

Math 107: Mathematical Reasoning and its Applications Fall 2009

Instructor: Dr. Leanne Robertson

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Office hours: M 3:40-5:10, T 1:25-2:25, W 3:40-4:40, F 10:30-12:00, and by appointment

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Course Description: This course serves as an introduction to the richness of the mathematical ideas used in the modern world, with an emphasis on developing students' problem-solving and critical thinking skills. Students will explore a variety of topics that involve mathematical reasoning and in doing so gain confidence and the ability to use various quantitative methods to solve problems. Topics include the mathematics of voting, weighted voting systems, collecting statistical data, graphing and summarizing data, probability, the mathematics of population growth, a little graph theory, and Fibonacci numbers.

Class Schedule: The class meets MTWF from 12:15-1:20 PM in ADMIN 322.

Goals: The mathematics department has established the following goals.

Goals for students in all mathematics courses. Each student will:

- develop the ability to think abstractly and critically;
- improve the ability to communicate mathematically through writing and speaking;
- represent abstract concepts pictorially;
- use mathematics as a modeling and problem-solving tool;
- appreciate and use appropriate technology, becoming proficient with, but not dependent on, symbolic graphing tools or mathematical software.

Additional goals for students in Math 107. A student who successfully completes Math 107 will:

- understand the fundamental ideas of the topics discussed, including various voting methods, the significance of Arrow's impossibility theorem, introductory concepts of statistics, linear and exponential models of population growth and decay and graphs that illustrate these models, graphs and how Kruskal's algorithm can be used to find the shortest network between four or more points, Fibonacci numbers and where they appear in nature;
- develop basic mathematical skills needed for lifetime proficiency, as well Core sciences and social sciences (such as the ability to organize qualitative information, estimate quantities, interpret and draw graphs, and understand and compute ratios, percentages, and proportions);
- recognize when mathematical tools are appropriate for solving both real word and abstract mathematical problems, and gain confidence in solving such problems;
- apply qualitative tests to determine whether a solution to a problem is reasonable;
- Enjoy studying and writing about mathematical applications, and working with others in the class.

Core Curriculum Requirement: This course satisfies the university's Core mathematics requirement, the goal of which is to develop students' facility in "critical and creative thinking, in writing and speaking skills, and in mathematical literacy." The course emphasizes active learning with class meetings consisting of discussion, informal conversation-style lectures, and group work. Assignments and class activities are chosen to help students develop speaking, writing, and analytical reasoning skills, as well as a mastery of the topics at hand.

Prerequisite: High school algebra and geometry (one year of each) or at least two years of integrated mathematics at the high school level

Text: *Excursions in Modern Mathematics, with Mini-Excursions* (6th edition), by Peter Tannenbaum. Publisher: Pearson/Prentice Hall.

Homework: Homework is due on Tuesdays at the beginning of class. Late homework is not accepted, but your lowest homework score will be dropped. Collaboration on solving homework problems is strongly encouraged. More precisely, you may work together and share information verbally, on scratch paper, or at a blackboard, but you are obligated under Seattle University's Academic Honesty Policy (see www.seattleu.edu/regis and click on the "Policies" link) not to share the homework papers that you plan to submit. Under no circumstances should a solution be copied from someone else.

Project: There will be 3 or 4 class projects. Project descriptions, guidelines, and due dates will be handed out a week before the project is due.

Quizzes: There will be six short quizzes. Make-up quizzes will not be given, but your lowest quiz score will be dropped. Quizzes will be given on Friday, Oct. 2, Oct. 16, Oct. 23, Nov. 6, Nov. 13, and Wednesday, Dec. 2.

Tests: There will be three in-class tests and a two-hour cumulative final exam. If you miss one test, then the final exam will serve as a make-up test. A score of zero will be given for any additional missed tests. If you take all three tests and your grade on the final exam is higher than your lowest test grade, then your final exam grade will replace your lowest test grade.

Test 1: Friday, October 9

Test 2: Friday, October 30

Test 3: Friday, November 20

Final: Thursday, December 10, 10-11:50 AM

Participation: Students are expected to prepare for, attend, and participate in all class meetings. To prepare for class you should look over your notes from the previous class and try the assigned problems. I begin class by asking for questions, so prepare a question to ask if you are confused about something from the last class or stuck on a homework problem. You should also prepare by reading assigned material. Even reading for only 10-15 minutes for familiarity can significantly help you understand the material when we discuss it in class.

Once prepared, come to class on time, ready to learn and participate, and with your **cell phones turned OFF**. Using your cell phone during class will have a negative effect on your participation grade. Participating in class includes answering and asking questions, offering ideas and conjectures, listening and working effectively with your group during group problem solving, doing assigned readings, volunteering to do a problem on the board, and simply being alert and paying attention in class. Participating and talking are not necessarily the same thing.

Grading: The points for the course will be distributed as follows:

Homework	40 points
Quizzes (16 points each)	80 points
Projects	70-90 points
Participation and Attendance	20 points
Midterm tests (80 points each)	240 points
<u>Final exam</u>	<u>130 points</u>
Total	580-600 points

Based on the above point distribution, students are guaranteed the following course grades, *including + and -*. The percentages may be lowered, but they will not be raised.

A: 90% and above	C: 65% and above
B: 80% and above	D: 55% and above

Assistance: There are a number of people who want to help you succeed in this course. When you have difficulties with a concept or just want to discuss an idea further, you are strongly encouraged to seek help from:

1. Your instructor: Come to my office hours, make an appointment to see me, or just drop by if my office door is open. I want to help each of you to do your best.
2. Your classmates: Many students learn the most when they work with others. You will often be required to work together in class, and I hope you will study together outside of class and cooperate on homework. Ask each other lots of questions. This even benefits students who are comfortable with the material – you know you really understand something if you can explain it to others.
3. The Math Lab: You may drop by ENGR 300 any time it is open to receive help (hours will be posted and announced in class).
4. The Learning Center: The center is located in Loyola 100 and provides services for all SU students to help them get the most out of their education. The Learning Center provides one-on-one consulting about study skills, arranges course tutoring, and offers a variety of interactive workshops. It also provides services for students with learning, physical, and psychological disabilities. Please make an appointment with the Learning Center immediately (phone 296-5740) if you think their services could contribute to your success at Seattle University.