GEOLOGY

Program's offered

Sr.no.	Program	Program objectives	Program specific objectives
1.	B.Sc. GEOLOGY	• This educational program is to equip students with the fundamental knowledge of the diverse field of Geology. • It has engaged a diverse spectrum of the geosciences academic and employer community in a comprehensive review of the skills, competencies, and conceptual understandings needed in geoscience undergraduate programs, the best methods of producing these learning outcomes, and how to best broaden, recruit and retain undergraduate geoscience students, especially underrepresented groups. • The medium of explanation way is English. English being the language of world students become habitual to communicate in English using subject Geology. • By using this syllabus students make inferences about Earth systems from observations of the natural world. • Have strong field skills and Be able to collect, illustrate, and analyze spatial data. • All Geology courses have developed sets of learning objectives that are intended to provide our students with the skill sets. • Student success in courses is gauged via traditional methods of examinations, homework and laboratory- and field-based projects. • In this program student can know about geologic time scale and place important geologic events in a temporal framework. • Explain how and why the Earth has changed over time • Identify and interpret common fossils, rock-forming minerals and rock-forming processes. • Interpret environments of deposition of sedimentary rocks • Describe large-scale internal Earth processes and the features produced by them. • Describe and interpret types of surficial deposits and landforms	• To make students improve self by solve problems, especially those requiring spatial and temporal interpretation. • Have strong field skills for managing and analysing multi-component Field specimen and habitat to sea economic important material. • Students successfully will meet the requirements of secondary student teaching and for the professional seminar that accompanies this experience.

Sr.no.	Program	Program objectives	Program specific objectives
		- Understand natural hazards and climate change, their causes and their mitigation. - Understand the formation and distribution of geological natural resources as well as issues surrounding their utilization - Interpret topographic maps and terrain models and create profiles - Use compasses, survey instruments, and images in geological investigations - Communicate observations and interpretations in oral and written formats. - Apply principles of mathematics, chemistry, and physics to geologic problems - Program curriculum has been designed such a way that its improve curiosity and problem solving approach which makes them self-directed and learning becomes a continuous process through the life. - In addition, it is critical that students learn to think like a scientist and to apply the scientific method in their coursework and in their lives.	

Program	Program objectives	Program specific objectives
B.Sc. Sem-I	CC GEO-101 General and Physical Geology, Mineralogy	• This course provides a study of the structure and composition of the earth's crust. • Students should be able to explain the structure, composition, and formation of the earth's crust. • Minerals are essential to various needs within human society, such as minerals used as ores for essential components of metal products used in various commodities and machinery.
	PC GEO-101 PR Mineralogy Lab	• Minerals are also used in fertilizers to enrich the growth of agricultural crops.
B. Sc. Sem-II	CC GEO-201 Physical Geology, Mineralogy and Petrology	• This course provides a study related to earth's geomorphology with distinct features of earth surface. • The study of the Rocks and minerals in the microscope for the batter identification. • The study related to genesis, properties, emplacement crystallisation and composition of magma.
	PC GEO-201 PR Optical Mineralogy, Crystallography and Petrology Lab	• Identification different optical properties in the mineral or Rock section by using microscope. • To identify definite atomic structure and definite chemical composition in the mineral specimen. • Megascopic identification of typical rocks.
B. Sc. Sem-III	CC GEO-301 General & Physical Geology, Stratigraphy, Palaeontology and Economic Geology	• This concept is related to the tectonics of earth's major plates. • Stratigraphy used to identify order of superposition from encient to present. • Theories of on origin of life, organic evolution, occurrence and mode of preservation of fossils.
	CC GEO-302 PR Optical Mineralogy, Crystallography, Petrology, Economic Geology.	• Study of the different crystal system related to arrangement of different atomic structure of minerals. • Mode of occurrence and structure of different rocks. • Study of the economically important minerals and Ores.
	PC GEO-301 PR Mineralogy, Crystallography, Petrology, Structural Geology Lab	• Microscopic and Megascopically identification of minerals. • Study of typical crystal models belonging to varies crystal system.
	PC GEO-302 PR Structural Geology lab	• Construction of topographic profile, Geological cross section of Horizontal beds.
B. Sc. Sem-IV	CC GEO-401 Dynamics of the Earth, Stratigraphy, Physiography of India, Structural and Economic Geology.	• Dynamics of the earth- topic oriented to atmospheric circulation, weather and global climatic change of the earth. • Physiographic and structural sub-divisions of India and their characteristics.
	CC GEO-402 Physical Geology, Soil,	• Study of classification, composition, texture, fertility and chief types of soil profiles.

Program	Program objectives	Program specific objectives
	Chemical Mineralogy, Crystallography, Geomorphology, Engineering Geology, Stratigraphy, Palaeontology	- Structural and atomic properties of elements. - Radioactive decay schemes and their application to Geochronology and petrogenesis. - To identify strength, SPT n value, Grain size analysis and specific gravity of Soil.
	PC GEO-401 PR Crystallography, Petrology, Structural Geology and Palaeontology Lab	- Microscopic identification of the rocks. - Study of the forms and indices of crystals. - Typical fossils specimen showing mode of fossilisation and petrification of the wood.
	PC GEO-402 PR Structural Geology Lab	- Construction of Geological cross section of inclined bed with intrusions. - By using different counter elevation with varies thickness of the bed which give idea of order of superposition of bed.
B.Sc. Sem-V	CC GEO-501 Mineralogy; Crystallography.	- In this, Study about the silicate structure and study of chief mineral families. - Detail study of optical properties-Extinction, Interference colours, Order of interference colours – their controlling factors. - To illustrate the different types of crystal structure formed by inorganic oxides.
	CC GEO-502 Petrology– Igneous and Metamorphic	- Details of Crystallisation of Unicomponent and bicomponent magma with influencing factors and appropriate examples. - Phase equilibrium in two and three component silicate system. - Metamorphic structures and Textures. Classification of metamorphic rocks. - Outlines of zones, facies and phase diagrams of metamorphism.
	CC GEO-503 Structural Geology; Sedimentary Petrology.	- Causes, Mechanism, Classification and types of different Geological structure. - Sedimentary structures. - Concept of sedimentary facies.
	CC GEO-504 General & Standard Stratigraphy; Geology of Peninsular India.	- Analyse about Geological Time, Geological eras and their sub-divisions. - Emphasis to be given on Paleogeography and life forms of the time. - Detail study of Post Archean formations of Peninsular India.
	CSE GEO-505 Fundamentals of Hydrogeology	- To understand Classification of aquifers. Darcy's law and its validity. - Concept of water shed management. - Elementary knowledge of use of Aerial photographs and remote sensing techniques in hydrogeology.
	PC GEO-501 PR Megascopic and	Acquire technical and manipulative skills in using laboratory equipment, tools and materials.

Program	Program objectives	Program specific objectives
	Microscopic Minerals	• Megascopic study of metallic and non-metallic minerals representing important mineral families.
	PC GEO-502 PR Crystallography; crystal projections.	• Study of crystal models representing four types with diagrams. • Clinographic projections of simple crystals of different crystal systems. • Representation of elements of symmetry of four types of symmetry with stereographic projections.
	PC GEO-503 PR Structural–Maps (with Unconformity, Overlap and Fault)	• Section and description of geological maps with various structural features.
	PC GEO-504 PR Simple Geometrical exercise, simple Out Crop Filling Problems.	• Outcrop problems with one series of strata with inlier, outlier. • Graphic solutions of structural problems.
B. Sc. SEM-VI	CC GEO-601 Economic Geology.	• Historical development of economic geology. • Various aspects of mineral exploitation and classification of mineral deposit. • Processes of mineral formations with examples from India and world. • Study of different economically important minerals with reference to India. • Terminology of Mines, Types of mining methods and Prospecting for economic minerals.
	CC GEO-602 Geology of Extra Peninsular India.	• Detail Study of Archaeans, Proterozoic and Paleozoic formations of Extra Peninsular India. • Geology of Gujarat and associated mineral wealth. • History of Geology of India, Major thrust Area of research. • Understand the concept of important stratigraphic sections of different formations in India. • Demonstrate and understanding of Type areas of important formations.
	CC GEO-603 Palaeontology.	• Concept to build the complete stratigraphic and organic formation in the world from Pre-Cambrian to recent. • Concepts of natural ecosystems on the earth and their mutual interrelations and interactions. • Taxonomic categories and codes of systematic nomenclature. • Outlines of palaeobotony and paleoecology.
	CC GEO-604 Applied Geology.	• Methods of geological and geophysical prospecting and their applications. • Demonstrate and deeper understanding of geological mapping and report writing.
	CSE GEO-605 Engineering Geology	• Detail study of Geotechnical properties of rocks and rock masses. • Geotechnical problems related to dam and tunnel constructions.

Program	Program objectives	Program specific objectives
	PC GEO-601 PR Optics; Mega / Micro Rocks	• Megascopic and Microscopic identification of the various rock specimen. • To understand Uniaxial and Biaxial interference figures and Optic sign determination by using petrological microscope.
	PC GEO-602 PR Palaeontology	• Study of invertebrate and plant fossil specimen representing important phyla belonging to different geological eras - with diagrams.
	PC GEO-603 PR Structural – Maps (with Folding)	• Identification of thin Section by using microscope to differentiate like minerals. • Students able to design and draw description of geological maps with structural features. • Out crop problems with one series of strata with inlier, outlier.
	PC GEO-604 PR 3-Point problems, Outcrop Filling problems with fault, Aerial Photo interpretation.	• Graphic solutions of 3–POINT structural problems. Aerial Photo interpretation.

Botany

Program's offered

Sr.no.	Program	Program objectives	Program specific objectives
1	**B.Sc. Botany**	The syllabus made for the betterment of the students; enhance the ability and thinking power. Communication: the complete medium of program is in Gujarati so students will communicate easily. Because of continuous field visits in the interior regions students interact with the social activities for their study. Being the botany students have to communicate with many people The Botany subject teaches students about the moral responsibility, not to cut the plants. With the help of botany subject we can understand how to conserve the environment. Each and every aspect of the module teaches lifelong learning.	Bot.1. To Provide through knowledge about various plant groups from primitive to highly evolved. Bot.2. To make the students aware of application of different plants in various industries. Bot.3. To highlight the potential of these studies to become an entrepreneur. To equipped the students with skills related to laboratory as well as field based studies. Bot.4To makes the students aware about conservation and sustainable use of plant. Bot.5.To creates foundation for further studies in Botany. To address the socio-economical challenges related to plant science Bot.6.To facilitates students for taking up and shaping a successful career in Botany.

Program offered –Post graduate Botany

Sr.no	Program	Program objectives	Program specific objectives
1	**M.Sc. Botany**	Critical thinking is to regulate and conduct acquaintance regarding basic plant biology and fetch supremacy in the biological science. The complete medium of program in English hence students will able to communicate with each other easily and face the competitive national activities. Establish the interactive program of socio-economical development through adopt latest activities by students in respective field. To give the basic and applied knowledge related with botany to the undergraduates students. Being the botanist students teach the ethical approach that save the plants and environment. Conservation of plants and environment practices studied to the botany students for sustainable development. Teach the botany students with aspect of latest module which help them lifelong learning.	To develop the botany department with modern educational technologies and knowledgeable training center. To give the basic and practical knowledge to the students with scientific skills in the respective field. To train the students for taking up and shaping a successful career in their respective field. Anticipation of new teaching techniques and new researchable areas. Aware the botany students about global threats and opportunities.

Courses offered- Under graduate Botany (B.Sc. Botany)

Sr.no.	Class	Course	Course outcome
1	B.Sc. Botany sem. 1	111:Cell Biology-Cytology Biology of cryptogams (Algae and fungi) plant Anatomy Environment Biology ES-111: Horticulture **Practical Work**	➢ To provide the knowledge about cell structure and ultra-structure prokaryotes & Eukaryotic cell. ➢ To provide the knowledge about economic importance of algae and fungi. ➢ Internal structure will be observed for further studies as well as to study the developmental pattern of plant. ➢ To study about various type of factor like light and temperature and its effect on distribution of plant. ➢ To study about the various techniques like cutting, Budding, Layering, Grafting in Horticulture. ➢ Students to train about how to prepared slide of the algae and fungi. ➢ To students learn about how to use Microscope. ➢ Students learn about how to prepare slides of different tissues of plant.
2	B.Sc. Botany sem. II	122: Genetics Biology of Cryptogams (Bryophytes and Pteridophyte) Morphology of Angiosperm Plants and human welfare ES 44: Human disease and control	➢ Analyze the evolution with genetical characteristics for future aspects. ➢ To provide knowledge about various primitive plants group. ➢ To study about phyllotaxy, leaf venation, and pinnate incision. ➢ To study about economic uses of plants. ➢ To study about which type of disease we have faced and how we can control them.

Sr.no.	Class	Course	Course outcome
		Practical work	➢ To students train about how to take the section of any plant part. ➢ Students aware about Cryptogams & Angiosperms plants and learn about their morphological characters. ➢ To students learn about sustainable use of plants.
3	B.Sc. Botany sem. III	211:Morphology Gymnosperm and Paleobotany Taxonomy of Angiosperm Cell Biology 212:Plant physiology Plant Ecology Genetics Es-213: Plant Biodiversity **Practical work**	➢ To study about Bracts and different kind of inflorenences in plants. ➢ To provide through knowledge about various highly evolved plant groups ➢ .To study the different metabolic process for synthesis of food material ➢ To provide knowledge about sustainable use of plants ➢ .To study about different kinds of animals and plants. ➢ To study about the physical form and external structure of plant. ➢ To study about cell structure and function. ➢ To study about different types of morphological characters of plants. ➢ To make the students aware about Gymnosperms and Paleobotany. ➢ To study the different metabolic process of plants like Osmosis, Imbibitions, Adsorption etc.
4	B.Sc. Botany sem. IV	221: Morphology and Angiosperm Angiosperm families Plant Anatomy	➢ To study about classification of fruits and reproduction in angiosperm ➢ To study about internal structure of plant

Sr.no.	Class	Course	Course outcome
		222:Angiosperm Embryology Bio-Chemistry Plant Physiology **Practical work**	➢ .To study about different types of carbohydrates, lipids amino acids and proteins ➢ To study about water absorption in plants, respiration and transpiration process in plants. ➢ To provide knowledge through the classification of highly evolved plant groups & also learn about the internal structure of plants. ➢ To study the developmental pattern of plant. ➢ To study the different metabolic activity of plants.
5	B.Sc. Botany sem. V	311:Algae Fungi Plant Pathology 312:Bryophyta Pteridophytes Gymnosperms 313:Angiosperm Families Plant Ecology Plant Anatomy 314:Cell Biology & Genetics Microbiology (bacteriology) Biostatistics ES- BOT-313: Air pollution **Practical work**	➢ Interpret the performance characteristics & life cycle of various lower plants like algae and fungi. ➢ To study about different types of pathogens in plants. ➢ To provide through knowledge about life cycle of various lower plant. ➢ Biostatistics are the application of statistics to a wide range of topics in biology and its used in analysis of data from any experiment. ➢ To study about micro living organisms like bacteria and their cell structure. ➢ To study about the harmful effect of the air pollution, it may also cause disease, allergies and even death to humans and to study about how we can prevent the air pollution. ➢ To provide knowledge through identification, cell structure, reproductive structure of different plants groups.

Sr.no.	Class	Course	Course outcome
			➢ To learn about different Angiospermic plants and their identification through the field work as well as laboratory work. ➢ To study the different internal structure of plants by taking their sections. ➢ To make the students aware about some laboratory equipments and learns different staining techniques. ➢ With the chemical tests to learn about different ecological
6	B.Sc. Botany sem.VI	321:Molecular Biology Plant Pathology & Lichens Angiosperm Families 322: Biochemistry Plant Physiology-1 Plant Physiology-2 323: Economic Botany Plant Tissue Culture & Biotechnology Genetics & Plant Ecology 324:Plant Anatomy Plant Breeding-1 Plant Breeding-2 ES-BOT-302: Fresh water ecology **Practical work**	➢ To study about a branch of biology that concerns the molecular basis of biological activity between biomolecules in the various system of the cell. ➢ To the study about chemical processes within and relating to living organisms. ➢ To study about the relationship between people and plants. ➢ Evaluate the performance of multiplication technique and seed storage technique. ➢ To study about the collection techniques used to maintain or grow plant cell, tissues or organs under sterile conditions on a nutrient culture medium. ➢ To study about relationship between freshwater organisms and their environment. This includes the study of streams, rivers, ponds, lakes, reservoirs and some wetlands. Freshwater ecosystems provide us with may valuable services. ➢ To learn about highly evolved plant group by classification.

Sr.no.	Class	Course	Course outcome
			➢ To study about the different molecular structure of cell.
			➢ To make students aware about lichens through charts and specimen.
			➢ To study the different metabolic process in plants.
			➢ To make students aware about economic use of plants & learn about different techniques in biotechnology.
			➢ To make students aware about different techniques of breeding & learn about different internal structure of plants.

Courses offered – Post graduate Botany (M.Sc. Botany)

Sr.no.	Class	Courses	Course outcome
1	**M.Sc. sem. I**	401:Bacteriology,Phycology, Mycology and Plant Pathology 402:Bryophytes, Pteridophyte, Gymnosperm and fossils 403: Cell Biology and Genetics EBO- 401: Biodiversity	➢ To provide through knowledge about various primitive plant group and its life cycle. ➢ Evaluate the performance of various line of evolution with respect to live and fossil forms. ➢ To study about genes, genetic variation and heredity in living organism ➢ To study about cell structure and function and revolves around the concept that the cell is the fundamental unit of life ➢ To understand the tissues and organisms that cells compose. ➢ To make aware the students about conservation. To study about genetic diversity, Species diversity, and Ecosystem diversity. ➢ To study about role of Biotechnology in Biodiversity conservation.
		Practical work	➢ To make students aware through knowledge of identification, classification, cell structure and reproductive structure lower plant group. ➢ Advanced experimental studies related with above subject.

Sr.no.	Class	Courses	Course outcome
2.	M.Sc. sem. II	404: Angiosperm Taxonomy and Plant reproduction 405: Plant Anatomy and Ecology 406: Biophysics, Instrumentation and Biochemistry EBO-405: Plant tissue Culture **Practical Work**	➢ Plant taxonomy is the science that finds, identifies, describes classifies and plant names. ➢ To study about internal structure of plant. Plant anatomy is investigated at the cellular level and often involves the sectioning of tissues and microscopy. ➢ To study about sexual and asexual reproduction in plants. ➢ Biophysics is an interdisciplinary science that applies approaches and methods used in physics to study biological phenomena. ➢ To study about photometry, Colorimetry and spectrophotometer and their applications. ➢ Plant tissue culture now has been direct commercial applications well as value in basic research in to cell biology, genetics and biochemistry. ➢ Micropropagation using meristem and shoot culture to produce large number of individual. ➢ Students are expected to learn about the history of the plants classification and identification based on different characters. ➢ Students learn about biomolecules by experimental methods. And more specialized and selected subjects.

Sr.no.	Class	Courses	Course outcome
3	M.Sc. sem. III	501: Plant Physiology 502:Plant Resource utilization, conservation and Biometry 503: Molecular Biology and Biotechnology EBO-502: Air pollution and climate change **Practical work**	➢ To the study about photosynthesis, respiration, plant nutrition, plant hormones and photoperiodism in plant physiology ➢ To make the students aware about conservation and sustainable use of plant. ➢ Biometry is the statistical analysis of biological observation and phenomena. ➢ To study the techniques of multiplication and Nano techniques. ➢ To make aware the students about Air pollution and its harmful effects and how to control it. ➢ Students learn about biomolecules by experimental methods. And design the appropriate experiments for advanced studies. ➢ To make students aware about conservation and sustainable use of plants. ➢ Advanced experimental studies related with above subjects.
4	M.Sc. sem. IV	504: Plant breeding and Horticulture 505:Mycorrhizae, Mushrooms, Ethnobotany and Plant Geography	➢ Plant breeding is the science of changing the traits of plants in order to produce desired characteristics. It has been used to improve the quality of nutrition in products for humans and animals.

Sr.no.	Class	Courses	Course outcome
		Practical work	➢ To study about anatomical and physiological aspects of rooting of cuttings, Grafting, Budding, Layering techniques in horticulture.
			➢ Enthnobotany is the systematic study of the relationship between plants and people.
			➢ To study about geographic distribution of plant species and their influence on earth's surface.
			➢ To students learn about different techniques of breeding and Horticulture.
		Project, Review writing	➢ To aware about knowledge through cultivation and industrial use of mushrooms.
			➢ Research methodology for future entry in research discipline.

Chemistry

Programme's offered

Sr.no.	Program	Program objectives	Program specific objectives
1	B Sc. Chemistry	The curriculum is created such path that students should acquire and able to learn accurately and objectively. They should be able to solve the problems and also think scientifically, independently and draw rational conclusions. In this course students are made aware of environment related issues. They are made aware of optimal use of fertilizers, water, fuels and drugs. Being Chemistry students they become well conversant with various pollutants their sources and their impact on bio-system. So they become well versed.	To provide the basic principles of all branches of chemistry knowledge of chemical principles and make them independent for the effective application of it. To make the students self sufficient in understanding and handling the various issues that may arise related to chemistry. Learn to start point to high industry level knowledge.

Courses offered – Under graduate Chemistry

Sr. No	Class	Course	Course Outcomes
1	B.Sc. Chemistry SEM-1	CORE CODE -101	❖ States of metter , surface chemistry, thermodynamics & structureof atom, V.S.E.P.R theory. M.O theory, periodic properties of elements.
2	B.Sc. Chemistry SEM-2	CORE CODE -201	❖ Coordination compounds, numerical of complex, atomic theory factors, stereo chemistry, geometrically isomers, symmetry, molecule chirality, chemical kinetic, order of reactions, rate of reactions, kinetic energy, acid-base titration, redox titrations.
3	B.Sc. Chemistry SEM-3	CORE CODE -301	❖ Wave mechanism, black body radiation, quantum theory, photo electric effect, acid-base properties, thermodynamics, phase equilibrium, particle polar properties, variations of chemical potentials with temperature and pressure, instrumental volumetric analysis and non-instrumental analysis.
		CORE CODE -302	❖ Nobel gases their occurrence, isolations of non-radioactive of noble gases. electronic configuration of noble gases and basic principles. non real compounds prepared by different methods . amino acids properties and nomenclature .dipolar ions structures and Iso electric points for knowledge about electricity and electivity, synthesis of amino acids and theirs reactions. peptides in geometry, synthesis of peptides, ❖ effects of substitutions groups, determine of oriental, classification of other groups and substitute benzenes., synthesis and mechanism of nitrogen, Sulphonation, Fridal-kraft alkylation's and halogenations , valance theory of liquid their scale pressure and surface tension and a pectin's .viscosity and measurement of viscosity by Oswald-viscometer, reflective index by Abbes refractor meter.
4	B.Sc. Chemistry SEM-4	CORE CODE -401	❖ Application of C.F.T, C.F.S.E value and limitations of C.F.T. ❖ magnetic properties of co-ordination compounds and types magnetics of behaviors. ❖ method of determining magnetic susceptibility and their spin only formula about exact principal of compound. heterocyclic compound introduction their nomenclature and molecular orbitals picture and aromatic characteristics of parole, furan, thiophene and pyridine. Basify of parole, pyridine and peridine, carbohydrates classifications and their uses, glucose and

Sr. No	Class	Course	Course Outcomes
			fructose other saccharine, acetylating , oxidations, methylations etc.. , type of titrations like acid-base 1.strong acid & strong base 2.strong acid & weak base 3.weak acid & strong base 4. weak acid & weak base
3		CORE CODE -402	❖ Boron hydrides , hydrides and preparations , bonding like bridge in B2H6 and M.O Sp3 approach., Boron higher structure are B4H10, B5H11, B6H10, ❖ Woodward-fisher rules in spectroscopy, using of empirical rules for problems of conjugate, enounces and aromatic ketene, Aldehyde, acids and esters. Oxidations, reductions, red-ox, anodes, cathodes, electrode, half-cell, oxidation& reduction potentials Nernst equations of cell EMF and single electrode potentials for the describe other electrode like calomel, Weston, glass, standard, metal-metal electrode.
5	B.Sc. Chemistry SEM-5	CORE CODE -501 INORGANIC CHEMISTRY	❖ Reaction mechanism of coordination compounds, substitution reaction , square planner complexes reactions like platinum-2 complexes , the effects of trance theories use of synthesis in trans effects analysis , more electron transfer reaction mechanism of redox reaction ,mechanism of substitutions in square planner complexes 'oregano metallic compounds classifications nomenclature, structure and bonding in diatom metal olefins complexes, organ metallic compound of LI & AL complexes.
		CORE CODE -502 ORGANIC CHEMISTRY	❖ stereochemistry , analysis of mono and die substituted cyclone hexanes and molecular asymmetry as illustrated by alkenes and d biphenyl, aldo xime isomerism, ketoxime, glucose & maltose determination their structure and introduction of saccharides and disaccharides, isoprenoids general methods of separations, nucleophilic substitution at saturated carbon atoms their reactions, carbon sites, relative group activity, neighboring group participation and competitive reactions more elimination E1, E2, E1cb mechanisms.
		CORE CODE -503 PHYSICAL CHEMISTRY	❖ pH metry, Conductometry, Potentiometer, Colorimetric, Spectrophotometer, Refractometry and G. M. Counter. electro motive force, chemical cells, electrolyte concentrate, liquid-liquid junction potentials, degree of hydrolysis of salts .

Sr. No	Class	Course	Course Outcomes
			❖ statically thermodynamics useful equations learning for different state information learn. thermodynamics are macromolecules rules also classified polymers and mechanism of polymerizations. ❖ viscosity, light scattering, more determination of molar masses of macro molecule, numerical.
		CORE CODE-504 ANALYTICAL CHEMISTRY	❖ technique of separation, identification of purification using chromatographic techniques like TLC, GC, HPLC, electrophoresis etc., good analytical of Quality control chemist in various field. titration, spectroscopy, and symmetry of molecules operations and their point groups.
		CORE CODE-505 ELECTIVE	❖ dyes like azo, Congo etc.. ❖ Their synthesis uses of eosin, alizarin, rosanilin, sefronine-t,. oils & fats refineries classifications, their processing of making, qualitative solubility , properties and more.. ❖ Analysis of oils, fats & waxes their value, acid value iodine value-wijs methods and Richard messy value. Mostuseto learning the dry process, hydrogenation of oils
		CORE CODE-507 LABORATORY COURSE	❖ Alloys and Synthesis by convention methods. Qualitative analysis about mixture separations soluble & insoluble in water compounds also liquid compound must be natural in nature. Students to learn about all physical practical, pH meter, conduct meter and more instruments to used. ❖ part of kinetic & distributions to find out order of reactions between solutions. also determine to between solutions their reading different temperatures.
6	B.Sc. Chemistry SEM-6	CORE CODE-601 INORGANIC CHEMISTRY	❖ valiancy, variations methods , secular methods, equation, stability , other treatments of oh molecules. ❖ bio-chemistry, their elements and classifications, fixation & uses. ❖ physical and chemical properties of metal carbonyl, Learn about their classifications for use for inorganic branches.
		CORE CODE-602 ORGANIC CHEMISTRY	❖ electrophilic & free radical addition reaction, effects, additions reactivity, methylene groups compounds derivatives making and learn synthesis & application of ethyl aceto acetate and malonic ester, nucleophillic aromatic substitutions to find different compounds check aromaticity, mechanism of substitutions.

Sr. No	Class	Course	Course Outcomes
		CORE CODE-603 PHYSICAL CHEMISTRY	❖ Thermodynamics laws , equations , experimental verifications and chemical reactions , more the concept of fugacity and determinations of graphical methods , photo chemistry , entropy change in chemical reactions , flash photolysis , quantum yield , photochemical reaction , primary-secondary salt effect , trautz law , numerical.
		CORE CODE-604 ANALYTICAL CHEMISTRY	❖ L s coupling , J J coupling , determination of group state term by hund's rules , hole diagram , IR spectroscopy , molecular vibration , characteristics of IR spectroscopy , sample techniques , fingerprint zone , IR spectra & H-bonding , group frequencies , types of chromatography , column chromatography , paper chromatography , ion-exchange chromatography , van-dee meter equation , HPLC principal
		CORE CODE-605 ELECTIVE	❖ Polymers, classifications and nomenclature of polymers, isomerism of polymers, chain growth polymerization, mechanism of free radical, cationic and anionic polymerization , kinetic of free radical, polymerization techniques, concept of average, molecular weight and degree of polymerization , method for determination of molecular weight , membrane osmometry, viscometry and light scattering.
		CORE CODE-607 LABORATORY COURSE	❖ estimation of Ester, amide, ascorbic acid, aspirine, preparation of organic compounds, qualitative analysis of inorganic compounds, to determine potentiometry, colourimetry, conductometry, pH meter, kinetic, adsorption & polymer study.

Program's offered – Post Graduate

Sr. no	Program	Program objectives	Program specific objectives
1	M Sc. Organic Chemistry	**CRITICAL THINKING** It is intellectually disciplined process of actively and skilfully conceptualizing, applying, analyzing, synthesizing or evaluating information gathered from or generated by observations, experience, reflection, reasoning or communication as a guide to belief and action. The students of chemistry are progressively trained along these lines. **EFFECTIVE COMMUNICATION** It is two ways information sharing process which involves successfully delivering the intended message well receives by other party. Thus the students can deliver their knowledge of chemistry to the society using English or relevant language. **ETHICS** It includes practice of moral principles that govern the person's behavior or the conducting an activity. During the teaching of this course properties of various chemicals (old and newly synthesized) are discussed and also their beneficial and/or adverse effects on the human race/living world are also discussed. **ENVIRNMENT AND SUSTAINABILITY** It is state in which the demands placed in environment can be made without reducing its capacity to all the people to leave well now in future. In post graduate teaching a special course entitled Green Chemistry which especially stresses these issues considering the environmentally friendly processes and products is discussed with the students. **SELF DIRECTED AND LIFE LONG LEARNING** Program curriculum inculcates the curiosity, critical thinking and problem solving approach so as to reach the rational conclusions among the students making them self-directed and thus learning becomes a continuous process throughout their life.	To develop the post graduate department on the modern lines of education and training levels. 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. To trained students and make them eligible for accessing integrated multidimensional fields. Anticipation of new/upcoming areas in academics as well as in technology.

Courses offered –Post graduate Chemistry

Sr. No	Class	Course	Course Outcomes
1	M.Sc. Organic Chemistry Semester- I	CHN-401 Inorganic Chemistry	❖ stereochemistry & bonding in main group compounds, VSEPR, Walsh diagram , bent rule, energetic of hybridization , simple reactions, metal legends equilibrium in solution, reaction mechanism of transition metal complexes, metal legends bonding.
		CHN-402 organic Chemistry	❖ Nature of bonding in organic molecules, bonding-conjugation , cross conjugation , resonance, hyper conjugation, bonding in flurerenes tautomerism, stereochemistry, reactions mechanism , structure and reactivity, isotopic effects, hard & soft acids and bases, classical-nonclassical carbocation's, norbrnyl system, common carbocation, effects of structure on reactivity, free energy relationship, substituent and reaction constants, Taft equation.
		CHN-403 Physical Chemistry	❖ Quantum chemistry, Schrodinger equation, quantum mechanism, the harmonic oscillator, the rigid rotor, the hydrogen atom, angular momentum, ordinary angular momentum, generalized angular momentum, eigenvalues of angular momentum Pauli exclusion principle, electronic structure of atom and molecular orbital theory, thermodynamics, partical molar properties, debye-huckel theory, ionic strength, application of phase rule, second order phase transitions, application partition functions, transitional, rotational, vibrational, electronic partition functions., non-equilibrium thermodynamics, non-equilibrium stationary states, phenomenological equations.
		CHN-404-A Group theory , spectroscopy and Diffraction Methods	❖ Symmetry and group theory in chemistry, symmetry elements, operations , sub-group, relation between order of a finite group , use of spectroscopy, unifying principles, electromagnetic radiation , interaction of electromagnetic radiation with matter-adsorption , emission, electric energy levels, x-ray diffraction , Bragg condition, miller indices, laue methods, debye-scherrer method of x-ray structural analysis of crystals, index reactions, moss Bauer spectroscopy , applications.

Sr. No	Class	Course	Course Outcomes
		CHN-404-B Mathematics for Chemists	❖ Vectors and matrix algebra, addition, multiplications, cross and triple products etc. ❖ Matrix eigenvalues and eigenvectors, diagonalization, differential calculus, integral calculus, basic rules for integration, application of integral calculus. ❖ Elementary differential equations, permutation and probability.
		CHN-404-C Biology for Chemist	❖ Cell structure and functions ❖ Carbohydrates ❖ A lipids ❖ Peptides and proteins ❖ A amino acid ❖ Nucleic acids
		CHN-405- Laboratory Course	❖ Preparations of inorganic chemistry ❖ Qualitative analysis (a mixture containing total six radicals) ❖ Chromatography ❖ Qualitative analysis of organic chemistry (mixture of 3 compounds) ❖ Organic synthesis ❖ Physical chemistry practical ❖ Error analysis and statical data analysis ❖ Phase Equilibrium
2	M.Sc. Organic Chemistry Semester- 2	CHN-501 Inorganic Chemistry	❖ Electronic spectra and magnetic properties of transition metal complexes ❖ Metal π-complexes ❖ Metal clusters ❖ A isopoly and heteropoly acids and salts ❖ Sigma bonded oregano metallic compounds of transition metals classification synthesis structure, properties and applications.
		CHN-502 Organic Chemistry	❖ Free radical reactions , the effects of solvents on reactivity ❖ Allelic halogenation, oxidation of aldehyde to carboxylic acids ❖ Addition to carbon-hetero multiple bonds ❖ Per cyclic reactions ❖ Sigma tropic rearrangements ❖ Elimination reactions ❖ Mechanism and orientation in pyro lytic elimination.
		CHN-503 Physical Chemistry	❖ Chemical dynamics, steric factors , activated complexes, kinetic salt effects , flash photolysis and the nuclear magnetic resonance method. ❖ Surface chemistry ❖ Adsorption ❖ Macromolecules ❖ Electrochemistry-1 ❖ Electrochemistry-2

Sr. No	Class	Course	Course Outcomes
		CHN-504-A A Spectroscopy	❖ Vibrational spectroscopy , normal coordination analysis ❖ Raman spectroscopy ❖ Microwave spectroscopy ❖ Magnetic resonance spectroscopy – 1 ❖ Magnetic resonance spectroscopy – 2 ❖ NMR studies
		CHN-504-B Computers for Chemist	❖ Introduction to computers and computing ❖ Computer programming in FORTRAN/BASIC ❖ PROGRAMMING IN CHEMISTRY ❖ Use of computer programmes
		CHN-505 Laboratory Course	❖ Qualitative analysis of inorganic chemistry ❖ Separation and determination of metal , ions ❖ Qualitative analysis of organic chemistry ❖ Organic preparation ❖ Determination of DO , COD of water sample ❖ Physical chemistry practical ❖ Adsorption and phase equilibria ❖ Partition coefficient ❖ Chemical kinetic ❖ Conductometry ❖ potentiometry ❖ polarimetry
3	M.Sc. Organic Chemistry Semester- 3	CHN-601 INOrganic chemistry	❖ natural coloring matter , classifications general method of structural determination ❖ chemistry of heemin and chlorophyll ❖ terpenoids ❖ vitamins ❖ biological importance of vitamins ❖ alkaloids ❖ chemistry of reserpine, coichicine, strychnine and narcotine
		CHN-602 Organic chemistry	❖ basic chemical data , batch versus continuous operation , design flowcharts , chemical process selective safety hazards ❖ soap & detergents ❖ vegetables oils , cotton seeds , hydrogenations ❖ pulp , pulping processes , sugar –ethanol industries base carboxyl ❖ alkylation ❖ acetylation
		CHN-603 Physical chemistry	❖ naming of organic medicinal compounds ❖ classifications of drugs ❖ drug design ❖ receptor site theory ❖ diagnostic agents ❖ antibiotics ❖ classification of synthesis and activity

Sr. No	Class	Course	Course Outcomes
			❖ sulpha drugs ❖ chemistry of sulfonamides ❖ drugs stimulating or blocking the peripheral nervous systems. ❖ local anesthetics
4	M.Sc. Organic Chemistry Semester- 4	CHN-701 inOrganic chemistry	❖ Carbohydrates ❖ Type of naturally occurring sugars, deoxy sugars , amino sugars ❖ Conformational analysis ❖ Steroids ❖ Advances in NMR
		CHN-702 Organic chemistry	❖ Synthetic industries based on petroleum ❖ Industries paint and varnish-classification of paints manufacture paints. Methods of applying paints. ❖ Explosives, propellents and toxic chemical agents , industrial polymers ❖ Selected small scale industries, safety matches, disinfectant, soap, detergents.
		CHN-703 Physical chemistry	❖ Chemotherapeutic drugs ❖ Antimalarial agents ❖ Ant tubercular and antileprotic drugs, antifungal , antiviral drugs ❖ CNS drugs OR psychopharmacological agents ❖ Antidepressant ❖ Antianxiety ❖ General anaesthetics sedatives & hypnotics ❖ Di-ureic ❖ Cardiac drugs ❖ Antidiuretic drugs ❖ Hypertensive drugs ❖ Anticancer drugs

Programme's offered –Ph.D.

Sr. no	Program	Program objectives	Program specific objectives
1	Ph.D. Chemistry	To provide an excellent and high class environment for working in frontline research areas as per the national and International standards and adding the real values to the academic, medicinal and industrial sectors of development.	It develops the sense of curiosity and courage to question the existing information and knowledge. It aims at exploring and following newer methods to improve the existing solutions to the problems. It involves exercising imagination and innovative ideas.

Physics

Sr. No.	Program	Program Objectives	Program Specific Outcomes
1	B. Sc. Physics	➢ To offer knowledge of scientific and aspects of Physics with theoretical and practical base. ➢ To explain basic principles of physics. ➢ To explain current and recent scientific and modern developments. ➢ To enrich knowledge through problem solving, hand on activities, study tools to PRL, ISRO, Science City, BARC, projects etc. ➢ To help students build-up a enlightened and successful career in Physics.	➢ At the end of the program, students will be able to have thorough knowledge of basic ideas in Physics. ➢ Students will be able to apply the principles of Physics in real life to solve the problems. ➢ Students will develop skill of doing research through undertaking small projects. ➢ Student will have set his foundation to pursue higher education in Physics. ➢ Through the study of subject elective courses the program student will be able to develop interdisciplinary approach and can pursue higher studies in other subjects as well.
2.	M. Sc. Physics	➢ To develop in depth understanding various aspects of Physics. ➢ The principles in Physics will be studied in depth. ➢ To have deeper understanding of laws of nature through the subjects like relativity, classical mechanics, quantum mechanics, electrodynamics, statistical physics etc. ➢ Ability of problem solving will be enriched. Moreover students can apply principles of physics in real life problems.	➢ After completion of PG students will have ability to select his research topic for higher study. ➢ Students will have acquired necessary understanding to appear NET /SLET/GATE Examinations. ➢ Students will have acquired necessary skills for working in research institutes. ➢ Students will have acquired necessary skills and expertise to work in industry.
3.	Ph.D. Physics	➢ After completion of P.G. in physics student can improve his knowledge in physics. ➢ In Ph.D. course student can enhance his understanding of principles of physics.	➢ During the Ph.D. the student can improve his knowledge as well as applications of physics. ➢ After completion of Ph.D. student can have batter opportunities in different scientific post at National laboratories and International Laboratories as well as academic institutions.

Courses Offered

Sr. No.	Course	Course Outcome
1	B.Sc. semester (I) (CC PHY-101)	
	- Vector Analysis - Simple Harmonic Motion and Damped Vibration - D.C. Circuits - Network Theorems - Heat and Thermodynamics - Entropy - Rectifier and filter circuits - Transistors	- To Extended study of vector, operations of vectors from three vectors to four vectors. - To learn diff. of vector valued function to use gradient, divergent, and curl. - Composition of Two simple Harmonic Motions along the same direction of the same frequency. - Explains motion in a resisting medium. - Introduces simple R-L Circuit, R-C Circuit and LCR Circuit. - Explains superposition theorem, Thevenin's Theorem, Maximum Power Theorem, etc. - Introduce and depth study of second law of thermodynamics. - Explains the Identity of perfect Gas Scale and Absolute Scale. - Understanding of change of entropy in a Reversible/Irreversible process. - Explains The half Wave rectifier , Voltage regulation , Ripple factor, etc. - Understanding of the CLC filter. - Introduces transistor current component and C-B Configuration static characteristics.
	B.Sc. semester (I) (Elective)	
	Instrumentation Measurement and analysis	- Introduces vernier calipers such as theory, figure, description of instrument, detail study of least count, errors, positive errors, etc. - Explains Micrometer Screw such as description of instruments, definition of pitch and its determination, study of least count, meaning of error and explanation of positive and negative errors, etc. - Explains Spherometer as zero error, Derivation of the formula the radius of curvature of curved surface, etc.
	B.Sc. semester (I) (PC PHY-101) (Practical)	
		In the practical course Students learns Damping Co-efficient, Relaxation and quality factor in the damped motion of a simple pendulum.

Sr. No.	Course	Course Outcome
		➢ Moment of Inertia of a fly wheel, Verification of Stefan's law using AC. Source, Arrangement of spectrometer for parallel rays using Schuster method and calibration of spectrometer. ➢ Refractive index of liquid using convex lens, Study of Resonator, Determination of the capacity 'c' of condenser, Study of the series resonance with frequency variation. ➢ P-N Junction diode as Half wave Rectifier , V-I characteristics of Zener diode and its use as voltage regulator, Verification of Thevennin's theorem, Characteristics of common Emitter Transistor.
	B.Sc. semester (II) (CC PHY-103)	
	➢ Mechanics of a single particle & of particles. ➢ Motion in a central force field & Pendulum. ➢ Refraction Through Lenses ➢ Interference ➢ Electrostatics ➢ Steady Current ➢ Waves ➢ Ultrasonic waves	➢ Introduces Motion of particle subjected to resistive force in proper way. ➢ Understanding Motion of a system with variable mass. ➢ Explains Equivalent one body problem. ➢ Introduces kapler's law of planetary motion. ➢ Introduces principal foci and Equivalent Focal length of two thin lenses separated by finite distance. ➢ Explains Interference in thin films. ➢ Introduces Refractive Index of a liquid using Newton's Rings. ➢ Introduces Millikan's Oil drop Method for Determination of Electronic charge. ➢ Explains Conservation of charge that is continuity Equation. ➢ Explains Production of ultrasonic waves and Application of Ultrasonic waves.
	B.Sc. semester (II) (ES PHY-03) (Elective)	
	➢ Electronic Circuit Elements ➢ Energy Sources	➢ Students are familiar with Resistor, Inductor, and Capacitor. ➢ Explains Cells and Battery such as Primary and Secondary cells and battery, Silver oxide cell, Mercury cell, etc. ➢ Explains Transformer, Transformer impedance, Can a Trans, Auto Transformer, etc.

Sr. No.	Course	Course Outcome
	B.Sc. semester (II) (PC: PHY -201) (Practical)	
		➢ In the Practical course students learn Bar Pendulum: Determination of 'K' and 'g', Double Refraction by Calcite prism, Melde's Experiments, Find out Refractive index of prism using spectrometer, etc. ➢ Determination of self-inductance 'L' of Inductor, study of parallel resonance with frequency variation, study of transformer, P-N junction diode as Full wave Rectifier, Bridge Rectifier, Basic Logic Gates AND, OR, NOT, etc.
2.	B. Sc. Sem III (CC:PHY-301)	
	➢ Heat and Thermodynamics ➢ Kinetic Theory of Gases ➢ Diffraction ➢ Special Theory of Relativity ➢ Crystal Structure ➢ Atomic Spectra	➢ Describe the characteristics functions, enthalpy and Helmholtz's and Gibb's function. ➢ Explains Maxwell's Equations, T-ds Equations and Thermal Expansivity. ➢ Describe Thermal Expansivity and Compressibility. ➢ Explains the Joule-Kelvin effect and Liquefaction of Gases by Joule-Kelvin effect. ➢ Describes the Maxwell's Distributions law of Velocities. ➢ Explain deduction of Maxwell-Boltzmann law . ➢ Describe the distinction between Interference and diffraction. ➢ Explain Fresnel and Fraunhoffer types of diffraction. ➢ Explain Fraunhoffer diffraction at a double slit ➢ Describe the Newtonian relativity and Michelson-Morley experiment. ➢ Explain Lorentz Transformation as well as Lorentz-Fitz Gerald length Contraction . ➢ Describe Crystalline, Amorphous Solids and Crystal Lattice. ➢ Explain Unit cell and Primitive Cell. ➢ Describe the spacing of a set of crystal planes. ➢ Explain Franck-Hertz experiment, Critical potentials and Summerfield extension of Bohr theory.

Sr. No.	Course	Course Outcome
	B. Sc. Sem III (CC:PHY-302)	
	- Electrostatics in Dielectric - Magneto statics - Transistors Biasing and Stabilization - Basic Transistor Amplifier - Solid state Devices - Fourier Series - Schrodinger Equations	- Describe the magnetic Potentials and Magnetic Vector Potential due to small current loop. - Describe the Magnetic Field vector. - Explain the Boundary Condition and Differentiable Equations to solve it. - Describe Bias Stabilization and Stabilization by Collector Base Resistance. - Explain the Stabilization by potential divider and Emitter resistor. - Describe Transistor as four pole and Grounded Emitter Circuit – Mathematical analysis using h- parameters only. - Introduction to Fourier Series in Physics. - Explain the periodic functions as sine and cosine with fundamental period F. - Introduce Fourier Co-efficient in integration form. - Describe the complex form of Fourier Series. - Introduce an Important theorems and Identity such as Perseval theorem. - Describe Curvilinear Coordinates, scale factors and basis vectors for an orthogonal systems. - Introduce A free particle in 1D, Generalization to 3D. - Describe Normalization and probability Interpretation. - Explain Non-Normalizable wave functions and Box Normalization.
	B.Sc. semester (III) (ES PHY -04) (Elective)	
	Vacuum Pumps, Pressure Guages And Instruments	- Explains Vacuum Pumps, Pressure Guages such as Exhaust Pumps and their characteristics, Rotary oil pumps, Thermocouple Guage, etc. - Students learn error of observations, types of errors, average, standard, etc. in Errors in Measurement. - Explains Optical Instruments and Electrical Instruments.
	B.Sc. semester (III) (Practical)	
	- PC:PHY-301 - PC:PHY-302	- In PC:PHY-301 students learn Coaxial Viscometer, mercury light, R.P. of telescope, Searl's Goneometer, Kundt's tube, e/k by power transistor, etc. - In PC:PHY-302 students learn Absolute value of capacity using B.G. or

Sr. No.	Course	Course Outcome
		S.G., low resistance by method of projection, Characteristics of a C.B. transistor(PNP), construction of AND, OR, NOT Gates using NAND & NOR Universal gates, etc.
	B. Sc. Sem IV (CC:PHY-401)	
	➢ Atomic Cohesion And Crystal Binding ➢ Physical Interpretation and Condition on 'ψ' ➢ Stationary States and Energy Spectra ➢ The Basic concepts of plasma. ➢ Polarization	➢ Explains Cohesion of atoms, primary bonds, the covalent bond, The Ionic bond, etc. ➢ Understanding of difference between Atomic Radi. And Lattice constants. ➢ Explains Conservation of Probability, Expectation value, etc. ➢ Define Stationary states such as The time Indeoendent Schrodinger Equation and A particle in a square well potential. ➢ Explains Resolving power of optical Instruments. ➢ Students know relation between magnifying power and resolving power of a telescope. ➢ Explains composition, characteristic of plasma and collisions, Elastic collisions, Inelastic collisions. ➢ Introduces polarization by double refraction and Huygens's explanation of double refraction.
	B. Sc. Sem IV (CC:PHY-402)	
	➢ Digital Electronics ➢ Programming in –C ➢ Detectors ➢ Modern Physics	➢ Introduces Number systems used in digital electronics. ➢ Explains Arithmetic Circuits-Exclusive – OR Gate. ➢ Introduces A.C. Bridges, Maxwell's Bridge, and Schering Bridge, etc. ➢ Explains overview of C such as History of C and Importance of C. ➢ Learn sample program and printing a message. ➢ Explains Basic structure of C programs and Programming style. ➢ Explains Detectors for Nuclear Particles and Proportional counter. ➢ Explains The Q-Equation. ➢ Explains orbital and Magnetic Dipole Moment. ➢ Explains term such as Electron spin, Vector model of atom, Paschan back effect.

Sr. No.	Course	Course Outcome
	B.Sc. semester (IV) (ES PHY-06) (Elective)	
	➢ Energy Technology	➢ Introduction that what is energy! , Energy Science and technology, mass and environment, etc. ➢ Explains Environmental aspects of energy such as pollution from use of energy, particulate Matter, etc. ➢ Explains Geothermal Energy and Wind energy.
	B.Sc. semester (IV) (Practical)	
	➢ PC:PHY-401 ➢ PC:PHY-402	➢ In PC:PHY-301 students learn Resonance pendulum. Determination of 'lo' , 'r' & 'a' , study of X-ray diffraction (Powder) Pattern, decay of Temperature when body is allowed to cool, activation energy of a semiconductor, etc. ➢ In PC:PHY-301 students learn Study of B.G.: To determine current sensitivity, volt sensitivity, figure of merit and Rg of B.G., High resistance by equal deflection method, Low resistance by Carry foster bridg, characteristic of a photodiode, etc.
	B. Sc. Sem V (CC:PHY-501)	
	➢ Mathematical Physics ➢ Classical Mechanics ➢ Quantum Mechanics	➢ Applications of Differential Equations and Second order Differential Equation. ➢ Applications of DE in Separation of Helmholtz equation in Cartesian coordinates and Laplace's equation. ➢ Generalized coordinates and learn Langrage's equation. ➢ Explains general expression for kinetic energy. ➢ Understand Euler's theorems and Euler's equations motion. ➢ Introduces General formalism of wave mechanics. ➢ Understand the fundamental postulates of wave mechanics. ➢ Explains the Dirac delta functions. ➢ Explains Evolution of system with time constants of the motions.
	B. Sc. Sem V (CC:PHY-502)	
	➢ Statistical mechanics ➢ Solid State Physics ➢ Plasma Physics	➢ Introduces Macroscopic and Microscopic states. ➢ Explains Statistical ensembles in depth

Sr. No.	Course	Course Outcome
		such as mean value and Fluctuations and Barometric formula etc.
		➢ Introduces Free Electron Theory of metal.
		➢ Introduce an application to Plasmons, Polaritons and Polarons.
		➢ Explains application to plasma and plasma oscillations.
		➢ Introduce Characteristics of a Plasma in a Magnetic field.
		➢ Introduce Application of plasma such as Controlled thermonuclear Reactions and Lawson criterion, Plasma propulsion etc.
		➢ Explains resonances and cut-offs or reflection points.
	B. Sc. Sem V (CC:PHY-503)	
	➢ Radio Activity ➢ Nuclear Physics ➢ Molecular Spectra	➢ Introduces Alpha rays : Spectra and Decay such as Range of particles. ➢ Introduces Beta rays : Spectra and Decay such as continuous beta ray spectrum-Difficulties in understanding it. ➢ Introduces Gamma rays : Spectra and Decay such as Gamma -ray emission – selection rules. ➢ Introduces Nuclear energy and Neutron Induced Fission and Nuclear Reactors. ➢ Introduces Elementary particles and symmetries and –conservation principles. ➢ Introduces Pure Rotational and Vibrational – Rotational spectra. ➢ Introduces Raman and electronic spectra. ➢ Explain the molecule as a Harmonic Oscillator. ➢ Understanding salient features of molecular electronic spectra.
	B. Sc. Sem V (CC:PHY-504)	
	➢ Network Transformations ➢ Photo Electric Devices and Thyristors ➢ Electronics ➢ Programing in C ➢ Electronics and Radio	➢ Explains principle of duality. ➢ Explains the bridged-T network and the lattice network. ➢ Classification of Photoelectric devices. ➢ Explains photoconductive cells and photovoltaic cells. ➢ Explains Currant and voltage amplifiers and effect of an emitter bypass capacitor in low frequency response. ➢ Introduces Multistage amplifier and Basic transistor amplifier. ➢ Explains Direct couples amplifiers. ➢ Explains Transistor series voltage Regulator and Transistor current

Sr. No.	Course	Course Outcome
		➢ Regulator. ➢ Introduction of ANSI C. ➢ Student familiar with Character Set , C Tokens, Keyword and Identifier, Constant , variables, Data type etc. ➢ Using C programming language student can perform experiment in the laboratory.
	B.Sc. semester (V) (ES PHY-07) (Elective)	
	➢ Instruments	➢ Introduces Michelson's Interferometer such as Principle, Construction, working, Visibility of fringes, etc. ➢ Explains C.R.O. , CR tube, Electrostatic Deflection sensitivity, CRT connections, Uses of C.R.O., etc.
	B.Sc. semester (V) (Practical)	
	➢ PC:PHY-501 ➢ PC:PHY-502 ➢ PC:PHY-503 ➢ PC:PHY-504	➢ In PC:PHY-501 students learn Acceleration due to gravity (g) using Kater's pendulum , Determination of Thermal conductivity 'K' of a rubber tube, Study of thermocouple, G. M. Counter, etc. ➢ In PC:PHY-502 students learn Refractive index 'μ' by total internal Reflection method using Gauss eye piece, Resolving power of grating, To study absorption spectra of Iodine gas molecule, etc. ➢ In PC:PHY-503 students learn Comparison of capacity (C_1/C_2) using method of mixture, Calibration of magnetic field, e/m Thomson method. ➢ In PC:PHY-504 students learn A study of transistorized Hartley Oscillator using CRO/Wave meter, I/P and O/P impedance of a R-C CE amplifier at different at different frequency using VTVM/CRO, Characteristic , etc.
	B. Sc. Sem VI (CC:PHY-601)	
	➢ Mathematical Physics ➢ Classical Mechanics ➢ Quantum Mechanics	➢ Introduce Curvilinear coordinates such as vector operators in orthogonal in orthogonal curvilinear coordinates. ➢ Introduce Special functions. ➢ Provide mathematical knowledge to develop application in physics such as Orthogonal properties of Legendre

Sr. No.	Course	Course Outcome
		➢ polynomial. ➢ Generating function of Hermite polynomials. ➢ Obtain recurrence formula for Hermite polynomials. ➢ Introduce Variational principle : Lagrange's and hemilton's Equations. ➢ Introduces Exactly soluble eigen value problems : the simple harmonic oscillator. ➢ Introduces Angular Momentum and Parity.
	B. Sc. Sem VI (CC:PHY-602)	
	➢ Statistical Mechanics ➢ Solid State Physics ➢ Holography and Fiber Optics	➢ Introduces Some Applications of Statistical Mechanics. ➢ Introduces B.E. and F.D. distributions. ➢ Explains Equations of state for an ideal gas. ➢ Introduces Superconductivity with phenomena without observable Quantization. ➢ Introduces Holography and principle of holography. ➢ Explains Important properties of Hologram and its applications. ➢ Introduces fiber optics, Optical Fiber , Critical angle of Propagation. ➢ Explains Pulse dispersion, Attenuation, Applications.
	B. Sc. Sem VI (CC:PHY-603)	
	➢ Electromagnetics ➢ Energy Technology	➢ Solve boundary value problems in Electrostatic Field with special techniques. ➢ Solve Laplace's Equation in two dimensions and three dimensions. ➢ Solve boundary conditions and uniqueness theorems. ➢ Explain Maxwell's Equation. ➢ Explains coulomb gauge and Lorentz gauge. ➢ Understanding of energy and momentum in electromagnetic waves. ➢ Explains Fundamental and applications of solar energy. ➢ Explains terms and limitations of solar energy conversion and utilization. ➢ Introduces solar energy conversion system and thermal power plants.

Sr. No.	Course	Course Outcome
	B. Sc. Sem VI (CC:PHY-604)	
	- Feedback Amplifier - Transistor Oscillators - Modulation - Digital Electronics - Programming in C	- Student learns principle of Feedback Amplifier and Advantage of Negative Feedback. - Introduces Sinusoidal such as Tuned collector Oscillators and Hatley Oscillator. - Expression for Amplitude modulated voltage and wave form amplitude modulated voltage. - Expression for frequency modulated wave and phase modulation. - Introduces Operators and Expressions in ANCI C. - Students learn Arithmetic, Relational, logical, assignment, etc. - Introduces Managing Input and Output Operations. - Understand Formatted Input and Output. - Introduces Decision making and branching in ANCI C. - Understand Decision making with if statement, The if__else statement, The?: operator, and The Go to statement.
	B.Sc. semester (VI) (ES PHY-09) (Elective)	
	Programming in Fortran 90 and 95	- Explains evolution of Fortran 90, writing a program, Input Statement, Some Fortran 90 Program Examples, constants, etc. - Explains Arithmetic operators and Modes of Expressions, Integer Expressions, Real Expressions, Precedence of Operations in Expressions, etc.
	B.Sc. semester (VI) (Practical)	
	- PC:PHY-601 - PC:PHY-602 - PC:PHY-603 - PC:PHY-604	- In PC:PHY-601 students learn Young modulus 'y' by Koening method. Optical lever, Viscosity by Log decrement , I-V Character of solar cell and determination of F.F, V.F. & n., etc. - In PC:PHY-602 students learn To determine air gape 't' between to plates of F.P. , Temperature of Flame, Newton's Ring , To determine $\lambda, d\lambda$ of sodium light using Michelson interferometer, etc. - In PC:PHY-603 students learn Mutual induction 'M' of two coil using

Sr. No.	Course	Course Outcome
		B.G., High resistance 'R' using leakage method, Maxwell's Bridge, Solenoid Inductor, etc. ➢ In PC:PHY-604 students learn A study of transistorized colpit's oscillator using CRO/Wave meter, Negative Feedback Amplifier, To determine frequency of AFO using wein bridge, etc.
3	M.Sc. Sem (I) (CPH-401)	
	➢ Mathematical Physics – I ➢ Quantum Mechanics-I	➢ Introduces Function of Complex Variables. ➢ Define analytic functions, Contour Integrals. ➢ Expand complex valued function in Laurent series. ➢ Explains Residue and pole. ➢ Introduces Integral Transforms. ➢ Define Laplace transform and Inverse Laplace Transform. ➢ Solve PDE using Inverse Laplace Transform. ➢ Introduces Some Exactly soluble 3D problem in Quantum Mechanics. ➢ Introduces Approximations Method for stationary states. ➢ Introduces WKB Approximations. ➢ Introduces Evolution with Time.
	M.Sc. Sem (I) (CPH-402)	
	➢ Solid State Physics-I ➢ Electronics-I	➢ Introduces Electron Energy Bands. ➢ Explains wave mechanical interpretation of energy bands. ➢ Introduces Mobile Electrons and Fermi Surfaces. ➢ Explains electrons in a uniform magnetic field. ➢ Introduces Power Amplifiers such as power distribution, Transformer coupled class –A amplifier. ➢ Introduces Multivibrators such as Astable multivibrator, Bistable multivibrator, etc. ➢ Introduces operational Amplifiers such as Ideal operational amplifier and Differential amplifier.
	M.Sc. Sem (I) (CPH-403)	
	➢ Computer	➢ Introduces Window and Power point. ➢ Introduces Micro-soft Word. ➢ Introduces Micro-Soft Excel. ➢ Explains Working in Excel, Mathematical

Sr. No.	Course	Course Outcome
		Calculations.
		➢ Students learn Mathematical calculations, Manipulating data, changing the layout, simple graphs, and Manipulating sheets.
		➢ Introduces Computer Network, Internet and Virus.
	M.Sc. Sem (I) (EPH-401) (Elective course)	
	➢ Electronic Communication.	➢ Revised Transmission lines and Waveguides.
		➢ Explains Transmission lines, Equivalent circuit, primary constants, etc.
		➢ Revised Digital and Satellite communication.
		➢ Explains Digital communication, Shannon limit for information capacity, digital amplitude, etc.
	M.Sc. Sem (I) (PPH-401) (practical)	
	➢ Group-I ➢ Group-II	➢ In Group –I Students learns e/m by Magnetron Valve, C.G. Bridge , Hall Effect, F.P. Interferrometer, Computer, etc.
		➢ In Group –I Students learns Transistorized R.C. Phase shift Oscillator, UJT, Power Amplifier, FET amplifier, Regulated power supply (78xx & 79xx), etc.
	M.Sc. Sem (II) (CPH-501)	
	➢ Electrodynamics ➢ Microprocessor	➢ Introduces Maxwell's equations and Boundary condition.
		➢ Introduces Potentials and Fields and Point charges : Lienard Wiechert potentials.
		➢ Introduces Radiation and Relativity , Magnetic dipole radiation, Radiation from an arbitrary source, etc.
		➢ Explains Microprocessors, Advances in semiconductor technology, organization of microprocessor based system.
		➢ Introduction to 8085 assembly language programming.
		➢ Explains Additional Data transfer from Memory to Microprocessor.
	M.Sc. Sem (II) (CPH-502)	
	➢ Classical Mechanics ➢ Programming in C -I	➢ Introduces canonical transformation, Condition for transformation to be canonical.
		➢ Introduces small Oscillation and Rotating

Sr. No.	Course	Course Outcome
		Frame. ➢ Introduces Decision making and Looping in C such as while statement, do statement, do while statement, etc. ➢ Explains array such as 1D array, declaration and initialization of array 1D arrays. ➢ Introduces Character array and strings and functions such as a multi-function program, elements of user defined functions.
	M.Sc. Sem (II) (CPH-503)	
	➢ Nano Technology	➢ Introduces Pre- Nanotechnology and Origins of Concepts of Nano, advance Experimental Methods, etc. ➢ Explains Nano chemistry, basic concepts, classification of nanomaterial. ➢ Introduces carbon nanotube and discovery, description, etc. ➢ Introduces Nanophysics, quantum dot, description, quantum confinement in semiconductors, etc. ➢ Explains Nano medicine, Nano biology, basics concepts and applications, etc. ➢ Explains instruments and methodology. ➢ Explains Environmental and social issues such as potential economic impact, over-pricing and poverty.
	M.Sc. Sem (II) (EPH-502) (Elective course)	
	➢ Synthesis of Materials	➢ Explains physical methods such as solid state reaction method, general principles, etc. ➢ Explains Thin Film synthesis such as vacuum Evaporation, sputtering, spin coating, etc. ➢ Introduces chemical Routes and Growth of Single crystals. ➢ Explains Czochalski method, Bridgman and stock Barger methods.
	M.Sc. Sem (II) (PPH-501) (Practical)	
	➢ Group – I ➢ Group - II	➢ In Group –I students learn Hysterisis by Magnetometer method, L by Rayleigh's Method, e by Milicon's method, G.M. counter, etc. ➢ In Group –II students learn Class-B Push-Pull Amplifier, MOSFET Characteristics, Amplitude modulation and demodulation, Voltage follower, IC-

Sr. No.	Course	Course Outcome
		723 Regulated Power supply, etc.
	M.Sc. Sem (III) (CPH-601)	
	➢ Statistical Mechanics ➢ Nuclear Physics	➢ Introduces some concept in statistical mechanics and Quantum statistics such as density distribution in phase space, the liouville theorem, etc. ➢ Explains density matrix, principle of conservation of density in phase space and principle of conservation of extension in phase space. ➢ Introduces Ideal Bose and Fermi system and Transport phenomena such as photon gas, Einstein derivation of plannk's law, Boltzmann H-theorem in Q.M., etc. ➢ Explains Distribution function, Mean energy of fermions at absolute zero, Therminonic emission, etc. ➢ Introduces Two-body problem in nuclear physics such as neutron-proton scatteringat low energy, spin-dependence, etc. ➢ Explains Nuclear Reactions and Elementry particles such as cross section, the compound nucleus, statistical theory of Nuclear reactions, G-Parity, Strange particles, associate prediction, etc.
	M.Sc. Sem (III) (CPH-602)	
	➢ Digital electronics ➢ Programming in C –II	➢ Introduces digital electronic such as A-bit memory, Flip Flop, D Flip Flop, T-type Flip Flop, shift-register, seriato parallel converter. ➢ Introduces counters such as shift register ring counter, Johnson counter, basic clocks, ripple counter, up down counter, etc. ➢ Explains D/A converter, D/A accuracy and resolution, A/D converter counter method, etc. ➢ Explains structure and unions in ANSI C. ➢ Explains declaring structure variables, accessing structure members, structure initialization, copying and comparing structure variables, etc. ➢ Explains pointer such as accessing the address variable, declaring and initializing pointer, pointer expression, pointer increments and scale factor, etc. ➢ Introduces file management in C and Developing a C program.

Sr. No.	Course	Course Outcome
	M.Sc. Sem (III) (CPH-603)	
	➢ Biophysics	➢ Introduces separation Techniques such as chromatography, column chromatography, thin layer chromatography, GLC, etc. ➢ Explains physic-chemical techniques to study biomolecules such as hydration of macromolecules, role of friction, diffusion, sedimentation, etc. ➢ Introduces spectroscopy and light microscopy such as CD and ORD, Bright field microscopy, the limits of resolutions, etc. ➢ Introduces electron microscopy such as electron optics , TEM, SEM, Image reconstruction, electron diffraction, Atomic force microscope, etc. ➢ Explains NMR spectroscopy such as basic principle of NMR, NMR theory and Experiment, Classical description of NMR, 13C NMR, etc. ➢ Introduces biomechanics and neurobiophysics such as electrocardiography and signal transduction.
	M.Sc. Sem (III) (CPH-603) (Elective course)	
	➢ Signal Processing Circuits ➢ Special Purpose Amplifier	➢ Introduces Linear IC's Applications. ➢ In the Signal Processing Circuits students learns Active Filters First/Second order low pass high pass Butterworth filters, band pass filter (wide/narrow) etc. ➢ In the special purpose Amplifier students learns Opamps using FET input stages, graphic equalizers, isolation Amplifiers, Video Amplifiers LM 733 and RCA 3040, etc.
	M.Sc. Sem (III) (PPH-601)	
	➢ Group –I ➢ Group –II	➢ In Group –I students learn An optical method for determining dielectric constant, dipole moment and polarizability of a polar liquid by Hollow prism, Young's modulus by optical method, G.M. Counter, Microwave, Fiber optics, C programming, etc. ➢ In Group –II students learn Frequency Modulation and demodulation, Phase shift oscillator using IC-741, A stable Multi vibrator with IC-555, TRIAC

Sr. No.	Course	Course Outcome
		characteristics, R-S Flip-Flop, SCR as a triangular wave generator, etc.
	M.Sc. Sem (IV) (CPH-701)	
	➢ Mathematical Physics –II ➢ Quantum Mechanics –II	➢ Introduces tensor analysis such as contravarient vector, definition of tensor of rank two, addition and subtraction of tensors, summation convention, symmetry- anti symmetry, contraction, etc. ➢ Introduces Group theory which is one of the part of pure mathematics. ➢ Explains definition of group, sub group, invariant, factor group, orthogonally theorem, reducible and irreducible representation. ➢ Explains The special unitary groups SU(2) and SU(3). ➢ Explains Homomorphism of groups which is the most important topic in group theory. ➢ Introduces Scattering theory such as the scattering cross-section, green function, the born approximations, the validity of the born approximations, the born series, the Eikonal approximation. ➢ Explains partial wave analysis such as the scattering amplitude in terms of phase shifts, the differential and cross-section, etc.
	M.Sc. Sem (IV) (CPH-702)	
	➢ Solid State Physics –II ➢ Electronics -II	➢ Introduces Imperfections in crystals such as point imperfections, line imperfections: Dislocations, Role of dislocation in crystal growth, strength of alloys, etc. ➢ Introduces magnetism such as Para magnetism, Magnetic resonance: ESR, NMR, spin relaxation, Weiss theory of Ferromagnetism, etc. ➢ Introduces FET Amplifiers such as FET parameters, biasing the FET, basic FET amplifier, FET small signal, common source amplifier, The common source amplifier , The common drain or source follower, common gate amplifier, etc. ➢ Explains power supplies such as basic voltage regulation building blocks, protection circuitry, adjustable type 723 regulator, etc. ➢ Introduces tuned voltage amplifiers such as resonance, series resonant circuit,

Sr. No.	Course	Course Outcome
		- parallel resonant circuit, advantage of tuned amplifiers, voltage gain, etc. - Explains IC Fabrication such as IC technology, advantage and limitations of ICs, Basic monolithic IC technology, Basic processes used in monolithic technology, etc.
	M.Sc. Sem (IV)	
	➢ Project Work	- Project Work comprises Project report, Project Presentation and VIVA. - The students can choose any topic related to physics based theory or practical or model making. - The Project can be done any industry or any well-known laboratory like PRL, ISRO, etc. - The total completed report is compiled in the form of dissertation and he can submit in the department.
	M.Sc. Sem (IV) (PPH-701)	
	➢ Group –I ➢ Group –II	- In Group –I students learn Babinet compensator, fiber optics, microwave, fibreless optical communication using IR, C Programming, Microprocessor, e/m by Helical method, etc. - In Group –II students learn Study of Differentiator, Study of Integrator, D/A and A/D convertor, Sawtooth generator using OP-AMP, Square wave generator, Crystal Oscillator, etc.
	Ph.D.	
	➢ Physics	- As per the rules of HNG University the students has to complete his course work as prescribed by the university authorities. - Study of Transition Metal Dichalcogenides. - Crystal growth and their characterization. - TMDCs Characterization and their applications. - All the characterizations and their applications are done by the students in the laboratory as well as outside other laboratory .

Mathematics

2.6 Student Performance and Learning Outcomes

2.6.1 Program outcomes, program specific outcomes and course outcomes

Sr. No.	Program	Program Objectives	Program Specific Objectives
1	BSc Mathematics	➢ Advancement of self-reading statements of theorems. ➢ Advancement of develop thinking level. ➢ To build up Self-confidence ➢ Advancement of Creativity ➢ To learn Problem Solving Techniques ➢ Accepting Concepts in dept. ➢ Growth of Writing skill, Listening and Excellent Teaching Skills	➢ To assist the students to cultivate a logical way of advance thinking Means that making suppositions, verifying them with further clarifications, simplifying them, and trying to find different type of proofs. ➢ To support the students to calculate their capabilities in subjects other than Mathematics. ➢ To allow the students to learn the fundamental constructions of mathematics. ➢ To enable the students to study mathematics for themselves. ➢ To provide higher mathematical education at state levels like as Prof. A.R.Rao Examination by Gujarat Ganit Mandal.

Courses Offered

Sr. No.	Course	Course Outcomes
1.	B.Sc. semester (I)	
	➢ Successive differentiation ➢ Integration ➢ Vector Analysis ➢ Sphere, Cone, Cylinder and introduction to Conicoids	To the end of this course students will be expected to ➢ Introduce the successive differentiation. ➢ To explain some standard result based on nth derivatives to apply in Leibnitz's theorem which is extended version of nth derivative of product of functions. ➢ Generalized LMVT to CMVT. ➢ Introduce Expansion of some standard function into series in power of (x-a) such as exp(x), sine and cosine, Ruther all trigonometry functions in its ROC.

Sr. No.	Course	Course Outcomes
		$\triangleright$ Generalized an integration of higher power of function using reduction formula such as sine and cosine functions.
		$\triangleright$ Introduce higher level applications of an Integration such as Rectification, surface and volume revolution.
		$\triangleright$ To learn nature of general conics.
		$\triangleright$ Introduce equation of spheres, cylinders and cones from different given.
		$\triangleright$ To improve knowledge about reciprocal of vectors.
		$\triangleright$ To Extended study of vector, operations of vectors from three vectors to four vectors.
		$\triangleright$ To learn diff. of vector valued function to use gradient, divergent, and curl.
2	B.Sc. Semester (II)	
	$\triangleright$ Complex Analysis $\triangleright$ Matrices $\triangleright$ Differential Equations	To the end of this course students will be expected to $\triangleright$ To improve complex study as develop knowledge of De'Morve's Theorem. $\triangleright$ Introduction of Hyperbolic functions and circular functions. $\triangleright$ To provides all different techniques to solve DE of first order as well as higher order DE. $\triangleright$ To familiarize different type of well-known Matrices such as inversion, Nilpotent, Hermitian Matrices. $\triangleright$ To learn dimension of Liner Transformation from rank and Nullity of its Matrix.
3	B.Sc. Semester (III)	
	$\triangleright$ Calculus and Liner algebra $\triangleright$ Numerical Analysis	To the end of this course students will be expected to $\triangleright$ To learn functions of severable variables and its DOD. $\triangleright$ To provide different technique of find Limit of functions of severable variables. $\triangleright$ To introduce partial derivatives term and when it use. $\triangleright$ To provide different technique of check Continuity and differentiability of functions of severable variables. $\triangleright$ To provide different technique of find Derivatives of Implicit functions. $\triangleright$ To identify condition of commutatively if d independent variables in higher ordered derivatives. $\triangleright$ To provide an applications of partial derivatives such as Euler's theorem which helps to determine derivatives of homogenous function. $\triangleright$ To capable to find extrema of functions of severable variables. $\triangleright$ To learn Tangent line, normal plane to twisted curves and Tangent plane, Normal plane to surfaces. $\triangleright$ Introduce algebraic structure such as vector space. $\triangleright$ To classify behavior of spanning of set regarding theorems.

Sr. No.	Course	Course Outcomes
		- To know about what is dimension actually (i.e.: It is not only like1D, 2D and 3D) with help of basis of vector space over field. - To Introduce Linear transformation between two vector space and its relation to Matrix of order m and n. - To verify Rank and Nullity of Linear transformations. - To introduce Finite differences table and theory of interpolation. - To classify factorial polynomials and symbolic operators. - To know about Divided Difference and central difference interpolation formula. - To capable to find Differentiations and integration using Numerical values as well as Picard method, Simpson rule's to solve ODE.
4	B.Sc. semester (IV)	
	- Advanced Calculus - Advanced Liner Algebra	To the end of this course students will be expected to - To explain curvature and radius of curvature of cure and plane curve. - To Explain Beta function and Gamma function. - To classify multiple integral such as double integral, integral on non-rectangular region, triple integral. - To revised vector analysis and extend integral to line integral, surface integral. - To explain an application of line and surface integral with help of Green's, Stoke's and Gauss's Theorem. - To extend study level of linear algebra such as matrix of linear transformation. - To introduce Inner product and inner product space. - To Explain linear functional and duality.
5	B.Sc. semester (V)	
	- Group Theory - Mathematical Analysis-I - Differential Equations - Operations Research-I	To the end of this course students will be expected to - To introduce algebraic structure such as Group. - To know all properties of group and order of group structure. - To explain abelian group and its results. - To Explain sub group of group and Lagrange's theorem. - Introduce permutation and transpositions and cycle using this they find determinant of order up to n with entries 0 and 1 only. - To explain the most important topic of algebra which are homomorphism and isomorphism. - To explain properties of cyclic group structure. - To know Mathematical analysis is a real and pure mathematics branch. - Introduce Euclidean space, Dedekind's cut, and algebraic numbers.

Sr. No.	Course	Course Outcomes
		- To explain basic topology using this define finite, countable and uncountable sets. - To value of neighborhoods and distance function. - To introduce metric space with respect to distance function. - To explain limit point of set, closed set, open set, perfect set and compact set and them results. - To well understand sequence is defined by function. - To explain convergence of a sequence and series. - To gives techniques and method to check sequence and series are convergent or divergent. - To learn formation of differential equations and symbolic operator. - To gives result to find C.F. and P.I. so that get general solution. - To explain exactness of LDE and its solution. - To explain method of undetermined co-efficient. - To define what is LPP. - To gives method to solve LPP such as Graphical method, Simplex Method, and dual simplex method. - To realized the importance of convexity of set.
6	B.Sc. semester (VI)	
	- Abstract Algebra - Mathematical Analysis-II - General Topology - Operations Research-I	To the end of this course students will be expected to - To introduce anther algebraic structure which are Ring and its illustrations. - To learn result based on ring. - To explain integral domain and zero divisors. - To introduce polynomial ring and unique factorization of polynomials. - To realized an importance of division algorithm for polynomial. - To gives techniques of solving polynomial equations. - To take advantage of Eisenstein criterion for irreducibility. - To introduce Quotient ring and its results. - To explain prime ideal and maximal ideal using this we check irreducibility of polynomial. - To explain limit, continuity and differentiability for function which domain is metric space. - To revised all LCD property in metric space. - To basic concept of an Integration which is Riemann-Stieltje's integral. - To revised sequence and series after than extend to the sequence and series of functions. - To introduce topology and topological spaces. - To explain Neighborhoods and hausdorff space. - To verify relation between topological space and metric space using results and properties.

Sr. No.	Course	Course Outcomes
		➢ To introduce a term hoeomomorphism between two topological spaces. ➢ To explain subspace of topological space and its results. ➢ To explain some applications of connectedness. ➢ To introduce Network models and concept of networks. ➢ To explain transportation problem and assignment problem using different methods like as Hungarian method, VAM method, LCM method, NWCM method and MODI method. ➢ To introduce sequencing problem and machine problem with respect to n jobs. ➢ To explain Game theory we introduce saddle point theorems, mixed strategies and dominance principles.
	➢ Purpose of including Subject Elective courses in B.Sc. Mathematics is one kind of revision of 10+2 level Mathematics such as permutation and combination, Differentiations, Integration, Basic Statistics and Linear Programming Problem.	

Commerce

Subject :   Subject Code :
Credits : 3 Hours

Objectives:

Outcomes:
- Convey the knowledge of various accounting concepts.
- Students become aware about the overall accounting knowledge and techniques.
- Students are able to use these concepts of accounting practically.

Subject: Advance Accounting   Subject Code :
Credits: 3 Hours

Objectives:
- To provide sound understanding of intricacies of solving practical problems relating to advance accounting.
- To make students aware about the software of creating accounts.
- To associate students with the business world practically.
- To prepare students to deal with practical issues related to the business world.

Outcomes:
- Imparted the knowledge of advance accounting practically.
- Students are able to use the software to make accounts.
- Students become practically prepare to deal with the business world.

Subject: HRM   Subject Code:
Credits: 3 Hours

Objectives:
- To provide conceptual and procedural knowledge of functional area of Human Resource Management.

Program: Bachelor in Commerce

Subject	Objectives
Sem -1 • Financial Accounting	• To convey the knowledge of various accounting concepts. • To inculcate the knowledge about accounting procedures, methods and techniques. • To introduce the students about practical knowledge of accounting.
• Advance Accounting	• To provide sound understanding of intricacies of solving practical problems relating to advance accounting. • To make students aware about the software of creating accounts. • To associate students with the business world practically. • To prepare students to deal with practical issues related to the business world.
• HRM	• To provide conceptual and procedural knowledge of functional area of Human Resource Management. • Make aware about various types of trainings to increase productivity. • Describe the students about importance of employees in the firm. • Inculcate students about various methods of Recruitment and training programs.
Sem-2 • Financial Accounting	• To convey the knowledge of various accounting concepts. • To inculcate the knowledge about accounting procedures, methods and techniques. • To introduce the students about practical knowledge of accounting
• Advance Accounting	• To provide sound understanding of intricacies of solving practical problems relating to advance accounting. • To make students aware about the

• Marketing Management	software of creating accounts. • To associate students with the business world practically. • To prepare students to deal with practical issues related to the business world • To inform the students about basic concepts of Marketing. • Describe them about Product , Distribution Channels and promotion • To understand marketing philosophy and generating ideas for marketing research.
Sem-3 • Corporate Accounting • Cost Accounting-1 • Taxation-1 • IFS	• To enable the students to develop awareness about corporate accounting in relation with the provisions of companies Act and accounting as per Indian Accounting Standards. • To make students aware about conceptual frame work of corporate accounting. • To convey the knowledge of amended accounting standards and companies law practically. • To make students acquainted with cost accounting. • To provide basic knowledge of cost accounting and its areas of application. • To make students aware about basic elements of costing such as material, labor and overhead. • To aware the students about basic concept of Taxation. • To make students acquainted with various types of Tax Authorities and their duties. • To enable the students solve the tax related issues practically. • Introduces the students about the concept of Indian Financial System and its structure. • Explain the various authorities of Banking, Insurance and Stock Exchange. • Provide the information about the various types of Financial Markets.

Sem-4	
• Auditing	• To familiarize the concept of Auditing and the company's Auditor. • To make students aware about the task of Auditing and its importance along with procedures. • To convey the duties and rights of Company's Auditor.
• Cost Accounting-2	• To make students acquainted with cost accounting. • To provide knowledge various costing methods practically. • To differentiate the reasons of variation in profit of profit and loss statement and cost statement and its solution with help of reconciliation.
• Taxation-2	• Describe the difference between the business and professional incomes in terms of taxation and calculations. • To make students aware of various types of gains and methods of calculating them. • Inform about the different types of other incomes and their taxability. • Provide basic information about GST.
• Production Management	• Introduce the students about the basic concept of Production Management. • Enable the students to utilize the concept of Management in Production practically. • Provide the information related to enhancement of production and productivity.
Sem-5	
• Marketing Management Practice	
• Cost & Financial Accounting	• Introduce the students about Marketing Environment and its concept. • Enable students to utilize distribution channels and marketing communication practically. • Describe the different types of products and their segments.

• Management Accounting -1	• To acquaint the students with significance of cost and financial accounting. • To impart the different types of methods of costing used in manufacturing and service sector.
Sem-6 • Fundamental of Financial Management	• Enable students to acquire the sound knowledge of concepts, methods and techniques of management accounting. • To make the students develop competence with their usage in managerial decision making and control.
• Management Accounting -2	• To convey the knowledge of conceptual framework of financial Management. • To develop the ability of decision making related to capital Budget and capital structure. • Make aware the students about stock exchange and dividend policies.
• Auditing -2	• Enable students to acquire the sound knowledge of concepts, methods and techniques of management accounting. • To make the students develop competence with their usage in managerial decision making and control • To provide information about overall company auditing and task of auditors. • To differentiate the concept of Auditing and Investigation.

Subject	Outcomes
Sem-1 1. Financial accounting	• Students got aware about the basic concept of financial accounting and various aspect of financial terms practically. • The have imparted the skill of various kinds of business transactions.
2. Accountancy-1	• Students are able to deal with the transaction regarding consignment, branch accounting and calculating fire claim. • They got knowledge about the software used in recording accounting transaction as well as making final accounts
3. HRM	• Students understood the importance of human in organization • They also understood the basic principles of Human Resource Management and their application in the business and industries
Sem-2 1. Financial accounting	• Students got aware about the basic concept of financial accounting and various aspect of financial terms practically. • The have imparted the skill of various kinds of business transactions.
2. Accountancy	• Students are able to deal with the transaction regarding consignment, branch accounting and calculating fire claim. • They got knowledge about the software used in recording accounting transaction as well as making final accounts
3. Marketing management	• Students are able to understand to concept of marketing management • They are to think about the new marketing ideas and its way of application.

Subject	Outcomes
Sem-3 1. Corporate accounting	• Students are fulfilled with the knowledge of new trends in corporate accounting, issues of shares and redemption of shares. • They are able to make transaction of corporate world with the help of such syllabus.
2. Cost accounting	• Students are aware bout the basic knowledge of cost accounting and its area of application. • They can figure out the costs of the material, labour and overheads of units according to their requirements.
3. Taxation-1	• They are fully aware about the concept of taxation and its importance. • They able to apply such knowledge of taxation in their personal lives practically.
4. IFS	• Now the students are familiar with the financial system of India and it's all the aspects. • They are enriched with the knowledge of various tools of financial marketing.
Sem-4 1. Auditing-1	• Learners are totally aware of the term Audit and Auditing. • They have knowledge of requirement of auditing in company and its importance and also the duties and rights of Auditor.
2. Cost accounting-2	• They are able to record cost in different types of business and organisation according to their nature. • They can find the reason of variation in profit in profit and loss statement and cost statement with the help of reconciliation statement.
3. Taxation-2	• The students are able to make calculation of various incomes and its taxability such as gain from business and professional, capital gain etc.

Subject	Outcomes
4. Production management	• They can reduce the tax liability with the help of deductions and relieves. • The overall concept of production management is conveyed which will help them to manage the production in manufacturing unit. • They have knowledge of increasing productivity and production channel to enable them in adding new product in market.
Sem-5 1. Cost and financial accounting	• Students acquainted with the significance of the cost and financial accounting. • They are aware of various methods of costing in manufacturing and service sector.
2. Managerial accounting	• They are able to acquire the sound knowledge of concept, methods, and techniques of managerial accounting. • Students are having the ability to conduct the managerial decision making and control.
3. Marketing management practice	• Students are able to understand the concept of marketing management. • They can utilise distribution channels and marketing communication practically. • They are familiar with different types of product and their segments.
Sem -6 1. Auditing-2	• Students convey the importance of the company audit, its methods and also task of auditor. • They are able to differentiate the concept of auditing and investigation.
2. Managerial accounting	• They are able to acquire the sound knowledge of concept, methods, and techniques of managerial accounting. • Students are having the ability to

Subject	Outcomes
3. Fundamental of financial management	conduct the managerial decision making and control. • Students become aware of conceptual framework of financial management. • They have enough ability of decision making related to capital budget and capital structure. • They have a proper knowledge and understanding of stock exchange and dividend policies.

Programme: **Bachelor in Commerce**

Subject: **Commercial Correspondence**	**Outline of Objectives** (Semester I to VI)
❖ **Paper Titles:** • Communications in Business　　**(Sem. I)** • Communications in Business　　**(Sem. II)** • Business Correspondence　　**(Sem. III)** • Business Correspondence　　**(Sem. IV)** • Corporate Communication　　**(Sem. V)** • Media and Public Relation Communication　　**(Sem. VI)**	• This paper will make students conversant with the basic forms, formats and techniques of business communication writing so that they will be thoroughly prepared to take part in real-world business fields. • This paper will provide discussion of all relevant communicational theories so that you can apply this knowledge to a myriad of different communicational tasks and genres. • Interview tips will help students to learn soft skills while facing interview. • To participate effectively in groups with emphasis on listening, critical and reflective thinking, and responding. • This paper helps students to develop their one single stand at the time of group discussion on a given topic. • Banking correspondence teaches commerce students to write a formal letter on opening of an account, complaint against misbehavior of the banker, loan applications. • E-Commerce course teach students how it eliminates geographical barriers and the difference between day and night in different areas and is improve communication and extensive national and international economy • After studying Press Reports in the classroom, students can learn how to gather news, identify the sources of news and, list the qualities of a good

Subject: **Commercial Correspondence**	**Outline of Objectives**
	(Semester I to VI)
❖ **Paper Titles:** • Communications in Business **(Sem. I)** • Communications in Business **(Sem. II)** • Business Correspondence **(Sem. III)** • Business Correspondence **(Sem. IV)** • Corporate Communication **(Sem. V)** • Media and Public Relation Communication **(Sem. VI)**	reporter, editor and sub-editor. • The present study of Share Market reports principally aimed to examine the share price behaviour of 30 selected shares belonging to various industries such as aluminum, consumer products, software, investment & finance, banking, automobiles and vehicles, pharmaceutical, general engineering etc. • To evaluate the possibility of predicting the price of a particular share by observing the behaviour of other share price series belonging either to the same industry or to different industries. • After studying Press Reports in the classroom, students can learn how to gather news, identify the sources of news and, list the qualities of a good reporter, editor and sub-editor. • The present study of Share Market reports principally aimed to examine the share price behaviour of 30 selected shares belonging to various industries such as aluminum, consumer products, software, investment & finance, banking, automobiles and vehicles, pharmaceutical, general engineering etc.

Programme: **Bachelor in Commerce**

Subject: **Commercial Correspondence** (All papers have 03 Credits)	**Learning Outcomes** (Semester I to VI)
Communications in Business **(Sem. I)**	• Apply business communication strategies and principles to prepare effective communication for domestic and international business situations. • Communicate via electronic mail, Internet, and other technologies.
Communications in Business **(Sem. II)**	• Deliver an effective oral business presentation. • Select appropriate organizational formats and channels used in developing and presenting business messages
Communications in Business **(Sem.III)**	• Students have developed soft skills: writing abilities, thought process is enhanced, choice of diction is improved. • Many commerce students have availed jobs in banking sector where they have banking correspondence and email
Communications in Business **(Sem. IV)**	• E-Commerce course has helped an understanding of the foundations and importance of E-commerce. • Students are in a state of key features of Internet, Intranets and Extranets and explain how they relate to each other. • After studying Press Reports in the classroom, students can learn how to gather news, identify the sources of news and, list the qualities of a good reporter, editor and sub-editor. • The present study of Share Market reports principally aimed to examine the share price behaviour of 30 selected shares belonging to various industries

Subject: **Commercial Correspondence** (All papers have 03 Credits)	**Learning Outcomes** (Semester I to VI)
Corporate Communication **(Sem. V)**	such as aluminum, consumer products, software, investment & finance, banking, automobiles and vehicles, pharmaceutical, general engineering etc.
Media and Public Relation Communication **(Sem. VI)**	• To evaluate the possibility of predicting the price of a particular share by observing the behaviour of other share price series belonging either to the same industry or to different industries. • Speech writing unit develops public speaking skills, create an understanding of your audience, Making a good impression, leaving your audience with two or three takeaway points.

Master of Commerce

Program: Master of Commerce

Subject	Objectives
Sem: 1 1. Corporate Financial Accounting	• To expose students to advanced accounting issues and practices such as maintenance of company account, valuation of goodwill and shares and handling accounting adjustments.
2. Management Concept and Organizational Behaviour	• To understand the conceptual framework of management and the organisational behaviour.
3. Financial Management	• To understand the conceptual framework of financial management and its application under various environment.
4. Corporate financial accounting	• To expose students to advanced accounting issues and practices such as maintenance of company account, valuation of goodwill and shares and handling accounting adjustments.
Sem: 2 1. Marketing Management	• To facilitate understanding of the conceptual framework of marketing and its applications in decision making under various environment constrains.
2. Elements of banking and insurance	• To develop conceptual understanding of the fundamentals of elements of Banking and different types of insurances.
3. Cost Accounting	• To provide sound understanding of the intricacies of solving practical problems relating to Cost Accounting
4. Security Analysis and Portfolio Management.	• The objective of this course is to help students to understand various issues in security analysis & portfolio management.
5. Indian Banking and Currency System	• To make the students familiar with the Indian Banking System and role in development of India.

Subject	Objectives
Sem: 3 1. Direct and Indirect Taxes	• To equip students with application of principles and provisions of concern tax laws.
2. Project Planning and Control	• To enable students learn the process and issued relating to preparation, appraisal, review and monitoring of projects.
3. Accounting for Managerial Decision	• To make students familiar with the accounting concepts, tools and techniques for managerial decisions.
4. Accounting for service organization	• To understand the concept and system of service sector organisation.
5. Company Law Administration	• To understand the provision of company act, 1956.
Sem: 4 1. Advanced Financial Accounting & International Accounting	• To acquaint students with the accounting concepts, tools and techniques for managerial decisions. • Students will be aware of International Accounting Standard.
2. Financial Markets	• To develop and understanding of the financial markets in India such as money market, capital market etc.
3. Quantitative Techniques and Research Methodology	• This course helps the students to make them familiar with art of using different research methods and techniques. • It also enables students irrespective of their discipline in developing the most appropriate methodology for their research studies.
4. Strategic Management	• The objectives of this course is to enhance decision making Ability of students in situations of uncertainty in a dynamic business environment.

Subjects	Outcomes
Sem: 1 1. Corporate Financial Accounting	• Students and aware of advanced accounting issues and practices such as maintenance of company account, valuation of goodwill and shares and handling accounting adjustments.
2. Management Concept and Organizational Behaviour	• Students are able to understand the conceptual framework of management and the organisational behaviour.
3. Financial Management	• Students are familiar with the conceptual framework of financial management and able to apply them under various environment.
4. Corporate financial accounting	• Students are exposed to advanced accounting issues and practices such as maintenance of company account, valuation of goodwill and shares and handling accounting adjustments.
Sem: 2 1. Marketing Management	• Students are grasping the knowledge of the conceptual framework of marketing and its applications in decision making under various environment constrains.
2. Elements of banking and insurance	• Students are aware of fundamentals of elements of Banking and different types of insurances.
3. Cost Accounting	• They are able to record cost in different types of business and organisation according to their nature. • They can find the reason of variation in profit in profit and loss statement and cost statement with the help of reconciliation statement.
6. Security Analysis and Portfolio Management.	• The students are able to understand various issues in security analysis & portfolio management.

Subjects	Outcomes
4. Indian Banking and Currency System	• The students are familiar with the Indian Banking System and role in development of India.
Sem: 3 1. Direct and Indirect Taxes	• The students are equipped with application of principles and provisions of concern tax laws. • The able to apply such knowledge in their personal lives practically.
2. Project Planning and Control	• T students are enable to learn the process and issued relating to preparation, appraisal, review and monitoring of projects.
3. Accounting for Managerial Decision	• The students are familiar with the accounting concepts, tools and techniques for managerial decisions. • Students are having the ability to conduct the managerial decision making and control.
4. Accounting for service organization	• The students are imparted with the knowledge of concept and system of service sector organisation.
5. Company Law Administration	• The students are able to understand the provision of company act, 1956.
Sem: 4 1. Advanced Financial Accounting & International Accounting	• Students are acquainted with the accounting concepts, tools and techniques for managerial decisions. • The have imparted the skill of various kinds of business transactions. • Students are aware of International Accounting Standard.
2. Financial Markets	• The students are imparted with the knowledge of the financial markets in India such as money market, capital market etc.
3. Quantitative Techniques and Research Methodology	• The students are familiar with art of using different research methods and

Subjects	Outcomes
4. Strategic Management	techniques. • The students are able to discipline in developing the most appropriate methodology for their research studies. • The students able to enhance decision making ability in situations of uncertainty in a dynamic business environment.