King Fahd University of Petroleum & Minerals
Department of Mathematics & Statistics
Math 455- Syllabus
2011-2012 (111)

Title:	Math 455- Number Theory
Credit:	3-0-3
Textbook:	An Introduction to the Theory of Numbers, by Niven, Zuckerman, and Montgomery, 5th edition, Wiley & Sons, 1991.
References:	Elementary Number Theory, by D. Burton, 6th edition, McGraw-Hill, 2007. Elements of the Theory of Numbers, By J. B. Dence & T. P. Dence, Harcourt Academic Press, 1999.
Description:	This is a first course in number theory. It will cover the fundamental concepts of number theory: Divisibility, Primes, Congruences, Fermat's and Wilson's Theorems, Pseudoprime and Carmichael numbers, Solutions of congruences, Primitive roots, Quadratic residues and quadratic reciprocity, Arithmetic functions, Perfect numbers, Pythagorean triangles, Diophantine equations, Cryptography.
Prerequisite:	Math 232 or Senior standing.

Grading Policy:

- Exam 1: 20% (6th week)
- Exam 2: 20% (13th week)
- Homework: 20%
- Project: 10%
- Final Exam: 30%

Office Hours:

- Office location: 5-326
- Office Phone Number: 1268
- Time: SMW: 11:00-11:50 am (or by appointment)
- E-mail: irasasi@kfupm.edu.sa
- Webpage: http://faculty.kfupm.edu.sa/math/irasasi

Wishing you all the best,

Dr. Ibrahim Al-Rasasi
The Course Instructor

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Week	Date	Sec.	Topics
1	Sep. 10-14, 2010	1.1 1.2	Introduction Divisibility
2	Sep. 17-21	1.3 1.4	Primes The Binomial Theorem; Fermat's Factorization Method
Saturday, Sep. 24, 2011: National Day (Holiday)			
3	Sep. 25-28	2.1	Congruences
4	Oct. 1-5	2.1 2.2	Continued Solutions of Congruences
5	Oct 8-12	2.3	The Chinese Remainder Theorem
6	Oct. 15-19		Cryptography (I)
7	Oct. 22-26	2.6	Prime Power Moduli
8	Oct. 29-31	2.7	Prime Modulus
Id al-Adha Vacation: Nov. 1-11, 2011			
9	Nov. 12-16	2.8	Primitive Roots and Power Residues
10	Nov. 19-23	3.1	Quadratic Residues
11	Nov. 26-30	3.2 3.3	Quadratic Reciprocity The Jacobi Symbol
12	Dec. 3-7	 4.1	Cryptography (II) Greatest Integer Function
13	Dec. 10-14	4.2 4.3	Arithmetic Functions The Mobius Inversion Formula
14	Dec. 17-21	5.1 5.3	The Equation ax+by=c Pythagorean Triangles
15	Dec. 24-28		Diophantine Equations (I)
16	Dec. 31-Jan 2.		Diophantine Equations (II)
Final Exam: Monday, January 9, 2012 at 7:00 p.m.			

Homework Problems

Section	Questions numbers
1.2	2, 6(a), 11, 15, 23, 26, 32, 50, 53
1.3	3, 10(a), 11, 19, 26(a), 31, 32, 42, 44, 48
1.4	Appended
2.1	A: 2, 6, 7, 8, 14, 32, 33
	B: 13, 18, 19, 20, 28, 30, 45, 47
2.2	3, 5(a, d), 8, 9
2.3	A: 3, 7, 8, 14, 18
	B: 12, 25, 31, 32, 35, 36
2.6	3, 6, 10
2.7	1(b), 2, 3, 4, 10, 11
2.8	A: 2, 4(a), 5, 8(b), 9, 12, 13
	B: 17, 18, 21, 22, 23, 24, 26
3.1	7(a, c, e, g), 9, 13, 19, 23
3.2	2, 6, 7, 10, 16(a), 17
3.3	2(a), (a), 6, 7, 16
4.1	2, 3(a), 7, 9, 18, 30
4.2	3, 5, 8, 9, 12, 13, 17, 20, 21
4.3	2, 3, 5, 6, 8, 18
5.1	See Section 1.4
5.3	2, 3, 5, 8, 11