Syllabus for the post of D.P.E & Physical Education Teacher

1. **History and Concept of Physical Education**
   - Meaning, Aims, Principle, Objectives, Scope, Need and Importance. Misconceptions about Physical Education and Modern Concept of Physical Education.
   - History of Physical Education in India: Pre and Post- Independence period
   - Physical Education in ancient Greece, Rome, Germany, France, Russia, China and Japan
2. **Changing Trends & Management of Sports Events**
   - Changing Trends in Sports Technological Advancement in playing Surface, Wearable Gears, Sports Equipment etc.
   - Fixtures and their procedures. Knockout, league and combination tournament.
3. **Major Sports Events**
   - Olympic Games: Ancient and modern Olympic Games
   - Winter Olympics, Para Olympics, Deaflympics and Special Olympics
   - Asian Games
   - SAF Games
   - Common Wealth Games
   - World Athletics meet
4. **Kinesiology:**
   - Joints and their movements – planes and axes.
   - Kinetics, Kinematics-linear and angular, levers.
   - Centre of Gravity, Projectile and friction
   - Posture, Postural deformities and their correction.
   - Sports Massage types and therapeutic exercises
5. **Yoga**
   - Meaning and Definition of Yoga
   - Importance of yoga
   - Elements of yoga (asthang Yoga)
   - Yogic Kriyas (Shat Kriyas, Asanas, Pranayam, Meditation)

- Yoga as preventive measure for lifestyle diseases: Obesity, Asthama, Hypertension, Back Pain and Diabeties

6. **Anatomy & Physiology**

- Meaning, Concept, Need and Importance of Anatomy, Physiology and Health Education in Physical Education &Sports
- Cell, Tissue and Organ System, Physiology of Sports
- Bones and Joints: Definition, Classification and Terminology of Movement around Joints.
- Muscles: Types, Structure and Functional Classification, General Characteristics (Properties). Macro and Micro Structure of Skeletal Muscles, Sliding Filament Theories, Physiology of blood
- Exercise Physiology: Meaning, Need and Importance in Physical Education & Sports. Effects of Exercise on Body Systems (Circulatory System, Respiratory System, Skeletal System, muscular System, Excretory System and Endocrine System
- Organization, Administration and Recreation.

7. **Sports Medicine**

i. FIRST AID- Meaning, Principles & Qualities of First Aider
ii. Common Sports Injuries- Types, Causes, Prevention & Treatments

8. **Physical Fitness, Wellness and Lifestyle**

- Meaning of Physical Fitness
- Components of Physical Fitness- Speed, Strength, Endurance, flexibility and Agility (types and how to improve these components)
- Physical and Health related Fitness Test (Harvard Step Test, Khelo India Fitness Test for school children, AAPHER Fitness Test & BMI
- Somato Types (Endomorphy, mesomorphy and actomorphy)
- Methods of Physical Education.
- Officiating and Coaching,

9. **Sports Training and doping**

- Concept and Principles of Sports training
- Sports training cycles
- Warming up and limbering down
- Types and methods to develop various physical fitness components
- Meaning and types of doping and its disadvantages

10. **Educational and sports Psychology**:

- Sports Psychology: Meaning, Definitions, Nature and Scope. Growth and Development

- Stress, Anxiety, Aggression and their Management.
- Psycho-Physical Unity, Motivation, Personality. Coping strategies, Self-Esteem and Body Images. Psychological Benefits of Exercise.
- Sports Ethics, Morality and Moral Values.

11. **Health and Nutrition**
    - Concept of Balanced Diet and Nutrition
    - Importance of Diet and Sports: Pre, During and Post Competition Requirements
    - Meaning and Importance of Health and Personal Hygiene
12. **Physical Education and sports for children with special needs**
    - Meaning of Disability and disorder
    - Types of disability, its causes and nature
    - Role of Various Professionals (Councilor, Occupational Therapist, Physiotherapist, Speech Therapist and Physical Education Teacher) for children with special needs
    - Meaning of Adapted Physical Education.
13. **Knowledge of Games & Sports, its Current Affairs and Adventure Sports**:
    - Games/Sports: Athletics, Basketball, Badminton, Baseball, Boxing, Chess, Cricket, Football, Gymnastic, Handball, Hockey, Judo, Kabaddi, Kho-Kho, Tennis, Softball, Swimming, Table Tennis, Volleyball, Wrestling and Weight Lifting.
    - Fixtures- Types (**KNOCKOUT**, **LEAGUE**-cyclic method, staire-case method, **COMBINATION**-league-cum-Knockout or Knockout-cum-league & double league) how to draw fixtures
    - History of respective Game/Sports at International and National level.
    - Latest General Rules and Skill Test of above Games &Sports.
    - Measurement of Play Fields and Specifications of Sports Equipment of above Game / Sports.
    - Adventure Sports- Rock Climbing, Trekking, Mountaineering, River Rafting.

Syllabus for exam to the post of Drawing Master.

DRAWING AND PAINTING

HISTORY OF INDIAN ART
UNIT 1: Art of Indus Valley
(Harappan and Mohenjo-daro) (2500 B.C. to 1500 B.C.)

(1) Introduction

(i) Period and Location.

(ii) Extension: In about 1500 miles

(a) Harappa & Mohenjo-daro

(b) Ropar, Lothal, Rangpur, Alamgirpur, Kali Bangan, Banawali and Dhaula Veera (in India)

(2) Study of following Sculptures and Terracottas:

(i) Dancing girl (Mohenjo-daro) Bronze, 10.5 x 5 x 2.5 cm.
Circa 2500 B.C.

(Collection : National Museum, New Delhi).

(ii) Male Torso (Harappa)

Stone, 9.2 x 5.8 x 3 cms. Circa 2500 B. C.

(Collection : National Museum, New Delhi).

(iii) Mother Goddess (Mohenjo-daro) terracotta, 22 x 8 x 5 cm.Circa 2500 B.C.
(Collection : National Museum, New Delhi).

(3) Study of Following Seal:

(i) Bull (Mohenjo-daro)

Stone, 2.5 x 2.5 x 1.4 cm.
Circa 2500 B.C.

(Collection : National Museum, New Delhi).

(4) Study of following Decoration on earthen wares:

(i) Painted earthen-ware(Jar)Mohenjo-daro)
(Collection : National Museum, New Delhi).

UNIT 2 : Buddishist, Jain and Hindu Art.
(3rd century B.C. to 8th century A.D.)

(1) General Introduction to Art, during Mauryan, Shunga, Kushana & Gupta Period:

(2) Study of following

Sculptures:

(i) Lion Capital from Sarnath (Mauryan period)
Polished sand stone,

Circa 3rd Century B.C.

(Collection: Sarnath Musseum, U.P.)

(ii) Chauri Bearer from Didar Ganj (Mauryan period)
Polished sand – stone

Circa 3rd Century B.C.

(Collection: Patna Museum, Bihar)

(iii) Bodhisattva head from Taxila (Gandhara Period)
Stone, 27.5 x 20 x 15 c.m.

Circa 2nd Century A.D.

(Collection: National Museum, New Delhi)

(iv) Seated Buddha from Katra Tila
Mathura – (Kushan Period)
(Collection: Mathura Museum)

(v) Seated Buddha from Sarnath (Gupta Period)
Stone
Circa 5th Century AD
(Collection: Sarnath Musseum, U.P.)

(vi) Jain Tirathankara (Gupta period)
Stone
Circa 5th Century AD
(Collection at State Museum, Lucknow U.P.)

(3) Introduction to Ajanta

Location, period, No. of caves, Chaitya and Vihara, Paintings and Sculptures subject matters and techniques etc.

(4) Study of following

Painting &

Sculpture:

(i) Padmapani Bodhisattva (Ajanta Cave No. I)
Mural Painting

Circa 5th Century A.D.

(ii) Mara Vijay (Ajanta Cave No.
26) Sculpture in stone

Circa 5th Century A.D.

Unit 3: Temples Sculpture, Bronzes and Indo-

Islamic Architecture Artistic aspects of Indian Temples

(6th Century A.D. to 13th Century A.D.)

(1) Introduction to Temple Sculpture

(6th Century A.D. to 13th Century A.D.)

(2) Study of following Temple-Sculptures;

(i) Descent of Ganga (Pallava period, Mahabalipuram Tamilnadu), Stone Circa7th Century A.D.

(ii) Ravana Shaking Mount Kailash (Rashtrakuta period, Ellora,

(iii) Trimurti (Elephanta, Maharashtra)
Stone
Circa 9th Century A.D.

(iv) Lakshmi Narayana (Kandariya Mahadev Temple)
(Chandela; Period, Khajuraho, M.P.)

Circa 10th Century A.D.

(V) Cymbal Player Sun Temple (Ganga Dynesty, Konark, Orissa)Circa 13th Century A.D.

(vi) Mother & Child (Vim la-Shah Temple, Solanki Dynesty, Dilwara, MountAbu, rajastahn) White marble.Circa 13th Century A.D.

(3) Bronzes

(i) Introduction to Indian Bronzes

(ii) Method of casting (solid and hollow)

(4) Study of following south Indian Bronzes:

(i) Nataraj (Thanjavur Distt., Tamilnadu) Chola period (12th Centry a.D.) (Collection: National Museum, New Delhi)

(ii) Devi (Uma)

Chola Period(12th Centry a.D.) (Collection: National Museum, New Delhi)

(5) Artistic Aspects of the Indo-Islamic Architecture (i)Introduction

(6) Study of following architectures:

(i) Qutab Minar, Delhi

(ii) Taj Mahal, Agra

(iii) Gol Gumbaj of Bijapur

Unit 4: The Rajasthani and Pahari Schools of Miniature painting (16th Century A.D to 19thCentury A.D.)

Introduction to Indian Miniature Schools: Western-Indian, Pala, Rajasthani,Mughal, Central India, Deccan and Pahari.

(A) The Rajasthan; Schools

(1) Origin and Development

(2) Schools-Mewar, Bundi, Jodhpur, Bikaner, Kishangarh andJaipur

(3) Main features of the Rajasthani & Pahari Schools.

(4) Study of the following Rajasthani Paintings:

Title	Painter	School
Maru-Ragini	Sahibdin	Mewar
Raja Ajniruddha Singh Heera	Utkal Ram	Bundi
Chaugan Players	Dana	Jodhpur
Krishna on swing	Nuruddin	Bikaner
Radha (Bani – Thani)	Nihal Chand	Kishangarh
Bharat meets Rama at Chitrakut	Guman	Jaipur

(B) The Pahari Schools:

(1) Origin and development

(2) Schools-Basohli and Kangra

(3) Main features of the Pahari School

(4) Study of the following pahari Paintings

Title	Painter	School
Krishna with Gopies		Basohli
Raga Megha		Kangra

Unit 5 The Mughal and Deccan Schools of Miniature Painting (16th Century AD to 19thCentury A.D.)

(A) TheMughal School

(1) Origin and development

(2) Main features of the Mughal School

(3) Study of the following Mughal paintings

Title	Painter	School
Krishna lifting mount	Goverdhan	Miskin Akbar
Babur crossing the river sone	Jaganath	Akbar
Jahangir holding the picture of Madona	Abul Hassan	Jahangir
Falcon on a bird nest	Ustad Mansoor	Jahangir
Kabir and Raidas	Ustad Faquirullah Khan	Shahjahan
Marriage procession of Dara Shikoh	Haji Madni	Provincial Mughal(Oudh)

(B) TheDeccan School

(1) Origin and development

(2) Main features of the Deccan School

(3) Study of the following Deccan paintings

Title	Painter	School
Raga Hindola		Ahmednagar
Chand Bibi Playing Polo(Chaugan)		Gol Konda

Unit 6 : The Bengal school and the Modern trends in Indian Art

(A) (1) A. New Era in Indian Art- an introduction

B. Study of the following painting

(i) Rama Vanquishing the pride of the ocean-Raja Ravi Verma

(2) Evolution of the Indian national Flag (First – 1906, Middle – 1921 andFinal 1947 stages): Study of the form and the colour scheme

(B) (1) Introduction to the Bengal School of painting

(i) Origin and development of the Bengal School

(ii) Main Features of the Bengal school

(2) Contribution of Indian artists in the struggle for National Freedom Movement

(3) Study of the follwing paintings of the Bengal School

(i) Jouney's End – Rabindranath Tagore

(ii) Parthasarthi – nandlal Bose

(iii) Radhika – M.a.R. Chughtai

(C) The Modern Trends in Indian Art

Introduction

(1) Study of the following Paintings:

(i) Magician-Gaganendranath Tagore

(ii) Mother and child-Jamini Roy

(iii) Woman face-Rabindranath Tagore

(iv) Tree Girls-Amrita Sher gill

(2) Study of the following pieces of Sculpture:

(i) Triumph of labour- D.P. Roychowdhury

(ii) Santhal Family-Ramkinker Vaij

(3) Study of the following work of contemporary Indian Art'

A Paintings

(i) Mother Teresa-M.F. Hussain.
(ii) Birth of Poetry- K.K. Hebbar
(iii) Gossip- N.S. Bendre
(iv) Diagonal- Tyeb Mehta

(4) Graphic Prints

(i) Whirl Pool-Krishna Reddy
(ii) Children-Somnath Hore
(iii) Devi-Jyoti Bhatt
(iv) Of Walls-Anupam Sud
(v) Man, Woman and Tree K. Laxman Goud

(5) Sculptures

(i) Standing Woman-Dhanraj Bhagat
(ii) Cries Un-heard-Amar nath Sehgal
(iii) Ganesha-P.V. Jankiram
(iv) Figure- sankho Chaudhuri
(v) Chatturmukhi – Aekka Yada Giri Rao

Note: The names of artists and their art work as listed above are only suggestive and in no way exhaustive.

Syllabus for the post of Language Teacher

स्नातक स्तर पर पढ़े पाठ्यक्रम के अवधारणाओं, की गहन का आकलन किया जाएगा।

गद्य-खंड :

हिंदी साहित्य का इतिहास

हिंदी साहित्य ऊध्व और विकास

गद्य साहित्य की विधाएं

कहानी , उपन्यास, नाटक/एकांकी, निबंध, रेखाचित्र, संस्मरण, जीवनी, आत्मकथा, यात्रा वृतांत, रिपोर्ताज, गद्य

काव्य-खंड:

आदिकालीन कविता

भक्तिकाल (सगुण, निर्गुण, सूफी काव्य)

रीतिकाल की कविता

आधुनिक काल की कविता (भारतेन्दु युग, द्विविदी युग, छायावाद, प्रगतिवाद, प्रयोगवाद, नई कविता, समकालीन कविता)

हिंदी भाषा का विकास एवं व्यवहारिक व्याकरण :-

हिंदी की उप - भाषाएं एवं बोलियां

वर्ण विचार (उच्चारण, वर्तनी)

शब्द विचार और शब्द रचना (विलोम शब्द पर्यायवाची, अनेकार्थ, श्रुतिसम भीनार्थक शब्द इत्यादि)

संधि, समास

विकारी शब्द, अविकारी शब्द

वाक्य रचना: (अर्थ एवं रचना के आधार पर)

पद - परिचय

अलंकार शब्दालंकार, अर्थलंकार (अनुप्रास, यमक, श्लेष, उपमा, रूपक, उत्प्रेक्षा, मानवीकरण, अतिश्योक्ति, अलंकार)

शब्द-शक्तियां

मुहावरे एवं लोकोक्तियां

अपठित गद्यांश, पद्यांश

संविधान में हिन्दी की स्तिथि सम्बन्धी धाराएं, उप धाराएं

हिंदी राजभाषा, संपर्क भाषा, प्रयोजन मूलक हिन्दी, कार्यालयी हिंदी, मानक हिंदी

इ मेल लेखन, लघु कथा लेखन इत्यादि लेखन।

Syllabus for the post of Shastri

भाग – क – व्याकरण
भाग – ख – वाक्यरचना
भाग – ग – काव्यांश
भाग – घ – गद्यांश

भाग – क – व्याकरण

शब्दरूप – राम, मति, नदी, हरि, गुरु, वधू, मधु, पितृ, मातृ, वारि, गो, भगवत्, जगत् आत्मन्, पथिन्, विद्वस्, सर्व, किम्,
तत्, एतत्, इदम्, अस्मद्, युष्मद्
धातुरूप – पठ्, पच्, भू, कृ, अस्, अद्, हन्, दिव्, तन्, तुद्, रुध्, क्री, चुर, सेव्,लभ्

(लट्, लङ्, लृट्, लोट् और विधिलिङ् लकारों में)

कारक– परिचय – षड् कारकाणि, सभी विभक्तियाँ

प्रमुख प्रत्ययः – क्त्वा, तुमुन्, ल्यप्, शतृ, शानच् क्त, क्तवतु, अनीयर्, तव्यत्, त्वय, त्व, तल, ठक्, मतुप्, टाप्, ङीप्

अव्यय – उच्चैः, च, श्व,, ह्यः, अध, अत्र, तत्र, यत्र कुत्र, इदानीम्, अधुना, सम्प्रति, साम्प्रतम्, यदा, तदा, कदा, सहदा, वृथा, शनैः, अपि, कुतः इतस्ततः, यदि, तर्हि, यावत्–तावत्।

सन्धि – स्वर – दीर्घ, गुण, वृद्धि, यण, अयादि

व्यंजन – जशत्व, अनुस्वार, परसवर्ण

विसर्ग – उत्व, रत्व, सत्व, विसर्ग लोप, विसर्ग के स्थान पर स्, ष्, श्

समास – उव्ययीभाव, तत्पुरुष, कर्मधारय, द्विगु, नञ्–तत्पुरुष, बहुव्रीहि, द्वन्द्व ।
उपसर्गः – द्वाविंशतिः (22)

संख्या – शतम् यावत् _(सौ तक)

भाग –ख – वाक्यरचना

भाग – क में निर्धारित व्याकरण बिन्दूओं के प्रयोग पर आधारित शुद्ध–अशुद्ध–निर्णय ।
अपठित–अवबोधन
अपठित अनुच्छेदों का अवबोधन – अनुवाद एवं प्रश्नोत्तर
लघु संस्कृत निबन्ध – संस्कृत भाषा, साहित्य और संस्कृति से सम्बन्धित

भाग – ग – काव्यांश

रघुवंशमहाकाव्यम् – प्रथम सर्ग – 1–25 श्लोक
अभिज्ञान शाकुंतलम् – चतुर्थ अंक:
प्रतिमा नाटकम् –तृतीय अंक :
नीतिशतकम् –सम्पूर्ण

भगवद्गीता – दूसरा – अध्यायः

भाग – घ – गद्यांश

शुकनासोपदेश : – प्रारम्भ से लक्ष्मीवर्णन के प्रसंग स्वल्पसत्वमुन्मतीकरोति' (बाणभट्टकृत कादम्बरी के अन्तर्गत)

शिवराजविजय : – प्रथम – निः श्वास
कवि परिचय – कालिदास, भास, भवभूति, माघ, शूद्रक, भारवि, श्रीहर्ष, भर्तृहरि
संस्कृत सुभाषित सूक्तियों का ज्ञान, प्रसिद्ध कथन
छन्द – अनुष्टुप, उपजाति, वंशस्थ, वसन्ततिलका, मालिनी, सग्धा एवं शार्दूलविक्रीडित

अलंकार – अनुप्रास, उपमा, रूपक, उत्प्रेक्षा, यमक, श्लेष एवं अर्थान्तरन्यास
वैदिक साहित्य – चारों वेदों का सामान्य परिचयः, ईशावाश्योपनिषद, तैतेरीय उपनिषद

Syllabus for exam to the post of TGT (Medical)

A. Subjects of B.Sc (Medical)

- **CHEMISTRY:**

(I) **Physical Chemistry**-Atomic and Molecular Structure; States of Matter; Gaseous State; Liquid State; Solid State. Chemical Thermodynamics; Chemical and Phase Equilibria; Solutions and Colligative Properties; Electrochemistry and Electrochemical Cells; Chemical Kinetics and Enzyme Catalysis; Adsorption and Colloidal Solutions; Molecular Spectroscopy.

(II) **Organic Chemistry-** Basic Concepts in Organic Chemistry,Stereochemistry & Conformational Analysis; Organic Reaction Mechanism and its application to synthetic chemistry; Nucleophilic Substitution Reactions; Nucleophilic Addition Reactions; Electrophilic Addition Reactions; Elimination Reactions; Name Reactions and Rearrangements; Qualitative Organic Analysis; Organic Spectroscopy (UV-Visible; IR; NMR); Basics of Natural Products and Biochemistry; Aromatic Nucleophilic and Aromatic Electrophilic Substitution Reactions; Free Radical Reactions; Heterocyclic Chemistry; Polymer chemistry.

(III) **Inorganic Chemistry-** Periodic Table and Periodic Properties; Extractions of Metals and Metallurgy; Structure of Atom; Chemical and Ionic Bonding and Geometry, Shape and Hybridization of Molecules; VSEPR and Molecular Orbital Theory; Main Group Elements (s and p-blocks), Transition Metals (d-block) and Inner-transition Elements (f- block) and their Chemistry. Bioinorganic Chemistry; Nuclear Chemistry; Analytical Chemistry; Coordination Chemistry

- **BOTANY**:

I. **Biodiversity**- Microbes; Algae, Fungi and Archegoniates (Bryophytes, Pterdophytes and Gymnosperms).

II. **Plant Ecology and Taxonomy**- Introduction to Ecology; Ecological factors; Biogeochemical cycles; Adaptation of plants to water; Ecological succession; Ecosystem ecology; Phytogeography; Environmental pollution; Biodiversity and wildlife conservation; Introduction to Taxonomy; Principles and rules of ICN; Classification system; Floral diversity.

III. **Plant Anatomy and Embryology**- Tissue system; The shoot system; Leaf; The root system; Embryology of Angiosperrms.

IV. **Plant Physiology and Metabolism**- Plants water relations; Mineral nutrition; Photosynthesis; Respiration; Nitrogen metabolism; Basics of Enzymology; Transport of organic solutes; Plants growth regulators; Photomorphogenesis; Seed germination & dormancy; Plants movements.

V. **Economic Botany and Biotechnology**- Cultivated plants; Botanical description & brief idea of cultivation, processing and uses of wheat, maize, rice, potato, cotton, mustard, tea, coffee & sugarcane; Medicinal plants (*Papaver somniferum, Rauvolfia serpentina, Cinchona succirubra, Ocimum sanctum*); Spices and condiments; Introduction to Biotechnology; Biotechnological techniques & Plant biotechnology.

VI. **Cell and Molecular Biology**- Overview and Chemistry of cell; Basic techniques used in Cell Biology; Plasma membrane as Ectomembrane; Endomembrane system of Eukaryotic cell; Chromosomes and cell division; Basic Molecular genetic mechanisms.

VII. **Genetics and Plant Breeding**- Mendelian genetics; Chromosomal alterations/ mutations; Genetic material; Gene expression and regulation; Extra nuclear inheritance; Evolutionary and population genetics; Nature and scope of plant breeding; Methods of crop improvement; Inbreeding depression and heterosis.

- **ZOOLOGY**:

I. Kingdom Protista – General Characters and classification upto classes.

II. Phylum Porifera- General Characters and classification upto classes. Canal system in Sycon.

III. Phylum Cnidaria- General Characters and classification upto classes.

IV. Phylum Platyhelminthes- General Characters and classification upto classes. Life history of *Taenia solium.*

V. Phylum Nemathelminthes- General Characters and classification upto classes. Life history of *Ascaris lumbricoides* and its parasitic adaptations.

VI. Phylum Annelids- General Characters and classification upto classes. Life history of *Pheretima posthuma*.

VII. Phylum Arthropoda- General Characters and classification upto classes. Metamorphosis in insects.

VIII. Phylum Mollusca- General Characters and classification upto classes. An introduction to the Pearl culture.

IX. Phylum Echinodermata - General Characters and classification upto classes.

X. Pisces- Classification upto orders. An introduction to the Indian Major Carps and Trouts.

XI. Amphibia- General features and classification upto orders.

XII. Reptilia - General features and classification upto orders. Examples of Poisonous and Non-poisonous snakes. Biting mechanism in snakes.

XIII. Aves - General features and classification upto orders. Flight adaptation in birds.

XIV. Mammals- General features and classification upto orders.

XV. Comparative anatomy of following systems of vertebrates.

XVI. Integumentary system, Skeletal system, Digestive system, Respiratory system, Circulatory system, Urinogenital system, nervous system, sense organs.

XVII. Developmental Biology of Mammals- Gametogenesis, Fertilization, cleavage, Implantation, Placentation, Parturition.

XVIII. Structure of neuron, Muscle contraction, origin and propagation of nerve impulse, resting membrane potential.

XIX. Digestion in alimentary canal, Transport of oxygen and carbon dioxide in blood. Structure of nephron, urine formation. Composition of blood, Structure of heart, cardiac cycle, structure of male reproductive system and female reproductive system of human being, menstrual cycle, structure and functions of pituitary gland. Glycolysis, Kreb's cycle, glycogenesis, gluconeogenesis, Transamination, deamination, urea cycle, Introduction to the enzymes and their functions.

XX. Mendel' s work on transmission of traits, Principles of inheritance, sex linked inheritance, pleiotropy, incomplete dominance, linkage crossing over, sex determination, Chromosomal Mutations – duplications ,inversion, deletions, translocation , Lamarckism, Darwinism, Natural selection, Concept and scope of biotechnology, Uses of DNA fingerprinting, introduction to the Southern blotting, Northern blotting and western blotting, concept of tissue culture.

XXI. Parasitism, symbiosis, commensalism, Pathogenecity of *Wuchereria bancrofti, Ancylostoma duodenale*, Economic importance of *Helicoverpa armigera, Sitophilus oryzae, Tribolium castaneum*.

XXII. Medical importance and control of *Anopheles, Culex and Xenopsylla cheopis*.

XXIII. Preservation and artificial insemination in cattle, poultry farming, induced breeding and transportation of fishes, hill stream fishes and adaptations in hill stream fishes.

XXIV. Freshwater ecosystems (lakes, streams, wetland and rivers).

XXV. Introduction to antigens, antibodies and vaccines, infertility in male, female and diagnosis and management.

XXVI. Diabetes type I and II, Hypertension

XXVII. PET, MRI, CT Scanning in medical diagnostics, Apiculture, sericulture, Life history of mulberry silk moth (Bombyx mori) and Lac culture, aquarium fishes

B. <u>Subjects of 01 year B.Ed</u>

- Childhood and Development Years, Contemporary India and Education, Language Across the Curriculum, Understanding Disciplines and Text Reading and Reflections, Learning and Teaching, Assessment for Learning, Drama and Art in Education, Teaching of Physical & Life Sciences, Knowledge and Curriculum, Gender, School and Society, Inclusive School, ICT in Teaching-Learning Process, Understanding the Self, Health and Physical Education, Vocational and Work Education, Education for Peace, Guidance and Counseling**.**

Syllabus for exam to the post of TGT (Non-Medical)

A. <u>Subjects of B.Sc (Non-Medical)</u>

- **CHEMISTRY** : Basic concepts of Chemistry, Structure of Atom, Classification of Elements & Periodicity in Properties, Chemical boding and Molecular structure, Chemical thermodynamics, Equilibrium, Redox reaction, Hydrocarbons, Solution, Electrochemistry Chemical Kinetics, d- and f- Block elements, coordination compounds, Haloalkanes and Haloarenes, Alcohols, Phenols and ethers, Aldehydes and carboxylic acids, Amines & Biomolecules.

(I) **Physical Chemistry**-Atomic and Molecular Structure; States of Matter; Gaseous State; Liquid State; Solid State. Chemical Thermodynamics; Chemical and Phase Equilibria; Solutions and Colligative Properties; Electrochemistry and Electrochemical Cells; Chemical Kinetics and Enzyme Catalysis; Adsorption and Colloidal Solutions; Molecular Spectroscopy.

(II) **Organic Chemistry-** Basic Concepts in Organic Chemistry,Stereochemistry & Conformational Analysis; Organic Reaction Mechanism and its application to synthetic chemistry; Nucleophilic Substitution Reactions; Nucleophilic Addition Reactions; Electrophilic Addition Reactions; Elimination Reactions; Name Reactions and Rearrangements; Qualitative Organic Analysis; Organic Spectroscopy (UV-Visible; IR; NMR); Basics of Natural Products and Biochemistry; Aromatic Nucleophilic and Aromatic Electrophilic Substitution Reactions; Free Radical Reactions; Heterocyclic Chemistry; Polymer chemistry.

(III) **Inorganic Chemistry-** Periodic Table and Periodic Properties; Extractions of Metals and Metallurgy; Structure of Atom; Chemical and Ionic Bonding and Geometry, Shape and Hybridization of Molecules; VSEPR and Molecular Orbital Theory; Main Group Elements (s and p-blocks), Transition Metals (d-block) and Inner-transition Elements (f- block) and their Chemistry. Bioinorganic Chemistry; Nuclear Chemistry; Analytical Chemistry; Coordination Chemistry.

- **PHYSICS**:

I. Physical world and Measurement, Kinetics, Law of Motion, Work, Energy and Power, system of Particles and Rotational Motion, Gravitational, Mechanical properties of solids & fluids, Thermal properties of Matters, Thermodynamics, Kinetics theory of Gases, Oscillations & Waves, Electrostatics, Current Elasticity, Magnetic effect of Current & Magnetism, Electromagnetic Induction and Alternating currents, Electromagnetic waves, Ray optics and Optical instruments, Wave optics, Dual nature of Radiation and Matter, Semiconductor Electronics: Materials, Devices and simple circuits.

II. Co-ordinate systems, Solid angle, space time symmeteries and conservation laws, Inertial and Non-inertial frames, Coriolis force and its applications,

Central and non-central forces, Inverse square force, Michelson- Morley experiment, special theory of relativity, Lorentz transformations, Length contraction, Time dilation, Variation of mass with velocity and mass energy equivalence, Relativistic momentum and energy.

III. Electrostatic Field and Electrostatic potential and its applications. Poisson and Laplace equations. Ohm's law, Microscopic form of Ohm's law ($J \alpha E$) and conductivity. Ampere circuital law and its applications. Hall effect, Dielectrics, parallel plate capacitor with a dielectric, dielectric constant, polarization and polarization vector, displacement vector D, Claussius - Mossotti equation, boundary conditions satisfied by E and D at the interface between two homogenous dielectrics. Diamagnetism, paramagnetic and Ferromagnetism. Maxwell's equations and its physical interpretation, Poynting vector, Poynting theorem, EM waves in conducting medium and skin depth. EM waves velocity in a conductor and anomalous dispersion.

IV. Scope of statistical physics, basic ideas about probability, distribution of four distinguishable particles in two compartments of equal sizes. Concept of macro-states, micro-states and thermodynamic probability. M-B, B-E, F-D statistics and their applications. Statistical entropy, law of increase of entropy. Reversible and irreversible processes. Thermodynamic Potentials: Enthalpy, Gibbs, Helmholtz and Internal Energy functions and Maxwell's thermodynamic relations.

V. Simple harmonic oscillator, Damped oscillator, Forced Oscillator, Coupled Oscillators and their applications. Interference: Division of wavefront and division of amplitude. Young's Double Slit experiment. Lloyd's Mirror and Fresnel's Biprism. Phase change on reflection. Interference in Thin Films, Haidinger Fringes, Fizeau Fringes. Newton's Rings and Michelson's Interferometer. Diffraction: Fraunhofer diffraction & Diffraction grating, Fresnel Diffraction: Half-period zones. Zone plate. Polarization: Unpolarized and plane polarized light, production of polarized light, Wire grid polarizer, Polaroid, Malus's law, double refraction, birefringence, Nicol Prism, quarter wave plate and half wave plate, Brewster law. Circular and elliptical polarization, production of elliptically polarized and circularly polarized light.

VI. Photo-electric effect and Compton scattering. De Broglie wavelength and matter waves. Heisenberg uncertainty principle. Wave-particle duality. Time dependent Schrodinger equation and Time independent Schrodinger equation and their applications. Electron Angular Momentum. Space Quantization. Electron Spin and Spin Angular Momentum. Spin Magnetic Moment. Stern-Gerlach Experiment. Zeeman Effect: Normal and Anomalous Zeeman Effect. Pauli's Exclusion Principle. Symmetric and Antisymmetric Wave Functions. Fine structure. Spin orbit coupling. Total angular momentum. Spin- orbit coupling in atoms: L-S and J-J couplings.

VII. Unit Cell. Miller Indices. Reciprocal Lattice. Types of Lattices. Brillouin Zones. Bragg's Law. Atomic and Geometrical Factor. Dulong and Petit's Law, Einstein and Debye theories of specific heat of solids. T^3 law. Fermi gas, density of states, Fermi energy and Fermi velocity, electronic contribution to specific heat of metals. Kronig Penny model, Brillouin zones, effective mass of electrons and holes, metals, insulators, p and n type Semiconductors. **Superconductivity:** Critical Temperature. Critical magnetic field. Meissner effect. Type I and type II Superconductors, London's Equation and Penetration Depth. Isotope effect. cooper pairs, BCS theory.

VIII. **Junction diodes:** pn junctions, V-I characteristics, Zener diode, voltage regulation, tunnel diode, LED and LCD, Solar cell, diode as circuit element, Rectifiers: Half Wave, full wave and bridge rectifier. **Transistors:** Characteristics of a transistor in CB, CE and CC mode, α and β of BJT, common emitter amplifier. Field Effect Transistor, biasing JFET, depletion and enhancement mode, MOSFET, FET amplifier. **Amplifiers:** Small signal amplifiers: General principles of operation, classification, distortion, RC coupled amplifier, gain frequency response, input and output impedance. Feedback in amplifiers; negative feedback and stability.

IX. General Properties of Nuclei, Nuclear Models, Radioactivity decay, Nuclear Reactions, Nuclear Detectors and Accelerators**.** Classification of elementary particles and its families. Conservation Laws: energy and momentum, angular momentum, parity, Baryon number, Lepton number, Isospin, Strangeness, Gell-Mann-Nishijima Scheme, CPT theorem, parity violation in weak interactions. Particle Symmetries. Quarks Model.

- **MATHEMATICS**:
  I. Sets, Relation, Functions, Trigonometric functions, Inverse Trigonometric functions, Co-ordinate geometry, Statistics.
  II. Real and Complex Numbers, Quadratic Equations, Linear Inequalities, Permutations & Combinations, Binomial Theorem.
  III. Arithmetic Progression, Geometric Progression, Arithmetic and Geometric means, relation between A.M. and G.M.
  IV. Matrices, Algebra of Matrices and properties, Determinants, Inverse of a matrix, Applications of matrices and determinants, Solution of system of linear equations.
  V. Groups, Subgroups, Lagrange's theorem, Normal subgroups, Quotient groups, Fundamental theorems on Homomorphism, Rings, Ideals, Integral domain, Fields.
  VI. Vector spaces, Quotient spaces, Linear combination of vectors, Basis and dimension, Linear transformations, Rank and nullity of a linear transformation, Matrix representation of a linear transformation, Eigen

values and Eigen vectors, Characteristic polynomial.

VII. Limit and Continuity, Types of discontinuities, Differentiability of functions, Successive differentiation, Leibnitz's theorem, Indeterminate forms.

VIII. Applications of derivatives, Maxima and minima, Rolle's theorem, Lagrange's Mean Value Theorem, Cauchy Mean Value Theorem, Taylor's theorem with Lagrange's and Cauchy's forms of remainder.

IX. Concavity, Convexity, Points of inflexion, Curvature, Asymptotes, Singular points, Double points, Polar coordinates.

X. Limit and continuity of functions of upto three variables, Partial differentiation, Euler's functions on homogeneous functions, Jacobian (upto three variables).

XI. Limits, Limits involving the point at infinity, continuity, Properties of complex numbers, regions in the complex plane, functions of complex variable, mappings.

XII. Derivatives of complex valued function, Cauchy-Riemann equations, Analytic functions, examples of analytic functions, Exponential function.

XIII. Methods of Integration, Fundamental Theorem of Calculus, Definite integrals. Applications of the Integrals, Area under simple curves.

XIV. Order and degree of Differential Equations, General and particular solutions of differential equation, Homogenous differential Equations, Linear differential Equations, Exact differential Equations.

XV. Wronskian, Equations of first order and higher degree solvable for x, y, p. Clairaut's form, Linear equations with constant and variable coefficients.

XVI. Simultaneous differential equations, Total differential equations, Partial differential equations of first order, Classification of second order partial differential equations into parabolic, Elliptic and hyperbolic.

XVII. Real line, Bounded sets, Sequences and series of real numbers Sequences and series of functions, Power Series.

XVIII. Order of Convergence, Bisection method, False position method, Newton's method, Secant method. Gauss-Jacobi and Gauss-Siedel methods.

XIX. Finite difference operators, Lagrange and Newton interpolation, Numerical differentiation using Newton's forward difference and backward difference method, Trapezoidal rule, Simpson's rule, Euler's method.

XX. Straight Lines, Slope, angle between two lines. Various forms of the equations of a line, Distance of a point from a line, Distance between two parallel line.

XXI. Cone, circles, ellipse, parabola, hyperbola, Coordinate axes and coordinate planes in three dimensions, Direction cosines and Direction

ratios, Equation of lines in space. Angle between two lines, Distance between two points and two lines.

XXII. Vectors, Vector Algebra, Direction ratios, Direction cosines, Types of vector, Vector joining two point, Section formula, Products of upto three vectors (scalars, corss etc.), Gradient, Divergence, Curl.

XXIII. Measures of dispersion, Mean deviation, Variance, Standard deviation.

XXIV. Probability, Multiplication theorem on probability, Conditional probability, Independent events, Total probability, Baye's theorem, Partition of a sample space.

XXV. Linear Programming problems, Objective function, Optimization, Types of linear programming problems, Feasible and infeasible regions, Graphical method to solve the LPP.

B. **Subjects of 01 year B.Ed -**Childhood and Development Years, Contemporary India and Education, Language Across the Curriculum, Understanding Disciplines and Subjects, Text Reading and Reflections, Learning and Teaching, Assessment for Learning, Drama and Art in Education, Teaching of Physical Science & Mahematics, Knowledge and Curriculum, Gender, School and Society, Inclusive School, ICT in Teaching-Learning Process, Understanding the Self, Health and Physical Education, Vocational and Work Education, Education for Peace, Guidance and Counseling**.**