Math 311w Section 004, Autumn 2017
Concepts of Discrete Mathematics

Where and When: Bouke 307, MWF, 09:05 - 09:55
Teacher: Timothy Reluga, Associate Professor of Mathematics and Biology
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Office hours: Wednesday 2 - 3 pm, walk-ins, and appointment arranged by email
Course Web page: http://www.math.psu.edu/treluga/311w

Course Description

This course introduces students to the use of mathematics as language. Using a theorem-proof framework much like that used in Euclid's geometry textbook 2 millennium ago, we will study elementary number theory from ancient to modern results including modular arithmetic, set theory, formal logic, groups, and other discrete-math topics. Applications include RSA encryption and error-correcting codes. **Prerequisites**: Students must be comfortable with algebra and rational numbers, including solving linear equations.

Textbook

Numbers, Groups, and Codes , second edition, by J. F. Humphreys and M. Y. Prest. The course will cover chapters 1 through 5, plus some lecture material not in the textbook.

Grading

The final grade will be assigned by a function $G(x)$ that takes scores of x points out of 460 points.

$$G(x) = \begin{cases} \text{A if } 429 \leq x \leq 460 \text{ pts}, & \text{A- if } 414 \leq x < 429 \text{ pts}, \\ \text{B+ if } 398 \leq x < 414 \text{ pts}, & \text{B if } 383 \leq x < 398 \text{ pts}, \\ \text{B- if } 368 \leq x < 383 \text{ pts}, & \text{C+ if } 352 \leq x < 368 \text{ pts}, \\ \text{C if } 322 \leq x < 352 \text{ pts}, & \text{D if } 276 \leq x < 322 \text{ pts}, \\ \text{F if } 0 \leq x < 276 \text{ pts}, & \end{cases}$$

Grades will be based on two term exams (100 points each), a final exam (150 points), 6 in-class quizzes (10 points each), and 3 short-essay writing assignments (20 points each). The lowest quiz grade will be dropped. The first exam will be September 29th in class, the second will be November 3nd in class. Quizzes will be given on Fridays at the beginning of class. There will be no make-up quizzes. The time and location of the final exam is not yet determined.

Learning goals

After this course, you will recognize basic discrete-math concepts and provide clear and precise factual arguments for why the presented results are true and the algorithms studied work. This includes being able to read and write a mathematical proof.
To assist you in reaching these goals, I will lecture in class on the course material. You are expected to read the textbook as well on your own time. Homework problems will also be suggested. You should do these problems and check your own answers. I will happily answer questions about homework problems in class. Testing, in the form of quizzes, essays, and exams will be given to encourage you to keep up with the material and to assess your progress as the semester progresses.

Course Outline

Midterm Exam 1 : Number theory, modular arithmetic, RSA Encryption (Chapter 1)

Midterm Exam 2 : Logic, sets, relations, functions, digraphs (Chapters 2 and 3)

Final : Exams 1 and 2 material + group theory and codes (Chapters 4 and 5)

Homework

Reading and homework assignments will be posted weekly on the class web page. Optional homework problems will be written or online for practice, but will generally *not* be graded.

Academic integrity

All Penn State Policies regarding ethics and honorable behavior apply to this course. I embrace puritanical righteousness.

Disability accommodations

In order to receive reasonable accommodations, you must contact the appropriate disability services office at the campus where you are officially enrolled, participate in an intake interview, and provide documentation: See documentation guidelines http://equity.psu.edu/sdr/guidelines. If the documentation supports your request for reasonable accommodations, your campus disability services office will provide you with an accommodation letter. Please share this letter with your instructors and discuss the accommodations with them as early as possible. You must follow this process for every semester that you request accommodations. For further information, please visit Student Disability Resources website http://equity.psu.edu/sdr/.

Counseling services

Many students at Penn State face personal challenges or have psychological needs that may interfere with their academic progress, social development, or emotional wellbeing. The university offers a variety of confidential services to help you through difficult times, including individual and group counseling, crisis intervention, consultations, online chats, and mental health screenings. These services are provided by staff who welcome all students and embrace a philosophy respectful of clients cultural and religious backgrounds, and sensitive to differences in race, ability, gender identity and sexual orientation.

- Counseling and Psychological Services at University Park (CAPS) (http://studentaffairs.psu.edu/counseling/): 814-863-0395
- Counseling and Psychological Services at Commonwealth Campuses (http://senate.psu.edu/faculty/counseling-services-at-commonwealth-campuses/)
- Penn State Crisis Line (24 hours/7 days/week): 877-229-6400
- Crisis Text Line (24 hours/7 days/week): Text LIONS to 741741

Educational Equity

Consistent with University Policy AD29, students who believe they have experienced or observed a hate crime, an act of intolerance, discrimination, or harassment that occurs at Penn State are urged to report these incidents as outlined at http://equity.psu.edu/reportbias/