

	Course Title: Teaching Mathematics III B. Ed (4-years) Program	
Semester	7	Class B. Ed
Duration of Course	16(sixteen) Week	Credit Hours 3
	<p>Course description</p> <p>Mathematics is the mother of all subjects Mathematics learning can inculcate problem-solving thinking, and reasoning skills in students only when they are taught in such a way that is conceptually instead of by drill and practice. In previous semesters, we have focused on content, but this course intends to extend Student Teachers' understanding of pedagogy as well as their understanding of the nature of mathematics, teacher beliefs and perceptions, and the teaching and learning. This will enable Student Teachers to develop students' problem solving thinking, and reasoning skills. This course will help in creating awareness of the history of mathematics as well as its scope and significance. Also Student Teachers will be able to design plans for using Information and Communications Technology (ICT) to develop students' mathematical learning. The importance of designing effective assessment items to facilitate students' learning is also covered.</p> <p style="padding-left: 40px;">The following main ideas are discussed in this course: • The nature and scope of mathematics • The attitude of teachers towards mathematics learning and perception of it • Research in mathematical processes • Planning assessment and teaching.</p> <p>Learning outcomes</p> <p>After completing this unit, Student Teachers will be able to: 1 discuss how teachers' beliefs, and attitudes influence their teaching practice. List the common misconceptions about teaching and learning mathematics. Critically review their own beliefs and attitudes towards teaching and learning mathematics and discuss how to develop students' conceptual understanding, develop activities from their own context for teaching mathematical concepts use the development of activities for the progression of mathematical concepts. Explore different schools of thought on mathematics absolutist, fallibility, constructivist, and social constructivist identify possible connections and influences of perspectives on the nature of mathematics and its teaching and learning. Explain the importance of mathematics in daily life, explain the relationship of mathematics to other subjects. Critically analyses mathematics content and students' learning outcomes in light of the philosophy proposed in the National Curriculum for Mathematics.</p>	

Learning and teaching approaches

The following approaches will be used in the course.

- Activity-based teaching
- Inquiry method
- Discovery method
- Exploration method
- Debate method
- Lecture method
- Discussion with peers and Instructor
- Use of ICTs to facilitate learning and teaching

Time	Lesson	Theory		Related Material
Week 1	1.Exponents/Indices 3.Laws of Exponents/Indices	i) Identify base, exponent and value. ii) Use rational numbers to deduce laws of exponents. <ul style="list-style-type: none"> • Product Law: when bases are same but exponents are different: • Quotient Law: when bases are same but exponent are different. 		Learning through work sheets
Week 2	4-6Irrational Numbers			Use of Power Point

		<p>i) Define an irrational number.</p> <p>ii) Recognize rational and irrational numbers.</p> <p>iii) Define real numbers.</p> <p>iv) Demonstrate non-terminating /non-repeating (or non-periodic) decimals</p>		
Week 3	7-9polynomial	<p>Define polynomial, degree of a polynomial, coefficients of a polynomial. ii)</p> <p>Recognize polynomial in one, two and more variables. iii)</p> <p>Recognize polynomials of various degrees (e.g., linear, quadratic, cubic and biquadratic polynomials.</p>		Teaching and learning activi
Week 4	10-13Operations on Polynomials	<p>i) Add, subtract and multiply polynomials. ii)</p> <p>Divide a polynomial by a linear polynomial</p>		Learning through work shee
Week 5	Functions 14-16	<p>i) Define function and identify its domain, co-domain and range. ii)</p> <p>Examine whether a given relation is a</p>		Teaching and learning activi

		<p>function or not. iii) Differentiate between one-one correspondence and one-one function. iv) Include sufficient exercises to clarify/differentiate between the above concepts.</p>	
Week 6	17-19 Circle	<p>i) Demonstrate a point lying in the interior and exterior of a circle. ii) Describe the terms; sector, secant and chord of a circle, concyclic points, tangent to a circle and concentric circles.</p>	Tool: Mathematica 6.5
Week 7	20-22 Pythagoras theorem	<p>i) State the Pythagoras theorem and give its informal proof. ii) Solve right angled triangles using Pythagoras theorem.</p>	Use of theorem:
Week 8	23-25 Hero's formula	State and apply Hero's formula to find the areas of triangular and quadrilateral regions	Tool: Mathematica
Week 9	26-28	Mid Term	Test

Week 10	Polygons 29-31	<p>i) Define a polygon.</p> <p>ii) Demonstrate the following properties of a parallelogram.</p> <ul style="list-style-type: none"> • Opposite sides of a parallelogram are equal. 	Lecture Notes
Week 11	Trigonometry 32-34	<p>i) Define trigonometry.</p> <p>ii) Define trigonometric ratios of complementary angles.</p> <p>iii) Solve right angled triangles using trigonometric ratios.</p> <p>iv) Solve real life problems to find heights (avoid naming angle of elevation).</p>	Microsoft Power Point to link presentations
Week 12	Trigonometric Ratios of Acute Angles 37.	<p>i. Define trigonometric ratios of an acute angle.</p> <p>ii) Find trigonometric ratios of acute angles (30 , 60 and 45 degrees).</p>	Lectures Notes

Week13	Factorization 38-40	Factorize expressions of the following types: $kb+kc+ka$, $bc+bd+ac+ad$,	Lectures Notes
Week14	Trigonometric Identities 41-43	Prove the trigonometric identities and apply them to show different trigonometric relations	Lectures Notes
Week15	Harmonic Mean 44-46	i) Define a harmonic mean. ii) Insert n harmonic means between two numbers	Lectures Notes
Week16	surface area and volume 47-48	i) Find the surface area and volume of a sphere. ii) Find the surface area and volume of a cone. iii) Solve real life problems involving surface area and volume of sphere and cone.	Lectures Notes

		Terminal	test
--	--	-----------------	------

Assessment Scheme: Total Marks 100 (Mid-Term Marks: 40 plus Final Term Marks: 60)	
□Mid-Term Marks: 40 i. Assignment: 5 ii. Test: 5 iii. Sessional Exam Marks: 30	□Final Term Marks: 60 iv. Assignment: 5 v. Test: 5 vi. Terminal Exam Marks: 50
Instructor	Mrs. Namrah Yasar (namrah.aslam01@gmail.com)

Books Recommended:

Kaufmann. J. E. *College Algebra and Trigonometry*, PWS-Kent Company, Boston, Latest Ed.

Swokowski. E. W., „*Fundamentals of Algebra and Trigonometry*”, Latest Edition.

References

Andrews, P., & Hatch, G. (1999). A new look at secondary teachers’ conceptions of mathematics and its teaching. *British Educational Research Journal*, 25(2), 203–223.

Baig, S., & Halai, A. (2006). Learning mathematics rules with reasons. *Eurasia Journal of Mathematics, Science and Technology Education*, 2(2). Retrieved from: Ø <http://www.ejmste.com/022006/d2.pdf>

Ball, D. L., & Hill, H. (2008). Learning mathematics for teaching: Mathematical knowledge for teaching (MKT) measures. Ann Arbor: University of Michigan, Learning Mathematics for Teaching Project.

Dossey, J. A. (1992). The nature of mathematics: Its role and its influence. In D. A. Grouws, (Ed.), *Handbook of research on mathematics teaching and learning* (pp. 39-48). New York: Macmillan.