Math 3096 Writing Project

The roots of modern algebra extend deep into the past, but perhaps surprisingly, most of the current concepts and ideas were not made precise until the early 20th century. In this course you will get a taste of some of the ideas of modern algebra, how they connect to the algebra you learn in high school, and some of the history of these ideas. In order to appreciate more fully the history and concepts in abstract algebra, as well as to meet the writing intensive requirements of this course, you will be required to do a research project.

Project requirements

Your research project will be done in a group of 3 students. Groups will be assigned before the start of the 4^{th} week of class. A list of possible topics will be provided. Together with your group you will select one of the listed topics. (If a group has an idea a topic not listed, you will have an opportunity to present it for approval.)

Your project should consist of 3 components:

1. A brief history leading up to the ideas in your subject.
2. A thorough description of your topic.
3. Some examples and applications of your topic.

Each student in the group is responsible for writing one of those components. Although each is a separate component, your completed project must flow together and each of you is expected to have an understanding of all components. Each of you must use at least two different sources for information, and one of the sources must be an original source (not a textbook in which information is cited). The completed written project must be handed in and can be no longer than 10 pages (approximately 3 pages per section). Your writing must be both grammatically and mathematically correct! In addition, each group will give a 15-minute presentation on your topic to the rest of the class. Due to time constraints, these presentations may be scheduled outside of our regular class meetings.

You will be graded on the project as follows:

- 50% on your individual piece of the write-up. This includes submitting a first draft to the instructor and then following up with at least one revised version. The writing will be graded on accuracy of the content, as well as grammar and mathematical writing.
- 25% will be given to the group for the written project as a whole. Included here are not only the pieces that are graded individually, but also how the project parts come together as a whole. Ideally, the paper should be typeset using software that accommodates conventional mathematical notation.
- 15% will be given to the quality of the group presentation, but you will be given an individual grade here. Each individual must speak briefly and clearly about his or her portion of the project.
- 10% will be given to your meeting deadlines and following instructions regarding sources.

Timeline

- By the start of week 4 groups are assigned.
- By the start of week 5 topics are selected.
- By the start of week 8 everyone must have met with the instructor. At the meeting, at least 2 resources per group must be identified and approved by the instructor. A summary of what you hope to achieve should be given at the meeting.
- By the start of week 10 a draft needs to be given to the instructor for comments. Within a week of submitting the draft, students should meet individually with the instructor for comments and feedback.
- By week 12 a revised version should be submitted to the instructor.
- Presentations will take place during the last 2 weeks of class. The written portion of the project is due at the time of the presentation.

Possible topics

As mentioned previously, this is only a list of suggestions; if you have your own ideas, feel free to tell me.

- Emmy Noether and her contributions to algebra
- Evariste Galois and Galois Theory (see Chapter 12)
- Public-Key Cryptography
- Primality Testing
- Complex Numbers and the General Solution of the Cubic
- Divisibility Tests, Check Numbers, and Modular Arithmetic Applications
- Geometric Constructions (see Chapter 15)
- Algebraic Coding Theory (see Chapter 16)
- The Fundamental Theorem of Algebra
- Algebraic integers and algebraic number theory
- p-adic numbers
- Elliptic curves

Plagiarism

Do not take Tom Lehrer's advice!

Be sure that your writing is your original work in your own words, and that you include all of your sources in your bibliography. If your work is found to have been plagiarized, you will receive a zero for the assignment, and may be reported to the Student Conduct Board.