

INSTRUCTIONAL TECHNOLOGY FOR TEACHING OF MATHEMATICS

Course Code: EDBESc362

Credit Hours: 3

Course Description

The course "Instructional Technology for teaching of Mathematics" is designed to provide basic knowledge and understanding of the modern instructional technology used for teaching of Mathematics. 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 Mathematics 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 Mathematics 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 Mathematics
9. Make effective use of laboratory apparatus in teaching concepts of Mathematics

Contents

1. Nature of Mathematics as a field of science

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

3. Media in Teaching and Learning of Mathematics

- 3.1 Materials for visual communications: Bulletin Boards, Chalk Boards, Flannel Boards, etc.
- 3.2 Graphic Materials: Graphs, Charts, Cartoons, Maps and Globes
- 3.3 Still Pictures:
 - 3.3.1 Opaque projector
 - 3.3.2 Over-head projector and transparencies
 - 3.3.3 Slide projector and film slides
 - 3.3.4 Filmstrip projector and filmstrip

- 3.4 Audio-Materials, Radio and Tape-Recorder
- 3.5 Motion Pictures, Films and Video
- 3.6 Real things, Models and Demonstrations
- 3.7 Games, Simulations
- 4. Methods and Procedures in Individualized Teaching Strategies for Mathematics**
 - 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 Mathematics**
 - 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 Mathematics**
 - 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 Mathematical concepts
- 7. Use of modern Instructional Technology in teaching of Mathematics**
 - 7.1 Use of smart interactive white boards for teaching Mathematics
 - 7.2 Use of LCD projector for teaching Mathematics
 - 7.3 Creating blogs and websites for teaching Mathematics
 - 7.4 Use of on line media for teaching Mathematics
- 8. Designing Instructional modules for teaching Mathematics**
 - 8.1 What is modular instruction?
 - 8.2 Lesson planning for modular instruction for teaching Mathematics
 - 8.3 Planning technology for modular instruction

Assessment and Examinations

Students will be assessed according to the following criteria.

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

Suggested Readings

- Basserear, T. (2012). *Mathematics for Elementary School Teachers*. Belmont, CA: Brooks.
- Donovan, S., & Bransford, J. (2005). *How students learn: History, mathematics, and science in the classroom*. Washington DC: National Academies Press. Also available at www.nap.edu/catalog.php?record_id=10126#toc
- Haylock, D. (2010). *Mathematics explained for primary teachers*. CA: SAGE Publications.
- Protheroe, N. (2007). What does good math instruction look like. Retrieved from <http://www.naesp.org/resources/2/Principal/2007/S-Op51.pdf>.
- National Council of Teachers of Mathematics. (n.d). *Illuminations*. Retrieved from <http://illuminations.nctm.org>
- New Zealand Ministry of Education. (2014). *Mathematics and statistics*. Retrieved from <https://nzcurriculum.tki.org.nz/The-New-Zealand-Curriculum/Mathematics-and-statistics>
- University of Cambridge, NRICH. (2020). Enriching Mathematics. Retrieved from <http://nrich.maths.org>
- Van de Walle J. A., Karp, K., & Williams, J. Bay. (2013). *Elementary and middle school mathematics: Teaching developmentally*. Boston: Pearson Education.