Bachelor of Arts

History

Class	Course	Outcomes from the Course (Students will be able to)
B.A. Part-I	**Rise of the Maratha Power.** (1600 A.D. to 1707 A.D.) Optional Paper No. I and II	➢ Understand the background and the inspiration behind the establishment of Swarajya.
		➢ Explain the reasons behind Chatrapati Shivaji's early conflicts with the regional lords and the outsiders.
		➢ Know about the early conflicts of Chhatrapati Shivaji with regional lords and outsider powers of Adilshahi and Mughal Empire.
		➢ Know about the importance of grand coronation of Chatrapati Shivaj.
		➢ Know about the administrative System and it's nature of Chhatrapati Shivaji.
		➢ Asses the Chhatrpati Shivaji's invasion on Karnataka.
		➢ Understand the formation of welfare state during the Maratha rule.
		➢ Understand the industrial and agricultural aspects of Chhatrpati Shivaji's regime
		➢ Understand the administrative aspect of the Swarajya.
B. A. Part-II	**History of Modern Europe.** (1750 A. D. to 1871 A. D.)	➢ Introduce to Modern History of Europe.

	Optional Paper No. III and V	
		➢ Identify the importance of Industrial Revolution.
		➢ Distinguish the detail account of French Revolution as well as its overall impacts on the French society.
		➢ Understand early political awakening in the France during the period of Nepolian Bonapart.
		➢ Identify the Political Developments during the age of Metternich.
		➢ Understand various phases of the Revolutionary movements in Europe.
		➢ Understand the development policy of Nepoleon III.
		➢ Grasp the details of Unification of Italy.
		➢ Understand the Unification of Germany.
B. A. Part-II	**Modern India.** (1857 A. D. to 1950 A. D.) Optional Paper No.IV and VI	➢ Introduce toModern Indian History.
		➢ Identify the importance and the legacy of Freedom Movement.
		➢ Distinguish the detail account of British raj as well as its overall impacts on the Indian society.
		➢ Evaluate the renaissance and Religious and Social reforms movement in India.
		➢ Understand some of the early resistance

		to British rule.
		➢ Understand early political awakening in Indian freedom struggle.
		➢ Identify the social institutions of late nineteenth century.
		➢ Understand various phases of the national movement.
		➢ Understand the difference between moderates, extremists and revolutionaries.
		➢ Comprehend the socio-religious scenario and the social reformation.
		➢ Grasp the details of freedom movement under the Mahatma Gandhi□s leadership.
		➢ Understand the evolutionary processes of constitutional developments.
B. A. Part-III	**History of Ancient India.** (Pre-Historic Age to 650 A.D.) Special Paper No. VII and XII	➢ Identify the various types of Sources of Ancient Indian History.
		➢ Grasp the details of Pre-Historic Age of Indian History.
		➢ Understand the about the cultural heritage of India during the Indus Valley Civilization.
		➢ Identify the importance and the legacy of Vedic Period.
		➢ Grasp the details of Political Developments in India during Magadh Empire.

		➢ Know about the Political Developments in India during Mauryan Empire.
		➢ Perceive about the Political Developments in India during Satvahanas and Gupta Empire.
		➢ Understand about the Political Developments in India during Vardhan Dynasty and Vakatak Empire.
B. A. Part-III	**History of Mughal India.** (1526 A.D. - 1707 A.D.) Special Paper No. VIII and XIII	➢ Identify the various types of Sources of Medieval Indian History.
		➢ Grasp the details of Medieval Age of Indian History.
		➢ Understand the about the Establishment of Mughal Empire in India under the leadership of Babar.
		➢ Identify the Conflict between Humayun and Shersha about achieving the power.
		➢ Grasp the details of Political Developments in India during age of Akbar.
		➢ Know about the Political Developments in India during Jahangir and Shahajan's era as a Golden Age.
		➢ Understand about the policy of Aurangzeb led to decline of Mughal Empire in India.
		➢ Understand about the Importance and

		developments in Administrative system during the Mughal period.
		➢ Identify the developments and unique legacy of Art and Architecture during the Mughal period.
B. A. Part-III	**Growth and Decline of the Maratha Power.** (1707 A.D. to 1818 A.D.) Special Paper No. IX and XIV	➢ Grasp the details about the Civil War between ChhatrapatiShahu and Maharani Tarabai in Maratha History.
		➢ Understand the about the Establishment of Peshawai in Maratha History under the leadership of BalajiVishvanath.
		➢ Identify the Expansion policy of the Maratha Power during the period of PeshwaBajirao First and Nanasaheb.
		➢ Grasp the details of Political situation in India led to Third Battle of Panipatduring age Peshwai.
		➢ Know about the restoration of the Maratha Power after panipatduring period of PeshwaMadhavrao First.
		➢ Understand about the policy of Barbhai Council for preclude the interfere of Raghunathrao and British power in Maratha power.
		➢ Understand about the Importance and developments in Administrative system during the Peshwai.
		➢ Identify the policy of PeshwaBajirao

		Second to caused to decline of Maratha Power.
B. A. Part-III	**History of Modern World.** (1870 A.D. to 2000 A.D.) Special Paper No. X and XV	➢ Identify the political situation of Europe during Modern time.
		➢ Grasp the details of internal developments External policy of Germany during the Bismark era.
		➢ Understand about the New Imperialism of Europeans countries.
		➢ Grasp about the First World War and situation in Europe thereafter.
		➢ Identify the Communist Revolution in Russia.
		➢ Know about the Dictatorships in Germany, Italy and Turkastan.
		➢ Grasp about the Second World War and situation in Europe thereafter.
		➢ Understand about the Cold War Concept and International politics during the cold war period.
		➢ Identify the Globalization and its various aspects.
B. A. Part-III	**Historical Documents and Places.** Special Paper No. XI and XVI	➢ Identify the Meaning, Nature and Scope of History.
		➢ Grasp the details of various types of sources and it's importamce in History writing.

		➢ Understand about the Research process in Historical research.
		➢ Grasp about the Historical writing process.
		➢ Know about the Importance and it'svaluable role in political success in Monarchy system.
		➢ Grasp about the importance of Museums in understanding of Historical legacy properly.
		➢ Understand about the Historical Tourism and it's importance in grasping Historical facts.
		➢ Identify the valuable contribution of leading historians in Indian History Writing.

Bachelor of Arts

Economics

Sr.No.	Program	Program Objectives	Program Spcific objectives
1	B.A. Economics	P01- Critical Thinking- Take informed actions after identifying the assumptions that frame or thinking and actions.	PS1: Understand the behaviour of Indian and world Economy.
		P02- Effective communication speak, read, write and listen clearly in person and through electronic media in English and in one Indian language and makes meaning of the world by connecting people, ideas, books, media and technology	PS1: Analysemacro Economic Policies including fiscal and monetary policies of India.

		P03- Social Interaction: Elicit views of others, mediate, disaggrements and help reach conditions in group settings.	PS3: Determine economic variables including infflation, unemployment, poverty, Balance of payment's using statistical method.
1	FYBA	P1- Indian Economy	To make the students known about the various sectors of the economy indetail. To highlight the potential of the Indian economy to study the facts and figures as out development.
2	SYBA	P2- Money, Banking & Public finance	To create the awareness of the student of money, Banking system. Understandins of the opportunities of banking their interaction with nest of the economy essential to realize how monotory force operates through multitude of channels. To understand the policies and operations which involve the use of tax and expediture measures while budgatary policy. It helps to understand expenditure program, stabilization instruments, etc.
		P2. Demography	To understand the importance of population in economic development and various theories that explains the growth of population in a country. Gender characteristics, migration and urbanization are the essential to understand the dygnamics of this change.
		P3. Labour Welfare (IDS)	Labour is an important factor of production wage determination, labour unions, social security are studied in the course. Similarly, ornised and unorganised employment, labour participation, female employment pattern are studied in the course. Effects are taken to make students aware about the labour pattern in India.
3	T.Y.B.A.	P4. Micro Economics	To understand the behaviour of an economoc agent namely, a consumer, a producer, a factor owner and the price fluctions in a market. Price formation in different makets structure and the equilibrium of a firm and industry.
		P5. Macro Economics	To understantthhe economic analysis in terms of theorotical, empirical as well as policy making issues. The objective of the course is to familiarize the students the basis concept of macro economics and applications.

		P6. History of Economic Thought	To understand the economic thought in terms of theorotical, empinical by various economists of Indian and global level.
		P7. Economics of Development & methodology	This paper is deveted to the theories of economics development, approaches to economic development, social and institutional aspects of development. The course provides extension and application of knowledge in a current specilized field. To get exposed to a few elements of social science research.
		P8. Agricultural Economics.	In this course the students are promoted to be capable to understand pattern of industrilization in India as well as world over. Agriculture is the major sector of economy in the country.

Bachelor of Arts

Psychology

1. **Effective communication** – Speak, read, write and listen clearly in person and through electronic media in English and in one Indian language, and make meaning of the world by connecting people, ideas, books, media and technology.
2. **Social Interaction**- Elicit views of others mediate disagreements and help reach conclusions in group settings.
3. **Effective Citizenship-** Demonstrate empathetic social concern and equity centered national development, and the ability to act with an informed awareness of issues and participate in civic life through volunteering.
4. **Ethics –** Recognize different value systems including your own, understand the moral dimensions of your decisions, and accept responsibility for them.
5. **Environment and Sustainability-** understand the issues of environmental contexts and sustainable development.
6. **Self-**directed and life-long learning- Acquire the ability to engage in independent and life-long learning in the broadest context socio-technological changes.

B.A.I Psychology Course Outcomes

1. To provide solid foundation for the basic principles of psychology

2. To familiarize students with the historical trends in psychology, major concepts, theoretical perspective, and empirical findings.
3. To provide an overview of the applications of psychology.

B.A. II Psychology Paper no. III Developmental Psychology

Course Outcomes

1. To acquaint the students with basic concepts of human development processes.
2. To help students to understand influences of various factors in development.

B.A. II Psychology Paper no. IV Modern Applied psychology

Course Outcomes

1. The emergence of Industrial and organizational psychology
2. The work done in Industrial and organizational psychology
3. The significance of training, performance appraisal, leadership models
4. The importance of engineering psychology
5. Help students to understand the relationship between theoretical and applied aspects of psychology
6. Acquaint students with various applications of psychology.

Bachelor of Arts

Political Science

Sr. No.	Course	Course Specific Outcomes
B.A.	B.A. Part-I P.I&II Indian Government and Politics	• Student understands making of Indian Constitution, It's features& Philosophy. • It extends the consciousness of the student about the fundamental rights & duties of citizen. • Student explains separation of power in Indian Political System and actual functioning of legislature, executive, judiciary in India. • Course gives analytical perspectives about federal structure of India and actual functioning of Union- State governments. • Student simultaneously studies structure & function of Election commission of India. • Course introduces to student nature, ideology & role of national political parties in India. • Course also acquaints student with influence of caste, religion, region, money & media in politics.
B.A.	B.A. Part-II P.III&V Introduction to Political Theory	• Students will understand certain key aspects of conceptual analysis in political theory. • Students will apply concepts to contemporary political issues • Student explains significance of liberty, equality and justice.
	B.A. Part-II P. IV&VI Modern Indian Political Thought	• Students will understand to the concepts, ideas and theories that developed in India. • Students will compare thinkers on similar concept • Students will use concepts to analyze new situations • Students will explain the nature and value of normative thinking
	B.A. Part-II Public Administration (IDS)	• Students will understand the governing philosophy into programs, policies and activities and making it a part of community living. • Develop a deeper understanding of the personnel public administration.
B.A.	B.A. Part-III P.VII&XII Government & Politics of Maharashtra	• Students will have a summary understanding of formation of Sanyukta Maharashtra& determinants of politics of Maharashtra • Develop a deeper understanding of the structure and policy

		of Maharashtra Government, Panchyat Raj Sansthas and Local Self Government.
	B.A. Part-III P.VIII&XIII Political Sociology	• Develop a deeper understanding of the concepts in modern political theory. • Students will apply certain key aspects of conceptual analysis in modern political theory.
	B.A. Part-III P.IX&IVX Introduction to International Politics	• To understand some important theoretical approaches in international relations & a history from 1945 onwards to the present. • To evaluate the foreign policy of Indian since independence and its possible future trajectory.
	B.A. Part-III P.X&XV Comparative Government & Politics	• Develop a deeper understanding of the structures and politics of United Kingdom, USA and Switzerland. • To understand the politics in United Kingdom, USA and Switzerland government comparatively and to know the principles of good governance.
	B.A. Part-III P.XI&XVI Western Political Thought	• Develop consciousness of the concepts, ideas and theories that developed in Western country. &western political tradition. • To understand seminal contribution of western political Thinker to the evolution of political theorizing in western country. • Students will explain their relevance of Western Political Thoughts to contemporary times.

Bachelor of Arts

Physical Education

At the end of the course the students gain the following knowledge

1) Basic structure and functions of human body.
2) The normal movements of human body.
3) The effect exercise on the different systems of the human body.
4) School health programme.
5) The need and importance of Health, Yoga and Physical education.
6) The principles of nutrition.
7) Application of knowledge of Health, Yoga and Physical education.
8) Cure the Student injuries and keep the Student Healthy and fit.
9) Student will be able to plan and implement development all appropriate learning experiences based on expected developmental level.

10) Student will be able to promote mutual respect self-responsibility, leadership, problem solving and teambuilding.
11) This course will develop ability to enhance student learning and engagement in life long physical activity.
12) There will be able to advocate physical activity in school and the large community.

B.A. I – Paper- The Principle of Physical Education.

1) Acquaint the student with importance of Physical Education and its Principle.
2) Student will be given knowledge of growth, development and learning procedure
3) All round Development of students
4) Promote/ cherish various life-skills.

B.A. II – Sub- History of Physical Education

Students gained the knowledge about
1) history of Physical Education.
2) Comparative study of Physical Education in present situation. (Ancient and Modern Sport)
3) The recent development in Physical education(update Knowledge)

B.A. II – Sub-The Organization and Administration of Physical Education.

Students gained the knowledge about
1) The basics for life lasting habits of physical exercise.
2) Traditional types of gymnasium and playgrounds games
3) Ample opportunities to develop motor skills of body.
4) The organization and administration of physical education and sports events.

B.A. III – Sub – Health Education

At the end of the program the students gain the following knowledge about
1) Personal health.
2) Various diseases and epidermics as well as the precautions.
3) National international health status.
4) The principle of nutrition.
5) Fitness concepts which affects one's life-style.

B.A. III – Sub – Rhythms and Recreation in Physical Education

At the end of the program the students gain the following knowledge about
1) Basic skills associated with team recreation games and tactics.
2) Student's all-round development.
3) Utilization of free time in constructive and creative way.
4) Fundamentals of happy life.
5) Enjoy the fun of game.
6) Developing the positive personal and social skills through funny games.

B.A. III – Sub – Applied Yoga

At the end of the program the students gain the following knowledge about
1) Physical, mental and social health.

2) Physical activities.
3) developing health fitness.
4) Adopting the healthy life style.

B.A. III – Sub –Anatomy and Physiology

At the end of the program the students gain the following knowledge about

1) Basic of Human Anatomy and Physiology.
2) Human organs / lungs and hormones secretion.
3)Exercise and its effects on health.

B.A. III – Sub – Diet and Hygiene

At the end of the program the students gain the following knowledge about

1) Balanced diet and calaries.
2) Need of healthy diet and rest.
3) personal, social, and National cleanliness.

B.A. II – Sub – Yoga Studies (IDS)

At the end of the program the students gain the following knowledge about

1) Physical, mental and social health fit and sound.
2) Physical activities.
3) Help Student is to develop health fitness.
4) Promotion of healthy life style.

Bachelor of Science

Botany

Paper-I: Microbiology and Phycology

On completion of the course, students are able to:

1) Understand the types and diversity in bacteria, viruses and mycoplasma
2) Understand the diversity among Algae.
3) Know the systematic, morphology and structure, of Algae.
4) Understand the useful, harmful activities and industrial applications of Algae.

Paper – II Biomolecules and Cell Biology

On completion of the course, students are able to:

1) Understand the Biochemical nature of cell.
2) Know the chemical nature of biomolecules.
3) Understand the different types of interactions and bonds in Biomolecules.
4) Structure and general features of enzymes.

5) Concept of enzyme activity and enzyme inhibition.
6)Understand difference between prokaryotic and eukaryotic cell.
7) Structure and organization of cell membrane, cell wall and peroxisomes.
8) Mitotic cell division

B.Sc. Part-I, Semester-II

Paper – III: Mycology and Phytopathology

On completion of the course, students are able to:
1) Understand General characteristics, Thallus organization, Cell wall composition Nutrition classification
2) Understand General characteristics, Occurrence, Thallus organization, Life cycle of fungi
3) Understand types and economic importance of Lichen
4) Understand types of Micorrhiza and its applications
5) Understand applied aspects of fungi with respect to biotechnology, industry
6) Understand the scope and importance of Plant Pathology.
7) Know the prevention and control measures of plant diseases and its effect on economy of crops.

Paper – IV: Archegoniate (Bryophytes, Pteridophytes, Gymnosperms)

On completion of the course, students are able to:
1)To understand unique characteristic features of archaegoniate.
2) Understand the morphological diversity, classification and economic importance of Bryophytes.
3) Understand the morphological diversity, classification and economic importance of Pteridophytes.
4) Understand the morphological diversity, classification and economic importance of Gymnosperm.

B. Sc. Part- III Semester-VI:

Paper-XIII: Molecular Biology

On completion of the course, students are able to:
1) Learn the scope and importance of molecular biology.
2) Understand the biochemical nature of nucleic acids, their role in living systems, experimental evidences to prove DNA as a genetic material.
3) Understand the process of synthesis of proteins.

Paper-XIV: Plant Biotechnology

On completion of the course, students are able to:
1) Understand the fundamentals of Recombinant DNA Technology.
2) Know about the Genetic Engineering.
3) Understand the principle and basic protocols for Plant Tissue Culture.
4) To understand applications of biotechnology in relation to the crop improvement.

Paper-XV: Plant Metabolism

On completion of the course, students are able to:
1) Understand the concept of ATP synthesis
2) To know about Carbon oxidation with different pathways
3) Understand the properties of Monosaccharides, Oligosaccharides and Polysaccharides.
4) They will learn about the Significance of Carbohydrates.
5) Understand the Properties of saturated fatty acids, and unsaturated fatty acids.
6) Understand lipid metabolism in plants.
7) Understand the Beta Oxidation, Gluconeogenesis and its role in mobilization of fatty acids during germination.
8) They will learn about the Significance of lipids.

Paper-XVI: Biostatistics

On completion of the course, students are able to:
1) To know the basic concepts of Biostatistics
2) To understand collection of primary and secondary data
3) To understand calculation of mean, mode median and variations
4) To know probability
5) To know statistical inference with respect to 't' test and chi square test

Bachelor of Science

Chemistry

Class	Paper No.& Name	Course Outcome
B.Sc. Part -I	Paper: I **Physical chemistry**	Students will be able to 1. Understand rate of chemical reaction ,the mechanism by which reaction proceed ,the scope of first and second order reaction andmethod to determine the order of reaction. Solve the numerical problem. 2. Understand essential mathematical concept frequently used in physical chemistry

		3. Understand basic terms in thermodynamics, various processes, second law and its different statement. Carnot's theorem, solve numerical problem. 4. Understand Gas laws, explanation of real gas behavior by van der Waal's equation , critical phenomena and principal of liquefaction of gases, solve numerical problem
	Paper :II **Inorganic chemistry**	Students will be able to Understand 1. Structure of atom, various atomic properties like ionization potential, atomic size, electron affinity, elctro-negativity etc. in thegroups and across the periods. 2. Meaning of ionic and covalent bonds, formation of covalent bonds, formation of ionic bond, VBT and MOT, examples.
	Paper: III **Organic chemistry**	Students will understand 1. General and basic ideas associated to structure, bonding, stereochemistry and reactivity of organic molecules. 2. General idea and chemical reactivity of alkane, cyloalkanes, alkenes and alkynes. 3. Aromaticity and electrophilic substitution of benzene.
	Paper: IV **Analytical chemistry**	Students will understand 1. Physical properties of viscosity, surface tension, dipole moment and refractive index of liquid. 2. Sources of air and water pollution and effect of air and water pollution on environment. 3. Qualitative and quantitative estimation of elements like C,H,N, S, X 4. Petroleum ingredients and petrochemicals. 5. Synthesis and industrial applications of petrochemicals
	Practicals	**Annual system** Practical Outcomes: • Acquaintance with glassware, handling of chemicals, safety measures, laboratory protocol. • Understanding of determination of equivalent weight of metal like Mg and rate of reaction, heat of reaction, heat of neutralization • Preparation of solution & Standardization of solution, Understand paper chromatography, calculation of Rf values and identification of basic radicals, spot tests to identify basic radicals • Estimation of organic compounds, Qualitative and quantitative analysis skills, Identification of organic compounds
B.Sc. part- II	Paper: V **Organic chemistry**	**Students will Understand** 1. Introduction to ultra violet spectroscopy, Problems based on spectral data 2. Geometrical and conformational isomerism, E-Z and R-S-

		nomenclature 3. Name reaction exhibited by aldehydes and ketones with mechanismChemical reactivity of ethylene glycol, glycerol and phenol 4. Chemical properties of ethers, epoxides, carboxylic acids and diazonium salts
	Paper: VI **Inrganic chemistry**	Students will Understand 1. Formation of coordinate compounds based on Werner's Theory,terminology related to coordinate compounds, nomenclature ofcoordinate compounds, formation of complexes based on VBT. 2. Ligands, chelating agents, chelation, classification of chelating agents and applications of chelation. 3. Lewis concept of hard and soft acid bases, 4. Members of d-block in periodic table, their electronic configuration and general properties like oxidation state, colour, magnetic properties, 5. Formation of complexes, comparative study of $1^{st}$with 2^{nd} and 3^{rd} transition series.
	. Paper:VII**Physical Chemistry**	Students will Understand 1. Understand concept of electricity,Terms in Electrochemistry, Transport number, Applications of Kohlrausch law, solve numerical problem. 2. Understand concept of Entropy, and its applications, Entropy changes in different processes, Third law of thermodynamics, solve numerical problem understand Law of crystallography , Weiss and Miller indices , 3. Type of cubic lattice,Diffraction of X-ray , Bragg's equation, Crystal structure of NaCl and KCl, solve numerical problem 4. Study Distribution law and its limitations, modifications and applications.
	Paper: VIII **Analytical Inorganic Chemistry**	After completion of this course students will be able to understand – 1. Terms in volumetric analysis- titrant, titrand, std. solution, indictor,equivalence point, primary and secondary standard, strength ofsolution, 2. Different types of volumetric analysis: acid-base titration, complexometric titrations. 3. Terms in gravimetric analysis-saturation, supersaturation, sol, gel, coagulation, flocculation, coagulation/flocculation value, peptisation, precipitation, precipitate, pre-precipitate, solubility, ageing or digestion, ignition 4. Steps involved in gravimetric analysis, precipitants in gravimetric analysis – DMG, aluminon, 8-hydroxy quinoline 5. Advantages and disadvantages of organic precipitants 6. Principle and manufacturing of ammonia, sulphuric acid 7. Metallurgy – Terms Metallurgy,Minerals,Ore, Gangue, Flux,

		Slag.Occurance of metals and types of ores. steps involved in metallurgical processes, concentration of ores ,physical and chemical methods, chemical and electrical reduction. 8. Iron and Steel occurrence and extraction of iron ,Types of iron Steel Definition Types and Manufacturing of steel ,Heat treatment on steel.
	Practicals	**Annual system** Practical Outcomes : • Handling skill ofrefractometer, polarimeter, pH meter. • Understanding of determination of unknown concentration of acid, comparison of acid strength, • Semi- micro qualitative analysis, organic and inorganic quantitative analysis skills • Quality control & Fertilizer analysis • Gravimetric analysis of Ba and Fe • Organic qualitative analysis skills • Inorganic and organic preparation skills
B.Sc. III	Paper : IX**Physical chemistry**	1. Understand Phase rule and terms in it, one and two component systems. 2. Understand Nernst equation, different type of electrode, chemical cells and concentration cell without transference. 3. Applications of emf measurements solve numerical problem. 4. Understand law of Photochemistry, Quantum yield, Jablonski diagram, think critically and solve numerical problem
	Paper : X**Inorganic chemistry**	Students will understand 1. Crystal field theory and its basic concept, splitting of d – orbitals shapes of d-orbitals, square planer, formation of octahedral and tetrahedral complexes ,Jahn – Teller distortion , factors affecting CFT splitting, calculation of CFSE with octahedral complexes,applications and limitations of CFT. 2. Molecular Orbital Theory – basic concept, symmetry classes of orbital's, formation of octahedral complexes, examples, applications and limitations. Difference between CFT and MOT 3. Nuclear reactions and energetics, Classification and types, use ofuranium, thorium and plutonium in nuclear reactor, application of radioisotopes as tracers. 4. Biological process and requirement of essential, trace elements, and non-essential elements, metalloporohyrins- structure and function of haemoglobin and myoglobin, role of Na^{+} , K^{+} and Ca^{++}

		5. Catalysts, classes of catalytic reactions, types, characteristics and mechanism of catalysis, Industrial applications of catalysis 6. Meaning of fertilizer, functions of fertilizer,classes of fertilizers, 7. Manufacture of fertilizers, mixed and complex fertilizers, pollution caused by fertilizers
	Paper:XI**Organic chemistry**	Students will understand 1. Detail study of spectroscopic methods like NMR, IR and mass Spectra 2. Struct.ure determination of organic compounds using NMR, IR and mass spectra 3. Study of Name reaction with mechanism and applications 4. Synthetic applications of active methylene groups, ethyl aceto acetate and diethyl malonate 5. Baeyer strain theory, conformational analysis of cyclohexane and disubstitutedcyclohexanes, concept of stereoselective and stereospecific reactions
	Paper:XII **Analytical and Industrial Physical chemistry**	Understand the basic principles of – 1. Colorimetry, 2. Potentiometry, 3. Electroplating, 4. Flame Photometry Their applications, advantages, limitations, acquire handling skills of these digital instruments.
	Paper : XIII **Physical chemistry**	1. Understand regions of electromagnetic spectrum, Rotational and Vibrational spectra and their applications, solve numerical problem 2. Understand ideal and non-ideal solutions, various, varrous system with different types. 3. Understand Free energy functions, Phase Equilibria, derivations of mass action, isotherm and isochore. Concept of fugacity and activity, solve numerical problems. 4. Understand simultaneous reaction ,Effect of temperature and theories of reaction rate.
	Paper : XIV **Inorganichemistry**	After completion of this course students will understand : 1. Electronic configuration, occurrence and separation methods of lanthanides, and actinides, 2. IUPAC nomenclature of super heavy elements with atomic number 100 3. Properties of metallic solids, Theories of bonding in metals 4. Classification of solids: conductor, insulator, semiconductor 5. Types of semiconductors 6. Superconductors : ceramic superconductors, applications

		7. Structures of borane, borazine, xenon compounds, oxides of sulphur and phosphorus and 8. Different types of corrosion. 9. Electrochemical theory of corrosion, factors affecting the corrosion, methods of protection of metals, 10. Passivity, its types, oxide film theory of passivity, 11. Applications of passivity 12. Meaning of organometallic compounds their nomenclature, 13. Structures and synthesis of alkyl and aryl compounds of Li, Be and Al. 14. Structure of simple monocarbonyl compounds
	Paper: XV **Organichemistry**	Students will understand : 1. Synthesis, physical and chemical properties of heterocycles like pyrrole, pyridine and quinoline 2. Detail study of vitamins (vitamine A) and hormones (adrenaline) 3. Dye – classification, auxochrome, chromophore, Witt's theory, synthesis and applications of congored, malachite green phenolphthalein. 4. Significance of agrochemicals: Indole acetic acid, carbaryl and methoxychlor 5. Introduction to drugs, classification, preparation and applications of some important drugs 6. Carbohydrates-classification, glucose, disaccharides and polysaccharides.
	Paper : XVI **Analytical organic chemistry**	Students will understand 1. Soap and detergents: classification, cleansing action of soaps, manufacture comparison between soaps and detergents, preparation of teepol and deriphat, 2. Classification of polymers, polymerization types. Preparation and uses of polythene, polystyrene, poly urethane, PVC, urea-formaldehyde resin, phenol-formadehyde resin,. Study of rubber 3. Study of sugar and alcohol industry 4. Reagents in organic synthesis: $LiAlH_4$, $NaBH_4$, SeO_2, OsO_4 , 1,3-dithiane 5. Twelve principles of green chemistry. Study of PTC, biocatalytic reactions MW-assisted reactions and ionic liquids 6. Principle and classification chromatographic. Study of paper chromatography, TLC, gas chromatography and column chromatography

	Practicals	**Annual system** Students will understand : **Physical Chemistry :** • Studyof temp. change on rate of reaction, • Determination of concentration of unknown solution Beer – Lambert's Law • Acquaintance of skill to use poteniometry, conductometry to determine normality of unknown solution • Comparison of strength of mono and dibasic acids using pH metry. • Determination of molar refractivity and calculation of refraction equivalents of C, H, and Cl atoms. • Determination of percentage composition of unknown mixture using refractometry • Determination of standard potential difference of different electrodes. **Inorganic Chemistry :** • Gravimetric analysis of one component in the presence of second component. • Preparation of complexes and determination of their purity • Analysis of commercial samples. • Separation skill-Separation of metals by using ion exchange column. **Organic Chemistry :** • Understanding of type determination, separation and identification of binary mixture, • Preparation skills : preparation of m-nitroaniline, aspirin, nerolin, p-iodo nitrobenzene, benzene azo B-naphthol and benzoic acid. • Estimation of sucrose, nitro group, sap value and formaldehyde
Outcome of B.Sc. Chemistry		The graduate of chemistry is eligible for- i) Eligible for P.G.Course and to do research in University and Government institutions like NCL, Institute of science, IIT ,BARC ,ISSER ,NISSER etc. ii) Appear any competitive examination MPSC &UPSC and various Government services. iii) Eligible to work independently in any chemical & pharmaceutical industry. iv) A capable Indian Citizen.

Bachelor of Science

Statistics

PAPER – I :- DISCRIPTIVE STATISTICS – I.

After studying this paper student is well acquainted with basic concepts of Statistics such as collection of data, classification, tabulation, preparation of frequency distribution.

He is able to present the data graphically using histogram, Bar diagram, Ogive curves etc.

He also studies measures of central tendency and measures of dispersion and is able to calculate them using appropriate formulae. He is able to calculate raw moments and central moments and coefficients of skewness and kurtosis for interpretation of data.

PAPER – II :- PROBABILITY AND PROBABILITY DISTRIBUTIONS – I

In this paper student is introduced with difference between experiment and random experiment. He is able to define various events on the sample space associated with the random experiment under consideration and is able to calculate probabilities of these events. He studies the problems in application of classical definition of probability and understands where it is not applicable. He studies Axiomatic definition of probability and can apply it for further probabilistic analysis. He can use the concept of conditional probability where ever required.

PAPER – III :- DISCRIPTIVE STATISTICS – II.

By the end of this course, student is able to compute correlation coefficient and interpret the relationship between the variables using its various values. He is also able to analyze the non measurable variations using theory of attributes and can find association if there between the attributes in terms of magnitude as well as direction. He studies Index Number in detail in this paper which is helpful for him to calculate and interpret various indices.

PAPER – IV :- PROBABILITY AND PROBABILITY DISTRIBUTIONS – II

This paper includes concepts of bivariate random variable, expectation, variance, conditional expectation and conditional variance. Student is able to obtain bivariate probability distributions

and conditional distributions for the problems under study. He is also able to calculate conditional expectation and conditional variance.

Depending upon the situations he is able to apply the knowledge of probability theory to solve the problems using certain standard discrete distributions like Bernoullie distribution, Binomial distribution, Hypergeometric distribution, uniform distribution etc.

PAPER – V :- CONTINUOUS PROBABILITY DISTRIBUTIONS.

By the end of this course, student is well acquainted with Univariate and bivariate continuous random variables and univariate and bivariate continuous probability distributions. He could obtain expectations, moments. Moment generating functions of these distributions. He also can find conditional expectation and conditional variance. He is able to obtain the distributions of certain functions of random variables using the concept of Jacobian of transformation. He studies Uniform and exponential distributions in this paper and he can find their applications in various fields.

PAPER – VI :- DISCRETE PROBABILITY DISTRIBUTIONS AND

STATISTICAL METHODS - I

By the end of this paper student studies some more discrete distributions based upon countably infinite sample space namely Poisson distribution, Geometric distribution, Negative Binomial distribution etc. He is also introduced with multinomial distribution wherein the possible number of outcomes of an experiment is more than two. He is able to calculate various characteristics like mean, variance, moments, pgf etc. of these distributions. He also studies correlation involving more than two variables namely partial and multiple correlation. He is able to apply least square theory for finding the equation of regression plane.

PAPER – VII :- CONTINUOUS PROBABILITY DISTRIBUTIONS AND

EXACT SAMPLING DISTRIBUTIONS.

In this paper student is introduced with some more continuous distributions namely Gamma distribution, Beta distributions of I and II kind, Normal distribution etc. He is also introduced with sampling distributions such as χ^2 distribution, Students t distribution and Snedecor's F

distribution. He is able to obtain various characteristics such as mean. Variance, mgf, CDF, median mode etc. He is also able to obtain distributions of certain functions of theser.vs.

PAPER – VIII :- APPLIED STATISTICS

This paper is very much helpful for the students as it deals with applications of statistical tools in various fields like industry, population study etc. After studying sampling theory a student is able to draw random samples using SRSWOR and SRSWR methods. He is able to apply knowledge of distribution theory for hypothesis testing problems using various statistical tests. He can apply the concept of 3σ limits based upon area property of normal distribution for the problems regarding performance testing. He also can calculate various birth and death rates.

PAPER – IX :- STATISTICAL INFERENCE – I

In this paper student studies various aspects of statistical inference. He studies point estimation, Unbiasedness , consistency, efficiency , MVUE and UMVUE and also sufficient statistic. He can apply Cramer-Rao lower bound for obtaining MVUE. He is also able to use various methods of estimation such as MLE and MME.

PAPER – X :- PROBABILITY DISTRIBUTIONS.

In this student is introduced with some more probability distributions like Laplace, Log-normal, Cauchy, Weibull, Logistic, Pareto, Power series distributions. He is also acquainted with the concept of truncation. He can obtain certain discrete and continuous truncated distributions after truncation on left of point a or right of point b. He can apply this concept in various problems.

PAPER – XI :- SAMPLING TECHNIQUES.

In this paper a student is introduced with some more methods of sampling techniques such as stratified random sampling, systematic sampling, cluster sampling, two stage and multi stage sampling, ratio and regression method of estimation etc. By the end of this paper a student is able to identify the situation where which method of sampling is appropriate for effective results after obtaining proper representative sample.

PAPER – XII :- REGRESSION ANALYSIS

In this paper student is introduced with the concept of regression, simple linear regression and multiple linear regression. He is also acquainted with logistic regression. At the end of this paper he is able to detect and treat the outliers, can perform residual analysis. He can obtain estimates of the regression parameters and variance. He is able to test the hypothesis of model parameters and model deviance and use LR test.

PAPER – XIII :- STATISTICAL INFERENCE – II

At the end of this paper a student is able to distinguish between point estimation and interval estimation. He can apply interval estimation for mean, variance of normal population, difference between two means, mean of exponential distribution etc. He is capable of of applying parametric as well as non parametric tests. He is able to use run test, sign test for testing randomness , Mann-Whitney U test or median test for testing independence of samples.

PAPER – XIV :- PROBABILITY THEORY

By the end of this paper student is well acquainted with order statistic and their distributions, various convergence concepts such as convergence in probability, convergence in quadratic mean, convergence in distribution, central limit theorem. He is able to understand the concept of stochastic process, finite markov chain and can apply the same in various fields like economics, finance, sociology etc.. He also studies queuing theory and so he can apply its concepts where we observe problems due to queues.

PAPER – XV :- DESIGNS OF EXPERIMENT

In this paper student studies various skills of designing an experiment and can be able to apply these techniques. He is capable of understanding and identifying the situations where the concepts of CRD, RBD, LSD or confounding or factorial experiments can be applied effectively.

PAPER – XVI :- TIME SERIE ANALYSIS

By the end of this paper student can understand meaning and utility of time series, its various components like trend , seasonal variations, cyclic variation, random variations etc. He can apply

various methods for estimation of these components. He is able to analyze the time series through regression analysis using AR(1) and AR(2) models for fitting of autoregressive models.

Bachelor of Science

Zoology

Class	Paper No. and Name Of the Paper	Outcomes
B.Sc.I	I- Animal Diversity I, II- Cell Biology Genetics, III- Animal Diversity II, IV-Ecology, Ethology, Evolution and Applied Zoology	• The successful students will be able to construct vermicompost center. • Students will be culture some animal in laboratory condition which is helpful for their study. • Students will know about parasitic diseases and their prevention and control measures. • Student will be able to establish research organization with the help of genetic counseling and cell biology. • Student will get knowledge and information about biodiversity among invertebrate animals. • The students will be able to establish their own industry like sericulture, dairy, and goat farming. • They will starts business like pearl farming, Fish farming. • Visit to aquatic ecosystem and study water parameters to know water quality. • Students will increase their attention regarding importance of animal diversity and their role in nature. • Survey and monitoring of local reptiles, birds and mammals .
B.Sc. II	V-Animal Diversity III, VI- Cell Science, Genetics ,Biological Chemistry and Economic Zoology VII- Animal Diversity IV, VIII- Histology and Physiology	• The students will know about species of mosquitoes which spread diseases like malaria, filaria, dengue. • They will aware about control and preventive measures regarding various diseases. • The successful students will be able to provide employment to the people in small scale business like goat farming, poultry, apiculture, construction of glass aquarium etc. • Student will be easily understand the poisonous and nonpoisonous snakes which will be helpful during snake bites and immediately take first aid treatments. • Survey and detection hemoglobin percentage, blood

		group and blood cell count. • Awareness about misguidance regarding menstrual cycle and their symptoms among girls. • Knowledge about contraceptives and their use and application. • Information about primary stages cancer cells. • Scientific research organization. • Primary knowledge about first stage cancer. • Enhances hobbies like bird watching ,survey and their monitoring. • Students will be awareness regarding abnormality in urine and consult their doctors. • Organization of blood donation camp and provide blood to the blood bank. • Organization of exhibition of poster presentation of animals for school students to enhance their curiosity.
B.Sc.III	IX-Non Chordates X- Developmental Biology XI-Comparative Anatomy of Chordates XII- Biostatistics, Bioinformatics, Medical Zoology and Evolutionary Biology XIII- Physiology XIV- Economic Zoology XV- Molecular Biology and Biotechnology XVI- Endocrinology, Environmental Biology and Toxicology	• The successful students will be able to establish research organization with the help of agriculture, environment protection and also their own industries for transgenic animal, clinical pathology, genetic counseling etc. • The successful student will have tremendous job potential. • Students will establish techniques about solid waste management. • Student will be aware about rainwater harvesting. • Students will play role as counselor regarding prevention and protection about rare animal species. • Awareness about toxic effect by using chemicals pesticides and use and importance of organic farming. • Use of biological indicators to prevent water pollution. • Protection of environment. • Use of biotechnology in various fields to increase production. • Study of crop pest and their control measures. • Students will have knowledge about handling of various tools and its techniques such as Ph meter, colorimeter, spectrophotometer, gel electrophoresis, etc. • Successful students will have opportunity in employment like forensic science, criminal investigation departments, pathology. • Cloning techniques and their application. • Student will be encouraged to participate in yoga and

		meditation center. • Survey and séances about rare and endangered species in local area. • Students will develop their personality, confidence, positive thinking regarding in all aspects. • Students will be participate in doing major research project regarding molecular biology,genetics,parasitology,toxicology,fish. • The study of Zoology is of practically importance. As man is dependent upon animals for many products and uses,such as food, clothing, drugs means of transport, recreation etc., animals prove to be of much economic important . • The study of zoology enlightens man kind in the pursuit of other disciplines like medicine, nursing, veterinary science, dietetics, agriculture, public health and many other fields. • Zoological study furnishes the basis for psychological and sociological studies. • The study of animal parasitology helps to save man, domestic animals and crops from injuries influences of animal parasites. • The study of animal ecology helps to maintain the web of life in which all animals and plants fit in to a pattern of environmental relationship.

Bachelor of Science

Physics

Sr. No.	Paper	Outcome
1	**Mechanics and Properties of Matter**	Students who have completed this paper should ➢ have a deep understanding of Mechanics of system and individual particle. ➢ Learn motion of oscillating object. ➢ Understand basic concept of Elasticity. ➢ Befamiliar with Surface Tension and Viscosity of liquid and its dynamics.
2	**Optics and Laser**	Students who have completed this paper should ➢ Be awareof geometry of optics,

		➢ Understand the models that describe these phenomena of light, ➢ have a deep understanding of function of Laser.
3	**Heat and Thermodynamics**	Students who have completed this paper should ➢ have a deep understanding of Transport Phenomenon of gas and liquid. ➢ Learn process of liquefaction. ➢ Understand basic thermodynamics ➢ Be learning function of heat engines and refrigerator.
4	**Electricity, Magnetism and Basic Electronics**	Students who have completed this paper should ➢ have a deep understanding of varying current in circuits. ➢ Learn function of Ballistic Galvanometer. ➢ Understand basic electronic circuit's components ➢ Be learning function of devices.

Sr. No.	Paper(Semester III)	Outcome
1	**General Physics, Heat and Thermodynamics (Paper IX)**	Students who have studied this course should • develop understanding and better problem-solver in scalar and vector triple product and field • good understanding of recessional motion and use of Gyroscope • understand elastic and plastic properties, use of elastic constants • well understanding of viscosity and use of viscometer • understand heat phenomenon and entropy of steam, gas • understand good acoustics requirement , sound limit. Musical sound and how to avid sound pollution.
2	**Electronics (PaperVI)**	Students who have completed this course should • understanding about electronics devices as Transistor. Use of Transistor as amplifier • understand the types oscillator and its use to produce different range frequencies • understand the basic unipolar devices FET and UJT. Use of FET and UJT as VVR and voltage sweep generator • understand digital electronic with different basic gets and applications of digital electronics • be able to make electronic circuit design and built regulated power supply • understand applications of CRO and understand use of CRO for measure wave length, phase, frquency
3	**Modern Physics(Paper VII)**	Students who have completed this course should • be able understand the concept of theory of relativity, Michelson –Morley experiment • understand concept of De Broglie Hypothesis of

		matter wave. understand uncertainty principal • be able to understand the vector atom model and quantum numbers • be able to understand Compton effect and its use • be able to understand nuclear energy sources and use of fission reaction. Know about role of Atomic Energy in India
4	**Optics (Paper VIII)**	Students who have studied this course should be able to • able to understand the basic of Reflection, Refraction and Cardinal points of lens system • understand the phenomenon of interference of light and interferometers to find out λ, μ and t as Michelson and F-P interferometer • understand phenomenon of diffraction of light and use of zone plate • understand concept of resolving power and find R.P of prism and grating • able to understand polarization phenomenon and optical active material also use of polarimeter • understand formation of optical fiber and use of optical fibre in communication system

Sr. No.	Paper(Semester V)	Outcome
1	**Mathematical and Statistical Physics(Paper-IX)**	Students who have studied this course should • develop sharp analytical skills, become a better problem-solver • be able to use mathematical tools in many disciplines that rely on quantitative and statistical methods • Be familiar with the main mathematical methods used in physics, vector analysis, coordinate systems etc.
2	**Solid State Physics(Paper-X)**	Students who have completed this course should • understand the basic nature of Matter, and correlate with types of matter • understand the crystalline and amorphous nature of matter • understand the basic phenomena in solid state physics, • understand magnetism and superconductivity and also understand the models that describe these phenomena,

		• be able to make quantitative estimates for phenomena in solid state physics.
3	**Classical Mechanics(Paper-XI)**	Students who have completed this course should • be able understand the concept of motion, types of motion like linear, rotational, rigid body etc. • be able to understand the nature of gravitational field • be able to understand the motion of projectiles to parts of machinery • be able to understand the motion of aircrafts • be able to understand more analytical mechanics like Lagrangian mechanics, Hamiltonian mechanics
4	**Nuclear Physics(Paper-XII)**	Students who have studied this course should be able to • able to understand the basic components of atomic nuclei • understand the creation and decay of elementary particles • understand the basic forces in the nature of the matter • understand radioactivity and the uses of radioisotopes • nuclear accelerators and high energy physics • study solar energy as an example of nuclear fusion
Sr. No.	**Paper(Semester VI)**	**Outcome**
6	**Electrodynamics (Paper-XIII)**	Students who have studied this course should • be able to understand the nature of electric and magnetic forces • be able to understand Maxwell's equations which govern the electromagnetic interactions • be able to relate relativity and electrodynamics
7	**Materials Science (Paper-XIV)**	Students who have studied this course should be • able to understand the manipulation of material properties and their applications • able to select a material for a given use based on considerations of cost and performance. • able to understand the limits of materials and the change of their properties with use • able to create a new material that will have some

		desirable properties
8	**Atomic, Molecular physics and Quantum Mechanics (Paper-XV)**	Students who have studied this course should be • able to understand the isolated properties of atoms and molecules • able to understand the emission, absorption, transmission and reflection of energy • have a deep understanding of the mathematical foundations of quantum mechanics, • able to solve the Schrödinger equation for simple configurations • able to differentiate between atomic and macro levels

Bachelor of Science

Mathematics

Paper-V Differential calculus

Course specific outcome

At the end of the paper students are able to solve

1)Equation of tangent, normal, intersection of two curves, sub tangent ,subnormal and there explanation.

2)Problems of curvature and radius of curvature

3)Problems of jacobian

4)Problems on maxima and minima

Paper- VI Real analysis

At the end of the paper students are able to solve

1)Problems on field structure , order structure, bounded , supremum, infimum completeness, absolute value.

2)Problems on limit of sequence, convergent sequence, Cauchy sequence, algebra of sequence , monotonic sequence

3)Problems on infinite series and comparison

Paper- VII Differential equation

At the end of the paper students are able to solve

1)Differential equation of first order and degree higher than one

2)Linear differential equation of second order

3)homogenous linear equation

4)Total differential equation

Paper-VIII Abstract algebra

At the end of the paper students are able to solve

1)Problems on groups, sub-groups, symmetry

2)Equivalence relation , partition, division algorithm

3)Properties of groups , co-sets, isomorphism

4)Group homomorphism, kernel, quotient groups

Paper-IX ALGEBRA II

At the end of the paper students are able to solve

1)Problems on ring, integral domain, field

2)Problems on quotient ring, homomorphism of ring

3)Vector space ,subspace , linear combination, LI ,LD, basis ,dimensions

4)Problems on linear transformation , matrix multiplication, isomorphism

Paper-X -Complex analysis

At the end of the paper students are able to solve

1)Problems on limit,continuity of complex differentiation , integral function ,analytic function

2)Problems on complex integration

3)Problems on residue at pole , residue at infinity

Paper- XI Integral calculus

At the end of the paper students are able to solve

1)convergence of improper integral of different kind

2)Problems on beta and gamma function

3)Problem s on multiple integration

Paper –XII Partial differential equation

At the end of the paper students are able to solve

1)Problems on linear partial differential equation of order one

2)Problems on non-linear partial differential equation of order one

3)Problems on linear partial differential equation with constant coeeficient

Paper XIII Metric spaces

At the end of the paper students are able to solve

1)Problems on limit in metric spaces

2)Problems on continuous function on metric spaces

3)Problem on completeness and compactness

Paper –XIV Numericalananlysis

At the end of the paper students are able to solve

1)Problems on finite differences , interpolation

2)Problems on differentian and integration

3)Problems on difference equation

Paper – XV Programming in C

At The end of the paper students are able to solve

1)knowledge about C language

2)Concept of constants, variable , data types

3)Concept of operation and expression

4)Input and output operation, decision making operator, loops and arrays

Paper-XVI Integral transform

At the end of the paper students are able to solve

1)Problem on Laplace Transform

2)Problems on inverse laplace transform

3)Application of laplace transform

Bachelor of Science

Computer Science

Class	Course	Outcomes (Students will be able to)
Computer Science		
FYBSc	ECS 102 Fundamental of Computer	• Understand the History of Computers.
		• Understand What is Computer and Basic concepts of computer.
		• Aware about various types of Computers, types of input and output devices.
		• Learn Microsoft office, Excel, PowerPoint.
		• Learn computer storage devices, its types
		• Learn OS
	CS C Programming - I	• Develop their programming skills.
		• Be familiar with programming environment with C Program structure.
		• Declaration of variables and constants.
		• Understand operators, expressions and preprocessors.
		Understandinf control statements with examples
		• Understand arrays , it's declaration and uses.
	ECS 202 Introduction to Web Designing	• Understand HTML and HTML5
		• Understand CSS and JavaScript
		• Know the different tags in HTML and CSS
		• Designing website using HTML language.
		• Design advanced website using CSS.
	CS 122 C Programming - II	• Design programs using Functions, Pointers , Structures and Unions in C language.
		• Write a program using File Handling.
		• Writing programs for drawing different graphical shapes.
	LAB – I: Laboratory Course in Computer Science	• On completion of the course, students are able to develop programs using C to meet real world needs and able to develop their own websites. This course provides platform to enhance student"s basic skills required for advanced programming.
SYBSc	COMP V : Object Oriented Programming Using C++	• Be familiar with Object Oriented Programming Environment.
		• Differentiate between Structure oriented programming and object oriented programming.
		• Understand different object modelling techniques and analysis like Generalization , Aggregation and Metadata.
		• Write Reusable , Extensible and Robust programs in C++.
	COMP VI: Software Engineering	• Get aware of evaluation of software and Software Development Life Cycle (SDLC).
		• Know about Software Development Model.
		• Get knowledge of Requirement Analysis and Specification in software engineering .
		• Learn use of Fact finding Techniques , Types of Requirement Modeling and Data Modeling Concepts.
		• Get knowledge of Design Concepts in software engineering.
		• Know about Cohesion & Coupling , Decision Table & Decision Tree, Data flow Diagram
		• Know about Software Coding & Testing.
		• Get aware about Elements of Software Quality Assurance.
	COMP VII : Data Structure	• Know what is data structure and basic algorithmic notations.
		• Analyse the time and space requirement of any algorithm.
		• Understand the different approaches of sorting and searching elements in the arrays.
		• Understand different techniques of designing the algorithms.
	COMP VIII : DBMS Using Oracle	• Explore polymorphism using Function and Operator Overloading.
		• Write programs for handling runtime errors using exception.
		• Understand the concepts of pointers in C++.
		• Understand the different aspects of hierarchy of classes and their extensibility.

		• Write generic programs using templates and STL.
	Practical III &IV Based on Paper V,VII and VIII	• On completion of the course, students are able to develop programs using C++ based on object oriented concepts and write the ROBUST, EXTENSIBLE and EFFICIENT programs.
TYBSc	CS- IX Visual Programming using C#	• Get aware about .Net platform.
		• understand looping structure, control flow statements and exception handling in VB.NET
		• understand Exception handling,multithreading,File IO in C#
	CS-X Core Java	• Get knowledge JDK Environment.
		• Explore polymorphism using Function and Operator Overloading ,overriding .
		• Understand the different aspects of hierarchy of classes and their extensibility .
		• Understand the concepts of streams and files .
		• Write programs for handling runtime errors using exception.
		• Understand Applet and swing programming
		• Understand Collection framework
	CS-XI Operating System	• know about functions and services of operating system.
		• aware about different CPU scheduling algorithms
		• get familiar with different memory management techniques.
		• understand different disk and drum scheduling algorithms as well as deadlock concepts.
		• get introductory knowledge about android operating system.
		• understand features and data types in SQL server.
		• create and manipulate databases for various applications.
		• use procedures and trigger for performing complex operation on databases.
		• handle errors using exception handling concepts.
	CS-XII Software Testing-Elective	• Get aware of evaluation of software and Software Development Life Cycle (SDLC).
		• Know about Software Development Models
		• Get knowledge of Requirement Analysis and Specification in software testing
		• understand white box and black box testing in details
		• Get knowledge of Design test cases.
	CS-XII Python-Elective	• Introduction to Python
		• understand Data types,looping structure, strings, collection lists
		• understand Functions and modules
		• Understand exception handling and regular expressions
	CS-XIII Web Technology	• By using c# code and ASP.Net create dynamic web pages.
		• Using Application and page framework in ASP.NET
		• Know about Server and validation controls
		• Working with master pages and site navigation
		Introduction to AJAX and ADO.Net
	CS-XIV Advanced Java	• program using JDBC and servlet
		• handle different kinds of events generated while handling windows.
		• create programs using menus and dialog boxes.
		Understanding hibernet and struct
		• understand advanced java concepts like JDBC and servlets.
	CS-XV Data communication and networking	• **Introduction to Data Communication & Networking**
		• Learn Physical layer
		• Understand Data link layer
		• Understand Network layer
		• • Understand Transport & sessionlayer
		• Understand Presentation layer

		• Understand Application layer
		• Understand Network layer
	CS-XVI :LINUX-**Elective**	• know about History Linux and UNIX operating system. • How to create users and group • Learn about file system of Linux Linux Varios Commands •Linux filters and editors

		• Communication commands:-
		• Learn Text Editors-vi, vim.
		• Write Shell Programmings.
		• How to create variables and how to write program
		• Learn Linux System Management
		• Understand Process Management
		• Disk management and System Administration
		• Linux Networking
		• Understanding various Servers.
	CS-XVI **AngularJS -Elective**	**• Learn Overview of AngularJS**
		• How to use Directives
		• Learn Angular Expressions
		• Learn Controller
		• Learn Filters
		• Learn AngularJS Modules
		• Learn AngularJS Forms
		• Learn Scope
		• Learn Single Page Application(SPA)
		• Learn AngularJS Animation
	Practical IV	Based on paper IX, XIII
	Practical V	Based on paper X, XIV
	Practical VI	Project Based on IX, X,XII,XIII,XIV,XVI
	Practical VII	Based on paper XII, XVI

Bachelor of Science

Electronics

F. Y. B. Sc. Electronics

Paper: I - Basic Circuit Theory and Network Analysis

On completion of the course, students are able to:

1. Understand response of electronic components to a continuously variable signal i.e. AC signals.
2. Understand proportional relationship between input and output signal in the form of voltage or current that represents the signal.
3. To learn function of basic circuit components used in linear networks.
4. Understand component symbols, working principle, classification, specifications and applications.
5. To learn different laws and theorems for simplification of basic linear electronics circuits.

6. To learn and understand the concept of two port networks and inter-conversion of networks.

Paper: II - Digital Fundamentals

On completion of the course, students are able to:

1. Understand basics of number systems like binary, decimal, octal and hexadecimal and their inter-conversion.
2. To learn function of basic digital circuits and use of transistors to create logic gates in order to perform Boolean logic.
3. To learn different theorems for simplification of basic Digital electronics circuits.
4. Students understand symbols, Truth tables, Boolean equations, & working principle.
5. Use of logic gates and Boolean algebra in designing digital arithmetic circuits.

Paper: III – Semiconductor Devices

On completion of the course, students are able to:

1. Understand construction, working and characteristics of Active Devices like diode, transistor (BJT), JFET, SCR, TRIAC, UJT etc.
2. Learn function of basic circuit components used in linear circuits.
3. Students understand basic linear electronic circuits and their working principle.

Paper: IV - Digital Electronics

On completion of the course, students are able to:

1. To learn TTL digital logic family with their specifications.
2. Understand combinational logic digital circuits and their types.
3. Students will be introduced to Flip-flop, shifts register, counters and semiconductor memory for data Processing circuits.
4. To learn symbol, working principle of basic Digital electronics circuits for data processing application.
5. At the end of this course, students should be able to recognize and analyze the basic digital circuits.

S. Y. B. Sc Electronics
COURSE OUTCOMES

Paper V - Electronic Circuits

On completion of this course, students are able to:

1. Understand rectifiers, filters and regulators.
2. Understand Transistor Biasing.

3. To learn basic function of single stage amplifier, multistage amplifier and power amplifier and their working principle.
4. Understand basic amplifier, feedback amplifier and oscillator circuits and their application in analog circuits.

Paper VI - Pulse and Switching Circuits

On completion of this course, students are able to:

1. Understand wave shaping circuits, time base circuit using active and passive components.
2. Understand Multivibrators using BJT.
3. Learn different multivibrator circuits using gates and ICs.
4. Understand IC 555 timer as astable and monostable multivibrator and its applications.

Paper VII - Operational Amplifier and Applications

On completion of this course, students are able to:

1. Understand differential amplifiers using discrete components.
2. Understand operational amplifiers.
3. To learn basic function of operational amplifier, Ideal and practical characteristics and their mathematical application.
4. Understand linear systems using Op-amp.
5. Learn amplifier non –linear system using Op-amp.
6. Understand oscillators and waveform generators using Op-amp.

Paper VIII - Digital Techniques and Microprocessor

On completion of this course, students are able to:

1. To understand different types of semiconductor memories and data converters like ADC and DAC.
2. To understand the basic architecture of 8- bit microprocessors (µp 8085).
3. Able to write programs for 8085 microprocessor based systems.
4. Identify various addressing modes of an instruction for microprocessor 8085.
5. Develop programming skills in assembly language.
6. Learn interfacing techniques for microprocessor 8085.

T. Y. B. Sc Electronics
COURSE OUTCOMES

Paper IX - Linear Integrated Circuits and Applications

On completion of the course, students are able to:

1. To understand fabrication of linear Integrated circuits.
2. To learn non-linear applications of Op-amps.
3. To understand basic construction of different active filters using Op- amps and their application in electronics.
4. To understand regulated power supply using three pin IC regulators.
5. To understand phase lock loop using IC 565 and its applications.

Paper X – Fundamentals of Microcontroller

On completion of the course, students are able to:

1. Ability to differentiate microprocessor and microcontroller
2. To learn the architecture of 8051 microcontroller.
3. To learn instruction set of 8051.
4. To learn the programming of 8 bit microcontroller related I/O ports, timers, interrupts and serial communications.

Paper XI – Sensors and Transducers

On completion of the course, students are able to:

1. To understand Basic Analog and digital measurement systems for measurement of various electrical parameters.
2. To understand basic principles of different active and passive sensors, transducers and their construction, Working principle, classification and application in various fields.
3. To understand various electronic transducers and actuators.

Paper XII – Biomedical Electronics (DSE-1)

On completion of the course, students are able to:

1. Analyze and evaluate the effect of different diagnostic and therapeutic methods, their risk potential, physical principles, opportunities and possibilities for different medical procedures.
2. To have a basic understanding of medical terminology, relevant for biomedical instrumentation.
3. To understand and describe the physical and medical principles used as a basis for biomedical instrumentation.
4. Understand the elements of risk for different instrumentation methods and basic electrical safety.
5. Understand monitoring and imaging system for basic medical diagnosis.

Paper XII – Electronics Communication (DSE-2)

On completion of the course, students are able to:

1. Use of different modulation and demodulation techniques used in analog communication.
2. Identify and solve basic communication problems.
3. Analyze transmitter and receiver circuits.
4. To understand Antenna and Radio wave propagation.
5. To understand basics of television.
6. To understand principles and Basics of Telephone Systems.

Paper XIII – Power Electronics

On completion of the course, students are able to:

1. Learn different power semiconductor devices used in industries.
2. Understand the construction and working of different power semiconductor devices.
3. Understand Thyristors and concept of turn on and off mechanisms of SCR.

4. Design power electronic circuit for real time application like rectifier, inverters and choppers etc.
5. To understand application of power devices in motor control, UPS, SMPS and inverters.

Paper XIV – Embedded System Design

On completion of the course, students are able to:

1. To learn the basics of "C" programming language and embedded "C".
2. To learn, interfacing of hardware and writing software for interface devices.
3. To write interfacing programming.
4. To identify embedded systems in various applications.
5. Design of Embedded System like temperature, humidity measurement and speed control of DC motors.

Paper XV – Electronics Instrumentation

On completion of the course, students are able to:

1. Understand the fundamentals of signal conditioning.
2. Understand Programmable instrumentation amplifier AD 594/595.
3. Learn signal transformation and data acquisition systems (DAS).
4. Understand Measuring instruments and display and recording devices like DMM, CRO, DSO, LCR-Q meter etc.
5. Take a case study of pH meter, conductivity meter and temperature meter.

Paper XVI – Virtual Instrumentation (DSE-1)

On completion of the course, students are able to:

1. Understand fundamentals of virtual instrumentation systems and its comparison with traditional systems.
2. To learn standard tools for virtual instrumentation like LABVIEW, PSPICE, Proteus system etc.
3. To get familiar with fundamentals of LABVIEW.
4. To develop Virtual instrumentation with LABVIEW.
5. To design VI for DAS for measurement of physical parameters and for temperature controlling.

Paper XVI – Modern Communication Systems (DSE-2)

On completion of the course, students are able to:

1. To understand basics of fiber optic communication.
4. Understand basic concept of computer communication system.
5. To understand Satellite and mobile communication systems.
6. Understand basics of microwave and RADAR communication.

Bachelor of Science

Microbiology

Class	Course	Outcomes (Students will be able to)
B.Sc. I (SM I)	Paper I: Introduction to Microbiology and microbial diversity	· Get an idea about the historical events in microbiology
		· Understand the diversity in microbiology
		· Understand the taxonomic classification of microorganisms
		· Know anatomy of prokaryotic cell , · Know structural detail of eukaryotic cell, · Understood various parts of cell and its importance
	Paper II: Microbial Techniques	· Acquainted with various sterilization techniques
		· Use various method to control microbes.
		· Understand different methods of staining techniques
		· . Understand Principle, working, ray diagram and application of advance microscopes
		· Develop basic skill in aseptic techniques
		· Understand various accessories for microbiology practicals
		· Perform various staining techniques
		· Cultivate bacteria with different cultivation technique
B.Sc. (SM II)	Paper III: Microbial Biochemistry & Physiology	· Understand concepts of growth and reproduction of bacteria
		· Develop fundamental knowledge about various biomolecules
		· Understand the basic concepts related to enzymes
		Understand nutritional requirements of bacterial
		· Understand the concept of microbial metabolism
	Paper IV: Applied Microbiology	· Know the scope of Microbiology
		· Water microbiology-
		· Sewage microbiology – technique used in food industries,
		· Get familiar with various instrumentation
		Technique used in milk industry,
		Concepts related to medical microbiology

B.Sc. I (SM II)	Practical course in Microbiology	Get familiar with various instrumentation Develop skill to stain parts of bacterial cell. Detect microbial enzymes Perform various biochemical test
		• Acquainted with various sterilization techniques
		• Use various method to control microbes.
		• Cultivate bacteria with different cultivation technique
B.Sc. II (SM III)	Paper V: Cytology and Physiology of Microorganisms	• Know ultra structure and functions of different parts of prokaryotic cell , .Know detail anatomy of prokaryotic cell
		• Develop fundamental knowledge about various biomolecules
		• Understand the basic concepts related to enzymes
		• Know various biochemical pathway
		• Understand the concept of microbial metabolism
		• Know concepts of viruses
B.Sc. II (SM III)	Paper VI: Bacterial Genetics	Understand concept of genes and chromosomes • central dogma, Understand concept of genes and chromosomes • Process of DNA replication transcription, translation • Various method used for genetic recombination • Familiar with concept of mutations • Concept of Plasmid
B.Sc. II (SM IV)	Paper VII: Immunology and Medical Microbiology	• Various concepts of medical microbiology • Understand basics of immunology
		• Concept related to cells and organs related to immune system
		• Immune response and immune mechanism
		• Immunological disorders
		• Concepts related to Immunodeficiency
BSc II (SM IV)	Paper VIII: Industrial Microbiology I	• Know the concepts of Industrial Microbiology • Aware of screening of bacteria Scale up and large scale production Implement techniques of continuous culture
BSc II (SM IV)	Practical course in Microbiology II	• Develop skill to stain parts of bacterial cell • Detect fermentation product • Screen bacteria for organic acid and antibiotics

		• Know various screening methods • Know various environmental effects on microorganisms • Different immunological techniques • Isolate and identify microorganism form laboratory sample • Perform MIC of antibiotics
		•
BSc III (SM V)	Paper IX: Virology	• Understand the basic concepts of virology • Various viral types ,Animal ,plant and bacterial viruses., • Concept of tumor immunology, type of tumors, immune mechanisms against tumors • Texanomical study of viruses. • Isolation of bacteriophage
BSc III (SM V)	Paper X: Agricultural microbiology	• Approaches used in agriculture to control disease in plant
		• Microbial ecology and microbial interaction
		• Pathogenic interactions with plant
		• Microbial biocontrol agents
		• Approaches used in agriculture to control disease in plant
		•
		• Screen bacteria for organic acid and antibiotics
B Sc III (SM V)	Paper XI: Immunology	Concept related to cells and organs related to immune system Immune response and immune mechanism Immunological disorders Concepts related to Immunodeficiency
B Sc III (SM V)	Paper XII Industrial Microbiology I	Bbioreactors, Industrial sterilization Strain improvement Scale up and large scale production
B Sc III (SM V)	Paper XII Industrial Microbiology II	Bbioreactors, •ndustrial sterilization Strain improvement Scale up and large scale production
B Sc III (SM VI)	Paper XIII Microbial genetics	• Concept of central dogma of molecular biology Process of DNA replication transcription, translation

		• Viral genetics Various method used for genetic recombination Concept of gene regulation Principals and applications of various molecular techniques Concept, methods and application of r-DNA technology Gene library and gene mapping
B Sc III (SM VI)	Paper XIV Microbial Biochemistry	• Concept of bioenergetics • Anabolism and catabolism with examples • Bacterial photosynthesis • Regulation of enzyme • Various methods used for enzyme purification • Enzyme assay
B Sc III (SM VI)	Paper XV Environmental Microbiology	Soil microbiology and xenobiotics.. extremophilles Microbial waste treatment methods Concepts related to geo-microbiology Environmental impact assisment
B Sc III (SM VI)	Paper XV Clinical Microbiology I	Various viral disease, their causative agent, mode of infection, epidemiology, treatment, lab diagnosis, prophylaxsis Various bacterial disease, their causative agent, mode of infection, epidemiology, treatment, lab diagnosis, prophylaxsis Various fungal disease, their causative agent, mode of infection, epidemiology, treatment, lab diagnosis, prophylaxsis Various protozoal disease, their causative agent, mode of infection, epidemiology, treatment, lab diagnosis, prophylaxsis
B Sc III (SM VI)	Paper XV Clinical Microbiology II	Various antigen antibody reaction, Different immunological techniques Concepts related to transplantation, Concept of tumor immunology, type of tumors, immune mechanisms against tumors
B Sc III (SMV&V	Practical course in Microbiology	Isolate and identify microorganism form laboratory

I)		sample Perform MIC of antibiotics ELISA test for disease diagnosis Immuno-diffusion techniques Techniques used in industrial production of alcohol Phenol coefficient test Evaluation of sterilization techniques Temperature relation with microorganism- TDT, TDP Various techniques to estimate size of microbes Isolation of bacteriophage and endophytic microorganism Check quality of milk Awareness of material safety Data sheet. Isolate and identify microorganism form laboratory sample, Antibiotics senstitivity and resistance test Detection of parasite Handling of blood and body fluids Techniques used in industries –Citric acid fermentation, UV-survival curve Enzyme production and determination of its activity Validation techniques of instruments and immobilization process. Various methods used in agriculturally important microbes Tests in waste water treatment Antimicrobial action of plant extract Test for milk quality

Master of Arts

History

Class	Course	Outcomes from the Course (Students will be able to)
M.A. Part-I	**Historiography.** Compulsory Paper No. I for Semester I and II.	➢ Grasp the details about Meaning and various Definitions of History.
		➢ Understand the about Kinds of History and it's Auxiliary as a Science.
		➢ Identify the Theory and Laws of History.
		➢ Grasp the details about the Research Methodology.
		➢ Know about the Chronological events in History.
		➢ Understand about the Theories and Themes of History.
		➢ Understand about the rewriting of the Historical facts.
		➢ Identify the various trends in historical writing. ➢
M.A. Part-I	**History of Modern World.** (1900 A.D. to 1970 A.D) Compulsory Paper No. II for Semester I and II.	➢ Identify the different Concept of Modern World.
		➢ Grasp the details of about First World War.
		➢ Understand about the Dictatorships in European Countries.

		➢ Grasp about the Second World War and situation in Europe thereafter.
		➢ Identify the Communist Revolution in Russia.
		➢ Know about the Dictatorships in Germany, Italy and Turkastan.
		➢ Understand about the Cold War Concept and International politics during the cold war period.
M.A. Part-I	**History of Ancient India.** (Up to 650 A. D.) Optional Paper No. I for Semester I and II.	➢ Identify the various types of Sources of Ancient Indian History.
		➢ Grasp the details of Pre-Historic Age of Indian History.
		➢ Understand the about the cultural heritage of India during the Indus Valley Civilization.
		➢ Identify the importance and the legacy of Aryan culture and Vedic Period.
		➢ Grasp the details of Religious Movement in India during Magadh Empire.
		➢ Know about the Political Developments in India during Mauryan Empire.
		➢ Perceive about the Political Developments in India during Satvahanas and Gupta Empire.
M.A. Part-I	**History of India.** (1757 A.D. to 1857 A.D) Optional Paper No. III for Semester I and II.	➢ Introduce toModern age of Indian History.
		➢ Identify the establishment of British Power in

		India.
		➢ Distinguish the detail account of British raj as well as its overall impacts on the Indian society.
		➢ Evaluate the renaissance and Religious and Social reforms movement in India.
		➢ Understand some of the early resistance to British rule.
		➢ Understand early political and SocialChanges in Indian Society.
		➢ Understand about the Revolt of 1857.
M.A. Part-II	**History of the Marathas.** (1600 A.D. to 1818 A.D.) Compulsory Paper No. I for Semester III and IV.	➢ Grasp the details about different Sources and various trends in Maratha History.
		➢ Understand the about the Maratha Policy.
		➢ Identify the Agrarian System of under Maratha.
		➢ Grasp the details of Traditional Industries during Maratha Period
		➢ Know about the Social Institutions during the Maratha Period.
		➢ Understand about the Bhakti Movement during Maratha Period.
		➢ Identify the legacy of Maratha Art and Architecture .
M.A. Part-II	**History of Modern**	➢ Grasp about the Political, Economic and

	Maharashtra. (1818 A.D. to 1900 A.D.) Compulsory Paper No. II for Semester III and IV.	Social Condition in Maharashtra.
		➢ Understand the about different uprising in the Nineteenth Century.
		➢ Identify the reforms movements in Maharashtra.
		➢ Grasp about the Emergence anf Growth of Nationalism in Maharashtra
		➢ Know about the Formation of Present Maharashtra State.
		➢ Understand about the Development of Modern Maharashtra.
M.A. Part-II	**History of India.** (1858 A.D. to 1964 A.D.) Optional Paper No. I for Semester III and IV.	➢ Identify the Strategies of British for Imperial Control.
		➢ Identify the Impacts of British Rule on Social and Economic sector of the India.
		➢ Distinguish the detail account of British raj as well as its overall impacts on the Indian society.
		➢ Understand early political awakening in Indian freedom struggle.
		➢ Understand various phases of the national movement.
		➢ Grasp the details of freedom movement under the Mahatma Gandhi□s leadership.
		➢ Understand the evolutionary processes of

		building of New India.
M.A. Part-II	**Women in Indian History.** Optional Paper No. II for Semester III and IV.	➢ Grasp about the origin and meaning of Feminism concept.
		➢ Understand the about women different religions.
		➢ Identify the about the women in different sectors of the Society.
		➢ Grasp about the Educational participation of women.
		➢ Know about the Participation of Indian women in Freedom Struggle.

Master of Arts

Political Science

Sr. No.	Course	Course Specific Outcomes
M.A.	M.A. Part-I Group D 1 Political Theory	• Student explains nature & significance of political theory. • To understand modern theories of state & democracy. • Develop a deeper understanding of the liberalism.
	M.A. Part –I Group D 2 Major Ideas & Issues in Public Administration	• To understand some important theoretical approaches& views in Public Administration. • To understand bases of organization. • Develop a deeper understanding of the personnel& financial administration.
	M.A. Part –I Group D1-II Indian Government & Politics	• Student explains understanding making of Indian Constitution, its features& Philosophy. • Student explains Constitution as an instrument of social change. • Develop consciousness of the concept- Political Economy. • Student will demonstrate critical assessment of fifty years of Indian Constitution.
	M.A. Part -I Group D1-III Modern Indian	• Student explains the concepts, ideas and theories that developed in Modern India. • To understand history of Indian Renaissance.

	Political Thought	• Students will have a summary understanding of New Humanism, Communism & Socialism in the view of Indian Thinkers.
M.A.	M.A. Part-II Group D 3 Research Methodology in Political Science	• Students will learn research methods and hypothesis writing, testing. • Demonstrate critical thinking and writing skills related to Report Writing. • Students will have a stronger and more informed perspective on Research Methodology in Political Science.
	M.A. Part-II Group D 4 Theory of International Politics	• Students will explicate analyze concepts & some Theories of International relations. • Student simultaneously studies structure & function of United Nations • Student explains International Conflict. • Student will demonstrate understanding of Regional Organizations
	M.A. Part-II Group D1-VII Government and Politics of Maharashtra	• Develop a deeper understanding of theformation of Sanyukta Maharashtra& determinants of politics of Maharashtra. • Student explains the composition and policy making of Maharashtra Government, Panchyat Raj Sansthas and Local Self Government. • Students will analyze and critically assess the Demand for separate Vidarbha State.
	M.A. Part-II Group D1-IX Western Political Thought	• Develop consciousness of the Classical& Christian political thought. • Student will demonstrate understanding of secularization of political thought. • To understand theories of Social Contract. • Develop a deeper understanding of the various ideologies.

Master of Arts

Economics

Sr.No.	Program	Program Objectives	Program Spcific objectives
1	M.A.	PO1. Critical thinking: Higher post graduation degree makes the students to go in to deep knowledge and to take informed actions after identifying the assumptions that frame our thinking and actions.	PSO1: Understand the behavior of Indian and world economy.

		PO2. Social Interaction: To create socio- economical awareness among the students which, make them able to understand economic issues and their social relevance.	PSO2: Analysemacro economic policies including fiscal and momentary policies of India.
		PO3. self directed and life- long learning: To show the ways of self-employment and self development through aquiring new technological charges.	PSO3: Determine economic variables including inflation, unemployment poverty, balance of payment.
			PSO3: Understand the behaviour of financial and money markets and perform cost benefit analysis for making investment decisions.
1	M.A. I Sem II	1. Micro Economic Analysis: I	The students are motivated to be capable to analyse demand pattern at individual and market level as well as they are also motivated to be capable to be capable analyse elasticity of demand its application at government and firm level.
		2. Economic of growth and development- I	This course most important area of the economic exploration in the last 50-60 years. Although relatively recent in origin this subject occupies a significant position in the economic theory and practice.
		3. Industrial Economics- I	In this course the students are promoted to be capable to understand pattern of industrilisation in India as well as world over.
	M.A.I Sem-I	Financial Institutes and markets- I	To create the awareness of the students of modern banking system. Understanding of the opportunities of banking their interaction with rest of the economy essential to realize how monetary force operates through maltitude of channels.
	M.A.I Sem-II	1. Micro Economic Analysis: II	In this course we cover remaining part of micro economic which deals with market structure, factor price determination and welfare economics.

		2. Economics of growth and development- II	India beginning a developing country this subject becomes extremely relevant for current situation. It includes the practical aspects of process of growth and development including the role of agriculture and industry, foreign trade, state etc.
	M.A. I Sem II	3. Industrial Economics- II	Basically in this course the students are expected to understand the economics behind the process of industrialization going on world over.
		4. Financial Institutes and Markets- II	Course intends to make students aware about the changing scenario of the modern banking role. Structure, performance and current problem faced by baking sector in India and also in the world. It also covers the future prospects and role of banking sector at the global level.
2	M.A. II Sem-III	3. Macro Economic Analysis- I	Course equips the students to understand systematic facts and latest theorotical development for empirical analysis. To understand macro economictheorotical structure is considered essential for the proper comprehension of the different issues and policies.
		4. Public Economic- I	Public finance deals with governments revenue, expenditure and debt. The students are motivated to be capable to analyse theories of economics. The role of government, tax system and effects of tax imposition on income level of people as well as saving, consumption and production in the economy.
	M.A. II Sem-III	9. Labour Economics- I	Labour is an important factor of production. Wage determination, labour unions, social security one studied in the course. Similarly, organised and unorganised unemployment labour participation, female un-employment pattern are studied in the course.

		10. Agricultural Economics- I	In this course the students are promoted to be capable to understand pattern of Agriculture in India.
	M.A. II Sem-IV	3. Macro Economic Analysis- II	This course assumed such a great significance in recent times that a prior understanding of macro economicstheorotical structure is considered essential of the proper comprehension of the different issues and policies.
	M.A. II Sem-IV	4. Public Economic- II	In this course that the students are motivated to be capable to be analyse the concept of public debt and various theorotical views related to the concept. The requirement of public debt and its impact on the economy is studies.
		9. Labour Economics- II	The course attempts to sensitize the students about the dynamics of changes in Labour laws, government Acts etc.
		10. Agricultural Economics- II	In this course the students are expected to understand the economics behind the process Agriculture going on world over.

Master of Arts

English

M A I Seme I Entire English 2018-19	**By the end of the course the students will:**
British Literature Paper I	1. Get acquainted with major trends and writers in British Literature.
	2. be enable students to read and appreciate the works of major British authors.
	3. the linguistic competence along with the literary competence improved.
M A I Seme II Entire English 2018-19	**By the end of the course the students will:**
British Literature Paper V	1. Get acquainted with major trends and writers in British Literature.
	2. be enable students to read and appreciate the works of major British authors.

	3. the linguistic competence along with the literary competence improved.
M A I Seme I Entire English 2018-19	**By the end of the course the students will be:**
Indian English Literature Paper II	1. acquainted with the masterpieces in Indian English Literature.
	2. able to critically appreciate the works of Indian authors writing in English.
	3. familiar with the literary achievements of Indian Diasporic writers.
M A I Seme II Entire English 2018-19	**By the end of the course the students will:**
Indian English Literature Paper VI	1. acquainted with the masterpieces in Indian English Literature.
	2. able to critically appreciate the works of Indian authors writing in English.
	3. familiar with the literary achievements of Indian Diasporic writers.
M A I Seme I Entire English 2018-19	**By the end of the course the students will :**
Introduction to Language and Literature	1. interest in language studies would be developed.
Paper III	2. be acquainted with language as a mechanism and linguistic theories.
	3. familiar with the basic concepts in linguistics.
	4. familiar with various branches of Linguistics.
M A I Seme II Entire English 2018-19	**By the end of the course the students will:**
Introduction to Language and Literature	1. comprehend the concept of applied linguistics.
Paper VII	2. able to apply linguistic theories to different types of text.
	3. be acquainted with varieties of languages based on person, place, and society.
	4. able to analyze the prose and poetry discourses sytistically.
M A I Seme I Entire English 2018-19	**By the end of the course the students will:**
Camparative Literature Paper IV	1. be familiar with the discipline of comparative literature.
	2. familiar with the definition, nature, scope, concepts, issues, and
	methodologies of comparative literature.
	3. familiar with the ideal of one world beyond regional and national boundaries.
	4. able to analyse two form different languages text critically.

M A I Seme II Entire English 2018-19	**By the end of the course the students will:**
Camparative Literature Paper VIII	1. be familiar with the discipline of comparative literature.
	2. familiar with the definition, nature, scope, concepts, issues, and
	methodologies of comparative literature.
	3. familiar with the ideal of one world beyond regional and national boundaries
	4. able to analyse two form different languagestext critically.
M A II Seme III Entire English 2018-19	**By the end of the course the students will:**
American Literature Paper IX	1. Understand the different genres, the social, political and historical
	background of American Literature.
	2. Be competent to comprehend American Classics
	3. Be able to appreciate the prescribed texts critically.
M A II Seme IV Entire English 2018-19	**By the end of the course the students will:**
American Literature Paper XIII	1. Understand the different genres, the social, political and historical
	background of American literature.
	2. Be competent to comprehend American Classics
	6. Be able to appreciate the prescribed texts critically.
M A II Seme III Entire English 2018-19	**By the end of the course the students will:**
Critical Theory Paper X	1. Understand the broad development of critical theories from the early
	twentieth century to the present.
	2. Have enhanced ability to read, contextualize and compare literary theorists.
	3. Develop competency to mark differences and similarities between
	several critical theories and schools
	4. Develop an ability to apply the critical theories to literary texts
	5. Have enhanced ability to understand their own theoretical/critical stance as
	readers.
M A II SemeIVEntire English 2018-19	**By the end of the course the students will:**
Critical Theory Paper XIV	6. Understand the broad development of critical theories from the

	early
	twentieth century to the present.
	7. Have enhanced ability to read, contextualize and compare literary theorists.
	8. Develop competency to mark differences and similarities between several
	critical theories andschools.
	9. Develop an ability to apply the critical theories to literary texts.
	10. Have enhanced ability to understand their own theoretical/critical stance as
	readers.
M A II Seme III Entire English 2018-19	**By the end of the course the students will:**
Postcolonial Literature Paper XI	1.Enable the students to comprehend Postcolonial Studies in the global context.
	2.Have enhanced ability to read, contextualize and compare Postcolonial
	Theories.
	3.Make use of Postcolonial Critical Concepts to analyze social, cultural and
	political condition in today's global context.
	4.Analyze and critique specific aspects and elements of Postcolonial Studies.
M A II SemeIVEntire English 2018-19	**By the end of the course the students will:**
Postcolonial Literature Paper XV	1.Enable the students to comprehend Postcolonial Studies in the global context
	2.Have enhanced ability to read, contextualize and compare Postcolonial
	Theories.
	3.Make use of Postcolonial Critical Concepts to analyze social, cultural and
	political condition in today's global context.
	4.Analyze and critique specific aspects and elements of Postcolonial Studies.
M A II Seme III Entire English 2018-19	**By the end of the course the students will:**
Translation Studies Elective Paper XII	1) Comprehend translation studies as a separate discipline of knowledge
	2) Comprehend the nature, scope and theoretical issues in translation studies
	3) Comprehend major issues and methods in literary studies

M A II Seme IV Entire English 2018-19	**By the end of the course the students will:**
Translation Studies Elective Paper XVI	1. Comprehend translation studies as a separate discipline of knowledge
	2. Comprehend the nature, scope and theoretical issues in translation studies
	3. Comprehend major issues and methods in literary studies

Master of Science

Physics

Sr. No.	Paper	Outcome
1	**Mathematical Techniques**	Students who have completed this paper should ➢ Be familiar with the main mathematical methods used in physics.
2	**Condensed Matter Physics**	Students who have completed this paper should ➢ Be familiar with the basic phenomena in solid state physics, ➢ Understand the models that describe these phenomena, ➢ Be able to make quantitative estimates for phenomena in solid state physics.
3	**Analog & Digital Electronic**	Students who have completed this paper should ➢ have a deep understanding of Basic Circuits using Active Devices ➢ Learn function of basic circuit components used in linear circuits. ➢ Understand basic digital electronic systems ➢ Be learning function of basic digital circuits and use of transistors to create logic gates in order to perform Boolean logic.
4	**Classical Mechanics**	Students who have completed this paper should ➢ Have a deep understanding of Newton's laws, Lagrengian and Hamiltonian formulations, ➢ Be able to solve the Lagrangian and Hamiltonian equations and for simple configurations using various methods, ➢ Understand the foundations of chaotic motion.
5	**Elements of Materials science**	Students who have completed this paper should ➢ Conceptually explain the classification schemes that are used to categorize materials. ➢ Explain the differences in the mechanical

		behavior of materials based upon bond type, structure, composition, and processing. ➢ Describe the basic structures and repeat units for common thermoplastics and relate the distribution of molecular weights, degree of polymerization, percent crystallinity, and glass transition temperature to properties in service. ➢ Describe how and why defects in materials greatly affect varies field properties and limit their use in service.
6	**Quantum Mechanics**	Students who have completed this paper should ➢ Have a deep understanding of the mathematical foundations of quantummechanics, ➢ Be able to solve the Schrödinger equation for simple configurations, ➢ Understand the effect of symmetries in quantum mechanics.
7	**Electrodynamics**	Students who have completed this paper should ➢ Have a deep understanding of the theoretical foundations of electromagneticphenomena, ➢ Be able to solve the Maxwell equations for simple configurations, ➢ Have a working knowledge of special relativity.
8	**Analytical Techniques**	Students who have completed this paper should ➢ Identify the principles of processing, manufacturing and characterization of nano materials and nanostructures. ➢ Apply the electronic microscopy, scanning probe microscopy and nanoindentation techniques to characterize the nano materials and nanostructures. ➢ Evaluate and analyze the mechanical properties of bulk nano structured metals and alloys, nano composites and carbon nanotubes.
9	**Statistical Mechanics**	Students who have completed this paper should ➢ Have a deep understanding of physical statistics and its relation to information theory, ➢ Be able to solve statistical mechanics problems for simple non-interacting systems, ➢ Have a basic understanding of the phase transitions, ➢ Be able to use linear response theory and kinetic equation approach.
10	**Fundaments of Semiconductor and Nanophysics**	Students who have completed this paper should ➢ Have ability to utilize semiconductor models to analyze carrier densities and carrier transport.

		➢ Be ability to understand and utilize the basic governing equations to analyze semiconductor devices. ➢ Understand and analyze the inner working of semiconductor p-n diodes. ➢ understand the fundamental physical principles, which govern properties of the condense matter and in particular the role of dimensionality on the mechanical, thermal, optical, electrical and magnetic properties of materials ➢ understand the physical basis of new phenomena that appear when the linear dimension of an object or device shrinks below a micrometer
11	**Conventional &Non-conventional Energy**	Students who have completed this paper should ➢ Describe the environmental aspects of non-conventional energy resources. In Comparison with various conventional energy systems, their prospects and limitations. ➢ Know the need of renewable energy resources, historical and latest developments. ➢ Describe the use of solar energy and the various components used in the energy production with respect to applications like-heating, cooling, desalination, power generation, drying, cooking etc.

Analytical Chemistry, M. Sc. I, Semester I & II

HCT-101 Inorganic Chemistry I	• Understand concepts related to wave mechanics. • Study of d-block, f-block elements, metal clusters and splitting of orbitals • Learn the geometry of different molecules • Study of semiconductor, supercapacitor, rectifiers and transistors. • Understand the nuclear reactions, radioactivity and different techniques for its measurements
HCT-102 Organic Chemistry I	• Understand concepts related Reaction mechanism: Structure and reactivity . • Study of Aliphatic Nucleophilic substitutions, Aromatic Electrophilic Substitutions, • Addition to Carbon–Carbon Multiple Bonds • Learn the Elimination Reactions and rearrangements • Understand the concepts related to Stereochemistry
HCT-103 Physical Chemistry-I	• Understand the concepts related to Chemical Thermodynamics and its appliacations • Understand the thermodynamics of ideal and non-ideal solutions, Raoults law and Henry's law • Study of Fast Reactions and different techniques to study fast reactions • Learn the concepts related to Statistical Thermodynamics and its applications • Understand the Colloids and macromolecules, types of Polymerization and methods for determination of molecular weights of macromolecules
SCT-104A Analytical Chemistry-I	• Study the basic concepts of Statistical data analysis and different methods of data analysis • Understand different Chromatographic Methods, its instrumentation and applications. • Learn the Principles, instrumentation and analytical applications of Polarography and Amperometry • Learn key elements of basic programme structure, different softwares and PC based models for chemical analysis
SCT-104B Chemistry in Life Sciences	• Study basic concepts in cell biology and Structure of different cell organelles • Study structures, classifications, properties and functions of Amino acids and Nucleic acids • Learn Polypeptide backbone, end-group analysis by chemical and enzymatic methods, Chemical modification and cross linking • Understand bioenergetics and related terms, reactions and cycles
HCT – 201 Inorganic Chemistry – II	• Study the Chemistry of Non- transition Elements and their compounds • Study Organometallic reagent in organic synthesis and different reactions • Understand Metal- Ligand Equillibria and stability of complexes

	• Study properties, separation methods and applications of Lanthanides and Actinides (08) • know extraction, properties and applications of copper different metals • Study role of metal ions in biological processes
HCT – 202 Organic Chemistry-II	• Study of name reactions with mechanism • Study of Reagents in organic syntheses • Study of catalytic hydrogenation using homogeneous and heterogeneous catalysts. • Study different Application of different oxidizing agents. • Study of Organometallic compounds • Study Methodologies in organic synthesis, synthons and retrones • Study of Mechanism and synthetic applications Hydroboration, formation of enamines and protection of functional groups
Paper No. SCT – 203A Physical Chemistry-II	• Study basic concepts and rules in photochemistry, phosphorescence, fluorescence, Stern- Volmer equation • Understand Electrical double layer and its significance, emf concepts, Debye Huckel theory and • Storage batteries • Know Basic concepts in Biophysical chemistry, folding and defolding phenomena, Bioenergetics • Basic concepts in chemical kinetics, Reaction mechanism, Ionic reactions, Primary and secondary salt effect
Paper No. SCT – 203B Green Chemistry-I	• Basic concepts and principles of Green chemistry • Understand Hazard assessment and mitigation in chemical industry • Study of green synthesis/reaction, development of analytical techniques and Future trends in Green Chemistry
Paper No. OET-204A Instrumental Methods of Analysis	• Study of Basic concepts in Ultraviolet and visible Spectrophotometry and Qualitative and Quantitative applications . • Basic concepts, Instrumentation and sampling techniques in Infra-red spectroscopy and its applications • Study of Basic concepts, sample preparation and Instrumentation in Nuclear Magnetic Resonance and its applications • Study of concepts, Principle, working of mass spectrometer and applications • Study of concepts, principles, instrumentations and applications of Atomic Absorption Spectroscopy and Inductively Coupled Plasma Spectroscopy
Paper No. OET-204B Medicinal Chemistry	• Understand the Concepts about Drug design and administration • Study of PharmacokineticsPharmacodynamics • Study of Cardiovascular Drugs and Non Steroidal Anti-inflammatory Drugs • Study of Antibiotics and anaesthetics and mode of actions
Inorganic Chemistry Practicals Semester-I& II	• Performing experiments of different ore analysis • Carrying out the experiments of different alloy Analysis • Preparation of different compounds, complexes and determination their of purity
Oragnic Chemisty Practicals Semester–I & II	• Separation and identification of the two component mixtures • Demonstration of TLC, Vacuum and steam distillation techniques and Extraction by Soxhlet Method • One stage preparations involving various types of reactions • Two stage preparations involving various types of reactions

	• Estimation of amine, hydroxyl group, iodine value of an oil and percentage of Keto-enol form.
Physical Chemistry Practicals Semester-I & II	• Kinetics of auto-catalytic reaction, Iodonation of acetone, acid catalyzed hydrolysis of an ester, Determination of order of reaction by differential method, Comparison of acid strength by hydrolysis of ester • Determine the molecular weight of PVA and radius of molecule by viscosity measurements • Study of Adsorptionof Acetic acid and oxalic acid on activated animal charcoal • Study of three component systems and CST of phenol-water system in presence of NaCl and naphthalene • To determine the surface tension of a liquid by stalagmometer (drop number method) • To determine the structure of given Organic Liquids • Determination of pKa of dibasic acids (malonic acid, Oxalic acid and succinic acid) and hydrolysis constant of aniline hydrochloride using pHmetry • Study of precipitation titration using Conductometry • Conductometric estimation of NH_4Cl with NaOH solution. • To determine the basicity and pKa value of organic acids by potentimetric method. • Determine the solubility and solubility product of sparingly soluble salts using Potentiometry • To determine the atomic parachor of C, H and Cl by surface tension measurements. • To determine the electron polarization and electron polarizability of a liquid using Refractometry • Conductometric Titration of a mixture of HCl, CH_3COOH and $CuSO_4$ against alkali. • Estimate the amount of halides present in the given mixture by titrating with $AgNO_3$ solution using *Potentiometry*, potentiometric Titration of mixture of acids with base. • To determine the percentage of two optically active substances (d-sucrose and d-tartaric acid) in a given solution using Polarimetry
Analytical chemistry Practicals Semester I & II	• Determination of calcium from given drug sample. • Determination of hardness, alkalinity and salinity of water. • Separation and estimation of chloride and bromide on anion exchanger • To determine the amount of Cu in brass metal alloy titrimetrically • Separation and estimation of Fe and Al on cation exchanger • Determination of sodium from the fertilizer sample using cation exchange chromatography. • Determination of Zn and Cd from the given solution by using anion exchanger resin • Separation and estimation of Ni and Co on anion exchanger • Estimation of Pb and Sn in solder alloy • Determination of Mo, Fe by solvent extraction using isopropyl alcohol as solvent. • Analysis of Pharmaceutical tablets. • Colorimetric estimation of drugs, D-glucose and dyes • To determine the acid value of given oil. • Separation of mixture of o-and p-nitroanilines on an alumina column. • Determination of uric acid / createnins in urine. • Estimate amount of endosulphon.

	• To separate a mixture of 2,4-dinitrophenyl hydrazones by adsorption chromatographic technique. • Estimate Caffeine in Tea Powder. • Determination of percentage purity of given olefinic compound by brominationmethod. • To Verify Beer –Lambert's Law for solutions of $KMnO_4$ in water and $K_2Cr_2O_7$ in water in acid mediumColorimetrically • To study Ionic Strength Effects for different ions • To study H^+ ion Effect on solubility of calcium Oxalate • To determine the pKa value of dibasic acid () by pHmetery. • To determine the amount of carbonate & bicarbonate potentiometrically. • Estimate the concentration of H_2SO_4, CH_3COOH and $CuSO_4$ by conductometrictitration • Determine the amount of carbonate & bicarbonate by pHmetry • Determine the concentration of vinegar conductometrically. • Estimate the amount of D-glucose in given solution polarimetrically.
Analytical Chemistry, M. Sc. II, Semester III & IV	
CH-ANAL-301Advance Separation Techniques-I	• Study of basic concepts types, methodologies and applications of chromatography • Study of Theory, classification, instrumentation and applications of Electrophoresis • Study of Dialysis, Electrodialysis, Ultrafiltration, Ultracentrifugation, Zone refining and their applications. • Study of Basic principles, classification and applications of Solvent Extraction
CH-ANAL-302 Instrumental Methods of Chemical Analysis-I	• To understand the methods of thermo gravimetric analysis, Differential Thermal Analysis, Differential Scanning Calorimetry • Study of principle, types, instrumentation and applications Radio Analytical Techniques • To study ion selective electrodes, voltametry and stripping voltametry and coulometric methods • Study of High frequency titration, Ampherometry titration and Electrgravimetric titration
CH-ANAL-303 Applied Analytical Chemistry	• Study on Analysis of Soil, Stock feeds, Plant, Fertilizers, Pesticides and insecticides • Understanding about analysis of minerals, ores and alloys • Study of Analysis of face powder, Deodorants and antiperspirants
CH-ANAL-304-A Analytical Spectroscopy	• Study of principles, instrumentations and applications of Raman spectroscopy, Resonance Raman Spectroscopy, Mossbauer spectroscopy • Understanding about scope, principles, instrumentations and applications of Nuclear Quadrapole Resonance Spectroscopy, Photoelectron Spectroscopy, Photo acoustic spectroscopy • Study of scope, principles, instrumentations and applications of Electron Spin Resonance Spectroscopy and Electron Microscopy
CH-ANAL-304-B Analysis of Commercial Materials	• Understanding about Analysis of petroleum, coal, coke, gaseous fuels and Explosives • Study of Cement, Glass and Ceramics industries • Knowing about the basic concepts and Analysis of Paints and Pigments, Soaps and Detergents

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CH-ANAL-401 Advanced Analytical Techniques	• Study of the Ion Chromatography and Hyphenated Techniques such as UV-Visible, IR, 1H-NMR, 13CNMR, Mass spectrometry (advanced examples), GC-MS, HPLC-MS and their applications. • Understanding about the kinetic methods of analysis and automated analysis • Study of Super critical fluid chromatography, Super critical fluid extraction and Particle size determination
CH-ANAL-402 Instrumental Methods of Analysis-II	• Study of X-ray methods of Analysis and Surface characterization by spectroscopy • Understanding about theory, instrumentation and applications of Nephlometry, Turbidometry Interferometry and Refractometry • Study of theory, instrumentation, applications of Fluorimetry,Phosphorimetry, Emission Spectroscopy and Flame photometry.
CH-ANAL-403 Bio-chemical and food analysis	• Study of basic concepts and tests about Food Analysis and Body Fluid Analysis • Study of Characterization and analysis of different drugs • Understanding about features and applications of Clinical Analysis and Forensic Analysis
CH-404-A Environmental Chemical Analysis	• Study of different parts of environment • Detailed Study of air, water and soil pollution • Study of Waste water treatments • Understanding about Industrial pollution and hazardous substance analysis
CH-ANAL-404-B Pharmaceutical Analysis	• Study of sources of impurities in pharmaceutical raw materials and finished products • Knowing about test and assay of raw materials and finished products • Understanding about standardization and quality control of different drugs • Study of role of FDA in pharmaceutical industry
Analytical Chemistry Practicals Semester-III & IV	• Analysis of waste water, dairy whitener , beverages,drugs, food samples and fertilizer samples by different methods • Determination of amount of different ions from the given sample solution by various methods • Determination of dissociation constant of weak acid pH-metrically. • Chromatographic separation of sugars, amino acids by paper, • Analysis of felspar ore. • Analysis of some common pesticides insecticides, plastics and detergents.
Analytical Chemistry Practicals	• Analysis of waste water, dairy whitener , beverages,drugs, food samples and fertilizer samples by different methods • Determination of amount of different ions from the given sample solution by various methods • Determination of dissociation constant of weak acid pH-metrically. • Chromatographic separation of sugars, amino acids by paper, • Analysis of felspar ore. • Analysis of some common pesticides insecticides, plastics and detergents.

Semester-III & IV	• Spectrophotometric determination of the amount of each para nitro-phenol and meta nitro-phenol from the given mixture, and the amount of copper and bismuth and iron (III) from the given mixture • Conductometric determination of relative strength of acetic acid, chloroacetic acid and trichloroacetic acid • Determination of the pka value of chloroacetic acid and trichloro acetic acid by pH. metry • Potentiometric pH-metric and conductometric determination of strength of acetic acid from the commercial vinegar sample • Flame photometric estimation of each Na, K, Li and Ca from the given sample mixture • Estimation of Zn and Cd from unknown solution by polarographic technique. • Determination of moisture content in food sample by Karl Fisher reagents. • Flame photometric estimation of different metal ions by standard addition method and internal standard on flame photometry. • Potentiometric estimation of various transition elements like Zn/Ni/Co/Cd/Al from various • commercial samples by complexometric titrations • Determination of dissociation constant of Cu-ammonia complex potentiometrically. • Determination of an indicator constant and isosbestic point of an indicator by spectrophotophometry. • Simultaneous estimation of Cl and I , bicarbonate and carbonate by potentiometrically. • Estimation of purity of a given azo dye by colorometry • Analysis of iodized table salt and malathion by colorometry.
Analytical Chemistry Practicals Semester-III & IV	• Estimation of Tannin from Tea and Isolation of caffeine from tea. • Assay of soaps and detergent. • Preparation of sulphanilide from acetanilide ,Preparation of methyl Salicylate and aspirin assay its purity • Estimation of the purity of a given azo dye by colorimetry. • Analysis of milk. • Determination of sap value and Iodine value of an oil. • Kjeldahl method for protein estimation in foods and feeds. • Identification of organic compounds by their IR spectra. • Determination of amount of vit-B2 in the medicinal tablet fluorometrically. • Estimation of N-methyl and C-methyl groups. • Estimation of sodium benzoate/sodium metabisulphite boric acid and salicylic acid in food. • Determination of Latent heat of fusion of naphthalene. • Estimation of glycine from given unknown solution • Estimation of vit.C by 2,6 dichloro-indophenol method. • Determination of glucose from blood serum. • Estimation of urea from blood sample
Analytical Chemistry Practicals	• Determination of standard deviation of results obtained from redox titration of Fe^{+2} against standard $K_2Cr_2O_7$ solution

Semester-III & IV	• Determination of amount of zinc from given sample solution by Nephelometric / Turbidimetric titration using standard solution of K4 (Fe (CN)6) in 0.4 M HCL • Determination of amount of sulphate from the given sample solution by Nephelometric / Turbidimetric titration using standard solution of Ba (NO3)2 or Pb (NO3)2 • Analysis of soda ash. • Determination of moisture content in food sample by Karl Fisher reagent. • Colorimetric and spectrophotometric determination of managanese in steel. • Solvent extraction separation of iron from marncrike using diethyl ether and their determination titrimetrically. • Analysis of chrome steel alloy for chromium and nickel content. • Agricultural analysis of soil sample, animal feeds, soil micronutrients, milk powder for Ca, Fe and P content. • Simultaneous spectrophotometric determination of (Cr and Mn)and (Ti and V) • Analysis of Illiminate ore. • Estimation of Fe by ceric sulphate and potassium dichromate titration potentiometrically. • Determination of concentration of Fe ions in ferric salicylate complex spectrophotometrically. • Estimation of amount of copper (II) with EDTA spectrophotometrically. • Analysis of vitamin A in food products. • Determination of Al/Mg by using 8-hydroxyquionoline as complexing agent by spectrophotometric method. • Analysis of pigments with respect to Zn and Cr. • Assay of polymer and plastic. • Isolation of lycopene from tomoto or β-carrotene from carrots. • Estimation of phosphoric acid from given sample of Cola drink by molybdenum blue method.
	• **Compulsory Project or Industrial in plant training completion by students**