B.Ed. Two Year Programme

P.2.6 : Physics

Maximum Marks: 100

Course Objective

This course is aimed at developing the insights, competencies and skills among the pupil-teachers to effectively transact the Physics curriculum and evolve as a reflective practitioner, capable of translating theoretical perspectives into pedagogical practices.

Unit I Pedagogical Underpinning

- Place of physics in school curriculum - Nature of physics as a science discipline and its linkages with other disciplines.
- The concept of Pedagogical Content Knowledge (PCK) and its implications for Physics teaching.
- Aims of teaching physics at the senior secondary level with linkages to upper-primary and secondary level.
- Objectives of teaching physics with special reference to the development of thinking and process skills

Unit II Classroom processes

- Pedagogical planning: considerations in relation to content (curriculum and concepts) and learners (with specific reference to socio-cultural and developmental context of the learner including special needs).
- A repertoire of teaching-learning processes: Inquiry based approach, inductive and deductive approach, experimentation, demonstration, discussion, investigatory projects, individually paced programmes, group work, peer learning, observation-based survey, problem solving, guided independent study, seminar presentation, action research
- Developing unit plans, lesson plans and Remedial/Enrichment plans using combinations of various processes.
- Planning for conduct of activities, experiments and laboratory work in Physics with a critique of the current practices

Practicum

1. *Planning and discussion of lessons for the school experience programme.*
2. *Developing remedial or enrichment programmes.*
3. *Conduct of activities/Experiments.*

Unit III Teaching- Learning Resources

- Criteria for selecting/designing Teaching-Learning Resources : content based, learner based and context based.
- Textbook, reference books, encyclopaedia, newspaper and alike
- Improvisations and Science Kits
- Instructional aides, computer aided instruction, multi-media packages, interactive software, websites, Open Education Resources(OER) etc.

- Planning of extended experiences, science quiz, science fair, science corner/resource room, science club, excursion and related SUPW activities.

Practicum: *Developing Teaching-Learning resources*

Unit IV Organization of the Physics Laboratory

- Layout and design of the physics laboratory.
- Storage of apparatus, consumable and non-consumable items/materials
- Maintenance of laboratory records.
- Making arrangements for the conduct of experiments.

Practicum: *Laboratory work- management of laboratory, activities and project work.*

Unit V Assessment

- Nature of learning and assessment, analysis and critique of the present pattern of examinations.
- Design and analysis of
    - Formative assessment tasks
    - Summative Assessment
- Assessment of laboratory work and project work
- Assessment through creative expression-drawing, posters, drama, poetry, etc as part of formative assessment for continuous assessment of thinking and process skills
- Developing learner profiles and portfolios; participatory and peer assessment.

Practicum: *Preparation of a detailed Assessment Report of learners' continuous and comprehensive assessment.*

Suggested Reading List

- Bal, V. (2005). *Women scientists in India: Nowhere near the glass ceiling*. Current Science: 88(6). pp. 872-878.
- Bevilacqua F, Giannetto E.& Mathews M.R. (Ed.) (2001), *Science Education and Culture The Contribution of History and Philosophy of Science* . Netherlands: Kluwer Academic Publishers.
- Bowling, J. & Martin, B. (1985). *Science: a masculine disorder?* Science and Public Policy: 12(6). pp. 308-316
- Cobern W.W.(Ed.) (1998), *Socio-Cultural Perspectives on Science Education An international Dialogue*. Netherlands: Kluwer Academic Publishers.
- Cole, Jonathan R. and Harriet Zuckerman. 1987. "Marriage and Motherhood and Research Performance in Science" Scientific American 256: 119-125.
- Hiroko, H. (2012).Modernity, Technology and Progress of Women in Japan: Problems and Prospects. In D. Jain & D. Elson(Ed.), *Harvesting feminist Knowledge for Public policy Rebuilding Progress.* New Delhi :Sage Publication.

- Kumar, N. (Ed.)(2009). *Women and Science in India A Reader*. India: Oxford University Press.
- Oakes, J. 2007 More than misplaced technology : A normative and political response to Hallinan on tracking in *Sociology of Education* by Alan R. Sadovnik (Ed.). New York: Routledge
- Okebukola, O. J. (1991). The Effect of Instruction on Socio-Cultural beliefs Hindering the Learning of Science. *Journal of Research in Science Teaching, 28* (3), pp 275-285.
- Osborne, J. F. (1996). Beyond Constructivism. *Science Education, 80* (1), pp 53-82.
- Sur, A. (2011). Dispersed Radiance: Caste, Gender and Modern Science in India. Navayana : India
- Taylor, P.C. &Cobern W. W. 1998 Towards a Critical Science Education in Socio-Cultural Perspectives on Science Education- An international Dialogue By William W. Cobern (Ed.) Dordrecht: Kluwer Academic Publishers.
- Wallace J.& Louden W (Ed.) (2002)*Dilemmas of Science Teaching Perspectives on Problems of Practice.* Routledge: NewYork.