

MATH 101: Introduction to Mathematical Sciences Fall 2009

Section 1: **TR 1:20 pm - 2:35 pm**, Frey 243

Section 2: **TR 2:45-4:00 pm**, Frey 241

Instructor:

Robert Shannon
Frey 237 D
(717) 796-1800,x2471
RShannon@messiah.edu

Office Hours:

Tuesday & Thursday, 12:00 – 1:15 pm

Text:

Excursions in Modern Mathematics, by Peter Tannenbaum, 6th edition,
Pearson/Prentice Hall, Upper Saddle River, 2004. ISBN 0-13-187363-6.
(note 6th edition)

Course Objectives:

This course is designed to introduce students to systematic, mathematical thinking as it applies to classical problems in the history of mathematics and as it connects to modern society. We will study topics in the following area:

Voting

Methods for determining a winner in a decision-making process..

Fair Division

Methods of fairly dividing both discrete and continuous goods..

Graph Theory

Types of mathematical graphs, planar graphs, graph coloring, matrices & graphs, circuits, trees, and digraphs..

Population Growth

Characteristics of linear, exponential, and logistic growth and their applications..

Apportionment

Classical algorithms for the apportionment of items among stakeholders.

The following are the objectives of the course as a General Education course fulfilling the mathematical science requirement:

1. To introduce students to the methods and philosophy of the mathematical sciences.
2. To introduce students to at least one of the three mathematical sciences of computing, mathematics and statistics from a liberal arts perspective.
3. To help students develop logical, analytical, and abstract thinking through quantitative problem solving activities.
4. To integrate students use of the computer as a tool in the pursuit of the above objectives.

Prerequisites:

The only prerequisite for the course is knowledge of basic algebra skills, which are included in most high school level mathematics courses. Math 101 fulfills the general education requirement for a mathematical science, however, it is not the best choice for all students. If you have successfully completed a calculus for precalculus course, for example, you should not be enrolled in this course. COSC 171, STAT 269, MATH 107, or MATH 108 is a better choice. You may also want to consider other mathematics courses if they are required for your major. If you have questions about your placement in this course, please consult with your advisor as soon as possible.

Course Description and Requirements:

The assignments you will be given in this class are designed to motivate you to think about and work on mathematics problems regularly and consistently throughout the semester. In order to do well in the course, it is essential that you develop the habit of reading assignments and reviewing class notes soon after they are covered in class.

Your performance in this course will be assessed primarily according to your final grades on 5 written exams, 6 quizzes, 12 homework assignments, 5 projects, and a final exam. The point system shown below for calculating your course grade should be viewed as a guideline; your assigned grade may be higher than your numerical average if your grades show steady and significant improvement over the semester. As outlined in the Student Handbook, your grade may be lowered, possibly to an F, regardless of your point average, in cases of academic dishonesty such as cheating or plagiarism.

Exams (5 @ 100): 500 points
Quizzes (6 @ 20): 120 points
Homework (12 @ 10) 120 points
Projects (5 @ 50) 250 points
Final Exam: 250 points
Attendance: 30 points

Course Grade is based on 1270 points total

92-100: A 90-91: A- 87-89: B+ 81-86: B 79-80: B-
75-78: C+ 65-74: C 63,64: C- 50-62: D

Late Work / Makeup Policy:

All written assignments should be handed in on or before the assigned due date, during the class period. There will be a 5 point reduction per weekday for any late project without a written medical excuse, and a 3 point reduction per day for a late homework assignment (an assignment is late once the class period has ended on the due date). Makeup quizzes are not given. A strong attendance grade will compensate for a quiz missed due to minor illness or other conflict. In the case of a written medical excuse or school-excused absence, your grade on a missed quiz will be replaced by your average on other quizzes/exams. It is your responsibility to get written documentation to me in the case of an excused absence for a quiz.

If you are unable to take a scheduled exam due to illness or other emergency, please make every attempt to contact me before the exam. You may leave a message at any time on my voicemail, at extension 2471. In cases of documented emergency or with permission of the instructor, your grade on a missed exam will be replaced with your percentage grade on the final exam. If you miss an exam and do not contact me within twenty-four hours of the exam, the grade is automatically a "0".

Calculators:

You should have access to some type of scientific or graphing calculator to use in class and for homework assignments. There are no specific calculator requirements or restrictions for the course.

Calculator Loan Agreement: TI-83s will be loaned to students with a security deposit of \$50 in the form of cash or check (payable to Messiah College). The security deposit will be returned to the student when the calculator is returned in good condition before the day after final exams end. If it is lost, stolen, or not returned, the student will lose their security deposit. Students are responsible for replacing the batteries as necessary while the calculator is in their possession. To borrow a calculator for the semester, please see Jean McCauslin, in Frey 222, during normal business hours.

Student Math Helpers:

Student math helpers are available on a free, walk-in basis Monday through Thursday evenings (7-9 pm) in Frey 341 throughout the semester.

Weather Emergency:

In case of a weather emergency, all class plans will be moved up to the next official meeting time. In particular, this means that if the school is closed on a day when an exam is to be given or an assignment is due, you should assume that the exam will be given on the next day the school is open and class is scheduled to meet, or that the assignment will be due in the next class. If Messiah College is not closed, you

should assume that class is meeting as scheduled.

Final Exam:

The final exam is scheduled for Monday, December 14, 1:30 to 3:30 pm in Frey 143.

All students must take the final exam to complete the course.

Please make a note of this date and time, as final exams cannot be rescheduled unless you have more than two exams scheduled for the same day, or two exams at the same time. In this case, you must complete a “Request for Final Examination Change” form and submit it to the Registrar’s Office at least one week prior to the first day of final exams.

Students needing special accommodations:

Any student whose disability falls within ADA guidelines should inform the instructor at the beginning of the semester of any special accommodations or equipment needs necessary to complete the requirements for this course. Students must register documentation with the Office of Disability Services.

MATH 101

FALL 2009 (1:20 & 2:45 SECTIONS)

Day	Date	Assignment
Tuesday	September 1	
	1.1 – 1.3 Mathematics of Voting Borda Count	Homework 1 due Thursday
Thursday	September 3	
	1.4 – 1.6 Instant Runoff, Pairwise Comparisons, & Rankings	Homework 1 due Homework 2 due Tuesday
Tuesday	September 8	
	Quiz 1: Voting Begin Project 1	Homework 2 due
Thursday	September 10	
	Exam 1: Voting Chapter 1	Project 1 due Tuesday
Tuesday	September 15	
	2.1 – 2.3 Weighted Voting & Banzhaf Index	Project 1 due Homework 3 due Thursday
Thursday	September 17	
	2.4 & 2.5 Shapley-Shubik Index Applications of Power Indices	Homework 3 due Homework 4 due Tuesday
Tuesday	September 22	
	Quiz 2: Weighted Voting Begin Project 2	Homework 4 due

Thursday	September 24		
	Exam 2: Weighted Voting		Project 2 due Tuesday
Tuesday	September 29		
	3.6, 3.7, 3.1, 3.2 Fair Division: Sealed Bids Fair Division Methods	Project 2 due	Homework 5 due Thursday
Thursday	October 1		
	3.3 – 3.5 Lone Divider Method Last Diminisher Lone Chooser	Homework 5 due	Homework 6 due Tuesday
Tuesday	October 6		
	Quiz 3: Fair Division Begin Project 3	Homework 6 due	
Tuesday	October 8		
	Exam 3: Fair Division		Project 3 due Thursday
Thursday	October 13		
	5.1 – 5.5 Mathematical Graphs Euler Circuits	Project 3 due	Begin Homework 7
Tuesday	October 15		
	5.6, 5.7, 6.1, 6.2 Euler Circuits Hamiltonian Circuits		Homework 7 due Tuesday Begin Homework 8
Thursday	October 22		
		Mid-Fall Recess October 22-25	No Classes
Tuesday	October 27		
	6.3 – 6.8 Hamiltonian Circuits Traveling Salesman Problem	Homework 7 due	Homework 8 due Thursday

Thursday	October 29	7.1 – 7.3 Trees & Spanning Trees Graph Coloring (Excursion 2, p 310+)	Homework 8 due Homework 9 due Tuesday
Tuesday	November 3	Quiz 4: Graph Theory Begin Project 4	Homework 9 due
Thursday	November 5	Exam 4: Graph Theory	Project 4 due Tuesday
Tuesday	November 10	10.1 – 10.3 Population Growth (Linear & Exponential)	Project 4 due Begin Homework 10
Thursday	November 12	10.4 Logistic Growth Modeling Growth with Spreadsheets	Homework 10 due Tuesday
Tuesday	November 17	Annuities: Future Value (Excursion 3, p. 444+) Annuities: Present Value	Homework 10 due Homework 11 due Thursday
Thursday	November 19	Quiz 5: Growth Begin Project 5	Homework 11 due
Tuesday	November 24	Exam 5: Growth	Project 5 due Tuesday

Thursday	November 26	Thanksgiving Recess November 26 – 30
Tuesday	December 1	
	4.1 – 4.3 Apportionment: Hamilton's Method and Paradoxes of Apportionment	Project 5 due Begin Homework 12
Thursday	December 3	
	4.4, 4.6 Jefferson, Webster's Method	Homework 12 due Tuesday
Tuesday	December 8	
	Quiz 6: Apportionment	Homework 12 due
Thursday	December 10	
	Cumulative Review	
Monday	December 14	Final Exam for both sections will be Monday, Dec 14 from 1:30-3:30 in <u>Frey 143</u>