University of North Texas at Dallas
Spring 2013
SYLLABUS

MATH 3400	NUMBER THEORY	3 Hrs

Department of	Mathematics and Information Sciences
Division of	Liberal Arts & Life Sciences
Instructor Name:	Dr. Noureen Khan
Office Location:	*Founders Hall - 223*
Office Phone:	*972 338 1567*
Email Address:	*noureen.khan@unt.edu*
Office Hours:	Monday & Wednesday 1: 00 pm – 3: 00 pm Tuesday 3: 30 pm – 5: 30 pm or by appointments.
Classroom Location:	*Founders Hall – 242*
Class Meeting Days & Times:	Monday & Wednesday 11: 30 am - 12: 50 pm
Course Catalog Description:	Factorizations, Congruencies, Quadratic Reciprocity, Finite Fields, Quadratic Forms, Diophantine Equations.
Prerequisites:	MATH 3000 or MATH 2770
Required Text:	*Elementary Number Theory* 6th Edition, Addison, Kenneth H. Rosen**,** Wesley
Reference Books	• *A Classical Introduction to Modern Number Theory*, Ireland & Rosen. • *A Friendly Introduction to Number Theory*, Joseph Silverman.

Access to Learning Resources:	UNT Dallas Library:
	    phone: (972) 780-3625;
	    web: http://www.unt.edu/unt-dallas/library.htm
	UNT Dallas Bookstore:
	    phone: (972) 780-3652;
	    e-mail: 1012mgr@fheg.follett.com

Course Goals: The goal of this course is to	
1	Learn about Divisibility and the Greatest Common Divisor and Linear Equations.
2	Emphasize Factorization and the Fundamental Theorem of Arithmetic.
3	Describe Prime Numbers, Counting Primes, Mersenne Primes and the Perfect Numbers
4	Discuss Congruences, Fermat's Little Theorem, Euler's Phi Function and the Chinese Remainder Theorem.
5	Present the study of Pythagorean Triples and the Unit Circle and Sums of Higher Powers and Fermat's Last Theorem.

Learning Objectives/Outcomes (course): At the end of this course, the student will be able to	
1	Formulate the conjectures about GCD and LCM and their relation to the prime factorizations of two numbers;
2	Understand the meaning of the order of a number with respect to a relatively prime modulus;
3	Read and understand the basic arithmetic of the number system formed by taking the integers modulo a fixed number m;
4	Know Fermat's little theorem, and Euler's extension of it;
5	Know the definition of Euler's φ -function and its expression in terms of prime factors;

Learning Outcomes (Program): At the end of this course, the student will be able to	
	Communicate with technical precision in writing mathematical ideas.
	Understand, formulate, explain, and apply mathematical statements.
	State and prove important results in key mathematical areas including algebra and analysis.

Course Outline:

Number theory studies the properties of particular types of numbers– in this course, mainly integers. The study of number theory provides an excellent opportunity to develop the habits of mind necessary to write careful proofs in mathematics. Prior experience with analytic proofs will be assumed; here you will be introduced to algebraic proofs. Attendance is required for this class as its essential for effective learning. The home work will be assigned in every meeting; you are encouraged to do every home work. UNT Dallas provides all possible help to assure student success, Math lab is open and Faculty is available to help on one to one basis throughout the day. You can also come during my office hours or make an appointment otherwise in order to seek further help.

Course Evaluation Methods:

This course will utilize the following instruments to determine student grades and proficiency of the learning outcomes for the course.

Home Work: Home work will be assigned in every class meeting and will be collected time to time without notice. <mark>Two lowest quiz grades will be replaced by two home work grades.</mark> You are required to do all your home work in a proper notebook throughout the semester. It's your responsibility to obtain the missing class/home work from you class mates or by contacting me.

Quizzes –   Weekly short quizzes
Exams –   Three Exams
Project –   Groups (2-3 students) will work together on assigned assignments.
Final Exam – Comprehensive *Final Exam* at the end of semester.

************ Schedule for Quizzes, Exams and Final Exams is attached. *************

<u>**Absolutely NO MAKE –UP Quizzes or Exams.**</u>

Grading Matrix:

Instrument		Percentage %	Points
Quizzes	8 quizzes (10 pts each)	20	80
Project	Group Project	10	40
Exam	Three Exams (60 pts each)	45	180
Final Exam	One comprehensive Final Exam	25	100
Total:		**100**	**400**

Grade Determination:

Grade	Percentage %	Points
A	90 or better	360 or more
B	80 – 89	320 – 3599
C	70 – 79	280 – 319
D	60 – 69	240 – 279
F	less than 60	239 or less

Calculator Policy: This course REQUIRES a graphing calculator. TI-84 is recommended. TI-89 and TI-92 calculators are NOT allowed in this course. These Calculators do symbolic calculations and are big advantage over the TI-84. You are expected to bring your calculator to each class meeting.

Class Schedule: This schedule is subject to change by the professor at any time.			
	Monday	**Wednesday**	**Topics**
Week 1 **Jan 14 & Jan 16**			Chapter 1. The Integers
Week 2 **Jan 23 & Jan 25**	No Class MLK Day	Quiz #1	Chapter 1. The Integers
Week 3 **Jan 28 & Jan 30**		Quiz #2	Chapter 2. Integer Representations and Operations
Week 4 **Feb 04 & Feb 06**		Quiz #3	Chapter 2. Integer Representations and Operations
Week 5 **Feb 11 & Feb 13**		Test #1	Chapter 3. Primes and Greatest Common Divisors
Week 6 **Feb 18 & Feb 20**			Chapter 3. Primes and Greatest Common Divisors
Week 7 **Feb 25 & Feb 27**		Quiz #4	Chapter 4. Congruences
Week 8 **Mar 04 & Mar 06**		Quiz #5	Chapter 4. Congruences
Week 9 **Mar 11 & Mar 13**	SPRING BREAK		
Week 10 **Mar 18 & Mar 20**		Quiz #6	Chapter 5. Application of Congruences
Week 11 **Mar 25 & Mar 27**		Test #2	Chapter 5. Application of Congruences
Week 12 **Apr 01 & Apr 03**			Chapter 6. Some Special Congruences
Week 13 **Apr 8 & Apr 10**		Quiz #7	Chapter 6. Some Special Congruences
Week 14 **Apr 15 & Apr 17**		Quiz # 8	Chapter 8. Cryptology
Week 15 **Apr 22 & Apr 24**		Test #3	Chapter 8. Cryptology
Week 16 **Apr 29 & May 01**	Project Presentations		**Review Final Exam**
Week 17 **May 06**	**Final Exam**		*Comprehensive Final Exam* @ **11:00am - 1:00 pm**

University Policies and Procedures
Students with Disabilities (ADA Compliance):
Any student requesting academic accommodations based on a disability is required to register with Disability Services each semester. A letter of verification for approved accommodations can be obtained from this office. Please be sure the letter is delivered to me as early in the semester as possible. Disability Services is located in the Student Life Office in DAL2, Suite 200 and is open 8:30 a.m. – 5:00 p.m., Monday through Friday. The phone number is (972) 338-1775.
Student Evaluation of Teaching Effectiveness Policy:
The Student Evaluation of Teaching Effectiveness (SETE) is a requirement for all organized classes at UNT. This short survey will be made available to you at the end of the semester, providing you a chance to comment on how this class is taught. I am very interested in the feedback I get from students, as I work to continually improve my teaching. I consider the SETE to be an important part of your participation in this class.
Exam Policy:
Exams should be taken as scheduled. No makeup examinations will be allowed except for documented emergencies (See Student Handbook). In the case of injury or illness, you need to provide a note from a health care professional affirming date and time of a medical office visit regarding the injury or illness and stating that you should not be in class that day. You must notify me no later than the end of the second working day after the missed exam.
Academic Integrity:
Academic integrity is a hallmark of higher education. You are expected to abide by the University's code of conduct and Academic Dishonesty policy. Any person suspected of academic dishonesty (i.e., cheating or plagiarism) will be handled in accordance with the University's policies and procedures. Refer to the Student Code of Conduct at http://www.unt.edu/csrr/student_conduct/index.html for complete provisions of this code.
Attendance and Participation Policy:
*The University attendance policy is in effect for this course. Class attendance and participation is expected because the class is designed as a shared learning experience and because essential information not in the textbook will be discussed in class. The dynamic and intensive nature of this course makes it impossible for students to make-up or to receive credit for missed classes. Attendance and participation in all class meetings is essential to the integration of course material and your ability to demonstrate proficiency. Students are responsible to notify the instructor if they are missing class and for what reason. Students are also responsible to make up any work covered in class. It is recommended that each student coordinate with a student colleague to obtain a copy of the class notes, if they are absent. **Excessive absences (more than 3 classes) may result in being dropped from the class or receiving an F for the course.***
Diversity/Tolerance Policy:
Students are encouraged to contribute their perspectives and insights to class discussions. However, offensive & inappropriate language (swearing) and remarks offensive to others of particular nationalities, ethnic groups, sexual preferences, religious groups, genders, or other ascribed statuses will not be tolerated. Disruptions which violate the Code of Student Conduct will be referred to the Center for Student Rights and Responsibilities as the instructor deems appropriate.
Copyright Policy:
The handouts used in this course are copyrighted. By "handouts," I mean all materials generated for this course, which include but are not limited to syllabi, lecture notes, quizzes, exams, in-class materials, review sheets, projects, and problems sets. Because these materials are copyrighted, you do not have the right to copy and distribute the handouts, unless I expressly grant permission.
Miscellaneous Policy:
• *Use of Cell Phones & other Electronic Gadgets (such as Laptops) are prohibited in the classroom.*
• *Food and drinks are not allowed during the lectures.*