King Fahd University of Petroleum & Minerals
Department of Mathematics & Statistics
Math 232 Syllabus
Second Semester 2016-17 (162)
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).

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:

- Exam 1: 20% (Wednesday 15 March 2017, Chapters 1,2,3,4)
- Exam 2: 20% (Wednesday 19 April 2017, Chapters 5,6,8,9)
- Tests/Quizzes: 20%
- Homework: 5%
- Final Exam: 35% (Tuesday 30 May 2017 (9 PM), Comprehensive)

Attendance and Academic Integrity: KFUPM policies regarding attendance and ethics will be enforced.

Course Plan:

Chapter	Title	Number of weeks
1	**Sets**	1
2	**Logic**	2
3	**Direct Proof and Proof by Contrapositive**	1
4	**More on Direct Proof and Proof by Contrapositive**	1
5	**Existence and Proof by Contradiction**	1
6	**Mathematical Induction**	1
8	**Equivalence Relations**	1
9	**Functions**	1
10	**Cardinalities of Sets**	2
11	**Proofs in Number Theory**	1
13	**Proofs in Group Theory**	2
-	**Well-ordering and Axiom of Choice**	1

Homework Exercises

1. Sets: 2, 16, 30, 36, 48, 64
2. Logic: 4, 14(a,c), 18(b), 24(a,c,e), 32(c), 40(b), 48, 54, 62, 68, 72, 78
3. Direct Proof & Proof by Contrapositive: 4, 12, 24, 32, 42
4. More on Direct Proof & Proof by Contrapositive: 10, 18, 28, 46, 58, 68, 75
5. Existence & Proof by Contradiction: 6, 20, 34, 48, 50
6. Mathematical Induction: 4, 12, 24, 34, 42, 62
7. Equivalence Relations: 4, 22, 28, 34, 40, 42
8. Functions: 8, 14, 26, 32, 48, 58
9. Cardinalities of Sets: 4, 10, 20, 24, 28, 41(a)
10. Proofs in Number Theory: 6, 24(a), 34, 38(c), 56, 62(d), 68
11. Proofs in GroupTheory: 12, 23, 24, 25, 28, 32(a,c), 40, 41, 45
12. Posets & Well-ordering (see handouts).