

INSTRUCTIONAL TECHNOLOGY FOR TEACHING OF BIOLOGY

Course Code: EDUB – 352

Credit Hours: 3

Course Description

The course “Instructional Technology for teaching of Biology” is designed to provide basic knowledge and understanding of the modern instructional technology used for teaching of Biology. Upon completing of this course the students should be able to select, use and use reliable and valid instructional technology. They should also be able to select the most appropriate instructional best suited for the topic. The students will become familiar with the professional as well as ethical issues in use of using instructional technology. The course will also provide an understanding of the basic terminology, methods, designs and models as they relate to the area of Biology Education. It develops awareness about the procedures and options available worldwide in Instructional Technology in professional pursuit.

Learning Outcomes

After successful completion of this course the students will be able to:

1. Understand the concept of instructional technology.
2. Recognize the importance of instructional technology in Biology Education.
3. Relate the use of instructional technology with various methods of teaching.
4. Know the modern instructional technologies being used worldwide.
5. Design instructional technology with the help of low cost no cost material.
6. Plan science lessons incorporating instructional aides and best teaching method.
7. Know the advantages and limitations of various instructional technologies.
8. Make effective use of computers in teaching Biology
9. Make effective use of laboratory apparatus in teaching concepts of Biology

Contents

1. Nature of Biology as a field of science

- 1.1 What is the nature of Biology?
- 1.2 Application of Scientific Method to study Biology
- 1.3 How do Biologists conduct research? Some classic work in field of Biology
- 1.4 Biology and the human welfare

2. Classroom Communication

- 2.1 What is teaching, learning and instruction?
- 2.2 Elements of classroom communication
- 2.3 Barriers to classroom communication

3. Instructional Aids or Teaching Aids

- 3.1 What are the Instructional or teaching Aids
- 3.2 Importance of teaching aids
- 3.3 Different types of teaching aid material
- 3.4 Principles for selection of teaching aids
- 3.5 Principles for using of teaching aids

4. Media in Teaching and Learning of Biology

- 4.1 Materials for visual communications: Bulletin Boards, Chalk Boards, Flannel Boards, etc.
- 4.2 Graphic Materials: Graphs, Charts, Cartoons, Maps and Globes
- 4.3 Still Pictures:
 - 4.3.1 Opaque projector
 - 4.3.2 Over-head projector and transparencies
 - 4.3.3 Slide projector and film slides
 - 4.3.4 Filmstrip projector and filmstrip

- 4.4 Audio-Materials, Radio and Tape-Recorder
- 4.5 Motion Pictures, Films and Video
- 4.6 Real things, Models and Demonstrations
- 4.7 Games, Simulations
- 4. Methods and Procedures in Individualized Teaching Strategies for Biology**
 - 4.1 Rationales and significant features
 - 4.2 Methods of Individualization
 - 4.3 Programmed Instruction
 - 4.4 Computer Assisted Instruction and Computer Managed Instruction
 - 4.5 Modular Instruction
 - 4.6 Personalized System of Instruction
 - 4.7 Individually Prescribed Instruction
 - 4.8 Audio-tutorial Method
- 5. Designing Instruction in Biology**
 - 5.1 Designing Instructional Sequence
 - 5.2 Model for Systematic Planning of Instruction
 - 5.3 Steps in Instructional Planning
 - 5.4 Designing Individual Lesson/unit Planning
- 6. Designing Conceptual Toolkit for teaching Biology**
 - 6.1 What is the significance of low cost no material in teaching
 - 6.2 Types of low cost no material
 - 6.3 Use of low cost no cost material
 - 6.4 Concept of toolkit
 - 6.5 Use of low cost no material in developing toolkit for different Biological

Concepts

- 7. Use of modern Instructional Technology in teaching of Biology**
 - 7.1 Use of smart interactive white boards for teaching Biology
 - 7.2 Use of LCD projector for teaching Biology
 - 7.3 Creating blogs and websites for teaching Biology
 - 7.4 Use of on line media for teaching Biology
- 8. Designing Instructional modules for teaching Biology**
 - 8.1 What is modular instruction?
 - 8.2 Lesson planning for modular instruction for teaching Biology
 - 8.3 Planning technology for modular instruction

Teaching-learning Strategies

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

- American Association for the Advancement of Science (AAAS) (1985). *Science Books and Films*, 20(5).
- Ahmad, J. (2011). *Teaching of biological sciences (Intended for Teaching of Life Sciences, Physics, Chemistry and General Science)*. PHI Learning Pvt. Ltd.
- Alvermann, D. E., & Boothby, P. R. (1986). Children's transfer of graphic organizer instruction. *Reading Psychology*, 7(2), 87–100.
- Anderson, L. W., Krathwohl, D. R., Airasian, P. W., Cruikshank, K. A., Mayer, R. E., Pintrich, P. R., et al. (Eds.). (2001). *A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational Learning Outcomes*. New York: Longman.
- Bybee, R. 1987. *Human ecology and teaching: New trends in biology teaching*. UNESCO; 5:145-155.
- El-Nemr, M. A. (1980). Meta-analysis of outcomes of teaching biology as inquiry. *Dissertation Abstracts International*, 40, 5813A.
- NSTA (National Science Teachers Association). 1987. *NCATE-Approved Curriculum Guidelines for Biology Teacher Education Programs*. Washington, D.C.: NSTA.
- Malhotra, V. (2007). *Methods of teaching biology*. New Delhi: Crescent Publishing Corporation.