

PAPER-V/VI (EDN: 05/06)

Methods of Teaching Physical Sciences  
[100 Instructional Hours – 100 Marks]

Objectives:

This course will enable the student teachers to:

1. know the nature of science, structure, value and correlation with other school subjects
2. draw the attention on development of science and the contributions of western and Indian scientists
3. understand the aims and objectives of teaching physical sciences
4. develop the skill of organizing science curriculum and critique on the present secondary school physical sciences curriculum
5. organize the content into plan of action and practice the micro and macro teaching skill
6. cope up with the methods of teaching physical sciences and use the learning experiences
7. develop the skill of procurement and care of the science laboratory
8. equip the resources of teaching physical sciences
9. utilize the applications of science and technology on society
10. construct the scholastic achievement test and compare and contrast with the existing evaluation system.

Course Content:

**Unit I: Introduction to Science**

**7 Hours**

- 1.1 Science – Meaning, Nature, Scope and Importance
- 1.2 Structure of Science–Syntactic Structure (Process of Science), Substantive Structure (Product of Science)
- 1.3 Values of Teaching Physical Sciences
- 1.4 Correlation of Science with Mathematics, Biological Sciences, Social Studies, Languages and Fine Arts.

**Unit II: Development of Science**

**8 Hours**

- 2.1 Milestones in Development of Science
- 2.2 Contributions of Western Scientists - Copernicus, Newton and Einstein
- 2.3 Contributions of Indian Scientists-Aryabhata, C.V. Raman, S. Chandrasekhar, A.P.J. Abdul Kalam
- 2.4 Impact of Science and Technology on Society

**Unit III: Aims and Objectives of Teaching Physical Sciences**

**10 Hours**

- 3.1 Aims and Objectives of Teaching Physical Sciences
- 3.2 Bloom's Taxonomy of Educational Objectives
- 3.3 Instructional Objectives and Specifications of Teaching Physical Sciences

**Unit IV: Approaches / Methods and Teaching Techniques of Teaching Physical Sciences** **12 Hours**

- 4.1 Inductive and Deductive Approaches
- 4.2 Teacher Centered Methods – Lecture, Lecture cum Demonstration, Historical
- 4.3 Student Centered Methods – Heuristic, Project, Scientific and Laboratory
- 4.4 Modern Teaching Techniques – Brainstorming, Team Teaching, and Digital Technology

**Unit V: Planning of Teaching Physical Sciences** **12 Hours**

- 5.1 Micro Teaching – Concept and Meaning, Skills of Micro Teaching, Practice of Micro Teaching Skills: Introduction, Explanation, Probing Questions, Reinforcement, and Closure.
- 5.2 Year Plan and Unit Plan
- 5.3 Lesson Plan – Herbartian and Constructivist Approaches
- 5.4 Learning Experiences

**Unit VI: Science Curriculum** **12 Hours**

- 6.1.1 Curriculum–Concept and Meaning, Principles of Curriculum Construction
- 6.2 Different Approaches of Curriculum Organisation: Concentric, Topical, Psychological & Logical
- 6.3 Qualities of a Good Science Text Book
- 6.4 Critical Analysis of a High School Physical Science Text Book.

**Unit VII: Science Laboratories** **10 Hours**

- 7.1 Importance of Practical Work in Science
- 7.2 Planning and Organisation of Science Laboratories
- 7.3 Procurement and Care of Laboratory Equipment, Registers, First-Aid, and Safety Management
- 7.4 Development of Improvised Apparatus

**Unit VIII: Resources in Teaching Physical Sciences** **10 Hours**

- 8.1 Science Clubs, Science Exhibition, Science Museums
- 8.2 Science Library
- 8.3 Role of Governmental Organizations in Popularizing Science: DST, CSIR, BARC, ISRO, DRDO, NGRI and CCMB
- 8.4 Role of Non-Governmental Organizations in Development of Science

**Unit IX: Teaching Learning Material in Physical Sciences** **10 Hours**

- 9.1 Edgar Dale’s Cone of Experience
- 9.2 Over Head Projector (OHP); LCD Projector; TV; Computer
- 9.3 Charts; Models; Specimens; Display Boards
- 9.4 Improvisation of Teaching Aids

**Unit X: Evaluation in Physical Science** **12 Hours**

- 10.1 Concept of Test, Examination, Measurement, Assessment and Evaluation

- 10.2 Evaluation – Meaning, Process, Types and Tools
- 10.3 Qualities of a good test and Types of Tests
- 10.4 Preparation of Scholastic Achievement Test (SAT) with Weightage Tables and Blue Print
- 10.5 Analysis and Interpretation of Test Scores

References:

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2. Anju Soni (2000), 'Teaching of Science', Tandon Publications, Ludhiana
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5. Das. R.C.(1990), 'Science Teaching in Schools', Sterling Publications Pvt. Ltd., New Delhi.
6. Nagaraju. M.T.V. (2008), 'Hand Book for Teaching Physical Sciences- Methods and Techniques', Kanishka Publishers and Distributors, New Delhi.
7. Narendra Vaidya (1989), 'The Impact of Science Teaching', Oxford and IBH publishing Co. Pvt. Ltd.
8. Rajiv Garg (1994), 'World Famous Scientists', Pushtak Mahal, New Delhi
9. Sharma. R.C. (1987), 'Modern Science Teaching', Dhanpat Rai and sons, New Delhi
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