Pratibha College Of Commerece And Computer Studies
DEPARTMENT OF SCIENCE

B.Sc.(Regular) (2019 Pattern)

Programme Outcomes:

After successfully completing B.Sc.(Statistics) Programme students will be able to:

PO1: Digital literacy:

The course has been designed in such a way that a student gets software knowledge related to subjects such as Excel, R -Programming, C-Programming, Maxima, Scilab, Python, etc.

PO2: Environment & sustainability:

To prepare graduates who are not only statistically sound but also capable of using their appropriate statistical skills in interdisciplinary areas such as physics, chemistry, mathematics, finance, health, agriculture, government, business, industry, and telecommunication, biostatistics, etc. As a result, they can pursue their future career either in the core field or in the applied field of Statistics.

PO3: Disciplinary Knowledge:

The proposed curriculum is expected to provide the students with a sound knowledge of Statistics covering various aspects. As a result, they will not only appear appropriate for pursuing higher studies in the subject but also develop skills to apply statistical know-how to a variety of real-life problems.

PO4: Problem Solving :

The students will be able to analyze/ handle different/ various situations sucas model fitting, and algorithm writing and will be able to identify and conclude relevant resources to find their rational answers.

PO5: Communication Skills:

As students have to do projects every year, they collect real-life data from the field. Here, these students interact with many people which builds their communication skills. This helps them in the future.

PO6: Team Work:

The students have to complete a project in a group or team that develops the skill of working in a team which in turn develops their unity and integrity.
During the completion of the project the students who are reserved, start making interaction with their teammates and other students. These students get desired objectives, motivation and inspiration from team members as a team.

PO7: Self-directed Learning:

Students will be able to identify their learning needs and learning goals. They will be able to choose and implement appropriate learning strategies and evaluate learning outcomes (with or without the help of others).

PO8: Scientific Reasoning:

The students will be able to analyze, interpret and draw appropriate conclusions from both quantitative and qualitative data.

PO9: Practical Approach:

In the project, students have to model real problems and apply the appropriate methods that they learn in three years of the graduation program.

PO10: Ethics:

Apply ethical principles and commit to professional ethics and responsibilities and norms of the science practices.

After successfully completing B.Sc. (Chemistry) Programme students will be able to:

PO1: Digital Literacy:

Use modern techniques, equipment and chemistry software. Based on a standard protocol, students will learn to operate the Turbidimeter, flame photometer, pH meter and other physical instruments safely. Students will be able to apply their skills in drawing basic structures with the help of free chemistry software like ChemDraw and Reaction Flash.

PO2: Environment & sustainability:

Being a chemistry student must be aware of the impact of chemistry on the environment, society and development outside the scientific community. We have an optional course entitled "Environmental and Green Chemistry" for our third-year students which especially covers the importance and conservation of the environment, the need for green chemistry technology and different catalytic routes for sustainable developments.

PO3: Disciplinary Knowledge:

The students are able to demonstrate and understand major concepts in all disciplines of chemistry. Students will be able to express their views on the current status of chemistry and explore various research opportunities

PO4: Critical Thinking:

Employ critical thinking and scientific knowledge to design, carry out and record and analyze the chemical reactions. Students will be able to relate

concepts to practice and be creative. Students will be able to explore nature and get innovative ideas and express it on paper.

PO5: Communication Skills:

Students will be taken for various Industrial and research institutional visits to collect real-life data. Here, these students interact with many people which builds their communication skills. This will help them in the future.

PO6: Team Work:

The students have to complete a project in a group or team that develops the skill of working in a team which in turn develops their unity and integrity. During the completion of the project the students who are reserved, start making interaction with their teammates and other students. Motivation and extra boosting for the participation in the quiz or model-making competitions at the national and international levels. These students get desired objectives, motivation and inspiration from team members as a team.

PO7: Self-directed Learning:

This program curriculum inculcates the students' problem-solving approach and use of advanced ICT techniques which makes them self-directed and lifelong learning.

PO8: Scientific Reasoning:

The students will be able to analyze, interpret and draw appropriate conclusions from both quantitative and qualitative data. Using advanced software and instrumental techniques students will be able to do chemical analysis and separation.

PO9: Learn the laboratory skills:

Needed to design, safely and interpret chemical research.The practical work done in the laboratories improves the students' knowledge about various chemical reagents and reactions. So they are able to handle the corrosive, explosive and carcinogenic chemicals. Communicate effectively through report writing, documentation and effective presentations.

PO10: Ethics:

Apply ethical principles and commit to professional ethics and responsibilities and norms of the science practices. Students will be made aware of accessing the scientific articles/research papers, their copyrights and basic ideas about plagiarism structures with the help of free chemistry

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B.Sc.(Regular) (2019 Pattern)

Course Outcomes

F. Y. B. Sc. (Regular) Sem - I

MT 111 Algebra

CO1: Identify the concept- well defined set,relation and a function,
Identify- the types of sets,relations and functions and various operations ona sets,
Solve the practical problems- on Union and Intersection of thesets,Equivalence and Congruence relations,Equivalence classes and Inverse and compositefunctions,
Understands- Relations of two sets, functions,pictorial representations oftwo sets as a Subset of their cartesian products.

CO2: Students will be able to apply Principle of Mathematical Induction toestablished the Validity of the general statement,
Students will be able to understand the Division algorithm and solvesDifferent mathematical problems of GCD using Division algorithm.

CO3: Identify prime numbers and understand the properties of prime numbers.
Students will be able to understand the Euclid's Lemma and Fermat'stheorem and solves Problems using both.

CO4: Define a complex number and able to identify real and imaginary parts ofComplex number
Understands-the operations on complex numbers,inverse and conjugate of aComplex Number and geometrical representation of complex number(argand diagram), De-Moivre's theorem,
Students will be able to Solve-different mathematical problems of Modulus,Principal Arguments of complex numbers and nth root of unity of complex numbersusing De-Moivre's theorem.

MT 112 Calculus-I

CO1: The students will be able to understand algebraic properties & order properties of the real line $\mathbb{R}$, properties of absolute value function & able to find rational number between any two irrational numbers usingdensity theorem.

CO2: Discuss the concepts of sequence in terms of functions from $\mathbb{R}$ to a subset of $\mathbb{R}$. Recognize bounded, convergent, divergent, Cauchy andmonotonic sequences and finding limit of a bounded sequence.

CO3: The students will be able to find the limit of a sequence.Solve problems on Increasing/decreasing functions,even/odd functions.

CO4: Analyze & explain the continuity of a function.

ST 111 Descriptive Statistic I

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

CO1: Describe the definition of statistics and are able to give its application invarious fields, as well as are familiar with well-known statisticians and workings of different statistical organizations.

CO2: Understand the concepts of statistical population and sample , differenttypes of data and characteristics.

CO3: Organize, manage and present data.Analyze statistical data graphically using frequency distributions and cumulative frequency distributions. Analyze statistical data using measures of central tendency, dispersion andlocation.

CO4: Define Moments and their use in studying various characteristics of data. Measures the Skewness and Kurtosis of data and interprets the distributionof data (viz., Skewed, symmetric, kurtosis) based on raw and central moments.

CO5: Understand conditions for the consistency and criteria for the independenceof data based on attributes. Also association and dissociation between attributes.

ST 112 Discrete Probability

CO1:

To distinguish between random and non-random experiments,Basic definitions ofProbability Theory like Sample space,Events.

CO2:

To find the probabilities of different events

CO3:

To obtain a probability distribution of random variable (one or two dimensional)in the given situation

CO4:

To obtain mean ,variance,probabilities of Bernoulli,Binomial,Hypergeometric, poisson,exponential distributions and to solve statistical problems related to thesedistributions.

PH 111 Mechanics and Properties of Matter

CO1: To understand the general Introduction to motion, Types of motion, Displacement, Velocity, Acceleration, Inertia, Newton's laws of motionwith their explanations.

CO2: To understand types of energy, Work Energy Theorem, Work done with constant and varying forces, Conservative and Non-conservative forces etc.

CO3: To demonstrate an understanding of various concepts of fluid mechanics,viscosity, Steady and Turbulent flow, Reynolds number, Equation of continuity, Bernoulli's Principle, Applications of Bernoulli's Principle.

CO4: To study the concepts of Properties of Matter, Surface Tension and its applications, Stress and Strain, Hooke's law and Coefficient of elasticity,three elastic moduli and their relationship.

PH 112 Physics Principles and Applications

CO1: Describe theories explaining the structure of atoms, different atomicmodels, types of bonding, and the origin of the observed spectra.

CO2: List different types of atomic spectra.

CO3: Study of Laser & its Applications.

CO4: Understanding of electromagnetic waves and its spectrum, understand thetypes and sources of electromagnetic waves and applications

CO5: To develop problem solving skill in all topics.

EVS 111 Fundamental of Environmental Biology

CO1: Students can appreciate the basic concepts from Biology and their applications from an environmental point of view. To understand about historical context of environmental issues and the links between human andnatural systems.

CO2: To provide adequate information about evolutionary changes, extinction andto aware about its current situation and possible remedies.

CO3: To understand concepts of biogeography and factors responsible for distribution of biogeography. Get familiarized with the biogeographicalstatus of the world.

CO4: Can describe and integrate the information of characteristics of kingdoms. To understand taxonomic principles. Can recognize different hierarchy levels and get information about classification and nomenclature systems of living organisms.

CO5: Helps to recognize the different attributes of organisms for adaptations inenvironment and to evaluate current environmental issues related to bioresources and its significances.

EVS 112 Fundamental of Environmental Chemistry and Physics

CO1: Demonstrate knowledge of Environmental Chemistry, Segments ofEnvironment (air, water, and soil), Chemical Aspects of Bio-geo- chemical cycles & principles of Green Chemistry.

CO2: Recognize different types of toxic substances, responses and analyzetoxicological information & further Climate Change in Atmosphere.

CO3 : Describe Chemistry of toxic Heavy Metals their compounds, & discussHuman exposure-influence & its mitigation strategies.

CO4: The ability to understand Chemistry of Surfactants, Environmental Impactsand Toxicity also learnt about chemicals in food Additives, Contaminants & Adulterants, discuss Properties and their effects.

CO5: The ability to analyse titrimetric methods, Principles of pH meter andconductivity meter, & Environmental Physics

BO 111 Plant Life and utilization I

CO1: Outline & Define general characters of cryptogams and Phanerogams

CO2: Describe the general characters, classification and Life cycle of Spirogyraand utilization of algae

CO3: Identify lichens and their economic value

CO4: Describe the general characters, classification and Life cycle of Mushroom Agaricus and utilization of fungi

CO5: Describe the general characters, classification and Life cycle of Riccia andutilization of Bryophytes

BO 112 Plant morphology and Anatomy

CO1: Students able to understand introduction, define, importance in phylogenyand plant breeding

CO2: Discuss morphology of vegetative and reproductive parts of plants.

CO3: Describe anatomy of Monocot and dicot plants.

CO4: Explain types of plant tissues

CO5: Categorize the plants into Monocot and Dicot on the basis of anatomicalcharacters.

CH 101 Physical Chemistry

CO1: Students able to calculate bond energy, enthalpy of formation, bonddissociation energy,resonance energy etc.

CO2: Students able to know concepts of free energy and equilibrium inthermodynamic processes.

CO3: Explain types of electrolytes, ionization of weak acids and weak bases andcalculate degree of dissociation.

CH 102 Organic Chemistry

CO1: To understand these effects: Inductive Effect, Electromeric Effect, Resonance and Hyperconjugation. To be able to explain electrophiles andnucleophiles.

CO2: Students should be able to identify the difference between relative and absolute configuration; Basic understanding about how to draw the Saw-Horse, Newmann and Fischer projections.

CO3: To be able to identify various functional groups and their interconversions. To understand preparation methods for alkenes, alkynes & alkyl halides.

F.Y.B.Sc. (Regular) Sem-II

MT 121 Analytical Geometry

CO1: The student develops theoretical, applied and computational skills andproblem solving Technique.

CO2: The student gains confidence in proving theorems and solving problems.

CO3: Students will be able to understand the equation of a line symmetric andUnsymmetric Forms,Problem solving on Angle between line and a plane,coplanarity of two lines.

CO4: Students will be able to understand the equation of a Sphere,circle and its inDifferent forms,Intersection of a sphere and a line and related to problems.

MT 122 Calculus -II

CO1: Students will be able to Explain the relationship between the derivative of afunction as a function and the notion of the derivative as the slope of the tangent line to a function at a point.

Students will be able to Compare and contrast the ideas of continuity and differentiability.Geometrical representation and problem solving on MVT.

CO2 : Students will be able toTo be able to calculate limits in indeterminate formsby a repeated use of L' Hospital rule.

CO3: Students will be able to explain the concept of **differential equation.**classify the **differential equations** with respect to their order andlinearity into linear, nonlinear, partial and ordinary differential equations.

CO4: Students will be able to convert separable and homogen equations to exactdifferential equations by integrating factors & solving first-order exact differential equations.

ST 121 Descriptive Statistics II

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

CO1: Compute the correlation coefficient for bivariate data and interpret theResult from it.

CO2: Fit linear (regression line) to the bivariate data to investigate the relationbetween two variables.

CO3: Fit non-linear regression model and exponential curves to the bivariate datato investigate the relation between two variables.

CO4: Compute and interpret various index numbers.

ST 122 Discrete Probability Distribution

CO1: Standard discrete probability distributions like poisson,geometric based onfinite sample space and apply them to different real life situations.

CO2: Able to calculate mean,variance of univariate discrete probabilitydistributions.

CO3: Able to understand properties of Bivariate discrete probability distribution like mean,variance,correlation,Marginal distribution,conditional distributionand so on.

PH 121 Heat and Thermodynamic

CO1: To understand the Fundamentals of Thermodynamics and learn thermodynamic state, Equation of state, Van der Waal's equation of state, Thermal equilibrium, Laws of thermodynamics, Thermodynamic processes: Adiabatic, Isothermal, Isobaric and Isochoric changes, Indicator
diagram, Work done during isothermal change and during adiabatic change.Students are also taught to solve Problems.

CO2: To understand the Conversion of heat into work and it's converse. Lawsrelated to the interconversion and numericals related.

CO3: To understand Heat Transfer Mechanisms and to relate the same to thenumericals and processes related.

CO4: To learn Concept of heat & temperature, Principle of thermometry andtypes of thermal measurement instruments.

PH 122 Electricity and Magnetism

CO1: Understand electric force, field and potential, and related concepts, forstationary charges.
CO2: Calculate electrostatic field and potential of simple charge distributionsusing Coulomb's law and Gauss's law.
CO3: Understand dielectric and effect on dielectric due to electric field.
CO4: Understand the magnetic field, Biot-Savart law, Ampere's laws, magneticfield due to solenoid & toroid.
CO5: Magnetic properties of materials.

EVS 121Fundamental of Environmental Geoscience

CO1: Can understand about structure of earth and related theories. Informationabout types of rocks and minerals.

CO2: Will be able to learn about formation of soil, its composition and properties. Get familiar with classification of soil according to its agriculturalsignificance.

CO3: Can describe the general properties of earth's atmosphere and its structure and composition.. Learn about factors regulating atmospheric temperature.

CO4: Students will explore the processes of the hydrological cycle and factorsaffecting atmospheric pressure.

CO5: The students will learn about various types of natural calamities. Learn about causes; Planning & Management to prevent their effects. Explain thesignificance of alternative energy resources.

EVS 122 Fundamental of Environmental Pollution

CO-1: To the study of nature and the facts about environmental Pollution & typesof Pollution.

CO-2: The ability to understand Air and Radioactive Pollution, Environmental

issues with the case studies & their effects.

CO-3 : Describe Water and Thermal pollution with effects like Eutrophication, Bioaccumulation, biomagnifications along with Chemistry of toxic HeavyMetals, discuss Human exposure- influence & its mitigation strategies.

CO-4 : Understand the Soil Pollution with sources, causes, effects & Contromeasures.

BO 121Plant life and Utilization II

CO1: Explain Introduction of plant diversity- Pteridophytes, Gymnosperms andAngiosperms

CO2: Outline classification of Pteridophytes and Describe the Life cycle ofNephrolepis

CO3: Explain the utilization and economic importance of Pteridophytes.

CO4: Describe the general characters, Outline classification of Gymnospermswith reasons and explain Life cycle of Cycas

CO5: Describe general characters, Outline of classification of Bentham andHooker's system of Angiosperms.

CO6: Explain the utilization and economic importance of Angiosperms

BO: 122 Principles of Plant Science CO1: Define

terms related to plant physiology.

CO2: Describe the term Diffusion – definition, importance of diffusion in plants,imbibition as a special type of diffusion.

CO3: Demonstrate process of Osmosis – definition, types of solutions (hypotonic,isotonic, hypertonic),

CO4: Demonstrate the process Plasmolysis – definition, mechanism andsignificance.

CO5: Describe Plant growth - introduction, phases of growth, factors affectinggrowth.

CO6: Discuss the dynamics of the Structure of plant cell, differences betweenprokaryotic and eukaryotic cell.

CO7: Describe the plant cell wall – components of primary cell wall, structureand functions.

CO8: Describe the Ultrastructure and functions of chloroplast.

CO9: Discuss the Cell cycle in plants- importance of cell cycle in plants,divisional stages of mitosis and meiosis.

CO10: Define terminologies related to molecular biology, central dogma ofmolecular biology.

CO11: Describe the structure of DNA, nucleoside and nucleotide, Demonstratethe Watson Crick model of DNA and its characteristic features, types of DNA (A, B and Z DNA).

CO12: Describe types of chromosomes, Structure and types of RNA. DNA replication- Types of replication (conservative, semi-conservative anddispersive), enzymes involved, leading and lagging strands, Okazaki.

CH 201 Inorganic Chemistry

CO1: Basic concepts of Quantum Mechanics, radial and angular parts ofhydrogenic wave functions.

CO2: Periodic properties of elements and their classification in various groups and periods and write electronic configuration of elements in periodic table.

CO3: What are different types of bonds in molecules and describe valence andVSEPR theory, write hybridization and geometry of molecules.

CH 202 Analytical Chemistry CO1:

What is Analytical Chemistry
CO2: Define: Mole
CO3: What are the different methods of purification of organic compounds
CO4: Define: Chromatography
CO5: Discuss the PH scale

S.Y.B.Sc. (Regular) Sem I

PHY-231 :Physics-I:Mathematical Methods in Physics

CO1: Understand the complex algebra useful in physics courses.

CO2: Understand the concept of partial differentiation.

CO3: Understand the role of partial differential equations in physics.

CO4:Understand vector algebra useful in mathematics and physics.

CO5: Understand the Terminology used in differential equations, concept ofsingular points of differential equations.

PHY-232:Physics-II:Instrumentation

CO1: Understand the concept of measurement.

CO2: Learn Standards of measurement and its classification. **CO3:** Understand the performance of measuring instruments. **CO4:** Design experiments using sensors.

CH-301 :Chemistry paper- I: Physical and Analytical Chemistry

CO1: What is rate of reaction.

CO2: Discuss the factors influencing adsorption

CO3: Define: Error

CO4: Explain titration curve of strong acid and strong base

CH-302 :Chemistry paper –II: Inorganic and Organic Chemistry

CO1: Distinguish between atomic and molecular orbitals, bonding, anti-bonding and non-bonding molecular orbitals

CO2: IUPAC nomenclature to coordination compound

CO3: To correlate reagents and reactions; To understand the reactivity of different carbonyl compounds towards nucleophilic reactions

CO4: Identify and draw the structures alkyl / aryl halides from their names or from structure names can be assigned; Students will be able to recognisethe structure of acid halides, esters, amides, and acid anhydrides.

CO5: Synthesis and properties of alcohols / phenols

MT-231 :Mathematics Paper- I:Calculus of Several variables

CO1: Students will be able to identify functions of two and more variables,domain and range Of functions of two or more variables, Students will be able to draw graphs and understands different curves, Identify the required method to

find the limit of given function and able tosolve it.

CO2: Understands the concept of partial derivatives and differentiability of function, Students will be able to solve the different problems on partialderivatives and total Differentiation, Students will be able to apply Clauraut's theorem,Chain Rule and Euler's theorem. In different mathematical problems.

CO3: Understands and able to identify the extreme values of a function of two ormore variables Students will be able to use Second derivative test and Lagrange's multiplier method to Find out the extreme values if exists.

CO4: Students Understands the concept of Double and triple integration and Able to understand the integration limits for functions of two or more variables, Understands The Fubini's theorem and Jacobian method to solvethe integration of functions of two or more variables and able to solve the different examples by applying Fubini's theorem and also with help of Jacobian method

MT-232(A):Mathematics Paper- II:Numerical Methods and ItsApplications

CO1: The student should be made aware of types of errors in Numerical Methods & also introduce methods to solve numerical algebraic andtranscendental equations.

CO2: Discuss the concepts of finite differences & gains knowledge aboutinterpolation for equal intervals & unequal intervals.

CO3: The student should be able to understand & apply appropriate methodnumerical integrations in solving problems.

CO4: Analyze & explain methods of Taylor series, Picard's method,Euler's Method , Modified Euler's and Runge Kutta methods to find solutions ofdifferential equations & Estimates the numerical solutions of first order differential equations.

ST-231: Statistics Paper- I: Discrete Probability Distributions andTime series

CO 1: Able to obtain probability mass function of negative binomial distribution,its descriptive statistics, relation between geometric and negative binomial distribution, real life problems.

CO 2: Able to obtain probability mass function of multinomial distribution, itsdescriptive statistics,

difference between binomial and multinomial distribution, real life problems.

CO 3: Able to identify truncated binomial and Poisson distribution, its probabilitymass function, mean and variance.

CO 4: Able to identify components of time series from the example, estimation oftrend and seasonal variation, fit the autoregressive model of order 1 and 2**.**

ST-232: Statistics Paper- II: Continuous Probability Distributions

CO1: To obtain summary statistics,moments,Moment Generating Function ,Cumulative Generating Function,Symmetry, probability of events related tocontinuous univariate random variable.

CO2 : To obtain Marginal and conditional probability distributions for Bivariate Data,joint moments and M.G.F, probability distributions of functions of (x,y), Identify whether the variables are independent in case of bivariate random variable,find probabilities of joint events of x and y, correlation andRegression lines of x and Y

CO3: Knowledge of important continuous distributions such as Continuous Uniform, Normal, and Exponential,able to identify relation of one distribution with other distribution,Ability to use and interpret Normal Probability Plot and q-q plots for testing Normality of data,Knowledgeabout Box- Muller transformation for simulations.

EL-231 :Electronics Paper -I: Communication Electronics

EL-232 :Electronics Paper –II: Digital System Design

BO-231: Botany Paper I- Taxonomy of Angiosperms and PlantEcology

CO1: Define plant taxonomy and taxonomic related terminologies.

CO2: Explain classification systems of angiosperms.

CO3: Explain plant families with examples.

CO4: Determine Botanical Nomenclature of angiosperm plants.

CO5: Define plantEcology and Ecological related terminologies.

CO6: Recognize ecological plant groups with examples.

BO-232 :Botany Paper II- Plant Physiology

CO1: Define and explain the scope and application of Plant Physiology

CO2: Discuss the role of water in plants and Explain mechanism processes of water absorption with respect to crop plants, various factors effect on therate of water absorption.

CO3: Define the terminologies of Ascent of sap and explain various theories which supported by experimental evidences, Determine factors affecting onascent of sap.

CO4: Explanation of the physiological processes like Antitranspiration, guttation,Exudation and Transpiration their types like cuticular, lenticular and stomatal transpiration, explain the mechanism of opening and closing of stomata by stewards hypothesis

CO5: Discuss nitrogen metabolism in plants

CO6: Explain Mechanism of Seed dormancy , anaylse the different methods ofseed dormancy and metabolic changes.

CO7: Classify the plants based on Photoperiodismand physiology of flowering.

EVS-231: EVS paper –I: Ecology and Ecosystem

1. Develop an appreciation of the modern scope of Interdisciplinary nature of Ecology & Become familiar with the variety of ways that organisms interact with both the physical and the biological environment.
2. Develop an understanding of the differences in the structure and functionof different types of ecosystems.
3. Integrate basic information related Nutrient cycles & Human Impact on Biogeochemical Cycles.
4. Learn techniques of data analysis as well as methods, Characteristics ofpopulation growth and the factors influencing this growth.
5. Understanding Community Ecology, ecological succession and the roleof environmental disturbance in this Mechanism.

EVS-232: EVS Paper- II: Natural Resources Conservation andManagement

CO1: Able to understand the importance and origin of resources. Criticallyevaluate the problems related to natural resources.

CO2: Can describe the function of forest and human interaction with forest.
Understand about forest management in India.

CO3: Students will recognize the food problems of world and able to understandmodern agriculture technologies

CO4: Identify the problems related to water resources and explain theconservation methods.

CO5: Develop awareness towards soil degradation and its consequences and takeinitiatives towards sustainable agriculture methods.

Environmental studies

CO 1: Articulate the interconnected and multidisciplinary nature of environmental studies;

Demonstrate an integrative approach toenvironmental issues with a focus on sustainability.

CO 2: Develop an understanding of the differences in the structure and functionof different types of ecosystems.

CO 3: Understand the Natural Resources, experience positive and negativeenvironmental impacts, on land, water & Energy Resource.

CO 4: Use critical thinking, problem-solving, and the methodological approaches

of the Biodiversity, its Conservation, and humanities in environmentalproblem solving.

English

CO 1: To understand the students about different genres of literature like poetryand short story.

CO2: To improve conversational skills of the students and make them awareabout different forms of informal communication.

CO3: To enhance the quality of students with different skills needed for interviewand personality development.

S.Y.B.Sc. (Regular) Sem II

PHY 241:Physics Paper –I: Oscillations, Waves, and Sound

CO1: To study underlying principles of oscillations and it's scope indevelopment.

CO2: To understand and solve the equations / graphical representations of motionfor simple harmonic, damped, forced oscillators and waves.

CO3: To explain oscillations in terms of energy exchange with various practicalapplications.

CO4: To solve numerical problems related to undamped, damped, forcedoscillations and superposition of oscillations.

CO5: To study characteristics of sound, decibel scales and applications.

PHY 242: Physics Paper -II: Optics

CO1: Will give the student a thorough fundamental knowledge withininterference, coherence, polarization and diffraction.

CO2: Describe and discuss optical interference observed using wavefront splittingand amplitude splitting interferometer

CO3: Understand optical phenomena such as polarization, birefringence, interference and diffraction in terms of the wave model.

CO4: Describe and discuss linear, circular and elliptical polarization and use of polarized light.

CO5: To develop problem solving methods that will include mathematical as well as numerical computations and solutions.

CO6: Learning of different microscopes.

CH 401:Chemistry Paper -I: Physical and Analytical ChemistryCO1: State Gibbs phase rule

CO2: Differentiate between ideal and non ideal solution

CO3: Explain Kohlrauch law

CO4: State Lambert- Beer's law

CO5: Principle of column chromatography

CH 402:Chemistry Paper -II: Inorganic and Organic Chemistry CO1: Students to be able to

explain different types of isomerism in coordination Complexes

CO2: To be having proper understanding of the principles of Valence bond theory in coordination complexes

CO3: To be able to explain principles of Crystal Field Theory with suitableExamples

CO4: To have basic ideas about the preparation of aldehydes and ketones andapply this in making derivatives of those.

CO5: To be able to recognize acid strength and preparation of carboxylic acidsand their derivatives

CO6: To be able to identify aliphatic and aromatic amines; know the applicationof aromatic amines towards synthesis of diazonium salt; to be able to apply this understanding in laboratory practical in making this salt and itsapplication.

CO7: To be able to draw structures of different conformations of cyclohexane andto identify the stability pattern of various di-substituted cyclohexane derivatives

MT 241: Mathematics Paper -I: Linear Algebra

CO1: The student should be able to express a system of linear equations in amatrix for & perform elementary row operations for the matrices and systems of linear equations. Investigate & analyze the solution set of asystem of linear equations using Gauss elimination & Gauss Jordan method.

CO2: Understand the concepts of a real vector space to an finite-dimensional vector space, properties of R^n and subspaces of R^n. Determine whether asubset of a vector space is linear dependent, describe the concept of a basisfor a vector space.

CO3: Compare and contrast the row space, null space and column space of amatrix & Solve a basis and the dimension of the subspace spanned bygiven vectors. Find dim Nul A, dim Row A, dim Col A, and/or rank A fora matrix A.

CO4: Analyze & explain the concept of Linear Transformation, kernel & range ofLinear Transformation.Relate matrices & Linear Transformation.

MT 242(B):Mathematics Paper -II: Dynamical Systems

CO1: The student would be able to understand the concept of Eigenvalues,Eigenvectors and Diagonalisation and able to solve it.

CO2: Students would be able to correlate Differential Equations with linear algebra and able to solve First order Equations and Planar Linear systems.

CO3: Students would be able to understand Eigenvalues and its types comprehensively and understand Phase portraits for planar systems.

CO4: Students would be able to identify and classify Planar system andExponential of a Matrix.

ST 241: Statistics Paper -I: Tests of Significance and StatisticalMethods

CO1: To understand Inferential Statistics, Formulate the null and alternative hypotheses, Test statistics, Parametric statistical test and apply large sample(Z-test) tests in real life problems.

CO2: Understand multiple linear regression models with applications.

CO3: Understand the different ways of summarizing the Vital Statistics.

CO4: Formulate M/M/1 queue and find its parameter and also find the averagewaiting time in the queue.

ST 242: Statistics Paper -II: Sampling Distributions and ExactICSIS

After completing the course students are able

CO1: To identify the nature of curve, probability density function, descriptivestatistics terms and calculation of probability values related to gamma distribution. Also able to identify its relation with Poisson distribution.

CO2: To identify the nature of curve, probability density function, descriptive statistics terms and calculation of probability values related to Chi-squaredistribution. Also able to identify its relation with Gamma and normal distributions.

CO3: To identify the nature of curve, probability density function, descriptive statistics terms and calculation of probability values related to t distributionand its relation with normal distribution.

CO4: To identify the nature of curve, probability density function, descriptive statistics terms and calculation of probability values related to F distribution. Also able to find the relationship between Chi-square, t and Fdistribution.

CO5: To test the given data/ information according to the most suitable distribution from Chi-square, t-test, F-test, confidence interval for t-test.

EL 241:Electronics Paper -I: Analog Circuit Design

CO1: Design single/multistage amplifier using transistor and analyze their frequency response base on gain-bandwidth product due to coupling /bypass capacitors

CO2: Classify and compare different power amplifiers

CO3: Understand and design push pull amplifier and need of heat sinks

CO4: Distinguish between Opamp Feedback circuits based on their configurations

CO5: Analyze the effect of negative and positive feedback on characteristics of OpampCO6Understand and analyze the need of positive feedback inoscillator circuits

CO7: Design , develop and build circuits for identified applications

EL 242: Electronics Paper-II: Microcontroller and Pythonprogramming

CO1: Identify the features and architectural details of microcontroller(arduiono)

CO2: Write code/program using open source programming language(ardiuno) forbasic identified applications

CO3: Understand programming basics of python programming language

CO4: Understand special features of python programming languagesuch asimporting modules, directory, tupules

CO5: Design , build and implement applications using ardiuno and python

BO 241:Botany Paper -I: Plant Anatomy and Embryology

CO1: Define terms related to plant Anatomy, Embryology.

CO2: Describe various tissue systems in plants like epidermal, mechanical andvascular.

CO3: Interpret the Principles involved in distribution of mechanical tissues.

CO4: Explain the process of normal and abnormal secondary growth in plants.

CO5: Illustrate the types of microspore, ovules, embryo, seed and endosperm. Megasporangium and female gametophyte.

CO6: Discuss the Structure and development process of male and femalegametophyte.

CO7: Identify the process of pollination and fertilization.

CO8: Describe the Endosperm and embryo Structure of Dicotyledonous andMonocotyledonous embryo.

BO 242: Botany Paper -II: Plant Biotechnology

CO1: Define the terminologies related to plant biotechnology.

CO2: Describe Plant Tissue Culture techniques.

CO3: Interpret the production of Single cell proteins.

CO4: Illustrate Application of plant genetic engineering and Tools of genetic engineering (restriction enzymes, ligases, plasmid vectors) , Gene cloningTechnique.

CO5: Explain applications of Genomics, Proteomics, Transgenic plants,Bioinformatics.

CO6: Illustrate the concept of Bioremediation.

CO7: Define and conceptualize the term Biofuel technology-concept of Biogas,Bioethanol, Biobutanol, Biodiesel & Biohydrogen.

EVS 241: EVS Paper -I: Biological Diversity and its Conservation

CO-1: Understanding the basics of science of biodiversity in an ecological context, their Levels & Methods of assessment of Biological diversity.

CO-2: Learning tools and techniques relevant to monitoring of Speciesbiodiversity, along with the Hotspots.

CO-3: Describe Genetic Diversity with Darwin's theory.

CO-4: Ability to design a field-based project with rationale and appropriate methodology of Significance & Threat to Biodiversity.

CO-5: To Study Need & Awareness, about Biodiversity Conservation Methods, National & International Conservation Efforts Also Traditional Methods of Conservation.

EVS 242:EVS Paper -II: Environmental Pollution ControlTechnology

CO1: Students will learn National standards for ambient air quality byWHO. Explain the monitoring of important ambient air components and instruments used for air quality monitoring.

CO2: Describe the protocol for water quality monitoring. Get information about collection of

water samples, its conservation andtest parameters. Describe the wastewater treatment.

CO3: Will acquire the knowledge of objectives of soil monitoring, sampling of soil Physiochemical and Biological parameters. Describe the biological method to control the soil pollution.

CO4: Explain disposal / management options for solid waste. Awarenessabout hazardous Waste and its management, storage & disposal.

Explain biomedical waste management.

CO5: Describe noise control technique. Explain noise control at source.

Environmental Studies

CO-1: To the study of nature and the facts about environmental Pollution & typesof Pollution.

CO-2: The ability to understand the environmental issues, their policies &practices.

CO-3 : To Develop public awareness about man made activity & impact onenvironment, disaster management & environmental ethics.

CO-4 : Field visit to an area to document environmental assets.

English

CO 1: To make students aware of different genres of literature like poetry and short story.

CO2: To improve written communication skills of students and make them awarewith different forms of written communication.

CO3: To enhance soft skills of students and helps to develop their personalitywith different skills.

TYBSc (Statistics) (CBCS Pattern)

Semester - I

ST 351: DISTRIBUTION THEORY – I

CO1:

Able to identify summary statistics , important properties of Beta one and Beta two distribution,relation of Beta distribution with other distribution and interrelation between both distributions, Able to apply Beta distribution in Real life situation.

CO2:
Knowledge of important concepts, Order Statistics, pdf of first order statistics and nth order statistics,joint pdf of order statistics.Distribution of median.

CO3:
Able to identify summary statistics,important properties of cauchy distribution,relation of cauchy distribution with other distributions,Able to apply cauchy distribution in Real life situation.

C04:
Knowledge of important concept,chebyshev's Inequality,chebychev's theorem,Application of chebychev's inequality in control charts.pdf of first order statistics and nth order statistics,joint pdf of order statistics.Distribution of median.

CO5:
Knowledge of important concept, Central Limit Theorem and Weak Law of Large Numbers ,Applications of CLT and WLLN.They can apply De Moivre - Laplace theorem to convert Binomial distribution to Normal distribution also CLT to convert any distribution to Normal distribution for large n.

ST 352: THEORY OF ESTIMATION

CO1: Able to identify parameters by point and by using Interval estimation, Able to identify difference between estimator and estimate.

CO2: Able to identify the Likelihood function for discrete and continuous distributions.they can derive MLE for discrete and continuous distributions.

CO3: Able to find Unbiased, sufficient,uniformly minimum variance unbiased estimators.Able to apply CRLB for discrete and continuous distributions.

CO4: Able to identify consistent estimators.

ST 353: DESIGN AND ANALYSIS OF EXPERIMENTS

CO1: Design of Experiment.Understand the basic terminology used in design of experiments, use appropriate experimental designs amongst CRD, RBD and LSD. To analyze the experimental data and appropriate test when null hypothesis for treatments is rejected.

CO 2: Efficiency of Design.Able to find the most efficient design amongst CRD, RBD, and LSD

CO 3: Factorial Experiments. Apply the factorial concept to experiments with several factors.Understand confounding in 2-square and 2-cube factorial experiment

ST-354: STATISTICAL PROCESS AND PRODUCT CONTROL

CO1: Students are able to Understand online and offline process controls.

CO2: Students are able to apply variable charts such as X-bar chart, R-chart, in real life data.

CO3: Students are able to apply attribute charts such as C-chart and P-chart in real life data.

CO4: Students are able to Compute capability indices for controlling processes.

CO5: Students are able to apply the single and double sampling plans on real life data for product controlling.

ST 355: OPERATION RESEARCH - I

CO1: Students are get familiar concept, origin, Features, Approach to problem solving

CO2: Students able to solve the LPP by both methods,Students understood different methods to solve the transportation problem,Students understood and were able to solve the duality by both methods

CO3: Students understood different methods to solve the transportation problem

C04: Students were able to draw the network diagram, identified critical path & solution to PERT with float values

ST 356: REGRESSION ANALYSIS

CO 1: Students will be able to fit the simple linear regression model and estimate the unknown parameters.

CO 2: Students will be able to fit the multiple linear regression model and can study the variability in dependent variables by means of independent or control variables and can estimate the unknown parameters.

CO 3: Students will be able to measure the relationship between a categorical dependent variable and one or more independent variables.

C04: Students were able to draw the network diagram, identified critical path & solution to PERT with float values

SEMESTER - II

ST : 361 DISTRIBUTION THEORY – II

CO1:

Able to identify statistics ,important properties of Weibull distribution,relation of Weibull distribution with other distribution,Real life situations of distribution.

CO2:

Able to identify summary statistics,important properties of Laplace distribution, relation of laplace distribution with other distribution,Real life situations of distribution.

CO3:

Knowledge of important continuous distribution,Log-Normal Distribution. summary statistics, important properties of distribution,relation of one distribution with other distribution,Real-life situations of distribution.

CO4:

Able to identify pdf of truncated normal distribution truncated i) to the left below a ii) to the right above b iii) to the left below a, and to the right above b, (a < b).They can derive mean of all these distributions.Real-life situations of distribution.

CO5:

Knowledge of important continuous distribution, Pareto Distribution. summary statistics, important properties of distribution,relation of one distribution with other distribution,Real life situations of distribution.

CO6:

Able to identify,summary statistics,important properties of Bivariate Normal Distribution.They can find Marginal,conditional ,MGF distribution of BVN.Real life situations of distribution.

ST 362: TESTING OF HYPOTHESIS

C01: Testing Of Hypothesis:

- Students are able to formulate null and alternative hypothesis and are able to identify Type-I and Type-II error.
- Able to solve numericals regarding Type-I and Type-II error.

C02: Likelihood Ratio Test:

- Students are able to construct likelihood ratio tests and solve examples for different cases of testing and learn to construct tests based on it.

C03: Non-parametric Hypothesis:

- Students are able to construct non parametric tests and solve numericals regarding it.

ST 363: SAMPLING THEORY

CO1: Students will be able to design a questionnaire and conduct sample surveys within the context of socially acceptable professional and ethical practices.

CO2: Students will be able to understand the basic terms like population, sample, random sample, sampling frame etc. and how to select a sample using simple random sampling (SRSWR or SRSWOR) and they will be able to estimate the unknown population parameters.

CO3: Students will be able to understand how to divide the entire population into different strata and apply the simple estimation method in stratified random samples and calculate the required sample size using various allocation methods like equal allocation, proportional allocation, Neyman allocation and optimum allocation.

CO 4: Students will be able to use systematic sampling methods to select the sample from a population.

CO 5: Students will be able to determine the sample size 'n' for the given population of size 'N'.

CO 6: Students will be able to apply the ratio and regression methods of estimation to estimate the population mean.

ST 364: INTRODUCTION TO SURVIVAL ANALYSIS

CO1: Students are able to understand survival function and real life situations of Ageing concepts, IFR, DFR IFRA, DFRA, NBU, NWU, NBUE, NWUE, DMRL, IMRL, bathtub failure rate.

CO2: Students are able to identify a parametric family that is included in IFR or DFR using hazard rate function. And also exponential distribution properties.

CO3: Students are able to find how censoring is used for real life data. Also estimate the different survival function estimators.

ST 365 (B): OPERATION RESEARCH – II

CO- 1: Replacement Theory. Understand replacement analysis techniques and differentiate among various types of failures. Application of replacement theory for items whose efficiency deteriorate with time, running cost increases with time etc.

CO-2: Inventory Theory. Understand the need of inventory, how to calculate Economic Order Quantity using different model. Various inventory analysis methods.

CO-3: Decision Theory.Understand the steps of the decision-making process.Determine the expected value of perfect information, expected opportunity, loss and expected monetary value associated with any decisions.

CO-4: Game Theory. Understand to find optimal strategies, and principles of zero-sum, two-person games, distinction between pure and mixed strategies.How to find a solution when the saddle point does not exist.

CO-5: Sequencing.Understand the sequencing techniques and use of Johnson's rule.Application of sequencing technique on two or three machines for n jobs.

ST 366 (A): STOCHASTIC PROCESSES

CO1: Students are able to understand Stochastic process, state space ,parameter space, one step transition probabilities, and transition probability,Chapman Kolmogorov equation, n-step transition probability matrix , initial distribution, joint distribution function , partial sum of independent and identically distributed random variables as Markov chain matrix (t.p.m.),stochastic matrix stochastic processes , Markov chains

CO2: Students are able to identify Communicating states, first return probability, probability of ever returning Classification of states, as persistent and transient states . Decomposition of state space, closed set of states, irreducible set of states, irreducible MC, periodicity of M.C. aperiodic M.C. ergodic M. C

CO3: Students are able to identify Stationary distribution for an irreducible ergodic finite Long run behavior of a M.C.

CO4: Students are able to understand the concept of Poisson process, its mean and variance, and compound poisson process.

T.Y.B.Sc. (Chemistry) Sem-I

CH 501 Physical Chemistry-I
CO1: Students able to understand the difference between classical and quantum mechanics. Students will understand the concept of wave function and its significance and can sketch wave functions

CO2: Students will be able to know electric, induced and orientation polarization of molecules and understand the concept of dipole moment. Students can explain rotational, vibrational and Raman spectra of diatomic molecules
.
CO3: Students able to know photochemical laws and quantum yield. Understand the photosynthesis, photocatalysis, photosensitization reactions.

CH 502 Analytical Chemistry
CO1: Define basic terms in gravimetry:Gravimetry, precipitation, Co-precipitation and post precipitation

CO2: Differetiate between qualitative and quantitative inorganic analysis.Define solubility product, ionic product, common ion effect.

CO3: What is electromagnetic radiation, Lamberts-Beer Laws, How to estimate metal ion from aqueous solution

CO4: Basic principle of thermal methods of analysis and different types of methods

CO5: Identify important parameters in analytical processes or estimations. Example: minimum analyte concentration in particular method, reagent concentration in particular analysis

CO6: Perform quantitative calculations depending upon equations the student has studied in the theory. Furthermore, students should be able to solve problems on the basis of theory.

CO7: Design analytical procedure for given sample.

CO8: Apply whatever theoretical principles he/she has studied in theory during practical session in laboratory

CO9: Demonstrate theoretical principles with help of practical.

CH 504 Inorganic Chemistry-I

CO1: To know electroneutrality principle, Nephelauxetic effect and Charge Transfer Spectra. Able to explainMOT of Octahedral complexes with sigma bonding.

CO2: Meaning of inert and labile complexes. The basic mechanisms of ligand substitution reactions.

CO5: To know the general electronic configuration and different properties of transition elements

CO6: The meaning of the term f-block elements, Inner transition elements, lanthanides, actinides.

CO7: To know the difference between metal, semiconductor and insulator.

CH 505 Industrial Chemistry

CO1: Discuss the importance of common ion effect and solubility in Gravimetric

CO-2. Principles of Thermogravimetry and Differential Thermal analysis

CO-3. Principle of additivity of absorbance

CO-4. Construction and working of dropping mercury electrode

CO-5. Measure the absorbance of atoms by AAS.

CO6: Measurement of emission of atomic species

CH 507 Organic Chemistry-I

CO1: Able to Define and classify polynuclear and hetreonuclear aromatic hydrocarbons

CO2: To Write the structure, synthesis of polynuclear and hetreonuclear aromatic hydrocarbons

CO3: Understand the reactions and mechanisms

CO4: To know meaning of active methylene group

CO5: To know synthetic applications ethyl acetoacetate and malonic ester

CH 508 Chemistry of Biomolecules

CO1: Students will understand the difference between plant, animal and bacterial cell, biological composition of cell membrane and concept of biomolecules.

CO2: Students will understand the types of carbohydrates and their biological significance in living organisms.

CO3: To know types of lipids, their structure and properties.

CO4: Students will be able to understand the structure and types of amino acids, formation of peptide bond, types of proteins and its structure .

CO5: To know classes of enzyme, enzyme kinetic equation and significance of enzyme catalysis.

CO6: To understand the biochemical nature of hormones and its mechanism.

CH 510 Introduction of Medicinal Chemistry

CO1: The basics of medicinal chemistry, biophysical properties, overview of basic concepts of traditional systems of medicine.

CO2: Overview of the overall process of drug discovery, and the role played by medicinal chemistry in this process.

CO3:Biological activity parameters and importance of stereochemistry of drugs and receptors.

CO4:Knowledge of mechanism of action of drugs belonging to the classes of infectious and non-infectious diseases.

CO5:Enhancement of practical skills in synthesis, purification and analysis.

CH 511 Environmental Chemistry

CO1: To know the importance and conservation of the environment.

CO2: Students will know water resources, hydrological cycle and water pollutants.

CO3: To understand the water quality parameters and monitoring techniques and methodology of water pollution.

CO4: Students will be able to know wastewater treatment and trace elements in water.

T.Y.B.Sc. (Chemistry) Sem-II

CH 601 Physical Chemistry II

CO1: Students will understand the electromotive force of electrochemical cell and EMF measurement. Understand the construction and working of primary and secondary reference electrodes. Students can explain applications of emf measurement and types of potentiometric titration.

CO2:Students can explain laws of crystallography, types of crystal system and methods of crystal structure analysis.

CO3: To know the types and properties of radiations, concept of radioactivity, its detection and measurement techniques. Calculation of half life period, binding energy and decay constant of radioactive elements.

CH 602 Physical Chemistry III

CO1: Meaning of the terms-Solution, electrolytes, nonelectrolytes and colligative properties. To determine molecular weight of nonelectrolyte and abnormal molecular weight.

CO2: Students will learn Solid state reactions and their different rate laws .

CO2: To know Cohesive energy in ionic crystals and metals, Phenomenon of photoconductivity

CO3: Polymer, its classification, bonding and molecular weight

CH 604 Inorganic Chemistry II

CO1: To know organometallic compounds, its structure and bonding using valence electron count rule and their applications in catalysis.

CO2: To understand the concept of catalysis, homogeneous and heterogeneous catalysis reactions and mechanism.

CO3: To know the biological role of inorganic ions and compounds, its abundance in the living system and role of metals in enzymatic processes.

CO4: To know inorganic polymers, their structure and uses.

CO5: Students can explain methods of preparation of inorganic solids, liquid crystals and synthesis of Ionic liquids, its properties and applications.

CH 605 Inorganic Chemistry III

CO1: Student will learn the concept of acid base and their theories

CO2:Know the nature of solids, crystal structures of solids and able to draw simple cubic, BCC and FCC structures

CO3: Different Zeolite Framework Types and their classification and applications

CO4:Various methods of nanoparticle synthesis, its properties and application

CO5: To know toxic chemicals in the environment.

CH607: Organic Chemistry-II

CO1: To learn the principle of mass spectroscopy, its instrumentation and nature of mass spectrum

CO2: To understand the principle of UV spectroscopy and the nature of UV spectrum. They will learn types of electronic excitations

CO3: To able to calculate maximum wavelength for any conjugated system

CO4: To understand the principle of IR spectroscopy, types of vibrations and the nature of IR spectrum

CO5: To 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

CH608: Organic Chemistry-III

CO1: To able to explain reactive intermediates (carbocations, carbanions, free radicals, carbenes, nitrenes, benzynes etc

CO2: To able to explain rearrangement reactions where bond breaks and new bond forms

CO3: To know various oxidizing and reducing reagents

CO4: To know the applications of various common reagents in functional group interconversion

CO5: To know extraction and structural determination of natural products

CH 610B: Introduction to Forensic Chemistry

CO1: To know the principles, functions of forensic science and significance to human society. To understand the work nature in the forensic science laboratory.

CO2: Define narcotics drugs and psychotropic substances. To know the classification and characteristics of the narcotics, drugs and psychotropic substances.

CO3: To understand the isolation techniques for purifying narcotics drugs and psychotropic substances and its testing.

CH 611A Analytical Chemistry-II

CO1: Define basic terms in solvent extraction, basics of chromatography, HPLC, GC, and AAS and AES.

CO2: Identify important parameters in analytical processes or estimations. Example: minimum analyze concentration in particular method, reagent concentration for particular analysis

CO3: Explain different principles involved in the analyses using solvent extraction, basics of instrumental chromatography, HPLC, GC, and atomic spectroscopic techniques.

CO4: Perform quantitative calculations depending upon equations students have studied in the theory.

CO5: What is the different electrophoresis technique.

CO6: Select a particular method of analysis if an analyze sample is given to him.