

**Mathematics 495 – The Nature of Modern Mathematics**  
**Section A – Fall 2003**

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<b>Instructor's Home Page</b>	<a href="http://www.faculty.gvsu.edu/sundstrt/">http://www.faculty.gvsu.edu/sundstrt/</a>		
<b>Class Schedule</b>	M W	3:30 – 4:45	2050 Mackinac Hall
<b>Office Hours</b>	Mon. 1:00 – 2:00 Wed. 1:00 – 2:00	Thur. 11:00 – 12:00 Fri. 9:00 – 10:00	
<b>Prerequisite</b>	MTH 210, MTH 227, MTH 310, and at least three other 300-400 level mathematics courses.		
<b>Textbooks</b>	<ol style="list-style-type: none"><li>1. <i>Journey through Genius</i> by William Dunham, Copyright © John Wiley and Sons, Inc., 1990.</li><li>2. <i>Euler, the Master of Us All</i> by William Dunham, Copyright © The Mathematical Association of America, 1999.</li><li>3. <i>The Mathematical Experience</i>, by Philip J. Davis and Reuben Hersch, Copyright © Birkhauser, 1981, reprint edition by Houghton-Mifflin, Inc., 1/14/2003.</li></ol>		
<b>Internet Access and Student e-mail</b>	Most of the materials and information for this course will be posted to the course home page. This homepage is part of one of Grand Valley's internet sites called "GVSU Blackboard." The internet address for the GVSU Blackboard System is <a href="http://bb.gvsu.edu">http://bb.gvsu.edu</a> . (A link to this page is also on the instructor's home page.)		

**Students are expected to check the course home page daily since the course schedule and assignments will be posted on this home page. Students are also expected to use the e-mail provided by GVSU as the instructor will frequently send e-mail messages to the entire class.**

## Grading for the Course

### Reading Assignments and Classroom Discussion (15% of the course grade)

For most class meetings there will be a significant reading assignment together with several questions, which will require written responses. These responses will be collected at the start of class and graded on a “done/not done” basis. The questions will be the central focus or launching point for the day’s discussion. There will also be a daily participation grade for contributing to the discussion in class. Everyone will have the opportunity to participate at least once each day.

### Assignments (20% of the course grade)

There will be four major homework assignments in the course, due roughly every third week. These will cover some of the major mathematical ideas in the course. Each student will turn in individual work on these assignments.

### Essays (15% of the course grade)

There will be at least four short essays assigned in the course. Each of these will focus on the nature of mathematics and ask you to think deeply about matters on your own. Typically, such an essay will be two to three pages in length. More details will follow when appropriate.

### Team Project (20% of the course grade)

In teams of 2 students, a major semester-long project will be completed. This project will involve the selection of an important topic/person in the development of modern mathematics, researching the nature, history, and implications of the idea, and then writing a substantial paper on the topic. More details will follow in a separate document.

### Examinations (35% of the course grade)

The midterm and final exams will focus on the key mathematical ideas from the course and their development. The reading questions, the work required in the assignments and essays will be guides to the types of questions and problems that will be on the exams. Each exam will also include at least one essay question on some concept central to the nature of modern mathematics. The midterm exam is tentatively scheduled for Wednesday, October 22, 2003, and the final exam will be given Thursday, December 11, 2003 from 2:00 to 3:50.

### Course Grades

Grades for the courses will be no lower than the grades determined from the following scale:

Grade	Minimum Score	Grade	Minimum Score
A	90%	C+	74%
A-	87%	C	70%
B+	84%	C-	67%
B	80%	D+	64%
B-	77%	D	60%

## **Expectations for the Course**

This is the capstone course for the mathematics major. You will be expected to spend a great deal of time writing and rewriting your essays, assignments, and project, and you will be responsible for the mathematical content in this course. The most important rule for this course is that **you cannot get behind in your work!!** Always stay up to date with the material in this course. **Make succeeding in this course a priority.**

### **Attendance**

Because this is a discussion-based course, attendance in class is critical to your success in this course. You are expected to be present and on time each day we meet. You are responsible for announcements made in class concerning material covered, assignments, changes in the syllabus or due dates, or anything else pertinent to the course.

### **Preparation and Participation**

It is imperative that you work on a consistent basis. This applies to both the day-to-day work to prepare for class as well as the more long-term work such as the essays, assignments, and project. You should keep a well-organized record of your study notes, completed problems, and problems in progress for future reference. You must understand that a great deal of your learning in this course must occur on your own. It is your responsibility to read the text, do the problems, be prepared for class, and to seek help as needed.

We are fortunate to have three wonderfully written books to consider in this course. Please understand that this is a course based in reading and discussion. The mathematics in each book is very accessible, and the reading surrounding the mathematics is central to understanding the nature of the subject we are considering. Everyone must devote substantial time to carefully reading these books in accordance with the assignments in order to come prepared to class to discuss the subject for the day. In every class meeting, every student will be expected to participate aloud at least once.

### **Due Dates**

All due dates for the course will be strictly enforced. It is expected that all assignments will be turned in by the due date. No late work will be accepted without prior approval from the instructor.

### **Honor System and Academic Honesty**

It is expected that students will not have given nor received unauthorized aid in any work that is submitted for a grade in this course. Please refer to and carefully read the policy on academic honesty and plagiarism included at the end of this syllabus. Note well the penalties for such behavior in the course. On every assignment, I reserve the right to discuss the nature and origins of your work with you prior to awarding a grade on the work.

### **Graded Work and Mathematical Typesetting**

I expect your very best on all graded assignments. All course writing should adhere to the writing guidelines and principles established in MTH 210. For papers to be handed in, please use pencil on loose-leaf paper, stapled if there is more than one page. Typeset work is required for the assignments, essays, and project.

## Standards and Expectations for Written Graded Work

The following guidelines apply particularly to graded homework problems, essays, and the semester project.

1. For the reading questions, you may choose to either provide neatly written work on loose-leaf paper or typeset your solutions in Word or LaTeX. Please use loose-leaf paper, rather than the fuzzy stuff from a spiral bound notebook. Submissions with more than one page must always be stapled (with one staple in the upper left corner), not paper-clipped or otherwise connected.
2. The assignments, essays, and project must be typeset. You may choose to use the Equation Editor in Word to enter mathematical symbols, and you are required to use correct mathematical notation and syntax as demonstrated in the text and in class. The mathematical typesetting language LaTeX may provide a more appealing alternative to Word. More information on this should be available in class at a later date.
3. For problems on the assignments, be certain that a statement of the problem you are solving is included before you begin your solution. Ideally, you will provide this in your own words. In all cases, the solution of the problem must be given in context so that anyone reading the problem knows what the question is without access to the original problem statement.
4. In every graded assignment, reasoning counts! While “the” answer is important, I consider *how you found your answer* even more important. In every graded response in the course (assignments, essays, project, and exams), you are expected to document your reasoning and demonstrate an argument that justifies your conclusion.
5. If you use a theorem/result from our books, cite it by name or number, including the page on which it was found. If you look up a result from a previous class, clearly cite where the result came from in your notes or textbook.
6. It is always essential that you use proper grammar, complete sentences, and correct spelling. Always proofread your work thoroughly. Use a spell checker for work that is done using a word processor.
7. On any assignment, if you collaborate with peers, please clearly indicate their names on the paper next to the relevant problems or ideas that they were involved in.
8. Overall, the expectation is that, in every assignment, you will strive to implement the professional mathematical writing standards that we teach and learn in MTH 210 (and use in subsequent courses). In each case, your very best work is expected. If you have any questions about how to present an idea or result, I would be glad to discuss that with you at any time well-prior to when the assignment is due.

## Academic Honesty and Plagiarism Policy

In this capstone course, the primary goal is to get you to think personally about all that you have learned in the process of majoring in mathematics. Explicitly, the point is for you to deepen your own understanding and to gain individual appreciation and insight regarding the nature of mathematics.

As such, all of the work that you complete must be your own. Note well that I am interested in what **you** think of the subject, both on matters opinion-related (such as the essays) and matters proof-related (such as the assignments). In everything that you write, I will be looking to find your personal understanding and development in the course of studying the material. To be clear, I have no interest in you emulating the work of one of your classmates, replicating the efforts of a student from a prior semester in 495, nor in work taken from an external resource such as a textbook or Internet site. All of this is to say that your work must be completed with the highest level of academic honesty and integrity, and that plagiarism will not be tolerated.

This document establishes our guidelines for the semester regarding academic honesty and plagiarism, hopefully setting appropriate boundaries for each student so that we can achieve the goals stated above for personal learning and understanding. This policy is in effect for all students in MTH 495 for the duration of the term. Please be sure to read it carefully and to honor it accordingly.

**Definition** *Plagiarism* is the act of submitting the work of someone else as if it were your own. Specifically, this action intends to mislead the instructor to think that the work is the result of learning accomplished by the student named on the paper.

(For example, Dr. Matt Boelkins wrote the material on standards and expectations and on plagiarism in this syllabus for MTH 495 courses last year. I have modified it somewhat for this semester, but since the material that Dr. Boelkins wrote is very well suited for this course, I decided to use his documents rather than writing something new.)

While there are many terrible things about plagiarism, the worst may be that committing the act once will call into question **all** of your work in a course. In addition, in an environment where students engage in academic dishonesty, the instructor is forced to look at everyone's work and question it. This is particularly unfair to the students who are doing honest work.

The following are guidelines for avoiding plagiarism in course assignments. The list is representative, but not exhaustive. Evidence of such behavior on any assignment will be grounds for a minimum penalty of zero on the entire assignment. In severe cases, the penalty will be failure of the course. In all cases, the guidelines established in the GVSU catalog and GVSU student code will be followed. I reserve the right to discuss the nature and origins of any assignment with you prior to awarding a grade on the paper.

1. On the assignments, every sentence that you write should be one that you have generated yourself and that you understand. While you are permitted to collaborate on big ideas and

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hints on problems with classmates, you must be working alone when you write your solutions. All collaboration with homework problems must occur with students in this class who are currently at the same stage of problem solution as you.

To be clear, suppose that you asked 4 different students in the class “How did you do problem 4?” You did this at a time when you had made no personal progress on the problem, and you asked until you found someone who both had the problem completed and was willing to give you a route to the solution. Such an act constitutes plagiarism, for the work is simply not your own. On the other hand, it is entirely fine to work with one or two peers who are similarly stuck and to “put your heads together.”

Do note that your instructor is generous with hints and is always willing to discuss problems with you. While I will never simply give you the answer, I will offer direction and guidance that will assist you in coming to a solution on your own.

2. On the assignments, the primary resources you should use are our three course books. If you look up relevant review material from a past mathematics course (e.g. calculus or MTH 210), you should cite the book you used and the specific pages you considered. You are not, however, permitted to go looking for completed solutions to current homework problems in any other texts or resources.

*In particular, using the Internet is completely off limits for homework assignments.* Evidence of using Internet sources in your work will result in a minimum penalty of failure of the assignment.

3. The course essays on the nature of mathematics are to be completely your own work. You should not discuss your written work with classmates, nor should you ever share your writing in electronic format. Moreover, if you use any external sources in writing an essay (for ideas, historical facts, or specific quotes), you must clearly cite your efforts. *Copying even one sentence from an uncited source (including a peer) will result in a minimum penalty of failure of the assignment.*
4. On the course project, everyone must be certain that sources are cited appropriately. Here, your job really is to use a wide range of sources, to digest them, and then report (in your own words) what you have learned. All non-quoted sentences must be written in your own words and sufficiently paraphrased. If you choose to take a sentence directly from a source, it must be quoted and cited. Each paragraph that results from your research into ideas should have appropriate citations with source and page numbers.

On the course project, you are working as part of a team. As such, it is assumed that each of you is putting in roughly 50% of the work. While it is impossible to make the workload exactly even, it should not be the case in your project that, say, one person did 80% of the work and the other 20%.

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If the workload is unevenly distributed, it is the responsibility of each person in the group to divulge this to me on their peer and self-assessment. This is especially so for the person not contributing their fair share to the work. In this event, individual project grades will be adjusted appropriately. It is an act of plagiarism if you put your name on a project paper on which you have not made substantial contributions.

5. On any assignment, it is an act of plagiarism to base your work on the efforts of a friend or acquaintance that has completed the course in a prior term. Be advised that in many instances, other instructors have kept copies of essays, homework assignments, and semester projects and I will be able to access them. I am well aware that students often share past exams, homework assignments, and more with one another. But, such sharing strives to defeat the point of the course for those of you registered this term, and therefore is not permitted. If you have any such materials in your possession, please return them immediately to their rightful owner. Use of such materials in your work this semester is grounds for failure of the course.

Again, the entire point of any course is for you to learn, grow, and mature as a student. Such development can only happen in an environment of academic honesty. I expect that each of you will adhere to these guidelines and that you will play active roles in encouraging your peers to do likewise. At any time, you are welcome to discuss with me questions or concerns that you have regarding this policy, your own work, or the work of your peers.