

PAPER-V/VI (EDN: 05/06)

Methods of Teaching Mathematics  
[100 Instructional Hours – 100 Marks]

Objectives:

This course will enable the student teachers to:

1. understand history, development of mathematics and the contributions of indian and other mathematicians towards mathematics.
2. understand aims, values and objectives of mathematics education.
3. identify the role of branches of mathematics & their implications on the society.
4. translate objectives of teaching mathematics in terms of expected behavioural outcomes.
5. understand principles of curriculum construction development, its transactions and evaluation.
6. understand and practice various methods and techniques of teaching mathematics.
7. develop competency in teaching strategies, content and in the preparation of suitable teaching learning materials.
8. utilize laboratory, library and mathematics club as inputs in the teaching and learning of mathematics.
9. sensitize the needs and requirements of slow and gifted learners in mathematics.
10. assimilate the strategies of evaluation and design the tools of evaluation.

Course Content:

**Unit-I: Introduction to Mathematics**

**10 Hours**

- 1.1 Meaning and Nature of Mathematics.
- 1.2 Scope of Mathematics.
- 1.3 Contributions of the following Mathematicians to Mathematics:  
(a) Pythagoras (b) Euclid (c) Rene Descartes (d) Aryabhata (e) Bhaskara Charya-II (f) Srinivasa Ramanujan (g) Shakunthala
- 1.4 Correlation of Mathematics with other subjects.

**Unit-II: Values and Objectives of Teaching Mathematics.**

**10 Hours**

- 2.1 Aims and Objectives of teaching Mathematics
- 2.2 Instructional objectives with reference to Blooms taxonomy and its limitations.
- 2.3 Teaching of different branches of Mathematics.
- 2.4 Values of teaching Mathematics at secondary level.

**Unit-III: Approaches / Methods of teaching Mathematics. 10 Hours**

- 3.1 Problem solving approach: Inductive & Deductive Method.
- 3.2 Analytic and Synthetic Methods
- 3.3 Heuristic Method
- 3.4 Laboratory Method
- 3.5 Project method
- 3.6 Techniques of Teaching Mathematics – Oral work, written work, supervised study, speed and Accuracy.

**Unit-IV: Planning for Teaching Mathematics. 10 Hours**

- 4.1 Skills of teaching Mathematics.
- 4.2 Micro teaching: Concept; Definition; Micro teaching cycle; Components of Micro teaching; Merits and limitations.
- 4.3 Microteaching Skills: Instructional objectives; Introducing a lesson, Explaining a concept, Stimulus variation; Illustrating with examples, Probing questioning, Reinforcement, Structuring classroom questions; and Blackboard writing
- 4.4 Planning of Instruction: Annual plan, Unit plan, and Lesson plan
- 4.5 Technology integrated lessons

**Unit V: Teaching Learning Material in Mathematics 10 Hours**

- 5.1 Edgar Dale's Cone of Experience
- 5.2 Over Head Projector (OHP); LCD Projector; TV; Computer
- 5.3 Charts; Models; Specimens; Activity aids (Herbarium, Vivarium, Terrarium); Display boards
- 5.4 Improvisation of Teaching aids

**Unit-VI: Mathematics Curriculum. 10 Hours**

- 6.1 Principles of curriculum construction.
- 6.2 Approaches of curriculum – Logical, Psychological, Topical, Concentric, and Spiral.
- 6.3 Constructivist approach
- 6.4 Project based learning.(PBL)
- 6.5 Recommendation of N.C.F.-2005, APSCF – 2011 with reference to Mathematics Education.

**Unit VII : Mathematics Textbook. 10 Hours**

- 7.1 Textbook in Mathematics: Importance and Criteria of a good Mathematics text book.
- 7.2 Concept Ladder process (CLP)
- 7.3 Experience, Language, Pictures and Symbols (ELPS).
- 7.4 Critical analysis of a high school mathematic text book.

**Unit-VIII: Resources for Strengthening Mathematics Education. 10 Hours**

- 8.1 Mathematics Library
- 8.2 Mathematics Laboratory

- 8.3 Mathematics Clubs
- 8.4 Mathematics Fairs / Exhibition; Mathematics Olympiad
- 8.5 Mathematics talent search examination

**Unit-IX: Mathematics Teacher and Professional Development.**

**10 Hours**

- 9.1 Qualities of a good Mathematics teacher.
- 9.2 Professional competencies of a Mathematics Teacher
- 9.3 Action Research for improving Quality of Mathematics Teaching & Learning.

**Unit – X : Evaluation in Mathematics**

**10 Hours**

- 10.1 Concept of Test, Examination, Measurement, Assessment and Evaluation
- 10.2 Evaluation – Meaning, Process, Types and Tools
- 10.3 Qualities of a good test and Types of Tests
- 10.4 Preparation of Scholastic Achievement Test (SAT) with weightage tables and Blue Print
- 10.5 Analysis and Interpretation of Test scores

## References:

1. A.P. State Curriculum frame work, 2011 published by SCERT, A.P., Hyderabad.
2. Bloom, Benjamin S., Ed. (1958): Taxonomy of Educational Objectives, Handbook I – Cognitive Domain, Harcourt Brace & World Inc., New York.
3. Mangal S.K. (1993): Teaching of Mathematics, Arya Book Depot, New Delhi.
4. Mathematics projects and Mathematics Laboratory by Dr.N.M.Rao, Professor, NCERT.
5. Methods of teaching Mathematics by Dr.S.Packiam.
6. National curriculum framework for teacher education – 2000 – (Document published by NCERT).
7. NCF, 2005 document.
8. Position papers for Mathematics prepared by SCERT, A.P., Hyderabad.
9. Siddu K.S. (1990): Teaching of Mathematics, Sterling Publishers, New Delhi.
10. Teaching of Mathematics (UGC Syllabus) by Dr.A.K.Kulshrestha and Puneeth Kumar – R.Lal Book Depot, Meerut.
11. Teaching of Mathematics by Dr.Anice James, Neelkamal Publications.
12. The Teaching of Mathematics by David.R.Davis, Newbook info, Surjeet Publications, New Delhi.
13. The Teaching of Secondary School Mathematics (1970): XXXIII Yearbook of NCTM, Washington.