B-201-A: PEDAGOGY OF MATHEMATICS

Internal Assessment: 30 marks **External Assessment**: 70 marks

Note: The Question paper is divided into four sections. Section-A contains Multiple Choice Objective questions of one mark each. Section-B contains Very Short Answer questions of 2 marks each, Section-C contains Short Answer questions of four marks each and Section-D contains Long Answer questions of 15 marks each. Attempt all questions of Section-A and Section-B, any five questions out of seven from Section-C and two questions out of four from Section-D. Answer of very short answer questions (section-B) should be maximum of 25 words only. Answer of short answer questions (section-C) should not exceed 150 words.

Objectives

The pupil teacher will be able:

1. To understand the language and symbolism of mathematics as a discipline.
2. To develop the pedagogic understanding of Mathematics in context of school and learner.
3. To understand and apply different methods of teaching mathematics in the classroom.
4. To promote understanding of Mathematics in learners.
5. To select and organize content, plan instruction and ensure effective delivery.
6. To organize pedagogic study of subjects in Mathematics at school level.
7. To facilitate philosophical & epistemological insights of Mathematics teaching in pupil teacher.
8. To enrich knowledge and teaching competency.

Course Content

UNIT I

- Nature, scope and importance of Mathematics, Brief history of Mathematics.
- Contribution of Mathematicians:

Indian: Aryabhata, Brahmagupta, Bhaskara-I, Bhaskara-II (Bhaskaracharya), Ramaujun.

Other than India: Pythagoras, Euclid, Gauss, Leonhard Euler, Alan Turing.

- Need and significance of teaching Mathematics, Aims and objectives of teaching Mathematics
- Concept formation (Theories and implications), Writing of objectives in Behavioral terms, Factors influencing learning of Mathematics

UNIT II

- Place of Mathematics in school curriculum.
- Selection, sequencing and organization of curriculum content.
- Correlation of Mathematics with other school subjects
- Critical appraisal of Mathematics curriculum and textbook at the Upper Primary, Secondary and senior secondary Level

UNIT III

- Methods of teaching Mathematics: Inductive, Deductive, Analytical, Synthetic, Heuristic, Project, Laboratory, Lecture and Question-answer.
- Techniques of teaching Mathematics: oral, written, drill, assignment, self study, supervised study, programmed learning, group work and review.
- Audio-visual aids, software and hardware and ICT for teaching Mathematics
- Unit plan and lesson planning in Mathematics, Teaching points of various content areas in Mathematics like Arithmetic, Algebra, Geometry and Trigonometry etc.

UNIT IV

- Evaluation in Mathematics: purpose and procedure.
- Teaching mathematics to Gifted and backward children, their identification and provision for mathematics education; remedial teaching: its meaning, principles of diagnosis and remediation.
- School activities (inside and outside) for popularization of Mathematics.
- Qualities and competencies of an effective Mathematics Teacher.

Practicum

- Practical exercises on Programmed instruction & CAI.
- Construction & standardization of Achievement test.
- Analysis and evaluation of syllabus for stage of education in secondary school.

- Construction of a diagnostic Test.
- Preparation of list of equipments essential for teaching mathematics in school.
- Preparation of teaching aids.
- Essentials of mathematics Library and Mathematics laboratory
- Preparation of Lesson Plan.

Books Recommended:

1. Chadha, B.N. : Teaching of Mathematics
2. Dharamabir and Agrawal: The Teaching of Mathematics in India.
3. Rawat, M.S. and Agrawal : M.B.L. : Ganit Shikshan
4. Schultz, A.: The Teaching of Mathematics in Secondary School.
5. Arora, S.K. (1988). *How to teach Mathematics*, Shanta Publisher, Bhiwani.
6. Chauhan, C.P.S, (1985). *Achievement in Algebra and structure of Intellect*, V ishwavidyalaya Prakashan, Varanasi.
7. Kumar, S, and Ratnalikar, D.N. (2003). *Teaching of Mathematics*, Anmol Publishers, Pvt. Ltd., New Delhi.
8. Russel, J., (2004), *Teaching of Mathematics*, Campus Book International, New Delhi.
9. Sidhu, K.S. (1982), Teaching of Mathematics, Sterling Publisher Pvt. Ltd. New Delhi.
10. Richard Courant & Herbert Robbins: What is Mathematics, Fai Lawn Oxford University Press, 1941.
11. Cosrines: The Mathematical Sciences – A Collection of Essay M.I.T. Press, 1969
12. The Psychology of Mathematical abilities in school children, V.A. Krutstski Chicago University Press, 1976
13. How Children Learn Maths: Teaching Implications of Piaget's Research, Rechard Copelard, New York, Macmillan, 1975.
14. How to Solve It, G. Polyn Garchen City, Double Day & Co., 1958
15. The Principle of Objective Testing in Mathematics, Fraser Cillam, 1971
16. Teaching of Mathematics by I.W.A. Young.
17. Teaching of Mathematics in the New Education by N.K. Kuppuswami Aiyangar