



FIRST SEMESTER 2016-2017

Course Handout (Part II)

Dated: 23/07/2016

In addition to part-I (General Handout for all courses appended to the time table) this portion gives further specific details regarding the course.

Course No. : MATH F215
Course Title : ALGEBRA I
Instructor-in-charge : JITENDER KUMAR

1. Scope and Objective of the Course :

The objective of this course is to teach the importance of fundamental algebraic structures in modern mathematics and to relate the general results so obtained to concrete applications.

2. Text Book: I.N. Herstein : Topics in Algebra, 2nd ed., John Wiley (1999)

3. Reference Books :

1. Michael Artin : Algebra, 1st edition, Prentice Hall of India (1991)
2. John B. Fraleigh : A First Course in Abstract Algebra, 7th edition, Pearson (2003)
3. David S. Dummit & Richard M. Foote : Abstract Algebra, 2nd edition, John Wiley (1999).
4. Joseph Gallian : Contemporary Abstract Algebra, 8th edition, Brooks/Cole, Cengage learning (2012).





4. Course Plan:

Lecture No.	Learning objective	Topics	Sections of text
Part 1 : Group Theory			
1-3	Understanding the concept of a group	Definition & Examples of Groups, Preliminary Lemmas	2.1, 2.2, 2.3
4-6	Concept of subgroup has more implications than a subset	Subgroups, A counting Principle	2.4, 2.5
7-9	Generalization of modular arithmetic to arbitrary groups	Normal subgroups and Quotient groups	2.6
10-12	Which re-labeling of group elements is allowed?	Homomorphisms, Automorphisms	2.7, 2.8
13	Abstract groups are not that abstract after all.	Cayley's Theorem	2.9
14-16	An important type of groups	Permutation Groups	2.10
17-20	Understanding structure of abstract groups	Another counting principle, Sylow's theorems	2.11, 2.12
Part 2 : Ring Theory			
21,22	Basic concept of a ring	Definition & Examples of Rings, Ring of real Quaternions	3.1, 3.2
23, 24	Which maps between rings relate their structures?	Homomorphism & Examples	3.3
25-27	Modular arithmetic in rings	Ideals & Quotient Rings	3.4, 3.5
28, 29	Process of creating fractions	Field of Quotients of ID	3.6
30, 31	Important rings in Algebra	Polynomial Rings	3.9
32-36	Ideals in these rings are nice	Euclidean rings and Principal Ideal Rings	3.7, 3.8
37-40	Rings in which factorization is a reliable process	Unique Factorization Domains, Factorization of polynomials	3.10, 3.11





5. **Evaluation Scheme:**

EC No.	Evaluation Component	Duration	Weightage (per cent)	Date & Time	Nature of Component
1.	Mid Term Test	90 min.	30	3/10 10:00 - 11:30 AM	Closed Book
2.	Quizzes		30	unannounced	Closed book
3.	Compre. Exam.	3 hrs.	40	1/12 FN	Open & Closed Book

6. **Chamber Consultation Hour:** To be announced in the class.

7. **Notices:** Notices concerning this course will be displayed on the Notice Board of Mathematics Group. Also NALANDA web-site can be used to post course material as well as notices.

8. **Makeup:** Prior permission is needed for makeup; makeup will only be given if enough evidence is there for not being able to take regular test. Quizzes will not have any make-ups.

Instructor-in-charge

MATH F215

