MATH 4043, NUMBER THEORY, FALL 2009
COURSE INFORMATION

Class Hour: 12-12:50pm MWF

Classroom: Boyd 206 (Changed from TLC 1114)

Instructor: Dr. Jeong-Hyun Kang

Course webpage: www.westga.edu/~jkang/4043.html

E-mail Address: jkang@westga.edu

Office and Phone: Boyd 316, (678)839–4143

Office Hours: Mon. 10–12, 1–2, 4:45–5:15; Wed. 11–12, 1–2, 4:45–5:15; Fri. 11–12, 1–4
If there is any change on office hours, I will post on the course web.

Tutor: Katie Dawson (Graduate student)

Math Tutoring Center Hours (held at Boyd 205): Wed. 12-4; Fri. 11-12.


Learning outcomes: The student will be able

– to compute the Euclidean Algorithm
– to compute linear Diophantine equations
– to understand prime numbers and the Fundamental Theorem of Arithmetic
– to understand linear congruences and the Chinese Remainder Theorem
– to understand Fermat’s little theorem and Wilson’s Theorem

and, most of all,
– to improve logical thinking and to prove theorems in mathematics

Homework: Homework will be assigned almost every class, and due on Mondays. Among those, a couple of problems will be graded (they will not be specified.) Homework must be submitted at the beginning of class on the due date. It should be written legibly. Late homework will not be accepted. In case you miss class, it should be handed-in before the class. You can work on the homework problems together but you must submit your own solution. If there are solutions copied from others, all those identical solutions will get zero point. Two lowest scores will be dropped at the end of the semester.

Summary of Contents: On the Monday before each scheduled hour exam, you will submit a short summary on what you learn – Definitions, Theorems, etc. You do NOT simply copy Theorems from the textbook or the lecture note but organize your thoughts and summarize them. This will make you better prepared for the hour exams and improve your writing ability.

Hour Exam: There will be 4 one-hour exams. Missed hour exams may be made up prior to the actual test date if the student has a provable excuse such as official university travel or doctor’s note.

– Exam #1 on Fri. 9/4
– Exam #2 on Fri. 9/25
– Exam #3 on Fri. 10/30
– Exam #4 on Fri. 12/4

Final Exam: The final exam is scheduled for Dec. 9, Wed. 11-1
Grading Policy:

- Homework 100 points (The homework total may be scaled to 100 points if necessary at the end of the semester.)
- Four hour exams 200 points (50 points each)
- Four Summary of Contents 50 points (The summary total may be scaled to 50 points if necessary at the end of the semester.)
- Final will count for 100 points of the grade
- 450 points total

Letter Grades: ≥ 90% A; ≥ 80% B; ≥ 70% C; ≥ 60% D; below 60%

Other Class Policies:

- COMMUNICATIONS:
  * Homework problems will not be specified during class but will be posted only on the class-log of the course webpage at www.westga.edu/~jkang/4043.html. Hence, it is essential for you to check the course webpage almost everyday.
  * Email communications regarding the course should be done only in the domain of westga.edu.

- EXAMS/GRADERS:
  * A final answer without showing procedure won’t earn any credit in homeworks or exams.
  * No calculator during the exams.
  * No extra credit!
  * Curving: The exams will be quite standard, hence probably any curve won’t be needed. However, exams can be graded on a curve at most by 3-4 points depending on the difficulty of the exam and the overall performance of the class. The curve will be announced after grading is complete. There will be no additional curving at the end of the semester.

- ATTENDANCE: I don’t count attendance in each class. However, if you miss weekly quizzes in a row in the beginning of the semester, your attendance will be recorded as “never attended” on BadWeb.

- CLASSROOM BEHAVIOR: You are expected not to disturb your classmate’s learning.

Advice for Students: There are eight levels of mathematical understanding, according to Dudley:

1. Being able to do arithmetic.
2. Being able to substitute number in ‘formulas’.
3. Given ‘formulas’, being able to get other ‘formulas’.
4. Being able to understand hypotheses and conclusions of theorems.
5. Being able to understand the proofs of theorems, step by step.
6. Being able to really understand proofs of theorems: that is, seeing why the proof is as it is, and comprehending the underlying ideas of the proof and its relation to other proofs and theorems.
   - 6 1/2. Non-trivial applications of math can be placed here.—-
7. Being able to generalize and extend theorems
8. Being able to see new relationships and discover and prove entirely new theorems.

- Calculus courses focus on level 1&2.
- Lower level undergrad math courses (such as elementary linear algebra) focus on 3&4.
- **Math 4043 focuses on 3,4,&5 with some of 6.**
- Levels 5&6 are considered as basic mathematical abilities for math majors.
• Levels 7&8 are researching mathematics.

**Remember that number theory is not arithmetic but proof-based mathematics!!**