Bachelor of Education (B.Ed.)

Title of the Course: P.2.8 B: Biology

(Semester II)

Credits: 2
MM: 50 (External 35 Internal 15)
Contact Week 15

Introduction of the Course

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

Learning Outcomes

After completion of the course, student will be able to:

1. Demonstrate proficiency with a repertoire of teaching-learning processes, such as inquiry-based approaches, inductive and deductive methods, experimentation, discussion, and group work etc., for providing varied teaching learning experiences for diverse student populations.
2. Plan units and lessons in Biology at various levels.
3. Develop insights and critically analyze the nature and role of assessment in science.
4. Develop competency and skills in designing and developing formative assessment tasks, summative assessment tasks, learner's profile, portfolio etc utilizing various means and contemporary assessment technology.

Number of Units (3) **Weeks 15 = 30 hours**

Unit 1: Classroom Processes **(6 weeks = 12 hours)**

- 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

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projects, individually paced programmes, group work, peer learning, observation-based survey, problem solving, guided independent study and seminar presentation.

- Role of action research in biology education

Unit 2: Pedagogical Planning **(5 weeks = 10 hours)**

- Developing concept map/conceptual hierarchy, unit plans and lesson plans, Remedial/Enrichment plans using combinations of various processes.
- Planning for conduct of activities, experiments and laboratory work in Biology with a critique of the current practices

Unit 3: Assessment **(4 weeks = 8 hours)**

- 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/ Suggested Projects / Assignments (Any Two)

1. Planning and Designing of Unit Plan and Lesson Plan for the School Experience Programme.
2. Developing Remedial or Enrichment Programmes.
3. Conduct of activities/Experiments
4. Designing of Assessment Strategy for biology classroom

Note: On the basis of the above, the teacher may design his/her own relevant projects/ assignments.

Essential/ Recommended Readings

- Ahmad, J. (2011). *Teaching of Biological Sciences Second Edition.* New Delhi: PHI Learing Private Limited.
- Chaudhari, P. (2022). *Teaching-Learning Resources for Science Teachers.* New Delhi: ABI.

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- Chaudhari, P. R. (2020). Video Simulation in Biology Teaching at Higher Secondary Level: Challenges and Possibilities. Sandeep Kumar and M Rajendran (Eds.). *Anthology of Qualitative Research in Education.* New Delhi: VLM Publications
- Chiappetta, L. Eugene and Koballa, R. Thomas (2010) *Science Instruction in the Middle and Secondary Schools,* Seventh Edition, Allyn& Bacon.
- Coll, R. K. (2007). Opportunities for Gifted Science Provision in the Context of a Learner- centered National Curriculum, In K. S. Taber (Ed.), Science Education for Gifted Learners (pp. 59-70). London: Routledge
- Collette, Alfred T. and Eugene L. Chappetta, (1994) *Science Education in the Middle and Secondary Schools;* MacMillan : N. Y.
- Driver, R., Squires, A., Rushworth, P. and Wood- Robinson, V. (2006) *Making Sense of Secondary Science: Research into Children's Ideas,* London: RoutledgeFalmer.
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- Friedrichsen, P.M. & Dana, T. M. (2005). Substantive-Level Theory of Highly Regarded Secondary Biology Teachers' Science Teaching Orientations. Journal of research in science teaching vol. 42, no. 2, pp. 218–244
- Kuhn, T. S. (1970, 2nd Ed)*The Structure of Scientific Revolutions*. Chicago: the University of Chicago
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- Minkoff, E. C. & Baker, P. T. *(*2004) *Biology Today – An Issues Approach* (III Ed.), Garland Science.
- Muralidhar, K., *'What Organisms Do?' in* Rangaswamy, N. S. (Ed.) *Life and Organism, Vol. XII (Part 6)* in Chattopadhyaya, D. P. (Gen. Ed.). *History of Science, Philosophy and Culture in Indian Civilization.* MunshiramManoharlal Publishers Pvt. Ltd., New Delhi.
- Nath, B. K. (2018). *Pedagogy of Science at Secondary level.* New Delhi: Shipra Publications.
- NCERT (2013). *Pedagogy of Science. Physical Science Part I: Textbook for B.Ed.* New Delhi: NCERT.
- NCERT (2013). *Pedagogy of Science. Physical Science Part II: Textbook for B.Ed.* New Delhi: NCERT.
- NCERT (2019). Vigyan Shikshashastra (Bhautik Vigyan Bhag I). New Delhi: NCERT.
- NCERT (2019). Vigyan Shikshashastra (Bhautik Vigyan Bhag II). New Delhi: NCERT.
- Pollard, A (2005) *Reflective Teaching*, London: Continuum.

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- Reiss, M. (Ed.). (1999) *Teaching Secondary Biology*. Association for Science Education.
- Siddiqi and Siddiqi. (2002) *Teaching of Science Today and Tomorrow*, Doaba House, New Delhi.
- Siddiqi and Siddiqi. *Teaching of Biology*, Doaba House, New Delhi.
- Sundarajan, S. (1995) *Teaching Science in Middle School : A Resource Book*. Orient Longman: Hyderabad.
- Turner, T. & *Dimotea*, W. (1998) *Learning to Teach Science in Secondary School*, Routledge Publication, USA.
- UNESCO (1966) Source Book for Science Teaching: UNESCO: Paris.
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- Wallace, J and Louden, W. (Eds.)(2001) Dilemmas of Science Teaching: Perspectives on Problems of Practice. Routledge, London.
- Wellington, J. (2004) *Teaching and Learning Secondary Science – Contemporary Issues and Practical Approaches*, London: Routledge.
- Wilson, E. O. (1999). Consilience: *The Unity of Knowledge, Vintage Books*. New York.

Journals

1. School Science, NCERT, New Delhi The American Biology Teacher
2. National Association of Biology Teachers

Teaching Learning Process

The course will be taught through interactive pedagogic methods such as classroom discussion, debates, discussions, critical analysis, collaborative learning tasks which enhance skills in the area and innovative projects. Reflective expression and learning will be encouraged.

Assessment Method

The assessment will be formative in nature and will factor in student participation. Individual and group tasks and assignments will be given. Summative evaluation will be done through the end- semester examination.

Key words: Inquiry Based Approach, Inductive, Deductive, Action Research.

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