Semester	AUG 2022
Open to semester	5,7,11,13
Course code	**MT3174**
Course title	**Fields and Galois theory**
Credits	4 /
Course Coordinator & participating faculty (if any)	Debargha Banerjee
Nature of Course	Lectures
Pre-requisites	Group Theory (MTH 310), Vector Spaces, Rings and Modules (MTH 320)
Objectives (goals, type of students for whom useful, outcome etc)	Galois theory arose from the study of “adjoining” roots of polynomials to the rational numbers to generate larger number sets, such as the Gaussian numbers. These larger fields of numbers enjoy the group of symmetries of the irrational roots of these polynomials, which is called the Galois group. Such fields correspond inversely to their Galois groups in a beautiful correspondence beloved to algebraists. A clear understanding of Galois theory allows one to settle classical questions such as whether we can or cannot use radicals to express the roots of various polynomials. It is also prerequisite to modern questions in number theory and algebraic geometry.
Course contents (details of topics /sections with no. of lectures for each)	1. Fields and extensions 2. Examples, 3. algebraic extensions 4. algebraic elements, 5. transcendental elements, 6. existence of algebraic closure 7. separable extensions, 8. normal extensions, 9. automorphisms 10. Main theorem of Galois theory (4 Lectures) 11. finite fields (2 Lectures) 12. Galois groups of finite fields, 13.Cyclotomic extensions (2 Lectures) 14.impossibility of solving polynomial equations of degree 5 or more by radicals. (2 Lectures)

Evaluation /assessment	End-Sem Examination-30% Mid-Sem Examination-30% Others-3.Class-tests (5)- 8*5%
Suggested readings (with full list of authors, publisher, year, edn etc.)	Main text book will be suggested just before the beginning of the course. 1. Abstract Algebra: Dummit and Foote (2003) Wiley India 2. Galois Theory: I. Stewart (2003) Chapman Hall/ CRC Math. Series 3. Algebra: S. Lang (2005) GTM Springer 4. Field and Galois Theory: Patrick Morandi (2011) GTM Springer. 5. Galois Theory (lectures delivered at the University of Notre Dame): E. Artin (1997) Dover 6. Galois Theory: Edwards (1984) Springer 7. Field Theory: Roman (2006) Springer 8. Galois Theory of Algebraic Equations: J.P. Tignol (2001) World Scientific 9. Lectures on the Algebraic Theory of Fields: K.G. Ramanathan, TIFR Lecture notes (available online) 10. Galois Theory: Murthy, Ramanathan, Seshadry, Shukla and Sridharan, TIFR Pamphlets (available online)