PROGRAMME OUTCOMES

(POs)

The Programme Outcomes (POs)

POs of B.A. Programme	
The under-graduate students, after completing their study of B.A. programme must acquire following characteristics attributes of arts graduate.	
PO-1	**Research Skills:** Conduct thorough research and analyze data.
PO-2	**Information Literacy:** Find, evaluate, and use information from diverse sources.
PO-3	**Cultural Competence:** Understand and appreciate cultural diversity
PO-4	**Human Values:** The B. A. program enables the students to acquire the knowledge with human values framing the base to deal with various problems in life with courage.
PO-5	**Oral Communication:** Speak clearly and persuasively in different contexts.
PO-6	**Global Awareness:** Recognize and understand global issues and interconnections.
PO-7	**Career Preparedness:** Prepare for careers with practical experiences and guidance.
PO-8	**Lifelong Learning:** Commit to continuous learning and personal growth.
PO-9	**Teamwork:** Work effectively in teams and manage projects.
PO-10	**Global Awareness:** Recognize and understand global issues and interconnections.
PO-11	**Social Responsibility:** Contribute positively to society and understand civic duties.
PO-12	**Ethical Reasoning:** Make ethical decisions and understand their impacts.
PO-13	**Quantitative Skills:** Understand and use quantitative data in decision-making.
PO-14	**Qualitative Skills:** Analyze qualitative data and understand social phenomena.
PO-15	**Adaptability:** Adapt to new situations and challenges.
PO-16	**Resilience:** Recover from setbacks and maintain perseverance.

POs of B.Com. Programme	
The under-graduate students, after completing their study of B.A. programme must acquire following characteristics attributes of commerce graduate.	
PO-1	**Business Knowledge:** Understand core business principles and practices
PO-2	**Adaptability:** Adapt to changing business environments and challenges
PO-3	**Strategic Planning:** Formulate and execute business strategies
PO-4	**Communication:** Communicate clearly and professionally in business contexts.
PO-5	**Entrepreneurial Skills:** Apply entrepreneurial principles to create and manage ventures
PO-6	**Ethical Decision-Making:** Make ethical decisions & understand their business implications.
PO-7	**Technological Proficiency:** Use business technologies and digital tools competently.
PO-8	**Problem-Solving:** Solve business problems creatively and logically.
PO-9	**Teamwork:** Work effectively in teams and manage projects.
PO-10	**Financial Literacy:** Understand and apply financial principles and practices.
PO-11	**Economic Understanding:** Grasp fundamental economic theories and their applications
PO-12	**Marketing Skills:** Develop and implement effective marketing strategies.
PO-13	**Analytical Skills:** Analyze financial and business data effectively.
PO-14	**Legal Knowledge:** Understand business laws and regulations.
PO-15	**Sustainability Awareness:** Incorporate sustainability practices in business operations.

POs of B.Sc. Programme

The under-graduate students, after completing their study of B.Sc. program must acquire following characteristics attributes of science graduate.

PO-1	**Scientific Knowledge:** Gain a comprehensive understanding of fundamental scientific concepts and principles within your chosen discipline.
PO-2	**Research Skills:** Develop the ability to design, conduct, and interpret scientific research using appropriate methodologies.
PO-3	**Critical Thinking:** Enhance critical thinking and analytical skills to evaluate scientific data and solve complex problems.
PO-4	**Quantitative Analysis:** Apply mathematical and statistical techniques to analyze and interpret scientific data.
PO-5	**Ethical Reasoning:** Understand and apply ethical principles in scientific research and professional practice.
PO-6	**Teamwork and Collaboration:** Work effectively in multidisciplinary teams to achieve common scientific goals.
PO-7	**Technical Proficiency:** Acquire technical skills and hands-on experience with scientific instruments and technologies relevant to your field.
PO-8	**Environmental Awareness:** Understand the impact of scientific practices on the environment and promote sustainable practices.
PO-9	**Global Perspective:** Recognize the global nature of scientific issues and collaborate with international scientific communities.
PO-10	**Disciplinary Expertise:** Achieve in-depth knowledge and proficiency in your specific scientific discipline.
PO-11	**Lifelong Learning:** Demonstrate a commitment to continuous learning and professional development in the scientific field.
PO-12	**Adaptability:** Adapt to new scientific discoveries, technologies, and methodologies in a rapidly changing field.
PO-13	**Innovation:** Foster creativity and innovation in developing new scientific approaches, solutions, and technologies.
PO-14	**Communication:** Communicate scientific information clearly and effectively through written reports, oral presentations, and digital media.

POs of B.Lib I.Sc. Programme

The under-graduate students, after completing their study of B.Lib I.Sc program must acquire following characteristics attributes of Library science graduate.

PO-1	**Information Management:** Develop skills in organizing, cataloging, and managing various types of information resources
PO-2	**Library Technologies:** Gain proficiency in using modern library technologies and digital tools for information storage, retrieval, and dissemination.
PO-3	**User Services:** Provide effective reference and information services tailored to the needs of different user groups.
PO-4	**Cataloging and Classification:** Apply standardized methods for cataloging and classifying library materials
PO-5	**Information Literacy:** Educate users on how to locate, evaluate, and use information effectively and ethically.
PO-6	**Collection Development:** Understand principles and practices of collection development, including selection, acquisition, and evaluation of resources.
PO-7	**Ethical Practices:** Adhere to ethical standards and practices in the management and

	dissemination of information.
PO-8	**Library Management:** Develop skills in library management, including budgeting, staffing, and policy development.
PO-9	**Digital Libraries:** Understand the principles and practices involved in creating and managing digital libraries and repositories.
PO-10	**Preservation:** Learn methods for preserving and conserving physical and digital information resources.
PO-11	**Information Policy:** Understand and apply information policies, laws, and regulations affecting libraries and information centers.
PO-12	**User Needs Assessment:** Assess and respond to the informational needs of diverse communities.
PO-13	**Marketing and Outreach:** Develop strategies for marketing library services and resources and conducting community outreach.
PO-14	**Interpersonal Skills:** Enhance communication and interpersonal skills to interact effectively with library users, staff, and stakeholders.
PO-15	**Project Management:** Apply project management techniques to plan and execute library projects and initiatives.
PO-16	**Innovation:** Foster creativity and innovation in developing new library services and programs.
PO-17	**Global Perspective:** Understand the global context of information access and the role of libraries in a globalized world.

POs of PG (M.Sc.)Programme

The post graduate students, after completing their study of post graduate M.Sc. program, must acquire following characteristics attributes.

PO-1	**Advanced Knowledge:** Gain comprehensive understanding and proficiency in advanced mathematical, physical, and chemical theories, principles, and methodologies
PO-2	**Critical Analysis:** Develop the ability to critically analyze complex mathematical, physical, and chemical phenomena, and propose innovative solutions to theoretical and practical problems
PO-3	**Research Skills:** Acquire advanced research skills, including experimental design, data analysis, and theoretical modeling, to conduct groundbreaking research in mathematics, physics, and chemistry.
PO-4	**Interdisciplinary Integration:** Integrate knowledge and insights from mathematics, physics, and chemistry to address interdisciplinary challenges and advance scientific understanding across these fields.
PO-5	**Quantitative Proficiency:** Demonstrate advanced quantitative skills in mathematical analysis, physical modeling, and chemical computations, enabling accurate and precise measurement and analysis of scientific phenomena.
PO-6	**Experimental Proficiency:** Gain proficiency in experimental techniques and laboratory methodologies in physics and chemistry, and apply mathematical modeling to interpret experimental data
PO-7	**Theoretical Proficiency:** Master theoretical frameworks and mathematical formalisms in physics and chemistry, and apply them to formulate hypotheses, predictions, and explanations of natural phenomena
PO-8	**Communication Skills:** Communicate scientific ideas, methodologies, and findings effectively through oral presentations, written reports, and visual representations to diverse audiences
PO-9	**Problem–Solving:** Apply analytical and problem-solving skills to tackle complex mathematical, physical, and chemical problems, and develop innovative solutions with real-world applications
PO-10	**Ethical Awareness:** Understand and adhere to ethical principles and professional

	standards in scientific research, ensuring integrity, transparency, and responsible conduct in all scientific endeavors
PO-11	**Collaboration and Teamwork:** Collaborate effectively with multidisciplinary teams of scientists, engineers, and researchers to address complex scientific challenges and achieve common research objectives
PO-12	**Innovation and Creativity:** Foster innovation and creativity in scientific inquiry, exploring new concepts, methodologies, and applications at the forefront of mathematics, physics, and chemistry
PO-13	**Professional Development:** Engage in continuous professional development, staying abreast of the latest advancements, methodologies, and technologies in mathematics, physics, and chemistry through lifelong learning and professional networking
PO-14	**Teaching and Mentorship:** Develop effective teaching and mentorship skills to educate and inspire the next generation of mathematicians, physicists, and chemists, fostering enthusiasm and curiosity for scientific exploration and discovery
PO-15	**Global Perspectives:** Understand the global impact and relevance of scientific research in mathematics, physics, and chemistry, and contribute to international collaborations and initiatives aimed at addressing global challenges and advancing scientific knowledge

POs of PG (M.A.)Programme

The post graduate students, after completing their study of post graduate M.A. programme, must acquire following characteristics attributes.

PO-1	Community Empowerment: Engage with communities to empower them with sociological insights and promote linguistic and cultural pride through Marathi language initiatives
PO-2	Critical Analysis: Develop the ability to critically analyze social structures, processes, issues, and literary texts within their cultural and social contexts
PO-3	Advanced Knowledge: Gain in-depth understanding of sociological theories, concepts, and methodologies, and achieve proficiency in Marathi language and literature
PO-4	Research Skills: Conduct advanced research using qualitative and quantitative methods in sociology, and perform scholarly research in Marathi language, literature, and culture
PO-5	Effective Communication: Communicate sociological ideas and research findings effectively through written, oral, and digital means, and write and speak proficiently in Marathi, including scholarly and creative texts
PO-6	Effective Awareness : Understand and apply ethical principles in sociological research and literary studies, promoting ethical considerations in the analysis of social phenomena and literary works
PO-7	Cultural Competence: Appreciate cultural diversity and its impact on social interactions and literary expressions, engaging with Marathi-speaking communities to promote language and cultural initiatives
PO-8	Interdisciplinary Integration: Integrate sociological knowledge with insights from literary studies and other disciplines, applying interdisciplinary approaches to enrich understanding of social issues and Marathi literature
PO-9	Social Policy and Engagement: Evaluate and contribute to social policies and programs, and engage with communities to address social problems and promote social justice using sociological insights
PO-10	Data Literacy Analysis: Analyze social data using statistical and computational tools, and utilize analytical skills to interpret data and trends in literary research
PO-11	Preservation and Promotion : Contribute to the preservation and promotion of Marathi

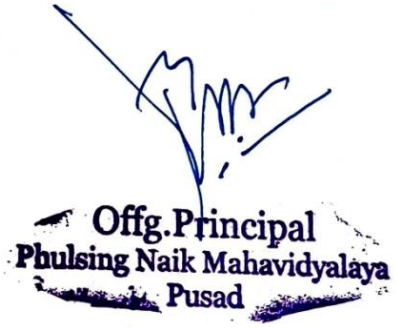
	language and cultural heritage, and promote social awareness and cultural understanding through dissemination of research and literary works
PO-12	Creative and Applied Skills : Develop creative writing skills in Marathi across different genres, and apply sociological concepts and methods to real-world problems and contexts
PO-13	Teaching Competence: Acquire skills for teaching sociology and Marathi language and literature at various educational levels, developing educational programs that integrate both perspectives
PO-14	Global and Comparative Perspectives: Explore global social phenomena and their local implications, and compare Marathi literature with literature from other languages and cultures to understand global literary trends
PO-15	Innovation and Lifelong Learning: Foster creativity and innovation in sociological research and literary studies, demonstrating a commitment to continuous learning and professional development in both fields

POs of PG (M.Com.)Programme

The post graduate students, after completing their study of post graduate M.Com. programme, must acquire following characteristics attributes.

PO-1	**Advanced Business Knowledge:** Attain advanced knowledge in various areas of commerce including accounting, finance, economics, management, and marketing, enhancing expertise in business concepts and practices
PO-2	**Analytical Skills:** Develop strong analytical skills to interpret financial data, evaluate business performance, and make informed strategic decisions, fostering the ability to solve complex business problems
PO-3	**Research Proficiency:** Acquire research skills to conduct in-depth analysis and investigations into business-related topics, enabling the formulation of evidence-based recommendations and solutions
PO-4	**Specialized Expertise:** Gain specialized expertise in a particular area of commerce through elective courses or concentrations, allowing for focused study and career specialization
PO-5	**Communication Abilities:** Enhance communication abilities through written reports, presentations, and interpersonal interactions, effectively conveying complex business concepts and ideas to diverse stakeholders
PO-6	**Ethical Awareness:** Develop an understanding of ethical considerations and responsibilities in business practices, promoting integrity, transparency, and social responsibility in decision-making
PO-7	**Global Perspectives:** Cultivate a global perspective by studying international business practices, understanding the implications of globalization, and engaging with diverse cultural and economic contexts
PO-8	**Entrepreneurship Skills:** Acquire entrepreneurial skills and mindset to identify opportunities, innovate, and create value in a competitive business environment, fostering creativity and adaptability
PO-9	**Leadership and Management:** Develop leadership and management skills to effectively lead teams, manage projects, and navigate organizational challenges, preparing for roles in business leadership and administration
PO-10	**Financial Management:** Master financial management principles and techniques to optimize financial resources, manage risk, and maximize shareholder value, ensuring sound financial decision-making
PO-11	**Strategic Planning:** Learn strategic planning processes and methodologies to develop and implement business strategies aligned with organizational goals and objectives,

	driving sustainable growth and competitiveness
PO-12	**Digital Literacy:** Enhance digital literacy skills to leverage technology for business innovation, efficiency, and competitiveness, staying abreast of digital trends and advancements in commerce
PO-13	**Professional Development:** Engage in continuous professional development through networking, workshops, and industry certifications, staying current with evolving business trends and practices
PO-14	**Collaboration and Teamwork:** Cultivate collaboration and teamwork skills to work effectively in diverse team settings, leveraging collective strengths and perspectives to achieve common business objectives
PO-15	**Customer Focus:** Understand the importance of customer-centricity in business success, developing skills to anticipate and meet customer needs, and deliver exceptional value and service



PROGRAMME SPECIFIC OUTCOMES (PSOs)

PSOs of B.A. Programme

The post graduate students, after completing their study of under graduate B.A. programme, must acquire following characteristics attributes.

PO-1	**Critical Thinking:** Develop the ability to think critically and analytically about complex issues in various disciplines such as humanities, social sciences, and arts.
PO-2	**Communication Skills:** Enhance written and oral communication skills to effectively express ideas, arguments, and narratives across different contexts and audiences.
PO-3	**Cultural Awareness:** Gain an understanding of diverse cultures, histories, and perspectives, fostering an appreciation of global diversity and intercultural competence.
PO-4	**Research Competence:** Acquire research skills, including the ability to gather, analyze, and interpret data and sources, to produce well-founded conclusions and arguments.
PO-5	**Ethical Understanding:** Develop an awareness of ethical considerations and the ability to apply ethical principles to personal, academic, and professional contexts.
PO-6	**Interdisciplinary Knowledge:** Integrate knowledge from various disciplines within the arts and humanities to provide a well-rounded and holistic understanding of complex issues.
PO-7	**Creative Thinking:** Foster creativity and innovation in problem-solving, artistic expression, and intellectual pursuits.
PO-8	**Historical Perspective:** Gain an understanding of historical contexts and their influence on contemporary issues, ideas, and cultures.
PO-9	**Social Awareness:** Develop an awareness of social issues, including inequality, justice, and human rights, and the ability to engage in informed and thoughtful civic participation.
PO-10	**Analytical Skills:** Enhance analytical skills to deconstruct texts, theories, and arguments, and to construct coherent and persuasive arguments of your own.
PO-11	**Adaptability:** Cultivate adaptability and the ability to learn continuously in response to changing societal and professional landscapes.
PO-12	**Empathy and Understanding:** Develop empathy and the ability to understand and appreciate diverse viewpoints and experiences.
PO-13	**Technological Proficiency:** Gain proficiency in using digital tools and technologies relevant to research, communication, and creative production in the arts.
PO-14	**Aesthetic Appreciation:** Develop an appreciation for artistic and literary works, understanding their aesthetic, cultural, and social significance.

PSOs of B.Sc. Programme

The post graduate students, after completing their study of under graduate B.Sc. programme, must acquire following characteristics attributes.

PO-1	**Fundamental Knowledge:** Gain a solid foundation in key scientific principles and concepts within the chosen discipline (e.g., Biology, Chemistry, Physics, Mathematics, etc.)
PO-2	**Analytical Skills:** Develop strong analytical and critical thinking skills to interpret scientific data and solve complex problems**.**
PO-3	**Research Competence:** Acquire basic research skills, including experimental design, data collection, and analysis, to conduct scientific investigations.
PO-4	**Technical Proficiency:** Attain proficiency in using scientific instruments, laboratory techniques, and software tools relevant to the field of study.
PO-5	**Communication Skills:** Communicate scientific information effectively through written reports, oral presentations, and digital media.
PO-6	**Quantitative Analysis:** Apply mathematical and statistical methods to analyze and

	interpret scientific data accurately
PO-7	**Interdisciplinary Knowledge:** Integrate knowledge from various scientific disciplines to address complex scientific questions.
PO-8	**Environmental Awareness :** Recognize the impact of scientific practices on the environment and promote sustainability.
PO-9	**Teamwork and Collaboration:** Work effectively in teams to achieve common scientific goals and participate in collaborative research projects.
PO-10	**Problem-Solving:** Utilize scientific knowledge and methods to identify, analyze, and provide solutions to real-world problems.
PO-11	**Application of Knowledge:** Apply theoretical knowledge to practical applications, including industrial, clinical, and technological contexts
PO-12	**Lifelong Learning:** Demonstrate a commitment to continuous learning and staying updated with advancements in the field of science
PO-13	**Ethical Practices:** Understand and adhere to ethical standards and practices in scientific research and professional conduct
PO-14	**Career Readiness:** Prepare for a range of career opportunities in science, technology, education, research, and industry, or for advanced studies in graduate programs.

PSOs of B.Com. Programme

The post graduate students, after completing their study of under graduate B.Com. programme, must acquire following characteristics attributes.

PO-1	**Business Acumen:** Gain comprehensive knowledge of core business concepts, including accounting, finance, marketing, management, and economics.
PO-2	**Financial Literacy:** Develop proficiency in financial accounting, management accounting, and financial management to analyze financial statements and make informed decisions.
PO-3	**Economic Understanding:** Understand microeconomic and macroeconomic principles and their application to business decision-making and policy analysis.
PO-4	**Marketing Insight:** Learn key marketing strategies, market research techniques, and consumer behavior to effectively promote products and services.
PO-5	**Management Skills:** Acquire skills in organizational behavior, human resource management, and strategic management to effectively lead and manage teams.
PO-6	**Ethical Awareness:** Understand ethical issues in business and develop the ability to make decisions that uphold ethical standards and corporate social responsibility.
PO-7	**Communication Proficiency:** Enhance communication skills, including writing, presenting, and interpersonal communication, to effectively convey business ideas and information.
PO-8	**Quantitative Analysis:** Apply quantitative techniques and statistical methods to analyze business data and support decision-making processes.
PO-9	**Legal Acumen:** Understand business laws and regulations, including corporate law, taxation, and labor law, to ensure compliance and manage legal risks.
PO-10	**Global Perspective:** Gain an understanding of international business practices, global markets, and cultural diversity to operate effectively in a globalized economy.
PO-11	**Information Technology:** Gain proficiency in business-related software and information systems to enhance operational efficiency and decision-making.
PO-12	**Entrepreneurial Skills :** Cultivate entrepreneurial thinking and skills to identify opportunities, develop business plans, and launch new ventures
PO-13	**Research Competence :** Acquire basic research skills to conduct business research, analyze data, and generate actionable insights
PO-14	**Problem-Solving :** Develop critical thinking and problem-solving skills to address complex business challenges and create innovative solutions

PSOs of B. Lib I.Sc. Programme

The post graduate students, after completing their study of under graduate B. Lib I.Sc programme, must acquire following characteristics attributes. These outcomes aim to prepare graduates for successful careers in libraries and information centers, equipping them with the knowledge and skills needed to manage and deliver effective library services.

PO-1	**Library Management:** Acquire knowledge and skills in library management, including organization, planning, and administration of library services.
PO-2	**Information Retrieval:** Develop proficiency in information retrieval techniques, cataloging, classification, and indexing to organize and access information effectively.
PO-3	**Information Technology:** Gain competence in using library and information technologies, including integrated library systems, digital libraries, and electronic resource management.
PO-4	**Reference Services:** Learn to provide reference and information services to users, including research assistance and information literacy training.
PO-5	**Collection Development:** Understand principles and practices of collection development, including selection, acquisition, and evaluation of library resources
PO-6	**Cataloging and Classification:** Master cataloging and classification standards such as Dewey Decimal Classification (DDC) and Library of Congress Classification (LCC) to organize library materials.
PO-7	**Digital Libraries:** Acquire skills in the development and management of digital libraries, including digitization, digital curation, and preservation of digital content.
PO-8	**User Services:** Develop the ability to assess and meet the diverse needs of library users, providing inclusive and user-centered library services.
PO-9	**Research Skills:** Gain research skills to conduct studies on library and information science topics, contributing to the advancement of the field.
PO-10	**Information Literacy:** Promote information literacy by teaching users how to locate, evaluate, and use information effectively and ethically.
PO-11	**Ethical Practices:** Understand and adhere to ethical standards in library and information services, including issues of privacy, intellectual property, and access to information.
PO-12	**Communication Skills:** Enhance communication skills to effectively interact with library users, colleagues, and stakeholders, both verbally and in writing.
PO-13	**Resource Management:** Develop skills in managing various types of library resources, including print, digital, multimedia, and special collections.
PO-14	**Cultural Competence:** Foster cultural competence to serve diverse communities and support inclusive library services and programs.

PSOs of PG (M.Sc.)Programme

The post graduate students, after completing their study of post graduate M.Com. programme, must acquire following characteristics attributes.

PO-1	Ability to communicate scientific findings effectively through written reports and oral presentations
PO-2	Understanding of interdisciplinary connections between mathematics, physics, and chemistry
PO-3	Proficiency in using mathematical and computational tools for data analysis and visualization
PO-4	Competence in theoretical modeling and computational simulations in physics and chemistry
PO-5	Preparation for pursuing further studies or careers in academia, research institutions, or

	industries related to mathematics, physics, or chemistry
PO-6	Commitment to lifelong learning and professional development in the sciences
PO-7	Capacity to critically evaluate scientific literature and research findings
PO-8	Awareness of ethical considerations and professional standards in scientific research
PO-9	Mastery of advanced mathematical theories, including calculus, algebra, and analysis
PO-10	Proficiency in theoretical physics, covering classical mechanics, electromagnetism, and quantum mechanics
PO-11	Understanding of fundamental concepts in chemistry, such as atomic structure, chemical bonding, and thermodynamics
PO-12	Ability to apply mathematical techniques to solve complex problems in physics and chemistry Competence in collaborative research and teamwork in interdisciplinary settings
PO-13	Skills in experimental design, data collection, and analysis in physics and chemistry laboratories
PO-14	Knowledge of advanced topics in mathematics, such as differential equations, complex analysis, and numerical methods

PSOs of PG (M.Com.)Programme

The post graduate students, after completing their study of post graduate M.Com. programme, must acquire following characteristics attributes.

PO-1	**Accounting Specialization:** Mastery of advanced accounting principles and practices, including financial statement analysis and auditing.
PO-2	**Finance Specialization:** Understanding financial markets, investment strategies, and corporate finance principles to make informed financial decisions.
PO-3	**Marketing Specialization:** Expertise in market research, branding, and digital marketing strategies for effective customer engagement.
PO-4	**Management Specialization:** Leadership and organizational skills for effective team management and strategic decision-making.
PO-5	**International Business Specialization:** Knowledge of global business environments and international trade practices to navigate cross-border operations.
PO-6	**Entrepreneurship Specialization:** Proficiency in business planning, venture financing, and innovation management for entrepreneurial success.
PO-7	**Economics Specialization:** Understanding economic theories and econometric analysis to analyze and forecast economic trends.
PO-8	**Information Systems Specialization:** Proficiency in information technology infrastructure management and data analytics for effective business operations.

IQAC Co-ordinator
Phulsing Naik Mahavidyalaya
Pusad

PHULSING NAIK MAHAVIDYALAYA
PUSAD

Offg.Principal
Phulsing Naik Mahavidyalaya
Pusad

COURSE OUTCOMES

(COs)

DEPARTMENT OF ZOOLOGY

Course Code	Name of the Course	COs	After completing this course students must able to
B.Sc. SEM I	Zoology	CO1	Describe the fundamentals of the origin of creatures and how they apply to non-chordates.
		CO2	Knowing the cellular and sub cellular (molecular) morphology and functional properties.
		CO3	Describe the phylum protozoa, the Plasmodium vivax life cycle, the study of parasitic protozoa, and illnesses.
		CO4	Recognize the diverse molecular physiological processes that animals belonging to different phyla go through.
		CO5	Describe the external features, the structure and importance of the canal system and habit of the phylum Porifera.
		CO6	Coelenterates, Phylum; Mesenteries; Gastro vascular Cavity; Reproduction
		CO7	Know the digestive, excretory, reproductive, and life cycles, the phylum Platyhelm is involved
B.Sc. SEM II	Zoology	CO1	Recognize the different animal developmental biology processes at the molecular level.
		CO2	Describe the ultra structure of the nucleus and nucleolus. The Chromosome's General Structure
		CO3	Build the Endoplasmic Reticulum's structure and the Plasma Membrane's function
		CO4	Elucidate the ultra structure and operations of the ribosome, mitochondria, lysosomes, and golgi complex.
		CO5	Examine the Frog's fate map for Cleavage, Blastulation, and Gastrulating up to the Formation of Three Germs.
		CO6	Thorough examination of Amphioxus's cleavage and development up to the formation of the coelome.
		CO7	Understands cleavage, blastulation, and gastrulation all the way up to the chick's formation of three germ layers.
B.Sc. SEM III	Zoology	CO1	Describe the external characteristics of amphibians and their respiratory system, which includes the heart's anatomy and the main veins and arteries.
		CO2	Arrange according to class important circulatory system arteries and veins; reptilia; Calotes versicolor; heart structure.
		CO3	Divide into the following classes: avian flight adaptations, respiratory and urogenital systems, and migration.
		CO4	Differentiate between the traits of Prototheria and Metatheria. Shape of the endocrine glands in mammals.
		CO5	Describe evolution. Direct and indirect evidence in favour of Darwinism, Lamarkism, evolution, and the modern theory of organic evolution.
		CO6	Explain Evolution Evidence of evolution, both direct and indirect, supporting Darwinism, Lamarkism, and the contemporary theory of organic evolution.
		CO7	Examine how man evolved and look into mammal adaptive radiations.

B.Sc. SEM IV Zoology	**CO1**	Understood Concept Interaction of genes. Mendel`s laws of hereditary–Monohybrid Laws of dominance, law of segregation.
	CO2	Distinguish types of linkage, linkage group, arrangement of linked genes, and significance of linkage.
	CO3	Explain Mitotic and meiotic, Mechanism, Types ,theories, Significance,
	CO4	Describe Factors affecting crossing over–Darlington's theory, breakage and exchange theory, and copy choice theory.
	CO5	Express Multiple alleles. Multiple alleles in relation to eye color in Drosophila. Blood group inman, Erythroblastosis foetalis.
	CO6	Explain Sex determination, Chromosomal Theory in animals, autosomes and sex chromosomes, Sex determination..
	CO7	Describe Genetic disorders , Sex linked genetic disorders and their inheritance in man. Haemophilia and color blindness.
B.Sc. SEM IV Zoology	**CO1**	Acknowledged the gills and lung anatomy as respiratory organs. Gas exchange and transportation.
	CO2	Explain blood coagulation factors, Rh factor, and blood group in relatio n to circulation.
	CO3	Sort the categories of Types, E.M. Structure, and Chemical Compositio n to include Muscle Physiology.
	CO4	Explain Reproductive Physiology and Hormonal Disorders:
	CO5	Describe neurotransmitters, synaptic transmission, and synapses. Hormones, the endocrine system, and physiological functions.
	CO6	Explain the mammalian placenta's physiology, structure, homeostasis, and conservative control.
	CO7	Explain the Significance of Insects economically in agricultural Zoology.
B.Sc. SEM IV Zoology	**CO1**	Describe genetic materials (RNA and DNA).
	CO2	Types of DNA and RNA, and experiments to demonstrate DNA as genetic material.
	CO3	Explain the genetic concept of DNA replication and illnesses caused by genetics.
	CO4	Describe the types, theories, and molecular foundations of mutation.
	CO5	Define biotechnology as recombinant DNA technology and genetic engineering.
	CO6	Explain the types of Immunological Techniques of Expression Gene Cloning in Immunology.
	CO7	Describes the PCR and Blotting Techniques and fingerprinting with DNA.

IQAC Co-ordinator
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DEPARTMENT OF MATHEMATICS

Course Code	Name of the Course	COs	After completing this course students must able to
B.Sc. SEM I Mathematics		CO1	Apply the De'moviers Theorem.
		CO2	Identifythe Gregory, Euler, Machin, Rutherford, and Trigometric series.
Algebra &Trigonometry			Apply De'Moviers Theorem to evaluate the problems.
		CO3	Determine the matrix's characteristic equation, eigenvalues, and corresp onding inverseigen vectors.
		CO4	Explainthe relationship between roots and equation coefficients,
		CO5	Calculate the coefficients of quadratic equations and Obtain the square matrix's inverse.
Integral & Differential Calculus		CO1	Understand boundaries and continuity in order to examine the functions.
		CO2	Calculate the derivative of the product of two functions to get the values of t he product of functions.
		CO3	Understand the geometrical uses of mean value theorems.
		CO4	Examine the distinctions between partial and ordinary differentiation.
		CO5	Utilizing Leibnitz's theory and study integration.
B.Sc. SEM II Mathematics		CO1	Solve first order differential equations using different techniques..
Ordinary Differential Equations		CO2	Solve higher order differential equations and orthogonal trajectories
		CO3	Calculate complementary function and particular integral of the second order differential Equation.
		CO4	Describe the different methods to solve second order differential equations.
		CO5	Illustrate applications of differential equations
Vector Analysis and Geometry		CO1	Interpret the vectors, their products, differentiation and integration.
		CO2	Determine curvature and torsion
		CO3	Apply the concepts of divergence, curls which are useful in physics
		CO4	Describe the different forms of sphere and properties
		CO5	Discuss the equations of cone and cylinder
B.Sc. SEM III Mathematics		CO1	Get knowledge basic principles of limit & continuity, Taylor's theorem
Advanced Calculus		CO2	understand Lagrange's multipliers method and Jacobian
		CO3	understand the concept of improper integral and Beta-Gamma function
		CO4	learn the definition of sequence and series and Sandwich theorem
		CO5	learn various tests for convergence and divergence of series
Partial Differential Equations		CO1	Study partial derivatives, differential equation, real valued functions of two variables and solve the system of homogeneous functions.
		CO2	learn to evaluate partial differential equations, solution of some special type of equations
		CO3	learn to solve methods of partial differential equation of second and higher order
		CO4	students will be familiar with techniques of Calculus of variations
		CO5	Recognize various methods of separation of variables.

B.Sc. SEM IV Mathematics	**CO1**	Learn the concept of Group, Subgroup and Cosets.
Elements of Algebra	**CO2**	Explain the significance of the notations of Cosets, Normal subgroups and Quotient group
	CO3	Learn the concept of Homomorphism & Isomorphism and its Theorem.
	CO4	Study the properties of Ring and Ideals and Integral domain.
	CO5	Familiar with Fundamental concepts of Number theory.
Classical Mechanics	**CO1**	learn radial and transverse component of velocities and acceleration
	CO2	Learn to explain Degree of freedom, Generalized co-ordinates and constraints.
	CO3	learn to expressing the central force motion and areal velocity
	CO4	explain the significance of coplanar forces, triangle law of forces, parallel forces and equilibrium forces
	CO5	learn to find work and energy, virtual work and uniform catenaries'.
B.Sc. SEM V Mathematics Analysis	**CO1**	Address instances of improper integral.
	CO2	Operate in the distinct ability for intricate functions and possess knowledge of the Cauchy-Riemann equations.
	CO3	Learn about Cauchy sequences and metric spaces.
	CO4	learn about the idea of complicated function continuity
	CO5	Recognize the goals and purposes of the beta and beta functions
Mathematical Methods	**CO1**	Solve ordinary and partial differential equations, use Laplace transform.
	CO2	Recognize Fourier series.
	CO3	Grasp the Fourier transform
	CO4	Understand Legendre's equation completely.
	CO5	Solve problems on Bessel's equation, the generating function for Jn(x),
B.Sc. SEM VI Mathematics	**CO1**	Understand the fundamental concepts of group theory, including groups, subgroups, cyclic groups, and permutation groups
Modern Algebra	**CO2**	Gain knowledge of ring theory, including rings, subrings, ideals, and quotient rings
	CO3	Explore the concept of fields and field extensions, understanding algebraic and transcendental extensions, and the notion of the degree of an extension
	CO4	learn about modules over a ring and vector spaces over a field, including their properties and structures
	CO5	They will be able to work with module homomorphisms, direct sums, and free modules, and understand their applications in linear algebra and beyond
Special Theory of Relativity	**CO1**	Use the relativity theory notation. and Resolves basic mathematical issues.
	CO2	Utilize the Lorentz transformation in addition to the concepts of length contraction and time dilation.
	CO3	Apply the relativistic invariance of Maxwell's equations to your analysis
	CO4	Do basic math operations in differential geometry.
	CO5	Review the Einstein Field Equations.

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DEPARTMENT OF CHEMISTRY

Course Code	Name of the Course	COs	After completing this course students must able to
B.Sc. SEM I Chemistry		CO1	Discover the fundamentals of periodic properties of elements, the development of various bonding types, and the variables influencing the formation of ionic bonds.
		CO2	Recognise the characteristics of the ionisation energy, oxidation state, electronic configuration, and sand block elements.
		CO3	To comprehend the physical and chemical characteristics of aliphatic hydrocarbons and to learn about the many effects
		CO4	Acting through covalent bonds.possess an understanding of the stereochemistry, structure, and behaviour of far-from natural hydrocarbons, as well as the applications based on electrophilic substitution
		CO5	Understand the concepts of entropy and become familiar with the principles, properties, and laws of thermodynamics.
		CO6	Comprehend the ideal and real concepts using mathematical equations, state variables, and the phase rule applied to the sulphur and water systems.
		CO7	Builds the abilities needed to synthesise organic molecules in one step using green chemistry
		CO8	To analyse the given mixture's radicals (neutral, basic, and acidic), which are needed for industry.
B.Sc. SEM II Chemistry		CO1	Understand the meaning and applications of polarisation, the directional nature of covalent bonds, hybridization principles, and acidbase theory
		CO2	Recognise the categories of solvents and the requirements for a good solvent
		CO3	Study of phenol, ether, and epoxide classification, production, and chemical reactions.
		CO4	Explain the synthesis and chemical processes of alcohol, aryl halides, and alkyl halides
		CO5	Recognising the steps involved in the synthesis and chemical reactions of hydroxyl and halogen derivatives of aliphatic and aromatic hydrocarbons
		CO6	Explain the rate of reaction in terms of concentration change and the way the rate of chemical reaction varies with time.
		CO7	Calculate the heat of solution and activation energy.
		CO8	Examinethe viscosity, surface tension, and other features of liquid states.
B.Sc. SEM III Chemistry		CO1	Describe the idea of bonding using MOT and VBT, which also predicts the covalent molecules' geometry
		CO2	Give a thorough explanation of the workings and methodology in the metallurgical process.
		CO3	Apply their knowledge of the stereochemistry of various substances to forecast reaction outcomes.
		CO4	Understand the significance of the thermodynamical idea and its use in industrial extraction and separation methods
		CO5	Comprehend many physical chemistry ideas by experimentation.
		CO6	Examine the method used to identify organic substances and acquire knowledge of both gravimetric and volumetric analysis.
		CO7	Builds the abilities needed to calculate surface tension, viscosity, and temperature effects.

B.Sc. SEM IV Chemistry	**CO1**	Comprehend the chemical and physical characteristics of transition elements and be knowledgeable about element extraction.
	CO2	Learn about the idea of inner transition elements, their characteristics, and the fundamentals of metallurgy.
	CO3	Exposure to polynuclear hydrocarbons' organic chemistry, knowledge of carbohydrates, and reactive methylene compounds.
	CO4	Comprehend and research the properties of amino acids and their derivatives, including benzene.
	CO5	Acquire knowledge of all the colliding characteristics of a diluted solution and be able to calculate the solute's molecular weight.
	CO6	Investigate the impact of diverse indicators on estimates and various forms of soft calculations
	CO7	Give an overview of the study fields of solid state and nanotechnology applications.
B.Sc. SEM V Chemistry	**CO1**	Comprehend the colour of coordination compounds, their uses in qualit ative analysis, and their colour on the basis of CFT.
	CO2	Create the heterocyclic and organic metallic compound synthesis needed for a new era of medical research
	CO3	Understand the synthesis processes and how drugs, dyes, and pesticides are used in industry.
	CO4	Learn about photochemistry, which is quite beneficial for studying photo chemical reactions in research.
	CO5	learn the fundamentals of molecular spectroscopy, a helpful technique f or determining a newly synthesised compound's structure in research.
	CO6	Employ collabative properties to investigate melting points, freezing poi nt depressions, and boiling point elevations
	CO7	Give fundamental concepts for classifying coordination compounds accord ng to different theories, electronic structure, and magnetic characteristics
B.Sc. SEM VI Chemistry	**CO1**	Describe the kinetic properties of metal complexes and analytical chemi stry techniques such paper chromatography, colorimetry, and spectroph otometry.
	CO2	Detect different functional groups and clarify the structure of organic co mpounds using IR spectroscopy, as well as
	CO3	Comprehend the information of electronic transition based on UVVis spectroscopy.
	CO4	Apply nuclear magnetic resonance spectroscopy and mass spectrometr which are helpful in research and a variety of sectors, to determine the s tructure of organic molecules.
	CO5	Employ this knowledge to analyse and synthesise compounds as a subst itute source of energy.
	CO6	Use chromatographic techniques to separate and identify the organic c onstituents (glycine, phenol, aniline, and urea) and to separate them qu antitatively.
	CO7	Describe the underlying theory of the laboratory's physical chemistry ex periments and interpret the findings

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.DEPARTMENT OF COMPUTER SCIENCE

Course Code	Name of the Course	COs	After completing this course students must able to
B.Sc. SEM I Computer Science		CO1	Familiar with the fundamentals of computers.
		CO2	Elaborate on computer science topics.
		CO3	Study fundamental programming concepts.
		CO4	Design such an algorithm should be logical.
		CO5	Access C programming Tools
		CO6	Utilize C programming tools for implementation.
B.Sc. SEM II Computer Science		CO1	Recognize the fundamental tags used in XML and HTML
		CO2	Add mark-up tags to web pages to process and present information.
		CO3	Create WebPages with various contents
		CO4	Use scripting languages to give web sites interactive elements.
		CO5	Produce a valid or well-written XML document.
		CO6	Execute utilizing sophisticated C programming methods.
B.Sc. SEM III Computer Science		CO1	Analyze different types of algorithms
		CO2	Recognize the methods of searching and sorting.
		CO3	Understand the concepts of trees and graphs
		CO4	Aware of how linked lists, stacks, and queues work.
		CO5	Execute using C++ programming tools.
		CO6	Explain oriented programming concepts.
B.Sc. SEM IV Computer Science		CO1	Comprehend the RDBMS and DBMS's basic and advanced features.
		CO2	Acquire Solid practical knowledge of SQL
		CO3	Create Different Database Tables with SQL Commands.
		CO4	Create, read, update, and delete relational database data using queries written in the structured query language (SQL).
		CO5	Write a PL/SQL program.
B.Sc. SEM V Computer Science		CO1	Analyse the code solution and build the VB project within the.NET framework.
		CO2	Create Windows Base.NET and console applications.
		CO3	Learn about Microsoft's MS.NET framework.
		CO4	Put into practice showcase Windows & web services component services.
		CO5	Learn about classes and objects and become acquainted with Java programming.
		CO6	Use Java Apps.
B.Sc. SEM VI Computer Science		CO1	Learn and comprehend Java's advanced concept.
		CO2	Capable of writing code with Exception Handling.
		CO3	Learn how to program using JavaScript and Servlets
		CO4	Create reusable software components, learn Java Beans.
		CO5	Understand VB.NET fundamentals, objects, and types.
		CO6	Comprehend ADO.NET

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DEPARTMENT OF ELECTRONICS

Course Code / Name of the Course	COs	After completing this course students must able to
B.Sc. SEM I Electronics **Unit I : Passive Components and Network Theorems**	**CO1**	Know passive and active components, analysis and verification of network theorems with numericals. Also students will be able to select and identify electronic components such as resistors capacitors etc. of required value.
Unit II: Measuring Instruments :	**CO2**	Understand principle and working of different meters and CRO . They will be able to handle and connect the measuring instruments such as Voltmeter, Ammeter etc. at appropriate place
Unit III : Semiconductor Diode and Regulated power supply	**CO3**	Know function of diodes, rectifiers and voltage regulators. They will be able to design simple dc power supply.
Unit IV : Bipolar Transistors:	**CO4**	After completion of this unit, students will be able to know types transistor and their working in different modes, amplification and biasing, faults detection in electronic circuits. Also they will be able to design and construct simple amplifiers
Unit V : Switching and Optoelectronic devices	**CO5**	Know Switching and Optoelectronic devices and their working. They will be able to use these active devices for many applications.
Unit VI : Integrated Circuits :	**CO6**	Know design and fabrication process of ICs and their scale of integration
B.Sc. SEM II Electronics **Unit I Binary Arithmetic & Logic gates**	**CO1**	Know number systems and binary codes, their inter conversion and arithmetic, logic gates, use of logic gates in adders. They will be able to design and construct logic circuits using logic gates.
Unit II Boolean Algebra & Logic families	**CO2**	Understand Boolean algebra, De'Morgan's theorem, logic equations, K-map & logic families like DTL,TTL etc. They will be able to minimize logic equation, design & construct logic circuits using logic gates.
Unit III Multivibrators and Flip Flops	**CO3**	Know construction and working of multivibrators and flip-flops. Also they will be able to design and construct different types of flip-flops using logic gates.
Unit IV Counters and Shift registers	**CO4**	Understand the construction and working of different types of counters and shift registers and their IC version. They will be able to design and construct different types of counters and shift registers using flip-flops and logic gates.
Unit V Combinational logic circuit	**CO5**	Know the construction and working of different types of encoders, decoders, multiplexers and demultiplexers and their IC version. They will be able to design and construct different types of encoders, decoders, multiplexers and demultiplexers using logic gates.
Unit VI Semiconductor Memories	**CO6**	Access these memories in serial and parallel mode (to read and write operations).
B.Sc. SEM III Electronics **Unit I Hybrid Parameters and Cascaded Amplifiers**	**CO1**	Know what hybrid parameters are. What is equivalent circuits of CE,CB and CC . What is concept of coupling? Which are different types of coupling etc.
Unit II Power Amplifier	**CO2**	Understand which are different types of power amplifier, How transformer is use as a coupling device. How power amplifier is work. Which are different stages of coupling etc.
Unit III Feedback amplifier and Oscillators	**CO3**	Know, what is mean by feedback. Physically how circuits are connected as positive or negative type. What is oscillator, Which are basic elements of oscillator? What is tank circuit?Which are different types of oscillators etc.
Unit IV Operational amplifier	**CO4**	Know, Block diagram of operational amplifier, Characteristics of ideal op amp, concept of virtual ground, Parameters of op amp. Op amp as inverting and non-inverting amplifier, Adder, Subtractor, Differentiator, Integrator, Regenerative comparator
Unit V Applications of Op-Amp	**CO5**	Know, Solution to simultaneous equation, Astable, Monostable and Bistable multivibrator using Op Amp. Need of A/D and D/A convertor, D/A convertor- R-2R ladder type, Weighted register, Sampled and hold circuit, IC ADC and DAC specifications.

B.Sc. SEM IV Electronics **Unit I Modulation and Demodulation**	**CO1**	Know Need for modulation, AM theory, Power relation, Theory of FM, Frequency spectrum of AM and FM, Generation of AM and FM, Difference between AM and FM, Demodulator: Diode detector, slope detector. Transmitter and receiver: Block diagram and working of AM and FM transmitter and receiver
Unit II Fiber Optic and digital Communication	**CO2**	Know Advantages and Multiplexing principles: TDM and FDM. At the end of this unit, students will be understand what is history of microprocessor, block diagram of microprocessor, disadvantages of OFC, Block diagram of OFC, Types of optical fibers, Total internal reflection, Jointer and Coupler, Fiber alignment, joint losses. Pulse modulation, Sampling theorem, PAM, PWM, PPM, and PCM
Unit III Architecture and timing of 8085	**CO3**	Understand what is history of microprocessor, block diagram of microprocessor how microprocessor work, what is function of each pin, skill of identify the pins and instruction, how to plot timing diagram of instruction etc.
UNIT IV Instruction and programming of 8085	**CO4**	Understand what is instruction, skill of development of algorithm and flowchart, identify what is difference between assembly language and machine language, skill of writing programs for Addition, Subtraction, Multiplication, Division, finding maximum and minimum number etc.
Unit V Interfacing	**CO5**	Understand what is interfacing, which are different types of memory, what is PPI, which ICs are used for PPI , What is block diagram of 8255, what is function of each blocks etc.
B.Sc. SEM V Electronics	**CO1**	Provides foundational knowledge of generalized instrumentation systems, Knowledge includes various transducer technologies used to measure physical quantities.
	CO2	Basic understanding of measurement such as temperature using thermocouple, thermistor RTD total radiation pyrometer etc.
	CO3	Provides fundamental knowledge about block diagram of IC 555 timer, Phase lock loop (PLL) and its application.
	CO4	Knowledge of different type of display unit, comprehensive knowledge about working principles and block diagram of DVM, DFM and DCM, understanding about necessity and different type of recorder, working principles of X-Y recorder, magnetic tape recorder
	CO5	Gain comprehensive knowledge about sensors, learn about various sensor and actuators technologies, includes learning the operating principles, characteristics, and performance metrics of sensors and actuators.
	CO6	Studying biomedical electronics involves understanding of electrodes and the application of electronics principles and technologies in medical devices such as EEG, EMG, ECG, X-ray machine.
B.Sc. SEM VI Electronics	**CO1**	Understanding Basic Microprocessor Concepts, gain a deep understanding of the different types of registers in the 8086 microprocessor ,Understanding the segmented memory model, Understanding Pin Functionality, learn about interrupts.
	CO2	Gain comprehensive knowledge of the 8086-instruction set architecture, Instruction Set Familiarity, learn about addressing modes which are crucial for accessing data and operands efficiently, Learn about Programming Skills in Assembly Language
	CO3	Comprehensive understanding of the architecture of the 8051microcontroller, memory organization, different types of registers, Role of register in Data Handling.
	CO4	Fundamental to understanding of the instruction set, how instructions are encoded and executed, how instructions are encoded and executed, Learn about Programming Skills in Assembly Language.
	CO5	Understanding the basic of serial communications, interfacing the 8051 microcontroller with various hardware components and peripherals such as RS232, ADC/DAC, LEDs.
	CO6	Gain comprehensive knowledge to AVR, architecture of the AVR, different types of registers and Role of register, memory organization, integrated peripherals such as timers/counters.

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DEPARTMENT OF BOTANY

Course Code	Name of the Course	COs	After completing this course students must able to
B.Sc. SEM I Botany		CO1	Understand the history of crypto gaming and a broad overview of viruses.
		CO2	To be aware of algae's classification and basic features.
		CO3	Describe the general characteristics and classification of fungi.
		CO4	Identify and categories the common traits of bryophytes.
		CO5	Sort and identify the common traits of Pteridophytes.
		CO6	Recognize the economic significance of crypt gaming and microorganisms.
		CO7	Understand the morphology, structure, and systematic of fungi, bryophytes, pteredophytes, and algae also cryptogams work.
B.Sc. SEM II Botany		CO1	Describe the geological timescale and fossilized plants.
		CO2	Recognise the broad reports and brief classification of gymnosperms.
		CO3	Recognise the morphology of crops used for food, oil, and fibre Plant parts their uses.
		CO4	Concentrate on the indepth study of medicinal plant phytochemistry and pharmacognosy.
		CO5	Understand the scope and uses of paleobotany.
		CO6	To comprehend the significance of fossil flora in our lives.
		CO7	Study thorough examination of gymnosperms.
B.Sc. SEM III Botany		CO1	Describe the genesis and development of angiosperms.
		CO2	Describe the genesis and development of angiosperms.
		CO3	Study thorough research on the systematic classification of angiosperms
		CO4	Systematic analysis of monocotyledons and cotyledons families.
		CO5	Describe in brief the general traits and structure of the root and stem.
		CO6	Understand Embryology and cutting sections, creating permanent slides, and differentiating tissues.
		CO7	Create her collection and recognize the plants.
B.Sc. SEM IV Botany		CO1	Recognize the fundamental ideas of genetics, biochemistry, and cell biology.
		CO2	Describe the composition and purposes of cell organelles.
		CO3	Comprehend Mendel's Law and address the genetics problem.
		CO4	Describe the functions of enzymes and comprehend carbohydrates
		CO5	Examine a variety of biochemical tests, such as those for cellulose, protein, lipid, and oil.
		CO6	Recognize the Importance of Meiosis and Mitosis.
B.Sc. SEM V Botany		CO1	Brief the explanation of the plant's mechanism for moving water
		CO2	Conceive of the metabolic processes of photosynthesis and respiration.
		CO3	Possess in-depth understanding of growth hormones, nitrogen metabolism.
		CO4	Describe the idea of photoperiodism and plant movements.
		CO5	Learn about the scope, significance, and relationship between plants and water.
		CO6	Observe some incredible facts about respiration and photosynthesis.
		CO7	Examine of the morphology and anatomy of xerophytes and hydrophyte plants.

B.Sc. SEM VI Botany	**CO1**	Explain the DNA's structure and function.
	CO2	Recognize Translation and Transcription in Eukaryotes
	CO3	Utilize gene transfer techniques.
	CO4	Clear concepts of plant tissue culture and comprehend the function of biotechnology in agriculture, business, and healthcare.
	CO5	Gain hands-on experience in advanced Molecular Biology and Plant Biotechnology courses.
	CO6	Pleasurable observation of the most valuable bimolecular, including proteins, DNA, and RNA, as well as their qualitative and quantitative estimates.
	CO7	Showcase sophisticated instruments such as centrifuges, autoclaves, laminar air flow chambers, electrophoresis, etc. to provide comprehension.

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DEPARTMENT OF PHYSICS

Course Code / Name of the Course	COs	After completing this course students must able to
B.Sc. SEM I Physics	CO1	Discuss the basic concepts of rotational dynamics.
	CO2	Examine the phenomenon of simple harmonic motion and distinction between undammed, damped and force oscillations and the concept of resonance.
	CO3	Explain the superposition of simple harmonic motion and acquire the knowledge of Ultrasonic waves, their production, detection and applications in different field.
	CO4	Determine the constants of elasticity and relate it with appropriate things.
	CO5	Interpret the postulates of special theory of relativity.
	CO6	Know the concept of Global positioning system (GPS).
B.Sc. SEM II Physics	CO1	Discuss the concept of scalars & vectors and their properties.
	CO2	Develop an understanding of Gauss law and its applications to obtain electric filed in different cases.
	CO3	Formulate the relationship between electric displacement vector, electric polarization and dielectric constant.
	CO4	Distinguish between the magnetic effect of electric current, electromagnetic induction and the related laws in appropriate circumstances.
	CO5	Simplify electrical circuits by applying various network theorems
B.Sc. SEM III Physics	CO1	Gain knowledge of the fundamental laws of thermodynamics, concept of enthalpy and develop critical understanding of concept of thermodynamic potentials.
	CO2	Understand the basic aspects of kinetic theory of gases, Maxwell's distribution law of velocities, Mean free path of molecular collisions and transport phenomena in ideal gases.
	CO3	Examine the nature of black body radiations and understand Stefan-Boltzmann's Law, Rayleigh-Jeans Law and Wien's displacement Law with their significance.
	CO4	Explain the structure and the operations of transistor and recognize the different types of transistor and their applications
	CO5	Understand the properties of macroscopic systems using the knowledge of individual particles by different theories and comparison of Maxwell's-Boltzmann, Fermi-Dirac and Bose-Einstein statistics.
	CO6	Explain the fundamental understanding of static and dynamic behavior of P-N junction diode, Zener diode, light emitting diode and Transistor.
	CO7	Understand concept of rectification, Ripple Factor and Filter Circuits and gain knowledge of construction of Regulated Power supply.

B.Sc. SEM IV Physics	CO1	Understand the phenomenon of Interference of light and its formation in thin films, Newton's rings and Michelson interferometer.
	CO2	Distinguish between Fresnel and Fraunhoffer diffraction and observe the diffraction patterns in case of double slit and diffraction grating.
	CO3	Describe the construction and working of zone plate and compare the zone plate with convex lens.
	CO4	Explain various methods of production of plane, circularly and elliptically polarized light and their detection.
	CO5	Comprehend the basic principle of LASER, the working of He-Ne laser and Ruby laser and their applications in various fields.

	CO6	Understand the parameters of fiber-optics and explore their applications
	CO7	Understand the kinematics of moving fluid by different theorems and Laws.
	CO8	Gain Knowledge about different applications of transistor by operational amplifier and oscillator circuits.
B.Sc. SEM V Physics	**CO1**	Knowledgeable about the key events in the history of quantum mechanics.
	CO2	Explain and analyze experiments showing the wave characteristics of matter and the reasons behind replacing classical physics with a wave equation.
	CO3	Recognize the fundamental ideas and ideas of quantum mechanics, including the uncertainty principle, the wave function and its statistical interpretation, the Schrödinger equation, and stationary and non-stationary states.
	CO4	Comprehend the vector atom model and use its tenets to investigate atoms, their behavior, the creation of X-ray spectra, and their properties.
	CO5	Clarify Raman effect and its significance as a spectroscopic method.
	CO6	Comprehend the fundamental elements of an atomic nucleus, such as binding energy and nuclear forces.
	CO7	Independently solve the Schrödinger equation for basic systems in one to three dimensions
B.Sc. SEM VI Physics	**CO1**	Comprehend the idea of microscopic and macroscopic states as well as the connection between statistics and thermodynamics.
	CO2	Apply for various particle systems, distinguishing between crystalline and amorphous materials.
	CO3	knowledgeable about both quantum (Bose and Fermi Dirac) and classical (Maxwell-Boltzmann) statistics,
	CO4	Determine the thermal and electrical characteristics in the free-electron model.
	CO5	Elucidate the idea of energy bands and how they affect electrical characteristics; describe several kinds of magnetic phenomena and the science underlying them.
	CO6	Comprehend the idea of nanoparticles and how an increase in the S/V ratio affects a material's characteristics.
	CO7	Comprehend the idea of quantum confinement and its effects.

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DEPARTMENT OF MARATHI

Course Code	Name of the Course	COs	After completing this course students must able to
B.Sc. SEM I Marathi Compulsory		CO	भाषेच्या आकरणाबरोबरच विद्यार्थ्यांमध्ये समाजातील उच्च कोटीची मानवी मूल्य वृद्धिंगत व्हावी राष्ट्रीय एकात्मता सामाजिक बांधिलकी माणूस ता राष्ट्रप्रेम राष्ट्रभक्ती वैज्ञानिक दृष्टिकोन पर्यावरण संरक्षण संवर्धन भूतदया इत्यादीची प्रेरणा पेरणी व्हावी विद्यार्थ्यांची मातृभाषा आणि वांग्मय विषयक अभिरुची वाडीला लागावे त्यांना दर्जेदार व व्यवसायाभिमुख शिक्षण मिळावे याकरिता केंद्र सरकारच्या मानव संसाधन आयोगाने जी ध्येयधोरणे निश्चित केली आहेत त्या अनुषंगाने हा अभ्यासक्रम नवीन शैक्षणिक धोरणाच्या परिप्रेक्ष्यात निश्चित करण्याचे धोरण संत गाडगेबाबा अमरावती विद्यापीठाने अत्यंत विचारपूर्वक साकार स्वीकारलेले आहे
B.Sc. SEM II Marathi Compulsory		CO	भाषेच्या आकरणाबरोबरच विद्यार्थ्यांमध्ये समाजातील उच्च कोटीची मानवी मूल्य वृद्धिंगत व्हावी राष्ट्रीय एकात्मता सामाजिक बांधिलकी माणूस ता राष्ट्रप्रेम राष्ट्रभक्ती वैज्ञानिक दृष्टिकोन पर्यावरण संरक्षण संवर्धन भूतदया इत्यादीची प्रेरणा पेरणी व्हावी विद्यार्थ्यांची मातृभाषा आणि वांग्मय विषयक अभिरुची वाडीला लागावे त्यांना दर्जेदार व व्यवसायाभिमुख शिक्षण मिळावे याकरिता केंद्र सरकारच्या मानव संसाधन आयोगाने जी ध्येयधोरणे निश्चित केली आहेत त्या अनुषंगाने हा अभ्यासक्रम नवीन शैक्षणिक धोरणाच्या परिप्रेक्ष्यात निश्चित करण्याचे धोरण संत गाडगेबाबा अमरावती विद्यापीठाने अत्यंत विचारपूर्वक साकार स्वीकारलेले आहे

COURSE OUTCOMES of Languages

CO1	Students will achieve a high level of fluency and accuracy in speaking and writing, allowing them to express complex ideas clearly and persuasively in the target language.
CO2	Students will be able to read and critically analyze a wide range of texts, including literary works, academic articles, and specialized professional documents, in the target language.
CO3	Students will develop the ability to understand and interpret spoken language in various contexts, including lectures, media broadcasts, and everyday conversations, even when delivered at a natural speed
CO4	Students will gain a deep understanding of the cultural, historical, and social contexts in which the target language is used, fostering an appreciation of cultural diversity and intercultural communication.
CO5	Students will be able to conduct research using sources in the target language, analyze data, and present their findings effectively in both written and oral formats.
CO6	Students will be able to conduct research using sources in the target language, analyze data, and present their findings effectively in both written and oral formats
CO7	Students will acquire specialized vocabulary related to their fields of interest or professional goals, enabling them to use the language effectively in academic, professional, and technical contexts.
CO8	Students will learn techniques for translating and interpreting between the target language and their native language, enhancing their ability to bridge communication gaps in multilingual settings.
CO9	Students will cultivate the skills necessary for lifelong language learning, including the ability to independently use resources, self-assess progress, and adapt to new linguistic and cultural environments.
CO10	Students will understand the ethical considerations involved in language use, including issues related to representation, bias, and the responsible dissemination of information

IQAC Co-ordinator
Phulsing Naik Mahavidyalaya
Pusad

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Offg. Principal
Phulsing Naik Mahavidyalaya
Pusad

COURSE OUTCOMES of HISTORY

CO1	Students will acquire a comprehensive understanding of key historical events, periods, and movements from a variety of global contexts, encompassing different time periods and geographical regions.
CO2	Students will develop the ability to critically analyze historical sources, interpret evidence, and assess different historical interpretations and arguments.
CO3	Students will learn how to conduct independent historical research, including formulating research questions, locating and evaluating primary and secondary sources, and employing appropriate methodologies.
CO4	Students will improve their ability to communicate historical arguments clearly and effectively in written and oral forms, using proper citation practices and adhering to academic standards.
CO5	Students will be able to place historical events and developments within broader social, political, economic, and cultural contexts, understanding the interconnectedness of historical phenomena.
CO6	Students will develop skills in comparing different historical experiences and perspectives, identifying similarities and differences, and understanding the diversity of human experiences across time and space.
CO7	Students will understand the ethical dimensions of historical inquiry, including issues related to bias, representation, and the responsible use of historical knowledge in contemporary debates and policymaking.
CO8	Students will gain an understanding of historiography, the study of how history has been written and interpreted over time, and will be able to critically assess historiographical debates and trends.
CO9	Students will learn to integrate insights from other disciplines, such as economics, sociology, anthropology, and political science, into their historical analyses, fostering a multidisciplinary perspective.
CO10	Students will cultivate a commitment to lifelong learning, developing the skills necessary to continue exploring and understanding the past, adapting to new historical questions, and contributing to public history initiatives.

COURSE OUTCOMES of POLITICAL SCIENCE

CO1	Students will gain a thorough understanding of various political systems, institutions, and processes, including democratic, authoritarian, and hybrid regimes
CO2	Students will develop strong analytical skills to critically evaluate political theories, concepts, and real-world political events, policies, and decisions
CO3	Students will learn to conduct rigorous political science research, including designing research projects, utilizing qualitative and quantitative methods, and effectively analyzing data
CO4	Students will acquire in-depth knowledge of key political theories and ideologies, such as liberalism, conservatism, socialism, feminism, and post-colonialism, and be able to apply these theories to contemporary political issues
CO5	Students will develop the ability to analyze, formulate, and evaluate public policies, understanding the policy-making process and the impact of policies on various stakeholders
CO6	Students will be able to compare political systems, institutions, and processes across different countries and regions, gaining a global perspective on political dynamics and international relations
CO7	Students will improve their ability to communicate complex political ideas and arguments clearly and persuasively in both written and oral forms, tailored to diverse audiences
CO8	Students will understand the ethical dimensions of political science, including issues of justice, equality, and human rights, and be prepared to engage responsibly in civic and political activities
CO9	Students will learn to integrate knowledge from related disciplines, such as economics, sociology, history, and law, to enrich their understanding of political phenomena and to approach problems from a multidisciplinary perspective
CO10	Students will cultivate a commitment to lifelong learning, staying informed about political developments, and continuously improving their skills and knowledge for careers in public service, academia, law, journalism, and other fields.

COURSE OUTCOMES of SOCIOLOGY

CO1	Students will acquire a thorough understanding of major sociological theories, including functionalism, conflict theory, symbolic interactions, and social constructions, and be able to apply these theories to analyze social phenomena
CO2	Students will develop strong critical thinking and analytical skills, enabling them to critically evaluate social issues, institutions, and processes, and to understand the complexities of social life.
CO3	Students will gain proficiency in sociological research methods, including both qualitative and quantitative techniques, and be able to design, conduct, and analyze research projects.
CO4	Students will develop an in-depth understanding of key social institutions such as family, education, religion, economy, and government, and their roles and impacts on society.
CO5	Students will acquire knowledge of various forms of social inequality, including race, class, gender, sexuality, and age, and understand their causes, consequences, and potential solutions.
CO6	Students will be able to compare and contrast different societies and cultures, gaining a global perspective on social issues and understanding the diversity of human experiences.

CO7	Students will improve their ability to communicate sociological concepts and findings clearly and effectively in both written and oral forms, tailored to academic, professional, and public audiences.
CO8	Students will develop the ability to use their sociological imagination to link individual experiences with larger social structures and historical processes, fostering a deeper understanding of personal and societal issues.
CO9	Students will understand the ethical dimensions of sociological research and practice, including issues of consent, confidentiality, and the responsible use of sociological knowledge, and be prepared to engage ethically in professional activities
CO10	Students will cultivate a commitment to lifelong learning, staying informed about ongoing sociological research and debates, and continuously improving their skills and knowledge for diverse career paths in academia, public service, social work, and beyond.

COURSE OUTCOMES of HOME ECONOMICS

CO1	Students will acquire a thorough understanding of home management principles, including budgeting, financial planning, and resource allocation for effective household operation
CO2	Students will develop expertise in nutrition and food science, including meal planning, food preparation, dietary needs, and food safety to promote health and well-being
CO3	Students will gain an in-depth understanding of child development, parenting strategies, and family dynamics to support healthy family relationships and child growth
CO4	Students will learn to educate consumers about their rights, responsibilities, and smart consumer practices, including sustainable resource management and environmental stewardship.
CO5	Students will develop skills in textiles and apparel, including fabric selection, clothing construction, and maintenance, as well as an understanding of fashion trends and industry standards
CO6	Students will gain knowledge in housing and interior design principles, including space planning, aesthetics, and ergonomics to create functional and comfortable living environments
CO7	Students will be able to promote health and wellness through education on physical fitness, mental health, and preventative healthcare practices tailored to diverse populations
CO8	Students will learn to engage with community and social services, developing programs and interventions to support individuals and families in need, enhancing community well-being.
CO9	Students will cultivate a commitment to lifelong learning, staying updated on advancements in home economics, and continuously improving their skills for personal and professional growth.
CO10	Students will understand the ethical implications of their work and develop cultural competence, enabling them to work effectively with diverse populations and uphold ethical standards in their professional practice

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COURSE OUTCOMES M.Sc. (Physics)

M.Sc. I SEM I Physics

Course Code / Name of the Course	COs	After completing this course students must able to
M.Sc. SEM I Physics	CO1	Possess a solid understanding of the fundamentals of complex analysis, including the key integral theorems;
Mathematical Physics	CO2	Calculate the residues of a complex function and apply the residue theorem to compute specific types of integrals;
	CO3	Solve ordinary second-order differential equations significant in the physical sciences;.
	CO4	Expand a function inside a Fourier series and the conditions under which such an expansion is valid;
	CO5	Comprehend the physics underlying them and continue their research in the fields of material science and nanotechnology..
Classical Mechanics	CO1	Grasp the basic ideas of particle dynamics; become acquainted with fundamentals of motion in central potential, small oscillations, kinematics, and rigid body dynamics;.
	CO2	Describe and comprehend the motion of a mechanical system
	CO3	Using the Lagrange-Hamilton formalism; be able to solve two-body and many-body problems using classical physics
	CO4	Solve central force problems and equations for planet orbits
	CO5	Solve and obtain canonical equations and to use Poisson's brackets.
Quantum Mechanics-I	CO1	Familiar with the key ideas and concepts of quantum mechanics, including the time evolution of solutions, stationary and non-stationary states, the uncertainty principle, the Schrödinger equation, the wave .
	CO2	Solve the Schrödinger equation independently for simple systems in one to three dimensions using both robust numerical techniques and analytical methods;
	CO3	Compute these solutions' temporal evolution, related probabilities, expectation values, and uncertainties in addition to providing succinct physical interpretations and the logic behind the mathematical findings
	CO4	Possess an understanding of the principles of angular momentum, spin, and quantization.
Computational Method &Programming	CO1	Possess the ability to use mathematical techniques to address issues in electrodynamics, quantum mechanics, statistical mechanics, and classical mechanics;
	CO2	Find the roots of smoothly varying functions with nonzero derivatives iteratively; identify and describe the properties of various numerical techniques.
	CO3	Acquire numerical techniques for interpolation and locating equation roots; be able to solve ordinary differential equations numerically with boundary value issues.
	CO3	Possess the ability to integrate a function within a given interval, allowing one to calculate the area under the curves;

M.Sc.I SEM II Physics

Course Code	Name of the Course	COs	After completing this course students must able to
M.Sc. SEM II Physics		CO1	Possess the ability to assess electrostatic potential and fields in various mediums and in free space;, as well as comprehend how a continuous current produces a magnetic field.
Electrodynamics- I		CO2	assess the configuration energy of an electrostatic system;
		CO3	Possess the ability to compute magnetic fields using Ampere's law and Boit-Savart's law.
		CO4	Possess an understanding of the Pointing theorem (vector), the relevance of Maxwell's equation of electrodynamics, and its applications to the propagation of electromagnetic waves.
Quantum Mechanics-II		CO1	Possess knowledge of perturbation theory and its various forms.
		CO2	Solve time-independent perturbation problems for quantum systems.
		CO3	Identify and utilize the perturbative expressions for first order wave function and second order energy shift.
		CO4	Solve time-dependent perturbation problems for quantum systems and forecast the outcomes
		CO5	Explain quantum scattering theory and apply it to various scattering problems.
Solid State Physics		CO1	Possess a basic understanding of crystal systems and spatial symmetries;
		CO2	Account for the concepts of form factor, structure factor, and scattering amplitude in the study of crystalline materials through diffraction.
		CO3	Account for inter atomic forces and bonds.
Network Theorems & Solid State Device		CO1	Explain and comprehend the physical concepts underlying the operation of semiconductor devices.
		CO2	Infer and evaluate transient response, steady state response, network functions, and analyze the series resonant and parallel resonant circuits
		CO3	Analyze and interpret energy band diagrams
		CO4	Analyze carrier flow and associated fields due to drift, diffusion, generation, and recombination.
		CO5	Obtain the maximum power transfer to the load.

M.Sc.II SEM III Physics

Course Code	Name of the Course	COs	After completing this course students must able to
M.Sc. SEM III Physics		CO1	Explain the dynamics of charged particles and the radiation produced by time-varying localized electromagnetic sources.
Electrodynamics–II& Plasma		CO2	Possess a rudimentary understanding of the concepts of confinement and waveguide.
		CO3	Understand the principles of plasma physics.
		CO4	Solve electrodynamics problems using simple equations and somewhat sophisticated mathematics.
Statistical Mechanics		CO1	Comprehend the idea of microscopic and macroscopic states and the connection between thermodynamics and statistics.
		CO2	Familiarize oneself with classical (Maxwell-Boltzmann) and quantum (Bose and Fermi Dirac) statistics and their applicability to various particle systems.
		CO3	Acquire knowledge of the concepts of phase transitions and super fluidity; comprehend one-equilibrium processes.

Atomic &Molecular Physics	**CO1**	Comprehend the vector atom model and apply its ideas to the study of atoms and their behavior
	CO2	Comprehend the quantum behavior of atoms in external electric and magnetic fields also comprehend the spectroscopy of hydrogen and alkali atoms.
	CO3	Combining ESR and NMR resonance spectroscopy.
	CO4	Discusses the hyperfine splitting of spectral lines and the spectroscopy of many electron atomic systems.
Condensed Matter Physics-I	**CO1**	Grasp the scope of condensed matter physics; distinguish between various lattice types.
	CO2	Explain the ideas of reciprocal lattice and crystal diffraction; forecast the thermal and electrical properties of solids.
	CO3	Explain how they came to be; clarify the idea of energy bands and how it affects electrical properties.
	CO4	Characterize the dielectric properties of insulators.

M.Sc.II SEM IV Physics

Course Code / Name of the Course	COs	After completing this course students must able to
M.Sc. SEM IV Physics	**CO1**	Comprehend the structure of atomic nuclei comprehend the mechanism of decay of alpha and gamma particles.
Nuclear &Particle physics	**CO2**	Comprehend the fundamental characteristics of a nucleus, such as the binding of energy and nuclear forces.
	CO3	Be familiar with the concept of particle detectors and accelerators.
	CO4	Gain knowledge of nuclear models; be able to classify elementary particles.
Condensed Matter Physics-II	**CO1**	Learn about the various kinds of crystal defects and the effects .
	CO2	comprehend the physics underlying the structural characteristics of solids;
	CO3	Modify solid properties with the right knowledge.
	CO4	undertake research in the fields of material science and nanotechnology
Op-Amp theory &Its Application	**CO1**	Possess knowledge of differential amplifiers, their configurations, and DC/AC analysis.
	CO2	Comprehend the fundamentals of integrated circuit design and packaging
	CO3	Design signal generators and low- and high-order filters; and be proficient in the understanding and design of multi-vibrators, ADC, and PLL circuits.
Nano sciences & Nano technology	**CO1**	Comprehend 1D, 2D, and 3D nano material concepts and quantum confinement and its implications.
	CO2	Gain knowledge of preparation and characterization techniques.
	CO3	Learn about various types of nanomaterials.
	CO4	Utilize the knowledge to prepare & characterize novel nano-materials.
	CO5	Comprehend useful applications of nanomaterials to design and fabricate nanodevices.

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Phulsing Naik Mahavidyalaya
Pusad

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Offg.Principal
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Pusad

COURSE OUTCOMES M.Sc. (Chemistry)

M.Sc.I Sem I (Chemistry)

Course Code	Name of the Course	COs	After completing this course students must able to
M.Sc. SEM I CHEMISTRY		CO1	In order to comprehend metal-bonding, students must grasp the CFT's capture.
CORDINATION CHEMISTRY		CO2	Study about the topology, structure, bonding, nomenclature, and categorization of boranes.
		CO3	Study about the development of macro cyclic complexes and metal clusters.
		CO4	comprehended the idea of metal-ligand equilibrium in solution since the previous section.
		CO5	Learn about non-aqueous solvents and how to employ them in organic solvents using the notion of the solvent system.
ORGANIC CHEMISTRY		CO1	Study the nature of bonds, their delocalization, and conjugation in organic molecules. Additionally.
		CO2	Tolerate steric effects, about aromaticity in both benzenoid and non-benzenoid compounds, etc.
		CO3	Comprehend stereochemistry of molecules, interconversion of configuration, and handling reaction with respect to stereochemistry, handle the molecule in three dimensions.
		CO4	calculate the reaction mechanism, the thermodynamic and kinetic characteristics, and the many circumstances needed for the completion of the reaction and equations such the Taft and Hammet equations.
		CO5	Work with nucleophile, selectivity, aliphatic nucleophilic substitution, and the associated instances.
PHYSICAL CHEMISTRY		CO1	Recognize the Schrodinger equation in one- and three-dimensional boxes, rigid-rotor theory, and quantum chemistry applications.
		CO2	Discuss thermodynamics, including phenomenological equations, numerical based on this idea, and classical and non-classical thermodynamics.
		CO3	Consider the concepts of eigen concept, ordinary and generalized angular momentum, and how to solve numerical problems based on them.
		CO4	Recognize nuclear reactions and the various phenomena that are associated with them, such as fission, fusion, and the various particles that are produced or generated during the reaction. ideas about reactors and half-lives reactions, etc
		CO5	Learn about Chemical Dynamics, which includes the use of TST to analyze reactions between atoms and molecules, as well as collision and transition state theory.
ANALYTICAL CHEMISTRY		CO1	Learn the fundamental ideas of analytical chemistry. The function of analytical chemistry Qualitative and quantitative analytical techniques, the nature of analytical chemistry, its function.
		CO2	Terms defined as mean and median .Chemical analysis mistakes, error classification, error kind, and error origin.
		CO3	Understand ion exchange separation as well as how it's used in analytical chemistry.
		CO3	The theory and equipment of high performance liquid chromatography (HPLC), column performance optimisation, gradient entelution and related procedures, derivatization, mobile phase delivery system, sample injection, separation column, detectors, GC-MS and LC-MS interface, applications, and problems are all included in this field.

M.Sc.I Sem II (Chemistry)

Course Code	Name of the Course	COs	After completing this course students must able to
M.Sc. SEM II CHEMISTRY		CO1	Electronic spectra of transition metal complexes are introduced Examine Transition Metal Complexes I's Reaction Mechanism. Metal complex reactivity, ligand replacement reaction, mechanism categorization, and reaction energy profile.
CORDINATION CHEMISTRY		CO2	Derivation of term symbols for the excited and ground states of dn configurations, microstates, and L-S and j-j couplings Types of experimental spectra recording, selection criteria, and the idea of magneto chemistry are all clear.
		CO3	Grouping of Inorganic Reactions Transition state or activated complex, substrate, attacking reagents, electrophilic and nucleophilic, are all included in the energy profile diagram along with nomenclature.
		CO4	Transition Metal Complexes II: Reaction Mechanism The effects of substitution reaction in square planar complexes include the trans-directing series, the solvent effect, the leaving group effect, the charge effect, the nucleophile effect, and the temperature effect.
		CO5	The mechanism of substitution reactions in Pt(II) complexes, trans effect hypotheses, and applications of trans-effect. Reactions of electron transport.
ORGANIC CHEMISTRY		CO1	Adding to the numerous bonds C-X and C-C, Electrophiles, nucleophiles, free radicals, orientation, and stereochemistry are all involved in the mechanistic and stereochemical aspects of addition reactions.
		CO2	Recognise novel forms of pericyclic reactions, the symmetry of molecular orbitals, and the frontier orbitals of Both radical cations and anions,free radical substitution mechanism at an aliphatic or aromatic substrate, types of free radical reactions, and reactivity at a bridgehead location.
		CO3	Support from neighbouring groups, reactivity for aliphatic and aromatic substrates, the impact of solvent on reactivity at the allylic carbon, and hydroxylation at the anaromatic carbon using Ferron's reagent
		CO4	Categorization and overall mechanistic analysis of molecules rearrangements caused by electrophilic, nucleophilic, and free radical reactions
		CO5	From Photochemistry: Radiation interaction with matter, excitation types, quenching, quantum yield, quantum efficiency, energy transfer during excitation, actinometry, FRET, singlet and triplet states, photochemistry of carbonyl compounds by experimentation, photoinduced energy transfer, and transition, Type I and type II Norrish reactions Photoreduction, Paterno-Buchi reaction, Enones' photochemistry is easily studyable.
PHYSICAL CHEMISTRY		CO1	Understood Kinetics of complex processes: Homogeneous catalysis (acid-base and enzymes), oscillation reactions, chain reactions (H2+Br, ®2HBrthermal and photochemical reaction).
		CO2	Explain Chemical reactions: Overarching characteristics of chemical reactions, halted flow technique, relaxation technique, nuclear magnetic resonance technique, flash photolysis,
		CO3	Recognize how the orbitals are constructed for the H2+ ion, how to calculate energy levels from wave functions, and the physical representation of bonding and anti-bonding wave functions.
		CO4	Describe macromolecules, polymer kinds, random coils, macromolecule configuration and conformation, electrically conducting molecular wires, fire resistance, liquid crystal polymers, polymerization kinetics, and polymerization mechanism.
		CO5	Calculate the coefficient of A.O. employed in hybrid orbital's; Huckel theory of conjugated systems; bond order & charge density computations; hybrid orbitals sp, sp2, sp3.

ANALYTICAL CHEMISTRY	**CO1**	Recognize optical methods, such as spectrophotometry and collometry, and apply them to issues involving both quantitative and qualitative analysis.
	CO2	Define Fluorimetry, Nephelometry, Turbidimetry, Polarimetry, and Refractometry: theory, apparatus, and applications.
	CO3	Compute soil chemistry and soil irrigation using effluents. The role of micronutrients in soil, trace element analysis in soil, pesticides, and agricultural pollution.
	CO4	Find more about the classification of air pollutants, their sources and sinks, and how they affect both living and non-living objects
	CO5	Examine air pollution, acid rain, greenhouse effect, ozone depletion, and their effects on the environment. Consequences of air pollution, photochemical smog, and air pollution monitoring.

M.Sc.II Sem III (Chemistry)

Course Code	Name of the Course	COs	After completing this course students must able to
M.Sc. SEM II Chemistry		**CO1**	Apply spectroscopic techniques such as Microwave spectroscopy, Raman, UV, IR and other spectroscopic methods for structure determination.
Spectroscopy-I (DSC IX)		**CO2**	Compute approximate wavelength regions for different types of transitions involved in UV spectroscopy.
		CO3	Deduce structures and reactivity patterns of organic, organometallic, and inorganic materials using spectroscopic data.
		CO4	utilizes zero-field spectra in Mössbauer spectroscopy to determine oxidation state, spin state, and coordination geometry;
		CO5	Elucidate the structure of organic and inorganic compounds using spectroscopic methods.
Selected topics in Chemistry-I (DSC X		**CO1**	Implement laboratory safety protocols, including safe working procedures, protective apparel, emergency procedures, and first aid.
		CO2	Explain the principles of electron diffraction, including scattering intensity and the Wierl equation, and utilize them to elucidate the structure of simple gas-phase molecules and surfaces.
		CO3	Explain the principles of ion-selective electrodes, including the glass electrode and solid-state electrodes, and utilize them for selective ion measurements.
		CO4	Demonstrate knowledge of coulometry, including coulometry at constant current and constant potential, and perform coulometric titrations for analysis.
		CO5	Apply the principles of diffraction techniques, including X-ray diffraction, electron diffraction, and neutron diffraction, and their applications in structural analysis.
Organic Chemistry special paper-I (Organic Synthesis-I) (DSE-I)		**CO1**	Develop a comprehensive understanding in research and advancements in the field of organic chemistry.
		CO2	Devise problem-solving skills and critical thinking ability through the analysis of complex reaction mechanisms.
		CO3	Modify the method to solve complex synthetic problems
		CO4	Appraise various synthesis and transformation processes
		CO5	Develop understanding to write the product with proper stereochemistry.
Organic Chemistry special paper-II (Drugs Chemistry) (DSE-II)		**CO1**	Demonstrate knowledge of the molecular targets for drug action, such as enzymes, receptors, and nucleic acids, and their role in disease processes.
		CO2	Explain the principles of structure-activity relationship (SAR) and the importance of molecular recognition and binding interactions in drug design

	CO3	Analyze the principles and techniques of computational drug design, including molecular modeling, virtual screening, and quantitative structure-activity relationship (QSAR) studies
	CO3	Describe the methods used for target identification, validation, and selection in the drug discovery process.
	CO4	Apply knowledge of drug metabolism and pharmacokinetics to optimize drug candidates for improved bioavailability, efficacy, and safety
	CO5	Apply the principles of drug design to propose rational strategies and approaches for the development of novel therapeutic agents for specific diseases or targets.
	CO6	Analyze the role of medicinal chemistry in drug design, including the design and synthesis of small molecules as drug candidates.

M.Sc.II Sem IV (Chemistry)

Course Code	Name of the Course	COs	After completing this course students must able to
M.Sc. SEM IV Chemistry		**CO1**	Apply major spectroscopic techniques such as mass spectrometry, NMR spectroscopy, 2D- NMR, C-13 NMR and Mossbauer Spectroscopy for structure determination.
Spectroscopy -II (DSC XI)		**CO2**	Interpret spectra to identify functional groups, chemical shifts, coupling patterns, and fragmentation patterns.
		CO3	Deduce structures from the fragmentation pattern. 4. understand the principles and applications of multidimensional NMR and dynamic processes by NMR.
		CO4	Accomplish structure elucidation of organic and inorganic compounds using advance spectroscopic methods.
		CO5	correlate ESR spectroscopic data with molecular structure
Selected topics in Chemistry-II (DSC XII)		**CO1**	Explain the principles, instrumentation, and applications of Auger electron microscopy and compare it with ESCA (electron spectroscopy for chemical analysis) techniques.
		CO2	Demonstrate knowledge of different electron microscopy techniques (e.g., TEM, SEM, STEM) and their applications in surface characterization.
		CO3	Apply analytical methods to determine the approximate composition of food, including moisture, fat, protein, fiber, and carbohydrate
		CO4	Evaluate the composition of cosmetics, including creams, lotions, and face powder, by determining water content, non-volatile matter, ash content, and specific chemical components.
		CO5	Classify different types of poisons, understand their mode of action, and estimate poisonous materials (e.g., lead, mercury, arsenic) in biological samples.
		CO6	Apply chemical sensors in various fields such as the food industry, agriculture, and biotechnology.
Organic Chemistry special Paper III (Organic Synthesis -II)		**CO1**	Devise and prioritize organic reactions and reagents for different types of organic transformation
		CO2	Design and execute own synthetic route for the organic synthesis.
		CO3	Analyze and develop reaction mechanisms for reactions.
		CO4	Correlate the stereochemistry of reactant and product for better understanding of organic transformations.
		CO5	Criticize and modify the role of organ metallic reagents. in organic synthesis.
Organic Chemistry Special Paper-IV (Natural Products)		**CO1**	Gain a comprehensive understanding of the structures, properties, and functions of steroids, hormones, alkaloids, and terpenoids.
		CO2	Learn about the diversity and biological significance natural products in different organisms. 3. Explore the biosynthesis of natural products.

	CO3	Study the enzymatic reactions, intermediates, and regulation involved in the biosynthetic pathways of compounds.
	CO3	Develop an understanding of the chemical and enzymatic mechanisms underlying the biosynthesis of natural products
	CO4	Investigate the relationship between the chemical structures of steroids, hormones, alkaloids, and terpenoids and their biological activities.
	CO5	Explore the pharmacological, ecological, and industrial applications of steroids, hormones, alkaloids, and terpenoids.
	CO6	Understand the importance of natural compounds in areas such as medicine, agriculture, and natural product-based industries.

IQAC Co-ordinator
Phulsing Naik Mahavidyalaya
Pusad

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Offg.Principal
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COURSE OUTCOMES M.Sc. (MATHEMATICS)

M.Sc.I Sem I (Mathematics)

Course Code / Name of the Course	COs	After completing this course students must able to
M.Sc. SEM I MATHEMATICS	**CO1**	Apply the Taylors, Inverse function and Implicit function theorems to solve the problems.
PAPER-I Real Analysis	**CO2**	Apply the differentiation to find out the maximum and minimum value of functions.
	CO3	Acquire the knowledge of sequence, series and uniformly convergence of series by different Test.
	CO4	To understand the statement and prove of important theorems.
	CO5	Define Riemann Stieltjes integral and illustrate the properties of integration and differentiation.
PAPER-II Advanced Abstract Algebra	**CO1**	To simplify algebraic expression, using the commutative , associative and distributive properties.
	CO2	Apply the concept and properties of group, rings to module.
	CO3	Apply the sylows first, second and third theorems.
	CO4	Gain knowledge of normal subgroups, permutation group, normal series, solvable group and nilpotent group
PAPER-III Complex Analysis	**CO1**	Checking differentiability and Analyticity of functions. Evaluate Complex integrals and applying Cauchy integral.
	CO2	To understand certain theorems like Casorti- wierstrass theorems, Hadamards three circle theorem, Hurwitz theorem.
	CO3	Evaluating limits and checking the continuity of complex function.
	CO4	Understand how complex numbers provide a satisfying extension of the real numbers
	CO5	Becoming familiar with the concepts Complex numbers and their properties and operations with Complex number.
PAPER -IV Topology-I	**CO1**	Define and illustrate the concept of the count ability axioms. And explain the types of different topological spaces and the related theorems.
	CO2	Define and illustrate the concept of topological spaces and continuous functions.
	CO3	Define and illustrate the concept of the separation axioms.
	CO4	Define connectedness and compactness, and prove related theorems.
PAPER-V Differential Geometry		Define, use, and articulate the differences between normal curvature, geodesic Curvature, Gaussian curvature, and mean curvature. To understand surfaces of revolution with constant negative and positive Gaussian curvature.
	CO1	Use geometric quantities such as length, curvature, and torsion associated to planar and spatial curves
	CO2	Prove the isoperimetric inequality and the "Four vertex theorem" for convex curves.
	CO3	State, apply, and prove parts of the Gauss-Bonnet theorem.
	CO4	Discuss Gauss Bonnet theorem and its implication for a geodesic triangle
	CO5	Introduced to Christoffel symbols and their expression in terms of metric coefficients and their derivatives.

M.Sc.I Sem II (Mathematics)

Course Code	Name of the Course	COs	After completing this course students must able to
M.Sc. SEM II MATHEMATICS		**CO1**	Understand the LP uniqueness of extension and derived proof of some theorems
PAPER V	**Measure and Integration Theory**	**CO2**	It includes Transferable skills such as ability to use abstract methods to solve problems and ability to use a wide range of references and critical thinking.
		CO3	Reflection of understanding of the theory on the basis of examples of application.
		CO4	Explain measure and outer measure, extension of measure.
		CO5	Acquire the knowledge and understanding of basic concepts of measure and integration theory.
PAPER-VI	**Advanced Linear Algebra and Field Theory**	**CO1**	Analyze mathematical statements and expressions (for example, to assess whether a particular statement is accurate, or to describe solutions of systems in terms of existence and uniqueness).
		CO2	Evaluate mathematical expressions to compute quantities that deal with linear systems and eigenvalue problems.
		CO3	Explain the fundamental concepts of field extensions and Galois theory and their role in modern mathematics and applied context
		CO4	Solve linear systems represented as linear transform
		CO5	Construct, or give examples of, mathematical expressions that involve vectors, matrices and linear systems of linear equations.
		CO6	Demonstrate accurate and efficient use of field extensions and Galois Theory
		CO7	Demonstrate capacity for mathematical reasoning through analyzing, proving an explaining concepts from field extensions and Galois theory.
Paper- VIII:	**Integral Equation**	**CO1**	Application of integral equation and greens function to solve ordinary differential equation.
		CO2	Formulate and solve initial and boundary value problems for the heat and wave equations in spherical and cylindrical coordinates.
		CO3	Understand the relationship between integral and differential equations and transform one type into another.
		CO4	Find out the iterate kernel and Resolvent kernel of Volterra, Fredholm integral equation
		CO5	Solve linear Volterra and Fredholm integral equations using appropriate methods.
Paper- IX	**Topology-II**	**CO1**	Understand theorems like the Urysohn's Lemma , Urysohn's Metrization Theorems.
		CO2	Define and illustrate the concept of product topology and quotient topology.
		CO3	Define complete metric space, product space and prove the related theorems
		CO4	Demonstrate knowledge and understanding of concepts such as point wise convergence and uniform convergence of Topology.
Paper- X	**Riemannian Geometry**	**CO1**	Reproduce the key results on Riemannian geometry, their curvature and their geodesics and give rigorous and detailed proofs of them.
		CO2	Derived and apply the equation of geodesic curve.
		CO3	Understand the types of Christoffel's symbol and calculate the Christoffel's symbol of different line element.
		CO4	Define and illustrate the Riemannian Curvature.
		CO5	Compute the Einstein's tensor for static and non-static spherically symmetric RW-space time, Bianchi identity.

M.Sc.II Sem III (MATHEMATICS)

Course Code	Name of the Course	COs	After completing this course students must able to
M.Sc. SEM III MATHEMATICS		CO1	Understand the fundamentals of spectral theory, and appreciate some of its power.
Paper-XI Functional Analysis-I		CO2	Understand and apply ideas from the theory of Hilbert spaces to other areas.
		CO3	Understand and apply fundamental theorems from the theory of normed and Banach spaces, including the Hahn-Banach theorem, the open mapping theorem and the closed graph theorem.
		CO4	Appreciate the role of Inner product space.
		CO5	Appreciate how functional analysis uses and unifies ideas from vector spaces, the theory of metrics, and complex analysis.
Paper- XII Advanced Mechanics		CO1	CO2: Understand the concept of Legendre's transformation and apply to derived the Hamilton's Equation.
		CO2	Demonstrate knowledge and understanding of Perturbation Theory.
		CO3	Derived the Lagrange's equation and Hamilton principle.
		CO4	Understand the concept of canonical transformation and apply to derived Poisson's Identity.
Paper- XIII Operations Research		CO1	Explain the graphical solution of linear programming problem by different method.
		CO2	Acquire the knowledge and understanding of Queuing system.
		CO3	Define and illustrate Game and strategies
		CO4	Solve many financial decision making problems by using linear programming technique
		CO5	Develop all skill and technique of problem solving.
PAPER-XIV General Relativity (Optional)		CO1	Give a mathematical description of gravitational waves in context of Einstein's relativity.
		CO2	Understand the concept of constant relative motion of different bodies in different frames of reference
		CO3	Familiar with the fundamental principles of the general theory of relativity. They shall know the meaning of basic concepts like the equivalence principles, inertial frames and time dilation
		CO4	Solve Einstein's field equations for static spherically symmetric problems and for isotropic and homogeneous cosmological models.
		CO5	Find out the Schwarzschild Exterior and Schwarzschild Interior solutions.
PAPER-XV Difference Equation-I (Optional)		CO1	Understand the key aspect in the inversion of the z-transform as well as demonstrating the use of partial fractions
		CO2	Solve constant coefficient linear difference equations using z-transforms
		CO4	Invert z-transforms using partial fractions or residues where appropriate
		CO3	Find out the solution of first order difference equation by successive calculation.
		CO4	Understand the concept of Asymptotic methods, apply into linear and nonlinear equation.

M.Sc.II Sem IV (MATHEMATICS)

Course Code	Name of the Course	COs	After completing this course students must able to
M.Sc. SEM IV MATHEMATICS		CO1	Understand the statement and proofs of important theorems and be able to explain the key steps in proofs, sometimes with variation.
PAPER-XVI Functional Analysis-II		CO2	Understand the fundamentals of spectral theory, and appreciate some of its theorems..
		CO3	Define and illustrate the projection operators.
		CO4	Define and illustrate the concept of reflexivity of Hilbert space
Paper- XVII Partial Differential Equation		CO1	Derived the Heat conduction problem and prove Kelvin's inversion theorem.
		CO2	Find solutions of partial differential equations and determine the existence, uniqueness of solution of partial differential equation.
		CO3	Find out the complete integral by Charpits method and also find the particular integral, singular integral
		CO4	Solve simple eigenvalue problems of Sturm-Liouville type. CO4: Classify partial differential equations into Linear equation, Semi linear, Quasi-linear and nonlinear equations..
		CO5	Understand the Dirichlet problem, Neumann problem and apply to solve problem for half plane.
PAPER- XVIII Numerical Analysis		CO1	Analyze and solve several errors and approximation in numerical methods.
		CO2	Demonstrate understanding of common numerical methods and how they are used to obtain approximate solutions to otherwise intractable mathematical problems.
		CO3	Apply numerical methods to obtain approximate solutions to mathematical problems.
		CO4	Derive numerical methods for various mathematical operations and tasks, such as interpolation, differentiation, integration, the solution of linear and nonlinear equations, and the solution of differential equations.
		CO5	Apply several methods to solve Curve Fitting and Interpolation questions and its related techniques
PAPER-XIX Relativistic Cosmology		CO1	Show how the Friedman-Robertson-Walker metric is an exact solution to the Einstein equations.
		CO2	Derived De-sitter model and Explain Einstein Field equation with cosmological term.
		CO3	Understand De-sitter model, there derivatives, properties and comparison with the actual universe.
		CO3	Study the motion of particle and light rays in R-W model.
		CO4	Explains the cosmological principle, Hubble's law, Weyls Postulate and Steady State Cosmological Models.
		CO5	Understand and apply the knowledge of gravitational waves in curved space time.
		CO6	Describe the key ideas behind cosmology and the expanding universe

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