

**COURSE LEARNING OUTCOME (CLO)**

**MATHEMATICS**

At the completion of Mathematics, students are able to:

* This helps to perform computations in higher mathematics.
* Students will Read and understand the basic proofs of mathematics.
* Write and understand basic proofs.
* It helps students to Develop and maintain problem-solving skills.
* Also help to communicate mathematical ideas with others.
* Utilize technology to address mathematical ideas.

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| **COURSE** | **OUTCOME** |
| **Algebra & Trigonometry** | * It helps to inculcate knowledge on algebraic equations and their relations with properties.
* Students will know about set theory, group theory, ring theory, De-moivre etc.
* Students will learn to solve system of linear equation.
* Students learn to find roots of polynomials over rational introduction to complex analysis.
* Use of Algebraic skills essential for the study of systems of linear equations, matrix algebra, vector spaces etc.
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| **Calculus** | * Students learn how to find radius of curvature, point of inflexion, node, and cusp. Also learn to solve Leibnitz’s theorem, Taylor’s theorem etc.
* Verify the value of the limit of a function at a point using the definition of the introduction to sequence and series.
* Finding extreme values of function.
* Students learn to solve ordinary & partial differential equation.
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| **Vector Analysis** | * To inculcate knowledge on triangle properties, vector calculus and Fourier series basic concepts.
* How to deal with vector valued functions to understand topics like line integral, surface integral which generalize integration to functions defined on curves & surfaces.
* Understand and concept of Fourier series which gives the idea of expanding the sectional continuous functions in to infinite series.
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| **Differential Equations &** **Laplace Transforms** | * Distinguish between linear, non-linear, partial and ordinary differential equations.
* To inculcate knowledge on solving of first and second order algebraic equations and basic information on Laplace transforms.
* Students will be able to use the rules of integration & definition of Laplace transform also students prove the properties of Laplace transform.
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| **Real Analysis** | * Students will study about real numbers and their properties & proofs.
* Demonstrate an understanding of limits and how they are used in sequences, series, construct rigorous mathematical proofs of basic results in real analysis.
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 **PHYSICS**

1. At the completion of course, students are able to understand the basic and detailed concepts about physics theory.
2. Students set forth the task of bringing about new and innovative ideas/concepts.
3. They will incorporate new and rapid advancements and multi-disciplinary skills, societal relevance, global interface, self-sustaining and supportive learning.
4. They will able to grasp the basic concepts of physics as well as have broader vision. Therefore, they should be exposed to societal interface of physics and role of physics in the development of technologies.

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| **COURSE** | **OUTCOME** |
| **Mechanics** | * Mechanics - science concerned with the motion of bodies under the action of forces, including the special case in which a body remains at rest.
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| **Electricity & Magnetism** | * Students will learn about charges, currents, and electric and magnetic fields to explore electromagnetic forces and their properties. Topics may include: Electromagnetic induction (including Faraday's Law and Lenz's Law) Inductance (including LR circuits)
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| **Heat & Thermodynamics** | * The branch of physics concerned with the interactions between heat and other sources of energy is thermodynamics. It explains, in particular, how thermal energy is transferred into and from other sources of energy and how it affects matter.
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| **Optics** | * Optics, Science concerned with the production and propagation of light, the changes it undergoes and produces, and closely related phenomena. Physical optics deals with the nature and properties of light; geometric optics deals with the formation of images by mirrors, lenses, and other devices that use light.
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| **Atomic physics & spectroscopy** | * Atomic physics has applications in the study of condensed matter, gases, chemical-reaction mechanisms, atmospheric science, lasers, nuclear physics, and the arrangement of elements in the periodic table.
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| **Quantum Mechanics &****Relativity** | * Applications of quantum mechanics include explaining phenomena found in nature as well as developing technologies that rely upon quantum effects, like integrated circuits and lasers. Quantum mechanics is also critically important for understanding how individual atoms are joined by covalent bonds to form molecules.
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**ZOOLOGY**

1. At the completion of Zoology, students are able to understand the basic concept of zoology and have broader vision
2. Students set forth the task of bringing about new and innovative ideas/concepts of zoology.
3. They will incorporate new and rapid advancements and multi-disciplinary skills, societal relevance, global interface, self-sustaining and supportive learning of zoology.
4. They will develop positive and scientific attitude towards zoology.

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| **COURSE** | OUTCOMES |
| **Cell Biology & Invertebrates**  | This course introduces students to the diversity of invertebrates, which are the vast majority of all animals on the planet. Students learned the development, adult anatomy, biology, and evolutionary relationships of the main animal phyla including but not limited to Sponges, Mollusks, Annelids, and Arthropods. |
| **Anatomy & Physiology** | Anatomy, in its broadest concept, is the science that studies the development and constitution of living beings. The study of human anatomy becomes mandatory for all courses in the Health Area since its understanding is fundamental for understanding the physiology and pathological processes that affect the human being. |
| **Vertebrate Endocrinology Reproductive Biology Behavior, Evaluation & Applied Zoology** | It mainly deals with the study of Animals, their classifications, evolution and their features. Botany, Zoology, Physiology, and Ecology are sub-disciplines of Biology. Animal physiology, Ornithology, Entomology, and Mamma-logy are sub-disciplines of Zoology. |
| **Ecology, Environmental-Biology, Toxicology, Microbiology & Medical Zoology**  | Through the study of zoology, students can gain an understanding of the natural world and how they can help with conservation. It also offers the opportunity to consider ways to face global challenges such as climate change and food security, trying to find solutions to help both animals and humans alike. |

**BOTANY**

1. At the completion of course, students are able to understand the basic concept of botany and have broader vision.
2. Students set forth the task of bringing about new and innovative ideas/concepts of Botany.
3. They will incorporate new and rapid advancements and multi-disciplinary skills, societal relevance, global interface, self-sustaining and supportive learning of Botany.
4. They will develop positive and scientific attitude towards Botany.

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| **COURSE** |  **OUTCOME** |
| **Bio Technology** | In this topic students gather information about biotechnology; Biotechnology is the application of technology to living organisms to benefit human life. This can include the use of living systems for the research and development of products, altering living systems through genetic engineering and more. Biotechnology is used in Agriculture, Health Care, and other industries. |
| **Plant Pathology** | Plant pathology is the scientific study of diseases in plants caused by pathogens and environmental conditions. Organisms that cause infectious disease include Fungi, Oomycetes, Bacteria, Viruses, Viroids, Virus-Like Organisms, Phytoplasmas, Protozoa, and Nematodes And Parasitic Plants. |
| **Plant Taxonomy** | Plant taxonomy is the science that finds, identifies, describes, classifies, and names plants. It is one of the main branches of taxonomy. Plant taxonomy is closely allied to plant systematics, and there is no sharp boundary between the two. |
| **Economic Botany** | Economic Botany is the interaction of people with plants. Economic botany is closely related to the field of Ethnobotany - that word is based on two Greek roots: ethnos (race: people: cultural group) and botanikos (of herbs) and can mean the plant lore of a race or people as well as the study of that lore. |
| **Plan Succession** | Plant succession is an ecological process of change in a plant community that occurs over time in response to management. The changes could take decades or only years, depending on many factors such as the existing plant community, climate, seed dispersal and soil type. |
| **Plant Anatomy** | Students will learn about Plant anatomy; Plant anatomy is the study of plant tissues and cells in order to learn more about the way these organisms are constructed and how they work. These studies are very important because they lead to a better understanding of how to care for plants and fight plant diseases. Plant anatomy is also known as phytotomy. |
| **Bio Fertilizer** | In this topic students get to know about biofertilizer; Bio-Fertilizers are biological preparations of efficient microorganisms that promote plant growth by improving nutrient acquisition. They enhance soil productivity by fixing atmospheric nitrogen, solubilizing soil phosphorus, and stimulating plant growth. |

 **CHEMISTRY**

1. At the completion of course, students are able to understand the basic concept of Chemistry and have broader vision.
2. Students set forth the task of bringing about new and innovative ideas/concepts of Chemistry.
3. They will incorporate new and rapid advancements and multi-disciplinary skills, societal relevance, global interface, self-sustaining and supportive learning of Chemistry.
4. They will develop positive and scientific attitude towards.

**ATOMIC STRUCTURE**

Students gets the Idea of De-Broglie matter-waves, Heisenberg Uncertainty principle, Schrodinger wave equation, significance of, radial & angular wave functions and probability distribution curves, Atomic orbital and shapes of s, p, d orbital's, Aube and Pauli exclusion principles, Hand’s Multiplicity rule, electronic configuration of the elements, effective nuclear charges.

**CHEMICAL BONDING**

Ionic Solids- Ionic structures, radius ratio & co-ordination number, limitation of radius, ratio rule, lattice defects, semiconductors, lattice energy Born-Haber cycle, Solvation energy and solubility of ionic solids, polarizing power & polarisabilitry of ions, Fajans rule, Metallic bond-free electron, Valence bond & band theories.

**S-BLOCK ELEMENTS**

Comparative study, salient features of hydrides, solvation & complexation tendencies including their function in biosystems and introduction to alkyl & aryls, Derivatives of alkali and alkaline earth metals.

**P-BLOCK ELEMENTS**

Halides hydrides, oxides and oxyacids of Boron, Aluminum, Nitrogen and Phosphorus, oranes, borazines, fullerenes and silicates, interhalogens and pseudohalogens.

**ALIPHATIC AND AROMATIC RING COMPOUNDS**

**A. Cycloalkanes:**

Nomenclature, methods of formation, chemical reactions, Baeyer's strain theory and its limitations. Ring strain in small rings (cyclopropane and cyclobutane), theory of strainless rigns. The case of cyclopropane ring: banana bonds.

**B. Mono-nuclear and polynuclear aromatic ring:**

Structure of benzene & naphthalene. Molecular formula and Kekule structure.Aromatic electrophilic substitution. General pattern of the mechanism, role of σ and complexes. Electrophilic substitution in naphthalene.

**BIOMOLECULES**

1. **Carbohydrates:**

Configration of monosaccharides, threo and erytho diastereomers.Formation of glycosides ethers and esters Determination of ring size of monosaccharides. Cyclic structure of D(+) glucose. Structure of ribose and deoxyribose. An introduction to disaccharides (maltose, sucrose and lactose) and polysaccharides (starch and cellulose) without involving structure determination.

**B. Proteins and Nucleic Acids**

Classification and structure of protein levels of protein structure, protein Denaturation / renaturation, Constituents of amino acids Ribonucleicsids and ribouncleotieds, double helical structure of DNA.

**HINDI**

1. **Ekkr`Hkk"kk ds egRo dk Kku gksrk gSA**
2. **fgUnh Hkk"kk ds izfr tkx:d gksrs gSA**
3. **Hkk"kk lacaf/k =qfV dks tkudj lq/kkj gksrk gSA**
4. **vkSipkfjd] vukSipkfjd Hkk"kk ds izfr layXu gksrs gSA**
5. **fgUnh ¼ekSf[kd vkSj fyf[kr½ Hkk"kk ds izdkjksa dk Kku gksrk gSA**
6. **Hkk"kk ds fcuk ge nSfud dk;Z ugh dj ldrs gSA**
7. **fgUnh Hkk"kk fo|kFkhZ lekt esa gh Hkk"kk lh[krk gS o iz;ksx djrk gSA ftlls mldh Hkk"kk fodflr gksrh gSA**
8. **छात्राध्यापक भाषा की भूमिका को जानेंगे। छात्राध्यापक हिंदी भाषा की स्थिति और भूमिका को जानेंगे।छात्राध्यापक भाषा के स्वरूपों को जानेंगे।**
9. **छात्राध्यापक भाषायी दक्षता को जानेंगे।**
10. **पत्राचार अनुवाद एवं शब्दावली मुहावरे और लोकोक्तियाँ को जानेंगे।**शब्द शुद्धि, वाक्य शुद्धि, शब्द ज्ञान ,पर्यायवाची ,विलोम, अनेकार्थी, **और**देवनागरी लिपि की विशेषता **को जानेंगे।**

**ENGLISH**

1. Seeks to develop the students’ abilities in grammar, Speaking skills, reading, writing and study skills
2. While learning English language students will get awareness of right uses of English grammar and speaking.
3. Students will improve their speaking ability in English both in term of fluency and comprehensibility.
4. Students will increase their reading speed and comprehension of academic articles.
5. Students will improve their reading fluency skills through extensive reading.
6. Students will enlarge their vocabulary by keeping a vocabulary journal.
7. Students will develop their ability as critical readers and writers.
8. Student will produce a short research paper using the drafting process.
9. Students will summarize information from academic sources, distinguishing between main ideas and details.

**ENVIRONMENTAL EDUCATION**

1. After the completion of this course, the student teacher will be able to:
2. Understand the concept, importance, scopes and aims of environmental education
3. Explain the environmental pollution, possible hazards & its courses and remedies.
4. Construct a responsibility towards conservation of environment, ecosystem, biodiversity & sustainable development, environmental management.
5. Role of information technology in environment and human health.
6. Understand the Impact of human rights in India, human rights under the constitution of India, fundamental rights under the constitution of India, directive principles of state policy under the constitution of India, enforcement of human rights in India.
7. Students will understand the multi-disciplinary nature of environmental studies. Also understand the importance of forest resources, water resources, mineral resources, food resources, energy resources & land resources etc.

**PEDAGOGY OF MATHEMATICS**

 The pupil teacher will able to-

1. Appreciate the importance of mathematics laboratory in learning mathematics

2. Examine the language of mathematics engaging with research on children's learning and specific areas

3. See mathematics as something to talk about, to communicate through, to discuss among them, to work together.

4. Construct appropriate assessment tools for evaluating mathematics learning

5. Focus on understanding the nature of children’s mathematical thinking through direct observation of children’s thinking and learning processes

6. Acquire professional skills for the teaching of mathematics

 **PEDAGOGY OF BIOLOGICAL SCIENCE**

 The pupil teacher will able to-

1. Analyses the content of biological science with respect to its branches, process, skills, knowledge organization and other critical issues.

2. Develop process- oriented objectives based on the subject matter units.

3. Identify the concept of biological science that are alternatively conceptualized by and students in general.

4. Exploring different ways of creating learning conditions for different concepts of biological sciences.

5. Develop suitable assessment tools for evaluating learning of biological science.

6. Stimulate curiosity, inventiveness and creativity in biological science.

7. Develop competencies for teaching, learning of biological science through different measures.

**PEDAGOGY OF PHYSICAL SCIENCE**

 The pupil teacher will able to-

1. Analyses the contents of physical science with respect to its branches, process skills, knowledge organization and other critical issues.

2. Develop process- oriented objectives based on the content themes/units.

3. Identify the concepts of physical science that are alternatively conceptualised by teachers and students in general.

4. Explore different ways of creating learning situations in learning different concepts of physical science.

5. Facilitate development of scientific attitudes in learners.

6. Construct appropriate assessment tools for evaluating learning of physical science

 **LEARNER AND LEARNING PROCESS**

 The pupil teacher will able to-

1. Understand intelligence, motivation and various types of exceptional children.
2. Develop Skill for effective teaching-learning process and use of psychometric assessment.
3. Acquire knowledge and understanding of stages of human development.
4. Develop understanding of process of child learning in the context of various theories of learning.
5. Understand intelligence, motivation and various types of exceptional children; and develop skills for effective teaching-learning process and use of psychometric assessment.

**PHILOSOPHICAL PERSPECTIVE OF EDUCATION**

1. The pupil teacher will able to-
2. Understand the role and importance of education in the progress of Indian Society.
3. Contribute in the field of education as great educators.
4. Understand the relationship of philosophy and Education.
5. Know the means and measures toward the development of nation and protection of human rights.
6. Play important role in creation of a new social order in our country.
7. The relationship between philosophy & education and implications of philosophy on education

**CURRICULUM AND KNOWLEDGE**

 The pupil teacher will able to-

1. Understand the nature of curriculum and also able to understand its relation with syllabi, textbook and classroom practices.
2. Understand moral values and develop skill.
3. Examine the place of work in education.
4. Develop innovative method of teaching.
5. Understand problems in education so that they find solutions or create solution for it.

 **ELECTIVE: EDUCATIONAL AND MENTAL MEASUREMENT**

The pupil teacher will able to-

1. Acquaint with the basic scientific concepts and practices educational and mental measurement.
2. Tabulate and find out some standard meaning from the raw scores by using statistical procedures.
3. Develop skills and competencies in the pupil’s teacher for the use of the techniques in the field.
4. Interpret the result of educational measurement.
5. Understand about various educational and mental measurement tools.

**ELECTIVE: EDUCATIONAL GUIDANCE AND COUNSELLING**

The pupil teacher will able to-

1. To acquire the students with the concepts, needs and viewpoints about Guidance and Counseling and the underlying principles in reference to normal children as well as in reference to children with special needs.
2. To acquire the students with the organizational framework and procedures of Guidance-Services in educational institutions.
3. To acquire the students with the tools and techniques required for providing guidance and counseling services to students.

**GENDER, SCHOOL AND SOCIETY**

 The pupil teacher will able to-

* + 1. Understand the role of culture as determinants of gender distinction in social living.
		2. Understand different factors that shape gendered roles in Indian society.
		3. Understand the problems of girl’s child education in Indian society.
		4. Develop critical perspectives on gender-based discrimination and its effects.
		5. Understand the curriculum, the hidden curriculum, gender stereotype.
		6. Understand role of women in the teaching profession.
		7. Device ways to deal with different types of social problem.
		8. Understand sexuality, violence against third gender women and legal rights of women.

**SOCIOLOGICAL PERSPECTIVE OF EDUCATION**

 The pupil teacher will able to-

* 1. The social diversity in the state and classroom and its meaning for teaching.
	2. Use some key concepts.
	3. The nature and changes in caste. To focus attentions on the scheduled caste and their education.
	4. The problem and challenges faced by the tribal communities in education of tribal children.
	5. How poverty and migration affects the schooling of Children?

**ART EDUCATION**

The pupil teacher will able to-

1. Work together on small and large projects. .

2. Acquaint with basic elements of design.

3. Develop an insight towards sensibility and aesthetic appreciation.

4. Develop a perspective of artistic and creative expression

**ELECTIVE: COMPUTER EDUCATION**

The pupil teacher will able to-

* 1. Appreciate the role of computer education in the context of modern technological society.
	2. Develop understanding of computers and their application in education.
	3. Acquire sufficient knowledge of handling computers with a view to impart computers independently at school level.
	4. Use computer-based learning packages and organize effective classroom instructions.
	5. Acquire necessary skills in using of modern word processing software.
	6. Develop skills of creating and managing simple databases and handling of computers.

**TEACHING OF VALUES**

1. Understand the nature and sources of values, and disvalues.

2. Understand the classification of values under different types.

3. Appreciate educational values like democratic, secular, and socialist

**ELECTIVE: EDUCATIONAL TECHNOLOGY AND MANAGEMENT**

The pupil teacher will able to-

1. Obtain a total perspective of the role of technologies in modern educational practices.

2. Equip with various technological applications available to him/her for improving instructional practices.

 3. Acquire the skills required for effective instructional and institutional management

4. Develop the professional skills required for guiding pupils in education, and technology