B.Ed. Two Year Programme

P.2.9: Integrated Science

Maximum Marks: 100

Course Objective

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

Unit I Pedagogical Underpinning

- Place of science in school curriculum
- The concept of Pedagogical Content Knowledge (PCK) and its implications for science teaching.
- Aims of teaching science at the upper-primary and secondary level.
- Objectives of teaching science 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 science, experiments and laboratory work 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 in science, multi-media packages, interactive software, websites, open Educational 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 science Laboratory

- Layout and design of the science 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

Collette, T. Alfred. And Chiappetta, L. Engene. (1994) *Science Instruction in the Middle and Secondary Schools, Macmillan Company.*

Driver Rosalind and Rushworth Peter et.al. *Making sense of Secondary Science Research into Children's Ideas.*

Harlan, Jean, (5th Edition), *Science Experience for the Early Childhood Years.*

Harley, Wynne & Elstgest, Jos, *UNESCO Sourcebook for Science in Primary School. A workshop approach on teacher education.*

Mohan, R. (196) *Innovative Teaching of Physical Science,* McGraw Hill Publishing Company Richard, Sandra Amos (2002). Aspects of teaching secondary science, The Open University Press.

Vaidya, N. (1999) *Science Teaching Science for the 21st Century,* Deep and Deep Publishers.

Vidya. N. (1998) *How to think Scientifically,* Deep and Deep Publishers.

Wallace, John and Louden, William (2002) *Dilemmas of Science Teaching,* Routledge Publishers.

Web resources:

http://www.arvindguptatoys.com/
https://phet.colorado.edu/
http://www.nasa.gov/
http://undsci.berkeley.edu/teaching/ and http://undsci.berkeley.edu/
http://www.plantingscience.org/
http://edheads.org/
https://www.discoveryeducation.com/teachers/
http://www.ncert.nic.in/NCERTS/textbook/textbook.htm?jesc1=0-16
http://www.ibe.unesco.org/publications/EducationalPracticesSeriesPdf/Practice_17.pdf