Math5383 Number Theory

Min Ru

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Course Format: On-line through WebCT. This course will follow such path: experimental part normally comes first and theoretical part follows. We will do experimental part by using the ”Web Lab”(Please ignore Maple Lab and mathematica Lab). This course covers 12 Chapters. Each chapter contains four parts: Prelab, Web Lab, Chapter Summary, Supplementary materials, Homework and review. You should spend, for each Chapter, one day on Prelab, Web Lab, two days on Chapter summary, one day on Supplementary materials, and one day on Homework and Review. Materials will be posted on the Web each week.


Prerequisites: None

Grading Policy: Homework 25% ,Midterm Examination 35%, Final Examination 40%.

Homework: Homework will be assigned right after we finish the materials for each chapter. Every time, the due date is different. Homework must be handed in by the due date (before 5:00pm) – by e-mail or by FAX (713-743-3505) or in person. Late homework will not be accepted.
Exams: Open book, any notes and homework. Midterm exam is on Saturday March 13, at PGH674, 8:30am-11:30am. The final is on Saturday, May 1, at PGH674, 8:30am-11:30am.

Course Description: Number theory is a subject that has interested people for thousand of years. This course is a one-semester long graduate course on number theory. Topics to be covered include divisibility and factorization, linear Diophantine equations, congruences, applications of congruences, solving linear congruences, primes of special forms, the Chinese Remainder Theorem, multiplicative orders, the Euler function, primitive roots, quadratic congruences, and representation problems. The method of presentation in this course is quite different. Rather than simply presenting the material, students first work to discover many of the important concepts and theorems themselves. After reading a brief introductory material on a particular subject, students work through electronic materials that contain additional background, exercises, and Research Questions, using Java applets. The research questions are typically more open ended and require students to respond with a conjecture and proof. We then present the theory of the material which the students have worked on, along with the proofs. The homework problems contain both computational problems and questions requiring proofs. It is hoped that students, through this course, not only learn the material, learn how to write the proofs, but also gain valuable insight into some of the realities of mathematical research by developing the subject matter on their own.

Instructor Information: Dr. Min Ru obtained his Ph.D from the University of Notre Dame in 1990. He is currently Professor of Mathematics at the University of Houston. Before joining the University of Houston in 1995, he was Benjamin Pierce Assistant Professor at Harvard University. His research work primarily concerns Complex analysis, Diophantine approximation in number theory and Differential geometry.