

King Fahd University of Petroleum & Minerals
Department of Mathematics
Math 210 Syllabus
First Semester 2023-24 (T231)
Instructor: Dr. A. Laradji

Title: Introduction to Sets and Structures

Textbook: Mathematical Proofs, A Transition to Advanced Mathematics (3rd edition) by Chartrand, Polimeni, and Zhang (Pearson, 2014).

Prerequisite: MATH 102

Description: Elementary logic. Methods of proof. Set theory. Relations and functions. Finite and infinite sets. Equivalence relations and congruence. Divisibility and the fundamental theorem of arithmetic. Well-ordering and axiom of choice. Groups, subgroups, symmetric groups, cyclic groups and order of an element, isomorphisms, cosets and Lagrange's Theorem.

Assessment (out of 300):

- Exam 1: 75 (Wednesday 4 October, 6:00 PM, Chapters 1,2,3,4)
- Exam 2: 75 (Wednesday 15 November 2023, 5:30 PM, Chapters 5,6,8,9)
- HW/Quizzes: 50
- Final Exam: 100 (TBA, Comprehensive)

Attendance and Academic Integrity: All KFUPM policies regarding attendance and ethics apply to this course. (See the Undergraduate Bulletin.)

Course Plan:

Chapter	Title	Number of weeks	Suggested Exercises
1	Logic	1	4, 14(a,c), 18(b), 24(a,c,e), 32(c), 40(b), 48, 54, 62, 68, 72, 78
2	Sets	2	2, 16, 30, 36, 48, 64
3	Direct Proof and Proof by Contrapositive	1	4, 12, 24, 32, 42
4	More on Direct Proof and Proof by Contrapositive	1	10, 18, 28, 46, 58, 68, 75
5	Existence and Proof by Contradiction	1	6, 20, 34, 48, 50
6	Mathematical Induction	1	4, 12, 24, 34, 42, 62
8	Equivalence Relations	1	4, 22, 28, 34, 40, 42
9	Functions	1	8, 14, 26, 32, 48, 58
10	Cardinalities of Sets	2	4, 10, 20, 24, 28, 41(a)
11	Proofs in Number Theory	1	6, 24(a), 34, 38(c), 56, 62(d), 68
13	Proofs in Group Theory	2	12, 23, 24, 25, 28, 32(a,c), 40, 41, 45
-	Well-ordering and Axiom of Choice	1	Handouts

Notes

- **September 24, 2023:** National Day Holiday
- **November 19–23, 2023:** Midterm Break