

**Semester – II**  
**Optional Paper**  
**Course Code 907.6**  
**Applicational Pedagogy of Mathematics Education**

Contact Hours : 108  
Duration of Exam : 3 hrs

Maximum weight : 32  
Maximum credit : 4

**Course Objectives**

- ❖ To understand the Psychological bases of Mathematics Education.
- ❖ To acquaint the teacher educands with the strategies and models of teaching in Mathematics education.
- ❖ To empower teacher educands with recent trends and findings of research in Mathematics education.
- ❖ To empower and energize the teacher educands with the application of information technology.
- ❖ To understand the teacher educands the skills and competencies regarding mathematics education.
- ❖ To develop research attitude among teacher educands.
- ❖ To acquaint the teacher educands with the different modes of evaluation techniques in Mathematics education.

**Course Contents**

**UNIT – 1 : Psychological bases of Mathematics Education (25 hrs)**

-Psychological approach in Mathematics Education

- Motivation and Transfer of learning in Mathematics classrooms

- Contributions of Piaget, Bruner, Gagne, Vygotsky, Ausubel, Richard Suchman and Gardner for Mathematics Education and learning.

## **UNIT – 2 - Instructional Dynamics of Mathematics Education**

**(30 hrs)**

(a) Approaches - Inductive & Deductive  
 Heuristic – Analytic & Synthetic  
 Problem solving – Project  
 Activity Oriented

(b) Models - Information Processing Models  
 Concept Attainment Model  
 Advance Organizer Model  
 Inquiry Training Model  
 Inductive Thinking Model  
 Cognitive Growth Model

© Strategies – Graphic Organizers, Brain-based learning, Problem based learning, Cooperative learning, Experiential learning & Reflective learning.

(d) Concept of Blended Strategies

(e) ICT for Mathematics learning

**UNIT – 3 – Research in Mathematics Education (10 hrs)**

- Survey of researches bearing on Mathematics education with special reference to learning theories, instructional strategies, instructional materials, learning styles and new curricula.

**UNIT – 4 – Evaluation of Educational Outcomes in Mathematics****(25 hrs)**

- Test construction and standardization – different types of test items
- Educational diagnosis – diagnostic test and Remedial instruction
- Action Research in Mathematics education
- Grading System – Direct and Indirect
- Evaluation of teaching, planning, and implementation of lesson designs
- Performance based evaluation – peer evaluation, self appraisal

**UNIT – 5 – Structure of Mathematical abilities (18 hrs)**

- Mathematical Giftedness & Creativity
- Implications of theory of Multiple Intelligence
- Basic Mathematical skills – logical reasoning, problem solving, approximation, computation etc.
- Geometrical skills – Construction and interpretation of tables, charts, graphs etc.

**Advanced Practicum (any two)**

1. Prepare a lesson design based on any two innovative teaching models.
2. Develop an observation schedule for assessing mathematics class at undergraduate level and prepare report on the observed class.
3. Create a multimedia presentation for teaching mathematics.

**References**

1. Baker, J and Tucker, R.N. (1990). The Interactive Learning Revolution. London: Kegan Paul Ltd.
2. De Cecco, J.P. and William Crawford (1974). The Psychology of Learning and Instruction New Jersey: Prentice Hall Inc.
3. Gagne, R.M. (1965). The condition of learning. New York: Holt, Reinhart and Winston Inc.
4. Howard Tannee and Jones, Sonia (2000). Becoming Successful Teacher of Mathematics. London: Routledge Falarer Series.
5. Joyce, B. and Weil, M (1980). Models of Teaching Englewood Cliffs New Jersey: Prentice-Hall Inc.
6. Kruteteski, V.A. (1976). The Psychology of Mathematical abilities in School Children University of Chicago Press.
7. Michael. D. Resnih (1997). Mathematics as a Science of Patterns. Oxford Press.

8. Passi, B.K. (1991). Models of Teaching. New Delhi: NCERT Press.
9. Paul Chambers (2010). Teaching Mathematics. New Delhi: Sage Publications.
10. Butler, C.H. and Wren, F.L. (1965). The Teaching of Secondary Mathematics. New York: Mc Graw Hill.

**Mahatma Gandhi University**  
**M.Ed Degree (CBCSS) - Second Semester Examination**  
**Course code : 907.6**  
**Applicational Pedagogy of Mathematics**

Duration of Exam : 3 hrs

Max. weight : 32

**PART A**

**Answer any two questions. Each question carries Four weightages**

1. Explain the contributions of Piaget for mathematics education.
2. Enumerate the features of Inquiry Training Model. Select a topic of your choice from secondary school mathematics syllabus and develop a lesson transcript.
3. Describe the process of standardization of an evaluation tool.
4. What is the role of ICT in empowering mathematics education?

**[2×4 = 8 weightages]**

**PART B**

**Answer any 6 Questions. Each question carries 2 weightages**

5. How will you motivate your students in learning mathematics.
6. Explain the characteristics of information processing models.
7. What is the significance of Action Research in Mathematics Education?
8. Differentiate between direct and indirect grading system.
9. Explain the basic mathematical skills to be developed at secondary school level.
10. What is the role of diagnosis and remedial measures?

11. Suggest any five areas of recent researches in mathematics education with special reference to instructional strategies.
12. What are the implications of theory of multiple intelligence?

**(6x2=12 Weightages)**

### **PART – C**

**Answer any six questions. Each question carries a weight of one**

13. How will you identify mathematical giftedness?
14. Mention the features of Brain-based learning.
15. Explain the concept of blended strategies.
16. Describe the role of graphic organizers in mathematics learning.
17. What are educational implications of Bruner's theory of cognitive development with special reference to mathematics learning.
18. How will you evaluate a project at secondary school level.
19. Compare between analytic and synthetic approaches in mathematics education.
20. Explain zone of proximal development?

**(6×1 = 6 weightage)**

### **PART – D**

**Answer all questions. Each question carries .5 weight**

21. What are the stages of Gagne's hierarchy of learning
22. Define problem solving method?
23. Illustrate inductive method from a topic at secondary level.
24. What are the different phases of concept attainment model.

25. Give two advantages of cooperative learning.
26. Bring out the importance of experiential learning
27. Mention any two techniques for performance based evaluations.
28. How a self appraisal report empower mathematics teachers.
29. What are the components of mathematical creativity?
30. Who is the exponent of multiple intelligence theory?
31. What are the geometrical skills?
32. Write a research topic in the area of 'instructional materials' in mathematics.

**(12×.5 = 6 marks)**