

2. 6. 1 Program outcomes, program specific outcomes and course outcomes for selected programs/courses offered by the institution are stated and displayed in website of the institution ( to

Name of the programme	Name of course	course code	Course outcomes	Programme outcomes
	Diversity of microbes	B - 101	After the completion of the course the students will be able to 1. understand the diversity of Bacteria, Viruses, and Fungi; 2. Know the systematic, morphology, and structure of Bacteria, Viruses, and Fungi; 3. Know About the different life cycles of Bacteria, Viruses, and Fungi. 4. Know both the beneficial and harmful aspect of Bacteria, Viruses, and Fungi.	
	Diversity of algae, lichens & Bryophytes	B - 102	After the completion of the course the students will be able to 1. Get the knowledge of the systematics, morphological diversity, structure, reproduction and life cycles of the lower plants such as algae, bryophytes and Lichens. 2. understand the useful and harmful activities of Algae. 3. Understand the characteristics and lifecycles of selected genera.	
	Diversity of pteridophytes & gymnosperms	B - 103	After the completion of the course the students will be able to 1. develop understanding on morphology, anatomy and life cycle of pteridophytes and gymnosperms. 2. develop understanding of plant evolution and their transition to seed habits. 3. know about plant diversity and their economic values. 4. understand importance of fossil plants and techniques used to study the fossils.	
	Practical	B - 401		
	Inorganic chemistry	B - 106	1. On completion of this course, students will develop the understanding about bonding theory for inorganic molecules. 2. Students will gain the knowledge about periodic properties of elements and their basic trends.	
	Organic chemistry	B - 107	After completion of course, students will develop an understanding of basics of organic chemistry of saturated and unsaturated hydrocarbons along with knowledge of different types of reaction, reaction mechanisms and stereochemistry of compounds.	
	Physical Chemistry	B - 108	After completion of course, students will develop an understanding of various states of matter including colloidal state. They will be also able to predict the rate of chemical reactions by applying the principles of chemical kinetics and catalysis.	
	Practical	B - 406	Students will be able to perform qualitative and quantitative analysis of chemical substances.	
	Lower non chordata (Protozoa Helminths)	B - 120		
	Higher non chordata (Annelida-Echinodermata)	B - 121		
	Cell biology and genetics	B - 122		
	Practical	B - 420		
	Fundamentals of Microbiology	B - 113	Learning about history and scope of Microbiology.	

	Microbial Physiology and Bio-chemistry	B - 114	Understanding the nature and chemical composition of microbes.	
	Tools and Techniques in Microbiology	B - 115	Learning various techniques used in microbiological area.	
	Practical	B - 413		
	Mechanics and wave motion	B - 116	The students would learn about the behavior of physical bodies it provides the basic concepts related to the motion of all the objects around us in our daily life. The course builds a foundation of various applied field in science and technology; especially in the field of mechanical engineering. The course comprises of the study vectors, laws of motion, momentum, energy, rotational motion, gravitation, fluids, elasticity and special relativity.	
	Kinetic theory and thermodynamics	B - 117	The course makes the students able to understand the basic physics of heat and temperature and their relation with energy, work, radiation and matter. The students also learn how laws of thermodynamics are used in a heat engine to transform heat into work. The course contains the study of laws of thermodynamics, thermodynamic description of systems, thermodynamic potentials, kinetic theory of gases, theory of radiation and statistical mechanics.	
	Circuit fundamentals and basic electronics	B - 118	The students would gain the knowledge of Basic Electronics circuits, network theorems and measuring instruments: They would know about common solid state devices: Semiconductor diodes and transistors. The topics also include the Rectifiers, Filters and their applications. number systems and logic gates which are foundation blocks of digital	
	Practical	B - 416		
B. Sc. I Year	A. Biology group B. Mathematics Group C. Statistics Group D. Microbiology Group E. Industrial Chemistry Group	Algebra and trigonometry	B - 126	<ol style="list-style-type: none"> <li>1. They become able to solve the theory of equations.</li> <li>2. Identify symbolic logic and Algebra of proposition.</li> <li>3. Understand the proof of Demovers Theorem &amp; its application.</li> <li>4. Understand new concept like group, cyclic group, lagrange's theorem.</li> <li>5. Get and idea of normal sub group, quotient group, homomorphism and isomorphism of group.</li> <li>6. Get an idea of sequence and its convergence, convergence of infinite series.</li> <li>7. Knowledge of complex functions and separation into real &amp; imaginary parts, exponential, direct and inverse trigonometric and hyperbolic functions, logarithmic functions, summation of series.</li> </ol>
		Calculus	B - 127	<ol style="list-style-type: none"> <li>1. Knowledge of successive differentiation, Maclaurin's and Taylor's Theorem.</li> <li>2. Knowledge of curvature, concavity and convexity, point of inflexion.</li> <li>3. Get knowledge of Maxima and Minima, Beta and Gamma function, double &amp; triple integral.</li> <li>4. Understand partial differentiation, Jacobians, Envelopes and evolutes.</li> <li>5. Knowledge of integration of transcendental function, reduction formulae.</li> <li>6. Get knowledge of quadrature, rectification, volumes &amp; surfaces of solids of revolution. Dirichlet's &amp; Liouville's integral formulae.</li> </ol>

Geometry and vector calculus	B - 128	<ol style="list-style-type: none"> <li>1. Get knowledge of scalar and vector product of three and four vectors.</li> <li>2. Understand gradient, divergence, curl and vector identities.</li> <li>3. Understand general equation of second degree, tracing of conics.</li> <li>4. Find equation of cone with given base, equation of cylinder, equations of sphere and its properties.</li> <li>5. Get an idea of central conicoid, paraboloids plane section of conicoids.</li> </ol>
Statistical methods	B - 194	<ol style="list-style-type: none"> <li>1: Understand the concept of a statistical population and a sample from a population.</li> <li>2: Classification and tabulation of data. Different types of data. Diagrammatical and graphical representation of data.</li> <li>3: Measures of central tendency, Dispersion, Skewness and Kurtosis and Moments.</li> <li>4: Concept of correlation, correlation coefficients - Karl Pearson's correlation coefficient, Spearman's rank correlation coefficient, multiple and partial correlation coefficients, Intraclass correlation.</li> </ol>
Probability	B - 195	<ol style="list-style-type: none"> <li>1: Understand discrete and continuous distributions and identify their characteristics. Students will be able to identify the type of statistical situation to which different distributions can be applied. Use the different distributions in solving statistical problems.</li> <li>2: Basic idea of Box Plot, QQ Plot and PP Plot.</li> <li>3: Gain knowledge in sampling distribution theory and their applications in statistical inference. Chi- square, t and F distribution, Chebyshev's inequality, Weak Law of Large numbers and the Central Limit Theorem.</li> <li>4: Gain knowledge in the concepts of Theory of estimation and distinguish various types of estimation. Know the properties of estimators and construction of point and interval estimators.</li> <li>5: Understand the process of hypothesis testing and its significance. Distinguish various test used in sampling theory. Use the different test in solving statistical problems</li> </ol>
Probability distribution and theory of attributes	B - 196	
Practical	B - 494	
Industrial aspects of organic and inorganic chemistry	B - 153	<ol style="list-style-type: none"> <li>1. From this course students will gain the knowledge and skills related to various industrial/ natural gases, petroleum refining process and extraction of organic compounds from petroleum.</li> <li>2. Student will get knowledge about types of coal, their properties and chemical derived from it.</li> <li>3. Students will gain an understanding of basic metallurgical operations &amp; principles of extraction of some metals like Iron, Copper, Lead, Silver, Sodium, Aluminium and Zinc.</li> <li>4. This course also gives insight to natural resources like Cellulose, Starch regarding their properties, modification, important industrial chemicals derived from them.</li> <li>5. Students will gain an understanding of inorganic materials of industrial importance</li> </ol>
Industrial aspects of physical Chemistry, Material and Energy balances	B - 154	<ol style="list-style-type: none"> <li>1. Students will gain an understanding of chemical calculations, material and energy balances.</li> <li>2. Upon completion of this theory course students would gain knowledge of surface chemistry, colloidal state and interfacial phenomena.</li> </ol>

Unit operations, utilities, fluid flow and heat transport in chemical industry	B - 155	1. From the course students will gain knowledge and skill related to utilities of processes in industries such as distillation, evaporation, absorption, filtration, extraction and drying etc. 2. This course also gives an idea regarding fluid flow and heat transfer methods/ techniques used in industries.
Practical	B - 453	From this lab course students should be able to know about 1. preparation of standard solutions, estimation of concentrations through volumetric analysis 2. determination of viscosity, surface tension of liquids 3. determination of distribution coefficient, Refractive index of materials and 4. Chromatographic separations.
Foundation Course : Bhartiya Sanskrit Evam Rastra Gaurav	B - 009	
Qualifying Course: Environmental Studies	B - 008	
Qualifying Course: Sports and Physical Education	B - 001	
Diversity of angiosperms: systematics, development & Reproduction	B - 201	After the completion of the course the students will be able to: 1. understand the principles of angiosperm classification and plant nomenclature. 2. Differentiate between different systems of angiosperm classification. 3. recognize various angiosperm species and genera. 4. Know about herbarium techniques and importance of botanical gardens. 5. differentiate between the different angiospermic plants. 6. spot the economic significance of angiosperm plants. 7. Understand the importance of Anatomy and Embryology and the scope of its application. 8. Understand the various plants tissue systems. 9. Understand the reasons of normal and abnormal secondary growth in plants. 10. carry out the anatomy techniques. 11. Able to understand the differences between micro-sporogenesis and mega-sporogenesis as well as reproductive behavior for plant breeding. 12. identify endosperm, embryogeny and polyembryony for further development of plants
Cytology, Genetics, Evaluation & Ecology	B - 202	After the completion of the course the students will be able to 1. understand the structure and function of various cell organelles and learn the process and significance of Mitosis and Meiosis 2. gain the knowledge about chromosome structure, chromosome models and study the structural and numerical chromosomal aberrations and their consequences 3. Learn about Mendelian principles and non- Mendalian genetics. 4. Familiarize with Evolution & Emergence of evolutionary thoughts. 5. Understand the process of plant succession, Ecosystems, and adaptations in plants.

Plant physiology and biochemistry	B - 203	After completion of the course the students will be able to 1. understand the operations of all physiological, biochemical and enzymological processes in plants. 2. know the disorders associated with mineral deficiency and their management. 3. understand the various processes associated with production of different metabolites, dietary supplements etc. 4. understand the relation of plants with their environment and changes in physiology of plants due to altered environmental conditions.
Practical	B - 501	
Inorganic chemistry	B - 206	1. On completion of this course, students will be able to understand about coordinated bond in transition metals and basic bonding theory like VBT and Werner theory. 2. Students will gain knowledge about different type of properties of lanthanide and actinides metal and their application.
Organic chemistry	B - 207	After completion of course, students will develop an understanding on Alcohols, Ethers, Aldehydes, Ketones along with introduction of Aromatic Compounds. Carboxylic acids, nitro compounds and carbohydrates.
Physical Chemistry	B - 208	Students will develop an understanding of basic principles and applications of Chemical Thermodynamics and Electrochemistry. .
Practical	B - 506	Students will be able to perform qualitative and quantitative analysis of chemical substances.
Chordata	B - 220	Understand the diversity in chordate groups. And to identify animals on the basis of specific features.
Animal distribution, evolution and developmental biology	B - 221	Students will able to learn about the geological and geographical distribution they also learn about evolution of different organism and learn different process of embryonic development.
Physiology and bio-chemistry	B - 222	Students will able to learn about the Bio Chemical compositions and role of biochemical's in human body and student will learn the about different internal organs structure, histological studies and their functions. Students will be able to learn about morphological, anatomical, and related diseases.
Practical	B - 520	
Microbial genetics and molecular biology	B - 213	Learning about microorganisms at molecular level having research aptitude to develop recombinant microbes for various applications.
Environmental microbiology	B - 214	Studying the development useful methods in Environment through microbes.
Computer, bioinformatics and Biostatistics	B - 215	Understanding of Basic knowledge of Computer and Bioinformatics developing statistical aptitude to be implemented in Microbiology.
Practical	B - 513	
Physical optics and lasers	B - 216	The course comprises of the study of superposition of harmonic oscillations, waves motion (general), oscillators, sound, wave optics, interference, diffraction, polarization. The course is important for the students to make their career in various branches of science and engineering, especially in the field of photonic engineering.

<p>B.Sc. II</p> <p>a. Biology Group</p> <p>b. Mathematics Group</p> <p>c. Statistics Group</p> <p>d. Microbiology Group</p> <p>e. Industrial Chemistry Group</p>	Electromagnetics	B - 217	It gives an opportunity for the students to learn about one of the fundamental interactions of electricity and magnetism, both as separate phenomena and as a singular electromagnetic force. The course contains vector analysis, electrostatics, magnetism, electromagnetic induction and Maxwell's equations. The course is very useful for the students in almost every branch of science and engineering.
	Elements of quantum mechanics, atomic and molecular spectra	B - 218	Quantum mechanics provides a platform for the physicists to describe the behaviour of matter and energy at atomic and subatomic level. The course plays a fundamental role in explaining how things happen beyond our normal observations. The course includes the study of Schrodinger equations, particle in one dimension potential, quantum theory of H like atoms, atoms/molecules in electric and magnetic fields. On one-electron atoms: Fine and hyperfine structure, Interactions of one-electron atoms with static external electric field, magnetic field and electromagnetic radiations, Two and many electron atoms: finding the least energy configurations and the corresponding energies. Molecular physics: Diatomic molecules-rotation, vibration and electronic spectra, configuration of diatomic molecules. Lasers and its applications.
	Practical	B - 516	
	Linear algebra and matrices	B - 226	<ol style="list-style-type: none"> <li>1. Get knowledge of vector spaces and their elementary properties, subspaces, quotient space.</li> <li>2. Knowledge of linear transformations, dual space, bi-dual space, natural isomorphism, Annihilators.</li> <li>3. Knowledge of Bilinear and quadratics forms, Inner product spaces, Cauchy-Schwarz's inequality.</li> <li>4. Understand the transformation of matrix which is useful to find rank of matrix.</li> </ol>
	Differential equations and integral transforms	B - 227	<ol style="list-style-type: none"> <li>1. Knowledge of formation of a differential equation, degree, order and solution of a D.E., different methods of solving equations of first order &amp; first degree.</li> <li>2. Knowledge of solving a differential equation of first order but not of first degree, Clairaut's equation, orthogonal trajectories, simultaneous linear diff. equations with constant coefficients, linear differential equations of second order.</li> <li>3. Knowledge of solving partial differential equation (its order &amp; degree), Lagrange's equations, Charpit's general method, linear partial diff. eqns with constant coefficients, Partial differential equation of second order.</li> <li>4. Understand series solution differential equation Bessel's function and Legendre's function.</li> <li>5. Knowledge of the concept of transform, integral transforms, Laplace transforms, inverse Laplace transforms, convolution theorem.</li> <li>6. Apply Laplace transformation in solving ordinary differential equations.</li> <li>7. Get knowledge of Fourier transforms (finite and infinite). Fourier integral, Application of Fourier transform to boundary value problems, Fourier series.</li> </ol>

On successful completion of this programme,

1. Students will be skilled in problem solving, critical thinking and analytical reasoning as applied to scientific problems.
2. Students will be able to function as a member of an interdisciplinary problem solving team.
3. Student can further prepare for competitive exams such as IFS, UPSC, SSC, CGL, etc.
4. To understand the basic laws and explore the fundamental concepts of physics. To understand the concepts and significance of the various physical phenomena. To carry out experiments to understand the laws and concepts of Physics. To apply the theories learnt and the skills acquired to solve real time problems. To acquire a wide range of problem solving skills, both analytical and technical and to apply them. To enhance the student's academic abilities, personal qualities and transferable skills this will give them an opportunity to develop as responsible citizens. To produce graduates who excel in the competencies and values required for leadership to serve a rapidly evolving global community. To motivate the students to pursue PG courses in reputed institutions. This course introduces students to the methods of experimental physics. Emphasis will be given on laboratory techniques specially the importance of accuracy of measurements. Providing a hands-on learning experience such as in measuring the basic concepts in properties of

Mechanics	B - 228	<ol style="list-style-type: none"> <li>1. Get knowledge of velocity and acceleration along radial &amp; transverse directions and along tangential and normal direction.</li> <li>2. Knowledge of simple harmonic motion, motion under other law of forces, earth attraction, elastic strings.</li> <li>3. Knowledge of motion in resisting medium, constrained motion.</li> <li>4. Knowledge of motion on smooth and rough plane curves, Rocket motion, central orbits and Kepler's law, motion of particle in three dimensions.</li> <li>5. Get knowledge of common catenary, centre gravity, stable and unstable equilibrium, virtual work.</li> <li>6. Knowledge of forces in three dimensions, Poinsot's central axis, Wrenches, Null line &amp; null plane</li> </ol>	<p>such as in measuring the basic concepts in properties of matter, heat, optics, electricity and electronics.</p> <p>5. Students with Mathematics in B. Sc. have good opportunity to get jobs as Data analyst, operational researcher, financial/ investment analyst, research assistant / scientist, general manager, actuarial science, teacher / professor.</p>
Statistical inference	B - 294	Statistical inference: Drawing conclusions about the whole population on the basis of a sample. Statistical inference is the process of deducing properties of an underlying probability distribution by analysis of data. Inferential statistical analysis infers properties about a population, this includes testing hypotheses and deriving estimates.	
Survey Sampling	B - 295	Survey Sampling provides the tools/ techniques for selecting a sample of elements from a target population keeping in mind the objectives and nature of population. Most of the research work is done through Sample Survey. The students are able to know about Indian Official Statistical System	
Analysis of Variance and Design of Experiment	B - 296	DOE is a tool to develop an experimentation strategy that maximizes learning using a minimum of resources. Extensively used by engineers and scientists involved in the improvement of manufacturing processes to maximize yield and decrease variability. It is widely used in many fields with broad application across all the natural and social sciences, to name a few: Biostatistics, Agriculture, Marketing, Software engineering. Industry etc.	
Practical	B - 594		
Material science and industrial pollution	B - 253	<ol style="list-style-type: none"> <li>1. Upon completion of this theory course, students would gain knowledge about various materials like metals and alloys, cement, ceramics, glass and advanced materials like polymer and composite materials; and corrosion.</li> <li>2. Students will gain knowledge regarding various pollutants, their statutory limits and pollution evaluation methods in respect to air pollution, water pollution, pesticide pollution, noise pollution and radiation pollution.</li> </ol>	
Unit processes in organic chemicals manufacture	B - 254	<ol style="list-style-type: none"> <li>1. This course enriches the students with knowledge regarding various chemical process of organic chemistry such as nitration, sulphonation, halogenation, oxidation, hydrogenation, alkylation, amination, esterification and hydrolysis.</li> <li>2. These organic chemical processes are important tools to synthesis of important pharmaceuticals or drug molecules and other industrially important organic compounds.</li> </ol>	
Effluent treatment, waste management and process instrumentation	B - 255	<ol style="list-style-type: none"> <li>1. This course gives an idea regarding effluent treatment &amp; solid waste management; and the process instrumentation for aerobic and anaerobic treatments.</li> <li>2. From this course student will get theoretical knowledge of thermal instrumentations, pressure measuring devices, liquid level measurement, viscosity, density, pH and conductivity measurement.</li> </ol>	

Practical	B - 553	Students gain knowledge and skill related to this paper are as follows- 1. Instrumental methods for water analysis involving volumetric analysis of solid content, hardness, COD etc. 2. Instrumental methods of analysis using pH metric and conductivity methods. 3. Fuel analyses in terms of flash point, ignition point, smoke point etc. 4. Laboratory synthesis using unit processes such as nitration, sulphonation, Friedel Crafts reaction, esterification, hydrolysis, oxidation, halogenations, reduction and polymerization.
Foundation Course : Language Communication and Writing Skill : Hindi /English / Sanskrit	B - 011/ B - 112/ B - 113	
Qualifying Course: General Awareness	B - 010	
Qualifying Course: Sports and Physical Education	B - 002	
Plant resources utilization palynology, plant pathology & Biostatistics	B - 301	After completion of the course the students will be able to 1. know the various plant products important to humans. 2. know about medicinal values of plants and plant parts. 3. Develop knowledge of the morphology, structure and function of the pollens and spores and the applications of the pollen analysis in taxonomy, ecology, geology, medicines etc. 4. Get the skill of identification of the economically important plants and management of plant pathogens. 5. apply the basic statistical concepts in research studies.
Molecular biology & biotechnology	B - 302	After the completion of the course the students will be able to: 1. to know about structure and properties of polysaccharides, amino acids, proteins, vitamins and hormones. 2. gain knowledge about enzymes and enzyme kinetics. 3. understand basic laws of thermodynamics and bioenergetics of biomolecules 4. understand DNA & RNA their specific roles in the cell. 5. understand about the genetic code, protein synthesis and its regulation. 6. understand the mechanism of DNA replication in prokaryotes as well in eukaryotes. 7. understand the mechanism of transcription and gene expression and gene regulation at various levels of central dogma. 8. understand the basics of biotechnology and its uses in healthcare and environment. 9. understand the basic concepts of recombinant DNA technology, transgenic methods in plants.
Environmental Botany	B - 303	After the completion of the course the students will be able to: 1. identify different types of natural resources and their conservation 2. become aware of different sources, effects and control of environment pollutants. 3. Understand about the plant population, communities and phytogeography. 4. understand the biodiversity and the methods of biodiversity conservation.



Practical	B - 601	
Inorganic chemistry	B - 306	1. On completion of this course, students will develop the understanding about crystal field theory in coordinated compound and provide the knowledge of the color for transition metal complexes. 2. This course will also help to understand the role of metals in biology through bioinorganic chemistry. Provide knowledge about enzyme function and protein functions by metals.
Organic chemistry	B - 307	Students will gain the knowledge of stereochemistry, chromatography, and hetero-cyclic compounds. Bio-molecules and their chemical synthesis.
Physical Chemistry	B - 308	Students will develop an understanding of basic principles and applications of Quantum Chemistry, Spectroscopy, Photochemistry and Colligative properties.
Practical	B - 606	Students will be able to perform qualitative and quantitative analysis of chemical substances.
Applied and Economic zoology	B- 320	1. To collect the insects and identify with the help of taxonomy book 2. The name of the insects with the help of nomenclature
Biotechnology, Immunology, biological tools and techniques and biostatistics	B- 321	Students will able to learn the role of biotechnology in different fields of Biological Science life in immunology, virology, cell biology and students also learn about prevention of natural resources, students also learn to apoptosis, cell death auto immunity , antibody and antigen reaction.
Ecology, Microbiology animal behavior and pollution and toxicology	B- 322	Student learns the different types of behavior and behavior pattern. Student able to learn about micro-organism and its toxicity and different types of pollution.
Practical	B - 620	
Immunology and medical microbiology	B - 313	Able to awareness of serological and medical aspect of microorganisms.
Agriculture & food microbiology	B - 314	Understanding bio- fertilizers and probiotic microbes.
Industrial microbiology	B - 315	Learning about improvement of Industrial Important Microorganisms.
Practical	B - 613	
Relativity and statistical physics	B - 316	Basic postulates of classical statistical mechanics; concepts of microstates, phase-space, partition function and density function; micro-canonical, canonical and grand canonical ensembles; Maxwell Boltzmann distribution; connection between statistical mechanics and thermodynamics applications to simple systems.
Solid state & nuclear physics	B - 317	Students would be able to understand various types of crystal structures and symmetries and understand the relationship between the real and reciprocal space and learn the Bragg's X-ray diffraction in crystals. Would also learn about phonons and lattice.
Solid state electronics	B - 318	To provide a comprehensive understanding of electronic devices and circuits. To understand the working diode and transistor. To study basic circuits using diodes and transistors. To know the concept of feedback and design feedback amplifier.

B.Sc. III  
a. Biology  
Group  
b.  
Mathematics  
Group  
c. Statistics  
Group  
d. Microbiology  
Group  
e. Industrial  
Chemistry  
Group

Practical	B - 616	
Analysis	B- 326	<ol style="list-style-type: none"> <li>1. Get knowledge of Axiomatic study of real numbers, countable and uncountable sets, neighborhoods, Interior points, Limit points, open and closed sets, derived sets, dense sets.</li> <li>2. Understand and concept of limit of sequence and Cauchy sequence.</li> <li>3. Understand Riemann integral, Integrability of continuous and monotonic functions, mean value theorem of integral calculus, improper integrals and their convergence.</li> <li>4. Knowledge of functions of a complex variable, analytic functions, harmonic functions, orthogonal system.</li> <li>5. Get knowledge of elementary functions, mapping by elementary functions, linear and bilinear transformations, conformal transformations.</li> </ol>
Linear programming	B- 327	<ol style="list-style-type: none"> <li>1. Knowledge of linear programming problems statements &amp; formation of general linear programming problems, graphical method, standard and matrix forms of linear programming problem.</li> <li>2. Get knowledge of conved sets, simplex method, artificial variables, Big-M method.</li> <li>3. Get knowledge of Resolution of degeneracy, revised simplex method.</li> <li>4. Knowledge of Duality in linear programming problems, Dual simplex method, Primal-dual method.</li> <li>5. Get knowledge of transportation problems, assignment problems, goal programming.</li> </ol>
Numerical methods and fundamentals of computer	B- 328	<ol style="list-style-type: none"> <li>1. Get knowledge of forward difference, backward difference and central difference operators and their relationships, divided differences.</li> <li>2. Knowledge of interpolation, Newton-Gregory's interpolation formulae, Newton's divided difference formula, Formula based on central differences, numerical differentiation.</li> <li>3. Get knowledge of solution of transcendental and polynomial equations by iterative methods, bisection method, regular-falsi method and newton-Raphson method.</li> <li>4. Get knowledge of Basic computer organization, computer arithmetic and number systems, storage devices, operating system.</li> <li>5. Knowledge of computer software, programing languages, computer, networking and computer network topologies.</li> </ol>
Non- parametric Methods and Numerical Analysis	B - 394	<p>The learning objectives include:</p> <ol style="list-style-type: none"> <li>1) Study of theoretical concepts of Bivariate Normal and Multivariate Normal Distributions along with their properties.</li> <li>2) Analyze multivariate data.</li> <li>3) Application of Wald's SPRT and Non-Parametric methods of testing of hypothesis.</li> </ol>
Applied Statistics	B - 395	<ol style="list-style-type: none"> <li>1. This course will help students to know the applications of Statistics and learn and apply these techniques in the core course of their study.</li> <li>2. This course will give exposure to four applied fields of statistics viz. Time Series, Index Numbers, Statistical Quality Control and Demographic methods.</li> <li>3. They will be having hands on practice of working on the data and interpreting the results related to above mentioned fields.</li> </ol>

Linear Programming & computational Techniques	B - 396	<p>1. In this course students learn to write code in C to do statistical computing and its role in problem solving. C is a powerful, structured programming language widely used in all areas of study.</p> <p>2. Student will understand basic data structures and develop logics which will help them to create well-structured programs using C language. It develops the analytical as well as logical thinking of the student.</p> <p>3. It also opens the adaptability to learn any other programming language and using computer languages/software as a tool to analyze data statistically.</p>
Practicals	B - 693	
Industrial chemistry analysis	B - 353	<p>On successful completion of course, students will gain the knowledge of important topics of industrial chemistry regarding modern instrumental analysis</p> <p>1. chromatographic techniques such as paper chromatography, TLC, GLC, HPLC; and</p> <p>2. spectroscopic methods like UV-visible spectroscopy, IR – Raman spectroscopy, NMR Spectroscopy, ESR spectroscopy, Atomic absorption spectroscopy, Neutron diffraction etc.</p>
Chemical process economics and Entrepreneurship	B - 354	This course gives the basic knowledge of factors involved in project cost estimation, capital formation, methods of determining depreciation and some aspects of marketing, pricing policy, profitability criteria and entrepreneurship.
<b>Any two of the following</b>		
(a) polymers	B - 455	<p>Students gain knowledge and skills related to this paper are as follows.</p> <p>1. The science of large molecules, types &amp; general classification of polymers, molecular weight and its distribution.</p> <p>2. Synthesis, chemistry, properties and applications of thermosetting and thermoplastics polymers.</p> <p>3. This course also includes study of polymers synthesis, polymer properties, polymer processing, polymer degradation etc.</p>
(b) pharmaceuticals	B - 457	<p>This course will impart knowledge and skills to students related to -</p> <p>1. Introduction related to pharmaceutical industry and various types of pharmaceutical excipients, raw materials and process of manufacture of the drugs such as sulpha drugs, antimicrobial, analgesic- anti-inflammatory, steroidal hormones, vitamins, blockers, cardiocascular agent and antihistamines.</p> <p>2. Chemical constitution of plants – including carbohydrates, amino acids, proteins, fats, waxes, volatile oils, terpenoids, steroids, saponins, flavonoids, tannins, glycosides, alkaloids.</p> <p>3. Brief idea of microorganisms and Enzyme systems.</p>

(c) heavy and fine chemicals	B - 459	On successful completion of this course, students will gain the knowledge and skills related to manufacture of heavy organic chemicals, heavy inorganic chemicals, fine chemicals with reference to (i) Raw material, (ii) production process, (iii) quality control, (iv) hazards and safety, (v) Effluent management.
Practical	B - 653	From this course, students will learn about 1. Synthesis of common industrial compounds involving two step reactions such as 4-amino benzoic acid, 4-nitro benzoic acid, paracetamol, oils of winter green etc. 2. Determination of acid value, Iodine value and saponification value. 3. Instrumental methods of analysis – colorimeter, flame photometer. 4. Preparation of urea formaldehyde resin. 5. Industrial analysis of common raw materials as per the industrial specifications such as phenol, aniline, formaldehyde, hydrogen peroxide, acetone, etc. 6. Analysis of drugs regarding heavy metal content, chlorine content, sulphate ash and identification of drugs by TLC.
Qualifying Course: Sports & Physical Education	B - 003	
Principles of Agronomy	D - 191	Students will learn about 1- the definition and scope of agronomy. 2- the agroclimatic zones of India. 3- tillage, seed and sowing, plant density and plant geometry. 4- nutrients, water and weed management. 5- basic principles of agronomy such as crop rotation, plant ideotype, growth and development of crops. 6- adaptation and distribution of crops. 7- the crops, seeds, fertilizers, pesticides, weed and tillage implements. 8- yield attributes and yield estimation. 9- fertilizer requirements, plant population, herbicides and water requirement. 10- soil moisture measuring devices and measurement of irrigation water.
Fundamental of Soil Science	D - 192	
Elements of Genetics	D - 193	1. To expose the students on basic concepts of genetics. 2. To acquaint the students with basic concepts of Genetics, Cell cycle and cell division 3. To understand the concepts of Sex determination, sex linkage, chromosome mapping 4. To provide the knowledge about Structural and numerical variations in chromosomes and their implications 5. To understand the DNA replication, protein synthesis

B.Sc. (Ag.) I Sem	Elementary Statistical and Applied Mathematics	D - 194		
	Agricultural meteorology	D - 195		
	Rural sociology and educational psychology	D - 196	1. Students understand the characteristics of rural society, social institutions, culture, social values and relevance in Agricultural Extension. 2. Students understand the educational psychology, learning and teaching situation. • Students access the personality types, emotions of human beings and motivation.	
	Fundamental of horticulture	D - 197	After successful completion of the course, the students are expected to have basic understanding of various principles and practices of growing of horticultural crops. The student would be expected to equip to acquire skills and knowledge of growing nursery, propagation, agrotechniques and orchard management.	
	Physical education (NA in Th.)	D - 198		
	Structural and spoken English	D - 199		
	Foundation Course: Bhartiya sanskrit evam gaurav	D - 009		
	Qualifying Course: Environmental Studies	D - 008		
Irrigation and water management	D - 291			
Fundamental of extension education and rural development	D - 292	1 Students Understanding the concept and importance of extension. 2 The students study the rural development programmes before and after independence and to study of various teaching and learning methods to use in to motivate of farmers in rural area for adopting new technology, dimensions and process of extension and programme planning. Innovations in extension and development. New trends in extension. Diffusion and adoption of innovations		
Elementary crop-physiology	D - 293	processes of related to crop production, mineral nutrition, plant growth regulators and environmental stresses. 2. Students will come to know the various functions and processes of related to crop production, mineral nutrition, plant growth regulators and environmental stresses. 3. To students will get introduced to crop physiology and its importance in Agriculture 4. To acquaint the students with Mineral nutrition of Plants 5. To provide the knowledge about the process of photosynthesis and plant growth regulators		
Introductory entomology	D - 294	This course of agriculture entomology is related to morphology, physiology and taxonomy of insects.		

B.Sc (Ag.) II  
Sem

Introduction plant pathology	D - 295	<p>On the completion of the course:</p> <ol style="list-style-type: none"> <li>1. Students will understand the need and importance of the course 'Introduction to Plant Pathology' after going through the history of plant diseases, and thus inflicted hunger, migration and discoveries in human history.</li> <li>2. Students will learn about the causal agents of plant diseases such as fungi, bacteria, viruses, viroid, nematode, mycoplasma and phanerogamic plant parasites, their general characters, somatic structures, reproduction (asexual and sexual) and classification.</li> <li>3. Students will also learn the structural and compositional differences among the plant pathogenic organism. They will also learn the disease triangle along with chain of events leading to disease development, pathogen survival and spread and role of environment in all this process.</li> <li>4. Students will get acquainted to basic laboratory equipment used in plant pathology lab and get hands on practice on media preparation, sterilisation, and fungus and bacteria isolation from diseased plant tissues as well as from soil samples.</li> <li>5. On successful completion of this course students shall be able to isolate, culture and identify major plant pathogens in laboratory.</li> </ol>	
Elementary plant biochemistry and chemistry of plant products	D - 296		
Introduction to Agricultural and natural resource economics and farm management economics	D - 297(old)		
Introduction to Agricultural economics, agricultural marketing and co-operation	D - 297(new)		
Cereals, millets and pulses crops ( Field crops-I)	D - 391	To explain the Importance, Origin, Distribution, Climate, Improved Varieties, Water, nutrient and weed management, Plant protection measures, Harvesting and processing of Cereal, Millets, Oil seeds, Pulses, fibre, green manure, Fodder and cash crops of kharif season.	
Principles of plant breeding	D - 392	<ol style="list-style-type: none"> <li>1. The plant breeding methodologies and applications employed for self, cross and vegetatively propagated crops will be exposed.</li> <li>2. To acquaint the students with historical development of plant breeding</li> <li>3. To study about different process of plant breeding methods</li> <li>4. To study about development of inbred lines and hybrid seed production.</li> </ol>	
Farm structures, power and machinery	D - 393		

B. Sc. (Ag.) III Sem	Environmental science and agro ecology	D - 394	<p>1- To study the definition, divisions and significance of ecology.</p> <p>2- To know about environment, control of pollution, Biotic and abiotic factor and their effect on agronomical crops.</p> <p>3- To know about the major ecosystem, Energy and its flow biochemicals and nutrient cycle in ecosystem.</p> <p>4-Classification, composition and study of plant composition structure.</p> <p>5- Ecological classification of plants and their morphological and physiological adaptations to adverse environment.</p> <p>6- Ecological problems of major field crops.</p>	
	Natural resource economics and farm management economics	D - 395(new)		
	Agriculture marketing, export and cooperation	D - 395(old)		
	Vegetable production	D - 396	The student would be expected to acquire knowledge about the production technology, harvesting, postharvest management, processing, marketing and utilization of vegetable crops.	
	Elementary microbiology and soil microbiology	D- 397		
	Oil seeds and commercial crops ( field crops-II)	D - 491	1. To study the economic importance, Origin, Distribution, Climatic requirement, High yielding Varieties, Agronomic practices, Water, nutrient and weed management, Plant protection measures, Harvesting and processing of Wheat, Barley, Oat, Rapeseed and mustard, Linseed, Sunflower, Chickpea, Field pea, Lentil, Rajma, Barseem, Lucerne, Potato and Mentha under various agroclimatic conditions of U.P.	
	Breeding of field crops	D - 492	<p>1. Study of Elementary plant breeding: Modes of pollination in major crop plants and its relationship to breeding methods. Reproduction in crop plants, techniques of hybridization, Plant breeding methods.</p> <p>2. Familiarization with Heterosis and in- breeding depression.</p> <p>3. Breeding for yield, quality and disease resistance. Mutation and polyploidy breeding, Interspecific and intergeneric hybridization.</p> <p>4. Crops: Morphological and taxonomic characters.</p> <p>5. Study of principles of plant breeding to the improvement of major crops: Wheat, Maize, Barley, Rice, Cotton, Oil seeds (Raya and Groundnut), pulses (Gram and Arhar) and Sugarcane</p> <p>6. Students will deploy different methods of plant breeding like pure line selection, mass selection, pedigree method and other hybrid crop varieties production for special crop improvement.</p>	

B.Sc. (Ag.) IV Sem	Principles of soil physics and soil conservation	D - 493	<p>1- To study the physical properties of soil and their determination.</p> <p>2- To define the soil conservation and its importance, to learn about soil survey, land use capability classification.</p> <p>3- To know about soil erosion, its types mechanism and causes of erosion.</p> <p>4- Factors affecting soil erosion and soil conservation measures.</p> <p>5- Water harvesting: Concepts and methods.</p> <p>6- To know the concepts of shifting cultivation and role of grasses and trees in soil conservation.</p> <p>7- Farm and social forestry.</p> <p>8- To study the prismatic compass and different engineering equipment used in surveying.</p>	
	Livestock production and management	D - 494	Basic understanding and knowledge of Dairy cattle Breed, feed and fodder management and Prevention of disease	
	Economic entomology	D - 495	This course will be useful for learning about losses due to stored grain insect pests and their management strategies.	
	Fruit production	D - 496	The student would be expected to acquire skill and knowledge about the production technology, harvesting, postharvest management, processing, marketing and utilization of fruit and plantation crops.	
B.Sc. (Ag.) V	Introduction to plant biotechnology	D - 591	<p>1. To understand the concepts and applications of Plant Biotechnology.</p> <p>2. To understand the various recombinant methods and gene transfer technologies.</p> <p>3. To understand plant tissue culture techniques and development of plant through micropropagation.</p>	
	Milk and milk processing	D - 592	Learning and understanding of different processing methods of milk for longer storage and quality	
	Post harvest management of fruits and vegetables	D - 593	After successful completion of this course, the students are expected to be able to understand regulation of postharvest losses by using chemicals and growth regulators, pre and postharvest treatments for extending shelf life of vegetable and fruit crops.	
	Crop pests and integrated pest management	D - 594	From this course, students will learn about insect and non insect pest different methods of pest control, which will be very useful for pest management.	
	Weed management	D - 595	<p>1- To learn about definition, classification, characteristics of weeds with their economic importance.</p> <p>2- To understand the principles and practices of weed management.</p> <p>3- Integrated weed management and its importance to sustain the yield.</p> <p>4- Management of Abnoxious weeds.</p> <p>5- To identify and preservation of important weeds of the locality.</p> <p>6- To calculate the commercial dose of herbicide, find out weed control efficiency and weed index.</p>	



B.Sc. (Ag.) Sem	Crop disease and their management	D - 596	<p>On the completion of the course:</p> <ol style="list-style-type: none"> <li>1. Students will know about the important diseases of all major crops grown in different parts of India, they will study the details of symptoms in each case and disease cycle starting from survival of pathogenic agent, primary infection to secondary spread of disease.</li> <li>2. Students will know about the principles of plant disease management, detailed practices under avoidance, exclusion, eradication, protection and immunization for the effective management of plant diseases.</li> <li>3. Students will learn about groups of chemicals used in plant disease control, their mode of action, target pathogen groups along with fungicide resistance development in major plant pathogens, and ways and means to overcome this.</li> <li>4. Students will also learn about the need and importance of use of eco-friendly ways and means for plant disease management i.e. the integration of all the available knowledge and means in the disease management and prioritizing the use of cultural, physical, biological and disease resistance over chemical use.</li> <li>5. On the completion of this course students shall be able to identify major crop diseases in field condition and will be able to recommend inclusive disease management strategy which is eco-friendly and sustaining for the farmers field.</li> </ol>	
	Soil fertility, fertilizers and integrated nutrient management	D - 597		
	Principles and seed production technology	D - 691	<ol style="list-style-type: none"> <li>1. Introduction to seed and seed technology and its importance.</li> <li>2. To study about quality seed production procedure.</li> <li>3. To study about hybrid seed production of different crops.</li> <li>4. To study about the seed drying, processing and their steps, seed testing for quality assessment seed treatment.</li> </ol>	
	Dairy products technology	D - 692	Learning of techniques for quality milk products production	
	Post harvest engineering	D - 693		
	Farming systems and sustainable agriculture	D - 694	<ol style="list-style-type: none"> <li>1- To study the definition, types and methods of farming systems.</li> <li>2- To learn definition, scope and advantages of sustainable agriculture.</li> <li>3- To study the sustainable agriculture in relation to tillage, fertilizers, irrigation, weed management and plant protection measures.</li> <li>4- To know the modern agriculture in relation to sustainable agriculture.</li> <li>5- To study the important cropping system for sustainable agriculture.</li> </ol>	
	Agriculture finance, business management and export	D - 695(new)		
	Agriculture finance, business management and trade	D - 695(old)		

B.Sc. (Ag.) VI Sem	Communication, Diffusion of Agriculture Innovation History and Development of Agri. Research and Diffusion of Agri. Innovation (ICAR)	D - 696	The course provide knowledge for students about Agricultural- Innovation, in various fields like Agronomy, Animal Husbandry. Genetic and Plant breeding-new varieties, invented by breeder and researchers and new Communication models. Techniques developed by the experts. Origen and history of ICAR and programme running in Agriculture field for improvement and uplift of living standard for rural people.	
	Practical- plant pathology	D - 697	<ol style="list-style-type: none"> <li>1. This is a totally practical oriented course designed to impart experiensal learning among students.</li> <li>2. Students will learn about the nutritional value and importance of mushroom for the nutritional security of general public and employment generation for youth. They will also lean the general morphology of mushroom, and differentiating features between edible and non-edible mushroom along with major edible and non-edible mushroom species.</li> <li>3. Students shall lean the process of isolation and pure culturing of mushroom (master culture) along with fungus multiplication on grain medium (mother spawn) and mass multiplication for commercial uses (spawn).</li> <li>4. Students will be given hand on training on compost preparation, mushroom bed preparation, spawning, casing and maintenance of room environmental conditions for better mushroom bud initiation and total mushroom production, along with the management of major diseases and insect pest.</li> <li>5. On the completion of this course students shall be skilled and trained for growing and handling mushroom crop of their own, thus providing an opportunity for self-employment</li> </ol>	
	Ornamental horticulture	D - 698	Students can proficiently applies principles of landscaping, uses of trees, shrubs and climbers in landscaping besides, expanding the knowledge of same to others.	
B.Sc. (Ag.) VII Sem	Rained agriculture dry land forming and water shed management (ICAR)	D - 791	<ol style="list-style-type: none"> <li>1- To study the definition, concepts, characteristic of dry farming, dry land farming and rainfed farming.</li> <li>2- To know the constraints associated with dryland agriculture.</li> <li>3- To understand the production techniques in rainfed farming.</li> <li>4- To learn the moisture conservation practices and use of Antitranspirant in dry land farming.</li> <li>5- To determine the soil moisture constants and preparation of crop rotation in rainfed farming.</li> </ol>	
	Silviculture and agroforesrty and special forestry (ICAR)	D - 792	<ol style="list-style-type: none"> <li>1- To study the definition, scope and classification of silviculture, Agroforestry and farm forestry.</li> <li>2- Role of forest, its type and regeneration.</li> <li>3- To study the natural seed production seed dispersion, germination and seedling establishment.</li> <li>4- To know about Afforestation, Reforestation and their objectives.</li> <li>5- To study the choice of tree species and nursery techniques.</li> <li>6- To learn the prominent agroforestry system prevailing in U.P.</li> </ol>	

	Production technology of medicinal aromatic and spice crops plants crops spices medicinal and aroma crops (ICAR)	D - 793	The students would be expected to elaborate and utilize various package of practices for spices, medicinal and aromatic plants.	
	Management of problems soil and water land	D - 794		
	Dairy chemistry and animal nutrition animal nutrition including forage and grasses (ICAR)	D - 795	Understanding and learning of constituents of milk and cattle Feed, fodder and testing for their quality	
	Computer applications	D - 796		
B.Sc. (Ag.) VIII Sem	Agriculture extension	D - 891(a)	This programme is designed for students to know that how much agriculture has improved farm practice applied and adopted by the farmers in their field for improvement in our agriculture production for better living stander in the rural area.	
	Agriculture economics	D - 891(b)		
	Agriculture botany	D - 891(c )	1. To improve the knowledge of Seed production techniques of farmers through student discussion of each other at village level. 2. To discuss about to farmer to production of certified seed of different crops.	
	Agriculture chemistry	D - 891(d)		
	Agriculture dairy	D - 891(e)	Understanding and learning of livestock owner experience in field/village condition	
	Agriculture engineering	D - 891(f)		
	Agriculture horticulture	D - 891(g)	Students will get acquainted with the actual village situation, organize various extension activities based on local requests, needs and exigencies and prepare development plans for the local panchayats.	
	Agriculture soil conservation	D - 891(h)		
	Agriculture agronomy	D - 891(i)	1- The students have been attached with different village and find out the problems and solutions. 2- Students allotted to farmers and visited the farmers field and identify problems.	
	Agriculture plant pathology	D - 891(j)	On the completion of the course: 1. The course will be benefited for the students in understanding agricultural technologies being followed by farmers and to prepare alternate farm plans to suit the local situation in consultation with the farmers. 2. It also develops communication skills among students using extension teaching methods in the transfer of technology. 3. They can also have jobs in areas that support the marketing and distribution of agricultural commodities as well as in the production sector of agribusiness operations. 4. It makes familiar students with the socio-economic conditions of farmers and their problems with reference to agricultural development. 5. The degree course develops the understanding of rural community life and the different situations prevailing in villages with special reference to agriculture.	

Agriculture entomology	D - 891(k)	The students will apply their knowledge at field level to tackle the pest problem. Besides, farmers will be informed regarding the seriousness of pests and hazardous effects of using pesticides, while encouraging biological control.
Short Stories	A - 109	In this paper the awareness towards environment is created by the help of poems and their creativity is awakened through short verses.
Phonetics & Communicative skill	A - 110	In this paper students have provided the knowledge of communication skill so that they can use it in various fields.
Physical Geography	A - 111	
Hurnan Geography	A - 112	
Practical	A - 711	
Prachin evem madhyakaleen kavya प्राचीन एवं मध्यकालीन काव्य	A - 113	<ol style="list-style-type: none"> <li>1. प्राचीन एवं मध्यकालीन काव्य के कवियों का परिचय</li> <li>2. तत्कालिक सांस्कृतिक, सामाजिक, धार्मिक, राजनीतिक एवं साहित्यिक परिस्थितियों का बोध</li> <li>3. प्राचीन एवं मध्यकालीन कवियों के समाज के प्रति अवदान का बोध</li> <li>4. छात्रों में सामाजिक, आध्यात्मिक तथा परस्पर समरसता की भावना का विकास</li> <li>5. छात्रों को भाषा के व्याकरणिक स्वरूप -रस, छंद और अलंकारों का सम्यक ज्ञान</li> <li>6. छात्रों में साहित्य सृजनात्मक-शैली का विकास</li> </ol>
Hindi natak & rangmunch हिंदी नाटक एवं रंगमंच	A - 114	<ol style="list-style-type: none"> <li>1. छात्रों को नाटक के स्वरूप एवं विकास का बोध</li> <li>2. हिन्दी के नाटककारों एवं उनके नाटकों का ज्ञान</li> <li>3. छात्रों को नाटक प्रस्तुति एवं रंगमंच का बोध</li> <li>4. छात्रों में नाट्य कला में सृजनात्मकता का विकास</li> <li>5. नाट्य कला के विविध तत्वों का ज्ञान</li> </ol>
Political history of Ancient India (B.C. 600 - A. D. 606)	A-115	Political History of Ancient India will give the student a basic knowledge of the pastoral and nomadic Indo-Aryans spread from the Punjab into the Gangetic plain, large swaths of which they deforested for agriculture usage. The composition of Vedic texts ended around 600 BCE, when a new, interregional culture arose. This course will help the students to understand what ancient history was and this will definitely help them to analyze and explain problems in the past.
Political history of Ancient India (A.D. 606 - A. D. 1206)	A-116	Political History of Ancient India will give the student a basic knowledge and idea of the capital of Harshavardhana's Empire was Kannauj. He ruled from 606 AD to 647 AD. His Empire extended from Punjab to northern Orissa. This course will help the students to understand what ancient history was and this will definitely help them to analyze and explain problems in the past.
Fundamentals of librarianship	A - 121	
Information sources and services (theory)	A - 122	
Principals of Economics Analysis	A - 145	The students are familiarized with the basic concept of economics like demand, utility

	Micro Economics	A-145 (Since 2019-20)	The students are familiarized with the basic concept of economics like demand, utility, production, markets, supply, cost profit and rent etc.
	Indian Economic problems	A-146	Students will be able to know the basic characteristics of Indian Economy, natural resources of India and features.
	Macro Economics	A-146 (Since 2019-20)	
	Political theory	A - 138	
	National movement and constitution of India	A - 139	
	Sanskritkavyam kavyashastrancha	A - 130	
	vyakaranam, Anuvadeh, Sanskritsahityetihassha	A - 131	
	Introduction to sociology	A - 132	The course is intended to introduce the students to a sociological way of thinking. It provides an understanding of the discipline of sociology and sociological perspective. It also provides foundation for other more detailed and specialized courses in sociology. Students will be able to- 1) Define sociology and demonstrate nature, scope and subject matter of sociology. 2) Demonstrate how sociology differ from and similar to other social sciences and their areas of interdependence. 3) Acquaint themselves with the basic concepts of sociology like society, community, association, group, social structure and function status and role culture, social change, social stratification etc. 4) Know the basic social institutions like family, marriage, kinship, caste, religion in a scientific way. 5) Understood and demonstrate how self developers through various process of interaction. Demonstrate how societal and structural factors influence individual behaviour.
	Society in India-structure and change	A - 133	The course is designed in this manner, so that students are introduced to the concepts related to Indian society. They are made familiar with the Indian society, its linkages and continuity with past and present. It also gives insights to analyze contemporary Indian society this course provides comprehensive understanding of Indian society.
B. A. I	Foundation Course : Bhartiya Sanskrit Evam Rastra Gaurav	A - 009	
	Qualifying Course: Environmental Studies	A - 008	
	Qualifying Course: Sports and Physical Education	A - 001	

British Poetry	A - 209	This course makes the students familiar with such terms like The Lyric, The Sonnet, The Ode, The Ballad, Dramatic Monologue. The Epic and The Elegy. In the course the British Poets are taught with the view to make the students aware of British Poets like William Wordsworth, P.B. Shalley, John Keats, Thomas Gray, Mathew Arnold, Lord Alfred Tennyson and Robert Browning. This course will not only help the students to be familiar with British Poetry but it will also help to create awareness of the environment.
Indian writing in English Prose & Poetry	A - 210	Indian writing in English started in the British period in the 19th Century. Raja Ram Mohan Roy, Ishwar Chandra Vidhya Sagar, Mahatma Gandhi, Gurudev Rabindranath Tagore were the pioneer of Indian Writing in English. This course helps the students to be familiar with Sri Aurobindo, Mahatma Gandhi, A.K. Ramanujam, Kamla Das, Nissin Ezekid, Rabindranath Tagore and Sarojini Naidu.
Economic Geography	A - 211	1. This course design for students to study of classification of resources, production major agriculture crops, industries, international trade, international trade blocks. 2. To understand the economy of the country and to aware student about food crisis problem. 3. Explain and apply key concepts and theoretical approaches in economic geography
Geography of India	A - 212	1. To educate students on global position of India, geological structure of India, origin of monsoon and climatic regions. 2. To understand natural resources, energy resources, human resources, national population policy. 3. To understand economic activities patterns, green revolution, major industries, growth of industries in India.
Practical	A - 811	
Adhunik Hindi kavya आधुनिक काव्य	A - 213	1. आधुनिक कवियों और उनके काव्य का बोध 2. आधुनिक काव्य की प्रवृत्तियों का ज्ञान 3. आधुनिक कालीन सामाजिक, सांस्कृतिक एवं साहित्यिक परिस्थितियों का ज्ञान 4. छात्रों में आधुनिक काव्य में निहित राष्ट्रीय, सामाजिक, सौंदर्य-चेतना का विकास 5. आधुनिक कवियों की काव्य-कला का बोध
Hindi katha sahitya हिंदी कथा साहित्य	A - 214	1. कथा-साहित्य के उद्भव और विकास का परिचय 2. कथा-साहित्य के तत्वों का बोध 3. पाठ्यक्रम में निहित कहानियों और उपन्यासों का परिचयात्मक बोध 4. कथा साहित्य में प्रयुक्त भाषा शैली का ज्ञान 5. उपन्यास और कहानी में अंतर का बोध

Political history of Medieval India (A.D. 1206 - A. D. 1526)	A- 215	<p>Political History of Medieval India will give the student a basic knowledge of the past and a lot of learnings. The period between 1206 AD and 1526 AD in Indian History is known as the Delhi Sultanate. The period between 1206 AD and 1526 AD in Indian History is known as the Delhi Sultanate.</p> <p>THE DELHI SULTANATE PERIOD</p> <p>The period between 1206 AD and 1526 AD in Indian History is known as the Delhi Sultanate. During this period of over three hundred years five dynasties, (32 kings) ruled in Delhi. These were: The Slave Dynasty (1206 - 1290) The Khilji Dynasty (1290 - 1320) and so on. . This course will help the students to understand what ancient history was and this will definitely help them to analyze and explain problems in the past.</p>
Political history of Medieval India (A.D. 1526 - A. D. 1740)	A-216	<p>Political History of Medieval India will give the student a basic knowledge and idea of the significance of Mughal Rule. The Mughal Empire at its zenith commanded resources unprecedented in Indian history and covered almost the entire subcontinent. From 1556 to 1707, during the heyday of its fabulous wealth and glory, the Mughal Empire was a fairly efficient and centralized organization, with a vast complex of personnel, money, and information dedicated to the service of the emperor and his nobility.</p>
Knowledge organisation in libraries	A - 221	
Information storage	A - 222	
National income analysis, money and planning	A-245	Students are able to understand what is national income, employment, saving and investment, classical and Keynesian theories of employment. Concepts of money and banking.
Elementary Quatitative Methods	A-245 (Since 2019-20)	
Public Finance and International Trade	A-246	Students will familiar with various functions of govt. regarding finance like budget, tax, G.S.T, public expenditure, public income and international trade.
Public Finance	A-246 (Since 2019-20)	
An outline history of western political thought	A - 238	
Comparative government	A - 239	
Natakam, Natya-shaityetihashcha	A - 230	
Indian Society-Issues and Problems	A - 231	

	Social change and social control	A - 232	This course is expected to clarify and broaden the structure of Indian society and changing aspects with the process. Social change has central concern of sociological study. Change has its pattern which is spelt out by various factors. This course also provides a whole idea to the student about the process, theories and factors of social change. They can relate their experience with theoretical explanation. After completing the course, student can- 1) Derive knowledge about the meaning, nature, forms and patterns of change. 2) Get on idea about the theories & factors of social change.
	Indian society-issues and problems	A - 233	This course is designed to introduce students to the emerging social problems, the concepts and issues of development in Indian society. The course intends to focus upon the deviant and delinquent behaviour, issues of corruption and other disorganizational and structural problems of Indian Society. The Endeavour of the course is to make learners aware about the social problems and developmental issues in the Indian society.
B. A. II	Foundation Course : Language Communication and Writing Skill : Hindi /English / Sanskrit	A - 011/ A - 112/ A - 113	
	Qualifying Course: General Awareness	A - 010	
	Qualifying Course: Sports and Physical Education	A - 002	
	Indian writing in english rama & fiction	A - 309	This course helps the students to be familiar with Indian Writers who has started writing in English. English Language was encouraged by the efforts of Raja Ram Mohan Roy and Ishwar Chandra Vidhya Sagar. This syllabus helps the students to know about the elements of drama, novel and to know the narrative technique. R.N. Tagore's drama Post Office makes the students understand the complexities of life. Mahesh Dattani is the contemporary dramatist who has raised the social problems through his dramas. Each and every contemporary problem is discussed and analysed in short dramas of Mahesh Dattani, Ruskin Bond's 'A flight of Pigeons' makes the student 'aware towards environment and nature. This work creates the awareness towards nature.
	Shakespeare	A - 310	William Shakespeare is considered the greatest dramatist of all times. His plays reflect the practical wisdom and human behaviour. This course helps the students to understand what is Tragedy, Comedy, Romance, historical plays. Three uniites the plays of Shakespeare tells us about human behaviour short comings and way of life. The study of these plays makes the student a perfect human being. Shakespeare is the dramatist of human emotions and human behaviour his practicality



Environmental studies	A- 311	<ol style="list-style-type: none"> <li>1. To create awareness about environmental conservation.</li> <li>2. To development the culture of protection of the Earth.</li> <li>3. Appreciate concepts and methods from ecological and physical sciences and their application in environmental problem solving.</li> <li>4. To understand role of human in ecological disturbances and conservation issues.</li> </ol>
Any one out of the following		
(a) South West Asia	A - 512	
(b) South East Asia	A - 513	<p>Analyze a range of historical and contemporary issues in a specific Asian society. To understand concept of region and regionalization and natural regions of the world. To teach different culture of the world. To teach special knowledge of Asia and south east Asia</p>
(c) Far East Asia	A - 514	
(d) South Asia	A - 515	
Practical	A - 911	
Adhyatan Hindi Evan kaurvi lok kavya अद्यतन हिंदी एवं कौरवी लोक काव्य	A - 313	<ol style="list-style-type: none"> <li>1. अद्यतन हिंदी एवं कौरवी लोक काव्य का परिचय</li> <li>2. नव कवियों के व्यक्तित्व एवं कृतित्व का बोध</li> <li>3. नई कविता की प्रवृत्तियों एवं भाषा वैशिष्ट्य का ज्ञान</li> <li>4. लोक साहित्य, लोक भाषा, लोक-संस्कृति, लोकोक्तियों और मुहावरों का ज्ञान</li> <li>5. निज अंचल विशेष की भाषा के प्रति गौरव-बोध</li> </ol>
Hindi nibandh and Anaya gandh vidyaye हिंदी निबंध एवं अन्य गद्य विधाएं	A - 314	<ol style="list-style-type: none"> <li>1. हिंदी निबंध के उद्भव और विकास का परिचय</li> <li>2. निबंध लेखन-शैली का विकास</li> <li>3. गद्य साहित्य की अन्य विधाओं का ज्ञान</li> <li>4. पाठ्यक्रम के माध्यम से छात्रों में सामाजिक, राजनीतिक, एवं सांस्कृतिक दृष्टि का विकास</li> <li>5. साहित्य की अन्य गद्य विधाओं के लेखकों और उनके साहित्य का ज्ञान</li> </ol>
Political Histroy of India (1740 - 1947)	A- 315	<p>Political History of India will give the student a basic knowledge of the past that is in 1740 India appeared to be relatively tranquil. In the north the Persian Nadir Shah's invasion (1739) had proved to be only a large-scale raid. In the Deccan the Nizām al-Mulk provided some measure of stability. In western India the Marathas were dominant. However, there was competition between Marathas, Mughals, and local rulers for political supremacy in the Deccan. There was a sense of impending change in the air; the Mughal emperor was sickly, the nizam was aged, and the Marathas were active and ambitious.</p>
History of Indian Culture	A- 316	<p>Political History of India will give the student a basic knowledge and idea of modern history. History of Modern India presents an authoritative overview of the history of what was known as British India. The text is largely based on the author's research on nationalism and colonialism in India and also draws from the works of eminent historians of the period. Challenging and revising colonial and nationalist</p>

	History of Modern world	A- 317	interpretations of history, this book moves away from a largely political narrative to a social, economic and religious history of modern India. It explains how conditions in India during the eighteenth century helped the British East India Company establish its rule in India. It also gives us important insights into the primary aim of colonial rule which was the economic exploitation of India through trade and investment. It will help students to know how trade practices were done at that time.
	Computer applications in libraries	A - 321	
	Library management	A - 322	
	Economics of growth and development.	A - 345	Students will be able to comprehend the meaning of economic growth and development, explain poverty, human development and factors of development.
	Indian Economy	A-345 (Since 2019-20)	
	Quantitative methods	A-346	Students will be able to analyze the economic problems with the help of statistical methods and tools.
	Economic Growth & International Trade	A-346 (Since 2019-20)	
	Principles of public administration	A - 338	
	(a) Indian political thought	A - 339	
	(b) International politics		
	Veda-Upnishad-Arshkavyam-Alankarashcha	A - 330	
	Gadyakavyam-Neetikavyam-Vyakaranam-Chandashcha	A - 331	
	Functions of sociological thought	A - 332	This course is intended to familiarize the students with the social, political, economic and intellectual contexts in which sociology emerged as a distinctive discipline. Its objective is to help students gain an understanding of some of the classical contribution sociology, and their continuing relevance to its contemporary concerns.
	Social research methods	A - 233	1) To educate students on meaning, scope, types and significance of social research .. 2) Importance of research design in social research and how to formulate it. 3) How to collect analyse data and how to write of field report.
B. A. III	Qualifying Course: Sports & Physical Education	A - 003	

B. P. Ed. I Yr	History, Principles and Foundation of Physical Education	CC-101	शारीरिक शिक्षा का इतिहास उसके सिद्धार्थ की अवधारणा के बारे में जानकारी।
	Anatomy and Physiology	CC-102	शरीर रचना विज्ञान शरीर की विभिन्न कोशिकाओं के बारे में जानकारी
	Health Education and Environmental Studies	CC-103	स्वास्थ्य शिक्षा और एनवायरमेंट के बारे में जानकारी
	Yoga Education	CC-104	योग क्रियाओं का समायोजन
	Educational Technology and Methods of Teaching In Physical Education	CC-105	शारीरिक शिक्षा में पढ़ाने के तरीके
	Organization and Administration	CC-106	संगठन और प्रशासन के बारे में जानकारी
	Officiating and Coaching	CC-107	एक सफल कोच बनने के बारे में जानकारियां
	Sports Nutrition and Weight Management	CC-108	सही डाइट और वजन को नियंत्रण करने का तरीका
	Track and Field (Running & Jumping Events.)	PC-101	दौड़ने जंपिंग करने एवं फेंकने की क्रियाओं का समावेश
	Swimming/Gymnastics /Shooting (Any one)	PC-102	केरला जिम्नास्ट एवं शुष्क क्रियाओं का समावेश
	Yoga/Aerobics	PC-103	योग व एरोबिक के तरीके
	Indigenous Sports: Kabaddi / Malkhambh/ Kho-Kho etc. (Any one)	PC-104	किसी एक के करने का तरीका के बारे में जानकारियां
	Mass Demonstration Activities: March past / Dumbbells /Tipri / Wands/ Lezim / Hoop/Umbrella.	PC-105	एकरूपता का अभ्यास
	Racket Sports: Badminton/ Table Tennis/Squash/ Lawn Tennis (Any one)	PC-106	किसी एक के करने का तरीका के बारे में जानकारियां
	Teaching Lesson		
	a. General Lesson Plan (05 Lessons)	TC-101	ब्लैक बोर्ड पर पढ़ने का तरीका बताया जाता है
b. Lessons in outdoor Sports & Game activities (05 Lessons)	TC-102	इसमें बहार ग्राउंड में एक्टिविटी कराई जाती है।	
Sports Training	CC-201	खेल की बारीक से बारीक जानकारी तरीका बताना	

Computer Applications in Physical Education	CC-202	शारीरिक शिक्षा में कंप्यूटर के महत्व के बारे में जानकारी देना
Sports Psychology and Sociology	CC-203	शील का साइकोलॉजी भी समाज में महत्व क्या है ज्ञान देना
Measurement and Evaluation in Physical Education.	CC-204	नापतोल की सभी जानकारी का समावेश
Kinesiology and Biomechanics	CC-205	शरीर क्रिया विज्ञान जिसके बारे में शरीर किस प्रकार से कार्य करता है की जानकारी देना
Research and Statistics in Physical Education	CC-206	शोध के तरीके का ज्ञान
Sports Medicine, Physiotherapy and Rehabilitation.	CC-207	क्योंकि खेल खेलने से चोट लगती है इसीलिए शारीरिक शिक्षा की दवाई और फिजियोथेरेपी के माध्यम से किस प्रकार तूने उसी अवस्था में आना का ज्ञान देना
Sports Management	CC-208	खेल को संचालित करने का तरीका
Track and Field (Throwing Events)	PC-201	खेलों में फेंकने के बारे में जानकारी देना।
Combative Sports :Martial Art/ Karate/ Judo/Fencing/Boxing/Tae kwondo/ Wrestling, etc.,(Any two out of these)	PC-202	खेलों में फेंकने के बारे में जानकारी देना।
Team Games Specialization: Baseball/Cricket/ Football/Hockey/Softball/Volleyball/Handball/ basketball/ Netball etc (Any two out of these)	PC-203	खेलों के बारे में जानकारी देना।
Sports Specialization Track and Field /Swimming /Gymnastics (Any one )	PC-204	खेलों के बारे में जानकारी देना।
Games Specialization Kabaddi/ Kho-Kho/Badminton/ Table Tennis/Squash/ Tennis etc (Any one out of these)	PC-205	खेलों के बारे में जानकारी देना।

1. शारीरिक शिक्षा के द्वारा छात्रों में अनुशासन कौशल का विकास
2. कैरियर निर्माण का निर्माण शारीरिक शिक्षा के द्वारा छात्रों में रुचि का विकास
3. शारीरिक शिक्षा के द्वारा धैर्य अनुशासन एवं समूह में कार्य करने का विकास सिखाता है
4. शारीरिक शिक्षक जीवन मूल्यों का विकास
5. शारीरिक शिक्षा के ज्ञान से स्वरोजगार वह सुनहरे भविष्य का निर्माण होता है
6. शारीरिक शिक्षा सहनशीलता समूह में कार्य करना एवं मित्रता का विकास होता है।

B. P. Ed. II Yr

<p>Teaching Practices/Internship Teaching (4 week School) Teaching Lesson Plans for Racket Sport/ Team Games/Indigenous Sports (out of 10 lessons 5 internal and 5 external at practicing school)</p>	<p>TC-201</p>	<p>क्लास में 5 लेसन बाहरी व पांच आंतरिक किस प्रकार से कैसे लेसन लेकर बच्चों को सिखाया जाता है</p>
<p>Teaching Practices/Internship Teaching (4 week School) Sports Specialization: Coaching lessons Plans(One for Sports 5 lessons) (out of 10 lessons 5 internal and 5 external at practicing school)</p>	<p>TC-202</p>	<p>इसमें बच्चों को कोचिंग के बारे में सिखाया जाता है</p>
<p>Teaching Practices/Internship Teaching (4 week School) Games Specialization: Coaching Lessons Plans(One for Sports 5 lessons) (out of 10 lessons 5 internal and 5 external at practicing school)</p>	<p>TC-203</p>	<p>इसमें बच्चों को कोचिंग के बारे में सिखाया जाता है</p>
<p>Angiosperm taxonomy, plant resources and utilization</p>	<p>H- 1001</p>	<p>After the completion of the course the students will be able to: 1. understand the history, principles of angiospermic classification and plant nomenclature and ICBN. 2. Differentiate between different systems of angiosperm classification and different taxonomic evidences. 3. Understand the concept of species, taxa delimitation and rank attribution. 4. Know about PhyloCode and APG 5. recognize various angiosperm species and genera. 6. Know about herbarium techniques and importance of botanical gardens. 7. Range of floral structure and phylogeny in selected Dicotyledons and monocotyledons. 8. differentiate between the different angiosperm plants. 9. spot the economic significance of angiosperm plants as fibres, medicines NWPPs,</p>

Biology and diversity of viruses and bacteria	H- 1002	<ol style="list-style-type: none"> <li>1. Able to understand the diversity and identification of Bacteria, Viruses, and Fungi;</li> <li>2. Able to recognize prokaryotic and eukaryotic microorganisms.</li> <li>3. Able to understand how bacteria, yeast, fungus, and viruses are purified and cultured.</li> <li>4. To understand microbial flora of air soil and water.</li> <li>5. Able to recognize the concept, principle, and procedure of different types of sterilization techniques.</li> <li>6. To understand the defense system of the body against different kind of antigens.</li> </ol>
Biology and diversity of algae and bryophytes	H- 1003	<ol style="list-style-type: none"> <li>1. Comprehend the diversity of lower cryptogams (Algae and Bryophyte).</li> <li>2. Gain adequate knowledge to know about the structure, reproductive parts and their development, mechanism of reproduction and life cycle pattern of algae</li> <li>3. Understand the morphological, anatomical and developmental diversity in the bryophyte.</li> <li>4. Familiarize the Positive and negative aspects of Algae.</li> <li>5. Gain adequate knowledge on comparative account of various divisions of lower plants to identify the algae and bryophytes up to the generic level in different localities.</li> <li>6. Familiarize ecology and the distribution of bryophytes in India.</li> </ol>
Biology and diversity of pteridophytes, gymnosperms and palaeobotany	H- 1004	<ol style="list-style-type: none"> <li>1. To impart Knowledge of the systematics, morphological, anatomical and developmental diversity in of various divisions of Pteridophytes.</li> <li>2. To gain knowledge stelar evolution, heterospory and origin of seed habit in Pteridophytes.</li> <li>3. Gain adequate knowledge to know the evolutionary trends and affinities of living gymnosperms with respect to external and internal features.</li> <li>4. To familiarize the diversity of Gymnosperms in India.</li> <li>5. Understand types of fossils, methods of fossilization and know the scope of Paleobotany, its role in paleobotany and geological time scale.</li> </ol>
Practical	H - 501	
Fungal Bio- diversity and Elementary Plant Pathology	H- 2001	<ol style="list-style-type: none"> <li>1. Students are able to understand the early stages of plant disease development and the role of various pathogens.</li> <li>2. The students have a general understanding of the properties of fungi that cause plant diseases.</li> <li>3. Able to recognize the importance and scope of Plant Pathology.</li> <li>4. Able to Know how to deal with plant disease and how to prevent them.</li> <li>5. Able to learn about the nutritional and therapeutic properties of edible and poisonous mushrooms.</li> <li>6. Know about organisms and causal factor responsible for plant diseases &amp; methods of studying plant diseases, get familiarized with some common plant diseases of India</li> <li>7. Gain knowledge on host parasite interaction process</li> </ol>

Master of Science (M.Sc.) in Botany is a two years postgraduate programme with science Students seeking admission in this programme must have BSc Biology with Botany as subject. This programme is beneficial for students having interest in plant Sciences. The programme structure has been designed by subject experts keeping in view the carrier prospects of students. A student acquiring M.Sc. (Botany) degree will be

M. Sc. I-IV  
Sem  
Programme  
Specialisation:  
Botany

Cell and molecular biology	H- 2002	After the completion of the course the students will be able to: 1. Understand the structural organization and structural dynamics of the plant cell. 2. Understand the Principles of microscopy and different types of advanced microscopes and their utility. 3. Get familiar with Ultra structure of Cytoplasmic organelles & their functions. 4. Understand Chromatin organization and special types of chromosomes and their functions. 5. Understand Cell cycle and programmed cell death. 6. Know about Nucleic acids and their functions. 7. Understand DNA Replication and repair mechanisms. 8. Proteins synthesis, gene repression and gene regulation and chromatin remodeling.	skilled in the following. fields:  Theoretical Knowledge: Student will gain the theoretical knowledge of diversity, origin and evolution of viruses, bacteria, fungi, Algae, Bryophytes, pteridophytes and gymnosperms, Student will gain the theoretical knowledge of anatomical, embryogenesis, physiological, biochemical, genetic, evolutionary mechanisms in different plant groups. Advancements in plant biotechnology, plant tissue culture, biodiversity conservation, modern phyto-techniques and biostatistics.
Genetics, Cytogenetics and Plant Breeding	H- 2003	1. Students are able to understand the basic principles of inheritance biology. 2. They get in depth knowledge about of gene interaction, sex determination, and cytoplasmic inheritance and are able to understand multiple allelic inheritances. 3. To know the linkage and recombination and learn about the gene mapping methods 4. Understand the various mechanisms of chromosomal aberrations and numerical changes followed by their consequences and significant role in the characteristics of an individual. 5. Familiarize to mutations and mutagens 6. Understand the concept of gene and gene structure. 7. Knowledge on the basic processes of plant breeding using different breeding technique and know about exploitation of Heterosis, hybrid and variety development and their release through artificial hybridization	Practical knowledge: 1. Plant Taxonomy and Identification: Student will be able to identify and classify major group of plants with their characteristic features.  2. Student will learn to carry out practical in the field and Laboratory with minimal risk.  3. Student will get the broad category of skills while getting exposures through various events organized by department of Botany to enhance their communication skills like Seminars, Power point presentations, Project Reports and Viva-voce.
Anatomy and Reproduction in Angiosperms	H- 2004	1. Understand the various forms of angiosperms in reference to anatomy and floral characters 2. Understand the importance of Anatomy and Embryology and the scope of its application 3. Learn how to distinguish between normal and aberrant secondary development in plants, as well as the reasons for the same. 4. Able to execute the necessary anatomical operations. 5. Able to understand the differences between micro-sporogenesis and mega-sporogenesis as well as reproductive behavior for better plant breeding. 6. Able to understand concept of fertilization, endosperm and embryogenesis	4. Conservation of Botanical Gardens: Through field work in the Botanical Gardens, students are able to learn Integrated Conservation Approaches for plants. Students will also be able to learn Plant Propagation Techniques. 5. Environment Sustainability: Students will be able to understand the ecological impact of plants. environmental Protection: Students will learn about environmental protection theory and practice
Practical	H - 601		6. Sustainable Development: Students will be able to contribute towards sustainable development. 7. Scientific Ethics: Students will be able to understand and commit to scientific and environmental ethics such as proper crediting of sources of information, data and ideas like honesty in reporting and analysis of results, responsibilities and norms of the biodiversity conservation.
Plant - soil- water relations, Growth and Development	H- 3001	1. Understand the significance and extent of plant water relation in detail. 2. Able to learn about the movement of sap and water absorption by the plant. 3. Able to understand the absorption mechanism of minerals, impact of their deficiency on plants. 4. Able to understand Plant adaptations to biotic and abiotic stress at the molecular and physiological levels. 5. Able to know Genes involved in plant stress tolerance, their genetic engineering. 6. Able to know different kinds of movement in plant and their mechanisms. 7. To understand different kinds of plant hormones and their activities in plants	

Phytochemistry and Metabolism	H- 3002	After completing this course the students will be able to 1. Understand the biomolecules at atomic level and their relationship with the cellular activities. 2. gain the knowledge of metabolism of carbohydrates and lipids through various anabolic and catabolic pathways. 3. understand the nitrogen and sulphur assimilation in living beings through various biochemical Pathways. 4. know the production of various secondary metabolites produced by the plants and their importance for human being. 5. explain how energy is used in human body to create work and power	8. Communication Skills: Students will learn the botanical jargons used in plant sciences and will be able to communicate scientific knowledge with scientific language 9. Modern Tool Usage: Students will be able to apply appropriate tools & techniques and other resources for Biochemical, Physiological, Molecular, biotechnological works in Plants. 10. Ethnobotany: Students will be able to understand and learn Importance and Utilization of Economically Important Plants.
Plant Ecology and Phytogeography	H- 3003	After completing this course the students will be able to: 1. know about different ecological factors. 2. Understand the ecological species concept, ecological niche and genecology. 3. Get familiar with population and community ecology its structure and dynamics. 4. Understand the process of ecological succession, ecosystem ecology. 5. Understand the methods and measurements in production ecology. 6. Know about different international ecological programs. 7. Know about recycling of organic and inorganic waste disposal, biodiversity conservation, soil conservation, reforestation etc. 8. Understand about the Concept and utilization of phytogeography. 9. Know about concept, principle and applications of remote sensing.	Attaining M.Sc. Biology degree opens doors to the following Professions:  1. Pharmaceutical, Horticulture, Floriculture, Vermiculture, Pisciculture, Sericulture, Silviculture, Hospitals, Veterinary, Aquaculture, Biotechnology, Microbiology, Beverage Industries, Sugar Mill, Pathological Laboratory. 2. Student can work in Government sectors as well private sectors related to Agriculture, Forestry and Food & Beverages industry. 3. Student can choose teaching profession in private or government Educational Institutions 4. Students can join higher education institutions for gaining further knowledge in a specific field such as M.Sc. Botany, Zoology, Microbiology, Biotechnology, Biochemistry, Genetics and Chemistry, B.Ed., Diploma in Lab technician 5. Students may start Microbusiness such as Nursery, Vermiculture, Organic farming, Coaching Institutes 6. Student can further prepare for competitive exams such as IFS, UPSC, SSC, CGL 7. Student can further prepare for CSIR NET, and can go for further studies in different fields of research in life sciences.
Elementary Biotechnology	H- 3004	After completing this course the students will be able to: 1. Know about the basic concepts, principle and scope of biotechnology. 2. Know about the basic concepts, principle of recombinant DNA technology. 3. Know about different types of coning vehicles their roles and limitations. 4. Understand basic concepts of DNA fingerprinting, gene therapy, genetic counselling. 5. Know about Gene libraries, types of genomic libraires 6. Know about transgenic plants and methods of plant transgenic production. 7. Know about intellectual property rights and their significance. 8. The basic concepts of plant tissue culture, methods of different types of PTC and soma clonal variation. 9. Know about different biotechnological methods used in plant germplasm conservation.	
Practical	H - 701		
Modem Phyto techniques and Biostatistics	H- 4001	After completing the course the student will be able to 1. use appropriate molecular technique required in plant Sciences. 2. gain the technical knowledge about instrument of cell fractionation, section cutting, herbarium preparation etc. 3. Analyze the biochemical compounds qualitatively as well as quantitatively. 4. Develop the knowledge about basic concepts of statistics viz collection, presentation and analysis of data. 5. find out the appropriate statistical method required for a particular Research Design.	



Bio-diversity Conservation & Plant Resources	H- 4002	<ol style="list-style-type: none"> <li>1. Gain adequate knowledge to know the all the types and levels of biodiversity.</li> <li>2. Global biodiversity patterns and factors affecting biodiversity in terrestrial, marine, and aquatic ecosystems and emphasis are placed on regional diversity hotspots.</li> <li>3. To gain knowledge about biodiversity of India and they get in depth knowledge about the biodiversity of different ecosystems in India.</li> <li>4. To analyze the current threat to biodiversity and suggest conservative measures.</li> <li>5. Understand the role and principles of operation of different types of protected areas and important conservation areas including IUCN classified protected areas, RAMSAR sites, Biosphere Reserves and other systems of global significance.</li> <li>6. Aware of the relevant legislation and recent initiatives taken at national and world level for the conservation of biodiversity.</li> </ol>
Recombinant DNA technology	H-4003	<p>After completing the course the student will be able to:</p> <ol style="list-style-type: none"> <li>1. Understand the advanced genetic engineering concepts,</li> <li>2. Differentiate between cloning and expression vectors.</li> <li>3. Know about different methods of cloning in bacterial and eukaryotic systems.</li> <li>4. Know about different methods of molecular probe preparation.</li> <li>5. Understand the principle, utility and variants of PCR.</li> <li>6. Know about RFLPs, RAPD and cDNA .libraries, chemical synthesis of DNA.</li> <li>7. Understand the concept and utility of protein engineering.</li> <li>8. Understand the concept and utility of drug designing.</li> </ol>
Environmental Biotechnology	H-4006	<p>After completing the course the student will be able to:</p> <ol style="list-style-type: none"> <li>1. Know about different kinds of pollutions, their effects on plant and ecosystems and cost of pollution.</li> <li>2. Get familiar with climate change and its consequences.</li> <li>3. Understand about concept of ecosystem stability&amp; ecological perturbations and ecosystem restoration.</li> <li>4. Know about environmental impact assessment, environment auditing/</li> <li>5. Know about sustainable development and natural resource management.</li> <li>6. About different methods of phytoremediation for mitigation of adverse effects of weedicides and pesticides and chemical fertilizers.</li> <li>7. Know about biotechnological advances in pollution control.</li> </ol>
Practical	H - 801	
Inorganic Chemistry- 1	H- 1007	<ol style="list-style-type: none"> <li>1. On completion of this course, students will develop the understanding about various theory of metal ligand bond and develop the interest in metal ligand back bonding by adjusted crystal field theory.</li> <li>2. This course will be helpful in understanding the catalytic property of transition metal by reaction mechanism and stability factors.</li> <li>3. Students will gain knowledge about the electron transfer reaction and helpful to elaborate various systems where electrons transfer mechanism can be applied.</li> </ol>

Organic chemistry- 1	H- 1008	On completion of this course, students will be able to 1. understand various methods of Carbanion generation and their applications in Organic Synthesis. 2. correlate the reaction mechanisms with practical procedures. 3. understand mechanisms in biological reactions that will help students to understand Nature better 4. differentiate between various organic reactive intermediates. 5. develop interest in writing and finding mechanisms of new reactions 6. understand various terminologies in stereochemistry. 7. draw the stereo chemical structures of different molecules. 8. understand the isolation of racemic mixtures. <del>9. draw various organic reactive intermediates with stereochemistry.</del>
Physical Chemistry- 1	H- 1009	Students will be able to apply concepts of Quantum Chemistry, Classical Thermodynamics and Statistical Thermodynamics in describing and predicting the physical and chemical behavior of microscopic and macroscopic chemical systems using appropriate methodologies.
Mathematics for Chemists	H- 1010	On completion of this course, students with bio background will learn vectors, matrix, Determinant, Simple differentiation, simple Integration, Logarithms, Probability and straight line etc, which are useful in learning the physical chemistry broadly.
Biology for Chemists	H - 1011	On completion of this course, students with math background will learn about cell structure and functions, Carbohydrates, Lipids, Amino-acids, Peptides, Proteins & Nucleic Acids, which are useful in learning the bio-chemistry broadly.
Computer for Chemists	H - 1012	On completion of this course, students will learn about computers and its functions, different operating system as Windows, DOS, UNIX, Computer language as FORTRAN, BASIC, C, etc, MS OFFICE, Molecular Modelling, Scientific Software like AMBER, CPMD, etc.
Practical	H - 507	
Inorganic chemistry - II	H- 2007	1. On completion of this course, students will gain advance knowledge on transition metals chemistry and they will Understand the reason of colour and magnetic property of transition metals. 2. This course will develop the understanding about metal-metal multiple bond by using d orbitals. 3. Students will gain the knowledge about bonding in organometallic compound like metals carbonyls, metal nitrosyls and their application. 4. Students will gain knowledge about various technique which use in structure determination of compounds. 5. This course will also helpful to develops the basic knowledge about radioactivity and their application in field of medical and energy
Organic chemistry - II	H- 2008	After the completion of this course, students will be able to 1. understand the concepts and mechanisms of various reactions and rearrangements such as aromatic electrophilic & nucleophilic substitution reactions, free radical & pericyclic reactions. 2. in depth knowledge about organic chemical reactions with a focus on principles for effective synthetic strategies.
Physical Chemistry - II	H- 2009	Students will develop an understanding of basic principles and applications of Chemical Kinetics, Surface Chemistry and Electrochemistry.

On completion of this programme,  
1. students will develop the understanding about chemistry of inorganic compounds and their application. Demonstrate broad knowledge of transition metals chemistry.  
2. students will develop the understanding with the most recent and upcoming frontier areas of knowledge in

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Group theory & Solid state	H- 2010	From this course content, students will learn about 1. Symmetry and symmetry operations; their application in spectroscopic analysis. 2. Various techniques of spectroscopy like IR, Raman, Electronic spectroscopy (Atomic, molecular & photoelectron), NMR and ESR spectroscopy regarding their principle and application in illustrating structure of molecules. 3. X-ray diffraction describing the procedure for X- ray structure analysis, absolute configuration of molecule etc.	Recent and upcoming frontier areas of knowledge in Chemistry expected from a Post Graduate in Chemistry. Besides, also making them aware of the recent frontier areas of knowledge and the tools/techniques/methodologies needed for research in Chemistry. 3. the students can pursue a career in Chemical Sciences. 4. the students can easily understand the concept of theoretical chemistry.
Practical	H - 607		5. the students can easily understand the concept of bio-chemistry.
Photochemistry	H- 3007	On completion of this course, students will be able to 1. understand various Pericyclic and photochemical reactions and rearrangements. 2. understand and write mechanism of reactions and their applications. 3. understand how to synthesize five, six and seven-membered organic compounds via photochemical reactions. 4. utilize their knowledge in predicting various photochemical conversions.	6. the students can easily understand the concept of computational chemistry. 7. Students will be familiar with the most recent and upcoming frontier areas of knowledge in Photo Chemistry expected from a post Graduate student in chemistry. Besides, also making them aware of the recent frontier areas of knowledge and the tools/techniques/methodologies needed for research in Photo Chemistry.
Spectroscopy	H- 3008	1. On completion of this course, students will gain knowledge about principle of different spectral techniques and their application in chemistry. 2. This course will be helpful to develop the understanding about structure determination of organic compounds by using different spectral method like NMR, IR, UV-Visible and Mossbauer spectroscopy.	8. students will develop the laboratory competence in relating chemical structure to spectroscopy phenomena and demonstrate the ability to synthesize and characterize compounds using modern instrument and techniques.
Analytical Chemistry	H- 3009	1. On completion of this course, students will be able to develop the understanding about new technologies and methods for analysis of inorganic and organic substances. 2. By this course students will acquire the knowledge about various methods for tracing and measuring new substances and develop some theoretical and practical understanding of advanced analytical instrument their application. 3. On completion of this course, students will be able to develop the understanding about new technologies and methods for analysis of inorganic and organic substances. 4. By this course students will acquire the knowledge about various methods for tracing and measuring new substances and develop some theoretical and practical understanding of advanced analytical instrument their application.	9. students will learn about the application of group theory in spectroscopic analysis related to structural illustration. 10. students will learn about various techniques of spectroscopy like IR, Raman, Electronic spectroscopy (Atomic, molecular & photoelectron), NMR and ESR spectroscopy regarding their principle and application in illustrating structure of molecules.
Elective -I (Any one of the following)			11. students will develop the basic analytical and technical skills to work effectively in the various field of chemistry.
(a) Bio-inorganic chemistry	H- 3010		12. Students will learn and demonstrate how to the structure of biomolecules determined, chemical properties, reactivity and biological uses. Understand biological processes like replication, transcription, translation. 13. Students will understand the application of chemistry in biological system.
(b) Bio-organic chemistry	H- 3011	Student will acquire knowledge on completion of this course about 1. metabolic process in all living organism. 2. various pathways like role of enzymes, coenzymes structure, synthesis and role of amino acids properties. 3. structure of DNA and RNA, nucleosides, nucleotides, transfer of genetic information from one generation to another generation. 4. understanding various bio chemical reactions - addition , elimination, electrophilic, nucleophilic, phase transfer etc.	14. the students may have some soft corner towards environment and can inspire the society to reduce the pollutions to save nature. 15. students will be familiar with the most recent and upcoming frontier areas of knowledge in organic synthesis expected from a post Graduate student in Chemistry. Besides, also making them aware of the recent frontier areas of knowledge and the tools/techniques/methodologies needed for research in synthetic Organic Chemistry. 16. the students can move towards pharmaceutical

(C) Bio-physical chemistry	H- 3012		chemistry, drug designing, QSAR technology etc. 17. This programme is career oriented and can provide various opportunities in the field of different chemical based industries like pharmaceutical, drug industries, cosmetics, pesticide, polymer industries etc.
Practical	H - 707		
Environmental chemistry	H- 4007	On completion of this course students will learn about the earth atmospheric system, biogeochemical cycles, hydrosphere, pollution and its control, analytical methods for measuring pollutants, soils, environment toxicology etc.	
Special Papers of Organic Chemistry (Any three out of five)			
Organic Synthesis	H - 4013	On completion of this course, students will gain advance knowledge of 1. various rearrangements of synthetic importance 2. different methods of oxidation of various classes of organic compounds by important oxidizing reagents. 3. different types of reduction methods of various organic compounds by reducing agents. 4. Metallocenes, Benzenoids and non benzenoids compounds and their aromaticity, craig rule 5. the use of Transition and main group metals in organic synthesis.	
Medicinal Chemistry	H - 4014	On completion of this course students will learn about the medicine (drugs), its designing through computer software, combinatorial chemistry, QSAR, metabolism and excretion of drugs, neuroactive agents (for psychological problems), cardiovascular agents (for heart disease), antineoplastic agents (for cancer and tumour), anti-infective drugs (antibiotic, antimalarial, etc). This course will introduce the students that how drugs work in the human body.	
Polymers	H - 4015	Students gaining knowledge and skills on completion of the course are as follows. 1. Knowledge about science of large molecules, types & general classification of polymers, molecular weight and its distribution, polymer solutions, structure and morphology. 2. Develop skills regarding synthesis and applications of thermosetting and thermoplastics polymers, conducting polymers, and biodegradable polymers. 3. Knowledge about polymer processing, polymer degradation mechanisms etc.	
Chemistry of Natural Products	H - 4016		
Heterocyclic Chemistry	H - 4017		
Special Papers of Physical Chemistry (Any three out of five)			
Solid State Chemistry	H - 4018	On completion of the course, the student should be able to describe the principles and applications of solid state reactions, crystal defects, electronic properties and band structure.	

Advanced Quantum Chemistry	H - 4019	On completion of the course, the students will develop an understanding of basic principles and applications of Hartree- Fock Theory and post Hartree- Fock Theory including Density Functional Theory. Additionally, the students will be able to carry out computer experiments (simulations) using Quantum Chemistry packages.
Liquid State	H - 4020	
Physical Chemistry ibn Organic Reactions	H - 4021	On completion of the course, the students should be able to apply the principles of Quantum Chemistry and Thermodynamics in describing the properties and reactivity of organic compounds in different medium.
Computational Chemistry	H - 4022	On completion of the course, the students should be able to use molecular modeling and mathematical tools to simulate and understand various chemical processes.
Practical	H - 807	
Mathematical physics	H- 1027	The students will have understanding of Basic and advanced mathematical tools required for Physics Problems Different Techniques to solve differential and integral equations Various special functions and important transforms and their applications.
Classical mechanics	H- 1028	Lagrange's and Hamilton's formalism: Generalised coordinates, Virtual work, Principle of Least action, Lagrange's equation of motion, Hamilton's Principle, Noether's Theorem. Two-body central force problem, effective potential technique, study of kepler system, Rigid body Kinematics, Euler angles,rigid rotator and heavy symmetrical top. Canonical transformations, Poisson brackets, Liouville's theorem. Hamilton Jacobi Theory, action-angle variables. Small oscillations, normal coordinates, continuous system, Lagrangian and Hamilton formalism of continuous systems
Quantum mechanics	H- 1029	The students will have understanding of Difference between classical and quantum mechanical theory and approach Linear Vector Space, operators and tools to calculate eigen values. Various techniques to solve time dependent and time independent Schrodinger equations using different coordinate systems Connection between symmetry and conservation laws, commutation relations, tools to calculate components and total angular momentum. Various approximation methods utilized in Quantum Mechanics
Electronics devices	H- 1030	To provide a comprehensive understanding of electronic devices and circuits and. To understand the working diode and transistor. To study basic circuits using diodes and transistors. To know the concept of feedback and design feedback amplifier. To study oscillators and power amplifiers using transistor. On completion of this course the student will learn about Field Effect Transistors, their principles and applications Photonic devices like LED, Laser diode, photodetectors, solar cells etc and their working in.
Practical	H - 527	
Quantum mechanics- II	H- 2027	Limitations of non-relativistic quantum mechanics; Dirac's theory of spin-1/2 particles; Lorentz transformation of a spinor and the bilinear covariants; Introductory quantum (free) field theory - examples of scalar and spinor field quantization.

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Statistical mechanics	H- 2028	Basic postulates of classical statistical mechanics; concepts of microstates, phase-space, partition function and density function; micro-canonical, canonical and grand canonical ensembles; Maxwell Boltzmann distribution; connection between statistical mechanics and thermodynamics applications to simple systems. Fermi-Dirac and Bose-Einstein distributions; applications - Degenerate Fermi gas, Black-body radiation, Bose-Einstein condensation.	
Electrodynamics & plasma physics	H- 2029	The students will understand The difference between static and dynamical system Maxwell's equations and time varying fields Gauges in electrodynamics, retarded potentials and its applications Radiation from time varying source, charged particle dynamics and relativistic electrodynamics. Basics of plasma physics; Various aspects of wave propagation in plasma.	
Atomic and molecular physics	H- 2030	On one-electron atoms: Fine and hyperfine structure, Interactions of one-electron atoms with static external electric field, magnetic field and electromagnetic radiations, Two and many electron atoms: finding the least energy configurations and the corresponding energies. Molecular physics: Diatomic molecules-rotation, vibration and electronic spectra, configuration of diatomic molecules. Lasers and its applications.	
Practical	H - 627		
Condensed matter physics	H- 3027	On Elementary Crystallography, basis, crystal class and Ewald construction. Knowledge on lattice vibrations and thermal properties and quantization of lattice vibrations, phonon momentum. Discussion on free electron Fermi gas with Classical free electron theory and Fermi-Dirac probability distribution function is discussed and hence an comprehensive view on Fermi energy is obtained. Dielectric Properties of insulators and ferroelectricity. In Magnetic properties of solids, Diamagnetism, paramagnetic susceptibility and ferromagnetism is discussed and a quantum picture of Heisenberg exchange energy is covered. Superconductivity Properties of superconductors with discussion on Meissner effect. London's equations are covered and discussion on superconducting magnets is carried out.	Create, apply and disseminate knowledge leading to innovation. Think critically, explore possibilities and exploit opportunities positively. Work in teams, facilitating effective interaction in work places. Lead a sustainable life. Embrace lifelong learning Master analytic and critical thinking skills through acquired knowledge in major branches of physics. Graduates sustain intellectual curiosity and know how to continue to learn not only areas that are relevant to Physics, but also that are important to Society. To equip the students for seeking suitable careers in Physics. Perform basic, applied and collaborative research.
Nuclear and particle physics	H- 3028	Basic properties of nucleus, its structure and different models that explain the behavior and characteristics. Bound state of deuteron by scattering theory Types of nuclear reactions and conservation laws, reaction mechanisms. Basic particle physics, conservation laws C, P, T invariance and relativistic kinematics	Enhance pedagogical and scientific writing skills through modern methods. Enhance National and International competency. Kindle entrepreneurial skills and lifelong learning. Become socially and environmentally responsible citizens.
(i) Electronics- special paper- I	H- 7027	Understanding the basics of Digital Electronics and different number systems and conversion between them. Design and construction of the basic and universal logic gates. Studying the Boolean algebra and simplification of Boolean expression using different methods. Study and construction of sequential logic circuits, understanding various design of flip flops. Studying the programmable logic devices, shift registers, counters	
(ii) solid state physics- special paper-I	H- 7028		
(iv) Spectroscopy- special paper-I	H- 7029		

(i) Electronics- Special paper-II	H- 7030	Understanding the basics of Operational Amplifier and study its ideal characteristics. The applicability of op-Amp in designing for solving various mathematical Understanding the concept of modulation and de modulation. AM, FM and Phase modulation techniques and their differences. Qualitative analysis of PAM, PWM, PPM, PCM, and Delta modulations.	
(ii) Solid state physics- Special paper-II	H- 7031		
(iv) Spectroscopy- Special paper-II	H- 7032		
Practical	H - 727		
Computational methods & programming	H- 4027	The students will have understanding of Fortran programming. Concepts on formatting, rounding off rules and errors. Different numerical techniques utilized in programming.	
Physics of Nanomaterial	H- 4028	Background, emergence and challenges in nanoscience, types of materials based on their degrees of freedom. Different types of preparation of nanomaterials, characterization techniques and their interpretations.	
(i) Electronics	H- 8027	Understanding the basics of digital communication and various digital modulation techniques like BPSK, DPSK, QPSK, BFSK. study its ideal characteristics. Understanding the concept of random variables , probability distributions and random processes. Qualitative analysis of data transmission and satellite communication.	
(ii) Solid state physics	H- 8028		
(iii) Nuclear physics	H- 8029		
(iv) Spectroscopy	H- 8033		
(i) Electronics	H- 8030	The course will focus on the different classes of thin film patterning techniques like the top down techniques, bottom up techniques as well as focus on various engineering applications of the patterned thin films. The course will be expose the students to the various soft lithography techniques and will focus on how hydrodynamics and capillarity plays and intriguingly critical role in evolution and pattern formation.	
(ii) Solid state physics	H- 8031		
(iii) Nuclear physics	H- 8032		
(iv) Spectroscopy	H- 8034		
Practical	H - 827		
Economics zoology and taxonomy	H- 1062	1. To collect the insects and identify with the help of taxonomy book 2. The name of the insects with the help of nomenclature	1. By completing their studies, students earning the M.SC degree in Genetics are expected to have achieved the following skills and capabilities 2. By completing studies student caring the M.SC Degree physiology are expected to have achieved the Skills and capability. 3. By completing studies student caring the M SC Degree
Evolutionary biology	H- 1063	This course consists of biological and chemical evolution, Distribution of animal in space and time, concept and mechanism of evolution, adaption and adaptive radiation.	
Non- chordata	H- 1064	Students learn the systematic position and evolution of different organism. Students must be learned the life cycle of different pathogenic and non-pathogenic non-chordate like photo zones helminthes nematodes which spread the diseases in the human population.	

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Cell and molecular biology	H- 1065	1. Comprehensive, detailed understanding of chemical basis of heredity. 2. Comprehensive and detailed understanding of genetic methodology and how quantification of heritable traits in families and populations provide insight into cellular and molecular mechanism.	3. By completing studies student earning the M.Sc Degree able to know how to prevent different diseases and study the evolution of different organism. 4. Student able to learn how evolution took place and how various evolutionary forces helps in mechanism of evolution.
Practical	H - 562		5. By completing studies student earning the M.Sc Degree able to know the use of research methodology and bioinformatics in the research
Biostatistics and bio-informatics	H- 2062	Student learn the principal of scientific methodology hypothesis testing and correlate the different data and use of internet regarding bioinformatics.	Students will able to learn how various biomolecules helps in proper functioning of body and how energy production takes place through various process in various species.
Genetics	H- 2063	1. Understanding of how genetic concepts affect broad societal issues including health and disease, food and natural resources, environmental sustainability etc. 2. Understanding the role of genetic mechanisms in evolution.	6. By completing studies student earning the M.Sc Degree physiology are expected to have achieved the Skills and capability.
Mammalian physiology	H- 2064	1. Have an enhanced knowledge and appreciation of mammalian physiology. 2. Understand the functions of important physiological systems including the cardiorespiratory, renal, reproductive and metabolic system. 3. Understand how these separate systems interact of yield integrated physiological responses to challenges such as exercise fasting and ascent to high altitude and how they can sometimes fail. 4. Be Able to perform analyze and report on experiments and observations in	7. By completing their studies, students earning the M.Sc degree in Genetics are expected to have achieved the following skills and capabilities.
Bio-chemistry	H- 2065	This course consist of structure and functionally various biomolecules, enzymes and its kinetics, mechanism of energy production in cell, various types of bonds that stabilizing the biomolecules structure .	8. Student will be able to establish correlation between Environment and aptive features. Student will be able to learn about morphological and anatomical features' of different chordate groups.
Practical	H - 662		9. Students will able to understand to know about development of an animal from embryonic stage to adult and till death at physiological as well as molecular level.
Chordata	H- 3062	Understand the diversity in chordate groups. And to identify animals on the basis of specific features.	10. Students acquired fundamental knowledge of different aspects of environment viz local regional and global environmental problems
Developmental biology	H- 3063	Student understand the fetus dev. Fertilization, reproductive organs in different species and learn the different stages during developing embryo.	11. By completing studies student earning the M.Sc Degree able to know the comprehensive understanding animal behavior , how hormones control the behavior pattern and how communication takes place between various species
Environmental biology	H- 3064	Understand the basic concepts of Environment and its Components. To understand the Biography and different aspects of pollution	12. Students will be familiar with the General & Specific feature of fishes and able to identify the fishes
Animal behavior	H- 3065	Student learn the different types of behavior and behavior pattern ,environmental perception, biological rhythm, neural and hormonal control of behavior and social behavior.	13. Student able to learn how can fish breed in process, about aquaculture farm management
Practical	H - 762		Breeding system and fish food production also.
Gen.Fish Biology	H-4066	Understand all groups of fishes, introduction to systematic and behavior and geographical distribution of fishes in India and lab course includes identification and dissection of some teleosts fishes.	13. Students will be familiar with the General & Specific feature of fishes.
Morphology and Physiology of Fishes	H-4067	Student learn the morphology and organ system , function and abnormalities In fishes. This course consists of fish food and its breeding system etc.	14. Student will be able to get familiar with fish culture and capture fisheries.
Fish culture and importance of fishery science	H-4068	To understand fish culture and capture fisheries, Ecology and fish proud action in aquatic bodies , Relationship between pollution Fish.	15. Student will be able to understand correlation between ecology and fish production.
Applied Fisheries	H-4069	Fundamental concepts of fish and fisheries. To understand pisciculture mainly in south east Asia.	16. Student can apply knowledge for effective management of fisheries. 17. By completing studies student earning the M.Sc Degree able to know the fish diseases treatment and fish processing technology.



	Practical	H - 862		
M. Sc. I-IV Sem Programme Specialisation: Statistics	Probability Theory	H - 1032	The students will be able to distinguish between probability models appropriate to different chance events and calculate probability according to these methods.	The Courses in the Department of Statistics will enable the student 1. to develop the skills to analyse complex statistical data coming from the various fields like industry, marketing, finance, agriculture and business. 2. to implement data analysis strategies to develop efficient models for various theoretical postulations. 3. understand the intricacies of statistical testing and its applications in real life problems 4. to develop, design and analyse experiments in empirical research. 5. to develop soft skills and practicing professional ethics.
	Statistical Distributions	H - 1033	The students will be able to formulate the mathematical/statistical models for real data set arising in various fields in order to analyse in respect of various useful characteristics of the populations.	
	Sampling Techniques	H - 1034	The course will equip a student with the knowledge of adopting a suitable sampling plan in a variety of situations and develop statistical inferences about the population.	
	Any one of the following -			
	(a) Computer Fundamentals and Fortran Programming	H - 1035		
	(b) Computer Fundamentals and Programming in C Language	H - 1036	After this course a student will be fully equipped with the techniques of developing his own computer programmes for most of the mathematical as well as Statistical methods.	
	Practical	H - 532		
	Design of Experiments and Linear Estimation	H - 2032	Students should be able to understand the random behavior of experimental processes, particularly, scientific, engineering and industrial.	
	Inference-I Theory of Estimation and Testing of Hypothesis	H - 2033	This course will make a student learn the various properties of a good estimator as well as techniques to develop such estimators from both classical and Bayesian point of view.	
	Matrices and Linear Difference Equations	H - 2034	After studying this course the students will be able to understand the basic concepts of matrices, their types and their mathematical operations leading to the estimation of parametric models.	
	Real and Complex Analysis	H - 2035	The students will be able to apply the tools studied in the course in his further studies of statistical courses and research investigation.	
Practical	H - 632			
Inference - II: Internal Estimation, Sequential Analysis & non - parametric inference	H-3032	The students will be able to demonstrate knowledge and understanding of the principles and theory of statistical inference and the ability to formulate statistical hypothesis and to use theory to estimate model parameters.		

Engineering Statistica, Quality control and reliability	H-3033	The students will be able to apply the fundamental tools/methods in various industrial plants.	6. analyse very large data sets in the context of real-world problems and interpret results using data analytics. 7. understand the optimization and computational techniques for the solution of the real-life problems.
Operations Research - I	H-3034	The knowledge of the contents of this course will help businessman/industrial managers to take optimum decisions/solutions to the executive type of problem.	
Any one of the following:			
(a) Decision Theory & Bayesian Inference	H-3035	After learning this course a student must be able to develop tests and confidence intervals for population parameters.	
(b) Stochastic Process & Survival Analysis	H-3036		
Practical	H-732		
Multivariate analysis	H - 4032	The students should be able to demonstrate knowledge and understanding of parametric and nonparametric tests, discriminant analysis, factor analysis, and principal component analysis in medical, industrial, engineering, business and many other scientific areas.	
Economic Statistics & Demography	H - 4033	After studying this course one learns the most important technique of forecasting used in economic analysis. It will also equip a student with tools used in population studies.	
Operational Research - II	H - 4034	To develop the ability to formulate fairly complex optimization problems in the context of practical problems.	
Any one of the following:			
(A) Computer oriented statistical methods	H - 4035		
(b) Advanced experimental Designs	H - 4036	Keeping the knowledge of the course, one can apply the techniques of advanced design in Biological and Agriculture research in order to see the significant effect of different new drugs/treatments.	
Practical	H - 832		
Basic of Bioinformatics, Computer system & c Programming	BI 101	1. Able to understand the basics of Bioinformatics i.e., human genome project, biological databases and internet applications in biology 2. Able to understand the basics of computers, number systems, logic gates 3. Know about the computer networking and networking topologies and transmission media. 4. Able to understand basic programming in C with special references to arrays in C.	

Biomathematics	BI 102	<ol style="list-style-type: none"> <li>1. Able to understand matrices, Arithmetic and Geometric Series, Permutation and combinations, set theory, Functions, Polynomials, limits and continuity.</li> <li>2. Able to understand Differentiation and Integration with standard functions and applications of Integral calculus in biology.</li> <li>3. To know about - 2D Coordinate Geometry: Equation of a line, circle, ellipse, parabola, and hyperbola as well as 3D geometry: Equation of sphere, cone.</li> <li>4. Able to understand Numerical Analysis with Gaussian Elimination and Gauss Jordan Methods, solution of Algebraic and Transcendental Equations by Bisection Method and Newton- Raphson Method.</li> <li>5. To understand Interpolation with Newton's formulae, Lagrange's formula and Curve fitting by Method of least squares.</li> <li>6. Able to calculate Numerical differentiation using Newton formulae. And Numerical Integration as Trapezoidal rule, Simpson's 1/3 and 3/8 rules.</li> </ol>
Biological Database System	BI 103	<ol style="list-style-type: none"> <li>1. Able to understand basics and components of DBMS with reference to data models, architecture and schema of architecture.</li> <li>2. Able to understand Relational Database with reference to relational data models and to also able to recognize keys of RDBMS.</li> <li>3. After learning Structured Query Language (SQL) students can able to create databases.</li> <li>4. To understand various biological databases and retrieval of data from them. Students can able to submit data to the databases.</li> </ol>
Microbiology & Immunology	BI 104	<ol style="list-style-type: none"> <li>1. Students are able to comprehend different concepts about origin of life, different kinds of classification of living beings, microbial evolution and diversity</li> <li>2. The students have a general understanding about structural organization of Eubacteria and Archaea, their evolutionary relationship</li> <li>3. The students have a general understanding about viruses e.g., how the viruses have been discovered, their nature, general characters of viruses, their nomenclature and classification</li> <li>4. Able to understand the basics of immune system e.g., innate and adaptive immunity, natural and artificial immunity, different types of cells and organs involved in immune system. In addition to that the types of antigens, antibodies, their interactions, the concept and types of vaccines, hybridoma technology, monoclonal antibodies and their applications.</li> </ol>
Practical	BI 105	
Operating System through Unix/Linux	BI 201	<ol style="list-style-type: none"> <li>1. Understand basics of various types Operating System, Process &amp; Memory Management in OS with special reference to Process Control Block, Process Scheduling and their types, Operations on Process, Basic Management of Memory, Swapping Virtual Memory and Paging</li> <li>2. Understand the significance of Input/Output Management as I/O Devices, Device Controllers, I/O Software; Device Drivers, Deadlock in detail.</li> <li>3. Able to understand UNIX/LINUX Operating Systems with special reference to VI Editor.</li> <li>4. Able to understand Shell Programming in detail.</li> </ol>

M. Sc. I- IV Sem Programme Specialisation: Bioinformatics	Object Oriented Programming with 'C++'	BI 202	<ol style="list-style-type: none"> <li>1. Understand the basics and Concepts of object-oriented programming with special reference to Objects, Classes, Data Abstraction, and Data encapsulation, Inheritance, Polymorphism, Advantages of OOP and Application of OOP with C++.</li> <li>2. Understand the basics of C++ as Token, Keywords, and Identifiers, Data types Variables, Declaration of Variables, Operators, Scope resolution operator, Manipulators, Operator Overloading, Operator Precedence, and Controlling Structures: Sequence structure, Selection structure and Loop structure.</li> <li>3. Students can able to understand Function Prototyping, Call by reference, Friend function, Inline function, Outside function inline, Private Member functions, Public Member functions, Static class members: Static data member, Static member function, Object assignment, Passing objects to function, Objects as function</li> <li>4. Able to understand Array Constructor &amp; Destructor, string characteristics, comparing and swapping</li> <li>5. Able to understand basics of Inheritance, Virtual functions &amp; Polymorphism, Formatted &amp; Unformatted I/O operations.</li> </ol>	<p>Develop students with a command on the core concepts of Bioinformatics, students that are able to address the challenges arising from the enormous amounts of various kinds of biological data, design and implementation of relational databases, thereby developing the predictive mathematical models of biological systems i.e., computational biology.</p> <p>Implementation of bioinformatics to define and solve a realistic research issue or real-world problem in various fields e.g., Medicine, veterinary science, crop improvement, gene therapy, evolutionary studies, environmental science etc.</p>
	Sequence Analysis	BI 203	<ol style="list-style-type: none"> <li>1. Understand sequence analysis as comparison, sequence scoring</li> <li>2. Able to understand Sequence database similarity searching algorithms as FASTA, BLAST, similarity searching scores and their statistical interpretation.</li> <li>3. Able to understand Motifs and Domains, Biological motifs.</li> <li>4. Able to understand Functional genomics Strategies for generating EST and full length insert, EST clustering and assembly, statistical analysis of EST and EST data and micro array.</li> <li>5. Able to understand phylogenetic prediction with MEGA software.</li> </ol>	
	Molecular Biology & Genetic Engineering	BI 204	<ol style="list-style-type: none"> <li>1. Understand the significance of nucleic acids as genetic information carrier, their structural features.</li> <li>2. To have a basic understanding of different aspects of gene expression and its regulations, molecular mechanism of different types of mutations and its repair.</li> <li>3. Able to understand the basic steps, tools and technologies involved r-DNA technology e.g., restriction endonucleases., cloning vectors, thereby preparation of genomic library and c DNA library.</li> <li>4. To have a basic understanding about the principles, methods &amp; the applications of different molecular techniques e.g., PCR, Southern Blotting, Northern Blotting, RFLP, RAPD etc., applications of same in designing of DNA vaccines, recombinant vaccines for the diseases like TB &amp; leprosy.</li> </ol>	
	Practical	BI 205		
	Statistical Analysis and Optimization	BI 301	<ol style="list-style-type: none"> <li>1. Understand the concept of Frequency distribution, different Measures of central tendency and dispersion, correlation and regression.</li> <li>2. To have a basic understanding about concepts of population and sample, Estimation, different testing procedures of hypothesis testing.</li> <li>3. The students have a general understanding about Probability, probability distributions</li> <li>4. Students gain the skill to do multivariate analysis, with multiple correlation and regression, Principal component analysis, Discriminant analysis and Cluster Analysis, application of same in extracting clusters of functionally related genes from microarray results.</li> <li>5. Understand the Dynamic Programming, Gibbs sampling, Markov chains, Hidden Markov Model Simulated annealing Genetic algorithm and their applications</li> </ol>	

Biocomputing Programming	BI 302	<ol style="list-style-type: none"> <li>1. Understand basics of Hyper Text Programming Language as Structure of HTML program, Titles &amp; Footer; Text Formatting Text Styles, Font Style, Colour &amp; Size; Image Tag, Table &amp; Attributes Frames; Forms and Anchors.</li> <li>2. Understand basics of Java Script its Data Types, Literals, Variables, Arrays, Condition Check, looping, Functions, scope of functions and Dialog Boxes.</li> <li>3. Understand basics of PERL its Data; Variable; List Data, Operators, Array, Hashes, Conditionals, while loop, for loop; controlling loop, Manipulating Lists and Strings, Pattern Matching and File Handling.</li> <li>4. Understand PHP Basics, Variables, Strings, Constants, Operators, Conditionals, Loops For, Foreach, While, Functions, string functions, user defined functions. Students also able to learn PHP Array &amp; MySQL</li> </ol>
Structural Biology & Molecular Modeling	BI 303	<ol style="list-style-type: none"> <li>1. Understand the various Macromolecular Structures in detail as Protein, Enzymes, Carbohydrates, lipids and 3D viral structures.</li> <li>2. Understand various Methods to study 3D structure, Principles of crystallography, Analysis of 3D structures, Methods for 3D structure prediction, and Principles of protein folding and methods to study protein folding.</li> <li>3. Able to understand basic concept of Bioenergetics; Thermodynamics principle in biology, Computational approaches in structural biology and Macromolecular interactions.</li> <li>4. Able to understand molecular modelling its methods as Conformational searching, Potential energy maps, Ramachandran maps, Ab-initio methods, Semi-empirical methods, Empirical methods- Conformational analysis, Introduction and Methods, Molecular fitting, Energy Minimization, Non-derivative and derivative methods.</li> <li>5. Able to understand Global optimization, Applications of energy minimization, Molecular Mechanics, various force fields as MM3, Dreiding, AMBER, CHARMM, Mechanics of Bio-macromolecules, Molecular Dynamics, Verlet and related algorithms, Types of dynamics simulations: adiabatic, constant T, annealed, etc., Conformational searching using MD, Free energy calculations, Dynamics of Bio-macromolecules.</li> </ol>
Genomics, Proteomics & Systems Biology	BI 304	<ol style="list-style-type: none"> <li>1. Understand the objective and overview of Genome comparison, different kinds of tools used for the same e.g., BLAST2, MUMmer, PipMaker, VISTA.</li> <li>2. The students have a basic understanding about Comparative Genomics and Comparative Genomic databases, an overview of pharmacogenomics.</li> <li>3. Able to understand Proteomics, different techniques involved in the same e.g., PAGE, MALDI, NMR spectroscopy, microarrays etc. In addition, students have a basic understanding Protein-Protein Interaction Networks, databases and software.</li> <li>4. Students have an overview of concept of Systems Biology, Computational modelling in biology</li> </ol>
Practical	BI 305	
Project Report include Viva-voce	BI 401	This course develop writing skill and ability to understanding the research work.
Bioinformatics (short questions including Objective type)	BI 402	

M. Sc. I- IV Sem Programme Specialisation:	Course outcomes for the session 2016-17, 2017-18 and 2018-19			<p>1. Students will have a strong base in microbial morphological and cultural practices and their application in environmental and industrial production.</p> <p>2. Students will be able to handle useful as well as pathogenic microorganisms after carryout experimental practices in microbiology labs.</p> <p>3. Students will be able to explore/application of new microorganism for food industry and applied research in the field of biotechnology and microbiology.</p> <p>4. Students will be able to problem solving in microbiological innovations in chemical industries.</p>
	Techniques in Microbiology	H-101	Learning various techniques used in microbial research.	
	General Microbiology and Bacteriology	H-102	Learning about basic ideas about microbes.	
	Virology	H-103	Information and exploration of Viruses diversity.	
	Phycology, Mycology & Protozoology	H-104	Studying about ecological adaptation of Algae, Fungi and Protozoans.	
	Nutrition, Growth & Metabolism	H-201	Learning the mode of nutrition and growth pattern of microbes.	
	Molecular Biology	H-202	Studying microorganisms at molecular level having research aptitude to develop recombinant microbes.	
	Microbial Biochemistry	H-203	Understanding the nature and chemical composition of microbes.	
	Biostatistics & Bioinformatics	H-204	Fundamental understanding of computer and Bioinformatics developing statistical aptitude to be implemented in Microbiology.	
	Medical Microbiology	H-301	Learning analysis and prevention of pathogenic microbes.	
	Immunology and Clinical Microbiology	H-302	Learning various serological techniques used in detection of diseases and developed effective prevention and control tools.	
	Agricultural Microbiology	H-303	Information about Agricultural important microorganisms.	
	Industrial Microbiology	H-304	Study of Industrial Important Microorganisms.	
	Environmental Microbiology	H-401	Learning analysis and interaction of microorganism with biotic system.	
	Genetic Engineering	H-402	Understanding the technique used in genetic engineering and application of microbes as genetic engineering tools.	
Microbial Genetics	H-403	Provide the information's of genetic map of prokaryotes.		
Food, Feed & Dairy Microbiology	H-404	Study of Industrial Important Microorganisms.		
Course outcomes for the session 2019-20, 2020-21 and 2021-2022				

Microbiology	Instrumentation and Microbial Techniques	GM 101	Learning various techniques instruments used in microbial research.	<p>5. Students will become aware to role of microbes in human and other living organisms for the production of various antibiotics, organic acids, vitamins and alcohol.</p> <p>6. Students speicalised in subject of Industrial microbiology may find job in various organizations like food industry, pharmaceuticals, biopesticides industries and medical pathology labs.</p>
	Microbial Diversity-Prokaryotes and Viruses	GM 102	Information and exploration of Bacterial and Viruses diversity.	
	Microbial Diversity-Eukaryotes	GM 103	Studying about ecological adaptation of microbes in higher organisms.	
	Biostatistics, Computer Applications and Bioinformatics	GM 104	Fundamental understanding of computer and Bioinformatics developing statistical aptitude to be implemented in Microbiology.	
	Microbial Physiology and Biochemistry	GM 201	Leaning the chemical composition and nature of microbes.	
	Microbial Genetics, Molecular Biology and Genetic Engineering	GM 202	Studying microorganisms at molecular level having research aptitude to develop recombinant microbes.	
	Agricultural Microbiology	GM 203	Information about Agricultural important microorganisms.	
	Microbial Environmental Technology	GM 204	Understanding various useful microorganism for developing ecofriendly system.	
	Medical Microbiology	GM 301	Learning analysis and prevention of pathogenic microbes.	
	Molecular Immunology	GM 302	Understanding the Development of New Vaccine Research.	
	Food and Dairy Microbiology	GM 303	Provide the information's of harmful Pathogenic) and beneficial microbes in Food Research.	
	Industrial Microbiology	GM 304	Study of Industrial Important Microorganisms and their improvement.	
	Project Report including Viva-voce (Any one of 4 Given Papers)			
	Medical Microbiology	GM 401	This course develop writing skill and ability to understanding the research work.	
	Industrial Microbiology	GM 402		
Agricultural Microbiology	GM 403			
Environmental Microbiology	GM 404			

Fundamental of bio-statistics and computer application	J-1004	Student will learn about 1- the measurement of central tendency, correlation and regression coefficient. 2- To learn and develop an analytic approach to deal with various kinds of data using excel.	<p>This course will be provided sound knowledge about crop growth with reference to environment. Students will understand the concepts of different tillage practices by which reduces the cost of cultivation. Students learn the concepts Mitscherlich, baule and inverse yield nitrogen laws which would be improved production and productivity in agriculture field.</p> <p>After completion of this course student will understand the concepts of cropping system, farming system, mix farming, crop rotation and sustainable agriculture. Students will able to learn concepts of protective agriculture by which they will disseminate the knowledge to the farmers.</p>
Modern concepts of crop production	J-1005	1- To study the growth with special reference to environment. 2- To know the concepts of tillage, Zero tillage, minimum tillage and conservation tillage. 3- To explain the concepts of plant population and plant geometry in relation to soil fertility status. 4- To understand the Mitscherlich, Baule and inverse yield nitrogen laws. 5- To know the different types of stress viz Biotic and abiotic stress. 6- To study the concepts of Ideal plant type, crop modelling for maximizing crop yield, crop response to production function. 7- To visualize the concepts of cropping scheme, cropping system, crop rotation, farming system, farming system research and sustainable agriculture. 8- Study of crop and growth analysis in relation yield maximization. 9- To study the crop production under protective agriculture and precision farming	
Kharif crops	J-1006	1. To explain the Importance, Origin, history, Distribution, classification, morphology, physiology, Climate, Improved Varieties, Water, nutrient and weed management, Plant protection measures, Harvesting and production technology of rice, maize, sorghum, millets, pigeon pea, moonbeam, uradbean, groundnut, soybean, cotton, jute, sun hemp and quality components and industrial uses of main and by products and their post-harvest handling for marketing.	
Management of problem soil	J-1007	1- To educate the students on origin, nature, properties and distribution of problem soils such as saline, sodic, calcareous, acid, waterlogged and eroded soils. 2- To study the reclamation methods of problem soils. 3- To educate the students about constraints associated with different types of problem soils. 4- To learn students on role of soil amendments for reclaiming the problem soils. 5- T aware the students with wastelands along with its dimensions, causes of formation, need and practices of management.	
Practical	J - 505		
Statistical methods in agriculture	J-2004	1- To learn the development of null and alternative hypothesis. 2-To learn the basic principles in the design of sample experiment. 3- To learn the application of different design in agriculture. 4- To learn scientific view to conduct the survey in proper way to collect the data about specific purpose.	



Principles and practices of water management	J-2005	<ol style="list-style-type: none"> <li>1- To understand the role of water in crop production.</li> <li>2- To know water resources of India.</li> <li>3- To study the soil water movement, water availability, uptake, transport and transpiration in plants.</li> <li>4- Plant response to moisture stress and crop plant adaptation to moisture stress.</li> <li>5- Scheduling of irrigation.</li> <li>6- Methods of irrigation, water use efficiency and water requirement of crops.</li> <li>7- Quality of irrigation water.</li> <li>8- Drainage requirement of crops, methods and layout of drainage channels.</li> </ol>	<p>After completion of this course student will be able to understand the cultivation of different crops. They will also familiar with the different problems and remedial measures of related crops.</p> <p>Students will be able to extend knowledge to village area and by which farmers will get knowledge and improve production and productivity.</p> <p>Students will be able to identify the different types of problem soils, causes of their formation along with their reclamation methods. They will also be the familiar with the causes, extent and associated constraints of different types of degraded soil along with their management.</p>
Soil fertility management and fertilizers use	J-2006	<ol style="list-style-type: none"> <li>1- To know the basic concepts of soil fertility, productivity, soil composition in relation to crop production.</li> <li>2- To study the organic, inorganic constituents, essential plant nutrients, deficiency, toxicity symptom of major, micronutrients and their control measures.</li> <li>3- To learn the concept of transformation, dynamics of major plant nutrients.</li> <li>4- To explain the kinds of fertilizers viz straight, complex and bulk blended methods of fertilizer application, fertilizer use efficiencies, nutrient interaction.</li> <li>5- To learn the concepts of fertilizer application in cropping system, direct, residual and cumulative effects, integrated plant nutrient supply systems.</li> <li>6- To study the types of organic manures used for sustainable crop production and maintain the soil quality and soil health.</li> <li>7- To study the concepts of fertilizer use in problem soil.</li> </ol>	<p>Students will be able to understand the importance and role of water in crop production. They will learn the efficient ways to increase water use efficiency, efficient methods of irrigation and drainage. Students will also be familiar with quality of irrigation water and management of brackish water in crop production.</p> <p>Students will be able know the concepts of soil fertility and productivity by which improved the production and productivity. They also learn the use of organic and inorganic constituents by which minimize the crop failure.</p> <p>After study of this course students know the nutrient transformation, dynamics, use of fertilizer and bulk blended fertilizer, fertilizer use efficiencies and nutrient interaction, fixation. They also conceptualize the fertilizer use in cropping system, residual and antagonistic effect on crop.</p>
Rabi crops	J-2007	To study the economic importance, Origin, Distribution, Climatic requirement, adaptation, classification, morphology, phenology, improved varieties, Agronomic practices, Water, nutrient and weed management, Plant protection measures, Harvesting, and improved production technology of Wheat, Barley, chickpea, lentil, pea, rapeseed & mustard, sunflower, safflower, linseed, sugarcane, sugar beet, potato, tobacco and other important regional crops of the area, quality component and industrial use of main and by product and their post-harvest handling of the marketing under various agroclimatic conditions of U.P.	<p>They will learn the application of organic manure improve the soil quality, soil health and fertility status of soil.</p> <p>The student will learn and conceptualize with the different agronomical packages &amp; practices of related crops viz; Wheat, Barley, chickpea, lentil, pea, rapeseed &amp; mustard, sunflower, safflower, linseed, sugarcane, sugar beet, potato, tobacco. They will also learn the constraints associated with different crops and how these problems can be solved.</p>
Practical	J - 605		
Principles and practices of weed management	J-3005	<ol style="list-style-type: none"> <li>1- To understand the concept, definition, classification and characteristics of weeds.</li> <li>2- To learn the crop weed competition along with allelopathy.</li> <li>3- To study the principles and methods of weed management.</li> <li>4- To educate the students on integrated weed management &amp; biological weed control.</li> <li>5- To know the herbicide selectivity.</li> <li>6- To learn the mode, mechanism and action of herbicides.</li> <li>7- To know the effect of herbicides in relation to environment.</li> <li>8- To understand the herbicide resistance in weeds and crops.</li> <li>9- To make the spray solutions of herbicides for high and low volume sprayers.</li> <li>10- To use the various types of sprayer pumps and nozzles and calculation of swath width.</li> </ol>	<p>Students will be able to identify the important weeds of different crops and cropping systems. They will get knowledge on crop-weed competition, critical period of crop weed competition, integrated weed management, use of allelopathy in managing the weeds. They will also be able to protect environment by reducing the dependency on chemical weed control as they will learn about the non-chemical methods of weed management.</p> <p>The student will learn and conceptualize with the different agronomical packages &amp; practices of related crops viz;</p>

M. Sc. (Ag) I-IV sem  
Programme Specialisation: Agronomy

Agronomy of fodder, forage, medicinal and aromatic crops	J-3006	<p>1- To study the adaptation, distribution, varietal improvement, Agro-techniques and quality aspects including anti quality factors of important fodder crops viz teosinte, sorghum, bajra, guar, cowpea, oat, barley, berseem, lucerne and clovers, year-round fodder production and managements, preservation and utilization of forage and pasture crops.</p> <p>2- To explain the methods of hay and silage making; chemical and biological changes.</p> <p>3- To learn the nutrient losses and factors affecting quality of hay and silage.</p> <p>4- To know the Physical, chemical and biological methods of improving nutrition value of poor-quality fodder and economics of forage cultivation.</p> <p>5- To learn the importance of medicinal and aromatic plants in human health, national economy and related industries.</p> <p>6- To know the classification of medicinal and aromatic plants according to botanical name, characteristics and uses.</p> <p>7- To study the important Medicinal and aromatic crops are study viz Isabgol, Citronella, Palmarosa, Rauwolfia, poppy, Nuxvomica, Mentha, basil, geranium.</p> <p>8- Management of HCN poisoning during hay and silage making process.</p>	<p>Wheat, Barley, chickpea, lentil, pea, rapeseed &amp; mustard, sunflower, safflower, linseed, sugarcane, sugar beet, potato, tobacco. They will also learn the constraints associated with different crops and how these problems can be solved.</p> <p>Students will able to identify the important weeds of different crops and cropping systems. They will get knowledge on crop-weed competition, critical period of crop weed competition, integrated weed management, use of allelopathy in managing the weeds. They will also be able to protect environment by reducing the dependency on chemical weed control as they will learn about the non-chemical methods of weed management.</p> <p>The students will learn about adaptation, distribution, varietal improvement, Agrotechniques, quality aspect and anti-quality factors of component fodder and forage crops like teosinte, maize, sorghum, bajra, guar, cowpea, oats, barley, berseem, lucerne and clovers. To know about the principles and methods of hay and silage making.</p>
Soil conservation and watershed management	J-3007	<p>1- To study the definition, nature and extent of erosion, types of soil erosion, factors affecting erosion.</p> <p>2- To learn the soil conservation, definition and its importance in Indian agriculture, methods of soil conservation.</p> <p>3- To know the different measures to control erosion viz Agronomical measures, contour cultivation, strip cropping, cover cropping, vegetative barrier, improved dry pasture in soil conservation.</p> <p>4- To learn the concepts of wind breaks and shelter belts.</p> <p>5-To study the watershed managements- definition, objectives, concepts, approaches, components, steps in implementation of watershed, development of cropping system in watershed areas.</p> <p>6- To know about the alternate land use system, agroforestry, ley farming, jhum cultivation and rehabilitation of abandoned jhum lands and measures to prevent soil erosion.</p> <p>7- To study the computation of average rainfall data by different methods.</p>	<p>They will also familiar with the importance, classification, characteristics &amp; uses, ecological requirements, cultural practices, constituents of important medicinal and aromatic plants like Isabgol, Citronella, Palmarosa, Rauwolfia, poppy, Nuxvomica, Mentha, basil, geranium.</p> <p>Students will also identify the different species of fodder, forage, medicinal and aromatic plants.</p> <p>After completion of this course students learn about the erosion and its control measures, watershed management and soil conservation measures. They will also learn the development of cropping system in watershed areas, alternate land use system, jhum cultivation practices in north east areas. They will also familiar with computation of average rainfall and wind break and shelter belt by which losses of crop damage can be minimize</p>

Organic farming	J-3008	<p>1- To learn the impact of high technology on crop production and environment.</p> <p>2- To study the alternate agriculture/sustainable agriculture, status of organic farming in India.</p> <p>3- To educate the concepts of organic farming, definition its relevance to India and global agriculture as well as future prospects.</p> <p>4- To conceptualize the component of organic farming research viz crop and soil management, organic residues, organic manures, earth worms, vermicompost, green manure and farm waste recycling, non-chemical weed management, bio-farming.</p> <p>5- To know the domestic and industrial waste recycling, energy use, food quality.</p> <p>6- To learn the processes of organic matter decomposition, C-cycle, humus, C and N ratio.</p> <p>7-To explain the classification of organic soils, Students will able to understand the definition, concepts, principles of organic farming. They will also able to know the different types of organic manure use in organic farming and its effect on soil physical properties. The also understand the seed treatment procedures and enhanced the nitrogen fixation. They will be able to learn the reduction of greenhouse effect, global warming and reduction of pollution. By practices of organic farming produced quality and chemical free food. physical, chemical characteristics and their management.</p> <p>8- To know the efficient biofertilizers use in seed treatment.</p>	<p>losses or crop damage can be minimize.</p> <p>Students will able to understand the definition, concepts, principles of organic farming.</p> <p>They will also able to know the different types of organic manure use in organic farming and its effect on soil physical properties. The also understand the seed treatment procedures and enhanced the nitrogen fixation.</p> <p>They will be able to learn the reduction of greenhouse effect, global warming and reduction of pollution.</p> <p>By practices of organic farming produced quality and chemical free food.</p> <p>Students will be able to impart knowledge on dry and rainfed farming techniques, soil moisture conservation practices.</p> <p>They will also familiar with crops, their varieties and cropping systems most suited to dry land farming situations.</p> <p>They will also be acquainted with the concept, techniques of water harvesting and watershed management.</p> <p>Students will be able to familiar with concepts, scope, medicinal uses and control of air pollution, minimize the green-house gases and global warming after completion of this course. They will be also knowing the alternate land use system, control of soil erosion and economics of agroforestry system.</p>
Practical	J - 705		
Dry- land agronomy	J4005	<p>1- To study the concepts, definition, characteristics and significance of dryland and rainfed farming.</p> <p>2- To identify the constraints associated with dryland farming.</p> <p>3- To study the types of droughts, adaptation of crop plant to drought.</p> <p>4- To know the drought management strategies.</p> <p>5- To study the mid-season correction for aberrant weather conditions.</p> <p>6- To know the water harvesting, its concept, techniques and practices.</p> <p>7- To learn dryland farming techniques.</p> <p>8- To know watershed and its management.</p> <p>9- To study soil moisture conservation techniques along with use of Antitranspirants.</p>	<p>They will learn the multipurpose tree species and their economic importance in village areas..</p> <p>Students will be able to know about physiological limit of crop yield and variability in relation to ecological optima.</p> <p>They will also learn about crop adaptation, global warming and its impact on field crops. They will also familiar with the greenhouse effect, agroecological and agroclimatic regions of India. Students will learn about geographical distribution of field crops in addition to they will also acquainted with adverse climatic factors of crop productivity, physiological stress in crops and remote sensing. They will visit to agromet observatory and research installation related to ecology.</p>
Agro- forestry and sustainable agriculture	J-4006	<p>1- To study the definition, concepts, scope; historical perspective of agroforestry systems, Agri-silviculture, Agri-silvi-pasture. Agri-horticulture. Aqua-silviculture, alley cropping and energy plantation.</p> <p>2- To know the Agroforestry system for forage and fuel wood production, resource conservation, improvement of degraded land, biological diversity and sustainable agriculture and environmental protection.</p> <p>3- To learn the allelopathic effect under various agroforestry system, design /model for different agroclimatic conditions.</p> <p>4- To explain the productivity and sustainability, alternate land use system through agroforestry system.</p> <p>5- To educate about the multipurpose trees for different uses and nutritive value of tree leaf.</p> <p>6- To know the economics of agroforestry system.</p> <p>7- To recognize the different tree species and their uses.</p>	<p>After completion of this course students learn about seed production techniques of important crops, seed purity, seed health, physical purity, genetic purity. They also know the hybrid seed production techniques, seed treatments, seed testing, seed certification procedures, processing, grading and storage techniques.</p> <p>They will be also knowing the germination testing procedure and certification process.</p>

Crop ecology and geography	J-4007	<p>1- To teach the principles of crop ecology, ecosystem concept determinants of productivity of ecosystem.</p> <p>2- To learn the physiological limits of crop yield and variability in relation to ecological optima.</p> <p>3- To study the crop adaptation techniques, climate shift and its ecological implication.</p> <p>4- To know the concepts of greenhouse effect under Agro-ecological and agroclimatic regions of India.</p> <p>5- To study the geographical distribution of cereals, legumes oilseeds, fodder and forage and commercial crops (Sugarcane, potato and tobacco). Adverse climatic factors and crop productivity, physiological stress in crops, remote sensing.</p> <p>6- To learn the phenological study in different crops and management of weather parameter like recording and interpretation.</p>
Seed production agronomy	J-4008	<p>1- To study the seed production techniques and agronomical practices for important crops like cereals, pulses, oilseeds, fibre crops and fodder crops.</p> <p>2- To visit the seed industry in country and role of various seed morphology, seed multiplication chain, seed purity, seed health.</p> <p>3- To educate the dormancy, seed vigour, hybrid seed production, seed treatment, seed viability, seed quality, physiology of seed germination.</p> <p>4- To know the procedure of seed testing for germination and seed evaluation.</p> <p>5- To teach the seed certification process, processing, grading and storage.</p> <p>6- To know the physical purity, genetic purity and seed germination.</p>
Practical	J - 805	
Fundamentals of bio-statistics and computer application	J-1004	<p>Student will learn about</p> <p>1- the measurement of central tendency, correlation and regression coefficient.</p> <p>2- To learn and develop an analytic approach to deal with various kinds of data using excel.</p>
Principles of economics in relation to agriculture	J-1041	<p>1. Understand theories and principles of economics including price theory, market structure, comparative advantage, factor markets, and consumer theory.</p> <p>2. Develop ideas of the basic characteristics of Indian economy, its potential in relation to agriculture.</p> <p>3. Analyses the progress in agricultural sector and its contribution to Indian economy.</p> <p>4. Understand the marginal productivity theory of distribution, theory of wages, identify different phases of Business cycle.</p> <p>5. Gain knowledge about different theories of interest, rent and profits.</p> <p>6. Calculation of various aspects of national income in a particular year. And Calculation of consumer's surplus.</p>
Economic structure, problems and planning of Indian agriculture	J-1042	<p>1. Students will be able to understand how planning and infrastructure of Indian agriculture to support can develop an economy.</p> <p>2. Students will be gain knowledge about role and share of agriculture in economic development.</p> <p>3. Students aware of the importance of population in economic development and the various theories that explain the growth of population.</p>

M. Sc. (Ag) I -  
IV sem  
Programme  
Specialisation:

Farm management	J-1043	1. The student will be able to define farm management and the terminologies such as assets, liabilities, net worth, income, expenses, depreciation, profit and loss. 2. The student will be able to understand the importance of having a farm business plan. 3. The student will be able to describe the responsibilities of a farm manager.	
Practical	J - 541		
Statistical methods in agriculture	J-2004	1- To learn the development of null and alternative hypothesis. 2-To learn the basic principles in the design of sample experiment. 3- To learn the application of different design in agriculture. 4- To learn scientific view to conduct the survey in proper way to collect the data about specific purpose.	
Agricultural marketing and price policy	J-2041	1. To know about the Concepts of market, marketing, agricultural marketing, market structure, marketing function and services. 2. To know about classification and characteristics of agricultural markets. 3. To study of Demand, supply and producer's surplus of agriculture commodities.	
Research methods and Agricultural statistics	J-2042	1. Students will be able to develop the ability to apply the methods while working on a research work in agriculture economics. 2. Students will be able to describe the appropriate statistical methods required for a particular research design. 3. Students will be able to choose the appropriate research design and develop appropriate research hypothesis for a research project.	
Economics of natural resources environment and sustainability	J-2043	1. Student will be able to identify natural resource utilization problems in the context of renewable and non-renewable resources. 2. Students will be able to understand the institutional economic approach to natural resource management. Agricultural development and its effect on ecology and environmental. 3. Students will be able to learn Farming system approach to sustainable development. 4. Student will be able to Gain knowledge on efficient allocation of natural resources. 5. Student will be able to understand the economics of environmental problems. 6. Student will be able to explore the concept of efficiency and the efficient allocation of pollution control and pollution prevention decisions.	
Practical	J - 641		
Agricultural finance & co-operation	J-3041	1. Students will be able to learn sources of Agricultural finance and credit. 2. Students will be able to Learn about Significance and limitations of Crop insurance. 3. Students will be able to Significance of Farming Cooperatives. 4. Students will be able to acquire Knowledge of successful cooperative systems in India and newly launched crop insurance schemes. 5. Students will be able to Estimation of Credit requirement of farm business. 6. Students will be able to Analysis and performance of commercial banks, cooperative banks to acquire first-hand knowledge of their management, schemes and procedures.	1. This curriculum is designed to fulfil the expanding need in the banking, insurance, and agricultural input and output marketing industries. 2. This curriculum will improve students' employability in niche emerging fields such as data analysis, data management, and so on. 3. The program's curriculum will prepare students for competitive civil service tests such as the IAS, IFS, and IES, among others. 4. The graduate's confidence and ability to do independent research will be bolstered as a result of this programme. and

Agriculture  
Economics

Production resource economics	J-3042	<ol style="list-style-type: none"> <li>1. To understand the concepts of cost, nature of production and relationship between input-output, input-input, output-output.</li> <li>2. Student will accomplish the identical Short Run and Long Run cost function of a firm and industry.</li> <li>3. Gain knowledge of Linear programming techniques and its applications in agricultural production decisions.</li> </ol>	<p>research will be conducted as a result of this programme and plan and evaluate projects that will make it easier for NGOs to hire them to conduct surveys, data analysis, interpretation, and policy formulation.</p> <p>5. This programme will pique students' interest in unique and futuristic research, leading to a desire to pursue a Ph.D., which will improve their chances of being hired as teaching and research faculty (Assistant Professors and Agricultural Research Scientist) will become bright.</p>
Entrepreneurial skill and new venture planning	J-3043(new)	<ol style="list-style-type: none"> <li>1. Students will be able to understand theories of entrepreneurship and business development.</li> <li>2. Students will be able to understand the key resources required to develop an existing business such as ideas and finance, launch a new venture, or initiate a business enterprise.</li> <li>3. Students will be able to understand and evaluate the key factors needed to develop a successful business.</li> <li>4. Students will be able to understand the central role of opportunity recognition and marketing to business development.</li> <li>5. Students will be able to understand the creation of business sustainability.</li> </ol>	
Marketing management	J-3044(new)	<ol style="list-style-type: none"> <li>1. Students will be able to understand the Market promotion – advertising, personal selling, sales promotion and publicity – their meaning and merits &amp; demerits.</li> <li>2. Students will be able to Marketing process, consumer behavior and exchange functions – buying and selling</li> <li>3. Students will be able to demonstrate strong conceptual knowledge in the functional area of marketing management.</li> <li>4. Students will be able to demonstrate effective understanding of relevant functional areas of marketing management and its application.</li> <li>5. Students will be able to demonstrate analytical skills in identification and resolution of problems pertaining to marketing management.</li> </ol>	
Practical	J - 741		
Strategic Management for Agribusiness	J-4041(new)	<ol style="list-style-type: none"> <li>1. Students will be able to understand major theories, background work, concepts and research output in the field of strategic management.</li> <li>2. Students will be able to clear understanding of the concepts, tools &amp; techniques used by executives in developing and executing strategies.</li> <li>3. Students will be able to demonstrate effective application of concepts, tools &amp; techniques to practical situations for diagnosing and solving organizational problems.</li> <li>4. Students will be able to demonstrate capability of making their own decisions in dynamic business landscape.</li> <li>5. Students will be able to understand develop their capacity to think and execute strategically.</li> </ol>	
Financial management for agriculture	J-4042	<ol style="list-style-type: none"> <li>1. Students will be able understand the use of finance for decision making</li> <li>2. Students will be able to describe time value of money, how a project is made and appraised.</li> <li>3. Students will be able to differentiate between the various sources of finance.</li> <li>4. Students will be able to outline capital requirements for starting a business &amp; management of working capital.</li> <li>5. Students will be able to recommend whether and why an investment should be accepted or rejected</li> </ol>	

Economic growth and development	J-4043	<ol style="list-style-type: none"> <li>1. Understanding the basic facts of economic growth.</li> <li>2. Comprehension of relationship between growth and development.</li> <li>3. Understanding the Keynesian Analysis of economic growth with a comparison to some other growth models.</li> <li>4. A thorough understanding of literature on neoclassical growth models and empirics.</li> <li>5. A critical account of the extension of the neoclassical growth model and applications. It will enable them to understand the evolution of the measures of development.</li> <li>6. It will acquaint them with the latest theories of economic development.</li> </ol>
Organizational behavior and human resource management	J-4044	<ol style="list-style-type: none"> <li>1. Students will be able to understand conceptual knowledge of organizational behaviour, and analyses the models and concepts.</li> <li>2. Students will be Gain experience about organizational culture and implementation of commodious organizational climate.</li> <li>3. Students have an inclusive knowledge about the behaviour of individuals in terms of personality, perception, attitude in organizations.</li> </ol>
Practical	J - 841	
Fundamental of bio-statistics and computer application	J-1004	<p>Student will learn about</p> <ol style="list-style-type: none"> <li>1. the measurement of central tendency, correlation and regression coefficient.</li> <li>2. To learn and develop an analytic approach to deal with various kinds of data using excel.</li> </ol>
Fundamentals of Extension	J-1051	<ol style="list-style-type: none"> <li>1- This course design for students to study of various aspect of extension education. Like objective, principles and Aim of extension education.</li> <li>2- After study this course the students can change behaviors of farmers and to motivate for adopting New technology in her field activities.</li> </ol>
Extension techniques and audio- video aids	J-1052	<ol style="list-style-type: none"> <li>1-The course design for student to learn various teaching and learning method, principle and theories.</li> <li>2-The teaching and learning have important for students to develop his personality</li> </ol>
Rural sociology	J-1053	<ol style="list-style-type: none"> <li>1- Under this course students to Know and study of sociological structure like;- Cast ,Religion and culture.</li> <li>2- The student study under this course to Identify of various factor those are responsible for change in society in rural areas.</li> </ol>
Practical	J - 551	
Statistical methods in agriculture	J-2004	<ol style="list-style-type: none"> <li>1. To learn the development of null and alternative hypothesis.</li> <li>2. To learn the basic principles in the design of sample experiment.</li> <li>3. To learn the application of different design in agriculture.</li> <li>4. To learn scientific view to conduct the survey in proper way to collect the data about specific purpose.</li> </ol>
Communication techniques	J-2051	<ol style="list-style-type: none"> <li>1- This course Introduce for students to various communication media, methods and tools those are applied in agriculture field for communicate of technology in rural community.</li> <li>2- The student can use of communication methods and tools for desirable change in self behavior and personality.</li> </ol>

M. Sc. (Ag) I -  
IV sem  
Programme  
Specialisation:  
Agriculture  
Extension

Psychology of human behaviour	J-2052	1- The course introduce for students to study of various aspect-like importance of education psychology and motivation in learning and behavior improvement. 2- This courses provide knowledge for students about social group –type, importance and organizations.	The programme devided into four part -- this program design for student in four course students to study of various aspect of extension education. Like objective, principles and Aim of extension education , and study the factors to change behaviors of farmers and to motivate for adopting New technology in her field activities The programme is design for rural background students as wel as urban back ground of students .The programme is design for how to know about new innovation and knowledge of new Agriculture technology. In this programme the students learn about communication technique, rural society, cast and rural marriage etc, and study of human behavior , attitude ,motivation and emotion about rural people behind of this the students learn about diffusion of innovation, extension management and rural welfare programme and to study administration, supervision, evaluation, journalism and training for development of rural people.
Research methods	J-2053	1- Under this course the student’s study of various aspect of research methods like-type of research identification of variables type and utilization. 2- Under this course the student found the knowledge and application of hypothesis, Various test and Design in social research. 3- To study Formation of data collection tools, data collection method and analysis of data etc.	
Practical	J - 651		
Diffusion and adoption of innovations	J-3051	1- In This course the student s study of diffusion- meaning definition importance and elements. 2- The course introduce to the students for various course content –like adoption, attribute of innovation and sources of information.the student study in this course about the transfer of technology and various sources of Agri. Knowledge generate system	
Management in extension	J-3052	1- Under this course the student study in the meaning, definition importance and basic management issues in extension organization. 2- The student study in factors, process and procedures decision. To study of planning concept importance and scope of management planning. 3- To study of meaning, concept, principle of organization. Importance and difference between Authority and responsibility.	
Rural welfare programmes	J-3053	1- The Students study under this course agriculture and its element, various state and National agriculture accelerators programme. 2- History and principles of rural welfare activities, organizational setup and working of rural welfare programme. Importance, utilization of loan for the farmer n rural area.	
Extension administration & supervision	J-3054	1- This course provide knowledge for students about the administration like as public and personnel administration. 2- The students’ study of this course Coordination and Extension supervision. 3- The students’ study under this course organization communication, Motivation.	
Practical	J - 751		
Programme planning and evaluation	J-4051	1- Under this course the study in the Importance of programme planning, and its steps. 2- The study under this course role and importance of planning commission and Concept, principles of evaluation. 3- To study the Participatory approaches and Project management techniques.	
Agricultural journalism and mass communication	J-4052	1- The student study in Concept, theories and scope of journalism, principles of journalism. 2- Under this course of student study of Photo journalism, radio and TV journalism- methods and techniques. 3- This course provides of knowledge for students Writing scripts for radio and TV Repport Building and art of speaking.	



	Disaster management	J-4053	1- Under this course student s study of disaster management, Element of environment. 2- The students' study under this course Population Explosion, and meaning, Definition and problem of Human Right.	
	Training for development	J-4054	1- Under this course study of concept, meaning and relationship Training and education. 2- To study under this course Organization development programme and training methods. 3- The student study of this course concept, need and prospectus of entrepreneurship and project designing and planning	
	Practical	J - 851		
M.Sc.(Ag) I - IV sem Programme Specialisation: Dairy Science & Technology	Fundamental of bio-statistics and computer application	J- 1004	Student will learn about 1. the measurement of central tendency, correlation and regression coefficient. 2. To learn and develop an analytic approach to deal with various kinds of data using excel.	Successfully completing the program me student will able to impart their knowledge or careers with Dairy cattle farm as field representative/ farm supervisor/manager and Dairy industry as Dairy technician/quality control, sale/marketing representative. The students seeking job opportunity in teaching/research. The student will be also able necessary skill for start their own work/business.
	Dairy cattle production	J- 1011	Basic understanding and learning of Dairy cattle Breed, feed, management and Treatment / Prevention of disease	
	Chemistry of milk	J- 1012	Learning of basic constituents of milk and testing for quality	
	Introduction to dairy microbiology	J- 1013	Understanding the fact of deterioration of milk and scope of microbes in dairy industry	
	Practical	J - 511		
	Statistical methods in agriculture	J-2004	1. To learn the development of null and alternative hypothesis. 2. To learn the basic principles in the design of sample experiment. 3. To learn the application of different design in agriculture. 4. To learn scientific view to conduct the survey in proper way to collect the data about specific purpose.	
	Dairy plant engineering	J-2011	Basic learning and understanding about to carryout maintenance of dairy machines/equipment and dairy plant layout and requirement of steam, ice and water	
	Market milk technology	J-2012	Learning of quality of different milk	
	Traditional value added milk products	J-2013	Basic understanding the advance techniques of product manufacturing	
	Practical	J - 611		
	Chemistry of milk products	J- 3011	Learning and understanding of major and minor constituents of milk products and testing for quality control	
	Elementary food science	J- 3012	understanding of food quality	
	Condensed & dried milks and dairy by-products	J- 3013	Basic understanding and Learning of production techniques of condensed dried milk products and concepts of utilization of dairy by product	
Technology of functional food	J- 3014	Learning and understanding of food processing for prolonged storage and therapeutic and pro-biotic attributes		
Practical	J - 711			

Fat rich and frozen milk products	J- 4011	Understanding and Learning of manufacturing of qualitative milk products	
Microbiology of milk products	J- 4012	learning the microbial deterioration and microbial testing of milk products	
Dairy process biotechnology	J- 4013	Learning of advance biotechnology process and implemented in dairying	
Cheese and fermented milk products	J- 4014	Basic knowledge of starter culture Learning of manufacturing techniques of cheese and fermented milk products	
Practical	J - 811		
Statistical methods for agriculture	J- 1004(A)	1. This course is help to students the basic concepts of data presentation, Frequency distributions; graphical presentation of data by histogram, frequency polygon, frequency curve and cumulative frequency curves. 2. It helps to study of different field experimental design viz; CRD, RBD simple factorial experiments (mathematical derivations not required); analysis of variance (ANOVA) and its use including estimation of LSD (CD)	<p>1. Students will acquire comprehensive understanding of the chemical basis of heredity.</p> <p>2. The knowledge required to design, execute, and analyze the results of genetic experimentation in Plant Breeding systems</p> <p>3. Critical understanding on quantification of heritable traits that provides insight into cellular and molecular mechanisms.</p> <p>4. The ability to evaluate conclusions that are based on genetic data.</p> <p>5. Students will be well versed in practical emasculation and pollination methods of important crops.</p> <p>6. To understand the various components to structure a plant breeding programme.</p> <p>7. Know the requirements in breeding for biotic and abiotic stress tolerant varieties.</p> <p>8. Learn the impact of IPRs including PBR, PVP and PPVFRA</p> <p>9. Students will acquire independent ability to carry out statistical analysis of data and Interpretation of results in breeding programs.</p> <p>10. Acquire knowledge on floral biology and selection of proper breeding method.</p> <p>11. Cultivate skill in conceptualization and application of</p>
General genetics	J-1021	This course is aimed at understanding the basic concepts of genetics, helping students to develop their analytical, quantitative and problem solving skills from classical to molecular genetics.	
Cytology & Cytogenetics	J-1022	To provide insight into structure and functions of chromosomes, chromosome mapping, polyploidy and cytogenetic aspects of crop evolution.	
Principles and methods of plant breeding	J-1023	1. To impart theoretical knowledge and practical skills about plant breeding objectives. 2. Modes of reproduction and genetic Consequences, breeding methods for crop improvement.	
Practical	J - 521		
Plant genetics resource: conservation and sustainable use	J-2004(A)	1. This course help to plant biodiversity, genetic resources and explanation, alpha vs. beta biodiversity. 2. Study of this course help to conservation of genoplasm in In situ and Ex-situ methods, cryopreservation of genetic materials, gene banks and cryobanks.	
Diseases and pests of crop plants and their management	J-2021	1. This course help us to improving the knowledge of principles of plant disease control 2. Students helping to identification of Causal organism, general symptoms and control measures of bacterial, fungal, diseases of crop plants	

M. Sc. (Ag) I-IV sem  
Programme Specialisation: Genetics & Plant Breedings

Computer and bio-informatics	J-2022	1. Introductory knowledge to computers Types, general characteristics, input/output units, memory, internal representation of data 2. Brief idea of operating systems, disc operating systems (DOS), UNIX and its versions (Linux), WINDOWS and its upgraded versions. 3. Introductory knowledge to bioinformatics: Introduction, objective of bioinformatics, kind of data used in bioinformatics, multiplicity of data and redundancy, major bioinformatics databases, data integration, data analysis	11. Cultivate skill in emasculation and pollination of various crop plants. 12. Gain expertise on hybrid seed production techniques. 13. Learn to use the descriptors in various crops for selection of superior genotypes 14. Analyze and evaluate literature involving quantitative genetic experiments. 15. Design and analyze quantitative genetic experiments 16. Statistically analyze the phenotypic data of plant traits collected taking into account G X E interaction.
Molecular genetics	J-2023	1. To impart knowledge in theory and practice about DNA structure, nitrogenous base and their functions. 2. Proteins and nucleic acids chemical composition and molecular structure.	17. Manage breeding populations to maximize progress from selection for accomplishment of breeding objectives. 18. Understand the basics of chromosome structure and occurrence of cytogenetic abnormalities
Practical	J- 621		19. Fix and count meiotic and mitotic chromosomes of major crops
Topics in plant breeding	J-3021	1. To apprise about various abiotic and biotic stresses influencing crop yield, mechanisms and genetics of resistance and methods to breed stress resistant varieties. 2. To provide insight into recent advances in improvement of legumes, oilseeds and fibre crops using conventional and modern biotechnological approaches	20. Analyse chromosome abnormalities in inter-specific crosses 21. The student will be able to carry out cytological analysis in breeding population
Bio-technology in crop improvement	J-3022	1. To impart knowledge and practical skills to use biotechnological tools in crop improvement. 2. To understand the various recombinant methods and gene transfer technologies. 3. To understand plant tissue culture techniques and development of plant through micropropagation	22. Acquire knowledge on floral biology and selection of proper breeding method. 23. Cultivate skill in emasculation and pollination of various crop plants.
Population and biometrical genetics	J-3023	1. To impart theoretical knowledge and computation skills regarding component of variation and variances, scales, mating designs and gene effects. 2. To impart knowledge on structure, properties and their breeding values of different population	24. Gain expertise on hybrid seed production techniques. 25. Learn to use the descriptors in various crops for selection of superior genotypes.
Heterosis and its exploitation	J-3024	1. To provide understanding about mechanisms of heterosis 2. Heterosis and its exploitation for yield improvement through conventional and biotechnological approaches.	26. Students will be able to independently plan and design breeding experiments for crop improvement. 27. Will be capable of handling segregating populations in major crops.
Practical	J - 721		28. Ability to apply the concepts and principles of plant tissue culture techniques on research problems pertinent to crop improvement
Basis of quantitative inheritance	J-4022	1. To impart theoretical knowledge and computation skills regarding component of variation and variances, scales, mating designs and gene effects. 2. Molecular mapping and tagging of agronomically important traits. Statistical tools in marker analysis, Robotics. 3. Study of Marker-assisted selection for qualitative and quantitative traits; QTLs analysis in crop plants, Gene pyramiding.	29. Dissemination of skills on usage of the acquired knowledge on practical biotechnology tools to augment plant breeding research. 30. The knowledge required to execute, analyze and apply molecular marker systems for crop improvement 31. Students will have knowledge on the conservation of biodiversity
Genomics, transcriptomics and proteomics	J-4023	1. Marker assisted selection and molecular breeding by Genomics and genoinformatics for crop improvement. 2. Integrating functional genomics information on agronomically/economically important traits in plant breeding. 3. Marker-assisted backcross breeding for rapid introgression, Generation of EDVs	32. They will be able to identify the various in situ and ex situ conservation techniques 33. They will acquire knowledge on various organizations involved in conservation and their policies 34. The students will have knowledge on plant quarantine regulations.

	Principles and practices of seed production	J-4024	1. To apprise the students about the variety deterioration and steps to maintain the purity of varieties & hybrids. 2. Principles of seed production in self & cross pollinated crops. 3. To study about quality seed production procedure 4. To study about hybrid seed production of different crops. 5. To study about the seed drying, processing and their steps, seed testing for quality assessment seed treatment.	35. Students will acquire comprehensive understanding of the chemical basis of heredity. 36. The knowledge required to design, execute, and analyze the results of genetic experimentation in Plant Breeding systems.
	Practical	J - 821		
M.Sc. (Ag) I-IV sem Programme Specialisation: Horticulture	Fundamentals of bio-statistics and computer applications	J- 1004		
	Fundamental of vegetable production	J- 1061	Implement and transfer knowledge about concepts and principles of vegetable crop production, They also learn the importance of vegetable crops in national economy, etc.	
	Propagation & nursery management	J- 1062	The student would be expected to equip to acquire skills and knowledge on principles and practices of sexual, asexual and micro-propagation and the handling of propagated material in nursery.	
	Fundamental of ornamental gardening	J- 1063	Implement and transfer knowledge about concepts and principles of ornamental plant production, They also learn the importance of vegetable crops in national economy, etc.	
	Practical	J - 561		
	Statistical methods in agriculture	J- 2004	1. To learn the development of null and alternative hypothesis. 2. To learn the basic principles in the design of sample experiment. 3. To learn the application of different design in agriculture. 4. To learn scientific view to conduct the survey in proper way to collect the data about specific purpose.	
	Production technology of vegetable crops & spices	J- 2061	The students are expected to equip themselves with production technology for growing vegetables and spices of national and international importance.	
	Orchard management	J- 2062	After successful completion of the course, the students are expected to learn the fundamentals of orchard and canopy management including soil management, irrigation and nutritional management, etc. .	
	Production technology of ornamental crops	J- 2063	After successful completion of the course, the students are expected to learn the production techniques of ornamental plants. They will also able to apply their knowledge gained to export of ornamental crops.	After successful completion of the programme, the students are expected to be able to understand:
	Practical	J - 661		1. Agrotechniques of fruits, vegetables and flower crops. 2. Post-harvest management and processing of horticultural crops.
	Fundamental of fruit production	J- 3061	Implement and transfer knowledge about concepts and principles of fruit crop production, They also learn the importance of fruit crops in national economy, etc.	3. Crop improvement methods and their application in horticultural crops.
	Breeding of vegetable & ornamental crops	J- 3062	After successful completion of the course, the students are expected to have an understanding on importance and peculiarities of vegetable and ornamental crop breeding. They will also be able to apply their knowledge in advancement of vegetable and ornamental crops.	4. Various methods of orchard management for obtaining sustainable and quality yield from horticultural crops. 5. They will also able to apply their skill in various agro-based industries and production areas.

Fundamental of preservation of horticultural crops	J- 3063	After successful completion of this course, the students are expected to be able to understand basic principles of preservation and their utilization in horticultural crops.
Post harvest technology of horticultural crops	J- 3064	After successful completion of this course, the students are expected to be able to understand about maturity indices, regulation of ripening by use of chemicals and growth regulators, pre and postharvest treatments for extending storage life/ vase life
Practical	J - 761	
Production of fruit crops	J- 4061	The students are expected to equip themselves with production techniques for establishment and management of an orchard leading to optimum and quality fruit production of tropical, subtropical and temperate fruits.
Breeding of fruit crops	J- 4062	After successful completion of the course, the students are expected to have an understanding on importance and peculiarities of fruit breeding. They will also be able to apply their knowledge in crop improvement of fruit crops.
Processing of fruits and vegetables	J- 4063	After successful completion of this course, the students are expected to be able to making various processed products from fruit and vegetables including jam, jelly, marmalade, nectar, squash, candy, etc.
Seed production technology of vegetables and flowers	J- 4064	After successful completion of this course, the students are expected to acquire knowledge about the complete seed production technology of vegetable and flower crops and they will be able to adopt seed production as entrepreneur.
Practical	J - 861	
Micro economics	G-1006	This paper mainly concerned with the objective of equipping the students in a rigorous and comprehensive manner. It deals with the behavior of individual, firms and markets. Students will know about consumer's behavior and demand analysis.
Macro economics	G-1007	Aggregative economics or Macro Economics deals with national income savings and investments of whole economy. Aggregate analysis has such a great significance in recent times. Students of post-graduate level understand system i.e. facts of economy as a whole.
Statistical methods for economic analysis	G-1008	The main objective of this paper is to equip students to use the mathematical and statistical methods for economic problem, the paper deals with simple tools and techniques which help a student in data collection, tabulation, classification, presentation, analysis and forecasting of various sector of economy.
(a) economics of education and health	G-5006	
(b) Demography	G-5007	This paper aware the students of importance of population in the development of a country. The students enlightened the qualitative and quantitative characteristics of population with gender importance. It helps in making policies of population as a source of development.
(c) Labour economics	G-5008	

M. A. I- IV  
Sem  
Programme  
Specialisation:  
Economics

(d) Economics of infrastructure	G-5009		
(e) Research methodology	G-5010		
Practical (Research Methodology)	G-506	This practical paper enables students for entire process of research work. It equips students for research proposal an interpretations.	
Micro economics-II	G-2006	The paper deals with the theory of rent, wage, interest and profits. The students aware how determent the rent, wage, interest and profit. Along with this paper deals welfare economics and behavior in uncertainty. It also deals with general equilibrium.	
Macro economics-II	G-2007	The students will well equipped with money banking and monetary policy by studying this paper and global investment in India, functions of central bank RBI are main feature of this paper. Students know about the Indian economy.	
Economics of growth and development	G-2008	This paper is devoted to the theories of growth and development. Students will aware that the domestic infrastructure, macroeconomic policies and investment criteria are the main pillar of growth. In India five years plan are main reason for development.	
(a) Agriculture Econometrics	G-6006	The objective of this paper is to familiarize students with policies that are relevant to Indian agricultural economics along with to enable them the analyze the issues in agricultural sector.	
(b) Gender economics	G-6007		
(c) Industrial economics and entrepreneurship	G-6008		
(d) Economics of insurance	G-6009		
(e) Computer Applications in economics	G-6010		
Computer application in Economic Analysis	G-606	This practical paper equipped students with computer based skills and tools with the help of computer. A student can learn the methods of analyzing the economic data.	
Public finance economics	G-3006	Students will familiarized with tax system, distribution of income, expenditure programs, budgetary procedure, stabilization instruments, debt issues by studying this paper. They understood the working of govt. in economic sector.	
Economics of development and planning	G-3007	The study of economic development in developing countries presents a way of uplifting the lives of puple. Students will know the majors, determinants and approaches of development. How five years planning in India develop this country.	
Indian economy Policy	G-3008	The objective of this paper to develop an integrated approach of functioning of India Economy. The students will know the various aspects of Indian Economy.	
Industrial Economics	G-7006	This paper of industrial economics intends to provide of productivity, efficiency, capacity, utilization of resources of a country to development industrial sector of a country. It also includes the industrial development of India.	

Economics is a social science. There are mainly two type of Economics. Firstly, microeconomics which deal with Indian ideas and secondly macroeconomics which is concerned with the economy as a whole.  
Studying Economics, we can learn how to get maximum satisfaction with limited resources, maximum profit with best utilization of resources, social welfare and to understand problems of a country as well as world.  
A student of Economics well be a better decision maker in his personal and professional life.  
With an Economic degree student can work as an Economist, Consultant, Data analyst, Credit analyst and a businessman.

Practical (Assignment of 3000 words on current issues)	G-706	This practical paper enables students to think and write down their views on current issues of the economy of India.
	G-4006	Students know the basic principles of free flow of trade in goods and services at global level, theories of export and import, impact of policies of a country on international trade. They study of this paper under present era of globalization will train student about employment, social standards and solutions of world in 21st century.
Demography	G-4007	Students will get knowledge of India finance and system, budgetary process, expenditure of India, tax system and control of finance system by studying this paper of Indian finance. Students also learn about federal finance of India.
History of economic thought	G-4008	The role of financial Institution in a economy is very important. It is very essential for a student to know the theory and practice of different financial institutions and markets. A student will be familiar by studying this paper with national and international monetary policies.
	G-8007	By studying this paper students enable the knowledge of labour market, wage theories, employment policies, trade unions and collective bargaining which is very important in developing countries. Students gain knowledge about unemployment and social security. This paper exposes students to theoretical and empirical issues of labour market of world as well as India
Presentation/ Viva-voce	G- 806	This practical paper familiarized the students with research work. Students learn what are the steps of research.
हिंदी साहित्य का इतिहास Hindi sahitya ka itihās	G-1025	1. हिंदी साहित्य के इतिहास की अवधारणा एवं इतिहास-निर्माण पद्धति का बोध 2. तत्कालिक सामाजिक सांस्कृतिक राजनीतिक एवं साहित्यिक परिस्थितियों का बोध 3. प्रतियोगी परीक्षाओं के लिए ज्ञानात्मक आधार विकसित 4. हिंदी साहित्य के कवियों तथा प्रवृत्तियों का ज्ञान 5. हिंदी साहित्य के इतिहास के सम्यक विश्लेषण का ज्ञान
प्राचीन एवं पूर्व मध्यकालीन काव्य Prachin evam purva madhya kaleen kavya	G-1026	1. प्राचीन एवं पूर्व मध्यकालीन कवियों एवं काव्य प्रवृत्तियों का ज्ञान 2. छात्रों में साहित्य सृजन की क्षमता का विकास 3. तत्कालिक सामाजिक, सांस्कृतिक परिस्थितियों का बोध 4. जीवन मूल्यों का विकास 5. प्राचीन एवं पूर्व मध्यकालीन काव्य में साम्य-वैषम्य बोध
नाटक एवं रंगमंच Natak evam rangmunch	G-1027	1. नाटक की अवधारणा, विकास और तत्वों का बोध 2. हिंदी नाटककारों तथा नाट्य-साहित्य का ज्ञान 3. नाट्य लेखन शैली का विकास 4. नाट्य प्रस्तुति तथा रंगमंचीय-कौशल का विकास 5. कथा से नाटक के रूपांतरण की शैली का विकास
प्रयोजनमूलक हिंदी Prayojan mulak Hindi	G-1028	1. प्रयोजनमूलक हिंदी के स्वरूप का बोध 2. विविध क्षेत्रों में प्रयोजनमूलक हिंदी की उपादेयता 3. सामान्य हिंदी के विविध रूपों का ज्ञान 4. कार्यालयी हिंदी के रूप में विकसित 5. प्रयोजनमूलक हिंदी में रोजगार के स्वर्णिम अवसर

प्रस्तुतीकरण एवं मौखिकी (पाठ्यक्रम पर आधारित) Presentation/viva-voce	G-525	1. पुस्तक समीक्षा प्रस्तुतिकरण की शैली का विकास 2. संपूर्ण पाठ्यक्रम के सम्यक विश्लेषण का ज्ञान 3. छात्रों में आत्मविश्वास की वृद्धि 4. वाचन तथा प्रस्तुति की क्षमता का विकास 5. साक्षात्कार-शैली की क्षमता का विकास
उत्तर मध्यकालीन काव्य Uttar madhya kaleen kavya	G-2025	1. उत्तर मध्यकालीन काव्य के स्वरूप का बोध 2. रीतिकाल की मुख्य धाराओं का ज्ञान 3. उत्तर मध्यकालीन काव्य के कवियों और प्रवृत्तियों का परिचय 4. काव्य के लक्षण ग्रंथों और काव्य शैलियों का बोध 5. साहित्य सृजन की क्षमता का विकास
कथा-साहित्य Katha sahitya	G-2026	1. कथा-साहित्य के स्वरूप का ज्ञान 2. कहानी एवं उपन्यास का परिचय 3. कहानी-लेखन की परंपरा का विकास 4. कथा साहित्य के समाज पर प्रभाव का बोध 5. जीवन मूल्यों का विकास
कथेतर गद्य साहित्य Kathater gadh sahitya	G-2027	1. हिंदी साहित्य की कथेतर गद्य विधाओं का ज्ञान 2. जीवनी, आत्मकथा, रिपोर्टाज, संस्मरण आदि नव विधाओं का बोध 3. कथेतर गद्य विधाओं में सृजनात्मकता का विकास 4. नव गद्य विधाओं में भाषा-कौशल का विकास 5. कथेतर गद्य साहित्य के लेखकों का बोध
भाषा विज्ञान एवं हिंदी भाषा Bhasha vjgyan evem Hindi bhasha	G-2028	1. हिंदी भाषा के उद्भव और विकास का परिचय 2. हिंदी भाषा की वैश्विक स्तर पर व्यापकता का बोध 3. भाषा का वैज्ञानिक अध्ययन 4. हिंदी भाषा-परिवारों तथा देवनागरी लिपि की वैज्ञानिकता का बोध 5. हिंदी के शुद्ध व्याकरणिक स्वरूप तथा शुद्ध लेखन का ज्ञान
प्रस्तुतीकरण एवं मौखिकी (पाठ्यक्रम पर आधारित) Presentation/viva-voce	G-625	1. पुस्तक समीक्षा प्रस्तुतिकरण की शैली का विकास 2. संपूर्ण पाठ्यक्रम के सम्यक विश्लेषण का ज्ञान 3. छात्रों में आत्मविश्वास की वृद्धि 4. वाचन तथा प्रस्तुति की क्षमता का विकास 5. साक्षात्कार-शैली की क्षमता का विकास
आधुनिक काव्य(छायावाद पर्यंत) Adhunik kavya (chhayavad pariyant)	G-3025	1. आधुनिक काव्य के कवियों और काव्य प्रवृत्तियों का बोध 2. आधुनिक युग के तत्कालीन सामाजिक, सांस्कृतिक, साहित्यिक परिस्थितियों का बोध 3. आधुनिक युग में द्विवेदी, छायावादी तथा प्रगतिवादी काव्य- सृजन शैली का विकास 4. आधुनिक काव्य के माध्यम से छात्रों में नैतिकता, राष्ट्रीयता एवं प्रकृति-प्रेम की भावना का विकास 5. आधुनिक काव्य शैली के आधार पर साहित्य सृजन की क्षमता का विकास



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काव्यशास्त्र (भारतीय एवं पाश्चात्य) Kavyashastra (bhartiya evem paaschatiya)	G-3026	1. काव्य-प्रयोजन, हेतु एवं काव्य-लक्षणों का बोध 2. काव्यशास्त्र की कसौटी पर काव्य-वैशिष्ट्य का बोध 3. भारतीय काव्यशास्त्र के विविध सिद्धांतों का ज्ञान 4. साहित्य में ध्वनि, अलंकार, रस, औचित्य, वक्रोक्ति और रीति की उपादेयता का बोध 5. भारतीय काव्यशास्त्र में रस निष्पत्ति के विविध सिद्धांतों का बोध	
विशिष्ट रचनाकार-सूरदास Vishisth rachnakar-Surdash	G-3027	1. साहित्यकारों की विशिष्टता का बोध 2. भक्ति काल की विविध धाराओं का ज्ञान 3. भक्तिकालीन काव्य-परंपरा और सूरदास का महत्व का बोध 4. सूरदास के व्यक्तित्व और कृतित्व का ज्ञान 5. ब्रजभाषा के कौशल का विकास	
पत्रकारिता Patrakarita - prashikshan	G-3028	1. पत्रकारिता के उद्भव और विकास का ज्ञान 2. पत्रकारिता के विभिन्न क्षेत्रों का बोध 3. पत्रकारिता प्रशिक्षण में संपादक, संवाददाता, रिपोर्टर आदि की अनिवार्य शर्तों और कार्यों का ज्ञान 4. पत्रकारिता के क्षेत्र में रोजगार के स्वर्णिम अवसरों का बोध 5. प्रिंट मीडिया, इलेक्ट्रॉनिक मीडिया, कंप्यूटिंग, प्रतिवेदन आदि के स्वरूपों तथा कार्य-शैली	
प्रस्तुतीकरण एवं मौखिकी (पाठ्यक्रम पर आधारित) Presentation/ viva-voce	G-725	1. पुस्तक समीक्षा प्रस्तुतिकरण की शैली का विकास 2. संपूर्ण पाठ्यक्रम के सम्यक विश्लेषण का ज्ञान 3. छात्रों में आत्मविश्वास की वृद्धि 4. वाचन तथा प्रस्तुति की क्षमता का विकास 5. साक्षात्कार-शैली की क्षमता का विकास	
छायावादोत्तर काव्य Chhayavodottar kavya	G-4025	1. छात्रों में सामाजिक धार्मिक, राजनीतिक, सांस्कृतिक एवं साहित्यिक चेतना का विकास 2. प्रयोगवादी कवियों के काव्य एवं काव्य-प्रवृत्तियों का ज्ञान 3. छात्रों को भाषा-शैली के नव रूपों का बोध 4. युगबोध वैश्विक उदारता एवं वैज्ञानिक दृष्टिकोण का विकास 5. प्रयोगवादी शैली में साहित्य सृजन की क्षमता का विकास	
पाश्चात्य काव्यशास्त्र Paschayatya Kavyasastra	G-4026	1. पाश्चात्य काव्यशास्त्र के विभिन्न सिद्धांतों का बोध 2. पाश्चात्य काव्यशास्त्र की कसौटी पर काव्य का बोध 3. पाश्चात्य विद्वानों तथा उनके सैद्धांतिक मूल्यों का ज्ञान 4. साहित्य के मर्म एवं मूल्यवत्ता की वास्तविक परख 5. साहित्य में मूल्य संप्रेषण तथा उदात्त तत्व का बोध	Programme specific outcomes 1. छात्रों में भाषा-कौशल का विकास 2. करियर निर्माण और शोध के क्षेत्र में स्वर्णिम भविष्य 3. हिंदी में साहित्य-सृजन की क्षमता का विकास 4. साहित्य-अध्ययन से जीवन मूल्यों का विकास 5. हिंदी भाषा व साहित्य के ज्ञान से रोजगार के सुनहरे अवसर 6. संवेदनशीलता तथा मानवता की भावना का विकास 7. छात्रों में सामाजिक, राष्ट्रीय, सांस्कृतिक तथा आध्यात्मिक चेतना का विकास
विशिष्ट काव्यधारा (कौरवी लोक-साहित्य) Vishistha kavyadhara	G-4027(a)	1. कौरवी लोक-साहित्य के उद्भव और विकास का परिचय 2. कौरवी लोक-संस्कृति का बोध 3. कौरवी लोक-कवियों एवं उनके काव्य का परिचय 4. छात्रों में कौरवी लोक-संस्कृति के प्रति रुचि का विकास 5. लोक संस्कृति के संरक्षण की भावना का विकास	Programme Outcomes वर्तमान समय में हिंदी में विश्व भाषा के रूप में ख्याति प्राप्त की है। हिंदी में शब्द निर्माण और वैज्ञानिक अवधारणाओं को वहन करने की अद्भुत क्षमता विकसित हुई है। रोजगार के क्षेत्र में भी हिंदी वर्तमान समय में महत्वपूर्ण भूमिका निभा रही है। आज समाचार पत्र, पत्रिकाओं, रेडियो,

हिंदी आलोचना Hindi aalochhna	G-4028	1. आलोचना के उद्भव और विकास का परिचय 2. आलोचना के विविध रूपों का ज्ञान 3. छात्रों को समीक्षा-पद्धति का बोध 4. साहित्य के गणमान्य आलोचकों का परिचयात्मक बोध 5. छात्रों में साहित्य के गुण-दोष परखने की क्षमता का विकास	दूरदर्शन, बैंकों तथा सरकारी कार्यालयों में रोजगार के विभिन्न अवसर प्रदान किए जा रहे हैं। साथ ही हिंदी अनुवादकों भाषा वैज्ञानिकों, संपादकों, संवाददाताओं तथा हिंदी अधिकारी के रूप में भी रोजगार के पर्याप्त अवसर दृष्टिगत होते हैं। हिंदी भाषा के अध्ययन के उपरांत नेट, स्लेट की परीक्षाओं को उत्तीर्ण कर असिस्टेंट प्रोफेसर तथा हिंदी व्याख्याता के पद पर भी अध्यापन के क्षेत्र में रोजगार के अवसर प्राप्त किए जा सकते हैं। अन्य विभिन्न क्षेत्रों की प्रतियोगी परीक्षाओं में सफलता हेतु सामान्य हिंदी का ज्ञान भी हिंदी विषय से प्राप्त किया जा सकता है। फिल्मों, विज्ञापनों तथा संगीत के क्षेत्र में भी हिंदी भाषा ने प्रतिष्ठा प्राप्त की है। आज हिंदी भाषा का ज्ञान व्यक्ति को आर्थिक रूप से सक्षम बना रहा है।
प्रस्तुतीकरण एवं मौखिकी (पाठ्यक्रम पर आधारित) Presentation/ viva-voce	G-825(a)	1. पुस्तक समीक्षा प्रस्तुतिकरण की शैली का विकास 2. संपूर्ण पाठ्यक्रम के सम्यक विश्लेषण का ज्ञान 3. छात्रों में आत्मविश्वास की वृद्धि 4. वाचन तथा प्रस्तुति की क्षमता का विकास 5. साक्षात्कार-शैली की क्षमता का विकास	
Course Outcomes for sessions 2019-20 and 2020-21			
हिंदी साहित्य का इतिहास	G-1025	1. हिंदी साहित्य के इतिहास की अवधारणा एवं इतिहास-निर्माण पद्धति का बोध 2. तत्कालिक सामाजिक सांस्कृतिक राजनीतिक एवं साहित्यिक परिस्थितियों का बोध 3. प्रतियोगी परीक्षाओं के लिए ज्ञानात्मक आधार विकसित 4. हिंदी साहित्य के कवियों तथा प्रवृत्तियों का ज्ञान 5. हिंदी साहित्य के इतिहास के सम्यक विश्लेषण का ज्ञान	
प्राचीन एवं पूर्व मध्यकालीन काव्य	G-1026	1. प्राचीन एवं पूर्व मध्यकालीन कवियों एवं काव्य प्रवृत्तियों का ज्ञान 2. छात्रों में साहित्य सृजन की क्षमता का विकास 3. तत्कालिक सामाजिक, सांस्कृतिक परिस्थितियों का बोध 4. जीवन मूल्यों का विकास 5. प्राचीन एवं पूर्व मध्यकालीन काव्य में साम्य-वैषम्य बोध	
नाटक एवं रंगमंच	G-1027	1. नाटक की अवधारणा, विकास और तत्वों का बोध 2. हिंदी नाटककारों तथा नाट्य-साहित्य का ज्ञान 3. नाट्य लेखन शैली का विकास 4. नाट्य प्रस्तुति तथा रंगमंचीय-कौशल का विकास 5. कथा से नाटक के रूपांतरण की शैली का विकास	
प्रयोजनमूलक हिंदी	G-1028	1. प्रयोजनमूलक हिंदी के स्वरूप का बोध 2. विविध क्षेत्रों में प्रयोजनमूलक हिंदी की उपादेयता 3. सामान्य हिंदी के विविध रूपों का ज्ञान 4. कार्यालयी हिंदी के रूप में विकसित 5. प्रयोजनमूलक हिंदी में रोजगार के स्वर्णिम अवसर	
उत्तर मध्यकालीन काव्य	G-2025	1. उत्तर मध्यकालीन काव्य के स्वरूप का बोध 2. रीतिकाल की मुख्य धाराओं का ज्ञान 3. उत्तर मध्यकालीन काव्य के कवियों और प्रवृत्तियों का परिचय 4. काव्य के लक्षण ग्रंथों और काव्य शैलियों का बोध 5. साहित्य सृजन की क्षमता का विकास	

कथा-साहित्य	G-2026	<ol style="list-style-type: none"> <li>1. कथा-साहित्य के स्वरूप का ज्ञान</li> <li>2. कहानी एवं उपन्यास का परिचय</li> <li>3. कहानी-लेखन की परंपरा का विकास</li> <li>4. कथा साहित्य के समाज पर प्रभाव का बोध</li> <li>5. जीवन मूल्यों का विकास</li> </ol>
कथेतर गद्य साहित्य	G-2027	<ol style="list-style-type: none"> <li>1. हिंदी साहित्य की कथेतर गद्य विधाओं का ज्ञान</li> <li>2. जीवनी, आत्मकथा, रिपोर्टाज, संस्मरण आदि नव विधाओं का बोध</li> <li>3. कथेतर गद्य विधाओं में सृजनात्मकता का विकास</li> <li>4. नव गद्य विधाओं में भाषा-कौशल का विकास</li> <li>5. कथेतर गद्य साहित्य के लेखकों का बोध</li> </ol>
भाषा विज्ञान एवं हिंदी भाषा	G-2028	<ol style="list-style-type: none"> <li>1. हिंदी भाषा के उद्भव और विकास का परिचय</li> <li>2. हिंदी भाषा की वैश्विक स्तर पर व्यापकता का बोध</li> <li>3. भाषा का वैज्ञानिक अध्ययन</li> <li>4. हिंदी भाषा-परिवारों तथा देवनागरी लिपि की वैज्ञानिकता का बोध</li> <li>5. हिंदी के शुद्ध व्याकरणिक स्वरूप तथा शुद्ध लेखन का ज्ञान</li> </ol>
आधुनिक काव्य (छायावाद पर्यंत)	G-3025	<ol style="list-style-type: none"> <li>1. आधुनिक काव्य के कवियों और काव्य प्रवृत्तियों का बोध</li> <li>2. आधुनिक युग के तत्कालीन सामाजिक, सांस्कृतिक, साहित्यिक परिस्थितियों का बोध</li> <li>3. आधुनिक युग में द्विवेदी, छायावादी तथा प्रगतिवादी काव्य-सृजन शैली का विकास</li> <li>4. आधुनिक काव्य के माध्यम से छात्रों में नैतिकता, राष्ट्रीयता एवं प्रकृति-प्रेम की भावना का विकास</li> <li>5. आधुनिक काव्य शैली के आधार पर साहित्य सर्जन की क्षमता का विकास</li> </ol>
काव्यशास्त्र (भारतीय एवं पाश्चात्य)	G-3026	<ol style="list-style-type: none"> <li>1. काव्य-प्रयोजन, हेतु एवं काव्य-लक्षणों का बोध</li> <li>2. काव्यशास्त्र की कसौटी पर काव्य-वैशिष्ट्य का बोध</li> <li>3. भारतीय काव्यशास्त्र के विविध सिद्धांतों का ज्ञान</li> <li>4. पाश्चात्य काव्यशास्त्र के काव्य-सिद्धांतों का बोध साहित्य में तथा साहित्य में उनकी उपादेयता</li> <li>5. साहित्य में भावों की उदात्तता एवं मूल्य संप्रेषण का बोध</li> </ol>
पत्रकारिता प्रशिक्षण	G-3027	<ol style="list-style-type: none"> <li>1. पत्रकारिता के उद्भव और विकास का ज्ञान</li> <li>2. पत्रकारिता के विभिन्न क्षेत्रों का बोध</li> <li>3. पत्रकारिता प्रशिक्षण में संपादक, संवाददाता, रिपोर्टर आदि की अनिवार्य शर्तों और कार्यों का ज्ञान</li> <li>4. पत्रकारिता के क्षेत्र में रोजगार के स्वर्णिम अवसरों का बोध</li> <li>5. प्रिंट मीडिया, इलेक्ट्रॉनिक मीडिया, कंप्यूटिंग, प्रतिवेदन आदि के स्वरूपों तथा कार्य-शैली का बोध</li> </ol>
प्रस्तुतिकरण एवं मौखिकी (पाठ्यक्रम पर आधारित)	G-725	<ol style="list-style-type: none"> <li>1. पुस्तक समीक्षा प्रस्तुतिकरण की शैली का विकास</li> <li>2. संपूर्ण पाठ्यक्रम के सम्यक विश्लेषण का ज्ञान</li> <li>3. छात्रों में आत्मविश्वास की वृद्धि</li> <li>4. वाचन तथा प्रस्तुति की क्षमता का विकास</li> <li>5. साक्षात्कार-शैली की क्षमता का विकास</li> </ol>

	छायावादोत्तर काव्य	G-4025	<ol style="list-style-type: none"> <li>छात्रों में सामाजिक धार्मिक, राजनीतिक, सांस्कृतिक एवं साहित्यिक चेतना का विकास</li> <li>प्रयोगवादी कवियों के काव्य एवं काव्य-प्रवृत्तियों का ज्ञान</li> <li>छात्रों को भाषा-शैली के नव रूपों का बोध</li> <li>युगबोध वैश्विक उदारता एवं वैज्ञानिक दृष्टिकोण का विकास</li> <li>प्रयोगवादी शैली में साहित्य सृजन की क्षमता का विकास</li> </ol>	
	हिंदी आलोचना	G-4026	<ol style="list-style-type: none"> <li>आलोचना के उद्भव और विकास का परिचय</li> <li>आलोचना के विविध रूपों का ज्ञान</li> <li>छात्रों को समीक्षा-पद्धति का बोध</li> <li>साहित्य के गणमान्य आलोचकों का परिचयात्मक बोध</li> <li>छात्रों में साहित्य के गुण-दोष परखने की क्षमता का विकास</li> </ol>	
	विशिष्ट काव्यधारा (कौरवी लो)	G-4027	<ol style="list-style-type: none"> <li>कौरवी लोक-साहित्य के उद्भव और विकास का परिचय</li> <li>कौरवी लोक-संस्कृति का बोध</li> <li>कौरवी लोक-कवियों एवं उनके काव्य का परिचय</li> <li>छात्रों में कौरवी लोक-संस्कृति के प्रति रुचि का विकास</li> <li>लोक संस्कृति के संरक्षण की भावना का विकास</li> </ol>	
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	Comparative politics	G-2072		
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	Concept and issue in political science	G-4070		

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(xviii) Medical sociology	G-9091		
(xix) Sociology of India	G-9092		