

**Course Title: Mathematics Content III
B. Ed (4 years) Program**

Semester :	VII
Class	B. Ed
Duration of Course:	16(sixteen) Week
Credit Hours:	3

Course Description:

This course intends to extend prospective teachers' content knowledge of mathematics as well as building their understanding of the nature of mathematics. This will enable prospective teachers to develop students' problem solving, logical thinking and reasoning skills. The importance of designing effective assessment items to facilitate students' learning is also considered.

The course will focus initially on the processes of learning and teaching mathematics content knowledge then proceed to consider the role of the teacher in enhancing learning. Course participants will appraise different approaches to solve mathematical problems and consider priorities for the future in learning and teaching mathematics. It will help them to learn from their cultural context and link in school mathematics with out-of-school mathematics. This course will provide prospective teachers with ICT knowledge and they can look at ways in which ICT can successfully be applied and integrated into the curriculum. It will help prospective teachers to develop cognitive ability (reasoning, decision making, and reflection) that may be useful to enhance the critical mathematical thinking and subject matter knowledge.

Learning Outcomes:

Course Outcomes:

After completion of this course prospective teachers will be able to:

- Attain a better understanding of mathematical ideas;
- Revisit beliefs, ideas and perceptions towards teaching and learning of mathematics;
- Acquire the skills and competencies required for the teaching of mathematics at elementary level.
- Apply effectively the various methods, techniques and strategies of teaching mathematics
- Appreciate mathematical processes and discover the power of mathematical thinking.
- Appreciate learning by doing rather than instrumental learning.
- Develop a positive attitude towards teaching and learning of mathematics.
- Design unit plan for teaching and manage a classroom effectively.
- Design assessment for/of/as learning to facilitate students learning.
- Use ICT in teaching and learning of mathematics
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Learning and Teaching Approaches

The following approaches will be used in the course.

- Mathematical Games
- Activity based teaching

- Inquiry method
- Discovery method
- Exploration method
- Demonstration method
- Lecture method
- Discussion with peers and instructor
- Use of ICTs to facilitate learning and teaching

Time	Lesson	Theory	Related Material
Week 1	1-3 Real and complex number theory	(i)Real and Complex numbers (ii) Inequalities (iii) upper and lower bound	Lecture notes
Week2	4-6 Matrices	(i)Define matrix addition and subtraction of matrices (ii) Inverse of a matrix	Teaching learning activities
Week 3	7-9 Sequence and series	(i)Define sequence and series (ii)finite and infinite series (iii) monotone increasing or decreasing sequences	learning through worksheets
Week 4	10-12 Permutations and combinations	(i)Rules of permutation and combination (ii) Use of permutations and combination to solve real life problem.	Worksheets and teaching through activities
Week 5	13-15 Binomial theorem	(i)Define binomial theorem (ii) define binomial distribution. (iii)Mathematical induction	Use of balls and cards, lecture notes
Week 8	16-18 Linear and quadratic equations	(i)define linear and quadratic equations (ii)Solution of linear equations (iii)linear equation in two variables (iV) solution of quadratic equations	Lecture notes, Use of worksheets.
Week 9	19-21	Mid Term	
Week 10	28-30 Polynomial	(i)Define polynomial, degree of polynomial (ii) polynomial in one and more	Teaching and learning activities

		variables	
		(iii) Reorganization of linear, quadratic and cubic polynomials.	
Week 11	31-33	(i) Identify base, exponent.	Use of cards,
	Exponents, Laws of Exponent	(ii) Define product law of exponent for same bases and when bases are different	charts and puzzles
		(i) Quotient law when bases are same and different	
Week 12	34-36	Define factorization.	(ii) Power point presentation
	Factorization	Factorization of polynomials.	(iii) Define use of factor theorem
Week 13	37-39	(i) Define function	Lecture notes, worksheets.
	Functions	(ii) Types of Functions	
		▪ Algebraic Function	
		▪ Trigonometric Functions	
		▪ Inverse Trigonometric Functions	
		▪ Inverse Trigonometric Functions	
		▪ Exponential Function	
		▪ Logarithmic Function	
Week 14	40-42	(i) Define functions,	Rational Worksheets, power point presentation.
	Rational functions	(ii) Proper Rational Fraction	
		(iii) Improper Rational Fraction	
Week 15	43-45	(i) Define vectors	(ii) Lecture notes
	Vectors	Geometric Interpretation of Vector	
		(iii) Multiplication of Vector by a Scalar	
		(iv) Addition and Subtraction of two vectors	

(v)Position Vector

Week 16 46-48

Volume of a cone

- (i) Find the volume of a cone Use of charts and lecture notes.
- (ii) Use different shapes from real life
- (iii) Names of different shapes obtained from a cone.

Week 17 Final term

Assessment Scheme:

Mid Term Marks:40

- i- Lesson planning:5
- ii- Presentation:5
- iii- Midterm exam:30

Total marks 100

Final Term Marks: 60

- i- Assignment :5
- ii- Test : 5
- iii- Final Term Exam: 50

Recommended Books and References:

1. Australian Association of Mathematics Teachers (2006). *Standards for excellence in teaching mathematics in Australian schools*.
2. Dossey, J. A. (1992). The nature of mathematics: Its role and its influence. In Grouws, D. A. (Ed.), *Handbook of research on mathematics teaching and learning* (pp. 39-48). New York: Macmillan.
3. De Lange, J. (2006). *Mathematical literacy for living OECD-PISA perspective*. Utrecht: Freudenthal Institute, Utrecht University.
4. Leon, B., & Jaworski, B. (Eds.) (1995). *Technology in mathematics teaching: A bridge between teaching and learning*. Chartwell-Bratt.
5. Mathematical Association of America (2001). *The mathematical education of teachers*, Washington DC: Conference Board of Mathematical Sciences.
6. National Council of Teachers of Mathematics (2004). *Handbook of research on mathematics teaching and learning* (p. 111).
7. Sidhu, K. S. (1989). *The teaching of mathematics*. New Delhi: Sterling Publishers.
8. Stone Wiske, M. (1998). *Teaching for understanding: Linking research with practice*. San Francisco: Jossey-Bass Publishers, San Francisco.

