

MA 1117.190 W

Math and Culture
Instructor: Dr. Cathy D'Ortona

Summer 2009

Office: Elliott Hall 212-B

Phone: 570-662-4703

Email: cdortona@mansfield.edu

Office hours: Via Blackboard & E-mail, and by appointment.

*Quizzes and tests must be taken on specific days, but not at specific times.

Class time: Whenever*

Class location: Wherever

Credits: 3

Texts: *Mathematics for Non-Mathematicians* by Morris Kline (ISBN 0486248232)

Journey through Genius: the Great Theorems of Mathematics by William Dunham (ISBN 014014739X
for paperback or 0471500305 for hardcover – either is fine.)

Both are available in the Bookstore and through sources such as Amazon, Half.com, etc.

Course Content and Purpose: In this course we will read, discuss, and write about mathematics, mathematicians, and their roles in the larger society. Unlike many other courses offered by the department; it is not designed to develop mathematical skills, *per se*. Instead, we will try to gain a better understanding of what mathematics is and why it is important to all members of society. In the process, we will often discuss issues in the fields of history, science, and philosophy. You are encouraged to ask questions and bring whatever outside knowledge you have to our discussions.

General Education/Portfolios: This class satisfies the mathematics general education requirement. It may be that I will collect “artifacts” from you for the purpose of assessing the general education program, as described in the Undergraduate Catalog. Items from this course that might be appropriate for this purpose include the longer writing assignments (as examples of communication and possibly critical thinking) and the Logic exercise that you will complete near midterms (as an example of analysis and critical thinking). Any “artifacts” collected will have names removed before they are seen by anyone besides myself.

Grading: Your course grade will be based on the following percentages.

Quizzes and class participation:	20%
Short writing assignments:	20%
Longer writing assignments:	20%
Midterm (Thursday 6/5):	20%
Final (Tuesday 6/26)	20%

Getting Started: First, read through this syllabus. The last two pages comprise a summary of what you will be doing in the course. For each day’s “class,” you should look under Lectures/Daily Classes/ to find the day’s date. There will be PowerPoint presentations for each day, along with reminders about papers, quizzes, and other assignments. Full descriptions of the various assignments can be found under the Assignments button. Before submitting any assignments via email, please make note of the File Naming Conventions described under the Assignments button on Blackboard. Please *do not use Digital Dropbox*. I will not check there for documents!

Reading and Discussion: You will do a great deal of reading (as compared to other math classes) in this course. (On the other hand, you will have no problem sets to do, except in the section on Logic.) It is important that you read the assigned selections, take notes on what you have read, reflect on the readings, and discuss the material with others. I will post daily “class notes” that reflect, in part, classroom discussions from previous face-to-face offerings of this course; I strongly encourage you to discuss the readings with each other. It is important that you understand that skimming the readings is not sufficient. You need to take the time to take good notes and really think about what you have read so that you are prepared to discuss the readings in class.

Taking Notes: Taking good notes is a learned skill. On Blackboard you will find a copy of my notes on selected readings. I hope this example will help you learn to take better notes. (Your notes do not have to look like mine. If you find that another style of note-taking is working well for you, by all means continue using it.) Quizzes will consist largely of material from the reading that I consider important enough to be in your notes; if the answers to the quiz questions are not usually in your notes, that is an indication that you need to revise your note-taking strategy.

Some students have found it useful to indicate in the margin of their notes the corresponding page numbers from the text. It may also be helpful, especially for exams, to number the pages of your notes and make an index for them.

Testing: There will be frequent quizzes (Tuesdays and Thursdays), a midterm, and a final exam. The quizzes and exams will be "open notes" **and** "open book." However, looking through the book may be more time consuming than looking through your notes, especially if taking notes on your reading helps you to read more carefully. Thus, you are **strongly** encouraged to take notes on your reading. Open-notes tests have their own difficulties. You will quickly accumulate a large volume of notes. **You cannot expect to have time on a quiz or exam to look up the answer to every question.** The questions I ask will be on the most important points of the reading, and you should be able to answer a fair number of them on your own.

Quizzes and exams will be given online in the Blackboard environment. Each will be password-protected and time-limited in both senses. That is, there will be a limited window when the quiz or exam is available to be taken – I will ask for your input/availability before setting this window, which will be at least 12 hours long – and also a limited amount of time that you can actually spend working on the quiz or exam once you start (35 minutes for quizzes and longer for exams). For the midterm and final I will also offer the *opportunity* to take the exam on campus in a classroom setting (that is, on paper). This may be preferred if you have not felt comfortable taking quizzes online, have a slow connection to Blackboard, or are particularly concerned about a server crashing during your exam.

Writing: Since this is a "W" course, writing will be a significant part of the course. Writing assignments should be submitted as email attachments (in MSWord – any edition – or in RTF format if you are using a different word processor) and will include:

A "mathematical autobiography" (1 – 2 pages)

A definition of mathematics

Two "biographical sketches" – a form will be provided.

Other short writing projects

Essay questions on the exams

Three longer writing assignments, as listed below. ***Regardless of your numerical average, you must turn in at least two of these three assignments in order to pass the course.***

<u>Paper</u>		<u>Due</u>
Paper #1	(100 points)	5/30
Paper #2	Part 1 (75 points)	6/13
	Part 2 (50 points)	6/23

The first paper should be a discussion of the mathematics of a particular period or culture (e.g., Mathematics of the Renaissance, Chinese Mathematics), or of the development of a particular branch of mathematics (e.g., Geometry, Statistics), or of applications of mathematics to a particular field (e.g., Mathematics of Art, Mathematics in Education). The second two papers form a "written debate." A choice of topics will be provided. Detailed descriptions of all the papers are available on Blackboard.

Attendance: Because you will not be attending class in the usual sense, you will bear an increased responsibility for keeping up with the material. We will make use of the Discussion Boards on Blackboard to simulate classroom discussion and participation.

Intellectual Honesty: Because you will be doing research papers for this class, it is important that you have a clear understanding of proper documentation. **I do expect you to reference your sources (for both direct quotes and paraphrased material).** For your citations, you may use parenthetical references in the body of the text, footnotes, or endnotes. (If you use parenthetical references, you should designate a **short name** for each website to be used in place of the author's name in these references. **Do not** use the entire web address for each reference! The entire web address **should** appear on your bibliography page, along with an indication of the short name you used for your citations and the date you accessed the page.)

Correct citations will be easier if you take notes as you read and note the source (including page number) for the information as you take the notes. That way you don't have to hunt back through your sources once you decide what material will end up in the final paper. I find it helpful to take notes verbatim (word-for-word). Then when I write the paper I can paraphrase without fear of accidentally reverting to the original wording. You may use any standard format for your references that you choose – MLA and APA styles are most common.

As a rule of thumb, **you should have a citation for any information you did not know before you began your research. For the first two papers for this class, that will most likely mean at least one citation per paragraph for essentially the whole paper.** (If all the information in a paragraph came from the same source, one citation at the end is sufficient. If several successive paragraphs came from the same source, each paragraph should still have its own citation.)

Remember: If you put the information in your own words (which you should do as much as possible), a citation is required. If you are quoting, a citation is required *and you must also show that you are quoting by using quotation marks or an accepted long-quote format.* Please note that the citation itself is not part of the quotation.

If you have any doubts whatsoever about the way you are citing your sources, check with me or one of the people at the Writing Center in Hemlock Manor to be sure you are doing it correctly. Once your paper is turned in, ignorance of the rules is not an acceptable excuse.

The first time you turn in a paper with unacceptable citations, it will be returned to be rewritten and resubmitted. You will receive no grade until you do so, and your paper will be penalized for being late. If you do it a second time, academic dishonesty papers will be filed with the Provost's Office.

I have posted a statement about intellectual honesty on Blackboard (under the Assignments button). You are required to *copy it out by hand* and submit it to me. This can be done in person, by mail, by FAX, or by scanning the document and emailing the file(s) to me. The purpose of this assignment is to guarantee that you are aware of these policies.

Web Source Policy: You may not use "Wikipedia" for papers in this course. "Wikipedia" is an open-source site. This means that *anyone* can add information to entries there. Thus, the potential for finding rumor and hearsay reported as fact is even greater there than is usual on the web. By extension, you may not use any other open-source sites, as well.

For papers where the number of Internet sources is limited: If you find journal articles or full-text books or chapters via a web search, those sources count as articles or books, not as Internet sources. The librarians can assist you in finding such high-quality online sources.

Final Exam Policy: It is possible to be excused from the final exam under the following circumstances: You must have perfect or near-perfect attendance. You must have an A average going into the final, and *this score must be strong enough that a final exam score 20 points below your midterm exam score would still leave you with a letter grade of A*. When I return the first part of the Debate, I will begin informing students who are on track to be eligible for this opportunity.

Cultural Diversity: Mathematics as a body of knowledge is the culmination of efforts by many people from many cultures over several millennia. The contributions of individuals of different cultures, races, genders, and creeds are all important and will be discussed in this course. The mathematics itself transcends all of these human divisions.

Exceptionalities and other issues: Any student having special needs or desiring extra challenges should see me as soon as possible to make suitable arrangements. I will make every effort to accommodate such needs and to make the learning experience satisfying and rewarding for each student. Any students with documented psychological or learning disorders or other significant medical conditions that may affect their learning should work through Mr. William Chabala in our Counseling Center (143 South Hall; Phone: 662-4695 or 662-4436; email: wchabala@mansfield.edu) to provide me with the appropriate letter so that I may serve their particular needs more effectively. If you have an exceptionality that requires class or testing accommodations, Mr. Chabala will work with us to identify and implement appropriate interventions.

The Counseling Center is also an excellent resource for any student who is dealing with personal or family issues or simply having difficulty adjusting to college life. The counselors there are highly skilled professionals who are experienced in the ways a student's personal and academic issues can interact. Your student activity fees have already paid for this resource to be available to you. Please don't hesitate to contact the Counseling Center if you need help or advice. I will be happy to help you set up an appointment if you would like me to do so.

Reading and Other Assignments

This is the schedule of reading assignments from the two texts, by Morris Kline and William Dunham. Please have the reading for each day completed on time. I will often remind you of these assignments, but you are responsible for them, even if I do not remind you. Most of the quizzes will be based on this material, along with the lectures.

Class #	Date	Kline	Dunham	Topics Covered	Assignments Due
1	May 18	None	None	Syllabus Blackboard orientation	“Quiz 0” * Brainstorming
2	May 19	1-28 39-44	v-viii	Historical Overview Mathematical Reasoning	Quiz 1 Brainstorming
3	May 20	45-54	1-26	Dunham Chapter 1	Mathematical Autobiography Brainstorming
4	May 21	58-75		The Pythagoreans The Irrationality of $\sqrt{2}$	Quiz 2
5	May 22		37-44 48-60	Dunham Chapter 2	Definition of Mathematics
6	May 26	75-91		My Hero, Zero Axioms of Number & Number Bases	Quiz 3
7	May 27	123-136 149-150		Euclidean Geometry	Intellectual Honesty Statement (Must be <i>received</i> before I will grade your research papers.)
8	May 28		73-83	Dunham Chapter 3	Quiz 4
9	May 29	153-163		Alexandria & Trigonometry Latitude & Longitude	First Paper
10	June 1	165-175	84-112	Charting the Heavens & Earth Dunham Chapter 4	YHM Sketch
11	June 2	187-202	113-118 127-132	The Fall of Greece & the Dark Ages Dunham Chapter 5	Quiz 5 Topic Preferences for Debate due
12	June 3	202-229		The Renaissance The Mathematics of Art	Be sure to have your copy of Kline handy for this material.
13	June 4	None	None	Midterm Exam	Midterm Exam
14	June 5	232-248		Projective Geometry Conics & Duality	None

15	June 8			Logic, Part I	Have the Logic Handout handy.
16	June 9	250-256	133-142 151-154	Logic, Part II Dunham Chapter 6 Coordinate Geometry, Part I	Quiz 6
17	June 10	256-278		Coordinate Geometry, Part II	Math as Language Essay
18	June 11	280-292 326-330		Logic, Part III Galileo Heliocentric Universe, Part I	Quiz 7
19	June 12	330-345 359-361		Heliocentric Universe, Part II Newton & Gravity	Debate, Part I
20	June 15		155-160 177-183	Logic, Part IV Dunham Chapter 7	None
21	June 16	356-385 388-389		Logic, Part V Calculus, Part I	Quiz 8 Have Calculus Handout handy.
22	June 17	394-397 404-409 412-413	184-196	Calculus, Part II Dunham Chapter 8	Möbius Activity
23	June 18		207-212 223-225 235-244	Dunham Chapter 9 Dunham Chapter 10	Quiz 9
24	June 19	452-476		Non-Euclidean Geometry Hamilton and the Quaternions	Logic Exercise (from handout)
25	June 22	499-520		Statistics, Part I	Debate, Part II
26	June 23	522-532 541-556		Statistics, Part II Probability	Quiz 10 YCM Sketch
27	June 24		245-266 285-286	Dunham Chapter 11 “Loose Ends”	
28	June 25	None	None	Final Exam	Final Essays

* “Quiz 0” does not count as a quiz grade. It is an overview of the material covered in the course. You should not expect to know many answers at the beginning of the course. You will have an opportunity to retake it later and see how much you have learned. The main purpose of taking this quiz on the first day is to identify any technical difficulties with taking quizzes. Thus, it is very important that you do take the quiz to help ensure that all goes smoothly with the first “real” quiz on May 19!