Bachelor of Education (B.Ed.)

Title of the Course: Pedagogy IIA: P.2.7A: Chemistry
(Semester: I)

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

Introduction of the Course

This course is aimed at developing understanding of the place of chemistry in school curriculum and the aims of teaching chemistry at various stages in the curriculum. The course will also enable pupil-teachers to effectively maneuver and develop insights related to pedagogical content knowledge and TPACK. The course unfolds across three cohesive units, each meticulously crafted to inculcate a profound understanding of the pedagogical underpinnings, classroom processes, teaching-learning resources, in the domain of Chemistry education. The course develops insights, competencies, and skills among the pupil teachers to effectively explore the Chemistry Laboratory and related aspects.

Learning Outcomes

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

1. Demonstrate an in-depth understanding of the role of chemistry in the school curriculum,
2. Develop understanding of Pedagogical Content Knowledge (PCK) & Technological, Pedagogical and Content knowledge (TPACK) and its implications for effective chemistry teaching, integrating theoretical perspectives into practical pedagogical approaches.
3. Exhibit competency in selecting and designing diverse teaching-learning resources, including textbooks, reference materials, improvisations, and multimedia packages, aligning them with content, learner needs, and the broader educational context.
4. Develop insights, competencies, and skills in organizing and managing a chemistry laboratory.

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

Unit 1: Pedagogical Underpinning (6 weeks = 12 hours)

- Place of Chemistry in school curriculum

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- The concept of Pedagogical and Content knowledge (PCK), Technological, Pedagogical and Content knowledge (TPACK) and its implications for Chemistry teaching.
- Aims of teaching Chemistry at the secondary level with linkages to upper primary and senior secondary school levels.
- Objectives and learning outcomes of teaching Chemistry with special reference to the development of thinking and process skills
- Integration of STEAM principles in chemistry pedagogy

Unit 2: Teaching- Learning Resources (5 weeks = 10 hours)

- Criteria for selecting/designing Teaching-Learning Resources: content based, learner based and context based.
- Textbook, reference books, encyclopedia, newspaper and alike
- Improvisations and Science Kits
- Instructional aides, computer aided instruction, multi-media packages, interactive software and simulations, 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.

Unit 3: Organization of the Chemistry Laboratory (4 weeks = 8 hours)

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

Practicum/ Suggested Projects/Assignments (Any Two):

1. Design a lesson based on TPACK explicitly stating desired learning outcomes
2. Developing Teaching-Learning resources for a blended learning classroom
3. Develop collaborative projects on types of Laboratories like mobile laboratory, virtual laboratory etc.

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

Essential/Recommended Readings

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78

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- Wellington, J. (2004) Teaching and Learning Secondary Science – Contemporary Issues and Practical Approaches, London: Routledge.

Teaching Learning Resources (Digital):

- Amrita Vishwa Vidyapeetham. (n.d.). Virtual Labs. http://www.amrita.edu/virtual-labs
- e-Yantra. (n.d.). Robotics and Embedded Systems. http://www.e-yantra.org/
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- Khan Academy. (n.d.). https://www.khanacademy.org/science
- Ministry of Education, Government of India. (n.d.). National Digital Library of India (NDLI). https://ndl.iitkgp.ac.in/
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- National Council of Educational Research and Training. (n.d.). Diksha. https://diksha.gov.in/
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Teaching Learning Process:

The course will be taught through interactive pedagogic methods such as classroom discussions, debates, collaborative learning tasks, laboratory methods with the appropriate use of digital processes, so as to enhance reflective practices and critical analytical thought

processes among learners. Self-learning, self-exploration, creative expression, and comprehension & application of concepts will be encouraged.

Assessment Method:

The assessment will be formative in nature both in theory and practicum and will focus on rigorous student participation. Individual and group tasks will aim at developing scientific temper among learners. Assessment will also be based on development of creative expressions, critical understanding, reflections, and ethics in science.

Key words: Chemistry, Pedagogy, Teaching Resources

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