Department of Mathematics **Faculty of Science**

MATH 309(206309) **FUNDAMENTAL CONCEPTS OF ARITHMETICS** **3(3/3-0/0)**

Abbreviation **FUND CONCEPTS OF ARITH**

Prerequisite Higher Certificate of Education Students or at least 6 credits from the following : MATH 112 (206112), MATH 203 (206203), MATH 207 (206207), MATH 216 (206216), CS 201 (204201)

Recommended Open only to teaching Mathematics in secondary school major

Course Description

Brief historic background of numbers from early period to the present time. Development of natural numbers by Peano postulates. Development of integers from natural numbers. Development of rational numbers from integers.Development of cuts. Rational cuts and irrational cuts. From cuts to real numbers. Development of complex numbers.

Course Contents	**No. of Lecture Hours**
1. Review Set , relation , equivalence relation. Function.	3
2. Natural numbers (N) Peano's Postulates. Addition and multiplication of natural numbers. Order in natural numbers.	6
3. Homomorphism and isomorphism	2
4. Integers (I) Addition and multiplication of integers. Integers and integral domain. Order in integers. Division algorithm. Greatest common diviser and least common multiple. Euclidean algorithm. The fundamental theorem of arithmetic.	9
5. Rational numbers (Q) Addition of rationals. Multiplication of rationals. Order in Q. Q as an ordered field. Density property of rational. Archimedean property of rationals. Integral power of rationals.	9

Course Contents:	**No. of Lecture Hours**
6. Real numbers (R) Dedekind cut. Rational cut and irrational cut. Addition of cuts. Multiplication of cuts. Density property of R. Archimedean property of R. R as a complete ordered field.	12
7. Complex nmubers (C) Addition of complex numbers. Conjugate of complex numbers. Polar form of complex numbers. Multiplication of complex numbers. Geometric representation of complex numbers. The nth root of complex numbers.	4
Total	**45**