

«Advanced Algebra Fall 2026» Syllabus

1. Basic course information

course name	Advanced Algebra	course code	MATH2102.01
Course Level	Undergraduate	Credit/Contact Hour:	4/64
Major:	undergraduates and gradates	Teaching Language	English
Prerequisite	Abstract Algebra (MATH1224) ; Linear Algebra (MATH1112)	Prerequisite suggestion	
School/Institute	Institute of Mathematical Sciences	Instructor	Daniel Skodlerack

2.Course Introduction

The content of the combined undergraduate/graduate course consists mainly of the second part of Serge Lang's Algebra. It is suitable as a pre-course for Algebraic Geometry, Representation theory of p -adic groups and Algebraic number theory. The topics are

- Galois theory and field extensions
- Basic algebraic number theory
- Basic algebraic geometry
- Noetherian rings and modules

3.Learning Goal

To obtain a profound algebraic knowledge to proceed with a specialisation in an algebraic direction of pure mathematics as for example mentioned in the course information.

4.Instructional Pedagogy

Lecture and self-reading and homework. The complete material will be published on the website www.skodleracks.co.uk

5. Course Content and Schedule

Chapter	Teaching Contents	Week	Contact Hours	Teaching Modes
[Lang, V, VII]	Ring extensions	1-2	6	Lecture
[Lang, VI]	Galois theory	2-4	10	Lecture
[Lang, VII]	Transcendental extensions	5	4	Lecture
[Lang, VIII] [Mumford]	Algebraic spaces	6-7	8	Lecture
[Lang, IX]	Noetherian rings and modules	8-9	8	Lecture
[Lang, X]	Real fields	11-12	8	Lecture
[Neukirch, Ch. 1]	Number fields and extension of primes	13-14	8	Lecture
[Neukirch, Ch II]	Local fields	15-16	8	Lecture

6. Grading Policy

Homework: 40%; ; Final: 60%.

7. Textbook (T) & Recommended Reading (R)

	book name	author	press	publication time	ISBN	edition
(T)	Algebra	Serge Lang	Springer	2005	978-1-4613-0041-0	3
(T)	Algebraic number theory	Jürgen Neukirch	Springer	1999	978-3-662-03983-0	
(R)	The red book of varieties and schemes	David Mumford	Springer	1999	3-540-63293-X	2

8.Academic Integrity

This course highly values academic integrity. Behaviours such as plagiarism and cheating are strictly prohibited.

9.Other Information (Optional)