

# MAA BHARTI PG COLLEGE, KOTA



2023-24

## Self-Study Report

### 2.6 Student Performance and Learning Outcome

#### 2.6.1 Programme Outcomes and Course Outcomes for all Programmes offered by the institution

S.NO	PROGRAMME
1.	B.Sc. B.Ed. / B.A. B.Ed.
<b>B.Sc.</b>	
2.	<u>Botany</u>
3.	<u>Chemistry</u>
4.	<u>Maths</u>
5.	<u>Physics</u>
6.	<u>Zoology</u>
<b>B.A.</b>	
7.	<u>English Literature</u>
8.	<u>Sociology</u>
9.	<u>Hindi Literature</u>
10.	<u>Geography</u>
11.	<u>History</u>
12.	<u>Drawing &amp; Painting</u>
13.	<u>Political Science</u>
<b>Computer science</b>	
14.	<u>BCA</u>
<b>M.Sc.</b>	
15.	<u>Botany</u>
16.	<u>Chemistry</u>
17.	<u>Physics</u>
18.	<u>Zoology</u>

**Department: Education**  
**B.Sc. B.Ed. / B.A. B.Ed.**  
**(Four Year Integrated Course)**

**Course Outcomes, Program Outcomes and Program Specific Outcomes**  
**2023-24**

**Program Outcomes**

1. **Subject Knowledge and Competence:** Graduates will demonstrate a deep understanding of the subjects they are qualified to teach, including a strong grasp of foundational concepts, theories, and methodologies.
2. **Pedagogical Skills:** Graduates will be proficient in various teaching methodologies, strategies, and techniques, allowing them to effectively convey complex subject matter to diverse groups of students.
3. **Curriculum Development:** Graduates will have the ability to design and adapt curricula to meet the needs of different learners, including the incorporation of technology and innovative teaching methods.
4. **Assessment and Evaluation:** Graduates will be skilled in assessing student learning outcomes, utilizing both formative and summative assessment methods, and providing constructive feedback to enhance student performance.
5. **Classroom Management:** Graduates will exhibit effective classroom management techniques, fostering a positive and inclusive learning environment that promotes student engagement and success.
6. **Diversity and Inclusion:** Graduates will demonstrate an understanding of diverse student populations, including those with special needs, and will be able to differentiate instruction to meet the needs of all students.
7. **Research and Inquiry Skills:** Graduates will possess the ability to engage in educational research, critically evaluate educational practices, and contribute to the improvement of teaching and learning.
8. **Professionalism:** Graduates will adhere to ethical standards in education, demonstrate effective communication with students, colleagues, and parents, and continue their professional development throughout their careers.
9. **Community Engagement:** Graduates will actively participate in school and community activities, fostering partnerships that benefit both the school and its surrounding community.
10. **Life-long Learning:** Graduates will have a commitment to ongoing professional development, staying current with educational trends and continuously improving their teaching practices.

## **Program Specific Outcome**

1. **Content Mastery:** Students will demonstrate in-depth knowledge and expertise in their chosen subject areas, enabling them to teach these subjects effectively.
2. **Teaching Strategies:** Graduates will be proficient in employing a range of teaching strategies, including lectures, group activities, and technology-based instruction, to cater to diverse learning styles.
3. **Lesson Planning:** Students will be able to design comprehensive lesson plans that align with curriculum standards and learning objectives.
4. **Assessment Expertise:** Graduates will excel in creating fair and valid assessments, including quizzes, exams, and performance assessments, to gauge student understanding.
5. **Inclusive Education:** Graduates will be equipped to adapt teaching methods to accommodate students with varying abilities and diverse backgrounds.
6. **Classroom Management:** Students will develop strategies for maintaining a positive classroom environment conducive to learning.
7. **Educational Technology:** Graduates will integrate technology effectively into their teaching, enhancing engagement and learning outcomes.
8. **Research in Education:** Students will engage in educational research projects, contributing to the improvement of teaching and learning practices.
9. **Professional Ethics:** Graduates will adhere to ethical standards in education, demonstrating integrity, confidentiality, and respect for students and colleagues.
10. **Community Engagement:** Students will actively participate in community outreach and extracurricular activities that benefit the school and local community.
11. **Reflective Practice:** Graduates will engage in ongoing self-assessment and reflection on their teaching practices to continuously improve their effectiveness.
12. **Parent and Stakeholder Communication:** Graduates will effectively communicate with parents, guardians, and other stakeholders to foster a supportive educational environment.
13. **Professional Development:** Students will commit to lifelong learning and professional development, staying updated with the latest educational research and pedagogical advancements.
14. **Cultural Competency:** Graduates will show cultural sensitivity and competence, recognizing and valuing the diversity of their students and communities.
15. **Leadership Skills:** Students will develop leadership skills that enable them to take on roles such as department heads or curriculum coordinators.

## **B.Sc. B.Ed. / B.A. B.Ed. Course Outcome**

### **First Year**

#### **Childhood and Growing Up**

1. Foundational Understanding of Psychology: Students will demonstrate a solid understanding of basic concepts, methods, and principles of psychology and their application in educational contexts.
2. Comprehensive Knowledge of Development: Students will acquire a comprehensive understanding of the nature, stages, principles, and various factors influencing human development across the lifespan.
3. Psycho-Social Perspective on Life Stages: Students will analyze different periods of life (childhood, adolescence) with a psycho-social perspective, considering the impact of family, school, peer groups, social climate, and media.
4. In-depth Understanding of Learning Theories: Students will demonstrate a profound understanding of various learning theories (Behavioristic, Gestalt, Cognitive, Social Constructive, etc.) and their application in educational settings.
5. Recognition of Learning Environment Importance: Students will understand the critical role of the learning environment in facilitating effective learning and its influence on cognitive processes.
6. Familiarity with Psychological Attributes: Students will become acquainted with various psychological attributes of an individual, including intelligence, creativity, higher-level thinking skills, socialization, and mental health.
7. Awareness of Developmental Theories: Students will analyze and understand influential developmental theories, including Piaget's cognitive development, Freud's psycho-sexual development, and Erikson's psycho-social development.
8. Insight into Childhood and Adolescence: Students will gain insights into the meaning, characteristics, and developmental influences of childhood and adolescence, including the effects of family, school, peers, and social media.
9. Understanding of Personality and Individual Differences: Students will comprehend the concept and nature of personality, various personality theories, and the assessment of personality. They will also appreciate individual differences, including those with special educational needs.
10. Application of Motivation and Classroom Management: Students will apply motivational concepts and theories (such as Maslow's Hierarchy of Needs) to create and maintain a productive classroom environment, effectively dealing with misbehavior.
11. Competency in Assessing Intelligence, Creativity, and Higher-Level Thinking: Students will demonstrate proficiency in assessing intelligence, creativity, and higher-level thinking skills, including the ability to apply different measurement techniques.
12. Understanding Socialization and Mental Health: Students will grasp the process of socialization, theories related to group dynamics, and concepts of mental health. They will also gain insight into common problems related to children's mental health and strategies for addressing them.

#### **Contemporary India and Education**

1. Developed Reflective Thinking: Students will demonstrate the ability to critically analyze and reflect upon educational issues in contemporary India, providing informed perspectives.

2. **Comprehensive Understanding of Education Trends:** Students will exhibit a deep understanding of the evolving trends, challenges, and issues facing the education system in contemporary India.
3. **Appreciation of Post-Independence Educational Developments:** Students will appreciate the significant developments in Indian education since gaining independence.
4. **Knowledge of Education Commissions and Committees:** Students will be familiar with the various commissions and committees on education established over time, understanding their roles and recommendations.
5. **Awareness of Societal Concerns in Education:** Students will demonstrate an understanding of the challenges and concerns related to education, especially in regards to marginalized sections of society.
6. **Familiarity with Innovative Educational Practices:** Students will be aware of and able to evaluate various innovative practices in education, including technological advancements and alternative teaching methods.
7. **Proficiency in Self-Teaching Technical Devices:** Students will acquire the skills necessary for independent learning through technical devices, empowering them to continue their educational journey beyond the classroom.
8. **Understanding of Constitutional Values and Provisions:** Students will grasp the constitutional values and provisions related to education in India, recognizing the significance of education in upholding democratic principles.

### **Instructional System and Educational Evaluation**

1. **Clear Understanding of Educational Evaluation:** Students will be able to articulate the need, importance, and distinctive characteristics of educational evaluation.
2. **Knowledge of Evaluation Approaches:** Students will demonstrate proficiency in describing and distinguishing between formative and summative evaluation, as well as understanding the advantages and disadvantages of external and internal evaluation.
3. **Integration of Evaluation in Teaching-Learning Process:** Students will comprehend the pivotal role of educational evaluation within the teaching-learning process, including its relationship with instructional objectives and performance assessment.
4. **Competency in Using Evaluation Tools and Techniques:** Students will be capable of explaining the nature of evaluation tools, including tests, and interpreting their results for various purposes such as instruction, guidance, and administration.
5. **Appreciation of Psychological Testing:** Students will recognize the significance and relevance of psychological testing in the context of educational evaluation.

6. Emphasis on Continuous Comprehensive Evaluation: Students will appreciate the necessity for continuous comprehensive evaluation in schools and understand its benefits for assessing the holistic development of learners.

7. Proficiency in Classification of Educational Objectives: Students will be adept at classifying educational objectives into cognitive, affective, and psycho-motor domains, and understanding their functional significance.

8. Ability to Create Evaluation Tools: Students will have the capability to develop a variety of evaluation tools, such as portfolios for student assessment, advanced evaluation instruments, self-assessment tools, and achievement tests along with their blueprints.

## **B.Sc. B.Ed. / B.A. B.Ed. Course Outcomes**

### **Second Year**

#### **Knowledge and Curriculum**

1. Develop a comprehensive understanding of the nature and sources of knowledge, with a specific emphasis on its relationship with society, culture, and modernity.

2. Recognize and differentiate between various forms of knowledge, including empirical, revealed, disciplinary, and course content knowledge, while understanding the distinctions between belief, information, knowledge, and understanding.

3. Analyze the diverse facets of knowledge, including its localization, universality, concreteness, abstractness, theoretical nature, and practical application, especially in the context of school-based knowledge.

4. Comprehend the concept of curriculum, including its meaning, objectives, and its pivotal role in educational institutions. Distinguish between curriculum and syllabus and recognize the factors influencing curriculum development.

5. Evaluate various types of curriculum models, including subject-centered, experience-centered, activity-centered, child-centered, and craft-centered approaches, with reference to prominent educational thinkers such as Franklin Bobbitt, Ralph Tyler, Hilda Taba, and Philip Jackson.

6. Understand the process of curriculum planning and development, including the construction of curriculum and the application of different curriculum development models.

7. Appreciate the significance of the school environment as the primary site for curriculum engagement. Recognize the role of school philosophy, administration, infrastructure, and organizational culture in facilitating effective curriculum implementation.

8. Identify and articulate the teacher's pivotal role in knowledge construction through dialogues, challenges, and feedback, functioning as a critical pedagogue in the curriculum transaction process.

9. Demonstrate the ability to conduct seminars, discussions, movie appraisals, group work, fieldwork, and projects. Engage in the close reading and analysis of articles, policies, and documents relevant to Curriculum Studies in Education.

## **Learning And Teaching**

1. **Conceptual Mastery of Teaching and Learning:** Students will acquire a comprehensive understanding of the concept, principles, and nature of teaching and learning processes.
2. **Recognition of Diverse Learning Styles:** Students will be able to identify and differentiate various learning styles based on individual learner differences.
3. **Understanding the Teaching-Learning Relationship:** Students will analyze the intricate relationship between teaching and learning, including the factors that influence effective learning.
4. **Proficiency in Educational Technology Integration:** Students will demonstrate the ability to utilize modern information and communication technology to enhance the teaching-learning process.
5. **Appreciation of Learning as Communication:** Students will recognize learning as a communicative process and be knowledgeable about the various resources available to optimize this process.
6. **Analysis of Socio-Cultural Factors in Cognition:** Students will critically analyze how socio-cultural factors impact cognition and learning.
7. **Comprehension of Learning in Constructivist Perspective:** Students will study and understand learning through a constructivist lens, recognizing the importance of active engagement in the learning process.
8. **Familiarity with Professional Ethics in Teaching:** Students will become acquainted with the ethical standards and responsibilities associated with the teaching profession.
9. **Awareness of Innovative Teaching Trends:** Students will be knowledgeable about emerging trends and innovations in the teaching-learning process while upholding professional ethics.

## **Peace Education**

1. **Comprehensive Understanding of Peace Education:** Students will demonstrate a clear understanding of the concept, theory, and practice of peace education, including its philosophical underpinnings.
2. **Recognition of Peaceful Mindset's Impact:** Students will grasp the significance of a peaceful mindset in fostering a harmonious world.
3. **Application of Peace Education Principles:** Students will be able to apply the principles and theories of peace education to promote conflict resolution, nonviolence, and positive interpersonal relations.
4. **Philosophical Insights for Peace:** Students will gain an understanding of the philosophical perspectives that advocate for peace and nonviolence.

5. Awareness of Conflict Dynamics: Students will develop an awareness of conflicting relationships at various levels (individual, societal, international) and recognize the importance of addressing them for global harmony.
6. Framework for Peaceful Societies: Students will be capable of formulating frameworks and strategies for creating peaceful and nonviolent societies.
7. Integration of Peace Education in Curriculum: Students will learn to integrate peace education principles and practices into educational curricula and co-curricular activities.
8. Utilization of Teaching Strategies for Peace Education: Students will demonstrate proficiency in employing various teaching strategies (such as meditation, yoga, dramatization, debates, etc.) to effectively deliver peace education.
9. Promotion of Peaceful Values and Practices: Students will actively engage in promoting values and practices that contribute to peace, including conflict management and environmental conservation.
10. Engagement with Global Peace Initiatives: Students will participate in and contribute to global peace initiatives, and understand the role of international agencies, NGOs, and social institutions in peace education.

## **B.Sc. B.Ed. / B.A. B.Ed. Course Outcomes**

### **Third Year**

#### **Language Across The Curriculum**

1. Understanding of Children's Language Background: Students will be able to comprehend the linguistic backgrounds of children, which is essential for effective teaching and learning.
2. Sensitivity to Language Diversity: Students will develop a heightened sensitivity to the diversity of languages present in the classroom, facilitating inclusive and culturally aware teaching practices.
3. Competence in Analyzing School Practices: Students will gain proficiency in critically analyzing current school practices related to language education and be able to propose alternative approaches.
4. Theoretical Understanding of Multilingualism: Students will enhance their theoretical understanding of multilingualism in educational contexts.
5. Effective Use of Oral Language in the Classroom: Students will develop strategies for utilizing oral language in the classroom to enhance learning in specific subject areas.
6. Proficiency in Reading Comprehension and Writing Skills: Students will gain a deep understanding of reading comprehension in content areas and develop effective writing skills tailored to specific subjects.
7. Awareness of Language and Society Interplay: Students will comprehend the interplay between language and society, including issues of identification, power dynamics, and discrimination.



8. Utilization of Language as a Tool: Students will understand the functional aspect of language and learn how to wield it as a powerful educational tool.
9. Recognition and Remediation of Language and Speech Disorders: Students will be able to identify language and speech disorders and devise appropriate remedial measures.
10. Application of Theories of Language Development: Students will apply theories of language development to enhance their teaching practices and create supportive learning environments.
11. Integration of Home Language and School Language: Students will understand the dynamics of using both home languages and standardized school languages in teaching and learning processes.
12. Proficiency in Classroom Discourse Strategies: Students will develop effective strategies for utilizing language in the classroom to promote subject-specific learning.
13. Skills in Questioning Techniques: Students will gain proficiency in using various types of questions to facilitate learning in the classroom.
14. Development of Reading and Writing Strategies: Students will acquire strategies for effective reading comprehension, note-taking, summarizing, and writing in various content areas.
15. Analytical Skills for Textbook Content: Students will be able to analyze the content of textbooks and understand their structural and informational aspects.

### **Guidance And Counselling In Schooling**

1. Conceptual Clarity in Guidance and Counseling: Students will demonstrate a clear understanding of the concepts, meaning, and need for guidance and counseling in an educational context.
2. Principles and Procedures of Guidance: Students will be acquainted with the underlying principles and procedural steps involved in providing effective guidance to students.
3. Role of Schools in Guidance: Students will recognize and appreciate the pivotal role that schools play in offering guidance and support to students.
4. Competence in Areas, Tools, and Techniques: Students will develop proficiency in addressing personal, educational, and vocational aspects of guidance using tools such as records, rating scales, psychological tests, questionnaires, and inventories, along with techniques like observation, interviews, and stoichiometry.
5. Understanding of Counseling Principles and Process: Students will grasp the fundamental principles and stages involved in the counseling process, including the distinctions between directive, non-directive, and eclectic counseling approaches.
6. Qualities and Roles of a School Counselor: Students will gain insights into the essential qualities and roles that a school counselor should possess in order to be effective in their role.

7. Utilization of Tools and Techniques in Counseling: Students will acquire the skills to conduct both individual and group counseling sessions, using techniques such as lectures, discussions, and dramatics. They will also recognize the importance of follow-up in the counseling process.

8. Specialized Guidance and Counseling for Diverse Populations: Students will be able to identify and address the unique needs of special populations, including gifted and creative students, underachievers, slow learners, first-generation learners, individuals with learning disabilities, drug addicts, alcoholics, and children with special needs.

9. Awareness of Resource Centers and Evaluation in Counseling: Students will gain knowledge about the availability and utilization of resource centers such as de-addiction centers and career resource centers. They will also understand the importance of evaluation in the counseling process and recognize the need for research and reforms in guidance and counseling.

## **B.Sc. B.Ed. / B.A. B.Ed. Course Outcomes**

### **Fourth Year Course Outcome**

#### **Creating an Inclusive School**

1. Demonstrate Knowledge of Perspectives in Special Education: Students will acquire a comprehensive understanding of diverse perspectives within the field of education for children with disabilities.
2. Attitudinal Reformulation towards Special Needs Children: Develop a positive and inclusive attitude towards children with special needs, fostering an environment of acceptance and support.
3. Application of Effective Teaching Strategies: Equip student teachers with specific strategies and skills essential for teaching special needs children within inclusive classroom settings.
4. Adaptation of Learner-Friendly Evaluation Methods: Modify and implement assessment procedures that are conducive to the diverse learning needs of special education students.
5. Integration of Innovative Practices: Cultivate the ability to incorporate innovative teaching practices tailored to address the unique educational requirements of children with special needs.
6. Contribution to Policy Formulation: Empower students to actively participate in the formulation of policies related to the education of children with special needs.
7. Implementation of Pertinent Education Laws: Enable students to effectively apply and implement existing laws and regulations pertaining to the education of children with special needs.

#### **Course Units and Corresponding Outcomes**

**Unit I-Paradigms in Education of Children with Special Needs:** Gain a comprehensive understanding of historical perspectives, contemporary trends, and various models of viewing disabilities, along with a strong grasp of the philosophies behind special education, integrated education, and inclusive education.

**Unit II-Legal and Policy Perspectives:** Develop a profound knowledge of key legislations and policies governing the education of students with disabilities, including the Right to Education (RTE) Act, 2009, and pertinent national policies.

**Unit III-Scheme of Inclusive Education:** Acquire proficiency in the implementation of inclusive education schemes, with a focus on special focus groups under Sarva Shiksha Abhiyan (SSA), schemes from MHRD, IEDSS (2009), and community-based education.

**Unit IV-Classroom Management:** Master the art of effective classroom management, including readiness assessments for addressing learning difficulties, and the integration of technological advancements and assistive devices to accommodate different disabilities.

**Unit V-Inclusive Practices in Classrooms for All:** Develop pedagogical expertise in responding to individual student needs through strategies such as cooperative learning, peer tutoring, reflective teaching, and the utilization of multisensory teaching methods, along with proficiency in documentation and record-keeping.

### **Understanding Disciplines and Subjects**

1. **Developing Understanding of Disciplinary Knowledge:** Students will gain a deep comprehension of the nature and significance of disciplinary knowledge within the school curriculum.
2. **Conceptualizing the Impact of School Subjects on Disciplines:** Acquire a conceptual understanding of how school subjects influence and interact with different disciplines.
3. **Cultivating Interest, Attitudes, and Content Knowledge for Syllabus Design:** Develop a keen interest, positive attitudes, and comprehensive knowledge regarding content selection and syllabus framing.
4. **Building Professional, Disciplinary, and Curriculum Expertise:** Foster the capacity to construct and implement professional, disciplinary, and curriculum programs effectively.

### **Course Units and Corresponding Outcomes:**

**Unit I-Meaning and Concept of Disciplinary Knowledge:** Gain a deep insight into the nature and role of disciplinary knowledge in the school curriculum, and understand the distinction between disciplines and interdisciplinary subjects.

**Unit II-Impact of Social Science Subjects on Disciplines:** Analyze the methods and techniques applicable to teaching social sciences, encompassing lecture, project, storytelling, and experiential learning, and their influence on various disciplines.

**Unit III-Impact of Science and Math Subjects on Disciplines:** Comprehend the teaching methods and techniques for science and mathematics, including brain storming, laboratory work, constructive learning, and problem solving, and their impact on disciplinary knowledge.

**Unit IV-Impact of Language Subjects on Disciplines:** Explore various modes of teaching language, such as story, poetry, and personal essay, and understand the redefinition of language subjects in the context of social justice and cultural perspectives.

**Unit V-Process and Framing of Disciplines and Subjects:** Gain proficiency in formulating syllabi and content by understanding the underlying theories, principles, and processes, and learn to integrate practical knowledge, community engagement, and co-curricular activities in relation to disciplinary knowledge and its relevance to the school curriculum.

**Tasks and Assignments:** Develop practical skills through class tests and a variety of assignments, ranging from chart preparation to lab work, which reinforce the application of disciplinary knowledge in real-world scenarios.

## Physical Education and Yoga

1. Understanding the Significance of Physical Education: Students will gain an appreciation for the need and importance of physical education.
2. Exploring Allied Areas in Physical Education: Familiarize students with related fields and areas within the domain of physical education.
3. Promoting Awareness of Physical Fitness: Sensitize student teachers towards the concept of physical fitness and its significance.
4. Recognizing Benefits of Physical Fitness and Activities: Enable students to appreciate the advantages of engaging in physical fitness and related activities for personal development.
5. Acquiring Skills for Physical Fitness Assessment: Provide students with the necessary skills to assess and evaluate physical fitness levels.
6. Introducing Philosophical Foundations of Yoga: Introduce students to the philosophical underpinnings of yoga.
7. Familiarizing with Types and Importance of Yoga: Familiarize students with different types of yoga and emphasize their importance.
8. Motivating Engagement in Physical Activity for Fitness: Motivate students to actively participate in physical activities to promote fitness development.
9. Understanding Health-Related Fitness Evaluation Procedures: Equip students with the knowledge and procedures for health-related fitness assessments.

## Course Units and Corresponding Outcomes:

**Unit I-Physical Education:** Define and understand the meaning and scope of physical education, along with its objectives and related areas within the field.

**Unit II-Physical Education Methods:** Recognize the need and significance of physical education at different levels of schooling. Develop an understanding of various training methods to enhance components of physical and motor fitness.

**Unit III-Physical Fitness:** Comprehend the meaning, types, and factors influencing physical fitness. Recognize the benefits associated with maintaining physical fitness.

**Unit IV-Physical Fitness and Yoga Activities:** Emphasize the importance of physical activities at the school level. Introduce and understand various aspects of yoga, including Ashtang Yoga and different types. Highlight the significance of Yogasanas, Pranayama, Shudhikriya, and Meditation.

**Unit V-Human Abilities and Yoga in Indian Context:** Explore the relationship between education and yoga in enhancing intelligence, awareness, and creativity. Understand the impact of stress on individuals and apply yogic techniques for stress management.

**Tasks and Assignments:** Evaluate practical skills through class tests and assignments, focusing on the application of yogic activities, the interrelation of health and physical education with other subjects, and fundamental skills in games, sports, and yoga.

### **Gender, School, and Society**

1. Developing Understanding of Key Gender Concepts: Students will gain a basic understanding and familiarity with key concepts such as gender bias, gender stereotype, empowerment, gender parity, equity, equality, patriarchy, feminism, and transgender.
2. Exploring Landmarks in Women’s Education: Understand important historical and contemporary landmarks in the growth of women’s education.
3. Analyzing Gender Issues in Educational Settings: Examine gender-related issues within schools, including curriculum, textual materials, pedagogical processes, and their intersections with class, caste, religion, and region.
4. Addressing Gender-Based Violence: Recognize the need to address gender-based violence in various social spaces and develop strategies for intervention and prevention.

### **Course Units and Corresponding Outcomes:**

**Unit I-Gender Issues - Key Concepts:** Acquire a comprehensive understanding of fundamental gender-related concepts, including sexuality, patriarchy, masculinity, feminism, bias, stereotypes, and empowerment, equity, equality, and transgender issues.

**Unit II- Socialization Processes in India: Family, School, and Society:** Analyze gender identities and socialization practices within different types of families. Understand the intersection of gender with class, caste, religion, and region in the context of curriculum, hidden curriculum, and classroom processes. Recognize the importance of addressing sexual abuse in various social contexts.

**Unit III-Gender Issues in Curriculum:** Examine the construction of gender within curriculum frameworks, exploring the intersection of class, caste, religion, and region. Analyze how gender is represented in textual materials and classroom processes. Recognize the role of teachers as agents of change and explore life skills and sexuality education.

**Unit IV-Gender Studies-Historical Perspectives on Education:** Gain insight into historical landmarks in socio-economic and educational upliftment of girls and women, understanding the societal progress in this regard.

**Unit V-Constitutional Commitments:** Understand the reports, recommendations, policy initiatives, schemes, and programs aimed at promoting girls' education and overall development of women, and addressing gender discrimination in society.

**Tasks and Assignments:** Evaluate understanding and application through class tests and assignments, including projects related to key gender concepts, analysis of textual materials, debates on equity and equality, and projects focused on transgender issues and family dynamics.

### Assessment for Learning

1. Understanding the Evaluation Process: Students will gain a comprehensive understanding of the evaluation process, including assessment, measurement, testing, examination, formative and summative evaluation, as well as continuous and comprehensive assessment mandated under RTE.
2. Developing Skills in Test Preparation and Interpretation: Equip students with the skills necessary to prepare, administer, and interpret achievement tests effectively.
3. Utilizing Various Techniques and Tools for Evaluation: Enable students to comprehend and utilize a range of techniques and tools for evaluating learning.
4. Comprehending Assessment for Learning: Provide a deep understanding of the process of assessment for learning, distinguishing it from assessment of learning, and recognizing its significance in pedagogic decision-making.
5. Statistical Measures for Assessing Learning: Develop the skills required to compute basic statistical measures to assess learning outcomes.

### Course Units and Corresponding Outcomes

**Unit I:** Basic Concepts and Overview: Define and understand fundamental concepts related to assessment and evaluation, and recognize their purposes in different paradigms of learning. Differentiate between assessment for learning and assessment of learning, and explore self-assessment and peer assessment.

**Unit II:** Analysis of Existing Practices of Assessment: Analyze records and tools used in assessment, such as learner profiles, evaluation rubrics, and cumulative records. Understand the ethical principles of assessment and be familiar with examination reforms.

**Unit III:** Assessment in the Classroom and Record Keeping: Expand the notion of learning in a constructivist perspective. Develop indicators for assessment, formulate engaging tasks and questions, and explore the use of projects and assignments. Learn to observe learning processes and organize student portfolios with the development of appropriate rubrics.

**Unit IV:** Interpreting Test Scores: Learn how to present and organize assessment data, including frequency distribution and graphical representation. Understand measures of central tendency and variability, as well as percentile rank and correlation methods.

**Unit V:** Feedback: Comprehend the meaning and importance of feedback in assessment. Recognize the different types of teacher feedback and its significance for students and parents. Address challenges associated with assessments.

**Tasks and Assignments:** Evaluate practical skills through class tests and assignments, including the development of achievement tests, evaluation tools for formative assessment, and the interpretation of assessment data.

**B.Sc. B.Ed. / B.A. B.Ed. Course Outcomes**  
**Third Year/Fourth Year**  
**“Pedagogy of a School Subject” Course Outcome**

**Pedagogy of Mathematics**

1. Insight into the Meaning, Nature, and Objectives of Mathematics: Gain a deep understanding of the meaning, nature, scope, and objectives of mathematics as a discipline.
2. Appreciation of Mathematics as a Cognitive Tool: Appreciate mathematics not only as a subject of computational skills, but also as a discipline with a logical structure that engages the mind.
3. Development of Concepts in Mathematics: Understand the process of developing mathematical concepts, including estimation, approximation, pattern recognition, reasoning, and proof.
4. Recognition of Mathematics in Everyday Life: Appreciate the pervasive role of mathematics in day-to-day life, beyond formulas and mechanical procedures.
5. Problem Posing and Solving: Acquire the ability to pose and solve meaningful mathematical problems, promoting critical thinking and problem-solving skills.
6. Appropriate Assessment Tools for Mathematics Learning: Develop the skills to construct relevant assessment tools for evaluating learning in mathematics effectively.
7. Understanding and Applying ICT in Teaching Mathematics: Gain proficiency in utilizing Information and Communication Technology (ICT) as a tool in the teaching of mathematics.
8. Remedial Teaching in Mathematics: Comprehend the principles of diagnostic testing and remedial teaching in mathematics, addressing the needs of learners with varying abilities.
9. Analysis of Mathematical Concepts and Learning Engagement: Conduct pedagogical analysis of various mathematical concepts, focusing on learning outcomes, experiences, and evaluation techniques.
10. Modes of Learning Engagement in Mathematics: Engage in various modes of learning, such as group activities, presentations, idea sharing, concept modeling, and reflective assignments, to facilitate concept formation in mathematics.
11. Assessment and Evaluation of Mathematics Learning: Master the planning and implementation of effective evaluation strategies in mathematics, including formative, summative, predictive, and continuous and comprehensive evaluation (CCE).

12. **Diagnostic Testing and Enrichment Programs:** Understand and apply diagnostic testing, and develop enrichment programs tailored to the needs of gifted learners, slow learners, and learners with dyslexia in mathematics.

#### **Practicum/Field Work:**

- **Concept Map Creation:** Create a concept map related to any theme in mathematics and explain how it facilitates teaching and learning.
- **Pointed Edit on Mathematicians:** Prepare a detailed study on the history and contributions of two mathematicians.
- **Group Activity and Report:** Conduct a group activity on any topic of mathematics and report your experiences.
- **Observation of Mathematics Teaching:** Observe a mathematics class in a secondary school, identifying and listing errors committed by students.

#### **Pedagogy of Physics**

1. **Insight into the Meaning, Nature, and Scope of Physics:** Gain a deep understanding of the meaning, nature, and scope of physics for effective teaching.
2. **Identification and Relating Everyday Experiences with Physics Learning:** Recognize and establish connections between everyday experiences and the learning of physics.
3. **Integration of Physics Knowledge with Other Subjects:** Integrate physics knowledge effectively with other subjects in the school curriculum.
4. **Use of Engaging Activities, Demonstrations, and Laboratory Experiences:** Utilize a variety of engaging activities, demonstrations, and laboratory experiences for effective teaching and learning of physics.
5. **Understanding of Assessment Concepts and Types:** Comprehend the meaning, concept, and various types of assessment in the context of physics education.
6. **Promotion of Scientific Attitude and Temper:** Foster a scientific attitude and temper among learners, emphasizing essential skills, methods, and processes for exploration, generalization, and validation of scientific knowledge.
7. **Pedagogical Analysis and Learning Engagement:** Conduct pedagogical analysis of units, focusing on concepts, learning outcomes, activities, and evaluation techniques. Engage students through observations, experiments, presentations, and hands-on models.
8. **Effective Utilization of Teaching Aids and Laboratory Work:** Utilize various teaching aids and engage students in laboratory work to enhance the learning experience.
9. **Reflective Practice and Assessment Frameworks:** Implement reflective written assignments and develop assessment frameworks for evaluating experimental work in physics.
10. **Assessment and Evaluation in Physics:** Understand and apply assessment concepts, including achievement tests, blueprints, open-book tests, formative and summative assessments, and continuous and comprehensive evaluation (CCE) in the context of physics education.



11. **Assessment of Project Work and Performance-Based Evaluation:** Assess project work in both laboratory and field settings. Evaluate learners' record of observations and oral presentations, emphasizing performance-based assessment.

### **Practicum/Field Work:**

- **Concept Map Creation:** Create a concept map on any topic and explain how it facilitates students' learning in physics.
- **Apparatus Description and Design:** Provide a detailed description and design of an improvised apparatus related to physics.
- **Reflective Journal on Radiations and Human Health:**
- Write a reflective journal on the topic of "Radiations and Human Health" in the context of physics.
- **Out-of-Class Activity Planning:** Plan an out-of-class activity using local resources to teach physics and report your experiences.
- **Plan for Assessing Students' Practical Work:** Prepare a plan for assessing students' practical work in physics.

### **Pedagogy of General Science**

1. **Understanding General Science as an Interdisciplinary Area:** Students will grasp General Science as an interdisciplinary field of learning that encompasses various branches of science.
2. **Understanding Aims and Objectives of Teaching General Science:** Students will comprehend the aims and objectives of teaching General Science at different educational levels.
3. **Creating Effective Learning Situations for Science Concepts:** Students will explore diverse methods of creating learning situations tailored to different scientific concepts, fostering inquiry, problem-solving, and investigatory learning.
4. **Facilitating Scientific Attitudes in Learners:** Student-teachers will play a role in developing scientific attitudes in learners, encouraging curiosity, inventiveness, and creativity in science.
5. **Addressing Pedagogical Issues in Science Learning:** Students will examine various pedagogical issues that arise in the teaching and learning of science.
6. **Stimulating Curiosity and Creativity in Science:** Encourage students to stimulate curiosity, inventiveness, and creativity in science education, fostering a sense of wonder and exploration.
7. **Developing Life Skills through Science Concepts:** Equip students with the ability to apply science concepts to practical life skills, emphasizing the relevance of science in everyday situations.
8. **Competencies for Teaching and Learning Science:** Develop competencies in students for effectively teaching and learning science through various instructional measures and strategies.

9. Constructing Appropriate Assessment Tools: Students will be capable of constructing relevant assessment tools to evaluate the learning of science concepts effectively.
10. Understanding the CCE Pattern of Evaluation: Students will gain a comprehensive understanding of the Continuous and Comprehensive Evaluation (CCE) pattern and its application in assessing General Science learning.

### **Practicum/Field Work:**

- Visit Ayurveda College/Science Labs: Report on the functioning and contributions of Ayurveda colleges and science labs to advancements in knowledge and prosperity.
- Concept Map Creation: Create a concept map on a chosen General Science theme, demonstrating its significance in the teaching and learning process.
- Exploring Indian Cultural Traditions: Research and uncover the scientific basis behind Indian cultural traditions.

### **Pedagogy of Biology**

1. Developing Insights into the Nature and Significance of Biology: Gain a deep understanding of the meaning and nature of Biology to determine effective teaching-learning aims and strategies.
2. Recognizing Biology as a Dynamic and Expanding Field: Appreciate that science, particularly Biology, is a dynamic and continuously evolving body of knowledge.
3. Fostering Curiosity about Natural Surroundings: Recognize that every child possesses a natural curiosity about their environment and learn how to harness and nurture this curiosity in Biology teaching.
4. Linking Everyday Experiences with Biology Learning: Identify and establish connections between everyday experiences and the learning of Biology, making the subject more relatable and engaging.
5. Exploring Various Teaching-Learning Approaches in Biology: Appreciate and employ diverse approaches to teaching and learning Biology, accommodating different learning styles and preferences.
6. Utilizing Laboratory for Effective Teaching-Learning: Understand the role of the laboratory in the teaching-learning process, and develop the skills needed to plan and conduct effective experiments, demonstrations, and activities in Biology.
7. Integrating Biology Knowledge with Other Subjects: Effectively integrate Biology knowledge with other subjects in the school curriculum, fostering interdisciplinary learning.
8. Analyzing Biology Content and Critical Issues: Analyze Biology content in terms of content, process, skills, knowledge organization, and other critical issues related to effective teaching.
9. Conducting Pedagogical Analysis of Biology Topics: Perform in-depth pedagogical analysis of various topics in Biology, ensuring an effective teaching approach.
10. Developing Process-Oriented Objectives: Create process-oriented objectives based on content themes and units, aligning with learning outcomes.

11. **Understanding and Applying Assessment Techniques:** Comprehend the meaning, concept, and types of assessment, and effectively apply them in evaluating Biology learning.
12. **Engaging in Practical Pedagogical Activities:** Engage in various practical activities, including creating assessment tools, designing instructional materials, conducting experiments, and assessing student practical work in Biology.

### **Pedagogy of Social Science**

1. **Understanding the Aims and Objectives of Teaching Social Science:** Comprehend the overarching goals and specific objectives of social science education.
2. **Grasping the Nature of Social Sciences:** Develop an understanding of social sciences as individual and integrated disciplines.
3. **Encouraging Critical Thinking and Concept Grasping:** Foster critical thinking skills and the ability to grasp complex concepts in social sciences.
4. **Definition and Differentiation of Social Science:** Define and differentiate the concept of Social Science and explain its relative position in the syllabus.
5. **Evaluation and Review of Syllabus and Textbooks:** Evaluate the existing school syllabus and review the textbook of Social Science at the secondary level.
6. **Application of Teaching Methods and Techniques:** Apply appropriate methods and techniques for teaching specific topics at different levels.
7. **Utilization of Teaching Aids:** Prepare, select, and effectively utilize various teaching aids to enhance learning.
8. **Pedagogical Analysis of Social Science Topics:** Perform pedagogical analysis of various topics in social science at the secondary level, considering concepts, learning outcomes, activities, experiences, and evaluation techniques.
9. **Understanding Multiple Assessment Techniques:** Gain insight into the concept of multiple assessment techniques in social science education.

### **Course Content Outcomes:**

#### **Unit I: Nature of Social Science as a Discipline:**

- Understand the meaning, concept, and needs of social science teaching.
- Comprehend the nature and scope of social science teaching.
- Trace the historical development of social science as a discipline.
- Recognize changing areas of social science as a subject.

#### **Unit II: Social Science as a School Subject:**

- Appreciate the importance of social science in the school curriculum.
- Define aims and objectives of teaching social science at the secondary level in behavioral terms.
- Correlate Social Science with other School Subjects such as History, Geography, Economics, Civics, and Environmental Sciences.

- Analyze changing trends and goals of teaching social science with reference to N.C.F. 2005.

### **Unit III: Methodology of Teaching-Learning of Social Science:**

- Familiarize with methods and devices of teaching social science at the secondary level including lecture, project, problem-solving, socialized recitation, questioning, dramatization, role plays, discussion, and story-telling.
- Understand excursion and team teaching as effective methods in social science education.
- Develop skills in planning, organizing, and conducting small community surveys.

### **Unit IV: Pedagogical Analysis and Mode of Learning Engagement:**

- Conduct pedagogical analysis of content in History, Geography, Civics, and Economics at the secondary level, considering concepts, learning outcomes, activities, experiences, and evaluation techniques.
- Apply appropriate modes of learning engagement, including group activities, presentations, idea-sharing, laboratory work, reflective assignments, library surveys, and field trips.

### **Unit V: Assessment & Evaluation of Social Science Learning:**

- Assess social thinking, logical reasoning, and discourage rote learning in social science education.
- Plan evaluation methods in social science, including formative and summative assessment, as well as continuous and comprehensive evaluation (CCE) at the secondary level.
- Identify difficulties in the evaluation process and suggest measures to overcome them.
- Construct achievement tests/question papers in social science.

### **Practicum/Field Work Outcomes:**

- Identify and interpret news related to positive social changes or initiatives.
- Conduct a panel discussion on creating a good social environment for a healthy ecological environment.
- Conduct a community survey on an existing social problem to determine its root causes.
- Write a reflective journal on the impact of globalization in a specified village.
- Prepare a portfolio of an eminent personality in a chosen area of social science (History, Geography, Economics, or Civics)

## **Pedagogy of English**

1. Understanding the Nature & Role of English Language:

- Grasp the essence and significance of English as a discipline.
  - Recognize its global influence and linguistic behavior in societal contexts.
2. Proficiency in Pronunciation Patterns:
    - Demonstrate mastery over English pronunciation patterns.
    - Comprehend the impact of linguistic diversity on speech and writing.
  3. Insight into Linguistic Behavior:
    - Analyze individual and societal linguistic behavior.
    - Identify gender bias and power dynamics in language use.
  4. Appreciating Different Roles of Language:
    - Understand the multifaceted roles of language, including its relationship with literature.
    - Foster creativity in learners through engaging activities.
  5. Connecting Literature and Language:
    - Analyze authentic literary and non-literary texts for deeper understanding and appreciation.
  6. Contextual Language Use:
    - Grasp the use of language in context, encompassing grammar and vocabulary.
  7. Activity and Task Development:
    - Competently design activities and tasks tailored to learners' needs and levels.
  8. Recognizing Home and School Language:
    - Acknowledge the importance of both home and school languages.
    - Utilize multilingualism as a classroom strategy.
  9. Teaching Poetry, Prose, and Drama:
    - Understand effective methods for teaching different forms of literary expression.
  10. Methods, Approaches, and Materials:
    - Identify suitable methods, approaches, and materials for teaching English at various levels.
  11. Constructive Language Teaching:
    - Implement a constructive approach to language teaching and learning.
  12. Language Assessment Process:
    - Grasp the process of language assessment, employing diverse evaluation techniques.
  13. Cultural Awareness and Language Teaching:
    - Familiarize students with India's rich culture, heritage, and contemporary life.
  14. Position of English in India:
    - Understand the role and challenges of English in the Indian context.
    - Differentiate between formal and informal learning of English.
  15. Overview of Language Teaching Methodologies:
    - Analyze various approaches and theories to language learning and teaching.
    - Evaluate different language teaching methodologies, from grammar translation to communicative approach.
  16. Acquisition of Language Skills: Grammar & Vocabulary:

- Discuss grammar content at Secondary & Senior Secondary levels, and understand their interlink ages.
  - Explore techniques for building vocabulary and effective use of dictionaries.
17. Instructional Design for Teaching:
- Develop logical instructional design for teaching any topic in English.
18. Language Skills Acquisition (Listening, Speaking, Reading, and Writing):
- Master sub-skills within listening, speaking, reading, and writing.
  - Utilize various materials and resources for skill development.
19. Barriers and Innovative Practices in LSRW Skills:
- Identify and address barriers in listening, speaking, reading, and writing.
  - Implement innovative practices to enhance language skills.
20. Evaluation Strategies:
- Assess language development through continuous and comprehensive evaluation.
  - Employ diverse evaluation techniques, including oral, written, and portfolio-based assessments.
21. Question Typology and Activities:
- Create a variety of questions and activities to enhance problem-solving, critical thinking, and imaginative skills.
22. Practicum and Fieldwork Activities:
- Conduct surveys, analyze educational materials, and prepare inclusive activities for English teaching.
23. Portfolio Development:
- Compile a portfolio showcasing the developmental aspects of language for exceptional learners.

### Pedagogy of Hindi

हहदी भाषा के स्वरुप और भाषा शिक्षा की सिद्धि-

- हहदी भाषा के रूप और उसकी शिक्षा के दृष्टिकोण को सिद्धिना।
  - हहदी भाषा के वष्वक प्रभाव और सांसाणिक सदभो िं भाषा के व्यवहार को पहचानना।
2. उच्चारण कौल का ववरण
- हहदी उच्चारण कौल ता करना।  
 िे ननपण अष्  
 ित
  - भाषाई वववधता के आधार पर उच्चारण और लेखन को िद्ध करना।
3. भाषा के व्यवहार का षततक और सांसाणिक /अतरसबध  
 अतवय अतसबध
- व्यषतगत और सांसाणिक भाषाई व्यवहार का वववलेषण करना।
  - भाषा उपयोग िं मलग ितभेद और भाषा की गनतीलता को पहचानना।
4. भाषा की ववमभन्न भाषा िकाँ
- भाषा की ववमभन्न भाषा िकाँओ को सिद्धिना, और हहदी साहहत्य से सम्बधत रोिंिंचक गनतववधधयोँ के िाध्यि से िक्षधधयोँ िे प्रोत्साहहत करना।

5. साहस्य और भाषा का सम्बन्ध
  - भाषा की गहन सिद्धि के मलए िौमलक साहस्यक और असाहस्यक पाठों का ववलेषण करना ।
6. भाषाई गनतवधध ववकमसत करना ।
  - छात्रों की आववयकताओं और स्तर के अनरूप गनतवधधयों और कायों का प्रारूप तयार करना ।

#### 7. ाषा और ववद्यालयी भाषा की िान्यता

िातभ ाषा और ववद्यालयी भाषा के िहत्व को स्वीकार करना ।

- िातभ तभ
  - मिक्षक द्वारा बोलचाल िे बहुभावषकता का उपयोग करना ।
- 8. कववता गदय और नािक की मिक्षणववधधयों को सडिज्ञाना
  - ववमभन्न प्रकार की साहस्यक ववधाओं के िाध्यडि से मिक्षण ववधधयों को सडिज्ञाना ।
- 9. उपयतु त ववधधयों दृषुडिकोणों और साडिधियों की पहचान
  - ववमभन्न स्तरों पर हहदी भाषा की मिक्षा के मलए उपयतु त ववधधयों, दृषुडिकोणों और साडिधियों की पहचान करना ।
- 10. भाषा मिक्षण का रचनातुडिक दृष्टिकोण
  - भाषा मिक्षण और अधधगडि का रचनातुडिक दृषुडिकोण ववकमसत करना ।
- 11. भाषा यडिंकन प्रक्रिया
 

<p>िेडिं िेडिू यडिंकन तकनीकों का उपयोग</p> <ul style="list-style-type: none"> <li>• ववमभन्न िेडिू लकरके भाषा िेडिू</li> </ul>	<p>यडिंकन प्रक्रिया को सडिज्ञाना और िहण करना</p>
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- 12. साडिंसकृ नतक िागरूकता और भाषा मिक्षण
  - छात्रों को भारत की सडिद्ध साडिंसकृ नतक ववरासत और सिकालीन िीवन से पररधचत कराना ।
- 13. भारत िेडिं हहदी की षुथनत
  - भारत िेडिं हहदी की भडू िेडिू का और चुनौनतयों को सडिज्ञाना ।
- 14. भाषा कौिलों की प्राप्तत व्याकरण और िड्दावली
  - िाध्यमिक और उचुच िाध्यमिक स्तर पर व्याकरण को सडिज्ञाना ।
  - िड्दावली को बढाने और िेड्दकोडि को प्रभावी बनाने के मलए नवीन ववधधयडिं अन्वेषत करना ।
- 15. मिक्षण के मलए िेडिू डै िक योडिना
  - हहदी मिक्षण के मलए तवुडि सगत मिक्षण योडिना ववकमसत कारण ।
- 16. भाषा कौिल की प्राप्तत (सनन, बोलने, पढने और मलखने)
  - सनने, बोलने, पढने और मलखने के िेडिू ता हामसल करना ।
  - कौिलों िेडिं ननपण
- 17. LSRW कौिल िेडिं बाधाए और नवाचारी अभ्यास

- सनने, बोलने, पढ़ने और मलखने में बाधाओं की पहचान और सिाधान करना ।
  - भाषा कौशलों को सधारने के मलए नवाचार अपनाना ।
18. िलयांकन उपकरण



- ननरिंतर और यािंकन के िाध्यि से यािंकन करना।  
सिििल भाषा ववकास का ििल
  - िौखखक, मलखखत और पोििफोमलयों िैसी यािंकन तकनीकों का उपयोग करना।  
ववमभन्न ििल
19. भाषा सम्बिं धत गनतववधधयाँ
- सिस्या सिाधान, ववचारीलता और कलपनात्िक कौिलों को बढाने के मलए ववमभन्न प्रकार की गनतववधधयों को आयोष्ित करना।
20. अभ्यासवृ ि और कृकायि गनतववधधयाँ
- सवेक्षणों का आयोिन करना, ििक्क साििी का वववलेषण करना और हहदी मिक्षण के मलए सिावेिी गनतववधधयों की योिना बनाना।
21. पोििफोमलयों का ववकास
- भाषा के िं की िानकारी देने वाले ार करना।  
ववकासात्िक पहलओ पोििफोमलयों कोस

**Department of Chemistry**  
**Program Outcomes and Program Specific Outcomes, Course Outcomes**  
**UG Programme-B.Sc.**  
**2023-24**

The department offers B.Sc. Chemistry programme for students which were based on University of Kota, Kota. The programme comprises a total of 9 papers in B.Sc. in each year. The syllabus of each course is framed so as the programme is able to rise the scientific temper of the scholar and provide a firm foundation in every aspect of Chemistry.

**Objectives**

- Develop students with basic knowledge and skills
- Develop wide knowledge in their major and allied subjects necessary to qualify for the degree
- Acquire a rich basket of value-added courses, co- curricular courses, soft skills and communication skills instilling self-confidence and moral values
- Strengthen the higher order thinking skills and develop professionalism.
- Qualify for higher education, government services, industry needs and start up units through continuous practice of preparatory examinations

**Programme Outcomes**

By successfully completing the undergraduate programme, the student will be capable of

PO1: Logical and critical thinking

PO2: Achieving a desire for higher education and self-learning.

PO3: Academic as well as extracurricular activities that will enable them to become skilled professionals.

PO4: Developing a sensible and unbiased conclusion by gathering information from various reliable sources.

PO5: Developing communication and coordination skills for employment and entrepreneurship.

**Programme Specific Outcomes**

Through the B.Sc. Chemistry programme, the students will achieve

PSO1: Human and Social Values and Responsibilities in the context of learning chemistry.

PSO2: Communicative Skills and the Creative scientific mind towards learning chemistry.

- PSO3: Positive approach towards Environment and Ecology from the Chemistry perspective.  
 PSO4: Critical thinking and the Analytical mind, students develop for the in depth knowledge in advanced-level Chemistry.  
 PSO5: The relevance of extension of Chemistry in the social context for solving social issues.  
 PSO6: Employability Skills shall enable the students to find jobs in core chemistry and other related fields.  
 PSO7: Entrepreneurial Skills shall empower the students to start their own industries / business in core-chemistry fields.  
 PSO8: Analytical or Experimental Skills make the students capable of doing higher level research works in the emerging fields of chemistry.

## **Course Outcomes**

### **B.Sc. Part-I**

#### **Paper-I Inorganic Chemistry**

- CO1: To understand all the basic concept of Inorganic Chemistry student will learn the atomic structures, Schrodinger wave equation and Quantum numbers.  
 CO2: Students will understand the chemical bonding through VBT and MOT.  
 CO3: To understand the ionic structure with the help of ionic lattice energy and coordination number.  
 CO4: To perform comparative study of s-block and p-block elements.  
 CO5: To study basic properties of dioramas, higher borates and silicates.

#### **Paper-II Organic Chemistry**

- CO1: To study the structure and mechanism of organic reaction and reaction intermediate.  
 CO2: To understand the concept of isomerism and stereochemistry.  
 CO3: To analyses the concept and reactions of alkane and cycloalkanes.  
 CO4: To study the nomenclature, methods of preparation of Alkenes, Cycloalkanes and Alkynes.  
 CO5: To understand the general pattern of mechanism of aromaticity in Arenes and alkyl halides.

#### **Paper-III Physical Chemistry**

- CO1: The basic concept of Mathematics and Computer Applications by logarithms and components.  
 CO2: The fundamental concepts of gaseous states by kinetic theory and isotherms.  
 CO3: The concept of intermolecular forces of liquid states and classification of colloids.  
 CO4: To determine the crystal structures of various classifications of solids.  
 CO5: To study the scope and concept of reaction rate and chemical kinetics.

### **B.Sc. Part -II**

#### **Paper-I Inorganic Chemistry**

- CO1: Explore characteristics properties of elements of first transition series and its binary compounds.  
 CO2: Impart knowledge of oxidation states and behavior of second and third transition series.  
 CO3: Examine the theory and structures of coordination complexes.  
 CO4: To understand the basic features and properties of Lanthanides and Actinides.  
 CO5: Discuss various concepts and properties of acids, bases and oxidation reactions.

#### **Paper-II Organic Chemistry**

- CO1: Analyze the concept of various spectroscopic absorption of radiations. CO2: To discuss the structural properties and reactions of alcohols and phenols. CO3: Explain and classify the reactions and concepts of aldehydes and ketones.  
 CO4: To understand the concept of reactions in compounds such as ethers, epoxides and

carboxylic acids.

**CO5:** Discuss the study of various organic compounds formed by Nitrogen groups.

### **Paper-III Physical Chemistry**

CO1: Develop the understanding of basic terminologies and introduction to thermodynamic laws.

CO2: Analyze the various concepts related to thermodynamic study.

CO3: Determine the terms and study of different equilibrium concepts.

CO4: Discuss the electric transport of different types of electric cells, batteries and their theories.

CO5: To study the concept of electrodes, various ions, EMF and solubility and buffer mechanisms.

## **B.Sc. Part III**

### **Paper-I Inorganic Chemistry**

CO1: Explore characteristics properties of Acid-Base classification and concepts.

CO2: Impart knowledge of bonding between metal and ligands, and various magnetic properties of transition metal complexes.

CO3: Examine the theory electronic transitions and thermodynamic stability of metal complexes.

CO4: To understand the basic features and introduction to organometallic compounds. CO5:

Discuss various concepts and properties of essential and trace elements in biological processes and compounds of Silicones and Phosphazenes.

### **Paper-II Organic Chemistry**

CO1: Analyze the concept of NMR Spectroscopy with chemical shift area of signals, etc.

CO2: To discuss the synthesis and chemical properties of Organometallic compounds.

CO3: Explain and classify the reactions and introduction to Heterocyclic compounds.

CO4: To understand the concept of reactions in compounds such as Emulates and Carbohydrates.

CO5: Discuss the study of various structures stereochemistry of amino acids, peptides, proteins and nucleic acids.

### **Paper-III Physical Chemistry**

CO1: Develop the understanding of basic terminologies and introduction to elementary quantum mechanics by Bohr's model and De-Broglie's hypothesis.

CO2: Analyze the various concepts related to Molecular and Atomic orbitals of hybridized compounds.

CO3: Determine the terms and study of rotational, vibrational, Raman and electronic spectroscopies.

CO4: Discuss the introduction to laws of photochemistry, radiations and quantum yield.

CO5: To study the concept of optical activity, magnetic properties, structure of molecules, various types of solutions and their colligative properties.

**Department: Physics**  
**Course Outcomes, Programme Outcomes And Programme Specific Outcomes**  
**UG Programme-B.Sc.**  
**2023-24**

**Objective of the Programme**

The department of Physics offers B.Sc. programme for students which were based on syllabus and pattern of University of Kota, Kota. The programme comprised a total of 9 Paper in B.Sc. The syllabus of each course is framed so as the programme is able to raise the scientific temper of the scholar and provide a firm foundation in every aspect of Physics and to explain a broad spectrum of modern trends in physics and to develop experimental, computational and mathematics skills.

- Develop students with basic knowledge and skills
- Develop their knowledge in the major and allied subjects to qualify for the degree.
- Prepare them for added courses, co- curricular courses, soft skills and communication skills instilling self-confidence and moral values.
- Developed physically and spiritually personality with regular sports, gym and yoga activities.
- Demonstrate social responsibility through NSS activities in the campus and in the society.
- Strengthen the higher order thinking skills and develop professionalism with the state of art ICT facilities
- Developed them to qualify for higher education, government services, industry needs and start up units through continuous practice.

**Programme Outcomes**

By the successful completion of the undergraduate programme, the student will be prepare for

PO1: Logical and critical thinking.

PO2: Achieving a desire for higher education and understand self-learning.

PO3: Extracurricular with academics activities will enable them to become skilled professionals.

PO4: Various reliable sources Developed a sensible and unbiased conclusion.

PO5: They prepare for employment and entrepreneurship with communication and coordination skills.

PO6: They take responsibilities that promote sustainable and green habitat for environment.

PO7: Attaining harmony and compassionate with different socio-cultural traditions.

**Programme Specific Outcomes**

Through the B.Sc. Physics programme, the students will be able to

PSO1: Understand the contributions of the scientific community and to develop research aptitude and scientific temper.

PSO2: Develop various communication skills such as reading, listening, speaking, etc., which will help in expressing ideas and views clearly and effectively.

PSO3: Get strong foundations in physics and develop basic experimental skills. PSO4: Acquire fundamental concepts of mathematics and chemistry.

PSO5: Understand the theories behind various physical phenomena.

PSO6: Students acquire skills to solve both theoretical and experimental scientific problems.

PO7: Interpret the inferences from verbal, mathematical and graphical data.

PO8: Perform various task using their creativity, intellectual capacity, innovative thoughts and enthusiasm with precision and responsibility.

PO9: As certain their area of interest in academic and R&D and get prepared for competitive exams.

## **Course Outcomes**

### **B.Sc. Part-I**

#### **Paper I Mechanics**

CO1: Provide foundations in the theory of wave motions and oscillations

CO2: Build theoretical basis of rotational mechanics and some mechanical properties of materials

CO3: Introduction of hydrodynamics and its real life applications

CO4: Acquire engineering skills in setting up of the experiment, systematic analysis of the experimental data and to estimate errors in measurement.

CO5: Provide a practical training with experiments in areas of rotational mechanics, hydrodynamics and properties of matter

#### **Paper II Electromagnetism**

CO1: Lay a sound theoretical foundation in electricity and electrodynamics

CO2: Comprehend various phenomena and applications around them related to electric and magnetic field.

CO3: Acquire practical knowledge to handle electronic gadgets and explain its working principle

#### **Paper III Optics**

CO1: Provide necessary foundations in wave optics.

CO2: Understand the theoretical treatment of interference in different conditions and familiarize the principles of interferometers.

CO3: Study the successful theoretical explanations of diffraction and polarization in different conditions.

CO4: Understand the basic working principle of Laser and different types of lasers. Familiarize applications of lasers in different fields.

## **B.Sc. Part-II**

### **Paper I Thermal and Statistical Physics**

- CO1: Define the concept of entropy and explain its physical significance.
- CO2: Explain Lees Disc experiment and can calculate the thermal conductivity by experimentally.
- CO3: Explain fundamental concepts of statistical mechanics
- CO4: Derive Maxwell-Boltzmann, Bose - Einstein and Fermi Dirac distribution laws and compare the laws.

### **Paper II Electronic**

- CO1: Describe different types of theorems such as Norton, Thevenin etc.
- CO2: Students will get a general idea about the Physics of semiconductors and the working of diodes, rectifiers and transistors
- CO3: Introduces the principles of semiconductor components such as diodes, transistors, OPAMP, JFET etc.
- CO4: Study the working of amplifiers and oscillators and different types of modulation in communication fields
- CO5: Introduction of the fundamental concepts and techniques used in digital electronics.

### **Paper III Mathematical Physics**

- CO1: Describe different type of curvilinear coordinates systems CO2: Explain Fourier analysis and special theory of relativity
- CO3: Describe different types of second order differential equation such as Legendre, Bessel etc.
- CO4: Solve separation variable methods

## **B.Sc. Part-III**

### **Paper I Solid State Physics**

- CO1: Realize the importance of crystallography in solid state physics
- CO2: Classify materials as metals, semiconductors and insulators based on band theory.
- CO3: Distinguish various chemical bonding in common crystal structures.
- CO4: Enables one to understand basic electric and magnetic properties of solids and the theoretical framework of the same

### **Paper II Nuclear and Particle Physics**

- CO1: Introduction of the various properties of nucleus and the nuclear forces
- CO2: Introduction of the concept of radioactivity and the theory of  $\alpha$ ,  $\beta$  and  $\gamma$ -decay in radioactivity
- CO3: A brief introduction to nuclear radiation detectors and particle accelerators CO4: Introduction to Particle Physics and quark models.

### **Paper III Quantum Mechanics and Spectroscopy**

- CO1: Appreciate the historical development and origin of quantum mechanics. Understand the basic mathematical formulation of quantum mechanics.
- CO2: Apply the Schrodinger equation for solving the problem of a particle in a box CO3: Apply the Schrodinger equation for solving the problem of a simple harmonic oscillator
- CO4: Introduction of Bohr model for H-atom
- CO5: Study different type of spectroscopy such as Vibrational, Electronic and Raman

**Department :Mathematics**  
**Programme Outcomes Programme Specific Outcomes And Course Outcomes**  
**UG Programme-B.Sc.**  
**2023-24**

**Objective of the Programme**

The B.Sc. Mathematics programme aims to prepare students with a deep understanding of mathematical concepts, research-oriented attitude and skill of application of mathematical and computational tools and techniques in formulation and solution of real world problem. It is specially designed to prepare students for a successful career in academic institution, research institution and industry.

**Programme Outcomes**

- PO1: Inculcate critical thinking to carry out scientific investigation objectively without being biased with preconceived notions.
- PO2: Evaluate hypotheses, theories, methods and evidence within their proper contexts.
- PO3: Prepare students for pursuing research or careers in industry in mathematical sciences and allied fields.
- PO4: Solve complex problems by critical understanding, analysis and synthesis.
- PO5: Develop proficiency in the analysis of complex physical problems and the use of mathematical or other appropriate techniques to solve them.
- PO6: Communicate effectively by oral, written, computing and graphical means.

**Programme Specific Outcomes**

- PSO1: Understanding of the fundamental axioms in mathematics and capability of developing ideas based on them.
- PSO2: Inculcate mathematical reasoning.
- PSO3: Prepare and motivate students for research studies in mathematics and related fields.
- PSO4: Provide knowledge of a wide range of mathematical techniques and application of mathematical methods/tools in other scientific and engineering domains.
- PSO5: Provide advanced knowledge on topics in pure mathematics, empowering the students to pursue higher degrees.
- PSO6: Recognize the need to engage in lifelong learning through continuing education and research.
- PSO7: Assist students in preparing (personal guidance, books) for competitive exams.



## **Course Outcomes B.Sc. Part-I**

### **Paper I – Number theory and Abstract Algebra**

Students will be able to

CO1: Define Group, Subgrouping Normal Subgroup.

CO2: Have a good knowledge of Group homomorphism with its kernel CO3: Define Rings, Zero divisors, integral domains and fields.

CO4: Define Principal ideals and principal ideal ring. Prime ideal. Maximal ideal.

### **Paper II – Advanced Calculus**

Students will be able to

CO1: Define Polar coordinates, Pedal equation of a curve, Curvature.

CO2: Define Partial differential coefficients of a function of two or more variables. CO3: Define Jacobians with properties Asymptotes, envelopes and evaluates.

CO4: Tracing of curves in Cartesian and polar coordinates.

### **Paper III – Vector Calculus and Coordinate Geometry**

Students will be able to

CO1: Define Vector differentiation and integration.

CO2: Define Ellipse, Hyperbola, Sphere, Cone, Cylinder, and Central Conchoids.

CO3: Have a good knowledge of Theorems of Gauss, Green, Stokes and Ellipse, Hyperbola, Sphere, Cone, Cylinder, Central Conchoids.

## **B.Sc. Part-II**

### **Paper I- Real Analysis**

Students will be able to

CO1: Define Complete ordered field, limit of sequence, Cauchy's sequence, Continuity of a function - Cauchy's and Heine's definitions, Riemann integral, Improper integrals. CO2: Have a good knowledge of Types of discontinuities, Rolle's Theorem, Lagrange's and Cauchy's mean value theorems, Darboux sums and their properties.

### **Paper - II Differential Equations**

Students will be able to

CO1: Define Order and Degree of a differential equation, Partial differential equations. CO2: Have a good knowledge of Differential equations of first order and first degree, linear differential equations with constant coefficients, Lagrange's solution. Charpit's general method of solution.

### **Paper- III Mechanics**

CO1: Define Common Catenary, Constrained Motion- Circular and Cycloidal.

CO2: Have a good knowledge of Analytical Conditions of equilibrium of a rigid body under coplanar forces, Simple harmonic motion, Hooke's Law, Projectiles.

## **B.Sc.-Part-III**

### **Paper - I – Linear Algebra and Complex Analysis**

CO1: Define vector space, Subspace of a vector space, Linear combination and Linear span, Basis and dimension of finitely generated spaces. Quotient space, linear transformation, Analytic functions, Mobius Transformation.

CO2: Have a good knowledge of Cauchy-Riemann equations. Harmonic functions, Isogonic and conformal mappings, Linear dependence and independence of vectors.

### **Paper – II – Mathematical Statistics and Linear programming**

CO1: Define Central moments, Karl-Pearson's Beta and Gamma coefficients, Moments and Moment generating function, Cumulant generating function and cumulants, Linear programming, Dual and primal.

CO2: Have a good knowledge of Discrete and continuous distributions with properties : Bernoulli, Binomial, Poisson and Normal, Simplex algorithm, Assignment problems.

### **Paper - III – Numerical Analysis and C-Programming**

CO1: Define Operators, Interpolation with equal and unequal intervals, Bisection method, regula-falsi method and Newton- Rap son method, Picard's method and Euler's method.

CO2: Have a good knowledge of Principles of C Programming: Algorithms, Flowcharts, Constants, Variables, Data type, Array, Numerical differentiation and Numerical – Integration.

## **Department :Zoology**

### **Programme Outcomes Programme Specific Outcomes And Course Outcomes**

### **UG Programme-B.Sc.**

#### **Program Outcome**

PO1- A graduate student will develop critical thinking.

PO2- A student after graduation will acquire life skills and become a better human being, will develop language competence and be proficient in oral communication and written skill.

PO3- Students can pursue career in multi and interdisciplinary fields.

PO4- Students can understand the use of analytical methods required for interpreting and analyzing results and drawing conclusions as supported by their data

PO5- Students will have better employability in the field of finance, industry, administration, social and extension work, IT sectors, research and many others.

PO6- Students will develop confidence to appear for various competitive exams related to public and private sectors.

#### **Program Specific Outcomes**

PSO 1- Students able to understand the basic concepts of taxonomy of animals, cell biology, anatomy, physiology, genetics, ecology, developmental biology and applied Zoology.

PSO 2- Identify and list out common invertebrates and vertebrates.

PSO 3- Understand the applications of biological sciences in Apiculture, Sericulture, lac culture Aquaculture, Agriculture, medicine and daily life.

PSO 4- Gains knowledge about research methodologies.

PSO 5- Understand various genetic abnormalities.

PSO 6-Perform procedures as per laboratory standards in the areas of Taxonomy, Physiology, Ecology, Cell biology, Genetics, Applied Zoology, Clinical science, tools and techniques of Zoology, Toxicology, Entomology, Nematology Sericulture, Biochemistry, Fish biology, Animal biotechnology, Immunology and research methodology etc.

PSO 7- Contributes the knowledge for Nation building.

### **COURSE OUTCOMES**

#### **B.Sc.-Part-I**

#### **Animal Diversity Non-Chordata**

CO 1- Learn about the importance of systemic, taxonomy and phylogeny to get a concrete idea of evolution of non-chordate phyla.

CO 2- Understand the various morphological, anatomical structures and functions of animals of different phyla.

CO 3- Get the knowledge about economic, ecological and medical significance of various animals in human welfare.

CO 4- Understand the important parasites and their control measures.

#### **Course Outcomes: Lab– Animal Diversity**

CO 1- Identify invertebrate animals of different phyla and their histology through study of museum specimens and slides.

CO 2- Learn their different systems through dissections.

CO 3- Enhance collaborative learning and communication skills through practical sessions, team work, group discussions, assignments and projects.

## **B.Sc. Part-II**

### **Animal Diversity**

CO 1- General character classification of Arthropoda, habit and habitat of prawn, larval forms of Crustacean, metamorphosis in insects

CO 2- Understand the various morphological, anatomical structures and functions of Mollusca. CO 3- General character classification of Echinodermata, Understand the various morphological, anatomical structures and functions of Asterias.

CO 4- Chordate: Primary chordate characters. General character classification of Hemichordate. CO 5- Understand the various morphological, anatomical structures and functions of Urochordate and Cephalochordate.

### **Endocrinology And Ethology**

CO 1- Hormones nature and properties, Structure and function of major and minor endocrine glands.

CO 2- Regulation of Hormone secretion, extra and intra cellular receptor, second messenger.

CO 3- Hormones related in reproductive system, hormonal control, menstrual cycle, implantation, lactation and parturition.

CO 4- Introduction of animal behavior, orientation, methods of studying behavior. 3

CO 5- Types of behavior and their regulation.

### **Ecology And Biostatistics**

CO 1- Demonstrated an Understood of ecological relationships between organisms and their environment.

CO 2- Presented an overview of diversity of life forms in an ecosystem. CO 3- Explained and identified the role of the organism in energy transfers

CO 4- Described the Habitat ecology and Resource ecology

CO 5- Function and importance of biostatics, frequency distribution, mean mode, median, correlation.

### **Lab**

CO 1- Identify invertebrate animals of different phyla and their histology through study of museum specimens and slides.

CO 2- Learn their different systems through dissections via models and charts.

CO 3- Demonstration of major endocrine glands using model, charts and computer software's. CO 4- Study of antennal grooming in cockroach, phototactic response in tribolium. Chemical communication in earthworm, feeding of an insect pest.

CO 4- Measurement of pH, alkanity, chloride, hardness and dissolved oxygen.

## **B. Sc. Part-III**

### **Vertebrate And Evolution**

CO 1- Knowledge of classification of protochordates and Vertebrates up to orders.

CO 2- Knowledge of comparative anatomy of different organ system of chordates.

CO 3- Imparts the knowledge about theories and nature of evolution, adaptation, speciation, mimicry and coloration etc.

CO 4- Students are able to understand Fossils, Methods of fossilization, Determination of age of Fossils and Study of Extinct forms: Dinosaurs and Archaeopteryx.

CO 5- Gain Knowledge of Zoogeographical distribution, Evolution of Man, Geological time scale and insular fauna.

### **Animal Physiology**

CO 1- Students are taught the detailed concepts of digestion, respiration, excretion.

CO 2- Students able to understand the physiology of nerve impulse conduction, Structure of muscles and theory of muscle contraction and its biochemistry.

CO 3- Outline the key components of the innate and adaptive immune responses.

CO 4- Gather knowledge on types of immunity, antigen-antibodies reaction and their properties, vaccines, diseases.

CO 5- Described the Infectious diseases, hypersensitivity, autoimmune disorders, and immunodeficiency diseases. 4

### **Developmental Biology**

CO 1- Understood and mastered on the basic concepts of developmental biology.

CO 2- Understood how fertilization, cleavage and gastrulating occur.

CO 3- Understood the basic concepts of organogenesis.

CO 4- Understood about the basic concepts of growth, regeneration and ageing

CO 5- Described the test tube baby and placenta ion in mammals.

### **Lab**

CO 1- Study of Museum specimens and slides related to vertebrate studied in theory. CO 2- Understood the anatomy and physiology of invertebrate and vertebrate animals by dissection simulation.

CO 3- Studied the histological slides of different visceral organs and endocrine glands.

CO 4- Skill development for the observation of blood cells and blood grouping and hemoglobin.

CO 5- Understood the mechanism of developing embryo of chick and frog.

## **Department: Botany**

### **Programme Outcomes, Programme Specific Outcomes And Course Outcomes**

#### **UG Programme-B.Sc**

#### **Program Outcomes**

PO1. Knowledge and understanding of: 1.The range of plant diversity in terms of structure, function and environmental relationships. 2. The evaluation of plant diversity. 3. Plant classification and the flora of Maharashtra. 4. The role of plants in the functioning of the global ecosystem. 5. A selection of more specialized, optional topics. 6. Statistics as applied to biological data.

PO2. Intellectual skills – able to: 1. Think logically and organize tasks into a structured form. 2. Assimilate knowledge and ideas based on wide reading and through the internet. 3. Transfer of appropriate knowledge and methods from one topic to another within the subject. 4. Understand the evolving state of knowledge in a rapidly developing field. 5. Construct and test hypothesis. 6. Plan, conduct and write a report on an independent term project.

PO3. Practical skills: Students learn to carry out practical work, in the field and in the laboratory, with minimal risk. They gain introductory experience in applying each of the following skills and gain greater proficiency in a selection of them depending on their choice of optional modules. 1. Interpreting plant morphology and anatomy. 2. Plant identification. 3. Vegetation analysis techniques. 4. A range of physiochemical analyses of plant materials in the context of plant physiology and biochemistry. 5. Analyze data using appropriate statistical methods and computer packages. 6. Plant pathology to be added for sharing of field and lab data attained.

PO4. Transferable skills: 1. Use of IT (word-processing, use of internet, statistical packages and databases). 2. Communication of scientific ideas in writing and orally. 3. Ability to work as part of a team. 4. Ability to use library resources. 5. Time management. 6. Career planning.

PO5. Scientific Knowledge: Apply the knowledge of basic science, life sciences and fundamental process of plants to study and analyze any plant form.

PO6. Problem analysis: Identify the taxonomic position of plants, formulate the research literature, and analyze non reported plants with substantiated conclusions using first principles and methods of nomenclature and classification in Botany.

PO7. Design/development of solutions: Design solutions from medicinal plants for Health problems, disorders and disease of human beings and estimate the phytochemical content of plants which meet the specified needs to appropriate consideration for the public health.

PO8. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and development of the information to provide valid conclusions.

PO9. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern instruments and equipment's for Biochemical estimation, Molecular Biology, Biotechnology, Plant Tissue culture experiments, cellular and physiological activities of plants with an understanding of the application and limitations.

PO10. The Botanist and society: Apply reasoning informed by the contextual knowledge to assess plant diversity, its importance for society, health, safety, legal and environmental issues and the consequent responsibilities relevant to the biodiversity conservation practice.

PO11. Environment and sustainability: Understand the impact of the plant diversity in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO12. Ethics: Apply ethical principles and commit to environmental ethics and responsibilities and norms of the biodiversity conservation.

PO13. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO14. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO15. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO16. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

## **Course Outcomes**

### **B.Sc. Part-I**

#### **Paper – 1 Diversity of Microbes and Cryptogams (Thallophytic)**

CO1: To understand structure and types of Viruses, Bacteria, Algae and Fungi. CO2: To study internal structure and reproduction of Thallophyta.

CO3: To aware about economic importance of Viruses, Bacteria, Algae and Fungi. CO4: To understand about various plant disease.

#### **Paper – 2 Diversity of Cryptogams (Bryophyta, Pteridophyta, and Paleobotany)**

CO1: To understand the structure of both living and fossil Bryophyta, Pteridophyta.

CO2: To understand General characteristics and classification of bryophytes and pteridophytes and their economic importance.

CO3: To learn about fossils and Techniques of fossils study.

#### **Paper – 3 Cell Biology, Genetics and Plant breeding**

CO1: To understand about prokaryotes and eukaryotes.

CO2: To understand Chromosome organization, Genetic Inheritance, Gene expression, Genetic Variations.

CO3: To understand Methods of plant breeding.

6

### **B.Sc. Part-II**

#### **Paper – 1 Diversity & Systematics of Seed plants- Gymnosperms**

CO1: To understand structure and types of living and fossil Gymnosperms.

CO2: To study internal structure and reproduction of Gymnosperms.

CO3: To aware about economic importance and distribution of Gymnosperms.

### **Paper – 2 Diversity & Systematics of Seed plants- Angiosperms**

CO1: To understand origin and Evolution of Angiosperms

CO2: To understand brief history aims and fundamental components of Angiosperms taxonomy.

CO3: To understand Diversity of flowering plants with salient features of some families.

### **Paper – 3 Structure Developments and Reproduction of Flowering Plants**

CO1: To understand about basic body plan of flowering plant.

CO2: To understand about shoot system, meristem and root system.

CO3: To understand significance of seed.

## **B.Sc. Part-III**

### **Paper – 1 Plant Physiology and Biochemistry**

CO1: To understand some important physiological activities in plants.

CO2: To study about photosynthesis, respiration, nitrogen and lipid metabolism.

CO3: To understand about growth regulators.

### **Paper – 2 Ecology and Phytogeography**

CO1: To understand plant and environment relation.

CO2: To study about various type of plants (Morphology and Anatomy).

CO3: To understand about biogeographically regions and Environmental pollution.

### **Paper – 3 Biotechnology and utilization of plants**

CO1: To understand about tools and techniques of biotechnology.

CO2: To understand about food plants, vegetable oils and fibers.

CO3: To understand general account of spices, medicinal plants and beverages.

### **Paper-I: Diversity of Microbes and Cryptogams (Thallophyta)**

On completion of the course, students are able to:

PSO1: Understand the diversity among Algae.

PSO2: Know the systematic, morphology and structure, of Algae. Understand the life cycle pattern of Algae.

PSO3: Understand the useful and harmful activities of Algae. PSO4: Understand the Biodiversity of Fungi

PSO5: Know the Economic Importance of Fungi

PSO6: Understand the morphological diversity of Bryophytes. PSO7: Understand the economic importance of the Bryophytes.

### **Paper II: Diversity of Cryptogams (Bryophyta, Pteridophyta & Paleobotany)**

On completion of the course, students are able to:

PSO1: Understand the morphological diversity of Bryophytes and Pteridophytes

PSO2: Understand the economic importance of the Bryophytes and Pteridophytes.

PSO3: Know the evolution of Bryophytes and Pteridophytes

PSO4: Understand the habit of the Bryophytes and pteridophytes

PSO5: Know the vegetative characteristics of cryptogames.

PSO6: Learn about the reproductive characteristics of the cryptogams

PSO7: Understand the basic concepts of Paleobotany

### **Paper-III: Cell Biology, Genetics & Plant breeding:**

On completion of the course, students are able to:

PSO1: The eukaryotic cell cycle and mitotic and meiotic cell division

PSO2: Structure and organization of cell membrane

PSO3: Process of membrane transport and membrane models PSO4: Mendelian and Neo-mendelian genetics

PSO5: To study the phenomenon of dominance, laws of segregation, independent assortment of genes.

PSO6: To understand the different types of genetic interaction, incomplete dominance, codominance, inter allelic genetic interactions, multiple alleles and quantitative inheritance etc.

PSO7: To understand different methods of crop improvement .hybridization, inbreeding depression.

### **B.Sc. Part II**

#### **Paper I: Diversity and Systematic of seed plants-Gymnosperms**

On completion of the course, students are able to understand

PSO1: Know the scope and importance of the Systematic of Gymnosperms

PSO2: Understand plant communities and ecological adaptations Gymnosperms.

PSO3: To understand morphology and anatomy of gymnosperm.

PSO4: To understand reproduction in Gymnosperm.

PSO5: To understand economic importance of Gymnosperm.

#### **Paper II: Diversity and Systematic of seed plants-Angiosperms**

PSO1: Know the scope and importance of Taxonomy.

PSO2: Understand different families of angiosperms.

PSO3: Know the concept of methodology in taxonomy.

PSO4: To understand the technique of herbarium preparation.

PSO5: To understand the importance of botanical garden.

#### **Paper III: Structure, Development and Reproduction of Flowering plants**

On completion of the course students are able to:

PSO1: Understand nature of basic plant body.

PSO2: Understand about meristem of plants and Morphological and Anatomical study of vascular plants

PSO3: Importance of endosperm.

### **B.Sc. Part-III**

#### **Paper 1 Plant Physiology and Biochemistry**

On completion of the course students are able to understand

PSO1: Know importance and scope of plant physiology.

PSO2: Understand the plants and plant cells in relation to water.

PSO3: Understand the process of photosynthesis in higher plants with particular emphasis on light and dark reactions, C3 and C4 pathways.

PSO4: Understand the respiration in higher plants with particular emphasis on aerobic and anaerobic respiration.

PSO5: Learn about the movement of sap and absorption of water in plant body PSO6: Understand the plant movements.

#### **Paper 2 Ecology and Phytogeography**

On completion of the course students are able to understand

PSO1: To understand various types of food chain, food web.

PSO2: To understand various phytogeographical regions.

PSO3: To understand the importance of CDM, Greenhouse effect.

### **Paper 3 Biotechnology and utilization of plants**

On completion of the course students are able to understand

PSO1: To understand tissue culture technique

PSO2: To understand importance of vectors.

PSO3: To understand use of different crop plants.

## **Department: Arts**

### **Programme Outcomes, Programme Specific Outcomes And Course Outcomes**

#### **UG Programme-B.A.**

## **English Literature**

### **Programme Outcome**

English Literature is a “magic casement” opening an entire new world of deep & profound ideas, enormous opportunities and limitless possibilities.

The scope of this course is immense. It offers plethora of opportunities to the students like research, creative writing, teaching, journalism etc.

PO1: Students develop intellectual flexibility, creativity and cultural literacy so that they may engage in lifelong learning.

PO2: Students develop the acumen of effective reading and writing skills.

PO3: They can write short story, compose verse, become script writer.

PO4: They can work as journalist, freelance writer, counselor, orator, anchor, translator, critic, and educator.

PO5: Expands the horizon of thinking.

PO6: The programme enables learners to appreciate a wide range of literacy or creative texts.

PO7: To sharpen critical, creative and analytical skills.

### **Programme Specific Outcomes**

PSO1: Literature broadens the learning spectrum of the students by introducing them to different cultures and social structures.

PSO2: After the completion of course the students are ready to take up the special studies in language and literature.

PSO3: Students go for higher studies like PG in English literature or linguistics.

PSO4: Literature provokes thoughts. It enables students in understanding all kinds of human behaviors, mindset of people and makes them more flexible in accepting even strange actions of human beings.

PSO5: Literature makes students more adaptable; it guides them towards life by providing them a general idea about human life.

PSO6: Reading literature augments vocabulary, comprehension and writing skills.

PSO7: Builds confidence in handling of English language.

PSO8: Inculcates feelings of togetherness, empathy and harmony.

PSO9: Acquaints the students with the nuances of literature.



## **Course Outcomes**

### **B.A. Part-I**

#### **Paper I-Poetry & Drama**

- CO1: Students are acquainted with poetry, drama and their various forms.
- CO2: To develop a taste for poetry reading and writing.
- CO3: To develop aesthetic sense of students. CO4: To develop imagination in students.
- CO5: Students learn Drama-its origin, its types and various dramatic devices.
- CO6: Drama helps to enhance language and communication skills.
- CO7: Drama develops emotional intelligence.
- CO8: Drama nurtures creativity.
- CO9: Literacy terms and devices, helps the students in understanding the effective ornamentation and euphemism of poetry.
- CO10: Literacy ages, prescribed in the syllabus, make the students learn and understand the writers and their works in accordance to the socio-political and cultural situations and popular themes of that particular age in a better way.
- CO11: It will help and enable the students in understanding literary language, archaic speech and allusions.

#### **Paper-II Prose & Fiction**

- CO1: Students learn prose and its forms.
- CO2: It enables the students to understand the passage, to read fluently, to enrich vocabulary and enjoy reading and writing.
- CO3: Enhance the writing skills of the students.
- CO4: Understand a passage and grasp its meaning.
- CO5: Students understand the definition, structure, history of fiction.
- CO6: Understand the elements of novel.
- CO7: Explain themes and plot construction.
- CO8: Understands the nuances of characterization.
- CO9: Describe and explain setting of novels.
- CO10: Relate the novel to the real life.
- CO11: To Read and comprehend the themes of the essays.
- CO12: Read the essays of eminent writers such as G.B. shaw, Aldous Huxley, Priestley etc.
- CO13: Read the stories of prominent authors such as Anton Chekhov, Leo Tolstoy, Arthur Conan Doyle etc.

### **B.A. Part-II**

#### **Paper I- Poetry & Drama**

- CO1: Students are acquainted with poetry and its various forms.
- CO2: To enable students to read the poem with correct rhyme and rhythm.
- CO3: Use proper pattern of intonation.
- CO4: Read biographies and literary compositions of great poets like Gray, Keats, Shelley etc.
- CO5: Students learn Drama-its origin, its types and various dramatic devices.

- CO6: Drama augments performance skills.  
 CO7: Students acquire analytical skills to make critical and rational judgements.  
 CO8: Understanding dramatic art forms and the ability to express themselves imaginatively and effectively.  
 CO9: Read the biography and play of eminent dramatist John Galsworthy.  
 CO10: Drama helps to enhance language and communication skills.  
 CO11: Poetry develops aesthetic sense in students.

### **Paper-II Prose & Fiction**

- CO1: Students learn prose and its forms.  
 CO2: To read with correct pronunciation, stress, pause.  
 CO3: Enhance the writing skills of the students.  
 CO4: It enables the students to understand the passage, to read fluently, to enrich vocabulary, and enjoy reading and writing.  
 CO5: Understand a passage and grasp its meaning.  
 CO6: Read essays of eminent writers like Bacon, Lamb, Hazlitt etc.  
 CO7: Students understand the definition, structure, history of fiction.  
 CO8: Explain themes and plot construction.  
 CO9: Understand the nuances of characterization.  
 CO10: Read the biographies and short stories of prominent authors like-Narayan, Faulkner, Maugham etc.  
 CO11: Read the novel of one of the greatest tragic novelists, Thomas Hardy.

## **B.A. Part- III**

### **Paper I-Poetry & Drama**

- CO1: Students are acquainted with poetry, drama and their various forms  
 CO2: To develop a taste for poetry reading and writing.  
 CO3: To develop aesthetic sense of students.  
 CO4: Students learn Drama-its origin, its types and various dramatic devices.  
 CO5: Drama helps to enhance language and communication skills.  
 CO6: Drama nurtures creativity.  
 CO7: Literary Terms and devices, helps the students in understanding the effective ornamentation and euphemism of poetry.  
 CO8: Literary ages help students in understanding authors and their works in the context of social and cultural situations of their era.  
 CO9: Read biographies and compositions of great poets like Tennyson, Arnold, Browning etc.

### **Paper-II Prose & Fiction**

- CO1: Students learn prose and its forms.  
 CO2: It enables the students to understand the passage, to read fluently, to enrich vocabulary and enjoy reading and writing.  
 CO3: Enhance the writing skills of the students.  
 CO4: Explain themes and plot construction.  
 CO5: Understanding the nuances of characterization.

CO6: To read and comprehend the themes of the essays.

CO7: Students understand the definition, structure and history of fiction.

CO8: Understand the passage and grasp its meaning.

CO9: Read the essays of eminent writers such as Lucas, Gardiner, Belloc etc.

CO10: Read the stories of prominent authors such as Hawthorne, O'Henry, Raja Rao etc

## **Department: Arts**

### **Programme Outcomes, Programme Specific Outcomes And Course Outcomes**

#### **UG Programme-B.A.**

### **Sociology**

#### **Program Outcome**

PO1: After the completion of course graduates may be prepared to pursue further education in sociology or related fields at the graduate level.

PO2: They should also be equipped for careers in various fields, including social services, public policy, education, research, eligible for M.A., eligible for B.Ed., eligible for UPSC/PSC exams and eligible for MSW.

PO3: Students will get information about various employment opportunities in government, corporate, N.G.O. and self-employment sector.

#### **Program Specific Outcomes**

Student can obtain higher education.

PSO1: Useful to understand sociology and social sciences.

PSO2: Important to study society in a scientific way.

PSO3: Useful for developing positive thinking towards life.

PSO4: Useful in personality development.

PSO5: Understanding of Sociological concept

PSO6: Graduates should have an understanding of cultural diversity and its impact on society.

PSO7: Graduates should be able to work effectively in group settings, whether in research teams or in community-based projects. They should be able to collaborate with diverse groups of people.

#### **Course Outcomes**

#### **B.A I Year**

#### **Paper I -Principles of Sociology**

In this Paper students can learn about basic and nature of sociology.

CO1: The conceptual learning of Society, Social group, social structure, Basic concepts of society, social control, social stratification and mobility, social institution etc. will help students in their day to day living.

CO2: Useful for making aware of various forms of social change.

CO3: By studying this paper students will get information about various employment opportunities in government, corporate, N.G.O. and self-employment sector.

### **Paper II- Indian Society**

CO1: Understand structure of Indian society, useful in terms of Basic institution of Indian society, concept of Dharm, Varn-system, Ashram-system, Karm and Sanskar.

CO2: Understand the process of social change (Sanskritization, Westernization and Urbanization), caste, Kinship, Family and Marriage etc.

CO3: The student will have enhance comprehension of Indian traditions and the opportunity to explore and express them.

## **B.A. Part II**

### **Paper I-Social Thinker**

CO1: Understand knowledge of social theories of sociological thinkers.

CO2: This knowledge helps student to develop interest in further study in Sociology.

CO3: Syllabus includes Emile Durkheim- Theory of Suicide, Theory of Religion and Theory of social fact, Max Weber's Social Action and Bureaucracy.

CO4: The Principles of all Sociologist are useful with a view to motivate the students to see the change and development happening in the society from a scientific point of view.

### **Paper II-Social Anthropology**

CO1: Understand the approaches to the study of social Anthropology, social structure, various theories of origin of Family and Religion.

CO2: This knowledge helps students to understand social structure of day by day living, customs and traditions etc. understand about primitive Economic and Political system.

CO3: Understand the detailed study of tribes meaning, tribal development, tribal problems etc.

## **B.A. Part III**

### **Paper I –Survey Methods of Social Investigation**

CO1: Knowledge of social research methods help in comprehending and exploring social studies scientifically.

CO2: Students obtain knowledge of social research, importance of scientific methods, basic steps of scientific research.

CO3: Knowledge of research methodology, formulation of hypothesis, testing

CO4: Knowledge of case study, sampling method, techniques of data collection, questionnaire, interview, observation.

CO5: It is helpful in giving knowledge related to the research methods and facts collection related to their study topic.

CO6: Classification of data, meaning of statistics, presentation of data, use of computer in social research makes student with complete knowledge of social research method.

## Paper II- Social Problems of Contemporary India

CO1: Understand the usefulness of family problems- dowry, divorce, domestic violence, gender inequality, cyber-crime, problems of elderly etc.

CO2: Understand the Social problem and Social Disorganization, Structural Problems in contemporary India.

CO3: It is helpful in giving knowledge of Development Problems in Contemporary India such as Poverty, Unemployment, Illiteracy, Problems of Slums etc.

# हृदीहृभाग कार्यका परिणाम विििण पाठ्यक्र-स्नातक साहित्य:कर्यका परिणाम िारभाषा के प्रर्त रुझान

1. सघीय | राज्य स्तरीय प्रिासननक सेवा की प्रनतयोधगता, कननटठ ादक की प्रनतयोगी परीक्षा, मलवपकीय परीक्षा, अनव आहद क्षेत्रों िि िाने की अहताि |
2. स्नािकोििर हृदी और भाषा वृज्ञान ििे िाने की अहिता |
3. बी.एड. पाठ्यक्रम मे प्रवेश करने की अर्त्ता |
4. स्वरोजगार की दृिि से उपयुक्त |

## काहयका के हििहि परिणाम

1. साष्ट्यिक आलोचनात्मक ँववेक के ँवकास मे सार्योगी |
2. उच्चतर शिा प्राप्त करने मे उपयोगी |
3. मानवकी के अन्य ँवषयो की समझ प्राप्त करने मे उपयोगी |
4. ँवषयो मे साष्ट्यि अध्ययन से सवेदनशीलता ँव मानवीय गुणो का ँवकास र्ोगा |
5. ँदी की मूल अवधारणा ँव ँवषय तथा उसके उद्भव को समझना |
6. ँदी साष्ट्यि की दाशष्टनक पद्धतयो को ँस्तार से समझना ँव समझाना |
7. अतीत से वतमान तक ँदी की अवधारणा का मूल्ाकन करना और समाज को और करीब से बनाना |

## पाठ्यक्रम परिणाम

## बि.ए. प्रथम िर्

1. मध्यकाल के साहित्य और संस्कृत का ज्ञान। यर्वा रािीय गौरव की समझ षकृषत करने में उपयोगी।
2. इस पाठ्यक्रम के अध्ययन से छात्र ष्दी कृषता की लम्बी परम्परा से पररृषत र्ोगे।
3. ष्वषथयो के व्यक्तत्व का षकास र्ोगा, उनकी जीवन दृषि का षस्तार र्ोगा। षजससे वे जीवन और जीवन मूलोको समझ सकेंगे।
4. रचनात्मक कौशल में दक्षता आएगी षजससे उन्हें कई सभावनाए षमलेगी।
5. पाठ्यक्रम के माध्यम से छात्र बुषनयादी जानकारी से पररृषत र्ो सकेंगे।

## बि.ए. ह्तीय िर्

1. ष्दी साहित्य द्वारा अतीत में समाज और साहित्य के सम्बन्ध समझना।
2. षयोजनमूलक ष्दी की अथ अवधारणा व मरुत्व को समझना।
3. कायालयी पत्र लेखन दक्षता का षकास र्ोगा।
4. अनुवाद कौशल में दक्षता र्ोगी षजससे रोजगार प्रात्यप्त के अवसर षमलेंगे।
5. ष्वषथयो को काव्याग की जानकारी षमलेगी।
6. ष्दी की शब्द सपदा के षस्तार की जानकारी ष्राप्त करेंगे।
7. पत्रकाररता के स्वरुप को समझने से पत्रकाररता के क्षेत्र में रोजगार की जानकारी प्राप्त करेंगे।

## बि.ए. तृतीय िर्

1. भारतेनु र्रशचद्र की रािीयता की भावना को समझना।
2. ष्दी नाटक के षकास को समझना।
3. मोरन राके श द्वारा रृषत नाटक “आपदा का एक षदन” से रगमच पर मचन कर अपने कौशल का षकास करना।
4. छायावादी साहित्यकार षसाद, षनराला के जीवन दशन के साथ-साथ काव्य का वणन समझना।
5. ष्दी साहित्य में ष्वषन्न लेखको के योगदान का वणन करना।
6. आधुषनक काव्य-षववेक के षकास में सर्योगी।
7. आधुषनक युग और गद्य की समझ की दृषि से मत्वपूण।

## **Department: Arts**

### **Programme Outcomes, Programme Specific Outcomes And Course Outcomes**

#### **UG Programme-B.A.**

## **Geography**

### **Program Outcomes**

- PO1: To understand the scope and evolution of the diverse discipline of Geography.
- PO2: Recognize synthesis and evaluate diverse sources of knowledge, arguments and approaches pertinent to exploring human environment problems.
- PO3: Explain societal relevance of geographical knowledge and apply it to real world human-environment issues.
- PO4: An understanding and acknowledgment of the threats that endanger the earth's natural systems.
- PO5: This help in further realization of the significance of anthropogenic causes of many of the disaster and threats that puts life on this planet on the edge.
- PO4: Development of knowledge, skills and holistic understanding of the discipline among
- PO5: Encouragement of scientific mode of thinking and scientific method of enquiry in students.
- PO6: This goal is achieved through the regular field excursions conducted by the Department to various parts of India extensively and the writing of a report/thesis on it.
- PO7: Students become equipped with the ability to respond to both natural and man-made disasters and acquire management skills.
- PO8: This is attained through the curriculum by studying and analyzing hazards, disasters, their impact and management.
- PO9: Ability to undertake research in interdisciplinary studies and problems or issues beyond the realm of what strictly comes under the purview of geography.
- PO10: This is possible because of the varied nature of the curriculum that encompasses the study and analyses of concepts of sub-disciplines and allied disciplines of Geology, Seismology, penology, Management, Resource Management and conservation, Regional planning and development studies etc.
- PO11: To cover basic contents for various competitive examinations such as civil services, state level PSC exams, school education exams and so on.
- PO12: To extend knowledge of landform dynamics.
- PO13: To develop and understanding of theoretical concepts related with formation of the earth.
- PO14: To create strong foundation of various geomorphologic phenomena shaping the earth surface.

### **Program Specific Outcomes**

- PSO1: Student will gain the knowledge of physical geography. They will gather knowledge about the fundamental concepts of geography and will have a general understanding about the



geomorphic and geotectonic process and formation.

PSO2: Imbibing knowledge, skill and holistic understanding of the earth, atmosphere, oceans and the planet through analysis of land form development; crustal mobility and tectonics, climate change.

PSO3: Associating landforms with structure and process; establishing man-environment relationship; and exploring the place and role of geography vis-a-sis other social and earth sciences.

PSO4: Students can easily correlate the knowledge of physical geography with the human geography with the human geography.

PSO5: They will analyze the problems of physical as well as cultural environments of both rural and urban areas. Moreover they will try to find out the possible measures to solve those problems.

PSO6: Understanding the functioning of global economics, geopolitics, global geostrategic views and functioning of political systems.

PSO7: Developing a sustainable approach towards the ecosystem and the biosphere with a view to conserve natural systems and maintain ecological balance.

PSO8: The physical environment, human societies and local and/or global economic system are integrated to the principles of sustainable development.

PSO9: Including a tolerant mindset and attitude towards the vast socio-cultural diversity of India by studying and discussing contemporary concepts of social and cultural geography.

PSO10: Explaining and analyzing the regional diversity of India through interpretation of natural an planning regions.

PSO11: Analyzing the differential patterns of the human habitation of the Earth, through studies of human settlements and population dynamics, Understanding and accounting for regional disparities, poverty, unemployment and the impacts of globalization.

PSO12: Sensitization and awareness about the hazards and disasters to which the subcontinent is vulnerable; and their management.

PSO13: As a student of the course they will enrich their observation power through field experience and in future this will be helpful for identifying the socio-environmental problems of their community.

PSO14: Training in practical techniques of mapping, cartography, software, interpretation of map, photographs and images etc; so as to understand the spatial variation of phenomena on the Earth's surface. PSO15: They will learn how to prepare map based on G.I.S. by using the modern geographical map making techniques.

## **Course Outcomes**

The course outcomes of the different papers offered are presented below. After completion of the course the student will be able to:

### **B.A. Part-I**

#### **Paper-I-Physical Geography**

CO1: Understand the theories and fundamental concepts of Geotectonic and Geomorphology. Understand earth's tectonic and structural evolution.

CO2: Gain knowledge about earth's interior. Develop an idea about concept of plate tectonics, and resultant landforms.

CO2: Acquire knowledge about types of folds and faults and earthquakes, volcanoes and associated landforms.

CO3: Understanding crustal mobility and tectonics; with special emphasis on their role in landforms development.

CO4: Overview and critical appraisal of landform development.

CO5: Ability to record temperature, pressure humidity and rainfall.

CO6: Develop the skills of identification of features and correlation between them. CO7: Do field surveys using appropriate techniques.

CO8: Identification of rocks and minerals.

### **Paper-II-Geography of Environment**

CO1: Build an idea about ecosystems.

CO2: Learn about environment pollution and resources conservation.

CO3: Gain knowledge about concepts, scope of environment geography and components of classification.

CO4: Understand about resources and their classification. CO5: Develop on idea about human environment relationships.

### **B.A.-Part-I**

#### **Practical**

CO1: Learn the usage of survey instruments use of chain and type survey instruments. CO2: Learn concept of scales.

CO3: Interpretation of data through cartograms.

CO4: Develop on idea about different types of thematic mapping techniques.

### **B.A. Part-II**

#### **Paper-I-Human and Economic Geography**

CO1: Acquire knowledge on the history and evolution of human.

CO2: Gain knowledge about major themes of human geography.

CO3: Develop on idea about space and society.

CO4: Understand the approaches and processes of human geography as well as the diverse patterns of habitat and adaptations.

CO5: Assess the significance of Economics geography.

CO6: Analyze the factors of location of agriculture and industries.

CO7: Map and interpret data on production, economics activities, transport network and flows.

CO8: Understand the concept of economic activity. Gain knowledge about different type of economic activity.

#### **Paper-II-Geography of Rajasthan**

CO1: Understand the economic resources of Rajasthan.

CO2: Understand the social distribution of population of Rajasthan.

CO3: Evolution of the impacts of human activities on natural environments special reference of Rajasthan.

CO4: Develop an idea about regionalization of Rajasthan.

### **B.A. Part-II**

#### **Practical**

CO1: Interpret Hythergraph, climograph, climatograph, Line graph & Diagram.

CO2: Recognize the importance and application of statics in Geography.

CO3: Understand the weather instrument.

CO4: Learn to use various meteorological instruments.

### **B.A. Part-III**

#### **Paper-I-World Geography**

CO1: Describe what geography and world geography are

CO2: Locate and define the major cultural regions of the world.

CO3: Locate and define the major physical regions of the world.

CO4: Briefly explain major historical events and the impact of these events on world geography.

CO5: Describe and know the location and distribution of various economics systems.

#### **Paper-II-Geography of India**

CO1: Identification and explaining the Indian Geographical environment from global to local scales.

CO2: Understand the social distribution of population of the country.

CO3: Evolution of the impacts of human activities on natural environments special reference of India.

CO4: Understand about Indian resources and their classification.

### **B.A.-Part-III**

#### **Practical**

CO1: Knowledge different types of map projection.

CO2: Recognize the benefits and limitations of some common map projections and their use.

CO3: Use of prismatic compass.

CO4: Have expertise in identification of area of study, methodology, quantitative analysis, and conclusions to be drawn about the area-fundamental to geographical research.

CO5: Develop skills in photography, mapping and report writing.

**Department: Arts**  
**Programme Outcomes, Programme Specific Outcomes And Course Outcomes**  
**UG Programme-B.A.**  
**History**  
**2023-24**

**Program Outcomes**

- PO1: The attributes expected from the graduates of BA History are: knowledge of multiple perspectives.
- PO2: Through which significant developments in the History of the Indian subcontinent from earliest times up to the period after independence.
- PO3: Build critical ability through competing interpretations and multiple narratives of the past offer multi-causal explanations of major historical developments based on contextualized analysis of interrelated political, social, economic cultural and intellectual processes.

**Program Specific Outcomes**

- PSO1: Understand the basic themes, concepts, chronology and the Scope of Indian history.
- PSO2: Accent with range of issue related to Indian History that span distinct eras.
- PSO3: Understand the history of countries other than Indian India with comparative approach.
- PSO4: Think and argue historically and critically in writing and discussion.
- PSO5: Prepare for various types of competitive exams like-UPSC, RPSC, Teachers. Especially Civil services written exams and UGC-JRF.

**Course outcomes**  
**B.A. Part-I**

**Paper – I Ancient history (up to – 1200 AD)**

After completing this course, student will be able to know the geographical location of important historical sites/events.

- CO1: Know about the source of ancient Indian history.
- CO2: Prehistoric cultures in India, Rock Paintings. Harappan Culture-Origin, Vedic Religion & Literature.
- CO3: Rise of Magadha upto the Nanda. Jainism and Buddhism and their contribution to Indian culture.
- CO4: Chandragupta Maurya. Ashoka- his policies, Dhamma, Mauryan Administration, Art and Architecture.
- CO5: Know about Age of the Satvahanas and Foreign Power
- CO6: Pushyamitra Sunga, Gautmiputra Satkarni, Rudradaman I, Kanishka I. Sangam Literature, Society and culture.
- CO7: Know about the Gupta Dynasty and Land Revenue system. Economy, Trade and Commerce during Guptas, Art, Architecture, Literature, Philosophy Science and Technology during Guptas.
- CO8: Know about Vardhan Empire.
- CO9: Understand the Polity, Religion, Art & Culture: Pallav, Cholas-Chaulukyias and Rashtrakutas, features of Chola-Chaulukya administration.
- CO10: Tripartite struggle, Achievements of Vigraharaja Chahamana, Bhoja Paramar and Mihir

Bhoja. Factors leading to disintegration of Rajput States.

## **PAPER – II - Outline of History of Western World (15th to 20th Century)**

- CO1: Know about Renaissance & Importance of Renaissance
- CO2: Reformation: Causes, Early reformer, Role of Martin Luther, Progress of Reformation, Counter Reformation, Results and Impact.
- CO3: American War of Independence (1776)
- CO4: Know about Agricultural and Industrial Revolution
- CO5: French Revolution (1789): Causes, Main events and its Impact.
- CO6: Achievements Napoleon Bonaparte and developed understanding that what was the cause of downfall.
- CO7: Unification of Italy and Germany and how to develop Liberalism and Nationalism in Europe, Eastern question with special reference to Crimean War and Berlin Settlement.
- CO8: Nazism and Fascism. Bolshevik Revolution, Economic and Social reconstruction in Russia
- CO9: First World War, Versailles Settlement World Economic Depression, .
- CO10: Second World War and developed a understanding that how did league of nation and UNO formed and achievements of those institutions.
- CO11: Cold War and Non-Aligned Movement, Soviet disintegration.

## **B.A. Part-II**

### **Paper – I - Medieval India (1206-1740 A.D.)**

- CO1: Turkish Invasion and Rajput struggle
- CO2: Delhi Sultanate and consolidation - Mohammad Gori, Iltutmish, Razia and Balban Khalji Imperialism- Expansion in North and South India.
- CO3: Know about Economic and Administrative policy of Allauddin Khilji
- CO4: Mohamad Bin Tughlag : Planning and its failures, Firoz Tughlag : Agriculture reforms and public works
- CO5: Vijaynagar and Bahamani Kingdom and causes of their decline
- CO6: Babur's invasion, Establishment of Mughal Empire
- CO7: Humayun and Shershah and student will known the revenue system of shershah
- CO8: Expansion and consolidation of the Mughal empire under Akbar. Jahangir and Mewar, Role of Nurjahan in the Mughal court.
- CO9: Shahjahan and Deccan policy of Aurangzeb and how it downfall of Mughal Empire
- CO10: Maratha power of Shivaji and his administration.
- CO11: Religious and Rajput policy of the Mughals .
- CO12: We also developed students understanding about Literature, Architecture and Painting during the Mughal period
- CO13: Know about Mughal administration, Mansabdari and Land Revenue System.
- CO14: Bhakti Movement and Sufism during the medieval period.
- CO15: Economy, Trade and Commerce during the medieval period.

### **Paper II - Survey of Rajasthan History (From earliest times to 1956 A.D.)**

- CO1: Student will be get historical knowledge Kalibanga, Ahar, Bairath and other new sites. Matsya Janapad, Shivi and Malav Janpadas , Various theories of origin of Rajputs.
- CO2: Early Chauhan rulers and Prithvi Raj Chauhan III
- CO3: Achievements of Maharana Kumbha.

- CO4: Rise of Marwar under Maldeo  
 CO5: The policy of collaboration with Mughals and resistance of Rajput states with special reference to Man Singh of Amber, Rai Singh of Bikaner,  
 CO6: Rana Sanga and Maharana Pratap of Mewar and Chandrasen and Durgadas of Marwar.  
 CO7: Maratha penetration in Rajputana.  
 CO8: Know concept of Circumstances and consequence of the treaties of 1818 between Rajput rulers and company with Mewar, Marwar and Kota.  
 CO9: Uprising of 1857-causes and results with special reference to Kota.  
 CO10: Causes of political awakening in Rajasthan and Prajamandal movement in Rajasthan and Integration of Rajasthan ( 1948-1956  
 CO11: Peasant movement Bijolia and Barad, Tribal Movements Govind Giri and Motilal Tejawat and undertand that how the leaders will fight against injustice in that time. Various Schools of Rajasthani Painting with special reference to Bundi and Kota Fort  
 CO12: Bhakti movement in Rajasthan with special reference to Meera, Saint Dadu & Pipa, Sufism in Rajasthan  
 CO13: Arya samaj and its effects in Rajasthan.

### **B.A. Part-III**

#### **Paper – I - Modern Indian History (1740 – 1947 A.D.)**

- CO1: During decadent of Mughal power in Delhi and other state then how was foreign or European companies eatable in india? There will student got understand Third Battle of Panipat and its consequences, Marathas under Mahadi ji Sindhia and Nana Phadnavis, Maratha struggle with the British.  
 CO2: Establishment of British rule in Bengal and Mysore, Panjab and Awadh their struggle with British and their absorption in the British Empire.  
 CO3: East india company exploited Indian people then how did policies of britises became fan a fire to uprising 1857 first freedome struggle of Indians. CO4: Students will know about Growth of British paramouncy in the Princely States 1858-1947.  
 CO5: Main features of Permanent Roytwari and Mahalwari land revenue settlements and their impact on peasantry.  
 CO6: Drain of wealth and its consequences.  
 CO7: Economic impact of British rule.  
 CO8: Role of Moderates and Extremists, Revolutionary activities. Salient features of Government of India Act of 1919 and 1935.  
 CO9: Struggle for Freedom Movement from 1920 to 1947.

### **B.A. Part-III**

#### **Paper – II - Contemporary India (1947-2000 A.D.)**

- CO1: Know about Indian struggle from 1757 to 1947 against European's exploitative and oppressive policies.  
 CO2: In the 20<sup>th</sup> century our freedom fighter fight against them and remain legacy for us like some moral values and non-violence National integration, Social Equality, Women participation.  
 CO3: Know about Framing of Indian Constitution – Main features and major amendments  
 CO4: Bhudan Movement, Planned economy.

CO5: Industrialization-Policy, Programme and Progress.

CO6: Mixed economy, Green revolution, Nationalisation of Banks and abolition of Privy Purses, Liberalization.

CO7: Major Political parties and their role in democracy, From one party dominance to Coalition.

CO8: Foreign policy.

CO9: Changing social structure - population growth, unemployment, poverty, communalism.

CO10: Social movements- woman, dalits and other Backward Classes.

CO11: Role of middle class.

CO12: Progress and achievements in Science and technology, Changing trends in dance, music painting, Literature and Mass Media.

## **Department: Arts**

### **Programme Outcomes, Programme Specific Outcomes And Course Outcomes UG Programme-B.A.**

## **Drawing and Painting**

**2023-24**

### **Program Outcomes**

PO1: Motivate the students of drawing and painting towards self-employment.

PO2: Develop qualified and professional experts in multiple fields of drawing and painting.

PO3: Enhance the knowledge about the use of drawing & painting in all disciplines of present professional life and culture of society.

### **Program specific outcomes**

PSO1: Provide the mode of employment to the students in the field of drawing and painting and motivate them about the prosperity of our cultural diversity.

PSO2: Demonstrate skillful use of recent technological development in the field of drawing & painting.

PSO3: Realize them that Painting is most important and integral part of life it is a mode of expression which make the life it is a mode of expression which make the life beautiful.

PSO4: To encourage economic self-reliance through thematic education so that the student in mentally component to lead a worthy and confident life.

PSO5: Develop the ability of indecent artist and art exhibition on a large scale along with a leading capacity which can serve the group of people which associated with them.

PSO6: Prepare student young artist with morality spiritually empowered mind and responsible citizens of the nation.

PSO7: Aware them, about representation of the problem of our developing society and nation.

Program Educational Objectives: -

The program consists of discipline/core courses and foundation courses. The core courses drawing

and painting. The foundation courses are of two types-care and elective. These courses are designed in such a way that they help students in achieving their holistic personality and aesthetic dimensions of human existence.

It intends to dissolve all seeming binaries of life so that the students of Department can nature a harmonious and holistic personality.

It also develops a sense of ethical behavior nationalism, appreciating Indian culture and art.

The main objectives of the program are:

- To acquaint students with complex textures of Indian culture and art.
- The develop students wide understanding of and on the major concepts, thoughts and ideas of drawing and painting.
- The none students critical, creative, liberal, innovative and artistic thinking.
- The engage students in self-reflexivity and lifelong learning.
- To help students in integrating different aspects of physical, practical, aesthetic, moral and intellectual dimensions of education to develop a holistic personality of each student.
- To nurture an effective citizen with a strong artistic value base and ethics.
- To familiarize students with environmental contexts inclusivity, sustainable and aesthetically development.

### **Course outcomes**

#### **B.A.-Part-I**

#### **Paper-1 (Fundamental of Visual art)**



CO1: Knowledge of visual art-clearly communicate the content of their work visually orally and in writing, Through creative process use a variety of brainstorming techniques to generate novel ideas of value to solve problems.

CO2: Modern tool usages: - Learn select and apply appropriate method and procedures resources and modern art-related computing tools with an understanding of the limitations.

CO3: Recognize and understand major monuments artist, methods and theories and be able to assess the qualities of works of art in their historical and cultural settings apply reasoning informed by the contextual knowledge to asses societal, environmental, and legal issues and the consequent responsibilities relevant to the professional art practice.

### **B.A.-Part-II**

#### **Paper-I (History of Indian Art)**

CO1: Under India art, information about the art of prehistoric period is given about the painting of ancient art.

CO2: The characteristics of Ajanta art will be explained under Buddhist art.

CO3: Under Indian art painting styles of Rajasthan, Mughal style, Patna, Jain and pal styles will be taught.

CO4: Mohenjo-Daro will be taught under Indus valley civilization.

### **B.A.-Part-III**

#### **Paper-I (History of Western Art)**

CO1: In art of the west, the art prehistoric period will be explained to the students.

CO2: Egyptian Greek Roman classical arts will also be taught so that students can get acquainted with the arts of the west and learn something from them.

CO3: Information about arts like byzantine art, Gothic art, Rococo art etc. will be given in it and the biographies of artists of different movements will be taught to the students.

**Department: Arts**  
**Programme Outcomes, Programme Specific Outcomes And Course**  
**Outcomes**  
**UG Programme-B.A.**

## Political Science

### Program Outcomes

PO1: Students know the pros and cons of democracy, the sacrifices of freedom fighters.

PO2: Knowledge of India's constitutional and political machinery.

PO3: Inculcation of ethical, Moral, Philosophical values.

### Program Specific Outcomes

PSO1: Knowledge of the main tradition of western political thinkers to political thought.

PSO2: Knowledge of the basic concepts, principles and dynamics of public administration. PSO3: Get acquainted with the diverse political system of the world.

PSO4: Understand International law, human-rights, Women's rights & the Rights of minorities.

### Course Outcomes

#### B.A.-Part-I

#### Paper-I

**CO1: Political Theory:** - Students get knowledge about govt. formation and functioning. They also acquire sense of rights, equality Justice and democracy.

#### Paper-II

**CO1: Indian Political Thoughts:** - Kautilya, Nehru, Gandhi, Ambedkar, who shaped India's path are taught to the students preaching of such great thinkers prepare students for discussions debates and speeches.

#### B.A.-Part-II

#### Paper-I

**CO1: Indian Government and Politics:** - Students come to know how India won her freedom and what are their fundamental rights and duties.

#### Paper-II

**CO1: Comparative Governments:** - Constitutional and political aspects of Major countries like USA, UK, France, Swiss are imbibed into the Minds of students there by widening their vision.

#### B.A.-Part-III

#### Paper-I

**CO1: International Politics:** - Students come to know about the conflict and cooperation occurring at world arena, this is now a vision for peace emerges, among them.

#### Paper-II

**CO1: Western Political Thinkers:** - Various political philosophies are useful for the students, as they get knowledge of state's emergence, individual and state relation and different political and constitutional

norms and values.

**Department: COMPUTER SCIENCE**  
**Program Outcomes, Program Specific Outcomes and Course**  
**Outcomes,**  
**2023-24**  
**BCA**

**Program Outcomes**

- PO1-Helps the graduates to use and apply current technical concepts and practices in core computer applications.  
 PO2- Identify and analyze computer related problems and provide the solution for the problem considering legal, ethical and social issues.  
 PO3- Helps them to appear for various competitive exams.  
 PO4- Helps to develop handling of electronic gadgets and technological equipment  
 PO5- Helps to create employment opportunities through learning of computer service.  
 PO6- Develop Logical thinking.  
 PO7-Exhibit clarity on both conceptual and application-oriented skills of Computing, programming for higher studies in Post Graduate programs.  
 PO8-Student will be able to know various issues, latest trends in technology development and thereby innovate new ideas and solutions to existing problems.

**PROGRAMME SPECIFIC OUTCOMES**

- PSO1- To enable students have in depth knowledge of hardware and software components and applications.  
 PSO2- To enhance creative skills in the students through computer program.  
 PSO3- To enable employment opportunities through learning of computer service.  
 PSO4- To upgrade the logical thinking of the students.  
 PSO5- To develop handling of electronic gadgets and technological equipment.  
 PSO6- To pursue further studies to get specialization in Computer Science and Applications, Economics, Mathematics, business administration.  
 PSO7- To Work in the IT sector as programmer, system engineer, software tester, junior programmer, web developer, system administrator, software developer etc.  
 PSO8- To work in public sector undertakings and Government organizations

**Course Outcomes**

**Semester 1**

**Paper 1: Introduction to Information Technology**

- CO1: Understand fundamentals of Computer.  
 CO2: Discuss the basics of computer organization.

CO3: Understand basic knowledge of different number systems and their importance in reduction of errors.  
 CO4: Apply algorithm and draw flow charts for solving simple problems  
 CO5: fundamentals of computer networking, including network topologies, protocols, and services, as well as an introduction to the Internet and its technologies

### **Paper 2: Problem Solving Through C -Programming**

CO1: Understand the basic fundamentals and structure of C programming  
 CO2: Discuss concept of operators, library functions.  
 CO3: Formulate conditional and iterative statements to write C programs.  
 CO4: Conceive and Design the C programs that use arrays, strings, concept of modularization and user defined functions, structures and unions.  
 CO5: Analyze the concept of pointers and file handling

### **Paper 3: PC Software Packages**

CO1 Understanding the concept of input and output devices of Computers  
 CO2 Learn the functional units and classify types of computers, how they process information and how individual computers interact with other computing systems and devices.  
 CO-3 Understand an operating system and its working, and solve common problems related to operating systems  
 CO4 Learn basic word processing, Spreadsheet and Presentation Graphics Software skills. CO5 Study to use the Internet safely, legally, and responsibly

## **Semester 2**

### **Paper 1: Basic Mathematics4**

CO1 Represent data using various mathematical notions.  
 CO2 Explain different terms used in basic mathematics.  
 CO3 Describe various operations and formulas used to solve mathematical problems.  
 CO4 To impart knowledge regarding relevant topics such as set Theory, basic logic, graphs, trees or discrete probability.  
 CO5 To familiarize students with linear Algebra, differential and integral calculus, numerical methods and statistics.

### **Paper 2: Database Management System**

CO1 Able to understand various queries and their execution  
 CO2 Populate and query a database using SQL DML/DDI commands.  
 CO3 Declare and enforce integrity constraints on a database  
 CO4 Programming PL/SQL including stored procedures, stored functions, cursors, packages CO5 Able to design new database and modify existing ones for new applications and reason about the efficiency of the result

### **Paper 3: Data Communication and Computer Networking**

CO1 familiar with the different Network Models.  
 CO2 Understand different network technologies and their application.  
 CO3 update with different advanced network technologies that can be used to connect different networks  
 CO4 Understand the protocols, standards of data communication and various transmissions CO 5 Identify the types of multiplexing and its application such as telephone system, cellular system and mobile communications  
 CO6 Discuss data link control, data link protocols, local area networks CO4 Analyze and identify integrated services digital network and subscriber access to ISDN.

## **Semester 3**

### **Paper 1: Data Structures**

- CO1 Understand the concept of dynamic memory management, data types, algorithm and Big O notations.
- CO2 Design and implement various data structure algorithms.
- CO3 Implement linear and nonlinear data structures.
- CO4 Develop application using data structure algorithms.
- CO5 Compute the complexity of various algorithms

### **Paper 2: Digital Electronics**

- CO1: Became familiar with the digital signal, positive and negative logic, Boolean algebra, logic gates, logical variables, the truth table, number systems, codes, and their conversion from to others.
- CO2: Learn the minimization techniques to simply the hardware requirements of digital circuits, implement it, design and apply for real time digital systems.
- CO3: Understand the working mechanism and design guidelines of different combinational, sequential circuits and their role in the digital system design.
- CO4: Became able to know various types of components-ADC and DAC, memory elements and the timing circuits to generate different waveforms, and also the different logic families involved in the digital system.

### **Paper 3: Python Programming**

- CO1 Remember mathematical preliminaries for sets, languages and proof techniques
- CO2 Understand model of computation formal languages and automata
- CO3 Apply regular grammars and their automata for applications
- CO4 Apply context free grammars and their automata for real applications
- CO5 Understand different Turing machine automata

## **BCA -Part-II Semester 4**

### **Paper 1: Operating System**

- CO1 Understand the process management policies and scheduling of processes by CPU
- CO2 Describe the important computer system resources and the role of operating system in their management policies and algorithms
- CO3 Identify use and evaluate the storage management policies with respect to different storage management technologies
- CO4 Understand objectives & functions of Operating Systems.
- CO5 Understand Shell Programming concepts

### **Paper 2: Software Engineering**

- CO1 Understand and demonstrate basic knowledge in software engineering.
- CO2 Understand basic software engineering process models
- CO3 Design & develop the software projects.
- CO4 Identify risks, manage the change to assure quality in software projects
- CO5 Apply testing principles on software project and understand the maintenance concepts

### **Paper 3: Programming With Java**

- CO1 Understand the object-oriented programming concepts
- CO2 Formulate Java programs using class and objects that may include basic data types, operators, tokens and control flow constructs
- CO3 Understand and develop exception handling multithreaded applications with synchronizations and I/O
- CO4 Conceive the idea of JDBC architecture and Connectivity
- CO5 Design GUI based applications and develop applets for web applications

#### **Paper 4: Business communication**

- CO1. Demonstrate the use of basic and advanced business writing skills.
- CO2. Produce clear and concise written business documents.
- CO 3. Develop interpersonal communications skills that are required for social and business interaction.
- CO 4. Plan and conduct effective meetings.
- CO 5. Employ proper public speaking techniques.
- CO 6. Develop and deliver a formal presentation.
- CO 7. Employ proper telephone etiquette.
- CO 8. Communicate effectively in the online environment.

### **BCA -Part-III Semester 5**

#### **Paper 1: E-Commerce**

- CO1 Understand basics of electronic commerce framework.
- CO2 Understand the various models of E-Commerce
- CO3 Understand the basics of networks and E-marketing
- CO4 Understanding the security, legal and ethical issues in E-Commerce
- CO5 Analyzing the e-payment systems and designing the payment system

#### **Paper 2: Management Information System**

- CO1. Relate the basic concepts and technologies used in the field of management information systems;
- CO 2. Compare the processes of developing and implementing information systems.
- CO 3. Outline the role of the ethical, social, and security issues of information systems.
- CO 4. Translate the role of information systems in organizations, the strategic management processes, with the implications for the management.
- CO 5. Apply the understanding of how various information systems like DBMS work together to accomplish the information objectives of an organization.

#### **Paper 3: Web Technology**

- CO1 Understand the current technologies in internet.
- CO2 Learn the language of the web: HTML and CSS.
- CO3 Analyze a web page and identify its elements and attributes.
- CO4 To learn the basics of JavaScript programming

#### **Paper 4: Programming with PHP**

- CO1 Understand basic structure of the Internet
- CO2 Analyze a web page and identify its elements and attributes.
- CO3 Illustrate relationship between the client side and the server side scripts.
- CO4 Describe the general concepts of PHP scripting language for the development of internet websites.
- CO5 Apply the basic functions of MySQL database program.

#### **Paper 5: Cyber Security**

- CO1: Analyse and evaluate the cyber security needs of an organization.
- CO2: Conduct a cyber security risk assessment.
- CO3: Measure the performance and troubleshoot cyber security systems.
- CO4: Implement cyber security solutions.
- CO5: Be able to use cyber security, information assurance, and cyber/computer forensics software/tools.
- CO6: Identify the key cyber security vendors in the marketplace.
- CO7: Design and develop a security architecture for an organization.

CO8: Design operational and strategic cyber security strategies and policies.

### **Paper 6: Information Security**

CO1: Strategic alignment of information security with business strategy to support organizational objectives.

CO2: Risk management by executing appropriate measures to manage and mitigate risks and reduce potential impacts on information resources to an acceptable level.

CO3: Resource management by utilizing information security knowledge and infrastructure efficiently and effectively.

CO4: Performance measurement by measuring, monitoring and reporting information security governance metrics to ensure that organizational objectives are achieved.

CO5. Value delivery by optimizing information security investments in support of organizational objectives.

## **Semester 6**

### **Paper 1: Artificial Intelligence**

CO1 Understand the informed and uninformed problem types and apply search strategies to solve them.

CO2 Apply difficult real life problems in a state space representation so as to solve them using AI techniques like searching and game playing.

CO3 Design and evaluate intelligent expert models for perception and prediction from intelligent environment.

CO4 Formulate valid solutions for problems involving uncertain inputs or outcomes by using decision making techniques.

CO5 Demonstrate and enrich knowledge to select and apply AI tools to synthesize information and develop models within constraints of application area.

### **Paper 2: Data Science**

CO1 Use the core concepts and technologies of data science for data collection, management and data storage

CO2 To be able to apply various data analysis techniques on data sets.

CO3 To examine the various data visualization types and identify the type to be applied.

CO4 To investigate the applications of data science in various domains.

CO5 To examine recent trends in data collection and analysis techniques.

### **Paper 3: Cloud Computing**

CO1 To develop an understanding of computing paradigms and compare them.

CO2 To be able to choose a particular deployment model according to scenario.

CO3 Design and develop cloud and implement various services on cloud.

CO4 To develop an understating of virtualization technology and its different dimensions.

CO5 Investigate the issues and challenges in implementing cloud security and mobile cloud security.

CO6 Compare and contrast various open and proprietary cloud platforms

### **Paper 4: Data Warehousing**

CO1 Design Data Warehouses to solve real world problems

CO2 Assess the raw input data, and process it to provide suitable input for a range of data mining algorithms

CO3 Discover and measure interesting patterns from different kinds of databases

CO4 Evaluate and select appropriate data mining algorithms and apply, and interpret and report the output appropriately

CO5 Understand and deploy appropriate classification and clustering techniques

CO6 Implement the Data Mining techniques to conceptualize a Data Mining solution to a practical problem

**Department: Botany**  
**Programme Outcomes, Programme Specific Outcomes and Course**  
**Outcomes**  
**PG Programme-M.Sc.**  
**2023-24**  
**M.Sc.- Botany**

**Programme Outcomes**

At the end of Post Graduate Program at Maa Bharti PG College Kota, a student will have obtained:

- PO1: Attained profound Expertise in Discipline
- PO2: Acquired Ability to function in multidisciplinary domains
- PO3: Attained ability to exercise Research Intelligence in investigations and Innovations
- PO4: Learnt Ethical Principles and be committed to Professional Ethics
- PO5: Incorporated Self-directed and Life-long Learning
- PO6: Obtained Ability to maneuver in diverse contexts with Global Perspective
- PO7: Attained Maturity to respond to one's calling

**Program Specific Outcomes**

At the end of M.Sc. Botany at Maa Bharti PG College Kota, student will develop:

- PSO1: Differentiate plant groups according to their morphology, anatomy and genetics.
- PSO2: Practice the methodology followed in plant protection, propagation and improvement.
- PSO3: Understand the advanced concepts of physiology, biochemistry and molecular biology of plant and microbes.
- PSO4: Employ problem solving and laboratory skills pertaining to biological techniques and apply strategies for environmental conservation.
- PSO5: Adapt scientific methods in plant research.

**Course Outcomes**  
**Semester 1**

**Paper 1: Biology and diversity of Lower plants**

- CO1: To understand structure and types of Algae and Bryophyta.
- CO2: To study internal structure and reproduction of lower plants.
- CO3: To aware about economic importance of lower plants.

**Paper 2: Pteridophyta, Gymnosperm and Palaeobotany**

- CO1: To understand the structure of both living and fossil Gymnosperms and Pteridophytes.
- CO2: To equip the students to identify Gymnosperms in India.
- CO3: Familiarize students about fossilization and techniques in palaeobotany.

**Paper 3: Plant Physiology**

- CO1: To understand important physiological activities in plants.
- CO2: To familiarize activities of plant growth regulators.
- CO3: To demonstrate experiments that clearly explains the physiological activities in plants.

**Paper 4: Microbiology and Plant Pathology**

- CO1: To understand the structure and types of bacteria and viruses.



- CO2: Familiarize different methods of isolation of microbes.  
 CO3: To create floristic awareness about microbes.

## **Semester 2:**

### **Paper 1: Plant Ecology**

- CO1: To make students aware about ecological relationships.  
 CO2: To understand structure and function of ecosystem.  
 CO3: Create an insight about the extent of biodiversity and importance of their conservation.  
 CO4: Acquaint students about the significance of the environmental awareness

### **Paper 2: Plant Resource Utilization and Conservation**

- CO1: To study about plant diversity and importance of sustainable development  
 CO2: To study about recent innovations about green revolution  
 CO3: To study about international efforts and Indian initiatives regarding in situ conservation  
 CO4: To guide students about BSI, CSIR, DBT, ICAR and DBT

### **Paper 3: Cell and Molecular Biology**

- CO1: Equip students to identify different stages of cell division ( mitosis, meiosis)  
 CO2: To understand the mechanism of DNA replication, RNA synthesizing and processing, protein synthesis.  
 CO3: To create an insight about protein sorting and translation.  
 CO4: To create awareness about gene expression control in prokaryotes and eukaryotes.

### **Paper 4: Biochemistry**

- CO1: To enable the students to learn concept of energy flow and principles of thermodynamics  
 CO2: To enable the students to learn about biomolecules and its function in biological process.  
 CO3: To familiarize the students about different types of enzymes and their mechanism.  
 CO4: To create an insight about nitrogen metabolism.

- Semester 3: Paper 1: Plant development and Reproduction** CO1: To create an insight about plant development.  
 CO2: Development of skills regarding techniques of pollen pistil interaction  
 CO3: To make students aware about basic concepts of development of gametophytes.  
 CO4: To understand the significance of double fertilization, in vitro fertilization in plants.

### **Paper 2: Cytogenetic**

- CO1: Create awareness about numerical alterations in chromosomes.  
 CO2: Equip students to understand gene structure and expression.  
 CO3: To study the different types of mutations and their effects.  
 CO4: To understand about sex determination, sex linked inheritance, blood group and multi gene families.

### **Paper 3: Taxonomy of Angiosperms**

- CO1: To identify common plant species in Rajasthan.  
 CO2: To familiarize the standard field and herbarium techniques.

CO3: To understand the phylogeny of Ancestors of Angiosperms. CO4: To familiarize the medicinal and economic uses of plants.

#### **Paper 4: Advanced Plant Pathology - 1**

CO1: To familiarize students about importance of host parasite interaction and disease development.

CO2: To equip the students about various techniques of isolation, culture and inoculation of pathogens.

CO3: To familiarize the students about different plant diseases and their importance.

CO4: To aware the students regarding control of plant disease.

### **Semester 4:**

#### **Paper 1: Biotechnology and Biometrics**

CO1: Understand and familiarize the technological advancement in the field of biotechnology and biometrics.

CO2: To familiarize the students about germplasm conservation and cryopreservation.

CO3: To gain information regarding various tools and techniques of recombinant DNA technology.

CO4: To provide awareness about various methods of biometry.

#### **Paper 2: Plant morphology and Anatomy**

CO1: Create an insight about Anatomy of plant.

CO2: Make students aware about basic concepts of plant Morphology. CO3: To develop skills regarding modular type of growth.

CO4: To familiarize about plant growth and Canopy architecture.

#### **Paper 3: Seed biology and Plant Breeding**

CO1: To familiarize about Ecological adaptations in seeds.

CO2: To familiarize seed germination and seed dispersal mechanisms. CO3: To study the importance of different breeding techniques for crop improvement.

CO4: To familiarize the importance of heterocyst and inbreeding depression.

#### **Paper 4: Adv. Plant Pathology-II**

CO1: To understand the morphology, physiology and nature of virus and disease caused by them.

CO2: To familiarize students about Acquired immunity, interference and synergism.

CO3: To aware the students about importance of plant disease forecasting. Epiphytotics.

CO4: To familiarize students about various nematode and bacterial disease.

**Department: Chemistry**  
**Programme Outcomes, Programme Specific Outcomes and Course Outcomes**  
**PG Programme-M.Sc.**  
**2023-24**  
**M.Sc.- Chemistry**

First and second semester of M.Sc. Chemistry comprises Inorganic Chemistry, Organic Chemistry, Physical Chemistry and Biology/Mathematics for a Chemist along with practical exercises. We offer specialization in Organic Chemistry in the second year (III & IV) of the program.

**PROGRAM OUTCOMES**

M.Sc. Chemistry is a unique kind of course dealing with all aspects of chemistry including fundamental ideas about Inorganic, Organic, Physical, and Analytical Chemistry.

This course also includes fundamentals of Mathematics, Biology, Computer, and Industrial Techniques, etc. which are essential to a chemist to develop his/her overall presentation in the pharmaceutical, chemical, and other related industries. The major objectives of M.Sc. Chemistry course are:

PO1: To impart knowledge in fundamental aspects of all branches of the Chemistry with basic ideas of other subjects such as Mathematics, Biology, and Computer Applications in Chemistry.

PO2: To acquire basic knowledge in the specialized areas like Organic Chemistry, Heterocyclic Chemistry, Medicinal Chemistry, Pharmaceutical Chemistry, Industrial

Chemistry, Green Chemistry, Organic Synthesis, Polymer Chemistry, Bio-inorganic Chemistry, Physical Chemistry, Environmental Chemistry, Photo-inorganic Chemistry, Solid state Chemistry, Supra-molecular Chemistry and Electrochemistry, etc.

PO3: Students will be able to identify and solve chemical problems and explore new areas of research.

PO4: Students will be explored to interdisciplinary and multidisciplinary areas of chemical sciences and their applications.

PO5: Knows the proper procedures and regulations for safe handling and use of chemicals and can follow the proper procedures and regulations for safe handling when using chemicals

PO6: Students will be empowered with excellent critical thinking skills and problem solving abilities and will be able to communicate the results of their work to chemists and non-chemists.

PO7: Generate awareness of the benefits and impacts of chemistry related to the environment, society, and other disciplines outside the scientific community.

**PROGRAM SPECIFIC OUTCOMES**

PSO1: Provides a fundamental insight into the changes taking place in and around our fascinating nature.

PSO2: Understand the issues of environmental contexts and sustainable development through lectures, laboratory work, exercises, project work, and its independent master's thesis, students will gain knowledge about relevant working methods for research, industry, administration, and education

PSO3: Acquires ability to synthesize, separate and characterise compounds using laboratory and instrumentation techniques

PSO4: Develops analytical skills and problem-solving skills requiring application of chemical principles

PSO5: Know and predict the structure and bonding in molecules/ions

PSO6: Understand theoretical concepts of instruments that are commonly used in most chemistry fields as well as interpret and use data generated in instrumental chemical analysis

PSO7: Develop an understanding of eco-friendly chemical processes and impact of chemistry on health and environment.

## COURSE OUTCOMES SEMESTER-I

### Inorganic Chemistry (511)

CO1: Students would be able to understand about VSEPR theory and its limitations, Walsh diagrams (tri-atomic molecules),  $d\pi-p\pi$  bonds, Bent rule, behaviour of binary oxides.

CO2: Understand about Metal-Ligand Bonding in Metal Complexes, Limitations of crystal field theory, molecular orbital theory, and octahedral, tetrahedral and square planar complexes.

CO3: Student will get knowledge of Stepwise and overall formation constants and their interaction, determination of binary formation constants by pH metric and spectrophotometric methods.

CO4: Symmetry operations, symmetry elements, definition of group, subgroup, etc.

CO5: Introduction of character tables, formation of character tables of  $C_{2v}$  &  $C_{3v}$  Point Groups, relationship between reducible and irreducible representations, formation of Hybrid orbitals:

#### Books:

1. Advanced Inorganic Chemistry, F.A. Cotton and Wilkinson, John Wiley.
2. Inorganic Chemistry, J.E. Huhey, Harpes & Row.
3. Chemistry of the Elements. N.N. Greenwood and A. Earn show, Pergamum.

### Organic Chemistry (512)

CO1: Students will be able to recollect and familiarize the basic concepts of organic chemistry, to develop a deep knowledge in the students about organic chemistry.

CO2: Students will be able to have a well-defined idea on organic photochemistry and authenticated idea of stereochemistry of an organic compound.

CO3: They are able to know and understand about the conformational analysis of organic compounds

CO4: Understanding about the types of reaction mechanism, potential energy diagram, transition states and intermediates, methods of determining mechanisms.

CO5: Students will get knowledge about Aliphatic Nucleophilic Substitution Reactions and aromatic Nucleophilic Substitution Reactions.

#### Books

1. Reaction Mechanism in Organic Chemistry, S. M. Mukherjee and S. P. Singh, Macmillan.
2. Textbook of Organic Chemistry by P S Kalsi, New Age International
3. Organic Reactions, Stereochemistry and Mechanism (Through Solved Problems) by PS Kalsi, New Age
4. Stereochemistry of Carbon Compounds, Ernest L. Eliel, Tata McGraw Hill.

### Physical Chemistry (513)

CO1: Students will be able to understand about the Schrodinger equation and the postulates of quantum

3. Chemical mathematics, D.M. Hirst, Longman

mechanics.

CO2: They will get knowledge about the angular momentum, molecular orbital theory and Huckel Theory of conjugated systems and bond calculations.

CO3: Students will understand about the Huckel theory of conjugated systems and bond calculations.

CO4: Understand about the Chemical Dynamics and Methods of determining rate laws.

CO5: They will be able to acquire knowledge about adsorptions, micelles and about rubber and plastics under the study of macromolecules, Dynamics of chain reactions and Surface active agents, etc.

### **Books:**

1. Introduction to Quantum Chemistry, A.K. Chandra, Tata Mc Graw Hill.
2. Quantum Chemistry, R. K. Prasad,
3. Coulson's Valence, R.Mc Weeny, ELBS.
4. Chemical Kinetics. K.J. Laidler, McGraw-Hill.
5. Micelles, Theoretical and Applied Aspects, V. Moroi, Plenum.
6. Modern Electrochemistry Vol. 1 and Vol II J.O.M. Bockris and A.K.N. Reddy, Planum.

### **Biology For Chemists (514)**

CO1: Students will be able to understand about the basic structure and functions of cell and cell organelles with basic processes of their working.

CO2: They will get knowledge about the Carbohydrate units in nature, its important derivatives and their roles.

CO3: Students will understand about the structure and function of fatty acid derivatives and their modals.

CO4: Understand about the Amino acid metabolism and chemical and enzymatic hydrolysis of proteins.

CO5: They will be able to acquire knowledge about the structure and functions of Nucleic acids on their chemical basis.

### **Books:**

1. Principles of Biochemistry, A.L.Leninger, Worth Publishers.
2. Biochemistry, J. David Rawn, Neil Patterson.
3. Biochemistry, Voet and Voet, John Wiley.

### **Mathematics For Chemists (514)**

CO1: Students will be able to understand about the Basic mathematics such as matrix, algebra, determinants, etc.

CO2: They will get knowledge about the Basic concept of differential equation and Linear programming problems.

CO3: Students will understand about the Operation research-concept and applications of OR.

CO4: To Understand about the basic concept of Statistics and various mathematical charts.

CO5: They will be able to acquire knowledge about probability of events and statistical inferences.

### **Books:**

1. Mathematical statistics, Gupta and Kapoor
2. Operations Research, Kanti Swaroop
3. Chemical mathematics, D.M. Hirst, Longman

## **SEMESTER-II**

### **Inorganic Chemistry (521)**

CO1: Students would be able to understand about Reaction Mechanism of Transition Metal Complexes with respect to Energy Profile of a reaction, acid-base hydrolysis, conjugate mechanism, etc.

CO2: Understand about Reaction Mechanism of Transition Metal Complexes with respect to substitution reactions of square planar complexes, one electron transfer system, etc.

CO3: Student will get knowledge of Electromagnetic Spectra and Magnetic Properties of Transition Metal Complexes.

CO4: To study the important reactions of Metal carbonyls of metals, their preparation, bonding and structure.

CO5: Introduction of metal clusters like Higher Boranes, carboranes and metallocboranes with their structures and bonding.

#### **Books:**

1. Advanced Inorganic Chemistry, F.A. Cotton and Wilkinson, John Wiley.
2. Inorganic Chemistry, J.E. Huhey, Harpes & Row.
3. Chemistry of the Elements. N.N. Greenwood and A. Earnshaw, Pergamon.

### **Organic Chemistry (522)**

CO1: Students will be able to recollect and familiarize the basic concepts of free radical reactions, elimination Reaction mechanisms and their spectrum with orientations.

CO2: Students will be able to have a well-defined idea on addition to Carbon-carbon multiple bonds and Carbon-Hetero multiple bonds with mechanism and stereo chemical aspects.

CO3: They are able to know and understand about the photochemical reactions with basic principles and their reaction mechanisms.

CO4: Understanding about the photochemistry of carbonyl compounds and their photochemical reactions.

CO5: Students will get knowledge about Pericyclic reactions with their various types of reaction mechanisms of different compounds.

#### **Books:**

1. Reaction Mechanism in Organic Chemistry, S. M. Mukherjee and S. P. Singh, Macmillan.
2. Textbook of Organic Chemistry by P S Kalsi, New Age International
3. Organic Reactions, Stereochemistry and Mechanism (Through Solved Problems) by PS Kalsi, New Age
4. Stereochemistry of Carbon Compounds, Ernest L. Eliel, Tata McGraw Hill.

### **Physical Chemistry (523)**

CO1: Students will be able to understand about the concept of thermodynamics, partial molar constants, non-ideal systems, activity and its coefficients.

CO2: They will get knowledge about the concept of distribution, thermodynamic probability, heat capacity behaviour of solids and equilibrium constants.

CO3: Students will understand about the thermodynamic criteria for non-equilibrium states, entropy production and irreversible thermodynamics for biological systems.

CO4: Understand about the electrochemistry of ion solvent interaction, thermodynamics of electrified interface equations.

CO5: They will be able to acquire knowledge about the electrical double layer of metals and semiconductors-electrolyte interface and also be able to analyse the concept of Polarography.

**Books:**

1. Coulson's Valence, R.Mc Weeny, ELBS.
2. Chemical Kinetics. K.J. Laidler, McGraw-Hill.
3. Micelles, Theoretical and Applied Aspects, V. Moroi, Plenum.
4. Modern Electrochemistry Vol. 1 and Vol II J.O.M. Bockris and A.K.N. Reddy, Planum

**Computer Application in Chemistry (524)**

CO1: Students will be able to understand about the concept of general elements of computer systems and functions of its components like Hardware and Software.

CO2: They will get knowledge about the concept of MS Office and its components like MS Excel and MS PowerPoint.

CO3: Students will understand about the Elements of programming languages, introduction and application of windows.

CO4: Understand about the introduction to CAD and computer interface with instruments and laboratory

CO5: They will be able to acquire knowledge about the computation in chemistry such as Van der waals Equation, pH of solution, etc.

**Books:**

1. Computational Chemistry, A.C. Norris
2. Programming in basic problems solving with the true and style, Stewart M. Venit Jaico.
3. Computers in Chemistry, K.V. Raman (Tata Mc Graw Hill)

**SEMESTER-III**

**Chromatography (631)**

CO1: Students would be able to understand about separation techniques, chromatographic techniques' principles and types and supercritical fluids.

CO2: Understand about Thin layer chromatography and High performance thin layer chromatography technique and their principles.

CO3: Student will get knowledge of techniques and principles of Column Chromatography and Gas chromatography.

CO4: To study the important principles and techniques of High performance liquid chromatography and ion exchange or ion chromatography.

CO5: Introduction to theory and classification of electrophoresis and principle of capillary electrophoresis.

**Books:**

1. Chromatography: Basic principles, sample preparations and related methods by Elsa Lundanes, Leon Leubsaet, Tyge Grriebrog, John Wiley and Sons.
2. Principles and Practices of Chromatography by R.P.W. Scott, Library for science.
3. Instrumental Methods of chemical Analysis, B.K. Sharma, Goel Publishing house, Meerut.

**Spectroscopy (632)**

CO1: Students would be able to understand about electromagnetic radiations and spectroscopy of UV-Visible radiations.

CO2: Understand about Nuclear Magnetic Radiations Spectroscopy, Nuclear angular momentum, nuclear spin, etc.

CO3: Student will get knowledge of Carbon-13 NMR Spectroscopy, operating frequency, electron spin resonance spectroscopy and its basic principle.

CO4: To study the basic concept of mass spectroscopy, production on ions by electron impact.

CO5: Introduction of structure elucidation and an integrated approach based on analytical spectral data.

**Books:**

1. Introduction to Spectroscopy, Donald L. Pavia, Cengage Learning, 2009
2. Organic Spectroscopy, Jag Mohan, Narosa Publication
3. Introduction to Photoelectron spectroscopy, R.S. Drago, Saunders College

**Organic Synthesis (633)**

CO1: Students would be able to understand about Disconnection approach with synthons and synthetic equivalents, principle of protection of various functional groups.

CO2: Understand about One-group C-C disconnections and two-group C-C disconnection involving alcohols and carbonyl group.

CO3: Student will get knowledge of introduction to various oxidative processes and oxidation of Hydrocarbons.

CO4: To study the basic concept of different reductive processes and reduction of hydrocarbons.

CO5: Introduction to molecular rearrangements and general mechanistic considerations.

**Books:**

1. Organic Synthesis: The Disconnection approach, Stuart Warren, John Wiley and sons

2. Organic synthesis through disconnection approach by P.S. Kalsi



### 3. Organic synthesis, Smith M.B. Mc Graw Hill

#### **Heterocyclic Chemistry (634)**

CO1: Students would be able to understand about Nomenclature of Heterocycles, detailed introduction to aromatic and non- aromatic heterocycles.

CO2: Understand about three membered heterocycles with one and two heteroatoms and four membered heterocycles with oxygen, nitrogen and sulphur heteroatom.

CO3: Student will get knowledge of Five Membered Heterocycles with one and two heteroatoms of oxygen, nitrogen and sulphur.

CO4: To study the basic concept of six membered Heterocycles with one and two heteroatoms as Nitrogen and Benzo-fused Heterocycles of one and two heteroatoms as Nitrogen.

CO5: Introduction of six membered Heterocycles with one and two heteroatoms as Oxygen and Benzo-fused Heterocycles of one and two heteroatoms as Oxygen, also the medicinal importance of Seven-membered Heterocycles.

#### **Books:**

1. Heterocyclic chemistry Vol. I, II, and III, R.R. Gupta, M. Kumar and V. Gupta, Springer Verlag.
2. Heterocyclic Chemistry, J.A. Joule, K. Mills and G.F. Smith, Black Hall
3. An Introduction to Heterocyclic compounds, R.M. Acheson, John Wiley

### **SEMESTER-IV**

#### **Environmental Chemistry (641)**

CO1: Students would be able to understand the causes, monitoring and control of air pollution in nature.

CO2: Understand about various causes and types of water pollution with analysis of water for pollutants.

CO3: Student will get knowledge of the composition of soil, analysis of soil for pollutants and control of soil pollution.

CO4: Introduction to pollution from various industrial wastes and their treatment.

CO5: Introduction to various types of radioactive pollution and its prevention methods.

#### **Books:**

1. Environmental Chemistry, B.K. Sharma, 12<sup>th</sup> Edition (2011), Goel publishing house, Meerut
2. Environmental Chemistry, Colin Baird, W.H. Freeman.Co. New York, 1998

#### **Recent methods of Organic synthesis (642)**

CO1: Students would be able to understand the modern approaches of Organic synthesis such as principles of green Chemistry, reagents and catalysts.

CO2: Understand about solvents for Organic Synthesis, Supercritical Liquids and Ionic Liquids.

CO3: Student will get knowledge of Microwave Assisted Organic Synthesis, fundamentals of microwave technology.

CO4: Introduction to ultrasound assisted Organic Synthesis and electrochemical Organic Synthesis.

CO5: Introduction to Types of reactors and organic synthesis using reactors.

**Books:**

1. Green Chemistry: Theory and Practice, Paul T. Anastos and John C. Warner
2. Green chemistry: an introduction text by mike Lancaster, Royal society of Chemistry.

**Chemistry of Natural Products (643)**

CO1: Students would be able to understand the classification, nomenclature and occurrence of Terpenoids and Carotenoids.

CO2: Understand about definition, nomenclature and physiological action of various alkaloids.

CO3: Student will get knowledge of the occurrence, nomenclature and basic skeleton of steroids and hormones.

CO4: Introduction to structure and synthesis of Porphyrins and plant pigments and biosynthesis of Flavanoids.

CO5: Introduction to occurrence, nomenclature and classification of Prostaglandins, Pyrethroids and rotanones.

**Books:**

1. Organic chemistry: Vol. 2, I.L. Finar, ELBS
2. Stereoselective synthesis: a practical approach , M. Norgredi, V.C.H.

**Medicinal Chemistry (644)**

CO1: Students would be able to understand the drug discovery and development, isosterism, molecular modelling and drug design.

CO2: Understand about Pharmacokinetics and pharmacodynamics and clinical pharmacology.

CO3: Student will get knowledge of Anti-Cancer drugs, Oncogenes, tumour suppressor genes and treatment drugs.

CO4: Introduction to cardiovascular drugs and hypertensive drugs and its types.

CO5: Introduction to sedatives and hypnotic drugs, anti-depressant drugs and anti-psychotic drugs and its types.

**Books:**

1. Burger's medicinal Chemistry and drug discovery, all volumes
2. Medicinal chemistry, Ashutosh Kar, new age International, New delhi

**Department: Physics**  
**Programme Outcomes, Programme Specific Outcomes and Course Outcomes**  
**PG Programme-M.Sc.**  
**2023-24**  
**M.Sc.- Physics**

**Objective of the Programme**

The department of Physics M.Sc. programme for students which were based on syllabus and pattern of University of Kota, Kota. The programme comprised a total of 12 compulsory and 4 elective papers in M.Sc. The syllabus of each course is framed so as the programme is able to raise the scientific temper of the scholar and provide a firm foundation in every aspect of Physics and to explain a broad spectrum of modern trends in physics and to develop experimental, computational and mathematics skills.

- Develop professionally competent and ethically responsible individuals.
- Comprehend advanced knowledge in the core and specialization subjects with relevant practical inputs.
- Gain inter-disciplinary, multi-disciplinary professional competence as value additions.
- Establish professional responsibility through mini project, summer internship, major project, field trip/ industrial visit and mentorship programmes.
- Exhibit attitude, skills and knowledge of a well groomed personality working.
- Develop problem solving, decision making and communication Skills.
- Explore research interest with creativity, advanced technology and sensitivity towards sustainable environment practices.

**Programme Outcomes**

- PO1: To develop an ability to become a specialist in various areas of Physics and apply the same in day to day life.
- PO2: To acquire knowledge about the nature, concepts, methods, techniques and objectives in the core physics subjects.
- PO3: To make the students in mastering in the field of materials science and astrophysics and prepare them for research.
- PO4: To cultivate scientific approach and culture of research aptitude.
- PO5: To enhance the problem-solving skills of the students so that they will be able to tackle the national level competitive exams like NET, GATE and SET etc.
- PO6: To understand the links of Physics to other disciplines and also to the societal issues.
- PO7: To train the students to develop their skill development, employability and entrepreneurship skills.

**Programme Specific outcome**

- PSO1: Understanding the basic concepts of physics particularly concepts in classical mechanics, quantum mechanics, statistical mechanics and electricity and magnetism to appreciate how diverse phenomena observed in nature follow from a small set of fundamental laws through logical and mathematical reasoning.
- PSO2: Learn to carry out experiments in basic as well as certain advanced areas of physics such as nuclear physics, condensed matter physics, lasers and electronics.
- PSO3: Understand the basic concepts of certain sub fields such as nuclear and high energy physics, atomic and molecular physics, solid state physics, plasma physics, and general theory of relativity, nonlinear dynamics and complex system.

PSO4: Gain hands on experience to work in applied fields.

PSO5: Gain a through grounding in the subject to be able to teach it at college as well as school level.

PSO6: Viewing physics as a training ground for the mind developing a critical attitude and the faculty of logical reasoning that can be applied to diverse fields.

## **Course Outcomes**

### **Semester I**

#### **Paper I Mathematical methods of Physics**

CO1: Knowledge about Vector calculus.

CO2: Bessel Functions, Legendre Differential equations. CO3: Complex variable.

CO4: Laplace transforms, Fourier Series etc. and their physical significance is learnt by students. CO5:

These mathematical concepts are widely used in various physics derivations.

#### **Paper II Classical Mechanics**

CO1: The Lagrangian and Hamiltonian approaches in classical mechanics.

CO2: The classical background of Quantum mechanics and get familiarized with Poisson brackets and Hamilton -Jacobi equation.

CO3: Gained a clear understanding of Maxwell's equations.

CO4: Grasped the idea of electrostatics and Magnetostatics along with time varying fields.

#### **Paper III Quantum Mechanics –I**

CO1: Linear vector spaces, Hilbert space, concepts of basis and operators and bra and ket notation. CO2: Both Schrödinger and Heisenberg formulations and their applications.

CO3: Different types of Approximation methods.

CO4: Theory of angular momentum and spin matrices, orbital angular momentum and Clebsh Gordan Coefficients.

#### **Paper IV Advanced Electronics**

CO1: Introduction of Microwave linear beam tubes, microwave crossed beam tubes.

CO2: Clear understanding about Microwave transistor and tunnel diodes, Microwave FET, Charged coupled devices.

CO3: Complete study of Transmission lines and microwave measurements. CO4: Description of Junction Diode, LED etc.

CO5: Study of Optical fibers.

## **Semester II**

#### **Paper I Classical Electrodynamics-I**

CO1: Clear understanding of Maxwell's equations.

CO2: Know that laws of reflection, refraction are outcomes of electromagnetic boundary conditions.

CO3: They will also be able design dielectric coatings which act like antireflection coatings.

CO4: Boundary value problems in electrostatics.

CO5: Gauges in electrodynamics, retarded potentials and its applications.

CO6: Radiation from time varying source, charged particle dynamics and relativistic electrodynamics.

#### **Paper II Statistical Physics**

- CO1: The students will understand different types of ensembles, relation between statistics and thermodynamics.
- CO2: Quantum statistics and other related phenomena.
- CO3: Grasp the basis of ensemble approach in statistical mechanics to a range of situations.
- CO4: To learn the fundamental differences between classical and quantum statistics and learn about quantum statistical distribution laws.

### **Paper III Quantum Mechanics –II**

- CO1: Scattering theory and validity of Born approximations, partial wave analysis.
- CO2: Importance of relativistic quantum mechanics compared to nonrelativistic quantum mechanics.
- CO3: Various tools to understand field quantization and related concepts. CO4: Exposure to quantum field theory and universal interactions.
- CO5: Space-time symmetries and conservation laws, theory of identical particles.

### **Paper IV Atomic and Molecular Physics**

- CO1: Know about different atom model and will be able to differentiate different atomic systems, different coupling schemes and their interactions with magnetic and electric fields.
- CO2: Have gained ability to apply the techniques of microwave and infrared spectroscopy to elucidate the structure of molecules.
- CO3: Be able to apply the principle of Raman spectroscopy and its applications in the different field of science & Technology.
- CO4: To become familiar with different resonance spectroscopic techniques and its applications. CO5: To find solutions to problems related different spectroscopic systems.

## **Semester III**

### **Paper I Nuclear Physics- I**

- CO1: Basic nuclear properties: size, shape and charge distribution, spin and parity, Binding energy, semi-empirical mass formula.
- CO2: Analysis of the ground state ( $3S_1$ ) of deuteron using a square well potential, range depth relationship, excited states of deuteron.
- CO3: Nucleon-Nucleon Scattering and Potentials.
- CO4: Interaction of radiation and charged particle with matter. CO5: Experimental Techniques.

### **Paper II Classical Electrodynamics-II**

- CO1: Plane Electromagnetic Waves and Wave Equation.
- CO2: Magneto-hydrodynamics of conducting fluids and Plasma Physics.
- CO3: MHD equations, magnetic field lines, magnetic hysteresis, hydro-magnetic waves. CO4: Radiation by moving charges: Lienard-Wiechert Potentials for a point charge.
- CO5: Radiation damping, self-fields, of a particle, scattering and absorption of radiation by a bound system.

### **Paper III Solid State Theory**

- CO1: The students will understand different types of bonds in solids, differences between insulators, semi-conductors and conductors based on energy gaps, and biasing effects in pn junctions.
- CO2: The students will understand free electron bands in solids, imperfections in crystals, propagation of electromagnetic waves in solid.
- CO3: Introducing basic concepts via diffraction methods, lattice vibrations and free electrons, Hall Effect

CO4: Understanding the basic transport properties of metals and semiconductors. CO5: Their introduction to the band structures for studying different materials.  
CO6: Theoretical study of Linear Combination of atomic orbitals method, Density function theory, Hartree Fock methods.

#### **Paper IV Energy Studies-I**

CO1: Study of Solar Thermal Energy Conversion. CO2: Learning about concentrating collectors.  
CO3: Basic idea Solar Photovoltaic (SPV).  
CO4: Brief explanation of The Wind Power Generation: Physical principles, Betz limit.  
CO5: Study of Hydroelectric Power Generation: Principles, construction types and classification.

### **Semester IV**

#### **Paper I Nuclear Physics-II**

CO1: Complete study of nuclear shell model: Single particle and collective motions in nuclei.  
CO2: Study Collective nuclear models: Collective variable to describe the cooperative modes of nuclear motion.  
CO3: Evaporate the Nuclear gamma decay: Electric and magnetic multiple moments and gamma decay probabilities in nuclear system.  
CO4: Acquire knowledge about nuclear decay processes and their outcomes. Have a wide understanding regarding alpha, beta and gamma decay.  
CO5: Understand the basic forces in nature and classification of particles and study in detail conservations laws and quark models in detail.  
CO6: Basic properties of nucleus, its structure and different models that explain the behavior and characteristics.  
CO7: Basic theory of bound state of deuteron by scattering theory.  
CO8: Nuclear Reactions: Theories of Nuclear Reactions, Partial wave analysis of reaction Cross section.

#### **Paper II Solid State Theory**

CO1: Explanation about the Magnetic Properties of materials.  
CO2: Describe Electrical properties of metals, ionic materials and semiconductors.  
CO3: Understand the Thermal properties, thermal expansion, heat capacity, thermal conductivity. CO4: Evaporation Vacuum Techniques: basic idea of conductance, pumping speed, Vacuum Pumps, Mechanical Pump.  
CO5: Basic theory of X-ray diffraction, Indexing of Debye-Scherrer patterns from powder samples.

#### **Paper III Laser Physics**

CO1: Explanation of Spontaneous and Stimulated emission, Population inversion, Idea of laser. CO2: Describe different Type of LASER such He-Ne laser, Ruby laser etc.  
CO3: Basic idea about laser fluorescence and Raman scattering.  
CO4: Full explanation of Holography: Construction of hologram and reconstruction of the image. CO5: Understand basic ideas about optical Fibers, Light wave communication, Light propagation- total internal reflection.

#### **Paper IV Energy Studies II**

CO1: Complete explanation of Nuclear reactions: Introduction to fission and fusion nuclear energy.  
CO2: Brief explanation Interaction of Neutrons with Matter: Compound nucleus formation, elastic and inelastic scattering.  
CO3: Evaporate the Fission Reactor: The fission chain reaction, reactor fuels.  
CO4: Basic theory of Energy Conservation and Management: Thermodynamic basis of energy conservation. CO5: Acquire knowledge about green Buildings: Thermal comfort, classification of climate zones.

**Department: Zoology**  
**Programme Outcomes, Programme Specific Outcomes and Course**  
**Outcomes**  
**PG Programme-M.Sc.**  
**2023-24**  
**M.Sc.- Zoology**

**Program Outcomes**

- PO1- Develop deeper understanding of key concepts of zoology at molecular, cellular level, physiology and reproduction at organism level.
- PO2- Describe the role of taxonomy and systematics in animal studies and gain in-depth knowledge of animals including invertebrates and vertebrates.
- PO3- Place zoological knowledge in context and show an understanding of the way zoologists think and understand the needs of zoology in shaping our planet.
- PO4- Comprehend, interpret, general evolutionary relationships among and between different animal groups.
- PO5- Correlate between the various animal habitats, their behavior and during the course of evolution
- PO6- Learn the skills of handling various scientific equipment, designing and performing the laboratory experiments.
- PO7- Explore various applied fields with the knowledge of sericulture, apiculture, fisheries, poultry, vermiculture, dairy farms etc.
- PO8- Communicate the importance of ecological factors, biodiversity, environmental conservation processes, pollution control and protection of threatened species to the society
- PO9- Enhance their scientific temper and scientific thinking and exhibit creativity in designing, planning, problem solving, and model making for various scientific concepts

**Program Specific Outcomes**

- PSO 1- Used the evidences of comparative biology to explain how the theory of evolution offers the only scientific explanation for the unity and diversity of life on earth. They are able to use specific examples to explicate how descent with modification has shaped animal morphology, physiology, life history, and behavior.
- PSO 2- Explicated the ecological interconnectedness of life on earth by tracing energy and nutrient flows through the environment. They are able to relate the physical features of the environment to the structure of populations, communities, and ecosystems.
- PSO 3- Subjects such as invasive or endangered species, embryonic development in mammals and ageing in social insects. Lead to advances in medicine to prevent disease amongst both animals and human beings.
- PSO 4- Developed knowledge and understood of living organisms at several levels of Zoological and Biological organization from the molecular, through to cells and whole organisms and ecosystems all organs of evolutionary perspectives.
- PSO 5- Understood how the chemistry and structure of the major biological macromolecules, including proteins and nucleic acids, determines their biological properties.

## **COURSE OUTCOMES**

### **Semester-I**

#### **Animal Diversity**

- CO 1- Understood the Classification and Phylogeny of Animals
- CO 2- Described General characteristics, classification of invertebrates and vertebrates.
- CO 3- Described General characteristics, classification and systematic portion of Minor phyla
- CO 4- Described the general biology of few selected non-chordates and chordates which are useful to mankind?
- CO 5- Enriched knowledge on ecology of some important fishes, amphibians, reptiles, birds and mammals

#### **Biochemistry**

- CO 1- Identified the five classes of polymeric biomolecules and their monomeric building blocks.
- CO 2- Explained the specificity of enzymes (biochemical catalysts), and the chemistry involved in enzyme action.
- CO 3- Understood types, Structure, biochemical properties and functions of vitamins.
- CO 4- Metabolism of organic compounds leads ultimately to the generation of large quantities of ATP.
- CO 5- Structure and classification of hormones.

#### **Cell Biology**

- CO 1- Described the ultra-structure and functions of cell organelles.
- CO 2- Understood DNA replication, RNA and protein synthesis and came to know protein synthesis
- CO 3- can be controlled at the level of transcription and translation.
- CO 4- Understood cell signaling and cellular communication.
- CO 5- Described the oncogenes
- CO 6- Understood the types and applications of stem cells.

#### **Evolution And Biostatistics**

- CO 1- Came to know the data collection, tabulation and presentation.
- CO 2- Described the mean, median, mode and SD.
- CO 3- Understood the Analysis of Variance.
- CO 4- Described Student 't' test and probability
- CO 5- Understood the Correlation and Regression.

#### **Lab 1– Animal Diversity And Biochemistry 4**

- CO 1- Performed and understood the anatomy and physiology of animals by dissection.
- CO 2- Performed by experiments to analyze the macromolecules in animals
  
- CO 3- Understood the principles and types of PCR demonstration.
- CO 4- Described the fine structure and functions of cell organelles.
- CO 5- Performed a variety of molecular and cellular biology techniques.

#### **Lab 2– Cell Biology And Biostatistics**

- CO 1- Squash and Acetocarmine preparation of testis of Cockroach and Grasshopper
- CO 2- Study of Mitosis in Onion root tip.
- CO 3- Study of Giant chromosome in the salivary gland of chironomous larva/Drosophila larva.
- CO 4- Preparation of frequency table, histogram and line graph.
- CO5- Calculation of standard deviation and error.



## **SEMESTER-II**

### **Immunology And Biotechnology**

- CO 1- Outline the key components of the innate and adaptive immune responses.
- CO 2- Described about cell types and organs which are involved in an immune response
- CO 3- Described the Infectious diseases, hypersensitivity, autoimmune disorders, immunodeficiency diseases
- CO 4- Understood the microbial diversity, ultra structure, culture techniques of microbes.
- CO 5- Came to knowing about the various pathogenic fungi and viruses and beneficial microbes.

### **Taxonomy**

- CO 1- Introduction and importance of taxonomy.
  - CO 2- Concept of species.
  - CO 3- Taxonomic key character, type and uses. CO 4- Classification of invertebrate up to order. CO 5- Classification of vertebrates upto order
- ### **Genetics**
- CO 1- Described the fundamental molecular principles of genetics
  - CO 2- Understood the structure and function of DNA & RNA
  - CO 3- Understood about the transmission, distribution, arrangement, and alteration of genetic information and how it functions and is maintained in populations
  - CO 4- Described the basics of genetic mapping.

### **Animal Physiology**

- CO 1- An integrated Understanding of physiological mechanisms
- CO 2- Described the physiology of digestive and respiratory system of human beings.
- CO 3- Understood the blood composition, types, groups and circulatory system.
- CO 4- Described the physiology of excretory system and nervous system of human beings.
- CO 5- Came to know the physiology of sense organs, muscles and reproductive system.

### **Lab I–Biotechnology, Immunology And Taxonomy**

- CO 1- Determine the ABO blood group
- CO 2- Experiments about the immunodiffusion, Immunoelectrophoresis and Immunoelectrophoresis
- CO 3- Identification of Invertebrate using taxonomic key
- CO 4- Field trip

### **Lab II– Genetics And Physiology**

- CO 1- Problem based on Mendelism and gene interaction
- CO 2- Performed an experiment to culture Drosophila, Identifications of sex & mutants.
- CO 3- Observed ABO blood grouping
- CO 4- Study of ECG, Blood presser and Heart Beat
- CO 5- Blood film preparation and Identification of Cell.

## **SEMESTER-III**

### **Chordata**

- CO 1- Origin and outline classification of chordata.
- CO 2- Zoological time scale, origin evolution of vertebrate (agnatha and gnathostomata).
- CO 3- Origin and evolution of Pisces and Amphibia.
- CO 4- Origin and evolution of Reptiles

CO 5- Origin and evolution of Birds and mammals.

Ecology

CO 1- Demonstrated an Understood of ecological relationships between organisms and their environment.

CO 2- Presented an overview of diversity of life forms in an ecosystem. CO

Explained and identified the role of the organism in energy transfers CO

Described the Habitat ecology and Resource ecology

CO 5- Understood the Environmental Pollution and their management

### **Fish Biology-I**

CO 1- Geographical distribution character and classification of fishes.

CO 2- General account and phylogenetic significance of ostrachoderm and placoderm.

CO3- Integument, fin musculature, exoskeleton and coloration of fishes.

CO 4- Structure and function of fins, fish locomotion, migration. Swim bladder structure and function.

CO 5- Endoskeleton, weberian apperatus and its significance

### **Zoology Practical (General Paper)**

CO 1- Chordate taxonomy: Study of museum specimen

CO 2- General Anatomy of Herdmania and bony Fish

CO 3- Osteology: comparative study of skeleton of fish to mammal

CO 4- Histology: All mammalian tissues

CO 5- measurment of pH, alkanity, chloride, hardness and dissolved oxygen

CO 6- Field trip

### **Zoology Practical (Fish Biology)**

CO 1- Complete anatomy of teleosts: external features afferent and efferent branchial vessel, eye

muscles, and cranial nerves.

CO 2- Breathing organs of Anabus, Clarius, Channa.

CO 3- Permanent preparartion

CO 4- Microtomy

CO 5- Local fish and their identification

## **SEMESTER-IV**

### **Animal Behaviuor**

CO 1- Introduction of animal behaviour, orientation, methods of studying behaviour

CO 2- Types of behaviour and their regulation.

CO 3- Learning, instinctive behavior, hormones and behaviour.

CO 4- Social behavior in primates, behavior of domestic and zoo animals

CO 5- Reproductive behavior in fishes, behavioural genetics.

### **Developmental Biology**

CO 1- Understood and mastered on the basic concepts of developmental biology.

CO 2- Understood how fertilization, cleavage and gastrulating occur.

CO 3- Understood the basic concepts of organogenesis.

CO 4- Understood about the basic concepts of growth, regeneration and ageing

CO 5- Described the test tube baby and placentation in mammals.

### **Fish Biology-I**

CO 1- Survey and Biology of principle fisheries of India.

CO 2- Exotic fishes, larvivorous fishes, fish marketing, composite fish culture, cage culture.

CO 3- Methods of fishing, pond management and induced breeding.

CO 4- Fish preservation and processing, Fish and mankind.

CO 5- Inland fisheries resources, Eusterine fisheries and marine fisheries.

### **Fish Biology-Ii**

CO 1- Estimation of population. Age and growth determination.

CO 2- Limnology, Plankton and its significance. Fisaheries management and conservation.

CO 3- Water pollution and fisheries.

CO 4- Diseases of fishes. Specialised organs: electric orgean, sound producing organs.

CO 5- Adaoptation to special condition of life. Applications of fish genetics and Biotechnology.

### **Zoology Practical (General Paper)**

CO 1- Ethology: Study of learning behavior in Rat, study of shock and avoidance behavior in Rat. Chemical communication in earthworm, feeding of an insect pest.

CO 2- Development biology: Study of development stages of Frog/Toad.

CO 3- Permanent microscopic slide of Chik embryo.

CO 4- Study of placenta of any mammal.

### **Zoology Practical (Fish Biology)**

CO 1- Hydrobiological exercise: pH, alkanity, chloride, hardness and dissolved oxygen.

CO 2- Biochemical/physiological/embryological exercise: Estimation of glycogen in liver, blood plasma or amino acid through chromatography.

CO 3- Study of development of teleost fish through preserved material.

CO 4- Preparation and maintenance of fresh water aquarium.

CO 5- Visit to local fish farm.