King Fahd University of Petroleum & Minerals
Department of Mathematics
Spring 2022 (Term 212)

SYLLABUS AND POLICY

Course: **Math 210**

Title: **Introduction to Sets and Structures**

Textbook: Mathematical Proofs: A Transition to Advanced Mathematics, by Chartrand-Polimeni-Zhang, 3rd Ed.

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.

Week	Chapter	Title	Homework
1	**1**	Sets	8, 18, 30, 40, 46, 64
2-3	**2**	Logic	6, 14abc, 18ab, 24, 32cd, 40ab, 46, 54, 62, 68, 70, 78
4	**3**	Direct Proof and Proof by Contrapositive	1, 10, 24, 30, 42
5	**4**	More on Direct Proof and Proof by Contrapositive	4, 22ae, 36, 40, 58, 68
6	**5**	Existence and Proof by Contradiction	6, 22, 38, 48, 50
7	**6**	Mathematical Induction	8, 24, 34, 42
8	**8**	Equivalence Relations	8, 22, 30, 40, 52, 56
9	**9**	Functions	10, 14, 24, 32, 46, 52, 60
10	**10**	Cardinalities of Sets	6, 10, 20, 26abc, 32
11-12	**11**	Proofs in Number Theory	6, 22, 36, 38c, 56, 62b, 68
13-14	**13**	Proofs in Group Theory	2, 12, 22, 26, 28, 32, 38, 40, 46
15	Handouts	Well-ordering and Axiom of Choice	-

Grading Policy (*)	Weight	Dates
Homework	50	Every Sunday (`Email directly to the grader`)
Test 1	35	Tuesday, **February 15**, In-Class
Test 2	35	Tuesday, **March 08**, In-Class
Midterm Exam (Chapters 1 – 10)	80	Tuesday, **March 29**, 5:00 – 7:00 p.m.
Final Exam (Comprehensive)	100	tba
TOTAL	300	

(*) **No Makeup** is given under any circumstance. If a student misses an assessment for a legitimate reason (e.g., medical emergency), his final grade will be determined based on the non-missed assessments.

Learning Outcomes: Upon completion of this course, students should be able to
- Discuss basic concepts of elementary logic such as negation, implication, quantifiers and other logical terminology
- Explain elementary concepts of set theory such as intersection and union, indexed sets, relations, functions, and cardinality
- Discuss basic concepts in number theory and group theory.
- Construct mathematical proofs of statements in elementary number theory and elementary group theory using rigorous methods such as induction and contradiction.

Academic Integrity: All KFUPM ethic policies apply in this course.

University Policy on Attendance: A DN grade will be awarded to any student who accumulates 9 absences.

Office Hours and Contact Information:

Office hours: UTR 8:00 a.m. – 9:00 a.m.

Teacher: Salah-Eddine Kabbaj (صلاح الدين القبّاج), Office: 5-428, Email: kabbaj@kfupm.edu.sa

Homework Grader: Omar Alshamrani (عمر الشمراني), Email: s201744890@kfupm.edu.sa