a uniform external magnetic field – magnetic moment for the Dirac particle.	After the completion of this unit the students will learn Klein Gordan equation for a free particle, Dirac equation for free particle, properties of Dirac matrices, solutions of free particle and Dirac particle under the influence of a uniform external magnetic field– magnetic moment for the Dirac particle.

SEMESTER-III
CPT 3.2: NUCLEAR PHYSICS

Unit	Objectives	Outcomes
I	• Interaction of charged particles: energy loss of heavy charged particles in matter, Bethe-Bloch Formula. • Bremsstrahlung. • Interaction of gamma rays- photo electric, Compton, and pair production processes. • Gamma ray attenuation- attenuation coefficients, absorber, mass thickness, cross sections. • Nuclear reactions- cross section for a nuclear reaction, Differential cross section, Q-value of reaction, threshold energy, Direct and compound nuclear mechanisms. • Bhors independencehypothesis and experimental verification. • Nuclear fission: energy released in fission, neutron cycle in a thermal reactor and four factor formula.	After the completion of this unit the students will learn the Interaction of charged particles, Bremsstrahlung, Gamma ray attenuation, Nuclear reactions, Direct and compound nuclear mechanisms and Nuclear fission.
II	• Nuclear forces - characteristics of nuclear forces, short range, saturation, chare independence and exchange characteristics. • Ground state of deuteron, Relation between the range and the depth of the potential using square well potential, Yukawa's theory of nuclear forces • Nuclear detectors- scintillation detectors- Nal(Tl), plastic scintillation-scintillation spectrometer. • Semiconductor detectors- Surface barrier detectors, Li ion drift detectors, relation between applied voltage and the depletion region in junction detectors, counter telescopes, particle identification, and position sensitive detector	After the completion of this unit the students will learn characteristics of nuclear forces, relation between the range and the depth of the potential, Yukawa's theory of nuclear forces and Nuclear detectors, counter telescopes, particle identification, and position sensitive detector
III	• Liquid drop model- Semiemphirical mass formula, stability of nuclei against beta decay, mass parabola. • Fermi gas model: Kinetic energy for the ground state, asymmetry energy. • Shell model- evidence for magic numbers, prediction of energy levels in an infinite square well potential, spin orbit interaction, prediction of ground state spin parity and magnetic moment of odd nuclei, Schmidt limit. • Beta decay: Fermi's theory of beta decay, curie plots and ft values, selection rules. • Gamma decay: Multi polarity of gamma rays, selection rules, internal conversion	After the completion of this unit the students will learn Semiemphirical mass formula, Fermi gas model, energy levels in an infinite square well potential, spin orbit interaction, prediction of ground state spin parity and magnetic moment of odd nuclei, Fermi's theory of beta decay, Multi polarity of gamma rays, selection rules and internal conversion
IV	• Elementary particle physics- types of interactions between elementary particles, hadrons and leptons, detection of neutrinos. • Symmetries and conservation laws: conservation of energy, momentum, angular momentum, charge and isospin, parity symmetry, violation of parity in week interactions, lepton number conservation, lepton family and three generations of neutrinos. Conjugation symmetry, CP violation in week interactions. • Strange particles, conservation of strangeness in strong interactions, Gell-Mann Nishijima formula, eight fold • Quark model, quark content of baryons and mesons, color degree of freedom, standard model.	After the completion of this unit the students will learn types of interactions between elementary particles, Symmetries and conservation laws, Gell-Mann Nishijima formula, eight fold, Quark model and quark content of baryons and mesons.

SEMESTER-III
SPT 3.3.A: CONDENSED MATTER PHYSICS –III

Unit	Objectives	Outcomes
I	• Disordered systems - Point defects, shallow impurity states in semiconductors-Localized lattice vibrational states in solids-Vacancies, interstitials in ionic crystals- • Color centers in ionic crystals- Types of Color centers, methods of production-mechanism, Characteristic absorption bands, Properties of Color centers- Models and Applications. • Photoconductivity, Luminescence- fluorescence, Phosphorescence-Thermoluminescence, • Photoluminescence, Electroluminescence; Mechanisms. Imperfections in crystals, Mechanism of • Plastic deformation in solids, Stress and strain fields of screw and edge dislocations, Elastic energy of dislocations.	After the completion of this unit the students will learn disordered systems, Color centers in ionic crystals, photoconductivity, Luminescence-fluorescence, Thermoluminescence, Electroluminescence, and Imperfections in crystals and Plastic deformation in solids.
II	• Disordered lattice- Compositional, disorder- Topological disorder-Magnetic disorder. • Localized states- Anderson Model- Density of states. Concept of glass- Glass transition- Atomic correlation function and structural description of glasses and liquids. Amorphous • Semiconductors- Classification, band structure- electronic conduction and Optical absorption. • Transport in disordered lattices- Transport in extended states, Fixed range and • Variable range hopping- conductivity in impurity bands and in amorphous semiconductors.	After the completion of this unit the students will learn disordered lattice, Concept of glass- Glass transition, Classification of semiconductors, band structure- electronic conduction and Optical absorption and Transport in disordered lattices.
III	• Semiconductors- Structure of typical semiconductors- Fermi energy expression in Intrinsic and extrinsic semiconductors- its variation with temperature and impurity concentration, Law of mass action. • Charge neutrality equation- mobility- diffusion, generation-recombination of Carriers in Semiconductors. • Conductivity equation- carrier Life time- Haynes-Shockley experiment- Hall effect in semiconductors- Determination of dell coefficient in intrinsic, n-type and p-type semiconductors. • Fabrication of devices- by growth, alloying. diffusion, ion implantation method. MS and SS contacts- energy Characterization of thin films- film thickness: optical band diagrams- Contact potentials- Rectification. Artificial structures: Supper lattice, conversion layers	After the completion of this unit the students will learn structure of typical semiconductors, Fermi energy expression, Charge neutrality equation-mobility, Hall effect in semiconductors and ion implantation method and Characterization of thin films.
IV	• Films and Surfaces- Methods of preparation, Thermal evaporation, sputtering, ion beam sputtering, Laser and electron beam evoparation technique, Chemical vapor deposition. • Structural characterization Scanning electron microscopy, Transmission Electron microscopy and Atomic Force Microscopy. • Internal stress and strain analysis. Electrical properties of thin films-Measurement of resistivity by four frobe method, thin film resistors • Magnetic properties- film size effect on MS- films for memory devices.	After the completion of this unit the students will learn Methods of preparation of thin films, Scanning electron microscopy, Transmission Electron microscopy and Atomic Force Microscopy, Electrical properties of thin films and Magnetic properties of thin films.

SEMESTER-III
OET 3.4: NANOSCIENCE AND NANOTECHNOLOGY

Unit	Objectives	Outcomes
I	• Basics of nano science- the nanoscale, historical background. • Quantum confinement, size dependent properties, surface to volume ratio. • Basic quantum mechanics - Wave-particle duality, Heisenberg uncertainty principle. • Schrödinger equation --solution of one-dimensional time-independent equation. • Particle in a one- dimensional box; density of states for zero-, one-, two- and three-dimensional box; particle in a • Coulomb potential. Tunneling of a particle through potential barrier	After the completion of this unit the students will learn basics of nano science, Quantum confinement, Wave-particle duality, Heisenberg uncertainty principle, density of states for zero-, one-, two- and three-dimensional box and Tunneling of a particle through potential barrier.
II	• Synthesis of nanomaterials- Synthesis and nanofabrication, Bottom-Up and Top-Down approach with examples. • Chemical precipitation methods, sol-gel method, chemical reduction. • Physical methods- mechanical-ball milling, melt mixing; RF sputtering, Physical Vapour deposition (PVD), chemical vapour deposition, molecular beam epitaxy. • Chemical methods: colloidal synthesis and capping of nanoparticles.	After the completion of this unit the students will learn Bottom-Up and Top-Down approach of synthesis of nano materials, sol-gel method, chemical reduction, Physical Vapour deposition (PVD), chemical vapour deposition, molecular beam epitaxy and colloidal synthesis.
III	• Characterization techniques- microscopes - optical, SEM, TEM, STM, AFM. • Diffracttion techniques -XRD, EXAFS, neutron diffraction, UV-visible-IR absorption, FTIR spectroscopes. • Photoluminescence	After the completion of this unit the students will learn characterization techniques, principle and operation of SEM, TEM, STM, AFM, XRD, EXAFS, UV-visible-IR absorption and FTIR spectroscopes.
IV	• Properties of nanomaterials-Mechanical and, Electrical properties. • Classification - metals semi-conductors, insulators, band structures; mobility and resistivity. • Hall effect. • Optical absorption and transmission, photoluminescence.	After the completion of this unit the students will learn properties of nanomaterials, metals semi-conductors, insulators, band structures; mobility and resistivity, Hall effect and Optical absorption and transmission.

SEMESTER-IV
CPT 4.1: CLASSICAL ELECTRODYNAMICS

Unit	Objectives	Outcomes
I	• Divergence and curl of electrostatic field, Gauss law in integral and differential forms. • Poisson and Laplace equations, Boundary conditions and uniqueness theorem, electrostatic potential energy and energy density of a continuous charge distribution. • Multipole expansion of the potential and energy of a localized charge distribution, monopole and dipole terms. • Electric field of a dipole, dipole-dipole interaction. Electrostatic fields in matter, polarization, macroscopic field equations, electrostatic energy in dielectric media.	After the completion of this unit the students will learn Gauss law in integral and differential forms, Poisson and Laplace equations, Multipole expansion of the potential and Electric field of a dipole.
II	• Current density, continuity equation, magnetic field of a steady current, the divergence and curl of B. • Ampere's law, magnetic vector potential, multipole expansion of vector potential of a localized current distribution. • Magnetic moment. Torques and forces on magnetic dipoles, effect of a magnetic field on atomic orbits. • Magnetic fields in matter, macroscopic equations, magnetostatic boundary conditions, magnetic scalar potential. Energy in the magnetic field.	After the completion of this unit the students will learn Current density, continuity equation, magnetic field, Ampere's law, magnetic vector potential, Magnetic moment. Torques and forces on magnetic dipoles, effect of a magnetic field on atomic orbits and Magnetic fields in matter.
III	• Faraday law of induction, displacement current, Maxwell's equations. • Vector and scalar potentials. Gauge transformations, Lorentz gauge, Coulomb gauge. • Poynting's theorem and conservation of energy and momentum for a system of charged particles and electeomagnetic fields. • Electromagnetic Waves: Plane waves in non-conducting and conducting medium, skin depth. • Linear and circular polarizations. Reflection and refraction of plane waves at a plane interface.	After the completion of this unit the students will learn Faraday law of induction, Vector and scalar potentials, Poynting's theorem and conservation of energy and momentum for a system of charged particles, Plane waves in non-conducting and conducting medium, skin depth.
IV	• Fields at the surface and within a conductor, cylindrical cavities and wave guides, modes in rectangular wave guide. • Electromagnetic radiation: Retarded Potentials. Radiation from an oscillating dipole, liner antenna. • Lenard-Wiechert potentials, potentials for a charge in uniform motion, power radiated by an accelerated charge at low velocities. • Larmor's formula , radiation from a charged particle with collinear velocity and acceleration, Bremsstrahlung radiation, radiation from a charged • Particle moving in a circular orbit, cyclotron and synchrotron radiation. • Plasma Physics: Plasma behavior in magnetic field,	After the completion of this unit the students will learn Fields at the surface and within a conductor, Retarded Potentials. Radiation from an oscillating dipole, liner antenna, potentials for a charge in uniform motion, power radiated by an accelerated charge at low velocities, Larmor's formula and Plasma behavior in magnetic field.

SEMESTER-IV
CPT 4.2: ATOMIC MOLECULAR AND OPTICAL PHYSICS

Unit	Objectives	Outcomes
I	• One electron atom- Quantum states, Atomic orbitals, spectrum of hydrogen, Rydberg Atoms. • Relativistic corrections to spectra of alkali atoms: Spin-orbit interaction and fine structure in alkali spectra. Lamb shift in hydrogen • Two electron atom- Ortho and Para states and role of Pauli principle, level schemes of two electron atoms. • The spectra of one and two electron atoms- Zeeman effect, Paschen-Back effect, Stark effect. • Hydrogen spectra. Hyperfine interactions. • Central field approximation. LS and JJ coupling schemes, Multiplet splitting and Lande interval rule.	After the completion of this unit the students will learn Atomic orbitals, spectrum of hydrogen, Spin-orbit interaction, Zeeman effect, Paschen- Back effect, Stark effect, LS and JJ coupling schemes, Multiplet splitting and Lande interval rule.
II	• Brief treatment of chemical bonds: covalent, ionic, Van der waal's interactions. • A rigid rotator, rotational spectra of rigid and non-rigid rotator, intensities of rotational lines. • Microwave spectroscopy- principle and technique. • Types of rotors: Eigenvalues of Linear, • Symmetric top, Asymmetric top and Spherical top molecules. Raman spectroscopy: Theory of • Raman effect, experimental techniques, rotational Raman spectra of diatomic and linear polyatomic molecules.	After the completion of this unit the students will learn Van der waal's interactions, rotational spectra of rigid and non-rigid rotator, Microwave spectroscopy, Raman spectroscopy, rotational Raman spectra of diatomic and linear polyatomic molecules.
III	• Diatomic molecule as a simple harmonic oscillator. • Morse potential curves, vibrating rotator: energy levels and vibration spectra, PQR branches. • Rovibronic spectra, experimental technique and IR spectrometer. Comparison of vibration and • Electronic spectra of diatomic molecules • Electronic spectra, intensity of vibrational lines in electronic spectra - Frank—Condon principle, dissociation and pre-dissociation, fluorescence and phosphorescence.	After the completion of this unit the students will learn Morse potential curves, vibrating rotator: energy levels and vibration spectra, PQR branches, Electronic spectra, intensity of vibrational lines in electronic spectra -Frank—Condon principle, fluorescence and phosphorescence.
IV	• Optical Physics-Coherence of light, spatial and temporal coherence, Einstein's Coefficients, spontaneous and stimulated emission, idea of light amplifications, characteristics of a laser beam, • Threshold condition for laser oscillation, role of resonant cavity, He-Ne lasers, Brief treatment of application of lasers. • Holography- Fundamentals of 3D mapping of images, recording and reconstruction, applications in microscopy and interferometer. • Fiber optics- Mechanism of light propagation in a fiber wave guide, numerical aperture, types of optical fibers, transmission characteristics of optical fibers—attenuation and dispersion, optical fiber communication system.	After the completion of this unit the students will learn Coherence of light, spatial and temporal coherence, He-Ne lasers, Holography, Mechanism of light propagation in a fiber wave guide, numerical aperture, types of optical fibers, transmission characteristics of optical fibers.

SEMESTER-IV
SPT 4.3.A: CONDENSED MATTER PHYSICS –IV

Unit	Objectives	Outcomes
I	• Reciprocal lattice- Elementary considerations, graphical construction, vector algebraic discussion. • Relation between direct and reciprocal cells, interpretation of Bragg's law using Reciprocal lattice concept, general spacing formula. • Transformation equations and their importance.	After the completion of this unit the students will learn Elementary considerations, graphical construction, vector algebraic discussion, Bragg's law using Reciprocal lattice concept and general spacing formula.
II	• The Laue method: Reciprocal lattice construction, instrumentation, flat plate cameras, front • Reflection region, appearance of photographs, back reflection region, appearance of Photographs. • Rotating crystal methods: Reciprocal lattice construction, instrumentation, camera, mounting and adjustment of crystal, interpretation of photographs, unit cell determination, indexing procedure.	After the completion of this unit the students will learn Reciprocal lattice, unit cell determination and indexing procedure.
III	• Moving film methods: Weissenberg method, reciprocal lattice. • Interpretation of photographs. • Single crystal diffract meter- Rciprocal lattice construction, para focussing and goniometry, intensity measurements. .	After the completion of this unit the students will learn Weissenberg method, reciprocal lattice, Interpretation of photographs and Single crystal diffract meter
IV	• Powder method- X-ray powder photographic methods, instrumentation and diffraction geometry. • Measurement of Bragg angles and interplanar spacing. • Index of power patterns, analytical and Graphical methods, precise lattice parameter determination, characteristics of powder pattern lines, application to identification of solid solution and phase changes, line broadening and particle size • Interpretation of powder photographs of unknown system, powder diffractometer and its applications.	X-ray powder photographic methods, Index of power patterns, Interpretation of powder photographs of unknown system, powder diffractometer and its applications

Department of Biotechnology

University College of Science, Tumkur University, Tumakuru

Plan of Work for the Year 2012 to 2013

Sl. No.	Proposed Date		Plan of Work	Remarks
	Odd Sem	Even Sem		
1.	25/06/2012	28/12/2012	Preparation of Time Table	
2.	26/06/2012	28/12/2012	Distribution of work loads	
3.	26/06/2012	31/12/2012	Distribution of Syllabus	
4.	29/06/2012	04/01/2013	Practical related ideas and preparations	
5.	31/07/2012	10/01/2013	Ist internal examination	
6.	20/09/2012	04/02/2013	IInd internal examination	
7.	17/09/2012	08/04/2013	Syllabus Completion – Discussion	
8.	21/09/2012	12/04/2013	Question Paper discussion	
9.	05/10/2012	15/04/2013	Conduct of internal practical test/revision	
10.	11/10/2012	08/04/2013	Conduct of Practical Examination	
11.	28/10/2012	28/04/2013	Vacation	

Outcomes (2012-13):

1. Time table was prepared as per the overall time table provided by the college
2. Work load was distributed as per the UGC guidelines (20hrs/week)
3. Syllabus was equally distributed based on area of specialization.
4. Practical topic and methods are studied and tried to adapt and rectify the problems in the laboratories. After the completion of practical opportunity to students were given for the revisions.
5. Along with the regular practical, new ideas and projects were given to students based on the syllabus
6. Internal tests were successfully completed
7. Study tour for students were achieved by visiting industries.
8. Practical tests were successfully achieved
9. Syllabus completed and old question papers were discussed.
10. Bridge Course and remedial classes 2012-13 were conducted.

Bridge Course: Participation of Students and Parents

Department of Biotechnology

University College of Science, Tumkur University, Tumakuru

Plan of Work for the Year 2013 to 2014

Sl. No.	Proposed Date		Plan of Work	Remarks
	Odd Sem	Even Sem		
1.	08/07/2013	16/01/2014	Preparation of Time Table	
2.	09/07/2013	16/01/2014	Distribution of work loads	
3.	09/07/2013	16/01/2014	Distribution of Syllabus	
4.	11/07/2013	Nil	Bridge Course	
5.	15/07/2013	20/01/2014	Practical related ideas and preparations	
6.	01/08/2013	31/01/2014	Assignments topic distribution	
7.	19/08/2013	20/02/2014	Ist internal examination	
8.	28/08/2013	04/03/2014	Interaction with IBt/IIBt/IIIBt students	
9.	30/08/2013	24/03/2014	Interclass Competitions	
10.	Nil	28/02/2013	Science Exhibition	
11.	18/09/2013	31/03/2014	IInd internal examination	
12.	22/10/2013	04/04/2014	Syllabus Completion – Discussion	
13.	24/10/2013	17/04/2014	Question Paper discussion	
14.	29/10/2013	21/04/2014	Conduct of internal practical test/revision	
15.	13/11/2013	05/05/2014	Discussion about successful /drawback in completion plan of work	
16.	21/10/2013	15/04/2014	Conduct of Practical Examination	
17.	14/11/2013	10/05/2014	Vacation	

Outcomes (2013-14):

1. Time table was prepared as per the overall time table provided by the college
2. Work load was distributed as per the UGC guidelines (20hrs/week)
3. Syllabus was equally distributed based on area of specialization.
4. Practical topic and methods are studied and tried to adapt and rectify the problems in the laboratories. After the completion of practical opportunity to students were given for the revisions.
5. Along with the regular practical, new ideas and projects were given to students based on the syllabus
6. Internal tests were successfully completed
7. Study tour for students were achieved by visiting Yana, Utara Kannada Dist.
8. Student interaction were done and implicated new ideas such as conduct of Science exhibition and participation for school children were initiated.
9. Practical tests were successfully achieved
10. Syllabus completed and old question papers were discussed.

Study Tour to Yana, Utara Kannada District

Department of Biotechnology

University College of Science, Tumkur University, Tumakuru

Plan of Work for the Year 2014 to 2015

Sl. No.	Proposed Date		Plan of Work	Remarks
	Odd Sem	Even Sem		
1.	23/06/2014	16/12/2014	Preparation of Time Table	
2.	24/06/2014	16/12/2014	Distribution of work loads	
3.	24/06/2014	16/12/2014	Distribution of Syllabus	
4.	27/06/2014	Nil	Bridge Course	
5.	30/06/2014	19/12/2014	Practical related ideas and preparations	
6.	08/07/2014	05/01/2015	Assignments topic distribution	
7.	05/08/2014		Ist internal examination	
8.	26/08/2015 27/09/2014	Nil	Seminars/workshop/study tour/industrial visits	
9.	Nil	28/02/2015	National Science Day	
10.	20/08/2014	27/02/2015	Interaction with IBt/IIBt/IIIBt students	
11.	25/08/2017	11/03/2015	Interclass Competitions	
12.	Nil	28/02/2015	Science Exhibition	
13.	Nil	28/02/2015	Food Fest	
14.	17/09/2014	15/04/2015	IInd internal examination	
15.	15/09/2014	01/04/2015	Syllabus Completion – Discussion	
16.	19/09/2014	03/04/2015	Question Paper discussion	
17.	30/09/2014	06/04/2015	Conduct of internal practical test/revision	
18.	18/10/2014	15/04/2015	Discussion about successful /drawback in completion plan of work	
19.	21/10/2014	11/04/2015	Conduct of Practical Examination	
20.	19/10/2014	16/04/2015	Vacation	

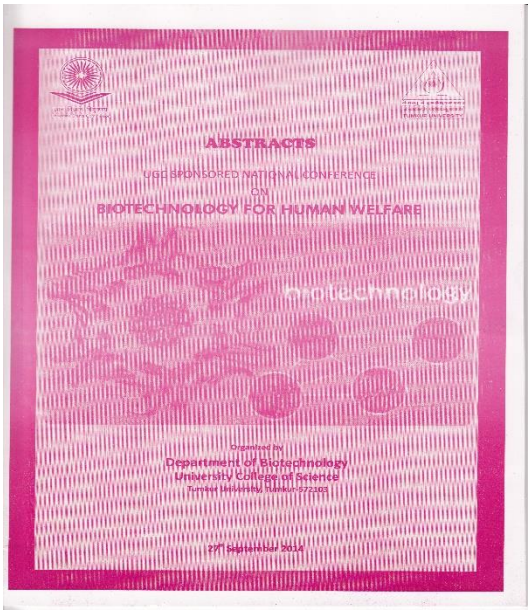
Outcomes (2014-15):

1. Time table was prepared as per the overall time table provided by the college
2. Work load was distributed as per the UGC guidelines (20hrs/week)
3. Syllabus was equally distributed based on area of specialization.
4. Practical topic and methods are studied and tried to adapt and rectify the problems in the laboratories. After the completion of practical opportunity to students were given for the revisions.
5. Along with the regular practical, new ideas and projects were given to students based on the syllabus
6. Internal tests were successfully completed
7. Assignments were given based on the syllabus
8. Project works were conducted – preparation of models
9. Study tour for students were achieved by visiting Botanical garden.
10. Conducted National level seminar

National Seminar	Biotechnology for Human Welfare	UGC	27th September, 2014	Venue -UCST, Tumkur University	Sri. Dwarakanath V – Organizing Secretary

11. Conduct of Science exhibition and more participation of school children.
12. Conducted food fest – cooking without fire
13. Practical tests were successfully achieved
14. Syllabus completed and old question papers were discussed.

Botanical Garden Visit: 2014-15



National Level Seminar

Food fest: Cooking without fire 2014-15

Department of Biotechnology

University College of Science, Tumkur University, Tumakuru

Plan of Work for the Year 2015 to 2016

Sl. No.	Proposed Date		Plan of Work	Remarks
	Odd Sem	Even Sem		
21	25/06/2015	04/01/2016	Preparation of Time Table	
22	26/06/2015	04/01/2016	Distribution of work loads	
23	26/06/2015	04/01/2016	Distribution of Syllabus	
24	02/07/2015	Nil	Bridge Course	
25	03/07/2015	08/01/2016	Practical related ideas and preparations	
26	17/07/2015	28/01/2016	Assignments topic distribution	
27	05/08/2015		Ist internal examination	
28	Nil	28/03/2016 and 29/03/2016	Seminars/workshop/study tour/industrial visits	
29	31/08/2015	26/02/2016	Interaction with IBt/IIBt/IIIBt students	
30	04/09/2015	21/03/2016	Interclass Competitions	
31	Nil	28/02/2016	Science Exhibition	
32		28/02/2016	Food Fest	
33	21/10/205	29/03/2016	IInd internal examination	
34	05/10/2015	08/04/2016	Syllabus Completion – Discussion	
35	12/10/2015	11/04/2016	Question Paper discussion	
36	13/10/2015	14/04/2016	Conduct of internal practical test/revision	
37	30/10/2015	23/04/2016	Discussion about successful /drawback in completion plan of work	
38	19/10/2015	20/04/2016	Conduct of Practical Examination	
39	01/11/2015	24/04/2016	Vacation	

Outcomes (2015-16):

1. Time table was prepared as per the overall time table provided by the college
2. Work load was distributed as per the UGC guidelines (20hrs/week)
3. Syllabus was equally distributed based on area of specialization.
4. Practical topic and methods are studied and tried to adapt and rectify the problems in the laboratories. After the completion of practical opportunity to students were given for the revisions.
5. Along with the regular practical, new ideas and projects were given to students based on the syllabus
6. Internal tests were successfully completed
7. Assignments were given based on the syllabus
8. Project works were conducted – preparation of models
9. Study tour for students were achieved by visiting Industry – UBL, Mangalore.
10. Conducted State level seminar

State Level Workshop	Multidisciplinary Workshop on Life Science	UGC	26th August, 2015	UCST, Tumkur University	Dr. Poornima D – Organizing Secretary

11. Conduct of Science exhibition and more participation of school children.
12. Conducted food fest – cooking without fire
13. Practical tests were successfully achieved
14. Syllabus completed and old question papers were discussed.

Food Fest: 2015-16

Industrial Visit: Breweries – UB Ltd., Mangalore

Department of Biotechnology

University College of Science, Tumkur University, Tumakuru

Plan of Work for the Year 2016 to 2017

Sl. No.	Proposed Date		Plan of Work	Remarks
	Odd Sem	Even Sem		
1.	27/06/2016	26/12/2016	Preparation of Time Table	
2.	28/06/2016	26/12/2016	Distribution of work loads	
3.	28/06/2016	26/12/2016	Distribution of Syllabus	
4.	01/07/2016	Nil	Bridge Course	
5.	04/07/2016	28/12/2016	Practical related ideas and preparations	
6.	20/07/2016	30/01/2017	Assignments topic distribution	
7.	04/08/2018	06/03/2017	Ist internal examination	
8.	Nil	07/01/2017	Seminars/workshop/study tour/industrial visits	
9.	31/08/2016	27/02/2017	Interaction with IBt/IIBt/IIIBt students	
10.	02/09/2016	06/03/2017	Interclass Competitions	
11.	Nil	28/02/2017	Science Exhibition	
12.	15/09/2016	06/03/2017	Food Fest	
13.	28/04/2016	21/03/2017	IInd internal examination	
14.	03/10/2016	29/03/2017	Syllabus Completion – Discussion	
15.	10/10/2016	03/04/2017	Question Paper discussion	
16.	11/10/2016	07/04/2017	Conduct of internal practical test/revision	
17.	21/10/2016	13/04/2017	Discussion about successful /drawback in completion plan of work	
18.	31/11/2016	10/04/2017	Conduct of Practical Examination	
19.	22/10/2016	14/04/2017	Vacation	
1.	18/09/2017		CPE Sponsor Workshop1	Planned and Took Action
2.	06/10/2017		CPE Sponsor Workshop2	
3.	01/09/2017		CPE Sponsor Seminar	

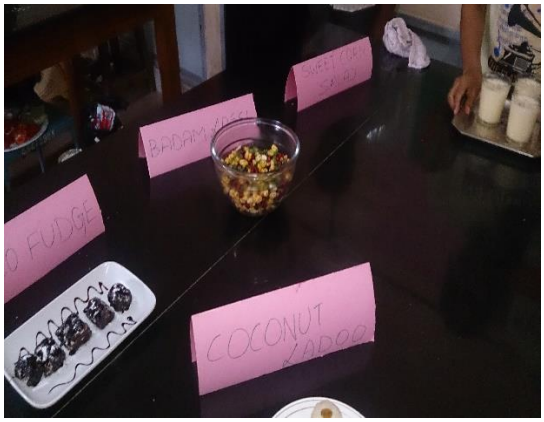
Outcomes (2016-17):

1. Time table was prepared as per the overall time table provided by the college
2. Work load was distributed as per the UGC guidelines (20hrs/week)
3. Syllabus was equally distributed based on area of specialization.
4. Practical topic and methods are studied and tried to adapt and rectify the problems in the laboratories. After the completion of practical opportunity to students were given for the revisions.
5. Along with the regular practical, new ideas and projects were given to students based on the syllabus
6. Internal tests were successfully completed
7. Assignments were given based on the syllabus
8. Project works were conducted – preparation of models
9. Study tour for students were achieved by visiting Industry.
10. Conducted seminar

Regional Level Lecture series for Students	Health and Informatics	Department of Biotechnology, Tumkur University and APLL	3rd January 2017	UCST, Tumkur University	Biotechnology Dept.

11. Conduct of Science exhibition and more participation of school children.
12. Conducted food fest – cooking without fire
13. Practical tests were successfully achieved
14. Syllabus completed and old question papers were discussed.
15. Conducted for Workshop, seminar, extension activity

Workshop- Blood Grouping Test by students in Tumkur village and Project Work



Students Seminar and interaction in PU Colleges and Food Fest

Department of Biotechnology

University College of Science, Tumkur University, Tumakuru

Plan of Work for the Year 2017 to 2018

Sl. No.	Proposed Date		Plan of Work	Remarks
	Odd Sem	Even Sem		
1.	08/07/2017	23/12/2017	Preparation of Time Table	
2.	10/07/2017	27/12/2017	Distribution of work loads	
3.	10/07/2017	28/12/2017	Distribution of Syllabus	
4.	12/07/2017	Nil	Bridge Course	
5.	13/07/2017	02/01/2018	Practical related ideas and preparations	
6.	02/07/2017	22/02/2018	Assignments topic distribution	
7.	09/08/2017	15/02/2018	Ist internal examination	
8.	Nl	29/01/2018 and 08/03/2018	Seminars/workshop/study tour/industrial visits	
9.	29/09/2017	01/03/2018	Interaction with IBt/IIBt/IIIBt students	
10	29/09/2017	01/03/2018	Interclass Competitions	
11	Nil	25/02/2018	Science Exhibition	
12	03/10/2017	03/03/2018	IInd internal examination	
13	02/10/2017	13/03/2018	Syllabus Completion – Discussion	
14	02/10/2017	16/03/2018	Question Paper discussion	
15	06/10/2017	20/03/2018	Conduct of internal practical test/revision	
16	28/10/2017	09/04/2018	Discussion about successful /drawback in completion plan of work	
17	11/10/2017	26/03/2018	Conduct of Practical Examination	
18	29/10/2017	--	Vacation	

Outcomes (2017-18):

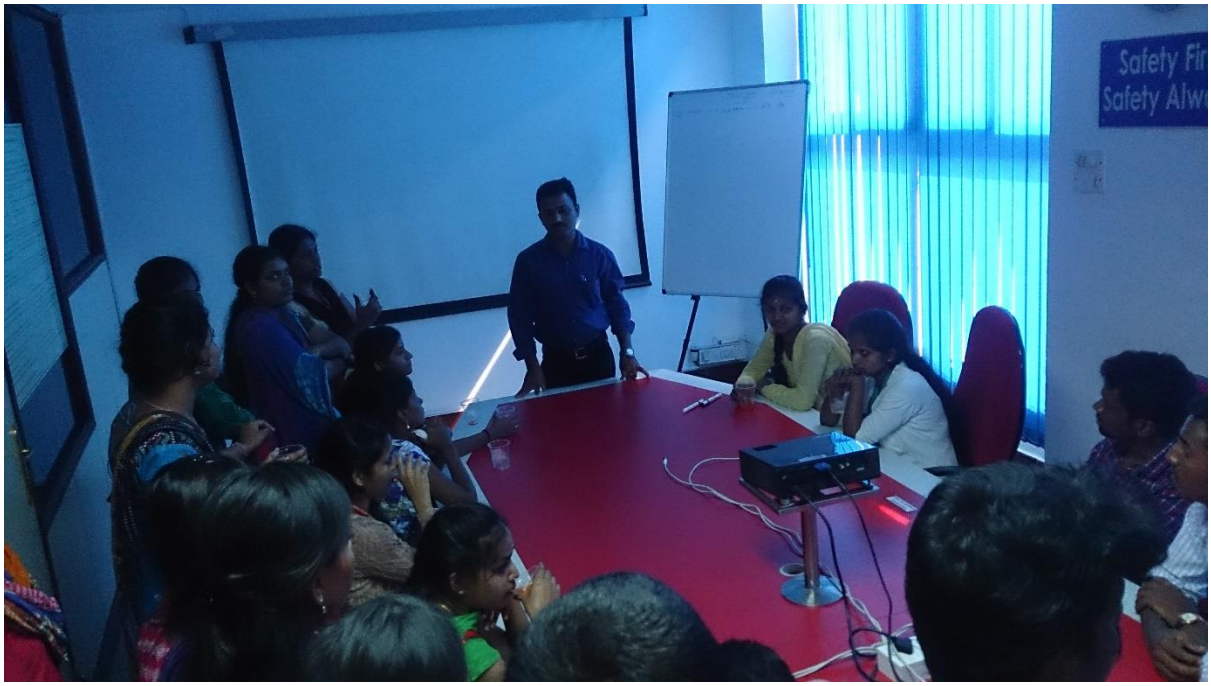
1. Time table was prepared as per the overall time table provided by the college
2. Work load was distributed as per the UGC guidelines (20hrs/week)
3. Syllabus was equally distributed based on area of specialization.
4. Practical topic and methods are studied and tried to adapt and rectify the problems in the laboratories. After the completion of practical opportunity to students were given for the revisions.
5. Along with the regular practical, new ideas and projects were given to students based on the syllabus
6. Internal tests were successfully completed
7. Assignments were given based on the syllabus
8. Project works were conducted – preparation of models
9. Study tour for students were achieved by visiting Industry.
10. Conducted seminar, Workshop, Extension activities by using CPE fund

University Level seminar	Biotechnology and its Applications	CPE, UGC	1st September, 2017	UCST, Tumkur University	Dr. Poornima D – Organizing Secretary
University Level Workshop	Tools and Techniques in Biotechnology	CPE, UGC	18th September, 2017	UCST, Tumkur University	Dr. Poornima D - Organizing Secretary
University Level Science Popularity Workshop	Azolla Utility and Health awareness	CPE, UGC	7th October 2017	UCST, Tumkur University	Dr. Poornima D - Organizing Secretary
National Level Conference	Advances in Biotechnology	TUT	29th January 2018	UCST, Tumkur University	Dr. Poornima D - Organizing Secretary

11. Conduct of Science exhibition.
12. Conducted food fest – cooking without fire
13. Practical tests were successfully achieved
14. Syllabus completed and old question papers were discussed.

CPE Sponsors Seminar and Workshop for the Year 2017-18

CPE Sponsors One Day Work Shop for the Year 2017-18



Group Discussions about safety measures in Brewery industry

Department of Biotechnology

University College of Science, Tumkur University, Tumakuru

Plan of Work for the Year 2018 to 2019

Sl. No.	Proposed Date		Plan of Work	Remarks
	Odd Sem	Even Sem		
1.	22/06/2018	17/12/2018	Preparation of Time Table	
2.	22/06/2018	17/12/2018	Distribution of work loads	
3.	22/06/2018	17/12/2018	Distribution of Syllabus	
4.	25/06/2018	Nil	Bridge Course for first year students	
5.	06/07/2018	18/12/2018	Practical related ideas and preparations	
6.	17/07/2018	11/01/2019	Assignments topic distribution	
7.	20/07/2018	31/01/2019	Ist internal examination	
8.	Nl	04/02/2019 and 08/02/2019	Seminars/workshop/study tour/industrial visits	
9.	24/08/2018 to 03/08/2018	26/02/2019 to 04/03/2019	Extension Activities	
10	27/08/2018	11/03/2019	Interclass Competitions /Seminars	
11	Nil	25/02/2019	Science Exhibition	
12	30/08/2018	27/03/2019	IInd internal examination	
13	28/09/2018	25/03/2019	Syllabus Completion – Discussion	
14	04/10/2018	28/03/2019	Question Paper discussion	
15	05/10/2018	29/03/2019	Conduct of internal practical test/revision	
16	10/10/2017	30/03/2019	Discussion about successful /drawback in completion plan of work	
17	03/10/2017	01/04/2019	Conduct of Practical Examination	
18	15/10/2017	13/04/2019	Vacation	
In addition to this NAAC Preparation will be conducted				

Outcomes (2018-19):

1. Time table was prepared as per the overall time table provided by the college
2. Work load was distributed as per the UGC guidelines (20hrs/week)
3. Syllabus was equally distributed based on area of specialization.
4. Practical topic and methods are studied and tried to adapt and rectify the problems in the laboratories. After the completion of practical opportunity to students were given for the revisions.
5. Along with the regular practical, new ideas and projects were given to students based on the syllabus
6. Internal tests were successfully completed
7. Assignments were given based on the syllabus
8. Project works were conducted – preparation of models
9. Study tour for students were achieved by visiting Industry.
10. Conducted Seven days training programme for Students by using CPE fund

07 days' skill development programme	Biotechnology – 07 different topics	CPE, UGC	21st July to 28th July, 2018	Biotechnology Lab, UCST	Dr. Krishna – Convenor, Co-Convenors: Sri. Dwarakanath V, Dr. Poornima D

11. Conduct of Science exhibition.
12. Conducted invited talk for Biotechnology Students
13. Conducted food fest – cooking without fire
14. Practical tests were successfully achieved
15. Syllabus completed and old question papers were discussed.

16. Planned training programme for faculties and students in collaboration with Institutes

Exhibition in Science Day

Resource Person Talk – Prof. M.N. Srinivas of University of Agricultural Sciences, Dharwad

Resource Person Talk: Dr. Dr. B. T. Prabhakar, Shivamogga

Extension Activity

Seven days Skill development programme – CPE, UGC Sponsored