

Hashemite University	 	Number Theory (110101343) 3 Credit Hours
Faculty of Science		Pre-requisite: 110101251
Department of Mathematics		2st Semester 2020 / 2021

Course Syllabus

Course Information	
Lecture's Time	9-11:30
Lecture's Room	102 ج
Instructor	Prof. Dr. Nedal Tahat
Office Location	212 ج
Office Hours	9:30-8 (Mon., Wed.)
Text Book : <i>Elementary Number Theory</i>, by D. M. Burton (7th ed. 2002)	
References(s)	1) <i>Elementary Number Theory and its Applications</i> , by K. H. Rosen. 2) <i>Elementary Number Theory</i> , by G. A. Jones & M. Jones. 3) <i>Elementary Number Theory</i> , by V. Eynden.

Grading Policy:

First Exam	30%
Second Exam	30%

Final Exam 40 %

Course Objectives

To become familiar with the basic concepts and theorems in the course such as division algorithm, greatest common divisor, fundamental theorem of arithmetic, properties of congruence, Fermat's and Wilson's theorems and some arithmetic functions (τ , σ , μ and ϕ) and to employ this knowledge in solving problems and proving related facts. To get a simple idea about some still open problems.

Teaching and Learning Methods

*Illustrating each introduced new concept by examples.
 Proving the theorems which constitute the core of the course.
 Solving some examples and assigning homework.
 Discussing some of the student's solutions of some homework problems.
 Making exams followed by a discussion of the problems of each exam.*

Course Contents		
Week	Topics	Cha. in Text
1	Some Preliminary Considerations	1
	1.1 Mathematical Induction	
	1.2 The Binomial Theorem	
2	Divisibility Theory in the Integers	2
	2.2 The Division Algorithm	
	2.3 The Greatest Common Divisor	
3	2.4 The Euclidean Algorithm	3
	2.5 The Diophantine Equation $ax + by = c$	
	Primes and Their Distribution	
5	3.1 The Fundamental Theorem of Arithmetic	4
6	3.2 The Sieve of Eratosthenes	
	3.3 The Goldbach Conjecture	
7	The Theory of Congruences	6
	4.2 Basic Theory of Congruence	
	4.3 Special Divisibility Tests	
8	4.4 Linear Congruences	7
9	Number-Theoretic Functions	
10	6.1 The Functions τ and σ	
11	6.2 The Möbius Inversion Formula	7
	6.3 The Greatest Integer Function	
	Euler's Generalization of Fermat's Theorem	
12	7.2 Euler's Phi-Function	7
	7.3 Euler's Theorem	
13	7.4 Some Properties of the Phi-Function	
	7.5 An Application to Cryptography	7
14	Fermat's Theorem	
	5.2 Fermat's Factorization Method	
15	5.3 The Little Theorem	7
	5.4 The Greatest Integer Function	

- Participation and Exams:

Attendance is absolutely mandatory. Missing 15% of the class sessions without a compelling excuse will qualify the student to be dismissal.