



Forman Christian College
(A Chartered University)
Department of Mathematics

Instructor Information:

Name: Dr. Ahmad Mahmood Qureshi

(Associate Professor & Dean Faculty of Computer and Mathematical Sciences)

Office: S - 204

Office Hours: Monday & Wednesday (02:00 PM to 03:30 PM)

OTHERWISE GET APPOINTMENT FIRST.

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Course Information:

Course Code and Title: MATH 212: Elementary Number Theory (Section A) **Credits:** 3

Prerequisite: Math 101 or A Level Mathematics or Intermediate with Mathematics

Class Room: S - 413

Class Time: Tuesday and Thursday (02:00 PM – 03:15 PM)

Text Book:

1. *Elementary Number Theory*, 7th edition by David M. Burton.

Reference Books:

2. *Elementary Number Theory and its Applications*, 6th edition by Kenneth H Rosen.
3. *The Theory of Numbers*, by Andrew Adler and John E Coury.

Course Objectives:

The purpose of this course is to:

1. introduce basic notions and arguments from elementary number theory.
2. develop a working knowledge of several important concepts, techniques, and results common in writing a proof.
3. have practice sessions of exercises and problems whereby students comprehend the concepts and techniques of solving and proving.
4. advance mathematical maturity in students so that they can recognize and appreciate the elegance of results and proofs.

Learning Outcomes:

After successfully completing this course, the students will:

1. acquire skills related to number theory topics of divisibility, primes and factorization.
2. be able to prove and apply the classical theorems of elementary number theory.
3. be skillful to formulate and solve congruences

Course Requirements:

Students must arrive at class on time during their designated weeks and those coming after attendance call won't be marked present.

1. Please watch attentively the video lectures shared as part of blended class.
2. Keep a note of your queries, if any, that you are not able to comprehend.
3. You will have the opportunity to get your questions answered, in-person if you are coming on campus or through a live zoom meeting when off-campus.
4. Work out the exercise questions to apply and analyze the learned concepts.
5. Quizzes, Midterms and Finals will be conducted in-class.
6. Working regularly, understanding the lectures, doing exercises will be very helpful in quizzes, mid-term and final to get a good grade. Your knowledge of the subject and ability to solve problems will be reflected in your grades.

Course Evaluation:

Grading will be based on following criteria:

Class participation and behavior	5%
Assignment	5%
Quizzes (Two)	20%
Mid Term	30%
Final Exam	40%

Grade Legend:

<u>Grades</u>	<u>Quality Points</u>	<u>Numerical Value</u>	<u>Meaning</u>
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 Outline:

Week	Topics	Assesment
1	1) Discussion of Course Plan 2) Introduction to Number Theory Principle of Mathematical Induction	
2	1) The Division Algorithm 2) Applications and Problem Solving	
3	1) The Divisibility Relation and its Properties 2) Applications and Problem Solving	
4	1) The Greatest Common Divisor 2) Applications and Problem Solving	QUIZ-1 Group B
5	1) The Euclidean Algorithm 2) Applications and Problem Solving	QUIZ-1 Group A
6	1) The Least Common Multiple 2) Applications and Problem Solving	
7	1) The Diophantine Equation $ax+by=c$ 2) Applications and Problem Solving	
8	1) Prime Numbers and Divisibility 2) Applications and Problem Solving	MID-TERM
9	1) The Fundamental Theorem of Arithmetic 2) Applications and Problem Solving	

10	1) The Sieve of Eratosthenes 2) Applications and Problem Solving	
11	1) Congruences and their Properties 2) Problem Solving	
12	1) Application of Congruences 2) Problem Solving	QUIZ-2 Group B
13	1) Divisibility Tests 2) Problem Solving	QUIZ-2 Group A
14	3) Solution of Linear Congruences 1) Problem Solving	
15	1) Fermat's Theorem 2) Problem solving	
16	FINAL EXAM (FROM THE WHOLE COURSE) February 2022	