Syllabus for MAT 312: Applied Algebra

Stony Brook University, Summer 2019

In this course, we will explore topics in elementary number theory, group theory, and polynomial rings with a view towards developing rigorous mathematical argumentation and presentation. We will also consider some applications of algebra to areas such as cryptography and error-correcting codes.

Instructor: Sam Auyeung
Lectures: TuTh 9:30am-12:55pm, Harriman Hall 111
Email: shamuel.auyeung@stonybrook.edu
Office: Math Tower, SL-240A
Office Hours: Tuesdays, 1 - 2 pm

Textbook: *Numbers, Groups and Codes* (2nd edition) by Humphreys and Prest.

Homework

Each week you will have one set of exercises and possibly, some problems. The exercises should be straightforward while the problems may be more challenging. Each assignment will be posted on Blackboard on a Tuesday and will be due the following Tuesday, **at the beginning of class**. In general, the exercises will be graded generously while the problems will be graded with higher expectations. Only some of these exercises/problems will be graded but you will not be told which ones: you are supposed to attempt all of them. **No late homework will be accepted** (you may email the homework if you cannot make it to class).

Exams

There will be one midterm and a final.

- Midterm: Tuesday, July 30 (in class)

- Final Exam: Thursday, August 15 (in class)

The exams will have a variety of questions involving computations, stating theorems, and proofs.

There will be no make-up exams except in very special circumstances. Calculators will **not** be allowed during exams. However, you are free to use a calculator when learning the material or doing the homework. Try to avoid becoming dependent on your calculator!

Grading scheme

- In-Class Participation = 10%

- Homework = 25%

- Midterm = 25%

- Final Exam = 40%

Topics

Some topics to be covered in the course:

- Fundamental Theorem of Arithmetic, Modular Arithmetic

- Multiplicative Structure and Applications to Public Key Cryptography

- Groups, Subgroups, Permutation Groups

- Lagrange's Theorem and Burnside's Theorem

- Isomorphism Theorems

- Error-Detecting and Error-Correcting Codes

- Polynomials, Fundamental Theorem of Algebra and Field Extensions

For more details on course content, see the course webpage on the Stony Brook Math Department webpage.

Disability Support Services (DSS) Statement

If you have a physical, psychological, medical or learning disability that may impact your course work, please contact Disability Support Services, ECC (Educational Communications Center) Building, room 128, (631) 632-6748. They will determine with you what accommodations, if any, are necessary and appropriate. All information and documentation is confidential. Students who require assistance during emergency evacuation are encouraged to discuss their needs with their professors and Disability Support Services. For procedures and information go to the following website: http://www.stonybrook.edu/ehs/fire/disabilities.

Academic Integrity Statement

Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty are required to report any suspected instances of academic dishonesty to the Academic Judiciary. Faculty in the Health Sciences Center (School of Health Technology and Management, Nursing, Social Welfare, Dental Medicine) and School of Medicine are required to follow their school-specific procedures. For more comprehensive information on academic integrity, including categories of academic dishonesty, please refer to the academic judiciary website at https://www.stonybrook.edu/commcms/academic_integrity/.

Critical Incident Management Statement

Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of Judicial Affairs any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn. Faculty in the HSC Schools and the School of Medicine are required to follow their school-specific procedures.

Conduct

Stony Brook University expects students to maintain standards of personal integrity that are in harmony with the educational goals of the institution; to observe national, state, and local laws and University regulations; and to respect the rights, privileges, and property of other people.