Birla Institute of Technology & Science, Pilani
Hyderabad Campus

FIRST SEMESTER 2019-20
Course Handout Part II

01-08-2019

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   : **Santanu Koley**
Instructor   : **Santanu Koley, Debopam Chakraborthy**

Scope and Objective of the Course: The objective of this course is to learn fundamental concepts of group and ring theory. In this course, we will focus on existence, uniqueness and the number of sub-groups by using Sylow's theorem. Further, important properties of ring theory such as principle ideal domain, unique factorization domain and many other concepts such as quotient ring, integral domain, principle domain will be discussed in detail along with examples. After learning this course students will be able to apply these concepts to their respective engineering fields.

Text Book: I. N. Herstein, Topics in Algebra, 2nd Edition, John Wiley, 1975.

Reference Books:

1. Joseph A. Gallian, Contemporary Abstract Algebra, Seventh Edition, Brooks / Cole, Cengage Learning.
2. John B. Fraleigh, A First Course in Abstract Algebra, 3rd Edition, Narosa.
3. Dummit & Foote, Abstract Algebra, Third Edition, Wiley.
4. Jacobson H., Basic Algebra I, Feemass HPC, 1982.

Course Plan:

Lecture No.	Learning objectives	Topics to be covered	Chapter in the Text Book
1 – 3	To introduce group structure in analytical way and its important properties. To gain knowledge on most important different type of groups.	Definition & Examples of Groups, Preliminary Lemmas	2.1 - 2.3
4 – 7		Subgroups, A Counting Principle	2.4, 2.5
8 – 10		Normal Subgroups & Quotient Groups	2.6
11 – 16		Homomorphisms, Automorphisms, Cayley's Theorem	2.7 - 2.9

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17 – 22		Permutation Groups, Another Counting Principle	2.10, 2.11
23 – 28	To learn how to classify a simple finite group	Sylow's Theorems	2.12
29		Definition & Examples of Rings, Ring of Real Quaternions	3.1, 3.2
30		Homomorphism & Examples	3.3
31 - 33		Ideals & Quotient Rings	3.4, 3.5
34	To learn the structural properties of different rings	Field of Quotients of ID	3.6
35 - 37		Polynomial Rings, Polynomials over the Rational Field	3.9, 3.10
38 - 39		Unique Factorization Domain	3.11
40 - 41		Euclidean Rings	3.7
42		A Particular Euclidean Ring	3.8

Evaluation Scheme:

Component	Duration	Weightage (%)	Date & Time	Nature of Component
*QUIZES (5)		28	Announced in the class	Closed book
Mid Semester Examination	1.5 Hr.	30	4/10, 11.00 -- 12.30 PM	Open Book
Comprehensive Exam.	3 Hrs.	42	11/12 AN	Closed Book

*Best 4 out of 5 will be taken.
Chamber Consultation Hour: To be announced by the respective Instructor.
Notices: The notices concerning this course will be displayed in CMS only.
Make-up Policy: Make-up for tests will be given only for very genuine cases and prior permission has to be obtained from Instructor In-charge.
Academic Honesty and Integrity Policy: Academic honesty and integrity are to be maintained by all the students throughout the semester and no type of academic dishonesty is acceptable.

INSTRUCTOR-IN-CHARGE (MATH F215)

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