MAT 190: Precalculus

Course Number: MAT 190
Course Title: Precalculus
Credits: 3:3:1
Prerequisites/Corequisites: Acceptable score on the placement exam.
For Whom Planned: This course is a more intensive, one-semester version of our two-semester precalculus sequence MAT 150–151. It is designed for students who intend to study calculus and have a sufficiently strong mathematics background to successfully complete precalculus in one semester. Students must earn a grade of C or better in this course to satisfy the prerequisite for MAT 191 (Calculus I).

Instructor Information:

Instructor: Dr. Richard Fabiano (fabiano@uncg.edu)
Office Hours: M 10:00-11:30, F 10:00-11:30 in Petty 140
I will be in or near my office at these times. My office hours are times set aside for you, and you should feel free to drop by my office during these times with questions or comments on anything pertaining to the course. Feel free to schedule an appointment if my office hours are not convenient.

Graduate Assistant: Byungjae Son (b_son@uncg.edu)

Bulletin Description: Essential prerequisites for calculus. Topics include functions and graphs, equations and inequalities, polynomial and rational functions, trigonometry, functions of trigonometric, exponential, and logarithmic type.

Student Learning Outcomes: MAT 190 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:
MAT190 SLO 1 Identify functions, their properties, and their graphs.
MAT190 SLO 2 Solve equations and inequalities arising in algebra and trigonometry.
MAT190 SLO 3 Combine different methods to simplify algebraic, trigonometric and exponential expressions.
MAT190 SLO 4 Compose clear, complete solutions to mathematical problems in algebra and trigonometry, using justifiable, step-by-step, deductive reasoning.
MAT190 SLO 5 Construct mathematical models from word problems.
The MAT190 SLO’s are closely connected with specific course topics, and this is indicated below in the topical outline for the course.

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.

This course follows a lecture/lab format. During the Tuesday/Thursday class meetings, I will lecture on new material and assign homework exercises from the text. Each week we will cover approximately 3 sections from the text. The Friday lab meeting will be devoted to reviewing homework problems and clarifying difficult material. Your success in this class depends upon you working and understanding the homework problems. Thus you are expected to write solutions to every assigned homework exercise. Each Tuesday in class I will collect the homework assigned the previous week, and there will be a quiz based upon that homework. There are three tests and a final exam, and all are based on the homework problems. Almost none of your assessed work is based on multiple choice or true/false questions. In every quiz and test question you are asked to write a solution which shows your work in a clear, efficient, and orderly manner. This is aimed at better preparing you for your calculus course.

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.

Tests: There will be three 75 minute tests and a comprehensive final exam. Test 1 is Thursday, September 18, test 2 is Tuesday, October 21, test 3 is Thursday, November 20, and the final exam is Thursday, December 4 from 8:00–11:00am. An unexcused missed test will receive a grade of zero.

Quizzes and HW: Homework will be assigned in every class meeting. Homework assigned Tuesday and Thursday of one week will be collected the following week at the beginning of class on Tuesday. Quizzes will be given at the beginning of class every Tuesday. The quizzes are approximately 10 minutes long, and based on recent homework and lecture material. There are no make-up quizzes, nor is late homework accepted. All missed quizzes and homework will receive a grade of zero.

Grade: The final numerical grade for the course will be determined as follows:

- Tests (3 @ 20%)  60%
- Quiz/HW  15%
- Final Exam  25%
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:**


**Topical Outline/Calendar:** This outline includes the homework exercises assigned for each section. The MAT190 SLO’s indicated for each chapter apply to every section in the chapter. Some chapter sections are connected to additional MAT190 SLO’s, as indicated.

- **Week 1**
  - **Chapter 1** Inequalities, Equations, and Graphs [MAT190 SLO 2,4]
    - **1.1** The Real Line
      - HW 9, 11, 15, 17, 23, 25, 29, 37, 39, 41, 43, 51, 53, 57
    - **1.2** Absolute Value
      - HW 9, 15, 17, 21, 25, 29, 37, 38, 39, 43, 44, 58
  - **Week 2**
    - **1.3** The Rectangular Coordinate System
      - HW 19, 22, 29, 33, 39, 44, 45
    - **1.4** Circles and Graphs
      - HW 7, 9, 11, 13, 17, 19, 23
    - **1.5** Calculus Preview - Algebra and Limits [MAT190 SLO 5]
      - HW 3, 4, 5
  - **Week 3**
    - **1.5** Calculus Preview - Algebra and Limits [MAT190 SLO 5] (continued)
      - HW 9, 13, 17, 21, 23, 27, 29, 31, 32
  - **Chapter 2** Functions [MAT190 SLO 1,4]
    - **2.1** Functions and Graphs
      - HW 3, 5, 7, 11, 13, 15, 23, 27, 31, 37, 41, 45, 47, 53
    - **2.2** Symmetry and Transformations
      - HW 3, 5, 7, 11, 15, 16, 23, 25, 27, 33, 37
  - **Week 4**
    - **2.3** Linear Functions
      - HW 5, 11, 13, 21, 25, 27, 29, 33, 35, 41, 43
    - **2.4** Quadratic Functions
      - HW 9, 13, 15, 19, 25, 27, 29, 37, 41, 43
    - **2.5** Piecewise-defined Functions
      - HW 3, 9, 17, 19, 25, 29, 37, 43, 45
  - **Week 5**
    - **2.6** Combining Functions
      - HW 7, 11, 13, 17, 19, 21, 33, 49
  - **TEST 1**
  - **Week 6**
    - **2.7** Inverse Functions
      - HW 3, 7, 11, 13, 15, 17, 19, 23, 25, 27, 29, 31, 33, 35, 37
2.8 Building a Function from Words [MAT190 SLO 5]
   HW 1, 3, 5, 7, 9, 19, 21, 29, 31
2.9 Calculus Preview - The Tangent Line Problem [MAT190 SLO 3,5]
   HW 3, 7, 9, 11, 15, 19, 25, 27

Week 7

Chapter 3 Polynomial and Rational Functions [MAT190 SLO 1,4]
3.1 Polynomial Functions
   HW 3, 5, 13-18, 21, 23, 29, 37, 39, 46
3.2 Division of Polynomial Functions
   HW 3, 7, 9, 13, 14, 25, 27, 29, 33, 35, 41

Week 8
3.3 Zeros and Factors of Polynomial Functions
   HW 7, 9, 11, 13, 17, 19, 21, 23, 27, 29
3.4 Real Zeros of Polynomial Functions [MAT190 SLO 3]
   HW 3, 5, 7, 9, 11, 13, 21, 23, 25
3.5 Rational Functions
   HW 3, 4, 7, 9, 15, 17, 23, 25, 27, 31, 37

Week 9

TEST 2
3.6 Partial Fractions
   HW 3, 7, 9, 11, 15, 19, 25

Week 10

Chapter 4 Trigonometric Functions [MAT190 SLO 3,4]
4.1 Angles and Their Measurement
   HW 3, 5, 7, 9, 11, 19, 27, 33, 37, 41, 43, 47, 49, 57, 58, 59
4.2 The Sine and Cosine Functions
   HW 3, 5, 7, 11, 13, 17, 19, 21, 23, 25, 29, 35, 39, 41, 43, 47, 51
4.3 Graphs of Sine and Cosine Functions
   HW 3, 5, 7, 9, 13, 15, 21, 23, 27, 29, 33, 37, 41, 43, 45

Week 11
4.4 Other Trigonometric Functions
   HW 1, 3, 5, 7, 9, 13, 19, 23, 29, 31, 37, 39
4.5 Special Identities [MAT190 SLO 3]
   HW 3, 5, 7, 9, 15, 17, 21, 33, 35, 37, 41, 43, 49, 62

Week 12
4.6 Trigonometric Equations
   HW 1, 3, 7, 11, 19, 21, 25, 27, 29, 37
4.9 Right Angle Trigonometry [MAT190 SLO 5]
   HW 3, 7, 11, 13, 17, 25, 27, 31

Week 13

TEST 3

Chapter 5 Exponential and Logarithmic Functions [MAT190 SLO 3,4]
5.1 Exponential Functions
   HW 5, 7, 13, 15, 17, 19, 25, 27, 39, 41, 45, 47, 49
5.2 Logarithmic Functions  
HW 1, 3, 9, 11, 15, 17, 23, 29, 33, 39, 45, 47, 55, 57, 61, 65, 67, 75 

5.3 Exponential and Logarithmic Models [MAT190 SLO 5]  
HW 3, 5, 7, 9, 13, 17, 20, 21 

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. Two consecutive absences or four total absences during the semester may result in you being dropped from the course. 

Final Examination: Then comprehensive final exam is Thursday, December 4 from 8:00–11:00am. 

Additional Information: 

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 accommodasions. 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 190: Explanation for GEC GMT Category Designation

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