

**King Fahd University of Petroleum and Minerals**  
**Department of Mathematics**  
**Math 210 – Syllabus**  
**First Semester 241**  
**Dr. Khalid Ali Alanezy**

[alanezy@kfupm.edu.sa](mailto:alanezy@kfupm.edu.sa)

<b>Title</b>	Introduction to Sets and Structures
<b>Credit</b>	3-0-3
<b>Textbook</b>	Mathematical Proofs, A Transition to Advanced Mathematics (3rd edition) by Chartrand, Polimeni, and Zhang (Pearson, 2014).
<b>Description</b>	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.
<b>Prerequisite:</b>	Math 102

**Grading Policy:**

<u>Classwork</u>	<u>HW</u>	<u>Presentation</u>	<u>Major Exams</u>	<u>Final Exam</u>
10%	16%	8%	36%	30%

**Learning Outcomes:**

Upon completion of this course, each student should be able to:

1. Discuss basic concepts of elementary logic such as negation, implication, quantifiers and other logical terminology.
2. Explain elementary concepts of set theory such as intersection and union, indexed sets, relations, functions, and cardinality.
3. Discuss basic concepts in number and group theory.
4. Construct mathematical proofs of statements in elementary number theory and elementary group theory using rigorous methods such as induction and contradiction.

## PACING SCHEDULE

Chapter	Title	HW Problems
3	Sets	2, 3, 8, 10, 20, 22, 24, 26, 30, 48, 50, 64
2	Logic	4, 14, 18(b), 24, 32(c), 40(b), 48, 54, 62, 68, 72
4	Direct Proof and Proof by Contrapositive	4, 12, 24, 32, 42
5	More on Direct Proof and Proof by Contrapositive	10, 18, 28, 46, 58, 68, 75
6	Existence and Proof by Contradiction	6, 20, 34, 48, 50
7	Mathematical Induction	4, 12, 24, 34, 42, 62
9	Equivalence Relations	4, 22, 28, 34, 40, 42
10	Functions	8, 14, 26, 32, 48, 58
11	Cardinalities of Sets	4, 10, 20, 24, 28, 41(a)
12	Proofs in Number Theory	6, 24(a), 34, 38(c), 56, 62(d), 68
14	Proofs in Group Theory	12, 23, 24, 25, 28, 32(a,c), 40, 41, 45

### Homework:

Since the only way to learn Mathematics is to **do** Mathematics, you will be asked to submit several HW sets on Thursday.

---

### Office Hours:

Every Monday and Wednesday 3 PM to 4 PM. **Try solving the problem before asking about it in the office hours.**

---

### Exams:

There will be two major exams and a final exam. **No** makeup exams without an official excuse.

**Exam 1:** Tuesday, October 01, 2024

**Exam 2:** Tuesday, November 05, 2024

---

### Attendance and Academic Integrity:

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

---

### Undergraduate Attributes: Please check the following link

<https://math.kfupm.edu.sa/bsinmathematics/graduate-attributes>

---