MAT 112: Contemporary Topics in Mathematics

Course Number: MAT 112

Course Title: Contemporary Topics in Mathematics

Credits: 3:3

Prerequisites/Corequisites: None.

For Whom Planned: This course fulfills 3 hours of math credits required for many majors. It is not preparation for any other math course. Please check your major requirements in the Undergraduate Bulletin.

Instructor Information:

Instructor: Dr. Sebastian Pauli (s_pauli@uncg.edu)

Office Hours: Tuesdays and Thursdays 11 am to noon, Wednesdays 9:30 am to 10:30 am in Petty 145.

I am available for help during my office hours and by email s_pauli@uncg.edu. I will answer email within 24 hours. If your question is of general interest, I may also answer it in the discussion forum.

Bulletin Description: Practical mathematical topics including set theory, properties and operations of number systems, algebra, geometry and consumer mathematics. Additional topics may be selected from logic, systems of numeration, and mathematical systems.

Student Learning Outcomes: MAT 112 satisfies the Mathematics (GMT) requirement of the General Education Program. It is open to and appropriate for all undergraduate students, regardless of major. The General Education learning goals attached to the GMT marker are as follows:

- LG1 Foundational Skills: Think critically, communicate effectively, and develop fundamental skills in quantitative and information literacies.
- LG2 The Physical and Natural World: Understand fundamental principles of mathematics and statistics, and recognize their relevance in the world.

At the successful completion of this course, the student will be able to:

- SLO1 Reason in mathematical systems beyond data manipulation. (LG1, LG2)
- SLO2 Formulate and use mathematical models to solve real-world problems. (LG1, LG2)
- SLO3 Communicate mathematical solutions clearly and effectively. (LG1)

Course Objectives: The course covers four topics, namely:

(1) **Sets** (Sections 2.1, 2.2, 2.3, 2.4, 2.5): Apply set theory and Venn diagrams to order and arrange items, picture relationships between sets, and solve practical problems. (SLO1, SLO2, SLO3)

(2) **Algebra** (Sections 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.9): Simplify algebraic expressions, solve linear equations and inequalities, solve quadratic equations, and apply these skills to real life problems. (SLO1, SLO2, SLO3)

(3) **Mathematical Systems** (Sections 4.3, 4.4, 10.1, 10.2, 10.3): Use number systems with various bases and compute in other mathematical systems such as clock arithmetic and groups. (SLO1, SLO3)

(4) **Geometry** (Sections 9.1, 9.2, 9.3, 9.4): Find areas and perimeters of polygons and circles, compute volumes of solids, apply principles of basic geometry to geometric shapes in everyday life. (SLO2, SLO3)

Teaching Methods and Assignments for Achieving Learning Outcomes: Abstract reasoning (SLO1) and clear, effective communication (SLO3) are a part of every lesson and homework in this course. The student, through regular and frequent attention to the lessons and homework questions, will make progress on each of these learning objectives. The formulation and use of mathematical models in real-world problems (SLO2) are integrated in the application of the fundamental techniques covered in the course. Homework questions are designed to reinforce these mathematics learning objectives.

For each course objective, you can find a page with further resources and links to the assignments on MyMathLab.

Online Homework: Homework is the most important way to actually learn mathematics. It is a safe time before exams where making mistakes is ok and helps you understand why mathematics is done in a certain way. It is practice, the same as practicing sports or music. It is rehearsal, the same as rehearsing a speech or part in a play. It is preparation for when the work really matters. Homework can be accessed in MyMathLab either through the calendar on the Course Home page or through the corresponding topic page. There will be one homework assignment for each section we cover, usually two assignments per week. Homework does not have a time limit. Also, a homework assignment does not have to be finished in one sitting. While working on a homework problem you may get help by pressing Help Me Solve It, View an Example or Textbook on the right side of the Homework sheet. In the first case, the system will help you, in the second case the system will give you a similar example with answers. In the third case, the system will open the textbook to the place you need to refresh your knowledge. Some exercises may have Animate or Video help options or no help options at all. You can also print the question by pressing Print.

Online Quizzes: Quizzes can be accessed in MyMathLab either through the calendar on the Course Home page or through the corresponding topic page. There will be one quiz every week, covering up to three sections. To be able to take a quiz you need to score at least 80% on the corresponding homework assignments. You can take each quiz as often as you want before the deadline, usually Monday at midnight.

Tests: For each test, bring Number 2 (HB) pencil, eraser, and calculator (cell-phones or PDAs are prohibited). The dates for the tests are:

Test 1 on Sets: Tuesday, February 4
Test 2 on Algebra: Thursday, March 6
Test 3 on Mathematical Systems: Thursday, April 3
Test 4 on Geometry: Thursday, April 24
Cumulative final exam: Wednesday, May 1, 8 am to 11 am

Evaluation and Grading: The primary student products are the tests and final exam. Due to the nature of the course, each test will address all of the SLOs. Specifically, SLO1 will be present in most of the questions. Several questions on each test will be designed to address SLO2 and SLO3. Since the final exam is cumulative, all of the SLOs will be addressed there. The student will demonstrate achievement of learning objectives through satisfactory completion of graded assignments and tests. The questions on graded assignments and tests

are designed to evaluate each of the three learning objectives, and in this way the grade reflects the attainment of the objectives.

Online Homework Assignments (the lowest three dropped)	10%
Online Quizzes (the lowest two dropped)	20%
4 In-Class Tests (lowest test grade may be replaced by final exam grade)	40%
Final exam (cumulative)	30%

Letter grades are assigned on a 10 point scale.

A+ : 97–100	B+ : 87–89	C+ : 77–79	D+ : 67–69	
A : 93–96	B : 83–86	C : 73–76	D : 63–66	F : 0–59
A− : 90–92	B− : 80–82	C− : 70–72	D− : 60–62	

Required Texts/Readings/References: A MyMathLab/Mastering access code is required for this class. You can purchase the access code through the college bookstore, through online vendors, or through the publisher at http://pearsonMyLabandmastering.com. You will need to register for the course with the Course ID:

pauli84389

on http://pearsonMyLabandmastering.com by noon on Monday, January 20. The website allows students to register on a temporary basis for up to 17 days and pay after this time period. **Anyone not registered in MyMathLab/Mastering by noon on Monday January 20 will be dropped from the course. The first homework assignment and the first quiz are due at midnight on Monday, January 20.**

Optional Textbook:

Allen R. Angel, Christine D. Abbott, and Dennis C. Runde, *A Survey of Mathematics with Applications*, 9th ed., Pearson Education, 2012.

There is an online version of the text available through MyMathLab/Mastering that is exactly the same as the 9th edition hardcover version.

Topical Outline/Calendar: Listed by calendar week.

Week 1	2.1 Set Concepts, 2.2 Subsets
Week 2	2.3 Set Operations, 2.4 Equality
Week 3	Labour Day, 2.5 Applications
Week 4	Review, Test 1, 6.1 Order of Operations
Week 5	6.1 Order of Operations, 6.2 Linear Equations, 6.3 Formulas
Week 6	6.3 Formulas, 6.4 Applications, 6.5 Variation
Week 7	6.5 Variation, 6.6 Inequalities, 6.9 Quadratic Equations
Week 8	6.9 Quadratic Equations, Review, Test 2
Week 9	Fall break, 4.3 Other Bases
Week 10	4.3 Other Bases , 4.4 Computations in Other Bases, 10.1 Groups
Week 11	10.2 Finite Systems, 10.3 Modular Arithmetic
Week 12	Review, Test 3, 9.1 Points
Week 13	9.1 Points, 9.2 Polygons, 9.3 Area
Week 14	9.3 Area, 9.4 Volume, Review
Week 15	Test 3, Thanksgiving
Week 16	Review, Final Exam (Wednesday, December 3, 8 am – 11 am)

Academic Integrity Policy: You are expected to abide by the UNCG Academic Integrity Policy at all times, and any cases of academic dishonesty will not be tolerated. Each student is required to sign the Academic Integrity Policy on all major work submitted for the course.

I have abided by the UNCG Academic Integrity Policy on this assignment.
Signature _____ Date _____

More information can be found at

http://sa.uncg.edu/handbook/academic-integrity-policy/.

Attendance Policy: Regular and punctual attendance is expected. You are responsible for any missed work and material.

Final Examination: The cumulative, multiple-choice final exam is scheduled for Wednesday, December 3 from 8 am to 11 am. The location will be announced closer to time for the exam. You must contact the instructor in advance and have a valid excuse to take the final exam makeup.

Additional Information:

Calculator Policy: A calculator is required for the course. Bring it to every exam. The calculator must add, subtract, multiply, divide and have a square root key and an exponential key. The TI89, TI92 or other calculators with similar capabilities may NOT be used in this class.

Extensions: All Homework assignments and Quizzes are available to you from the date that classes start. Computers and networks are unreliable, therefore, you need to complete the assignments well before the due date. If you decide to work on the day it is due, you are taking a risk. Work ahead of the deadlines and this will not be a problem. Extensions will be granted at the discretion of the instructor and only in the event of extreme circumstances. Please note that computer issues on the evening an assignment is due do not meet this criteria!

Makeup exams: If you must miss an exam, you should contact the instructor before the exam in order to schedule a makeup exam. You must have a valid excuse and written evidence of it to be allowed to take a makeup exam.

Old tests: You can find old tests for practice on the page for each topic on MyMathLab.

MyMathLab Support: The MyMathLab Technical Support number is 1-800-677-6337. Also you can reach MyMathLab Tech Support 24/7 from the MyMathLab Sign In page: under *For Students*, click on *Support* and then click on *Live Chat*.

Add/drop dates and holidays affecting this class:

(1) The last day to adjust your schedule with absolutely no penalty is Friday, August 22nd.
(2) Withdrawing from this course between August 23rd and October 10 will use 3 out of the 16 hour withdrawal limit and will be indicated on a transcript with a grade of WX.
(3) Dropping this course after October 10 or in excess of the 16 hour limit will result in a grade of WF, which is equivalent to a grade of F for your GPA.

(4) Labor Day holiday is September 1, Fall Break is October 11–14, and Thanksgiving holiday is November 26–30.

Students with Disabilities: You are responsible for contacting the OARS in 215 EUC (334-5440, http://ods.uncg.edu) and for filling out the necessary forms if you wish to have special accomodations. Without these forms the services provided by the OARS will not be available. OARS cannot schedule or reschedule tests without consent from the instructor.

Copyright Policy: Selling or purchasing notes from classes for commercial gain is a violation of the UNCG Copyright Policy. Any student who sells notes taken in class for commercial gain, or who purchases notes taken by another student for commercial gain, is in violation of this policy and, by extension, is committing a violation of the Student Code of Conduct.

http://sa.uncg.edu/handbook/student-code-of-conduct/

Free Tutoring: The Department of Mathematics and Statistics provides free walk-in tutoring in the Curry 210 beginning August 25. For the details, see

http://www.uncg.edu/math/mathhelpcenter

Student Success Center: Find more academic support at the Student Success Center.

http://success.uncg.edu/

Special Support Services: Tutoring may be available from Special Support Services.

http://success.uncg.edu/sss/tutoring.php

MAT 112: Explanation for GEC GMT Category Designation

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The content of MAT 112 is delivered in different formats, but with the exception of minor differences necessitated by the difference of format, the types of activities and assignments used to facilitate student achievement of the learning outcomes are the same. Due to the large class sizes of MAT 112, the predominant work products are multiple-choice quizzes and tests. The questions are carefully designed to ensure the successful student attains the three GMT learning objectives.