(iii)Area of Specialization Courses in Biology

TEACHING OF BIOLOGY

Course Code:EDUB351 **Credit Hours: 3**

Course Description

This course is designed specifically to equip the prospective science teachers with the latest pedagogical knowledge required to teach the contents of Biology at secondary level. Moreover, this course will also provide the prospective science teachers an association with utilization of laboratory, use of modern assessment techniques and incorporating computers in the field of teaching of Biology.

Learning Outcomes

At the end of the course students will be able to:

1. Recognize the importance of teaching Biology.
2. Differentiate between method, technique and strategy in context of teaching.
3. Describe various methods for teaching of Biology.
4. Describe the pros and cons of using technology in the classroom and provide examples of how this new learning environment is changing science education.
5. Identify resources for enhancing teaching in the science education literature.
6. Demonstrate the use of low cost no cost materials for teaching of Biology.
7. Apply the computer technology for teaching of Biology.
8. Use the laboratory apparatus effectively for disseminating biological knowledge.
9. Identify most suitable method to teach diverse topics.

Contents

1. **Introduction**
   - 1.1 The Nature of science
   - 1.2 Definition of sciences: Science as product and process
   - 1.3 The products of science
   - 1.4 Processes of science
   - 1.5 Scientific attitudes
   - 1.6 The nature of scientific laws, facts, concepts and theories
   - 1.7 Physical sciences and limitations of science
   - 1.8 Definition of Biology
   - 1.9 Importance of Biology in everyday life
2. **Relationship of Biology with other Subjects**
   - 2.1 Importance of the relationship
   - 2.2 Relationship with Chemistry
   - 2.3 Relationship with Physics
   - 2.4 Relationship with Geography
   - 2.5 Relationship with Sociology
   - 2.6 Relationship with Mathematics
   - 2.7 Relationship with other related fields
3. **Aims and Learning Outcomes of Teaching Biology**
   - 3.1 Aims of teaching Biology
   - 3.2 Learning Outcomes of teaching biology
   - 3.3 Difference between aims and Learning Outcomes
   - 3.4 Formulation of Learning Outcomes
   - 3.5 Taxonomy of Educational Learning Outcomes

4. **Curriculum in Biological Sciences**
   - 4.1 Concept of Curriculum
   - 4.2 Historical Background of Biological Curriculum
   - 4.3Critical Analysis and Evaluation of the Biological Sciences Curriculum
5. **Methods of Teaching Biological Sciences**
   - 5.1 Introduction
   - 5.2 Various methods of teaching Biology
   - 5.3 Choice of Method
6. **The Nature of Children and Science Teaching**
   - 6.1 Piagetian theory of cognitive development
     - 6.1.1 Stages of cognitive development
     - 6.1.2 Characteristics of individual in various stages of cognitive development
     - 6.1.3 Piaget's theory and science curriculum
     - 6.1.4 Implications of Piagetian theory in facilitating learning of science
   - 6.2 The process of learning according to Robert Gagne, Davis Ausubel and Bruner
7. **Unit planning and Lesson Planning**
   - 7.1 Prerequisites of Good Planning
   - 7.2 Unit planning and lesson planning
8. **Biological Sciences Laboratory**
   - 9.1 Need and Significance of Laboratory work
   - 9.2 Planning and layout of Science Laboratory
   - 9.3 Administration of a laboratory
   - 9.4 Safety Measures in the Laboratory and First Aid Kits
   - 9.5 Improvised Apparatus
   - 9.6 Text books
9. **Teaching Skills**
   - 10.1Characteristics of the teaching Skills
   - 10.2Important teaching skills
10. **Evaluation in Biology**
    - 11.1Introduction
    - 11.2Designing of Test
    - 11.3Evaluation of skills
    - 11.4Evaluation of the Practical work
11. **Research In Biology Education**
12. **Teaching-learning Strategies**
13. The instructional strategies will focus on constructionist learning approach. These strategies will be diverse in line with the course contents. Therefore, these strategies will include but not limited to demonstration, cooperative learning, collaborative learning, teacher and student-led discussion, individual and group presentations, reflective practices and classroom activities.

Assessment and Examinations

The students will be assessed according to the following criteria.

Examination	Marks Distribution
Sessional work	25 %
Mid Semester	35%
Final Semester	40%

Suggested Readings

Ahmad, J. (2011). *Teaching of biological sciences (Intended for Teaching of Life Sciences, Physics, Chemistry and General Science)*. PHI Learning Pvt. Ltd.

Malhotra, V. (2007).*Methods of teaching biology.* New Delhi: Crescent Publishing Corporation.

Martin, R. E., Sexton, C. M., &Gerlovich, J. A. (2001). *Teaching science for all children.* Boston: Allyn and Bacon

Nilson, L. B. (2016). *Teaching at its best: A research-based resource for college instructors.* John Wiley & Sons.

Ramakrishna, A. (2012)*Methods of teaching life sciences.* Chennai: Pearson.

Reiss, M. (2011). *Teaching secondary biology*.London: Hodder Education.