Estd 1864

Forman Christian College, Lahore
(A Chartered University)
Department of Mathematics

Spring 2021

Instructor Information:

Dr Faira Kanwal Janjua
Assistant Professor
Office: S 110 (Armacost Science Building)

Office Hours And Online Office Hours:

DAYS	Office hours
MWF	10:00am-11:00am
T,R	10:00am-12:00pm

(For online office hours students need to join the zoom Id is given above)

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Course Information:

Title: Set Theory
Code: Math 210 **Section: A** **Credits:** 3
Class Room: S416
Lectures Time: MWF: 09:00-9:50
Prerequisite: Math 101/A-Level/FSc Pre Eng
Text Book:
Set theory and Related topics Second Edition, Seymour Lipschutz,(Schaum's Outlines)

Course Contents: Sets and Basic Operation on Sets, Relations, Functions, Cardinal and ordinal numbers, axioms of choice, Zorn's lemma and well ordering theorem.

Course Objectives: Set theory is the official language of mathematics is the official language of science. The learning and teaching of the courses of pure Mathematics like Topology Group theory Ring theory Measure Theory Modules Real Analysis and functional Analysis cannot be effectively done without the knowledge of set theory. So the objective of this course is to prepare the students to learn basics of set theory so that they might not feel any difficulty in studying the courses mentioned above.

Course Policies:

- Basic blended model will be the mode of conduct/ teaching. It will involve face to face class sessions (on-campus) that are accompanied by online lectures (lecture recordings on Moodle) – essentially a "blend" of both on-campus and online learning through recorded lectures.
- Students with odd roll numbers (last digit) will be allowed on campus for the

first two weeks of class and those with even roll numbers (last digit) will learn remotely through the recorded lectures. After two weeks, those with even id numbers will come to campus for in-person classes and those with odd id numbers will learn from home through lecture recordings. Every fortnight, the students will switch who is on campus and who is studying remotely.

- Students are expected to watch every video lecture and read the lecture notes uploaded on Moodle. Off-campus students can discuss their queries/ questions in the given online office hours.
- Students are expected to attend every class. Students must arrive at class on time, should remain in class for the entire class period and mobile phone should be switched off or on silence. Note that there is 5 marks for attendance, behavior and class participation. if a student arrives more than 10 minutes late or leave class during lecture or use mobile in class, he/she will be marked absent.
- Course assessment will be through **quizzes; attendance, behavior and class participation; assignments; midterm and final exam**.
- **Viva Exam for the Course will be conducted in the end of the Semester.**
- Quizzes, Mid-term exam and final exam will be conducted on campus for both even and odd ID students. Assignments will be conducted on Moodle. There is **no make up** for the missed quizzes and assignments. Make up for quizzes, midterm and final exam is possible only under extremes cases if a student provides strong documentary evidence. In case of make-up exam there will be a 0-20% deduction in marks depending upon case to case basis.
- Academic dishonesty or cheating will result in zero points (grade F) and will be referred to AIC (Academic Integrity Committee) at FCC for necessary action.

Course Evaluation:

Grading will be based on following criteria:

Class participation and behavior	5%
Assignment	10%
Quizzes (3 and **best 2** will be counted)	20%
Mid Term	25%
Final Exam	40%

Grades	Quality Points	Numerical Value	Meaning
A	4.00	93-100	Superior
A-	3.70	90-92	
B+	3.30	87-89	

B	3.00	83-86	Good
B-	2.70	80-82	
C+	2.30	77-79	
C	2.00	73-76	Satisfactory
C-	1.70	70-72	
D+	1.30	67-69	
D	1.00	60-66	Passing
F	0.00	59 or below	Failing

Course Outlines:

Weeks	Contents	Assessments
1	☐ Discussion of Course Plan, Policies, Requirements, Grading Criteria. **Sets and Basic Operation on Sets**: Sets and elements, Subsets, Venn diagrams, Set operations, Algebra of sets, Duality, Finite set, Counting principles, Classes of sets, Power sets, Mathematical induction, Operation on collection of sets, Indexed collections of sets.	
2	**Relations:** Product set, Relations, Pictorial representations of relations, Composition of relations, Types of relations.	
3	**Relations:** Closure properties, Partitions, Equivalence relations, Partial ordering relations	**Quiz #1**
4	**Functions:** Functions, Composition of functions, One-to-one, Onto, and Invertible functions, Exponential, logarithmic and recursively defined functions.	**Assignment#1 Quiz#2**
5	One-to-one correspondence, Equivalent sets	
6	Denumerable Sets	
7	Countable Sets	
8	Ordering of Cardinal Numbers	
9	Cardinal Arithmetic	**Mid Term**
10	Ordered sets, Partially ordered sets, Minimal, maximal, first and last elements	
11	Supremum and Infimum, Isomorphic ordered sets	
12	Well-ordered sets, Transfinite induction, Initial segments, Similarity between a well-ordered set and its subsets, Comparison of well-ordered sets	**Quiz#3**
13	Ordinal numbers	**Quiz#4**

14	Ordinal arithmetic	**Assignment #2**
15	Axioms of Choice	
16	Final Exam	