Course Title:	**Advanced Topics in Algebra**
Course Code:	**MTE7131**
Course Coordinator	**V. K. Bhat**
Credits	**5**

Evaluation Scheme   Total 100 Marks

Quiz (Total 20 Marks)				Assignment/Project (Total 20 marks) (Minimum Two Assignments or one Project)		Mid-Term	Major Examination	Total
Quiz I (5 marks)	Quiz II (5 marks)	Quiz III (5 marks)	Quiz IV (5 marks)			20 marks) (1 ½ Hour Duration)	(40 marks) (3 Hour Duration	100 Marks

WEEKS	TOPICS TO BE COVERED
Week 1	Rings, Matrix rings, Polynomial rings
Week 2	Skew Polynomial rings, Laurent rings, Boolean rings. Opposite ring.
Week 3	Direct Products, Ideals, Homomorphism of rings, Endomorphism rings
Week 4	Field of fractions, Prime fields
Week 5	PIDS and UFDS
Week 6	Modules; Direct product, Direct sum of modules
Week 7	Free modules, Homomorphism of modules
Week 8	Maximal submodule, Minimal Submodule, Simple modules
Week 9	Schurs lemma, Annihilator of a Subset of a module
Week 10	Modules over PID's, Torsion modules, torsion free modules
Week 11 (17th -21st March, 2025)	**Mid-Term**
2nd April, 2025	**Showing of Mid-Term Answer Sheets**
Week 13	Chain conditions, Artinian modules, Northerian modules
Week 14	Composition series, Modules of finite length
Week 15	Jordan Holder Theorem. Artinian rings, Noetherian rings
Week 16	Hilbert Basis Theorem, I.S.Cohen's Theorem, Introduction to Nil radical and Jacobson radical.
Week 17 (5th -9th May, 2025)	**Revision Week**
Week 18 (13th – 22nd May, 2025)	**Major Examinations**
29th May, 2025	**Showing of Major Exams Answer Sheets**

Course Outcomes:

CO1: Understand application of modules over rings as an analogue of vector spaces over fields.

CO2: Understand the notion of lengths of chains of prime ideals in commutative Noetherian rings and its analogue in non-commutative set up.

CO3: Study the radicals i.e. Prime ideals, Jacobson radical and Nil radical and brief introduction to their possible application

Recommended Books:

1. C. Musili, Introduction to rings and modules, Narosa, 2003.

2. K.R. Gooderal and R.B. Warfield, Introduction to Non-commutative rings, Cambridge University Press, 2004.

3. N. McCoy, Ring Theory, Chelsea Pub Co., 1973.

Calendar of Quizzes/Assignment etc. to be provided as per below details and exact dates to be fixed in consultation with other course coordinators to avoid overlap of Quizzes of different courses.

Component	Date
Quiz-I	27th -31st, January 2025
Quiz-II	24th -28th February, 2025
Assignment-I	10th -12th February, 2025
Mid-Term	17-21st March, 2025
Assignment-II/ Project Submission	21st – 24th April, 2025
Quiz-III	7th – 11th April, 2025
Quiz-IV	28th April-2nd, May, 2025
Major Exam	13th – 22nd May, 2025

Note:

1. One surprise Quiz may be fixed out of Quiz-II, Quiz-III or Quiz-IV.

2. In case of any deviation in evaluation methodology for courses such as AEC/VAC/SEC shall be mentioned accordingly. The, same shall be approved by the next BOS of school if not done earlier.

Signature of Course Coordinator : V. K. Bhat