

Late K.G. Kataria College, Daund

Tal-Daund, Dist-Pune -413801 (Id No.PU/PN/S/140/1999)



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(Science, Arts and Commerce College)

kgkatariacollege@rediffmail.com

PROGRAMMES OUTCOMES (POs)

PROGRAMME SPECIFIC OUTCOMES (PSOs)

COURSE OUTCOMES (COs)

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Program Outcomes, Program Specific Outcomes and Course Outcomes

Department of Chemistry

BACHELOR OF SCIENCE	
PROGRAMME: B.Sc. Chem	istry
	PO-1. Solve the problem and also think methodically, independently &
	draw logical conclusion.
	PO-2. Use modern techniques, decent equipments & chemistry
T	software.
Program Outcomes	PO-3. Find out the green root for chemical reaction for sustainable
	development.
	PO-4. Employ critical thinking &specific knowledge to design, carryout,
	record & analyze results of chemical reactions.
	PSO-1. Understand good laboratory practices & safety.
	PSO-2. Identify chemical formulae & solve numerical problems.
	PSO-3. To explain nomenclature, stereochemistry, structure, reactivity&
Program Specific Outcome	mechanisms of chemical reactions.
110grum speeme outcom	PSO-4. Use modern chemical tools, models, charts & equipment's.
	PSO-5. Gain the knowledge of chemistry through theory & practicals.
	PSO-6. Make aware & handle the sophisticated instruments/
	equipment's.
	Course Outcomes F.Y.
	B.Sc. (CBCS- 2019)
	CO-1. Students will be able to apply thermodynamic principles to
	physical and chemical process.
	CO-2. Third law of thermodynamic and its applications.
	CO-3. Calculations of enthalpy, Bond energy, Bond dissociation
	energy.
CH-101: Physical	CO-4. Students will able to understand Relation between Free energyand
Chemistry	equilibrium and factors affecting on equilibrium constant.
	CO-5. Students will able to understand Exergonic and endergonic
	reaction
	CO-6. Students will able to understand Concept of ionization process
	occurred in acids, bases and pH scale.
	CO-7. Degree of hydrolysis and pH for different salts, buffer solutions
	CO-1. The students are able to understand the fundamentals,
CH- 102: Organic	principles, and recent developments in the chemistry.
Chemistry	CO-2. Students are familiarizing with current and recent developments in
	Chemistry.



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	CO-3. Students will able to understand stereochemistry related
	concept.
	CO-4. Students will able to understand the difference between alkane,
	alkene, and alkynes.
	CO-1. Students will learn the chemical safety while performing
	experiments in laboratory.
	CO-2. Students will able to learn the thermochemical parameters and
	related concept.
CH- 103: Chemistry Practical	CO-3. Students will learn the techniques of pH measurements.
•	CO-4. Students will able to learn the elemental analysis of organic
	compounds.
	CO-5. Students will able to learn the process of Preparation of buffer
	solutions
	CO-1. Students will Learns the Various theories and principles applied
	to revel atomic structure.
	CO-2. Students will able to understand structure of hydrogen atom.
	CO-3. Students will learn the Shapes of orbitals.
	CO-4. Students will define various types of chemical bonds- Ionic,
CH-201: Inorganic Chemistry	covalent, coordinate and metallic bond
	CO-5. Students will define Fajan's rule, bond moment, dipole moment
	and percent ionic character.
	CO-6. Students will able to discuss electronic configuration of an atom
	and anomalous electronic configurations
	CO-1. Students will define term mole, mill mole, molar concentration,
	molar equilibrium concentration and Percent Concentration.
	CO-2. Students will able to understand the relation between molecular
	formula and empirical formula
CH-202: Analytical Chemistry	CO-3. Basics of chromatography and types of chromatography
CII-202. Analytical Chemistry	
	CO-4. Students will able to learn Separation techniques of binary
	mixtures and analysis CO-5. Students are able to understand measurement and working of pH
	meter CO-1. The practical course is in relevance to the theory courses to
	improve the Understanding of the concepts.
CH-203: Chemistry Practical –II	CO-2. It would help in development of practical skills of the students.
on zoo. Chemistry Practical	
	CO-3. Use of microscale techniques wherever required
	S.Y. B.Sc. (CBCS- 2019)
	CO-1. Student will able to- Define / Explain concept of kinetics, terms
	used, rate laws, molecularity, order.
CH-301: Physical and Analytical	CO-2. Determines the order of reaction by integrated rate equation
CH-301: Physical and Analytic Chemistry	method, graphical method, half-life method and differential method.
Chemistry	CO-3. Students will able to define, explain and compare meaning of
	accuracy and precision
	CO-4. Students will able to Apply the methods of expressing the errors
	in analysis from results.



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	CO-5. Students will able to Explain / discuss different terms related to
	errors in quantitative analysis.
	CO-1. Students will able to define terms related to molecular orbital theory (AO, MO, sigma bond, pi bond, bond order, magnetic property of molecules, etc). CO-2. Student will able to Draw and explain MO energy level
	diagrams for homo and hetero diatomic molecules. Explain bond order and magnetic property of molecule.
CH-302: Inorganic and Organic Chemistry	CO-3. Student will able to Define different terms related to the coordination chemistry (double salt, coordination compounds, coordinate bond, ligand, central metal ion, complex ion, coordination number, magnetic moment, crystal field stabilization energy, types of ligands, chelate effect, etc.)
	CO-4. Students will able to Apply IUPAC nomenclature to
	coordination compound CO-5. Students will able to Identify and draw the structures aromatic hydrocarbons from their names or from structure name can be assigned.
	CO-1. Students will able to verify theoretical Principles experimentally
	CO-2. Students will able to Correlate theory to experiments.
CH-303: Chemistry Practical -	CO-3. Students will able to Understand systematic methods of identification of substance by chemical methods.
III	Co-4. Students will able to write balanced equation for the chemical
	reactions performed in the laboratory.
	CO-5. Students will understand/verify theoretical principles by experiment observations; explain practical output / data with the help of theory.
	CO-1. Define the terms in phase equilibria such as- system, phase in system, components in system, degree of freedom, one / two component system, phase rule, etc.
	CO-2. Explain meaning and Types of equilibrium such as true or static metastable and unstable equilibrium.
CH-401: Physical and Analytical	CO-3. Explain distillation of liquid solutions from temperature – composition diagram.
Chemistry	Co-4. Explain / discuss azeotropes, Lever rule, Henrys law and its application.
	CO-5. Explain / discuss conductometric titrations.
	CO-6. Apply conductometric methods of analysis to real problem in analytical laboratory.
	CO-7. Explain construction and working of colorimeter.
	CO-1. Student will able to- Isomerism in coordination complexes
	CO-2. Explain different types of isomerism in coordination complexes
CH-402: Inorganic and Organic	CO-3. Explain / discuss limitation of VBT.
Chemistry	Co-4. Calculate field stabilization energy and magnetic moment for



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	CO-5. Explain: i) strong field and weak field ligand approach in Oh
	complexes ii) Magnetic properties of coordination compounds on the
	basis of weak and strong ligand field ligand concept
	CO-6. Perform inter conversion of functional groups.
	CO-7. Explain / discuss synthesis of carboxylic acids and their
	derivatives
	CO-8. Draw structures of different conformations of methyl / t-butyl monosubstituted cyclohexane (axial, equatorial) and 1, 2 dimethyl cyclohexane.
	CO-1. Interpret the experimental data on the basis of theoretical
	principles.
	CO-2. Correlate the theory to the experiments. Understand / verify
	theoretical principles by experiment or explain practical output with the help of theory.
	CO-3. Write balanced equation for all the chemical reactions performed in the laboratory.
	Co-4. Perform organic and inorganic synthesis and able to follow the
	progress of the chemical reaction.
	CO-5. Perform the quantitative chemical analysis of substances and
	able to explain principles behind it.
CH-403: Chemistry Practical -	CO-6. Set up the apparatus properly for the designed experiments.
IV	CO-7. Verify theoretical principles experimentally.
·	Course Outcome
	T.Y.B.Sc. (CBCS -2019)
	CO-1. Students should understand and explain the differences between
	classical and quantum mechanics.
	CO-2. Students Should be able to explain De Broglie hypothesis and the
	uncertainty principle.
	CO-3. Students should know the Classification of molecules on the basi
DSEC-I: CH-501:	of moment of Inertia.
Physical Chemistry- I	CO-4 Students should be able to explain the difference between
	Rayleigh, Stokes and anti-Stokes lines in a Raman spectrum.
	CO-5. Students should be able to difference between thermal and
	photochemical processes.
	CO-6. Students should know Quantum yield and reasons for high and
	low quantum yield,
	CO-1. Students should be able to Define basic terms in gravimetry,
	spectrophotometry, qualitative analysis and parameters in instrumental
	analysis.
	CO-2. Explain different principles involved in the gravimetry,
DSEC-I: CH: 502: Analytical	spectrophotometry, parameters in instrumental analysis, qualitative
Chemistry-I	analysis.
	CO-3. Students should be able to differentiate / distinguish / compare
	among the different analytical terms, process and analytical methods.



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	CO-4. Apply whatever theoretical principles he has studied in theory
	during practical session in laboratory.
DSEC-I: CH-503: Physical	CO-1. Student should be able to determine specific refractivity of the
Chemistry Practical – I	liquid.
	CO-2. Student should be able to determine concentration of the complex
	through Spectrophotometry and Colorimetry.
	CO-3. Student should be able to determine conductance of a liquid by
	using Conductometry.
	CO-4. Student should be able to determine viscosity of liquid by using
	Ostwald Viscometer.
	CO-5. Student should know the principle Photoflurometry.
	CO-1. Students should know electroneutrality principle and different
	types of pi bonding.
	CO-2. Explain MOT of Octahedral complexes with sigma bonding.
DSEC-I: CH-504: Inorganic	CO-3. Students should able to explain Charge Transfer Spectra.
Chemistry – I	CO-4. Students should able to compare the different approaches to
	bonding in Coordination compounds.
	CO-5. Students should know nuclear fuels and their applications.
	CO-6. The difference between metal, semiconductor and insulator.
	CO-1. Knowledge of various industrial aspects.
	CO-2. They should also know the physico-chemical principals involved
DSEC-II: CH-505: Industrial	in manufacturing process.
Chemistry – I	CO-3. Importance of sugar industry.
	CO-4 Manufacturing of ethyl alcohol by using molasses and fruit juice.
	CO-5. Synthesis, Structures, properties and applications of dyes
	CO-1. Understood the gravimetric estimation of Fe as Fe ₂ O ₃
DODG W GW 504	CO-2. Analyze the sodium bicarbonate from the binary mixture.
DSEC-II: CH-506	
Inorganic Chemistry Practical	CO-3. Analyze the Cation and Anion from the mixture.
	CO-4. Understood the gravimetric estimation of Ba as BaSO ₄
	CO-1. Student Should define and classify polynuclear and heteronuclear
	aromatic hydrocarbons.
	CO-2. Student should be able to write structure and synthesis of
	polynuclear and heteronuclear aromatic hydrocarbons.
	CO-3. Student should know Synthetic applications ethyl acetoacetate
DSEC-III: CH-507: Organic	and malonic ester.
Chemistry – I	CO-4. Student should identify different types of intermediate in
	rearrangement reactions.
	CO-5. Student should understand stereochemistry by using models and
	learn reactivity of geometrical isomers. CO-6. Student should know effect of factors on the rate elimination
	reactions.
	CO-1. The types of lipids with examples, structure of lipids, properties
	of lipids.
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	CO-2. Effect of pH on structure of amino acid, Determination of N and
	C terminus of peptide chain.
DSEC-III: CH-508: Chemistry	CO-3. Enzyme specificity, Equations of enzyme kinetics Km and its
of Biomolecules	significance, features of various types of enzyme inhibitions, industrial
	applications of enzymes.
	CO-4. The types of carbohydrates and their biochemical significance in
	living organisms, structure of carbohydrates and reactions
	ofcarbohydrates with Glucose as example.
	CO-1. Students should be able to perform the quantitative
	chemical analysis of binary mixture, explain principles behind it.
	CO-2. Students should be able understand the techniques
	involvingdrying and recrystallization by various method.
	CO-3. Students will be familiar to the test involving identification
	ofspecial elements.
	CO-4. Students should be able learn the confirmatory test for
CH-509: Organic Chemistry	various functional groups.
Practical-I	CO-5. Students should be able to synthesis of various
1 Tactical-1	organic compounds through greener approach.
	CO-6. Students will be expertise in the various techniques of
	preparation and analysis of organic substances.
	CO-7. Students should be able understand principle of Thin
	LayerChromatographic techniques.
	CO-8. Students should be able understand the purification
	techniqueused in organic chemistry.
	CO-1. History of polymers.
	, , , , , , , , , , , , , , , , , , ,
	CO-2. Difference between simple compounds and polymer.
CH-510	CO-3. Names of polymers.
(B) Polymer Chemistry	CO-4 Various ways of nomenclature
	CO-5. Terms-Monomer, Polymer, Polymerization, Degree of
	polymerization, Functionality, Number average, Weight
	averagemolecular weight.
	CO-1. Students should understand the importance and conservation
	ofenvironment.
	CO-2. Students should be able to explain the importance
CH-511 (A): Environmental	ofbiogeochemical cycles.
Chemistry	CO-3. Students should know the different Water resources.
	CO-4. Students should be able to understand the Hydrological Cycle.
	CO-5. Students should learn different organic and inorganic pollutants.
	CO-6. Students should identify different water quality parameters.
	CO-1. Student should know thermodynamic conditions of
	reversible reversible and irreversible
	electrochemical cell with suitable example.
	CO-2. Student should know EMF of electrochemical cell and
	itsmeasurement.
	itomoutomont.



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	CO-3. Student should be able to distinguish between crystalline and
DSEC-IV: CH-601: Physical	amorphous solids / anisotropic and isotropic solids.
Chemistry-II	CO-4. Student should understand methods of Crystal structure
	analysis: The Laue method and Braggs method: Derivation of
	Bragg's equation.
	CO-5. Student should know types and properties of radiations:
	alpha,beta and gamma.
	CO-6. Student should know application of radioisotopes as a
	tracer:Chemical investigation- Esterification, Friedel -Craft
	reaction and
	structure determination w.r.t PCl_5 , Age determination use of tritium and C^{14} dating.
	CO-1. Meaning of the terms-Solution, electrolytes, nonelectrolytes and
	colligative properties,
	CO-2. Students are expected to know Factors affecting on solid state
CH-602: Physical Chemistry-	reactions, Rate laws for reactions in solid state
III	CO-3. Students should know Cohesive Energy of ionic crystals based on
Ш	coulomb's law and Born Haber Cycle.
	CO-4. Students are expected to know History of polymers,
	Classification of polymers, Chemical bonding & Molecular forces in
	Polymer, Molecular weight of polymers.
	CO-1. Student should be able to determine emf of liquid by using
	Potentiometry.
	CO-2. Student should know the principle of pH metry.
DSEC-IV: CH-603: Physical	CO-3. Student should know the principle and operation of G M Counter.
Chemistry Practical-II	CO-4. Student should know the principle and operation of G M Counter.
	<u> </u>
	CO-5. Student should know the Colligative properties.
	CO-6. Student should know the principle of Turbidometry.
	CO-1. Students should be able to understand M-C bond and to define
	organometallic compounds.
	CO-2. To know methods of synthesis of binary metal carbonyls.
	CO-3. A student should be able to Understand the phenomenon of
CH-604: Inorganic Chemistry	catalysis, its basic principles and terminologies.
–II	CO-4. A student should identify the biological role of inorganic ions &
	compounds.
	CO-5. A student should be able to draw the structure of Vit. B_{12} and give
	its metabolism.
	CO-6. A student should understand Preparation of inorganic solids by various methods.
	CO-1. How acid and base strengths get affected in non-aqueous
	solvents.
	CO-2. Draw the simple cubic, BCC and FCC structures.
	-
	CO-3. Be able to solve simple problems based on Born- Haber cycle.



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DSEC-V: CH-605: Inorganic	CO-4. Different Zeolite Framework Types and their classification.
Chemistry -III	CO-5. Various methods of nanoparticle synthesis.
	CO-6. To know toxic chemical in the environment.
	CO-7. To know the biochemical effect of Arsenic, Cd, Pb, Hg.
	CO-1. Understood the Phosphate from fertilizer.
CH-606-	CO-2. Analyze the Calcium from milk powder.
Inorganic Chemistry Practical	CO-3. Analyze the Strength of medicinal H ₂ O ₂ .
	CO-4. Analyze the Na by flame photometry
	CO-5. Analyze the K by flame photometry
	CO-1. Students will learn the principle of mass spectroscopy, its
DSEC-VI: CH-607: Organic	instrumentation and nature of mass spectrum.
Chemistry-II	CO-2. Students will understand the principle of IR spectroscopy, types
0.1.0.1.2.3.0.1 <u> </u>	of vibrations and the nature of IR spectrum.
	CO-3. Students will understand the principle of NMR spectroscopy and
	will understand various terms used in NMR spectroscopy. They will
	learn measurement of chemical shift and coupling constants.
	CO-4. Students will be able to interpret the NMR data and they will be
	able to use it for determination of structure of organic compounds.
	CO-5. Student should know the geometrical isomerism in disubstituted
	cyclohexane's. CO-6. Student should know the stability of geometrical isomers of
	decalin.
	CO-1. Meaning of terms Disconnection, Synthons, Synthetic
	equivalence, Functional Group Interconversion, Target Molecule
DSEC-VI: CH-608: Organic	CO-2. To write mechanism of some named rearrangement reactions.
Chemistry-III	CO-3. Understand the difference between carbocation & carbanion.
	CO-4. Synthesis of Citral and Ephedrin by Barbier- Bouveault and Nagi
	methods, respectively.
	CO-5. Synthetic applications some reagents.
	CO-6. Various methods of isolation/extraction of these natural products.
	CO-7. To determine the structure of above compounds by chemical
	methods.
	CO-1. Students should be able to identify the functional group or groups
	present in a compound. CO-2. Students should be able to understand use NMR spectra to
	determine the structures of compounds.
CH-609: Organic Chemistry Practical-II	CO-3. Students should be able to calculate coupling constants from 1 H
i racucar-ii	NMR spectra.
	CO-4. Students should be able to achieve the practical skills required to
	estimations of glucose and glycine and saponification value of oil.
	CO-5. Students should be able to determine the molecular weight of
	given tribasic acids.
	CO-6. Students should be able to apply the principles of extraction.



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	CO-7. Students should be able to describe the extraction separation
	process.
	CO-8. Students should be able to explain the processes of a
	chromatography analysis.
	CO-9. Students should be able to realize the selection of appropriate
	mobile phase, column and detector.
	CO-1. Understood various components of soil and soil properties and
	their impact on plant growth.
CII (10 (A)), Chamistary of Sail	CO-2. Understood the classification of the soil.
CH-610 (A): Chemistry of Soil and Agrochemicals	CO-3 Got experience on advanced analytical and instrumentation
and Agrochemicals	methods in the estimation of soil.
	CO-4 Proper understanding of chemistry of pesticides will be inculcated
	among the students.
	CO-5. Imparts knowledge on different pesticides, their nature and, mode
	of action and their fate in soil so as to monitor their effect on the
	environment.
	CO-1. Students should be able to define basic terms in solvent
	extraction.
	CO-2. Students should be able to identify important parameters in
	analytical processes or estimations.
	CO-3. Students should be able to explain different principles involved in
	the analyses using solvent extraction, basics of instrumental
CH-611(A): Analytical	chromatography, HPLC, GC, and atomic spectroscopic techniques.
Chemistry-II	CO-4. Students should be able to perform quantitative calculations
	depending upon equations students have studied in the theory.
	CO-5. Students should be able to discuss / describe procedure for
	different types analyses included in the syllabus.
	CO-6. Students should be able to differentiate / distinguish / compare
	among the different analytical terms, process and analytical methods.
	CO-7. Students should be able to apply whatever theoretical principles
	he has studied in theory during practical in laboratory.



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Department of Chemistry

MASTER OF SCIENCE	
PROGRAMME: M.Sc. Analytic	
•	PO-1. To develop a strong footing in the fundamentals and specialize
	in the disciplines of his/her
	PO-2. To develop in depth understanding of various aspects of the
	subject
D	PO-3. To have deeper understanding of laws of nature through
Programme Outcomes	subjects like material science, Nanotechnology, quantum mechanics,
	Bio-organic Chemistry etc.
	PO-4. The ability of problem solving will be enhanced. Students can
	apply principles in chemistry to real life problems
	PSO-1. After completion of program, students will be able to have in-
	depth knowledge of basic concepts in Chemistry
	PSO-2. Students will be able to apply the laws of Physics in real life
	situations to solve the problems.
	PSO-3. Students develop the aptitude of doing research by
Program Specific Outcomes	undertaking small projects.
	PSO-4. The student will have set his foundation to pursue higher
	education in Chemistry.
	PSO-5. After completing the program student will have developed
	interdisciplinary approach and can pursue higher studies in subjects
	other than Chemistry.
	Course Outcomes
	M. ScI (Sem-I) (CBCS- 2019)
	CO-1. Students should understand the concept of thermodynamics
CHP-110	CO-2. The course aims to provide a fundamental understanding of
	physical chemistry; students learn the concept of Gibbs and
	Helmholtz energies, Chemical potential, Expressing Chemical
	equilibrium in terms of chemical potential.
	CO-3. Elements of quantum chemistry, wave particle duality,
	uncertainty principle, wave function and its interpretation, well
	behaved functions, orthonormal functions, Schrodinger equation,
	particle in a box, degeneracy, quantum mechanical harmonic
	oscillator, and quantum tunnelling are introduced.
	CO-4. Students are made aware of Chemical kinetics and reaction
	dynamics topics such as Reversible reactions, the principle of
	microscopic reversibility, steady state approximation, elucidating
	mechanism using SSA.
	CO-1. Students should visualize in 3 dimension to understand the
	concept of symmetry



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CO-2. Students are made to understand the symmetry and group theory and use this knowledge to interpret the properties like dipole moment, optical activity, and signals in IR and Raman spectroscopy for structure identification.
CO-3. Students are also made to understand the periodic trends in properties of S and P block elements and their applications in fields like catalysis, industry, human metabolism CO-4. Students should understand the detail chemistry of S & P
elements
CO-1. To understand some fundamental aspects of organic chemistry,
to learn the concept aromaticity, to understand the various types of
aromaticity
CO-2. To study heterocyclic compound containing one and two
hetero atoms with their structure, synthesis and reactions.
CO-3. To know stereochemistry of organic compounds; able to do interconversion of Fischer to Newmann, Newmann to Sawhorse and vice versa, Able to assign R and S to given molecules; understand stereoselective and stereospecific reactions; acquire knowledge on topicity
CO-4. To study structure, formation, stability and related name reaction of intermediates like Carbocation, Carbanion, Free Radical, Carbenes and nitrenes; Recognize neighboring group participation. CO-5. To study rearrangement reaction with specific mechanism and migratory aptitude of different groups.
CO-6. To study Ylides and their reaction
CO-7. To understands the basis of redox reaction; acquire knowledge about the reagents which causes selective.
CO-1. Students will be able to explore new areas of research in both chemistry and allied fields of science and technology.
CO-2. Students will be able to function as a member of an interdisciplinary problem-solving team.
CO-3. To impart the student's thorough idea in the chemistry of carbohydrates, amino acids, proteins and nucleic acids etc. CO-4. Be able to describe the chemical basis for replication,
transcription, translation and how each of these central processes can
be expanded to include new chemical matter.
M. ScI (Sem-II) (CBCS- 2019)
CO-1. The course aims to provide an understanding of physical
chemistry, in this course, the fundamentals of molecular spectroscopy
are introduced. Nuclear and radiation Chemistry concepts are
introduced.
CO-2. Students learn basic elements of rotational, vibrational, Raman and electronic spectroscopy.



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	CO-3. Students get familiar with Chemical Bonding: Valence Bond
	theory, hybrid orbitals, geometry and hybridization, Molecular Orbita
	Theory, linear variation method, Approximations underlying Huckel
	theory, bond order, Aromaticity, Applications of Huckel theory
	CO-1. Students are made aware of spectral and magnetic properties of
	d and f block elements and spectrophotometric analysis of metals like
	Cr, Mn, Ni and magnetic behavior of various complexes of f-block
CHA-230	elements in MRI and as TV phosphors.
	CO-2. Students are also made aware of the role of the metal ion in
	biologically active compounds like Hb, Mb cytochromes and use of
	anticancer drugs i.e., platinum complexes.
	CO-1. Students will be able to understand the MOT and will be able
	to extend this in predicting reaction mechanism and stereochemistry
	of electrocyclic reactions.
	CO-2. The concepts in free radical reactions, mechanism and the
	stereo chemical outcomes.
	CO-3. Students should able to write MO diagram for various olefinic
	compounds and should able to predict the products, the
CHA-250	stereochemistry as well as should able to understand the preferred reaction pathways.
	CO-4. Student should able to calculate λmax value of organic
	compounds containing more than one and less than four conjugated
	systems. Students should able to correlate IR bands with functional
	groups using numerical data as well as spectral data.
	CO-5. The basic principle of spectroscopic methods and their
	applications in structure elucidation of organic compounds using
	given spectroscopic data or spectra.
	CO-1. Students will be able to explore new areas of research in both
	chemistry and allied fields of science and technology.
	CO-2. Students will be able to function as a member of an
	interdisciplinary problem-solving team.
CHA-290	CO-3. To impart the student's thorough idea in the chemistry of
	carbohydrates, amino acids, proteins and nucleic acids etc.
	CO-4. Be able to describe the chemical basis for replication,
	transcription, translation and how each of these central processes can
	be expanded to include new chemical matter.
CH-107	CO-1. These techniques will enable them to work as quality control
Physical Chemistry Practical	chemist in various labs and such organizations.
	CO-2. Students are trained to use techniques such as pH metry,
	Conductometry, Potentiometry, Colorimetry, Spectrophotometry,
	Refractometry, and G. M. Counter.
	CO-1. Students are trained to different purification techniques in
	organic chemistry like recrystallization, distillation, steam distillation
	and extraction.
CH -227	CO-2. Students are made aware of safety techniques and handling of
	chemicals.
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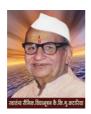
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Inorganic & Organic	CO-3. Students are made aware of carrying out different types of
Chemistry Practical	reactions and their workup methods.
	CO-4. This practical course is designed to make student aware of
	green chemistry and role of green chemistry in pollution reduction.
	M.ScII (Sem-III) (CBCS- 2019)
CHA-390 Electrochemical and	CO-1. Study of coulometry, Faraday law Electroanalysis.
Thermogravimetric Methods of	CO-2. Study of voltammetry and paleographic method of analysis,
Chemical Analysis	and radio analytical hydrodynamic voltammetry, plus paleography
	and cyclic voltammetry. methods of
	CO-3. Study of amperometry and their applications, analysis
	CO-4. Learn radio analytical methods of analysis, activation analysis,
	isotope dilution analysis, radio metric titration.
CHA-391 Analytical method	CO-1. To understand assay validation and inter laboratory transfer.
development and Extraction Techniques	CO-2. Study the statistical analysis and analytical figure.
Techniques	CO-3. Overview of worldwide regulations.
	CO-4 Specific methods and applications, Dissolution studies and USP
	types.
	CO-5 Method development technique and validation specific analyze.
	CO-6 Study extraction techniques in analytical chemistry.
	CO-7. Study the classical approach for aqueous extraction, solid
	phase extraction, micro extraction and SFE.
CHA-392 Advanced	CO-1. Study of Mass Spectroscopy apparatus
Chromatographic Methods of	CO-2. Study the fundamentals of Chromatographic methods- Gas
Analysis	Chromatography
	CO-3. Study the application of gas chromatography and mass
	spectrometry.
	CO-4. Study quantitative analysis by gas liquid chromatography
	method.
	CO-5. Study the instrumentation of HPLC
	CO-6. Methods of HPLC Reverse, adsorption, Ion Exchange, Size
	Exclusion and separation of enantiomers.
CHA-393 B Analysis of Food	CO-1. Analytical methods use for food analysis.
and Controlled Substances	CO-2. Study the preparation of sample and total solid analysis.
	CO-3. Analysis of Ash, Lipids and Proteins from Sample.
	CO-4. Study of Food preservatives.
	CO-5. Study the chemical test for narcotic drugs and psychotropic substances.
CHA-394 Practical I: Basic of	CO-1. To understand various terms involved practical methods of
Instrumentation Methods of	quantitative analysis.



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Chemical Analysis	CO-2. To analyze organic and inorganic materials using appropriate chemicals.
	CO-3. To study basic principles of chemicals and instrumental methods.
	CO-4. To calculate the result and interpret the result
	M.ScII (Sem-II) (CBCS- 2019)
CHA-490 Advanced Analytical	CO-1. Study of sample preparation techniques.
spectroscopic Techniques	CO-2. Atomic Absorption and Emission Spectroscopy method of analysis, its practical applications.
	CO-3. Understand an introduction AFS, AES and MS, its applications.
	CO-4. Study of chemiluminescence, Fluorescence and phosphorescence.
	CO-5. Study of ESR spectroscopy.
	CO-6. Study the electron paramagnetic resonance spectroscopy.
CHA-491 Chemicals Methods of Pharmaceuticals Analysis	CO-1. Study of pharmaceutical dosage from tablet, Oral Liquid and powder for injections.
	CO-2. To study the chemical test, limit test and assay of different material like Heavy metal, Vaccines, Assay of vitamin A etc.
	CO-3. To study the pharmaceutical methods of determination and its applications.
	CO-4. Study of agar diffusion assay, the theory and practice of tube assay, general practical aspects of microbiological assay.
CHA- 492 B Analytical Chemistry of agriculture,	CO-1. Study of analysis of Soil, fertilizer, sampling and sample preparation, kjeldahl's method.
Polymer and Detergent	CO-2. Understand the analysis of soap and detergents, UV-spectroscopic analysis of detergent.
	CO-3. Learn the polymer chemistry, analysis and testing of polymer, measurement of molecular weight and size.
	CO-4. To understand the analysis of pesticide residue.
CHA-493 A Optional Analytical Chemistry Practical	CO-1. To understand various terms involved practical methods of quantitative analysis.
CHA-494 Applied Analytical	CO-2. To analyze organic and inorganic materials using appropriate chemicals.
Chemistry (Practical II)	CO-3. To study basic principles of chemicals and instrumental methods.
	CO-4. To calculate the result and interpret the result.



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	MASTER OF SCIENCE
PROGRAMME: M.Sc. Organic Chemistry	
	PO-1. Determine molecular structure by using UV, IR and NMR.
Program Outcomes	PO-2. To give students a comprehensive understanding of the principles of Chemistry
	PO-3. Improve the Skill of student in organic research area.
	PO-4. To gain the skill to design and carry out scientific experiments and interpret the data
	PO-5. Study of Asymmetric synthesis.
	PO-6. Determine the aromaticity of different compounds.
	PO-7. To be able to define and resolve new problems in Chemistry and participate in the future development of Chemistry.
Program Specific Outcomes	PSO1.To develop the post graduate department on the modern lines of education and training levels.
	PSO2.To impart the advanced practical and theoretical knowledge to the students and develop the scientific skills among them to be useful in the concerned field.
	PSO3.To trained students and make them eligible for accessing integrated multidimensional fields.
	PSO4.Anticipation of new/upcoming areas in academics as well as in technology.
	Outcomes- Organic Chemistry ScI (Sem-I) (CBCS- 2019)
CHP-110 Fundamentals of Physical	CO-1. The course aims to provide fundamental understanding of physical chemistry.
Chemistry-I	CO-2 Students learn the concept of Gibbs and Helmholtz energies, Chemical potential and Expressing Chemical equilibrium in terms of chemical potential.
	CO-3 Elements of quantum chemistry, wave particle duality, uncertainty principle, wave function and its interpretation, well behaved functions, ortho normal functions, Schrodinger equation, particle in a box, degeneracy, quantum mechanical harmonic oscillator and quantum tunneling are introduced.



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	CO-4. Students are made aware of Chemical kinetics and reaction dynamics topics such as Reversible reactions, principle of microscopic reversibility, steady state approximation and elucidating mechanism using SSA. Arrhenius theory, enzyme catalysis and Michaelis-Menten mechanism.
CHI-130 Molecular Symmetry & Chemistry of p-block elements	CO-1. Student should visualize/ imagine molecules in 3 dimensions. To understand the concept of symmetry and able to pass various symmetry elements through the molecule. Understand the concept and point group and apply it to molecules. To understand product of symmetry operations. To apply the concept of point group for determining optical activity and dipole moment.
	CO-2. Student should understand the importance of Orthogonality Theorem. They should able to learn the rules for constructing character table. Using reduction formulae should be able to find out the possible type of hybridization. Student should know the concept of SALC. Student able to find out character for reducible representation.
	CO-3. To know about projection operator. Apply projection operator to find out the normalized wave function for atomic orbital. Student should correlate the application of symmetry to spectroscopy. Students able to find out the possible modes of vibration. From the previous knowledge of symmetry student must able to find out which mode are IR active.
	CO-4. Student should understand the detail chemistry of S and P block elements w.r.t. their compounds, their reactions and applications. To learn the advance chemistry of boranes, fullerene, zeolites, polymers etc. Organometallic chemistry of some important elements from the main groups and their applications.
CHO-150 Basic Organic Chemistry	CO-1. To understand some fundamental aspects of organic chemistry, to learn the concept aromaticity, to understand the various types of aromaticity To study heterocyclic compound containing one and two hetero atoms with their structure, synthesis and reactions.
	CO-2. To know stereochemistry of organic compounds; able to do interconversion of Fischer to Newmann, Newmann to Sawhorse and vice versa, Able to assign R and S to given molecules; understand stereoselective and stereospecific reactions; acquire knowledge on topicity. To study structure, formation, stability and related name reaction of intermediates like Carbocation, Carbanion, Free Radical, Carbenes and nitrenes; Recognize neighboring group participation.
	CO-3. To study rearrangement reaction with specific mechanism and migratory aptitude of different groups. To study Ylides and their reaction. CO-4. Student should aware about reaction mechanism.
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	CO-4. To understands the basis of redox reaction; acquire knowledge about the reagents which causes selective oxidation / reduction in various compounds; learn the basic mechanism of oxidation / reduction in organic compounds.
CHG – 190	CO-1. Bonding in solids – band theory
General Chemistry-I SECTION-I: Theory Course	CO-2. Electronic conductivity
Elective Option-A	CO-3. Semiconductors, photoconductivity
: Introduction to Solid State of Matter	CO-4. Non-stoichiometry, defects and types of defects in solids
	CO-5. Ionic conductivity and their applications
	CO-6. Superconductivity and theory of superconductivity
CHP-107 Practical Course – I	CO-1. The students are made aware of necessary guidelines of safety in chemical laboratory and good laboratory practice.
Basic Practical Chemistry-I Sec-I: Physical Chemistry	CO-2. Students get acquainted with different types of hazards at work place, use of personal protective.
Practical Sec-II: Organic Chemistry	CO-3 Students also aware about types of fire extinguisher inventory management, storage and disposal material safety data sheets.
·	CO-4 Students should know how to handle first Aid as while working different chemicals are in contact with the skin, eyes and inhalation and ingestion.
	CO-5 Students are trained to different purification techniques in organic chemistry like recrystallization, distillation, steam distillation and extraction.
	CO-6 This practical course is designed to make student aware of green chemistry and role of green chemistry in pollution reduction.
	CO-7. Students are made aware of Chemical kinetics and reaction dynamics topics.
	CO-8. To find the rate constant of reaction k and relative strength.
	CO-9. To find order of reaction
	Course Outcomes Semester-II
	CO-1. The course aims to provide understanding of physical chemistry.
CHP-210 Fundamentals of Physical Chemistry II	CO-2 In this course fundamentals of molecular spectroscopy are introduced. Students learn basic elements of rotational, vibrational, raman and electronic spectroscopy.



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	CO-3. Nuclear and radiation Chemistry concepts are introduced. Students get familiar with Chemical Bonding.
	CO-4 Valence Bond theory, hybrid orbital, geometry and hybridization, Molecular Orbital Theory, linear variation method, Approximations underlying Huckel theory, bond order, Aromaticity, Applications of Huckel theory
CHI- 230 Coordination and Bioinorganic Chemistry	CO-1. Students are made aware of spectral and magnetic properties of d and f block elements, spectrophotometric analysis of metals like Cr, Mn, Ni and magnetic behavior of various complexes of f block elements in MRI and as TV phosphors.
	CO-2 Students are also made aware of a role of metal ion in biologically active compounds like Hb, Mb cytochromes and use of anticancer drugs i.e.platinum Complexes.
	CO-3 It explains biochemistry of Na, K, Ca, with respect to Na/K pumps.
CHO-250 Synthetic Organic Chemistry &	CO-1. The main aim of this course is to study with various basic organic reactions with mechanism, reagent and ylides.
Spectroscopy	CO-2 This course also covers with the basic introduction to various spectroscopic methods like UV, ¹ H-NMR, ¹³ C-
	NMR, IR, Mass spectrometry and their applications.
CHA-290 General Chemistry	CO-1 The basicpurpose of this course is to understand the importance and properties of mass spectrometry, gas chromatography and high performance liquid Chromatography.
	CO-2 Students also familiar with concept of analytical chemistry like data handling and spreadsheets, Sampling, Standardization and calibration.
	CO-3 Separation by precipitation, distillation, extraction and ion exchange chromatography.
CHP-107 Practical Course	CO-1 Students are trained to use the techniques such as pH metry, Conductometry, Potentiometry, Colorimetry, Spectrophotometry, Refractometry and G. M. Counter.
(Physical Chemistry)	CO-2 These techniques will enable them to work asquality control chemist in various labs and such organizations.
CHI-147	CO-1 Students are given the knowledge of basic preparation of
Practical Course (Inorganic Chemistry)	various solutions, synthesis of various inorganic complexes and their characterization
	CO-2 The students are trained for handling of natural materials and their quantitative analysis which involves disintegration, separation and individual estimations.



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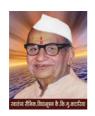
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	CO-3 They are given hands on training to handle various equipments like spectrophotometer, flame photometer, Condutometer etc.
	Semester- III
CHO-350	CO-1 The main aim of this course is to learn and understand the basic
Organic reaction	concept in reaction mechanism.
mechanism	CO-2 This course helps the students to understand the role of recent
	reagent, catalyst in mechanism of reaction.
	CO-3 This course also helps to improve the thinking ability of the
	students towards reaction mechanism.
CHO-351	CO-1. This course enables to the students learn the basic of
Spectroscopic Methods in Structure	spectroscopic methods like UV, ¹ H-NMR, ¹³ C-NMR, IR, Mass spectrometry and their application.
Determination.	
	CO-2. This course gives idea of structure determination of known and unknown organic molecules by using spectroscopic data.
	unknown organic molecules by using spectroscopic data.
CHO-352	CO-1. This course helps to aware the students to understand the
Organic	stereochemistry of organic reactions.
Stereochemistry	
Stereoenemistry	CO-2. Also gives detail idea regarding stereochemistry of alicyclic
	rings, fused, bridge and caged rings.
	CO-3. This course also includes resolution of racemic modification and
	determination of stereochemistry of organic compound using NMR, which helps to the students that they predict stereochemistry of organic
	compounds
CH-353	CO-1. The aim of this course is to furnish the students with
Photochemistry, pericyclic	fundamental and theoretical understanding of heterocyclic chemistry.
Reactions and Heterocyclic	CO-2. This course includes photochemistry and
Chemistry	pericyclicreactionswhichhelpsthestudentstoimprove
	their imagination power.
	CO-3.Heterocyclic chemistrygives basic idea to the students in
	synthesis of different heterocyclic derivatives.
	Semester IV
CHO-450	CO-1. In this course PG students learn the different pathways of
Chemistry of Natural	synthesis of natural products.
product	CO-2. It also helps stereochemistry and structure determination of
	some natural products.
	CO-3. The biogenesis develops the synthetic strategies to prepare
	different important natural compounds in the laboratory.
	CO-4. This course involves multistep synthesis of
	coumarins, flavonoids, isoflavonoids and terpenoids.



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CHO: 452 Carbohydrate and	CO-1. This course involves organometallic chemistry which helps the students to develop their ideas in organic synthesis.
Chiron Approach, Chiral Drugs and Medicinal chemistry	CO-2. This course involves the reactions like coupling reactions, multicomponent reactions, ring formation reactions, olifinationwhichhelpsthestudentstoplansynthesisof new organic molecules.
	CO-3.Click chemistry develops the ecofriendly approach towards organic synthesis
CHO-453 Designing organic	CO-1. This course is specially designed to understand the designing of organic synthesis, which helps develops the research ideas.
Synthesis and Asymmetric Synthesis	CO-2. It involves principle and applications of asymmetric synthesis which helps to predict the chiral products in organic synthesis.
	CO-3.Students also came to know the use of cram rule, felkinanh rule, cram chelate model, use of chiral auxillary and chiral reagents in organic synthesis.
CHO-347 Single stage	CO-1. This practical course involves single stage preparation of different organic compounds and heterocycles.
preparations	CO-2. The main objective of this course is to develop the skilled practical hand of the students in laboratory.
CHO-447 Two stage	CO-1. This course includes multistep synthesis of organic compounds and heterocycles.
Preparations	CO-2. This course helps the students to improve the techniques like workup of reactions, purification, TLC, M.P / B.P etc.
	CO-3. The main of this course is to improve practical skill and practice of micro scale preparation.
CHO-448 Green Chemistry	CO-1. This course makes the students to aware of roll of green chemistry in organic synthesis.
Practical	CO-2. Green chemistry helps to reduce the pollution.
	CO-3. The main objective of this course is how to avoid solvents and do solvent free reactions.



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Program Outcomes, Program Specific Outcomes and Course Outcomes

Department of Botany

PROGRAMME: B. Sc. BOTON	NY
	Course Outcomes
Semester: I Paper I: BO 111	F.Y.B.Sc. (CBCS- 2019) CO-1. Know the terminologies in Plant kingdom.
Plant life and Utilization I	CO-2. Gain the knowledge of outline of plant kingdom.
Tant me and Otmzation 1	CO-3. Know about the structure and life history of Algae, Fungi, Lichens
	and Bryophytes.
	CO-4. Understand the application of Algae, Fungi, Lichens and Bryophytes.
Paper II BO 112	CO-1. Understand the concepts and importance of plant morphology.
Plant Morphology	CO-2. Know the reproductive parts of the flower.
	CO-3. Gain the knowledge of terminologies in plant anatomy.
	CO-4. Learn the internal organization of various tissues and plant body.
Paper III BO 113 Practical	CO-1. Gain the practical knowledge of reproductive structures of plants.
based on BO 111 & BO 112	CO-2. Understand the life cycle pattern in <i>Spirogyra</i> , <i>Agaricus</i> and <i>Riccia</i> .
	CO-3. Gain the knowledge about the types of fruit in plants.
	CO-4. Understand the internal morphology of dicot and monocot plants.
Semester: II Paper I	CO-1. Gain the knowledge the of plant diversity.
BO 121 Plant Life and Utilization II	CO-2. Describe the life cycle and economic importance of Pteridophytes.
	CO-3. Understand the life cycle and economic importance of Gymnosperms.
	CO-4. Know about the classification system in Angiosperms.
Paper II Principles of Plant	CO-1. Know the importance and scope of Plant Physiology.
Sciences BO122	CO-2. Understand the various processes in plant physiology.
	CO-3. Explain the concepts of cell biology and cell cycle.
	CO-4. Understand the biochemical nature of DNA.
Paper III BO 123 Practical	CO-1. Understand the life cycle of Nephrolepis and Cycas.
based on BO 121 and BO 122	CO-2. Know the comparative account of dicot and monocot plants.
	CO-3. Gain the practical knowledge of mitosis and meiosis.
	CO-4. Gain the practical knowledge of estimation of chlorophyll pigment,
	plasmolysis and DPD.
Dotony (Doron I) Com I	S.Y.B.Sc. (CBCS- 2019)
Botany (Paper I) Sem-I BO-231 Taxonomy of	CO-1. Understand the Taxonomy of Angiosperm.
DO-201 Taxonomy of	CO-2. Classify the Angiosperm plants.



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Angiosperms and Plant	CO-3. Gain the knowledge about Plant families and plant nomenclature.
Ecology	CO-4. Describe the plant ecology.
Botany (Paper-II) Sem-I	CO-1. Gain the Knowledge of Plant Physiology scope and Importance.
BO-232 Plant Physiology	CO-2. Understand the concept of Transpiration Ascent of sap.
	CO-3. Describe the Nitrogen metabolism.
	CO-4. Get aware about physiology of flowering and seed germination.
Botany (Paper-III) Sem-I	CO-1. Gain the practical knowledge of Taxonomic tools ecological
BO-233 Practical based on	instrument plant families.
BO-231 & BO-232	CO-2. Understand the internal morphology of hydrophytes and xerophytes.
	CO-3. Analysed the different test, processes of plant physiology.
	CO-4. Gain the practical knowledge about seed germination, Transpiration DPD.
Botany (Paper I) Sem-II	CO-1. Understand the scope and importance of plant Anatomy.
BO-241 Plant Anatomy and	CO-2. Classify the different types of tissue systems.
Embryology	CO-3. Gain the knowledge about growth of plants.
	CO-4. Describe the different processes in embryology.
Botany (Paper II) Sem-II	CO-1. Understand the scope and importance of plant biotechnology.
BO-242 Plant Biotechnology	CO-2. Gain the knowledge about Plant tissue culture and single cell protein.
	CO-3. Understand the plant genetic Engineering, Genomics, Proteomics and Bioinformatics.
	CO-4. Describe the Bioremediation and Biofuel technology.
Botany (Paper III) Sem-II	CO-1. Gain the practical knowledge of plant anatomy.
BO-243 Practical based on BO-241 & BO-242	CO-2. Understand the practical technique of double stained temporary preparation of plant stem.
	CO-3. Understand the working principle of tissue culture lab instrument.
	CO-4. Gain basic practical knowledge of plant tissue culture, Transgenic
G W D G	plants, Spirulina cultivation.
	Environment Studies Course Outcome (CBCS- 2019)
S.Y.B.Sc. Semester I	CO-1. Understand the multidisciplinary nature of environment studies.
Environment Studies	CO-2. Gain the knowledge about Ecosystem.
	CO-3. Aware about the natural resources
CVDC C . W	CO-4. Describe the Biodiversity and its conservation.
S.Y.B.Sc. Semester II	CO-1. Understand the Environmental Pollution.
Environment Studies	CO-2. Gain the knowledge about Environmental Policies and Practices.
	CO-3. Describe the human communities and Environment.
	CO-4. Understand the basic concept of environment by field visit.



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Program Outcomes, Program Specific Outcomes and Course Outcomes

Department of Zoology

Course Outcomes	
	F.Y. B.Sc.
Paper I ZY-111 & ZY-121	CO-1. The student will be able to understand classify and identify the
(Animal Diversity I & II)	diversity of animals.
	CO-2. The student understands the importance of classification of animals
	and classifies them effectively using the six levels of classification.
	CO-3. The student knows his role in nature as a protector, preserver and
	promoter of life which he has achieved by learning, observing and
	understanding life.
Paper II ZY-112	CO-1. The learners will be able to identify and critically evaluate their
(Animal	ownbeliefs, values and actions in relation to professional and societal
Ecology)	standards
	of ethics and its impact on ecosystem and biosphere due to the dynamics in
	population.
	CO-2. To understand anticipate, analyse and evaluate natural
	resourceissues and act on a lifestyle that conserves nature.
	CO-3. The Learner understands and appreciates the diversity of ecosystems and applies beyond the syllabi to understand the local lifestyle and
	problems of the community.
	CO-4. The learner will be able to link the intricacies of food chains, food
	webs and link it with human life for its betterment and for non-
	exploitation of the biotic and abiotic components.
	CO-5. The working in nature to save environment will help development of
	leadership skills to promote betterment of environment.
Paper II ZY-122 (Cell Biology)	CO-1. The learner will understand the importance of cell as a structural and
	functional unit of life.
	CO-2. The learner understands and compares between the prokaryotic and eukaryotic system and extrapolates the life to the aspect of development.
	CO-3. The dynamism of bio membranes indicates the dynamism of life. Its
	working mechanism and precision are responsible for our performance
	inlife.
	CO-4. The cellular mechanisms and its functioning depend on
	endo-membranes and structures. They are best studied with
	microscopy.
Paper-	CO-1 Students will get exposure to diversity in animal
IIIZO-	groups(invertebrates) and Ecology.
113	CO-2 It will inculcate good laboratory practices in students and
Zoology Practical Paper	trainthem about proper handling of lab instruments.
Semester I	CO-3 They will acquire knowledge about various tools and techniques



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	of field ecology.
	CO-4 During field visits students will have social interaction with locals and develops ethical approach, to conserve diversity of animal kingdom.
Paper-III ZO123	CO-1 Students could identify various animals based on morphological features.
Zoology Practical Paper Semester II	CO-2 The student will be able to understand and classify the great variety of animals.
	CO-3 Students will acquire knowledge about cell organelles and cell division i.e., mitosis.
	CO-4 They will know how to measure and stain different cell types.
	S.Y. B.Sc.
Paper I ZO - 231 Animal Diversity III	CO-1 The students will be able to understand, classify and identify the diversity of higher vertebrates.
Paper-II ZO - 241 Animal Diversity IV	CO-2 The students will able to understand the complexity of higher vertebrates.
	CO-3 The students will be able to understand different life functions of higher vertebrates.
	CO-4 The students will be able to understand the linkage among different groups of higher vertebrates.
	CO-5 The student will become aware regarding his role and responsibility towards nature as a protector, to understand his role as a trustee and conservator of life which he has achieved by learning, observing and understanding life.
Paper II ZO - 232 Applied Zoology I	CO-1. The students will understand the various aspects of silkworm for effective rearing practices.
20 202 Applied 20010g; 1	CO-2. To aware the students about economic importance of sericulture, economics and qualities of silk etc.
	CO-3. Students will learn post-harvest processing of silk cocoons.
	CO-4. The learner understands the biology, varieties of silkworms and the basic techniques of silk production.
	CO-5. The learner understands the types of agricultural pests, Major insect pests of agricultural importance and Pest control practices.
Paper II ZO - 242 Applied Zoology II	CO-1. The learner understands the basics about beekeeping tools, equipment, and managing beehives.
20 212 Applied Zoology II	CO-2. The learner understands the basic information about fishery, cultural and harvesting methods of fishes and fish preservation techniques.
	CO-3. Learner will know about managing beehives for honey production and pollination. CO-4. The students will able to have self-employment in agricultural
	sector.
Paper-III ZO – 233	CO- It will provide exposure to diversity in animal groups (vertebrates), and applied zoology. CO-2 The practical course intends to inform students about Animal systematic, animal diversity and applied zoology field such as
20 200	Sericulture and Agricultural pests.



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Zoology Practical Paper	CO-3 Students will be able to identify and control various pests.
Semester-I	
Paper-III	CO-1 It will provide Knowledge of various animals from primitive to
ZO – 233	highly evolved forms and its complexity.
Zoology Practical Paper	CO-2 Students will be able to identify poisonous and non-poisonous
Semester-II	snakes.
	CO-3 The practical course intends to inform students about Animal
	systematic, animal diversity and applied zoology field such as Fisheries,
	Apiculture etc.



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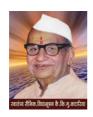
Program Outcomes, Program Specific Outcomes and Course Outcomes

Department of Physics

Program	Program Objectives	Program Specific Outcome
Physics	 To faster scientific attitude provides in depth knowledge of scientific & technological concept of Physics. To Familiarize with recent scientific & technological development. To help students to learn various experimental & computational tools there by developing analytical abilities to address real word problem. 	 Students will have acquired necessary skills & expertise to work in industry. Students will have acquired necessary skills for working in research. Students will have acquired necessary skills to teach physics in colleges. To help students build up progressive & successful career in Physics.

F.Y. B.Sc. (CBCS- 2019)

Course	Course Outcome
PHY-111:	CO-1. The students will be able to apply Newton's laws of motion.
Mechanics and	CO-2. The students will be able to apply the variational principles to real
properties of	physical problem.
matter	CO-3. At the end of course student will have through knowledge & problem-
matter	solving skills related to the mechanics.
PHY-112:	CO-1. Understanding of basics law of physics.
	CO-2. To understand the atomic excitation & laser principles.
Physics Principles	A A
and Application	CO-3. To understands the bonding mechanism in molecules & rotational &
DVVV 440	vibrational energy level of diatomic molecules.
PHY-113:	CO-1. Use various instruments and equipment.
Physics	CO-2. Design experiments to test a hypothesis and/or determine the
Laboratory	value of an unknown quantity.
course 1A	CO-3. Investigate the theoretical background of an experiment.
	CO-4. Setup experimental equipment to implement an experimental
	approach.
	CO-5. Analyze the data, plot appropriate graphs and reach conclusions
	from data analysis.
PHY-122:	CO-1. Understanding of basics law of electromagnetism.
Electromagnetism	CO-2. The students will able to analyze radiation system in which the electric
O	dipole, magnetic dipole or electric quadruple dominate.
	CO-3. Demonstrate an understanding of magnetization of materials.
PHY-121: Heat	CO-1. Apply the laws of thermodynamic to formulate the relations necessary
and	to analyze a thermodynamics process.
Thermodynamics	CO-2. Understand the types of thermometers & their usage.
	CO-3. Describe the properties of & relationships between the properties of a
	pure substance.



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PHY-123:	CO-1. Use various instruments and equipment.
Physics	CO-2. Design experiments to test a hypothesis and/or determine the
Laboratory	value of an unknown quantity.
course 1B	CO-3. Investigate the theoretical background of an experiment.
	CO-4. Setup experimental equipment to implement an experimental
	approach.
	CO-5. Analyze the data, plot appropriate graphs and reach conclusions
	from data analysis.

S.Y. B.Sc. (CBCS- 2019)

Course	Course Outcome
PHY-231:	CO-1. Understand the complex algebra useful in physics courses.
Mathematical	CO-2. Understand the concept of partial differentiation.
Methods in	CO-3. Understand the role of partial differential equations in physics.
Physics-I	CO-4. Understand vector algebra useful in mathematics and physics.
	CO-5. Understand the concept of singular points of differential
	equations
PHY-232:	CO-1. Apply different theorems and laws to electrical circuits.
Electronics	CO-2. Understand the relations in electricity.
	CO-3. Understand the parameters, characteristics and working of
	transistors.
	CO-4. Understand the functions of operational amplifiers.
	CO-5. Design circuits using transistors and applications of operational
	amplifiers
	CO-6. Understand the Boolean algebra and logic circuit
PHY-233:	CO-1. Use various instruments and equipment.
Practical	CO-2. Design experiments to test a hypothesis and/or determine thevalue
Course	of an unknown quantity.
	CO-3. Investigate the theoretical background of an experiment.
	CO-4. Setup experimental equipment to implement an experimental
	approach.
	CO-5. Analyze the data, plot appropriate graphs and reach conclusions from
	data analysis.
	CO-6. Work in a group to plan, implement and report on a
	project/experiment.
	CO-7. Keep a well-maintained and instructive laboratory logbook.
PHY-241:	CO-1. To study underlying principles of oscillations and its scope in
Oscillations,	development.
Waves, and	CO-2. To understand and solve the equations / graphical representations of
Sound	motion for simple harmonic, damped, forced oscillators and waves.
	CO-3. To explain oscillations in terms of energy exchange with various practical
	applications.



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	CO-4. To solve numerical problems related to undamped, damped, forced
	oscillations and superposition of oscillations.
	CO-5. To study characteristics of sound, decibel scales and applications.
PHY-242:	CO-1. Acquire the basic concept of wave optics.
Optics	CO-2. Describe how light can constructively and destructively interfere.
	CO-3. Explain why a light beam spread out after passing through an
	aperture
	CO-4. Summarize the polarization characteristics of electromagnetic wave
	CO-5. Understand the operation of many modern optical devices thatutilize
	wave optics
	CO-6. Understand optical phenomenon such polarization, diffractionand
	interference in terms of the wave model
	CO-7. Analyze simple example of interference and diffraction.
PHY-243:	CO-1. Use various instruments and equipment.
Practical	CO-2. Design experiments to test a hypothesis and/or determine thevalue
Course	of an unknown quantity.
	CO-3. Investigate the theoretical background of an experiment.
	CO-4. Setup experimental equipment to implement an experimental
	approach.
	CO-5. Analyze the data, plot appropriate graphs and reach conclusions from
	data analysis.
	CO-6. Work in a group to plan, implement and report on a
	project/experiment.
	CO-7. Keep a well-maintained and instructive laboratory logbook.



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Program Outcomes, Program Specific Outcomes and Course Outcomes

Department of Mathematics

PROGRAMME: B.Sc.		
Course Outcomes (Mathematics) F.Y. B.Sc. (CBCS- 2019)		
	equivalence relation.	
	CO-2 To understand the Division Algorithm and find g.c.d. by using	
	Euclidean Algorithm.	
(MT-111) Algebra	CO -3 Apply Euler-Fermat's Theorem to prove relations involving	
	prime numbers.	
	CO-4 To understand the theory of congruence.	
	CO-5 Be able to prove n th roots of unity and to find Regions in	
	Complex Plane.	
	CO-1 To understand The Algebraic and Order Properties of R,	
	Absolute Value and the Real Line.	
	CO-2 Define and utilize the following concepts: sequence,	
	subsequence, monotone sequence.	
	CO-3 To understand the Bolzano-Wierstrass Theorem and	
(MT-112) Calculus-I	Divergence criteria.	
	CO-4 Define Functions, domain and range, graphs of functions.	
	Determine increasing and decreasing functions, even and odd	
	functions.	
	CO-5 Be able to understand the definition of continuous function at a	
	point, Divergence criterion.	
	CO-1 Solve problems related to all topics in the syllabus of Algebra	
	and Calculus-I.	
(NAT) 113)	CO-2 The student gets knowledge of maxima software, using this	
(MT-113) Mathematics	software they can solve.	
Practical	CO-3 Identify the monotonic increasing and decreasing sequence of	
	real number.	
	CO-4 Using Maxima Software to find the graph of functions.	
	CO-5 To understand solves the problem using Maxima Software.	
	CO-1 Be able to define translation and rotation of axis discuss the	
	nature of conic.	



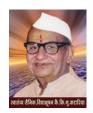
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	CO-2 Compute the angle between a line and a plane, length of
	perpendicular from a point to a line.
(MT-121) Analytical	CO-3 To understand Equations of a line in Symmetric and
Geometry	unsymmetrical forms, Line passing through two points.
	CO-4 To understand Intersection of a sphere and a line, Equation of
	tangent plane to sphere.
	CO-5. Find equation of a circle, sphere through a given circle.
	CO-1 To Understand the derivative of a function at a point, every
	differentiable function is continuous, Rules of differentiation.
	CO-2 Be able to calculate limits in indeterminate forms by a
	repeated use of L' Hopital's rule
	CO-3. Extract the solution of differential equations of the first order and of
	the first degree by variables separable, homogeneous and non-
	homogeneous method.
	CO-4. To understand Taylor's theorem and Maclaurin's theorem
	with Lagrange's form of remainder.
	CO-5. Find Integrating factors and decide exact differential
(MT-122) Calculus-II	equations
	CO-1. Solve problems related to all topics in the syllabus of
	Analytical Geometry and Calculus-II.
(MT-123)	CO-2 Find center of conic, nature of conic.
Mathematics Practical	CO-3 Apply Leibnitz theorem for successive differentiation and
	solve examples.
	CO-4 Using Maxima Software to find n th derivative of function.
	S.Y.B.Sc. (CBCS- 2019)
(MT-231) Calculus of	CO-1. Define functions of several variables, domain, range, level
several	curves, limit graphs. Find limit of function of several variables,
variables	domain, range, can draw graph, level curves.
	CO-2. Calculate the partial derivatives of functions of several
	variables, Clairaut's theorem, laplace equation, wave equation,
	differentiability of functions, chain rule, homogeneous function
	CO-3. Determine the extrema of functions of several variables, second
	derivative test, Use the Lagrange multiplier method to find
	extrema of functions with constraint
	CO-4. Iterated Integrals, Fubini's Theorem, Double integral over
	general regions, Double integral in Polar coordinates, Triple
	integrals, Evaluation of triple integrals.
	CO-5. Triple integrals in spherical coordinates, Jacobians, Change of



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	variables in multiple integrals
(MT-232(A))	CO-1. Be able to understand the basic idea of Errors and Their
Numerical Methods and	Computations. Know how to find Absolute, relative and percentage
its Application	errors, and to understand the general error formula. Be familiar withthe
	notion rounding off numbers to n significant digits, to n decimal
	places,
	CO-2. To find the Solution of Algebraic and Transcendental
	Equations using Bisection method, The method of False position,
	Newton-Raphson method
	CO-3. Define Basic concepts of finite difference operators and their
	relation, Differences of a polynomial, Newton's Interpolation
	Formulae (Forward and Backward) ,Lagrange's Interpolation
	Formula, Newton's General Interpolation formula
	CO-4. To understands and can find Numerical Differentiation
	Numerical Integration using General quadrature formula,
	Trapezoidal rule. Simpsons's 1/3 rd rule. Simpsons's 3/8 th rule
	CO-5. Able to find numerical solution of first order ordinary
	differential equations using Taylor Series method, Picard's methodof
	successive approximation, Euler's method, Modified Euler's
	methods, Runge - Kutta Methods 2nd and 4th order
MT-233 Mathematics	CO-1. Solve problems related to the syllabus of Calculus of several
Practical	variables and Numerical Methods and its Application.
	CO-2. The student gets knowledge of Maxima Software,
	CO-3. Using Maxima software student can solve the problems of
	Calculus of several variables and Numerical Methods and its
	Application.
T-241: Linear Algebra	CO-1. Students will be able to understand Row echelon form of a
	matrix, reduced row echelon form of a matrix.
	CO-2. Solve the system of linear equation, Consistency of
	homogeneous and non-homogeneous system of linear equations
	using rank, condition for consistency
	CO-3. Students will able to Define Vector Space, Subspace, linear
	combination linear span and linear dependence, independence, basis
	and inner product
	CO-4. Know how to find the row space, column space and null space of a
	matrix, and be familiar with the concepts of dimension of a
	subspace and the rank and nullity of a matrix
	CO-5. Apply the properties of linear transformations to linearity of
	transformations, kernel and rank of linear transformations, inverse
	transformations to solve the problems of matrix transformations,
	change of basis.



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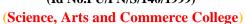
MT-242 Vector Space	CO-1. Define the Curves in Space, Limits and Continuity,
	Derivatives and Motion, Unit Tangent Vector, Curvature of a Plane
	Curve, Circle of Curvature for Plane Curves.
	CO-2. To find the Curvature of a Plane Curve, unit tangent vector
	CO-3. Understand the concept of Line Integral of Scalar Functions,
	Line integral in the Plane, Vector Fields, Gradient Fields, Line Integral
	of Vector Fields, Work done by a Force over a Curve in
	Space, Path Independence, Conservative and Potential Functions,
	CO-4. Solve the problem Parameterizations of Surfaces, Surface
	integrals, Surface Integrals of Vector Fields.
	CO-5. Students will be able to understand the concept The Curl
	Vector Field, Stokes' Theorem, Conservative Fields and Stokes'
	Theorem, Divergence Theorem, Unifying the Integral Theorems.
MT-243 Mathematics	CO-1. Solve problems related to the syllabus of Linear Algebra and
Practical	Vector Space.
	CO-2. Using Maxima software student can solve the problems
	Linear Algebra and Vector Space.



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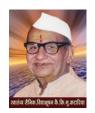
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Program Outcomes, Program Specific Outcomes and Course Outcomes

Department of Computer Science

PROGRAMME: B.Sc. Computer Science	
	F.Y. B.Sc. (CBCS- 2019)
Programme Outcomes	PO-1: Develop the ability to analyze a problem, identify and define the computing requirements, which may be appropriate to its solution. PO-2: To prepare students to undertake careers involving problem-solving using computer science and technologies.
	PO-3: Develop the ability to pursue advanced studies and research in computer science.
	PO-3: To produce entrepreneurs who can innovate and develop software products.
	PSO-1: To produce entrepreneurs who can innovate and develop software products.
	PSO-2: To make students employable according to the current demand of the IT industry and responsible citizens.
Program Specific Outcome:	PSO-3: Ability to apply the knowledge gained during the program from Mathematics, Electronics, Statistics, and Computer Science courses to identify, formulate and solve real-life complex problems faced in the industry.
	Course Outcomes:
	F.Y. B.Sc. Semester - I
CS-101 Problem solving using	CO-1: Explore algorithmic approaches to problem-solving.
computer and C programming	CO-2: Ability to analyze a problem and devise an algorithm to solve it.
	CO-3: Develop modular programs using control structures and arrays in 'C'
	CO-4: Able to formulate algorithms, pseudo-codes and flowcharts for arithmetic and logical problems.
	CO-5: Ability to implement algorithms in the 'C' language.
CS-102 Database Management Systems	CO-1: Understand fundamental concepts of database.



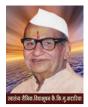
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	CO-2: Understand user requirements and frame them in the data model.
	CO-3: Ability in creation, manipulation, and querying of data in databases.
	CO-4: Ability to solve real-world problems using the appropriate set, function, and relational models.
	CO-5: Ability to design E-R Model for given requirements and convert the same into database tables.
CS-103 Practical Course based on CS-101 and	CO-1: Able to devise pseudocode and flowchart for computational problems.
CS-102 (C and DBMS)	CO-2: Understand how to write, debug and execute simple programs in C
	CO-3: Able to create database tables in Postgres SQL.
	CO-4: Able to write and execute simple and nested queries.
ELC-111: Semiconductor Devices and Basic Electronic Systems	CO-1: To study various types of semiconductor devices, elementary electronic circuits, and systems.
	CO-2: To bridge the gap between theoretical and practical knowledge.
ELC-112: Principles of Digital Electronics	CO-1: To get familiar with concepts of digital electronics.
	CO-2: To study arithmetic circuits, combinational circuits, and sequential circuits.
ELC-113 Electronics Practical Paper – I Course Outcomes:	CO-1: To use basic concepts for building various applications in electronics.
raper – r Course Outcomes.	CO-2: To understand design procedures of different electronic circuits as per requirement.
	CO-3: To build an experimental setup and test the circuits.
	CO-4: To develop skills of analyzing test results of given experiments.
MTC 111 Matrix Algebra	CO-1: Perform basic Matrix operation.
	CO-2: Define special matrices: diagonal, triangular, and symmetric.
	CO-3: Basics of solving systems of linear equations.
	CO-4: Understand determinants and their properties.
	CO-5: The logic behind writing programs using computer language.
	CO-6: Factorization of any square matrix in simpler LU-form.
MTC 112- Discrete Mathematics	CO-1: Understanding the concepts of discrete mathematics.



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	CO-2: Learning applications of discrete structures in Computer Science.
	CO-3: Express a logic sentence in terms of predicates, quantifiers, and logical connectiv
	CO-4: Apply the operations of sets and use Venn diagrams to solve applied problems; solve problems using the principle of inclusion-exclusion.
	CO-5: Demonstrate different traversal methods for trees and graphs.
	CO-6: Model problems in Computer Science using graphs and trees.
MTC 113 Mathematics Practical	CO-1: Students will be able to compute matrix calculations using Maxima software.
	CO-2: Solve applied problems using matrices.
	CO-3: Students will be able to formulate problems in the language of sets and perform set operations and will be able to apply the Fundamental Principle of Counting, Multiplication Principle.
	CO-4: Use appropriate modern technology to explore calculus
CSST 111Descriptive Statistics	concepts. CO-1: The main purpose of descriptive statistics is to provide a
CSST TTTDescriptive statistics	summary of the samples and the measures done on a particular study.
	CO-2: To provide basic information about variables in a dataset.
CSST 112Mathematical Statistics	CO-1: It will help students develop skills in thinking and analyzing problems from a probabilistic and statistical point of view.
	CO-2: It will provide the difference between Discrete and continuous distributions.
CSST 113Statistics Practical Paper I	CO-1: To Study free statistical software's and use them for data analysis in project.
	CO-2: To use Statistical tools in Ms-Excel.
Semester - II	
CS 201 Advanced C programming	CO-1: Develop advanced concepts of programming using C.
	CO-2: Develop modular programs using control structures, pointers, arrays, strings, and structures.
	CO-3: Design and develop solutions to real-world problems using C.
	CO-4: Able to develop a structured programming approach.
CS-202 Relational database	CO-1: Able to acquire knowledge of data security and its importance.
Management Systems	CO-2: Design E-R Model for given requirements and convert the same into database tables.



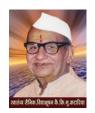
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	CO-3: Able to use database techniques such as SQL & PL/SQL.
	CO-4: Understand and be able to implement the concept of transactions.
	CO-5: Use advanced database Programming concepts.
CS-203 Practical Course based on CS-201 and CS- 202(Advanced C and RDBMS)	CO-1: Write debug and execute programs using advanced features in C.
202(Advanced C and RDBWS)	CO-2: To perform advanced database operations.
ELC-121 Instrumentation System	CO-1: To study various kinds of Instrument of different Instrumentation System
	CO-2: To control the parameter in the process or a particular system.
	CO-3: To study smart sensors for smart Electronics Applications.
ELC-122 Basics of Computer	CO-1: To study and design different counters.
Organization	CO-2: To study the basics of the computer system.
	CO-3: To study Memory Organization.
ELC- 123 Electronics Practical Paper – II	CO-1: To use basic concepts for building various applications in electronics.
Tuper II	CO-2: To understand design procedures of different electronic
	circuits as per requirement.
	CO-3: To build an experimental setup and test the circuits.
	CO-4: To develop skills of analyzing test results of given experiments
MTC 121 Linear Algebra	CO-1: Solve systems of linear equations using various methods including Gaussian and Gauss Jordan elimination and inverse matrices.
	CO-2: Perform matrix algebra, invertibility, and transpose and understand vector algebra in R ⁿ .
	CO-3: Compute linear transformations, kernel and range, and inverse linear transformations, and find matrices of general linear transformations.
	CO-4: Compute inner products on a real vector space and compute angle and orthogonality in inner product spaces.
	CO-5: Prove basic results in linear algebra using appropriate proof-writing techniques such as linear independence of vectors; properties of subspaces; linearity, injectivity, and surjectivity of functions; and properties of eigenvectors and eigenvalues.
MTC 122 Graph	CO-1: Explain basic concepts in graph theory
Theory	CO-2: Define how graphs serve as models for many standard problems.



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	CO-3: Account for the theory of paths and degree of connectedness of graph.	
	CO-4: Learn the use of a spanning tree.	
	CO-5: Discuss the concept of the graph, tree, and Euler graph.	
	CO-6: See the applications of graphs in science, business, and industry.	
	CO-7: To present a survey of essential topics for computer science students who will encounter some of them again in more advanced courses.	
MTC 123 Mathematics Practical	CO-1: Students will be able to find eigenvalues and	
	eigenvectors using Maxima software.	
	CO-2: Students will be able to perform operations on orthogonality and quadratic forms.	
	CO-3: Use appropriate modern technology to explore calculus concepts.	
CSST 121Method of Applied Statistics Course Outcomes:	CO-1: To create a mathematical model that can be used to predict the values.	
Statistics Course Outcomes.	CO-2: To Handle large data and analyze it with statistical tools.	
CSST 122 Continuous	CO-1: To study the distribution of various data	
Probability Distribution and Testing of Hypothesis	CO-2: Students should use these techniques for their projects.	
CSST 123Statistics Practical	CO-1: How to use statistical tools in a real-life situation.	
Paper II	CO-2: Handling data for research purposes.	
	Semester- III	
CS 231 Data Structures and Algorithms – I	CO-1: To use well-organized data structures in solving various problems.	
	CO-2: To differentiate the usage of various structures in problem solutions.	
	CO-3: Implementing algorithms to solve problems using appropriate data structures.	
CS 232 -Software Engineering	CO-1: Compare and chose a process model for a software project development.	
	CO-2: Identify requirements analyze and prepare models.	
	CO-3: Prepare the SRS, Design document, Project plan of a given software system.	
	software system.	



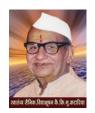
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CS 233 Practical course on CS 231 (Data Structures and	CO-1: Use the appropriate data structure in the context of the solution of the given problem.
Algorithms I) and CS 232	CO-2: Develop programming skills which require to solve given
(Software Engineering)	problems.
	CO-3: Able to implement different data structures.
	CO-4: Describe the problem definition, Scope of the proposed
	system.
	CO-5: Able to identify the requirement of the project.
	CO-6: Apply their knowledge and understanding with a professional approach.
ELC-231: Paper I:	CO-1: Able to write programs for 8051 microcontroller
Microcontroller Architecture &	CO-2: To study the basic instruction set of 8051microcontroller
Programming	CO-3: To interface I/O peripherals to 8051 microcontroller
	CO-4: To design small microcontroller based projects
	CO-5: To study the Programming of8051microcontroller
	CO-6: To study the interfacing techniques of 8051microcontroller
	CO-7: To design different application systems using
	8051microcontroller.
ELC-232: Paper II: Digital	CO-1: On completion of the course, students will
Communication & Networking	be able to
	CO-2: Understand various concepts involved in the process of
	communication
	CO-3: Define and explain terminologies of data communication.
ELC-233: Paper III, Practical	CO-1: Can design and build his/her microcontroller-based projects.
Course I	CO-2: Can build and test own network and do settings.
	CO-3: Get knowledge of multiplexing and modulation
	techniques useful in developing a wireless application
	CO-4: Can handle LAN network connections.
MTC-231: Groups and Coding	CO-1: Group theory is one of the great simplifying and unifying
Theory	ideas in modern mathematics. It was introduced to understand the
	solutions to polynomial equations.
	CO-2: A mathematical formulation of symmetry has been understood.
	CO-3: By Euclid's algorithm find GCD of numbers.
	CO-4: We will analyze the structure of 'small' finite groups, and
	examine examples arising as groups of permutations of a setand
	groups of matrices.
	CO-5: Application of group theory i.e. coding theory.
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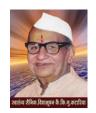


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MTC-232: Numerical	CO-1: The accuracy of common numerical methods.
Techniques	CO-2: Demonstrate understanding of common numerical methods
	and how they are used to obtain approximate solutions to otherwise
	intractable mathematical problems.
	CO-3: Apply numerical methods to obtain approximate solutions to mathematical problems.
	CO-4: Derive numerical methods for various mathematical
	operations and tasks, such as interpolation, differentiation,
	integration, the solution of linear and nonlinear equations, and
	the solution of differential equations.
MTC-233: Mathematics Practical:	CO-1: To provide Basic knowledge of Python. Python
Python Programming Language-I	programming is intended for software engineers, system analysts,
	program managers, and user support personnel who wish to learn
	the Python programming language.
	CO-2: Find the root of the equation by using Newton's
	Raphson method and Regula Falsi Method, Trapezoidal rule,
	Simpson's (1/3)rd rule, Simpson's (3/8)th rule.
	CO-3: Learn matrix operations under sympy module.
	CO-4: Use of lists, tuples, strings, and dictionaries in Python
	programs.
ENGLISH- (Ability Enhancement	CO-1: Competency to appreciate and
Course-AEC)	analyze short stories and poetry.
	CO-2: Learning the use of multimedia
	CO-3: Improvement speaking skills in various contexts
	CO-4: Improvement writing skills in different contexts.
	Semester- IV
CS 241 Data Structures and	CO-1: Implementation of different data structures efficiently.
Algorithms – II	CO-2: Usage of well-organized data structures to handle a large amount of data.
	CO-3: Usage of appropriate data structures for problem-solving
CS 242 Computer	CO-1: Have a good understanding of the OSI and TCP/IP
Networks-I	Reference Models and in particular have a good knowledge of
1.00	Layers.
	CO-2: Understand the working of various protocols.
	CO-3: Analyze the requirements for a given organizational
	structure and select the most appropriate networking
	architecture and technologies.
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CS 243 Practical course on CS 241(Data Structures and Algorithms II) and CS 242 (Computer Networks I)	CO-1: Discuss graph structure and understand various operations on graphs and their applicability.
	CO-2: Implement various tree traversal techniques and Graph techniques.
	CO-3: Get practical knowledge on the applications of data structures.
	CO-4: Understand how PCs can be connected using LAN
ELC-242: Paper II: Digital Communication & Networking	CO-1: Understand various concepts involved in the process of communication
	CO-2: Define and explain terminologies of data communication.
	CO-3: Understand the impact & limitations of various digital modulation techniques
	CO-4: To acknowledge the need for spread spectrum schemes.
ELC-243: Paper III, Practical Course II	CO-1: Able to design and develop own smart applications using Raspberry-Pi
	CO-2: Can write Python program for simple applications
	CO-3: Able to build own IoT based system
	CO-4: Get knowledge about how to connect PC with Raspberry-Pi
MTC-241: Computational	CO-1: In 2D & 3D, We learn Scaling, Shearing, reflection and
Geometry	rotation transformation.
	CO-2: Students will get acquainted with the typical problems of computational geometry.
	CO-3: The student will understand the existing solutions and
	their applications in computer graphics and machine vision.
	CO-4: Students will get a deeper knowledge of mathematics.
MTC-242: Operations Research	CO-1: Construct linear integer programming models and discuss the solution techniques.
	CO-2: Set up decision models and use some solution
	methods for nonlinear optimization problems.
	CO-3: Solve multi-level decision problems using the dynamic programming method.
	CO-4: Formulate pure, mixed, and binary integer programming models
MTC-243: Mathematics	CO-1: How to draw 2D and 3D graphs by using various
Practical: Python	commands of the graph.
Programming Language-II	CO-2: Solve examples of linear entities.
	CO-3: Representing polygons in python.
	CO-4: Various attributes of the polygon.



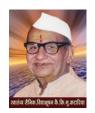
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ENGLISH- (Ability	CO-1: Competency to appreciate and analyze short stories and
Enhancement Course-AEC)	poetry.
	CO-2: Understanding the meaning and apt use of various soft skills
	CO-3: Understanding of the existing communicative skills of
	the students and the skills they require at the professional level.
	CO-4: Improved technical writing skills in different contexts
	Semester - V
CS-351: Operating Systems – I	CO-1: Understanding the purpose, functions, and Structure of the
	operating system.
	CO-2: Understand Processes and Thread Scheduling by the operating
	system.
	CO-3: Understand process scheduling algorithms and
	synchronization techniques to achieve better performance of a
	computer system.
	CO-4: Understand Memory management by the operating system
CS 252. Computer Networks	with the help of various schemes like Paging and segmentation.
CS-352: Computer Networks – II	CO-1: Study and understand the various protocols of the Application layer.
	CO-2: Develop an understanding of a technical aspect of Multimedia Systems
	CO-3: Develop various Multimedia Systems applicable in real-time.
	CO-4: Identify information security goals and understand
	cryptographic concepts.
CS-357: Practical course based on	CO-1: Demonstrate operation of the process like the creation of child
CS 351	process.
	CO-2: Demonstrate shell commands and some user-defined commands.
	CO-3: Demonstrate the concept of the zombie / Orphan process.
	CO-4: Implement CPU Scheduling Algorithm and Page
	replacement Algorithm
CS-353: Web Technologies – I	CO-1: Understand how to develop a dynamic and interactive Web site.
	CO-3: Understand the use of programming constructs.
	CO-4: Enhance the designing aspects of the webpage.
	CO-5: Understand how to handle different databases.
CS-354: Foundations of Data	CO-1: Understand the process of Data Science.
Science	CO-2: Understand the importance of data analysis using the statistical
	method in different fields.
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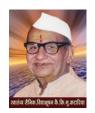
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	CO-3: Under the process of data analysis.
	CO-4: Detection of common data issues, like missing values, special values, outliers
CS-358: Practical course based on CS 353 and CS 354	CO-1: Understand how to develop dynamic and interactive Web Page.
	CO-2: Able to analyze, design, and develop different problems depends upon the situation.
	CO-3: Prepare data for use with a variety of statistical methods and recognize how the quality of the data may affect conclusions. CO-4: Perform exploratory data analysis.
CS-355: Object-Oriented	CO-1: Understand the concept of Object-Oriented
Programming using Java – I	Programming such as classes, objects, packages, and Collections CO-2: Develop Web-based applications and GUI-based Applications
	CO-3: Develop event-driven Applications.
CS-356: Theoretical Computer	CO-1: Understand pattern reorganization of Finite Automata.
Science	CO-2: Understand the use of automata during language design.
	CO-3: Relate various automata and Languages.
CS-359: Practical Course based on	CO-1: Use an integrated development environment to write,
CS 355	compile, run, and test simple object-oriented Java programs.
	CO-2: Develop real-world applications using Java programs.
	CO-3: Develop error-free applications with proper validation.
CS-3510: Python Programming	CO-1: Develop logic for problem-solving.
	CO-2: Understand methods to build Python programs by using data structures like lists, dictionaries, tuples, and sets.
	CO-3: To be familiar with the basic programming constructs like data, operations, conditions, loops, functions, etc.
CS-3511: Blockchain	CO-1: Understand the fundamentals of Blockchain Technology.
Technology	CO-2: Learn Blockchain programming using Python.
	CO-3: Acquire basic knowledge of Smart Contracts and how they function.
	Semester- VI
CS-361: Operating Systems –	CO-1: Management of deadlocks and File systems by the operating
II	system.
	CO-2: Scheduling storage or disk for processes.
	CO-3: Distributed Operating System and its architecture and the extended features in mobile OS.
CS-362: Software Testing	CO-1: Understand different software testing strategies and methods.
	CO-2: Understand different approaches and levels of testing.
	23 2. Shadibiana different approaches and levels of testing.



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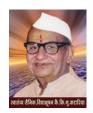




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	CO-3: Understand the testing life cycle and its implementation.
	CO-4: Identify defects and debugging process
CS-367: Practical course based on CS 361	CO-1: Management of deadlocks by the operating system using banker's algorithm.
	CO-2: Demonstrate concepts of file system management, its allocation, and free space management.
	CO-3: Able to implement Disk space management process and scheduling for processes.
	CO-4: Able to implement concepts of mobile Operating System.
CS-363: Web Technologies – II	CO-1: Build a dynamic website.
	CO-2: Using MVC based framework easy to design and handle the errors in a dynamic website.
CS-364: Data Analytics	CO-1: Use appropriate models of analysis, assess the quality of input, and derive insights from results.
	CO-2: Analyze data, choose appropriate models and algorithms for respective applications
	CO-3: Apply modeling and data analysis techniques to the solution of real-world business problems.
	CO-4: Understand the variety of data mining techniques such as classification, prediction, clustering, and association rule mining.
CS-368: Practical course based	CO-1: Build a dynamic website.
on CS 363 and CS 364	CO-2: Using MVC based framework easy to design and handle the errors in a dynamic website.
	CO-3: Design and develop models for data analysis using various data mining techniques.
	CO-4: Text analysis and sentiment analysis.
CS-365: Object-Oriented Programming using Java – II	CO-1: Develop the Java database application using Java DataBase Connectivity (JDBC).
	CO-2: Create and execute multiple processes simultaneously using multithreading.
	CO-3: Understand and Create dynamic web pages, using Servlets and JSP.
	CO-4: Work with basics of framework to develop secure web applications
CS-366: Compiler Construction	CO-1: Understand the process of scanning and parsing source code.
	CO-2: Understand compare the various methods of parsing.
	CO-3: Learn the conversion code written in the source language to machine language.



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	CO-4: Understand tools like LEX and YACC.
CS-369: Practical Course based on CS 365	CO-1: To Learn database Programming using Java.
	CO-2: Understand and create dynamic web pages using Servlets and JSP.
	CO-3: Work with basics of framework to develop secure web applications
CS-3610: Software Testing Tools	CO-1: Identify and manage defects.
	CO-2: Implement the defect management process.
	CO-3: Understand software metrics and thereby improve the quality of software.
	CO-4: Design test cases and test plans, review reports of testing for qualitative software.
	CO-5: Understand the latest testing tools used in the software industries.
CS-3611: Project Course	CO-1: Undertake problem identification, formulation, and solution.
	CO-2: Understand project characteristics and various stages of project development.
	CO-3: Design solutions to complex problems.
	CO-4: Gain a sound technical knowledge of selected project development platforms.
	CO-5: Develop and enhance coding skills.