

Fundamentals of Mathematics

Course number	: Math Ed 3001/3001E (G)	Course duration	: 150 hrs
Nature of the course	: Theoretical	Number of periods	: 180
Full mark	: 100	Periods per week	: 6
Pass mark	: 35	Time per period	: 50 min

Course Description

This is a modern course on basic structures and aspects of mathematics. The course deals with mathematical systems in general and provides a broad conceptual background of mathematics including an overview of basic geometric concepts and their application to the tiling of the plane.

General Objective

The course aims at providing the prospective teachers of Mathematics with a sound insight into and thorough knowledge of the fundamentals of Mathematics and at developing and enhancing performance skills related to various mathematical operations.

Specific Objectives

On completion of the course the students will be able to

- write the number in different numeration systems and characterise their features.
- explain the processes of inductive reasoning and mathematical induction in the study of mathematics.
- state, explain and verify the basic properties of the systems of whole numbers, integers, rational numbers and real numbers.
- prove the basic results of the theory of numbers.
- verify the basic axioms of a finite mathematical system.
- recall the basic concepts of geometric figures.
- prove basic results of the tiling of the plane.
- tessellate the plane with the given geometric figures.

Course Contents

- Unit 1: Numeration Systems
- Unit 2: Mathematical Patterns and Inductive Reasoning
 - Unit 3: The System of Whole Numbers (12 periods)
 - Unit 4: The System of Integers (7 periods)
 - Unit 5: Elementary Number Theory (18 periods)
 - Unit 6: Mathematical Systems (25 periods)
 - Unit 7: The System of Rational Numbers (19 periods)
 - Unit 8: The System of Real Numbers (21 periods)
 - Unit 9: Geometric Figures (29 periods)
 - Unit 10: Tessellation (10 periods)

Course Contents in Detail

Unit 1: Numeration Systems

- 1.1 Egyptian numeration system
- 1.2 Roman numeration system
- 1.3 Chinese-Japanese numeration system
- 1.4 Babylonian numeration system
- 1.5 Mayan numeration system
- 1.6 Hindu-Arabic numeration system
- 1.7 Numeration systems with bases other than ten and the computation in the system.

Unit 2: Mathematical Patterns and Inductive Reasoning

- 2.1 Mathematical patterns
 - 2.1.1 Number patterns
 - 2.1.2 Geometric patterns
- 2.2 Inductive reasoning
- 2.3 Mathematical induction
- 2.4 Magic squares

Unit 3: The System of Whole Numbers

- 3.1 Relation of equality on whole numbers and other relations
- 3.2 Addition and multiplication of whole numbers
- 3.3 The deductive system of whole numbers
- 3.4 Subtraction and division of whole numbers
- 3.5 Distributivity theorem.

Unit 4: The System of Integers

- 4.1 Set of integers
- 4.2 Addition of integers and its properties
- 4.3 Ordering of integers
- 4.4 Subtraction of integers and its properties
- 4.5 Multiplication of integers and its properties
- 4.6 Division of integers and its properties

Unit 5: Elementary Number Theory

- 5.1 Odd number and even numbers and their properties
- 5.2 Prime and composite numbers and their properties
- 5.3 Test for divisibility by certain numbers
- 5.4 Factors and their properties
- 5.5 Highest common factor (HCF)
- 5.6 Least common multiple (LCM)
- 5.7 Euclidean algorithm

Unit 6: Mathematical Systems

- 6.1 Clock arithmetic
- 6.2 Modular systems and their applications
- 6.3 Finite mathematical systems
- 6.4 Construction of transformation groups of symmetries of geometric figures

Unit 7: The System of Rational Numbers

- 7.1 Fractions and the set of rational numbers
- 7.2 The whole numbers as a subset of rational numbers
- 7.3 Order relation for rational numbers and the correspondence of points on the number line
- 7.4 Multiplication of rational numbers and its properties
- 7.5 Division of rational numbers and its properties
- 7.6 Addition of rational numbers and its properties
- 7.7 Subtraction of rational numbers and its properties
- 7.8 Decimal representation of rational numbers
- 7.9 Conversion of rational numbers into decimal notation and vice versa
- 7.10 Addition, subtraction and multiplication of terminating decimals
- 7.11 Rational numbers as a dense set

7.12 Cardinality of rational numbers

Unit 8: The System of Real Numbers

- 8.1 The set of rational numbers as a subset of the set of real numbers
- 8.2 Square root of some nonnegative integers as an irrational number
- 8.3 Decimal approximations of irrational numbers
- 8.4 The system of real numbers

Unit 9: Geometric Figures

- 9.1 Lines
 - 9.1.1 Line segments
 - 9.1.2 rays
- 9.2 Angles
- 9.3 Polygons
 - 9.3.1 Triangles
 - 9.3.2 Quadrilaterals
- 9.4 Simple closed curves
- 9.5 Circles
- 9.6 Construction of geometric figures
 - 9.6.1 Angles
 - 9.6.2 Triangles
 - 9.6.3 Quadrilaterals
- 9.7 Solids
 - 9.7.1 Prisms
 - 9.7.2 Pyramids
 - 9.7.3 Cylinders
 - 9.7.4 Cones
 - 9.7.5 Spheres

Unit 10: Tessellation

- 10.1 Tiling of plane
- 10.2 Tiling of rectangle
- 10.3 Regular tessellations
 - 10.3.1 Homogeneous tessellations
 - 10.3.2 Non-homogeneous tessellations
- 10.4 Irregular tessellations

Instructional Techniques

- Lecture, explanation and illustration
- Discussion
- Individual and group work
- Individual and/or group project
- Self study

Assessment Technique and Mark Distribution

Written examination : 100 marks

Unitwise mark distribution

Units 1, 2, 5, 9 and 10 : 30 marks
Units 3, 4, 6, 7 and 8 : 70 marks

Questionwise mark distribution

20 multiple-choice questions : $20 \times 1 = 20$ marks
2 long-answer questions : $2 \times 12 = 24$ marks
8 short-answer questions : $8 \times 7 = 56$ marks

Prescribed Textbook

1. Fundamentals of Mathematics. (Forthcoming)

References

1. Eves, H. An Introduction to the History of Mathematics. New York: Holt, Rinehart and Winston, 1961.
2. Millers, C. D. and Heeren, V. E. Mathematical Ideas. Glenview, Illinois: Scott Foremann and Company, 1978.
3. Narayan, S. and M. Lal. Algebra: A Text-book for Secondary Schools. New Delhi: National Council for Educational Research and Training (NCERT), 1966.
4. Ward, M. and C. E. Hardgrove. Modern Elementary Mathematics. Dutaris: Addison Wesley Publishing Company, 1964.



Modern Mathematics

Course number	: Math Ed 3002	Course duration	: 150 hrs
Nature of the course	: Theoretical	Number of periods	: 180
Full mark	: 100	Periods per week	: 6
Pass mark	: 35	Time per period	: 50 min

Course Description

This is a course on some selected topics of modern mathematics. The topics cover various aspects of mathematics and their application to social sciences and managerial sciences. The course also includes a statistical component which deals with the probability theory and its applications to the quantitative analysis of educational processes.

General Objective

The course aims at providing the prospective secondary school teachers of mathematics with a sound knowledge of modern mathematical concepts and their applications to social and managerial sciences. The course is also geared to acquainting them with statistical tools so that they can carry out quantitative analysis of educational processes.

Specific Objectives

On completion of the course the trainees will be able to

- state and prove the characteristic properties of infinite sets and apply the techniques of set theory to solve practical problems.
- make the judgement about the truth or falsity of statements
- describe the features of different methods of proving statements.
- determine the validity of a given argument.
- find isometric and inverse transformations of a given figure.
- prove the properties of isometric and inverse transformations.
- locate different symmetries in a geometric figure.
- state and prove the theorems of hyperbolic geometry and elliptic geometry.
- state the axioms of projective geometry.

- discuss the principles of duality in projective geometry.
- state and prove the results of Euler's discovery about networks.
- discuss the problems involved in map colouring on different types of surfaces.
- state and prove the theorems on probability theory.
- solve problems on probability, binomial distribution and normal distribution.
- solve problems on correlation and regression.
- solve problems on linear programming by graphical and simplex method.

Course Contents

Unit 1: Set Theory	(14 periods)
Unit 2: Symbolic Logic	(11 periods)
Unit 3: Geometric Transformations	(36 periods)
Unit 4: Non-Euclidean Geometry	(19 periods)
Unit 5: Projective Geometry	(12 periods)
Unit 6: Topology	(18 periods)
Unit 7: Probability Theory	(50 periods)
Unit 8: Correlation and Regression	(12 periods)
Unit 9: Linear Programming	(8 periods)

Course Contents in Detail

Unit 1: Set Theory

- 1.1 Review of set relations
- 1.2 Sets of numbers
- 1.3 Denumerable sets
- 1.4 Uncountable sets
- 1.5 Cardinality of sets and its properties
- 1.6 Cardinal arithmetic
- 1.7 Basic laws of algebra of sets
- 1.8 Number of elements in a finite set

Unit 2: Symbolic Logic

- 2.1 Statements
- 2.2 Negations
- 2.3 Compound statements
- 2.4 Laws of statements

- 2.5 Conditional statements
 - 2.5.1 Converse
 - 2.5.2 Inverse
 - 2.5.3 Contrapositive
 - 2.5.4 Biconditional
 - 2.5.5 Negation
- 2.6 Valid arguments and Euler diagrams
- 2.7 Deductive methods of proof
 - 2.7.1 Direct proof
 - 2.7.2 Indirect proof
- 2.8 Switching circuits

Unit 3: Geometric Transformations

- 3.1 Isometric transformations
 - 3.1.1 Reflection
 - 3.1.2 Translation
 - 3.1.3 Half-turn
 - 3.1.4 Rotation
 - 3.1.5 Glide reflection
 - 3.1.6 Equations of isometric transformations
 - 3.1.7 Theorems on isometry
- 3.2 Non-isometric transformation
- 3.3 Inversion transformation
 - 3.3.1 Inverse point and its geometric construction
 - 3.3.2 Equations of inverse point
 - 3.3.3 Inverses of lines, circles and curves
- 3.4 Transformation matrices
 - 3.4.1 Reflection matrix
 - 3.4.2 Rotation matrix
 - 3.4.3 Dilation matrix
 - 3.4.4 Translation matrix
 - 3.4.5 Composite transformation matrix
- 3.5 Symmetry
 - 3.5.1 Line symmetry
 - 3.5.2 Rotational symmetry
 - 3.5.3 Point symmetry
 - 3.5.4 Symmetry of plane curve
 - 3.5.5 Symmetry with respect to a plane
 - 3.5.6 Symmetry with respect to a point

Unit 4: Non-Euclidean Geometry

- 4.1 Review of Euclid Element I
- 4.2 Some logical shortcomings of Euclid
- 4.3 Hilbert's axioms
- 4.4 Attempts to prove the fifth postulate
- 4.5 Discovery of non-Euclidean geometries
- 4.6 Postulates of hyperbolic geometry
- 4.7 Trilaterals and its properties
- 4.8 Saccheri quadrilaterals
- 4.9 Defect of a triangle
- 4.10 Distance between two lines
- 4.11 Models for hyperbolic geometry
- 4.12 Postulates for elliptic geometry
- 4.13 Quadrilaterals and triangles
- 4.14 Models for elliptic geometry

Unit 5: Projective Geometry

- 5.1 Basic concepts
- 5.2 Axioms of projective geometry
- 5.3 Principles of duality
- 5.4 Complete quadrangle
- 5.5 Complete quadrilateral and related theorems
- 5.6 Projectivity and its theorem
- 5.7 Pappus theorem
- 5.8 Point conic
- 5.9 Line conic

Unit 6: Topology

- 6.1 Concept of topology
- 6.2 Topological equivalence
- 6.3 Networks and Euler's discoveries about networks
- 6.4 Regular polyhedra and their properties
- 6.5 Torus
- 6.6 Genus of a surface
- 6.7 Orientability of surface
- 6.8 Map colouring
- 6.9 Four colour problem and five colour theorem

Unit 7: Probability Theory

- 7.1 Basic concepts
 - 7.1.1 Sample space and events
 - 7.1.2 Operations on sets
- 7.2 Fundamentals of probability
 - 7.2.1 Concept of probability and probability of events
 - 7.2.2 Fundamental principle of counting and probability
 - 7.2.3 Permutations and combinations in probability
 - 7.2.4 Properties of probability
- 7.3 Conditional probability
 - 7.3.1 Conditional probability in equiprobable space
 - 7.3.2 Probability of joint occurrence of two or more events
 - 7.3.3 Independent events
 - 7.3.4 Bayes' theorem
- 7.4 Random variables and probability distributions
 - 7.4.1 Random variables and their probability distributions
 - 7.4.2 Mathematical expectations of random variables
 - 7.4.3 Variants of random variables
 - 7.4.4 Chebyshev's inequality
- 7.5 Binomial distributions and their properties
- 7.6 Normal distributions
 - 7.6.1 Continuous distribution and normal distribution
 - 7.6.2 Areas under standard normal curve
 - 7.6.3 Normal approximation to the binomial distribution

Unit 8: Correlation and Regression

- 8.1 Correlation
 - 8.1.1 Scatter diagram
 - 8.1.2 The coefficient of correlation and its determination
 - 8.1.3 Rank correlation and its determination
 - 8.1.4 Properties of coefficient of correlation
 - 8.1.5 Probable error of coefficient of correlation
- 8.2 Regression
 - 8.2.1 Regression lines
 - 8.2.2 Regression equations and regression coefficients
 - 8.2.3 Different forms of regression equations and the properties of regression coefficients
 - 8.2.4 Standard error of estimate

Unit 9: Linear Programming

- 9.1 Review of graphic method for solving linear programming problems
- 9.2 Simplex method for solving linear programming problems
- 9.3 Duality problems

Instructional Techniques

- Lecture, explanation and illustration
- Discussion
- Individual and group work/project
- Self study

Assessment Technique and Mark Distribution

Written examination : 100 marks

Unitwise mark distribution

- Units 1 to 6 : 60 marks
- Units 7 to 9 : 40 marks

Questionwise mark distribution

- 20 multiple-choice questions : $20 \times 1 = 20$ marks
- 2 long-answer questions : $2 \times 12 = 24$ marks
- 8 short-answer questions : $8 \times 7 = 56$ marks

Prescribed Textbooks

1. Maskey, S. M. Introduction to Modern Mathematics, Volume 1. Kathmandu : Ratna Pustak Bhandar, 1997.
2. Maskey, S. M. Introduction to Modern Mathematics, Volume 2. Kathmandu : Ratna Pustak Bhandar, 1997.

References

1. Courant, R. and H. Robbins, What is Mathematics? New York: Oxford University Press, 1969.
2. Efimov, N. V. Higher Geometry. Moscow: Mir Publishers, 1980.
3. Eves, H. An Introduction to the History of Mathematics. New York: Holt, Rinehart and Winston, 1961.

4. Freund, J. E. Modern Elementary Statistics. New Delhi: Printice-Hall of India, 1981.
5. Newman, J. R. The World of Mathematics, Vol. I. New York: Simon and Schaster, 1956.
6. Stewart, I. Concepts of Modern Mathematics. New York: Penguin, 1995.
7. Turner, J. C. Modern Applied Mathematics. London: ELBS (low-priced edition), 1970.

Teaching Mathematics

Course number	: Math Ed 3003	Course duration	: 150 hrs
Nature of the course	: Theoretical	Number of periods	: 180
Full mark	: 100	Periods per week	: 6
Pass mark	: 35	Time per period	: 50 min

Course Description

This is an introductory course on teaching mathematics at the secondary level. The course contains nine units that deal with various aspects of teaching mathematics. They include curriculum and textbook studies, learning theories, teaching methods and strategies, construction and use of teaching materials and the planning, practising, evaluation and supervision of classroom instruction.

General Objective

The course is designed with a view to providing the teacher trainees with a sound knowledge of learning psychology and teaching methods and strategies. It also aims at developing in them performance skills related to classroom teaching and other aspects of mathematics pedagogy such as construction of teaching materials, lesson planning and evaluation and supervision of the programme as a whole.

Specific Objectives

On completion of the course the trainees will be able to

- discuss learning theories and their implications in teaching mathematics.
- explain the structure of mathematics curriculum of Nepal and the objectives of mathematics education at the secondary level.
- use appropriate and effective teaching approaches, methods and strategies that facilitate better learning of mathematics.
- teach the contents of secondary school mathematics with greater confidence and efficacy.
- construct appropriate teaching materials and use them effectively



in real classroom instruction.

- plan and implement a strategy for classroom instruction
- assess the efficacy of teaching and extent of learning through different types of tests.
- discuss the importance of practical experiences in promoting learners' understanding of mathematical concepts.
- diagnose students' learning difficulties in mathematics and carry out appropriate remedial teaching.
- supervise mathematics instruction and point out its strengths and weaknesses.

Course Contents

Unit 1: Learning Theories	(10 periods)
Unit 2: Study of Curricula and Textbooks	(16 periods)
Unit 3: Approaches, Methods and Strategies	(16 periods)
Unit 4: Development of Instructional Materials	(24 periods)
Unit 5: Planning Classroom Instruction	(12 periods)
Unit 6: Evaluation in Mathematics Education	(20 periods)
Unit 7: Teaching Selected Topics	(60 periods)
Unit 8: Diagnostic and Remedial Teaching	(12 periods)
Unit 9: Supervision of Mathematics Instruction	(10 periods)

Course Contents in Detail

Unit 1: Learning Theories

- 1.1 Piaget's theory of intellectual development
 - 1.1.1 Sensory-motor stage
 - 1.1.2 Pre-operational stage
 - 1.1.3 Concrete operational stage
 - 1.1.4 Formal operational stage
 - 1.1.5 Piaget's theory and teaching mathematics
- 1.2 Bruner's theory of instruction
 - 1.2.1 Theorems on learning mathematics
 - Construction theorem
 - Notation theorem
 - Contrast and variation theorem
 - Connectivity theorem
 - 1.2.2 Implications of Bruner's theory in learning and teaching mathematics

Unit 2: Study of Curricula and Textbooks

- 2.1 Overview of secondary school mathematics curriculum
- 2.2 Study of secondary school mathematics curricula of other countries
 - 2.2.1 Curriculum of India
 - 2.2.2 Curriculum of Pakistan
 - 2.2.3 Curriculum of Thailand
 - 2.2.4 Curriculum of Malaysia
- 2.3 The need for change in curriculum
- 2.4 The nature of changes in curriculum
- 2.5 The in-depth gradewise study of textbooks
 - 2.5.1 Textbooks of Compulsory Mathematics
 - 2.5.2 Textbooks of Optional Mathematics
- 2.6 Consistency of textbooks with reference to the curriculum
- 2.7 Report on the analysis of textbooks

Unit 3: Approaches, Methods and Strategies

- 3.1 Different types of teaching methods
 - 3.1.1 Expository method
 - 3.1.2 Inductive and deductive methods
 - 3.1.3 Analytic and synthetic methods
 - 3.1.4 Guided discovery method
- 3.2 Teaching problem solving

Unit 4: Development of Instructional Materials

- 4.1 Instructional materials in mathematics classroom
- 4.2 Preparation of low cost materials and models
- 4.3 Evaluation of manipulative materials

Unit 5: Planning Classroom Instruction

- 5.1 Yearly plan
- 5.2 Unit plan
- 5.3 Lesson plan

Unit 6: Evaluation in Mathematics Education

- 6.1 Assessment techniques
- 6.2 Planning a test
- 6.3 Construction of test items
- 6.4 Construction of different types of test items
- 6.5 Analyzing and reporting the test

Unit 7: Teaching Selected Topics

- 7.1 Teaching Arithmetic
 - 7.1.1 Sets
 - 7.1.2 Ratio and proportion, and percentage
 - 7.1.3 Unitary method
 - 7.1.4 Simple and compound interest
 - 7.1.5 Commission and discounts
 - 7.1.6 Area and volume
- 7.2 Teaching Algebra
 - 7.2.1 Factorization
 - 7.2.2 Equations
 - linear equations
 - quadratic equations
 - 7.2.3 Relations and functions
 - 7.2.4 Matrices
- 7.3 Teaching Geometry
 - 7.3.1 Classification of polygons
 - 7.3.2 Similarity and congruency and their use
 - 7.3.3 Bearing and scale drawing
 - 7.3.4 Surface area and volume of solids
 - 7.3.5 Coordinate geometry
 - 7.3.6 Transformation geometry
 - reflection
 - rotation
 - translation
 - enlargement
- 7.4 Teaching Trigonometry
 - 7.4.1 Trigonometric functions
 - 7.4.2 Values of trigonometric ratios
 - 7.4.3 Sine, cosine and tangent graphs
 - 7.4.4 Area of triangles using trigonometric ratios
- 7.5 Teaching Statistics
 - 7.5.1 Graphical presentation of data
 - 7.5.2 Central tendencies
 - 7.5.3 Probabilities

Unit 8: Diagnostic and Remedial Teaching

- 8.1 Basic causes of student's difficulties
- 8.2 Major areas of student's difficulties in mathematics
- 8.3 Remedial instruction

Unit 9: Supervision of Mathematics Instruction

- 9.1 Need for supervision
- 9.2 Techniques of supervision
- 9.3 Evaluation of teaching

Instructional Techniques

- Lecture, explanation and illustration
- Discussion
- Individual and group work/project
- Self study

Assessment Technique and Mark Distribution

Written examination : 100 marks

Unitwise mark distribution

Units 1, 2, 3, 4 and 7 : 70 marks
Units 5, 6, 8 and 9 : 30 marks

Questionwise mark distribution

20 multiple-choice questions : $20 \times 1 = 20$ marks
2 long-answer questions : $2 \times 12 = 24$ marks
8 short-answer questions : $8 \times 7 = 56$ marks

Prescribed Textbook

1. Teaching Mathematics at Secondary Level (Forthcoming)

References

1. Aichel, D. B. and E. Robert. Readings in Secondary School Mathematics. Boston: Printle, Webr and Schmitt Inc. 1971.
2. Butler, C. H. and F. L. Wren. The Teaching of Secondary Mathematics. New York: McGraw-Hill Book Company, 1970.
3. Maharjan, H. B., H. N. Upadhyaya and L. N. Poudel. Teaching Mathematics in Secondary Level. Kathmandu: Ratna Pustak Bhandar, 2054 B.S.
4. Mathematics Curricula (Grades 1-10). Kathmandu: CDC, MOE, HMG, Nepal.
5. Secondary level mathematics curricula of India, Pakistan, Thailand and Malaysia.
6. Sidhu, K. S. The Teaching of Mathematics. New Delhi: Sterling Publishers (Fourth revised and enlarged edition), 1995.



Mathematics Practice Teaching

Course number	: Math Ed 3004	Course duration	: 45 (15+30) days
Nature of the course	: Practical	Number of periods	: 5+25+
Full mark	: 100	Periods per week	:
Pass mark	: 40	Time per period	:

Course Description

This is a practical course on actual classroom teaching. The teacher trainees, in this course, put into practice what they have learned in all other courses, particularly in the course "Math Ed 3003: Teaching Mathematics". The course has two components: Peer Teaching and Student Teaching. The trainees do peer teaching at their own campuses before they go out and do student teaching at assigned schools. Each trainee will be supervised by an Internal Supervisor throughout the implementation of this course and his performance will be evaluated independently by the Internal Supervisor and the External Examiner.

General Objective

The course is designed with a view to providing the teacher trainees with first hand knowledge and practical experience in teaching mathematics at the secondary schools of Nepal so that when they are assigned the job later on they can handle it with confidence, competence and efficiency.

Specific Objectives

- On completion of the course the trainees will be able to
- construct lesson plans and use them in classroom teaching.
 - collect, construct and use teaching aids and materials appropriately.
 - conceive, collect, design, construct and execute warming up activities creatively and interestingly.
 - review previous lessons efficiently.
 - present teaching items in comprehensible forms so that the learning of those items is automatically facilitated.

- get the students practise what they have learnt during presentation so that they can produce, present or use them with ease and confidence.
- check whether the students have learned what he has taught in the classroom and, if the learning is found to be unsatisfactory, do necessary remedial teaching effectively.
- instruct the students to carry out applied follow-up activities so that their day's learning gets consolidated.
- manage the class and classroom properly making them conducive to teaching/learning.
- make and keep the students alert and attentive throughout the class.
- behave appropriately so that the students feel at home with him and his teaching.
- teach and perform other classroom activities in an interesting and lively way so that the students enjoy his classes and are motivated to actively participate in the teaching/learning processes.
- observe the classes critically and give constructive comments on them.
- design, construct, administer and evaluate various types of tests related to his teaching.
- play the roles of deliverer, facilitator, motivator, strategist, supervisor, advisor, evaluator and overall leader in the teaching/learning processes

Course Contents

- Unit 1: Peer Teaching
Unit 2: Student Teaching

Course Contents in Detail

Unit 1: Peer Teaching

- 1.1 Lesson One
- 1.1.1 Preparation of lesson plan
 - 1.1.2 Preparation of teaching aids and materials
 - 1.1.3 Classroom teaching
 - 1.1.4 Participation in the day's post-class discussions
 - 1.1.5 Noting down strengths and weaknesses

- 1.2 Lesson Two
 1.2.1 Repetition of the steps of Lesson One with improvements on the basis of critical analyses made in the post-class discussions of the first day
- 1.3 Lesson Three
 1.3.1 Repetition of the steps of Lesson Two with improvements on the basis of critical analyses made in the post-class discussions of previous days
- 1.4 Lesson Four
 1.4.1 Repetition of the steps of Lesson Three
- 1.5 Lesson Five
 1.5.1 Repetition of the steps of Lesson Four
- Unit 2: Student Teaching**
 2.1- Same as Peer Teaching, but this time in real classroom setting at the assigned school
- 2.2 Designing, construction, administration and evaluation of tests

Instructional Methods and Techniques

As mentioned in the course "Math Ed 3003: Teaching Mathematics".

Requirements

Lessons

Peer Teaching	: 5 lessons over a period of 15 days
Student Teaching	: 25 lessons over a period of one month

(One lesson plan per lesson)

Test Items

Subjective type	: 5 items
Objective type 1	: 5 items
Objective type 2	: 5 items
Objective type 3	: 5 items
Objective type 4	: 5 items

(Based on actual teaching)

Evaluation Scheme

Peer Teaching	: 25 marks
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Distribution of marks

Subject matter

- depth of knowledge
- coverage

6 marks

10 marks

Methodology

- warming up
- revision
- presentation
- practice
- evaluation
- rounding up
- application

Lesson plan and teaching aids

- adequacy
- appropriateness
- use

Command of language

- correctness
- clarity
- fluency

3 marks

Student Teaching : 75 marks

Distribution of marks

25 %

Subject matter

- depth of knowledge
- coverage

30 %

Methodology

- warming up
- revision
- presentation
- practice
- evaluation
- rounding up
- application

Lesson plans and teaching aids

- adequacy
- appropriateness
- use

25 %

Tests

- construction
- administration
- evaluation

10 %

Command of language 5 %

- correctness
- clarity
- fluency

Overall impression 5 %

- disposition
- confidence
- regularity and punctuality
- class control and classroom management
- motivation and participation
- students' comprehension

Evaluators

Peer Teaching	:	Internal Supervisor	(25 marks)
Student Teaching	:	Internal Supervisor	(25 marks)
		External Examiner	(50 marks)

SCIENCE EDUCATION

