Secondary School Mathematics Curriculum

Programme(s) in which it is offered: B.Sc.B.Ed. Mathematics

Course Category: Core	**Schedule of Offering**: Even
Course Credit Structure: 3	**Course Code:** EG561
Total Number of Hours: 4	**Contact Hours Per Week:** 4
Lecture: 2, 2	**Tutorial:** 0, 0
Practical: 1, 2	**Medium of Instruction:** English
Date of Revision:	**Skill Focus:** Employability
Short Name of the Course: Secondary School Mathematics Curriculum	**Course Stream** ***(Only for Minor Courses)*****:**
Grading Method: Regular	**Repeatable:** Credit
Course Level: Beginner	

Course Description

This is a core course for students of B.Sc.B.Ed. Mathematics programme. This course discusses the meaning, construct and use of curriculum in general and then focusses on the nature and components of secondary school mathematics curriculum.

Course Introduction

Teachers are primary stakeholders of a school curriculum and thus it is important for a prospective teacher to understand the meaning, types, composition and utility of a curriculum. This course discusses the understanding, planning, development, review and renewal of curriculum. The course then discusses specifically the nature of mathematics curriculum at secondary school level and throws light on policies and curriculum framework governing the curriculum.

Course Objective

The objectives of the course are:

1. To discuss the concept and types of curriculum
2. To discuss the principles of a curriculum framework
3. To analyse the process of transaction, evaluation and renewal of curriculum
4. To discuss nature, components and determinants of secondary school mathematics

curriculum

Course Outcome

At the end of the course students will be able to:

1. Describe various types of curriculum and their basis
2. Describe the concept, principles and coverage of the curriculum frameworks
3. Analyse and apply the stages of curriculum development
4. Analyse the processes involved in the transaction, evaluation and renewal of curriculum
5. Analyse the nature of mathematics curriculum at secondary school level
6. Describe the components and determinants of secondary school mathematics curriculum
7. Review and evaluate the secondary school mathematics curriculum in light of the policies and curriculum frameworks

PO-CO Mapping

PO-CO Mapping Matrix

CO/PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6
CO1						
CO2						
CO3						
CO4						
CO5						

Prerequisites and other constraints

This course does not require any prerequisite course. This course is offered to all students of B.Sc.B.Ed. Mathematics programme.

Pedagogy

The course intends to engage the students in interactive lectures, brainstorming sessions, and group discussions. Frequent quizzes, group and individual assignments and presentations shall be employed for continuous assessment of the learners.

Suggested Reading:

1. Arora, G.L. (1984). Reflections on curriculum. New Delhi: NCERT.
2. Dewey, John (1956). The child and the curriculum. Chicago, Illinois: University of
3. Chicago Press.
4. Dewey, John (1997). Experience and Education. New York: Touchstone.
5. Dewey, John (1997). My pedagogic creed. in D.J. Flinders and S.J. Thorton (eds.), The Curriculum studies reader. New York: Routledge, Kegan &Paul.
6. Egan, K. (2005). An imaginative approach to teaching. San Francisco: Jossey-Bass.
7. Erickson, H.L. (2002). Concept-based curriculum and instruction. California: Corwin Press.
8. Jangira, N. K. & Singh, A. (1982). Core teaching skills: The microteaching approach. New Delhi: NCERT,
9. Mohapatra, J.K., Mahapatra, M. and Parida, B.K. (2015). Constructivism: The new paradigm: From theory to practice. New Delhi: Atlantic Publishers.
10. NCERT (2005). National curriculum framework 2005. New Delhi: NCERT.
11. NCTE (1990). Policy perspective in teacher education. New Delhi : NCTE
12. Olivia, Peter F. (1988). Developing the curriculum. London: Scott and Foresman.
13. Sharma, S. (2006). Constructivist approaches to teaching and learning. New Delhi: NCERT.
14. Taba, Hilda (1962). Curriculum development: Theory and practice. New York: Harcourt, Brace and Wald.
15. Von Glasersfeld, F. (1995). Radical constructivism: A way of knowing and learning. Washington D.C.: Falmer Press.
16. Vygotsky, Lev (1986). Mind in society. Cambridge, MA: Harvard University Press.
17. NCERT and State textbooks in Mathematics for Class VI to X
18. Nickson, Marilyn (2000). Teaching and Learning Mathematics: A Guide to Recent Research and its Applications, NY: Continuum.

Evaluation Pattern

Evaluation Matrix

	Component Type	Weightage Percentage	Total Marks	Tentative Dates	Course Outcome Mapping
Continuous Internal Assessment (CIA) Components*	Mid Semester Exam	50% of CIA	30	Around 8th week	1, 2, 3, 4
	Quizzes	16.7% of CIA	10	Every two weeks	1, 2, 3, 4, 5, 6

	Group Presentation	16.7% of CIA	10	End of each module	1, 2, 3, 4, 5, 6, 7
	Individual Assignment	16.7% of CIA	10	End of each module	2, 4, 7
	CIA Marks	100% of CIA	60		1, 2, 3, 4, 5, 6, 7
ESE		40%	80	End of the semester	

Module Sessions

Module 1: Understanding Curriculum (12 Hours)

Concept (difference between curriculum and syllabus), types (subject centered, teacher-centered, learner-centered, learning-centered, experience-centered, activity centered, hidden–manifest) and components (core-elective)

Mandates for formulation of curriculum policy (Constitutional, socio-cultural, political, economic, global concerns, environmental, etc.)

Curriculum framework – Concept, principles and coverage; NCF 2005 and NCFTE 2009 – objectives, aspects and recommendations.

Reading:

1. Arora (1984)
2. Dewey (1956)
3. Dewey (1997)
4. Dewey (1997)

Activities:

a) Group presentation on salient features of NCF 2005
b) Quizzes

Module 2: Curriculum planning and development (12 Hours)

Determinants of curriculum development, Principles of curriculum development

Approaches to curriculum planning, Processes / stages of curriculum development (preparation, tryout and finalization).

Reading:

1. Arora (1984)
2. Dewey (1956)
3. Olivia (1988)
4. Taba (1962)

Activities:

a) Individual assignment
b) Quizzes

Module 3: Curriculum transaction, evaluation and renewal (12 Hours)

Transaction: Planning (time, space, manpower, material and scheme of lessons), Preparation of curricular materials and activities (text and support materials, learning activities), conducting classroom transaction (preparation of lesson plans/notes, mode of transaction, learners' involvement, use of TLMs, use of assessment mechanism for learning etc.

Evaluation: Mode (internal and external), periodicity (continuous, periodic), Mechanism (research studies, on-site observation, FGD, on-line feedback).

Renewal: Use of evaluation feedback / inputs for 1) Immediate / long-term revision; 2) Specific / comprehensive improvement.

Current provisions and practices for curriculum development, transaction, evaluation and renewal in School Education and Teacher Education in the State

Reading:

1. Olivia (1988)
2. Sharma (2006)
3. Taba (1962)

Activities:

a) Critical review of assessment mechanism practised at secondary school level in India.
b) Group presentation
c) Quizzes

Module 4: Nature of Mathematics Curriculum (24 Hours)

Meaning, components and determinants of mathematics curriculum. Place of mathematics in secondary school curriculum.

Mathematical proficiency and its components/strands - conceptual understanding, procedural fluency, strategic competence, adaptive reasoning and productive disposition.

Interdependence among the five strands for developing mathematical proficiency, a framework for discussing the knowledge, skills, abilities, and beliefs that constitute mathematical proficiency and its assessment.

Philosophy and guiding principles for the development of Mathematics textbooks with reference to NCF -2005, NCFTE, NCERT and NCF Focused group discussion papers.

Characteristics of a Mathematics Textbook. Reviewing present mathematics textbooks of NCERT and other state boards (Class VI - X).

Review of recent research on curriculum of secondary school mathematics in India and abroad.

Reading:

1. Olivia (1988)
2. NCERT and State textbooks of Mathematics for Class VI to X
3. Nickson (2000)
4. NCF 2005

Activities:

a) A comparative study of secondary school mathematics curriculum of India with that of any other country
b) A comparative study of any textbooks of Mathematics (of any class from VI-X) developed by any two states.
c) Critical analysis the Mathematics textbook of any one class (VII-X)
d) Individual assignment – Group Presentation