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**  
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) Aryabhatta (e) Bhaskara Charya-II (f) Srinivasa Ramanujan (g) Shakunthalas.  
1.4 Correlation of Mathematics with other subjects.  

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

Unit VII : Mathematics Textbook.  10 Hours

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:
4. Mathematics projects and Mathematics Laboratory by Dr.N.M.Rao, Professor, NCERT.
5. Methods of teaching Mathematics by Dr.S.Packiam.
7. NCF, 2005 document.
11. Teaching of Mathematics by Dr.Anice James, Neelkamal Publications.