MATH 495/589/590
HISTORY OF 20th CENTURY MATHEMATICS

Nicholls State University, Summer 2003

Instructor: Brian Heck. My office is 117-A Peltier Hall and my office phone number is 448-4383 (4383 on campus). I will be available for office hours from 10:30 am until 12:00 every day (and by appointment). Please drop by if you have any questions. Also, my email is math-bh@nicholls.edu.

If I am not in my office during my scheduled office hours, then I am wandering the halls of Peltier. Please hang around, or come and find me. If I will be unable to hold office hours, I will put a note on my door.

Text: There is no required text. I will pass out class notes, and then lecture to explain them and fill in more detail. Class will be conducted much like an upper level history course – lecture with much discussion. You will be responsible for all material discussed in class (as well as all material in the notes), so you will need to be present everyday.

Goals of the Course: During this course, I hope to:

1. Help you develop an understanding of the breadth of mathematics.
2. Expose you to recent mathematical trends.
3. Enrich the technical mathematical courses you have had with context.
4. Show you that normal people can discover the most amazing things.
5. Help you by improving your reading, writing, and analytic skills; especially as they relate to mathematics.

Course Description: This is a *history* of mathematics course. Therefore, it is not only mathematics, but history as well. While we will cover the mathematics of the previous century (and you will be expected to understand it), our primary focus will be on its development and context. This is an ambitious theme. Much of the mathematics studied in the last 103 years is still being investigated today, and is therefore quite rigorous. We will nonetheless pursue the origin depth, beauty, and interconnections of this most astounding century.

"The golden age of mathematics – that was not the age of Euclid, it is ours."
Cassius J. Keyser (1862-1947)

We will begin our class in 1900. This was an extremely important time in mathematics as the very foundation upon which mathematics was built was being questioned and redefined. The direction of the coming century of research was to be guided by the outcome of this debate. Notable in this regard is David Hilbert (1862-1943). In 1900, he outlined 23 mathematical problems that he believed should be the primary focus of the mathematical community during the next 100 years. And so they were.

We will explore many problems posed by Hilbert and along the way learn about such classical topics as logic, set theory, and number theory. Then we will tackle more recent fields such as abstract algebra, topology, graph theory and others.

Grading Structure: We will have two exams, many assignments, and a term paper. Each of these four components (2 exams, assignments, and paper) will be equally weighted.

Exams: We will have a mid term exam and a final. Each exam will be in class and closed notes. Exam questions will be of the following types: true/false, multiple choice, short answer, matching, essay, and mathematical. You will be expected to know names, dates, and places (the "who", "when", and "what" of mathematics). But perhaps more importantly, you will need to understand the origins and context (the "how" and "why" of mathematics). Sample exams will be made available prior to each test.

Assignments: You will have an assignment every few days. These will range in style over the various types of problems appearing on the exams. **Assignment #1** is to write me your automathography. Introduce your mathematical self to me. Tell me the course you have taken, which were your favorites and your least favorites. Tell me what in mathematics interests you, why you signed up for this course, and what you expect to get out of it. Are the plans I have for this course different that what you wanted? I encourage you to be creative in your response. Don't just answer these questions; include whatever information you wish. Get this to me (via email or in person) by **Wednesday, June 11**.

Term Paper: This will be due to last week of classes (July 14-18). The topic is up to you. I suggest you discuss this with me (as I retain veto

power over unacceptable topics) as soon as possible. You must turn in to me your selected topic at the latest by **Friday, June 27**. Let's call this **Assignment #2**. By the way, if you have a creative idea for a different semester project (other than a term paper), talk it over with me. If it would require the same amount of effort and express the same amount of understanding, I might agree to let you do it. You will be expected to make a short presentation of your paper on the last couple of days of class.

Your term paper can be neither all history nor all mathematics. It should be self-contained mathematically (do not assume I know what you are talking about). If you have any doubts, let a friend read it. You should use two or more references, and they cannot be web pages. Much of what you read online (if you haven't already noticed) is inaccurate. Your paper should be written using the normal college formatting (regarding spacing, bibliography, etc). If you have any trouble with this, visit the WAC lab in the library. They would be glad to help you and I'm sure they would be trilled to learn that a math class requires writing. The length is up to you. Noted mathematical historian Fred Rickey (from whom I got many of these conventions) once said, "[a paper] has a natural length. You are telling a story which needs a certain background, exposition, and detail. When that is successfully done, stop." Well put. You should turn in two copies so that I may keep one.

I will assign grades at the end of the semester based on the university grading system and my interpretation of it. Namely,

Grade	Interpretation
A	Exceptional mastery of course material with insightful analysis
B	Good mastery of course material with quality analysis
C	Acceptable mastery of course material but limited analysis
D	Weak knowledge of course material or little to no analysis
F	Serious deficiency in understanding of course material

Final Comments: I am looking forward to this semester and to engaging discussions on a variety of topics. By no means is class meant to be all "me talking, you listening." Please feel free to ask questions, express opinions, pose conjectures, and elaborate on areas where you have something unique to offer. In six weeks, we will all be that much richer because of it.