# Department of Mathematics Faculty of Science

**MATH 722 (206722) FIELD THEORY 3(3-0-6)
Prerequisite** Consent of the instructor

**Course Descriptions :**

 Concept of rings and fields, homomorphisms, vector spaces, and polynomials. Extensions of fields and factorization of polynomials. Galois theory, automorphism of fields, norms and traces, and normal classes. Applications to : finite fields, cyclotomic extensions, cyclic extensions. Wedder Burn’s theorem, ruler and compass construction and generic polynomials.

**Course Contents No. of Lecture Hours**

1. Groups, rings, integral domains, fields 9

 - Groups

 - Rings, integral domains and fields

 - Polynomial rings

 - Vector

2. Some elementary field theory 9

 - Extensions

 - Algebraic extensions

 - Spliting fields

 - Algebraic closure

 - Finite fields

3. The structure of algebraic 12

 - The structure of an irreducible polynomial

 - Seperable and inseperable extensions

 - Normal and Galois extension

4. Galois theory 15

 - The Galois correspondence theorem

 - The normal basis theorem

 - Norm and trace

 - Cyclotomic extensions

 - Cyclic extensions

 - Abelian extensions

 - Solvable extensions

 - Theory of equations

 Total 45