



## PURE MATHEMATICS 431 "GROUPS, RINGS AND FIELDS"

**Calendar Description:** H(3-1T)

Factor groups and rings, polynomial rings, field extensions, finite fields, Sylow theorems, solvable groups. Additional topics.

**Prerequisite:** Mathematics 311 and Pure Mathematics 315 or consent of the Division.

**Possible Texts:**

J.B. Fraleigh, *A First Course in Abstract Algebra*, 5ed Addison, 1994.

T.W. Hungerford, *Abstract Algebra, an Introduction*, Saunders, 1990.

W.K. Nicholson, *Introduction to Abstract Algebra*, PWS 1993.

### Syllabus

<u>Topics</u>	<u>Number of Hours</u>
Factor rings and factor groups, isomorphism and correspondence theorems.	4
Polynomials, factorization of polynomials over a field, factor rings of polynomials over a field.	6
Algebraic field extensions, splitting fields, finite fields, geometric constructions.	10
p-groups, the Sylow theorems, the Jordan-Holder theorem, solvable groups.	6
Suggested Optional Topics:	10
<ul style="list-style-type: none"> <li>• Galois groups and separability</li> <li>• the fundamental theorem of Galois theory</li> <li>• More group theory: nilpotent groups, free groups, abelian groups.</li> </ul>	
<b>TOTAL HOURS</b>	<b>36</b>

\*\*\*\*\*