MAT 151: BASIC CALCULUS AND APPLICATIONS I
SPRING 2008 OS1016 10:00am – 10:50am

INSTRUCTOR: Dr. Daniel X. Guo
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OFFICE HOURS: M, W, F: 10:50am – 11:50am, 1:50pm--2:50pm and by appointment

TEXTBOOK: **Calculus with Applications**, tenth edition, by LIAL, GREENWELL, and RITCHEY; A graphical calculator is recommended in this course, such as **TI-83plus** or **TI-84**. The purpose of using a graphical calculator is to clarify and reinforce concepts, as a means of discovery, and as an efficient problem-solving tool.

HOMEWORK: Homework assignments will be assigned during each class meeting. It is expected that these assignments will be completed promptly and thoroughly. It is through the working of these problems that an understanding of the concepts and a mastery of the procedures are most successfully attained.

QUIZZES: Short quizzes based on the lectures and homework assignments will be given periodically.

TESTS: Three tests plus a comprehensive final exam will be given during the course. The tentative dates for the tests are **September 23 (Wednesday)**, **October 28 (Wednesday)**, and **November 20 (Friday)**. The final exam will be given **December 7,** from 8:00am to 11:00am at OS1016.

GRADING: The quiz and homework grades will collectively count 10% respectively, each of the three test scores will count 20%, and the final exam will count 20% toward the final average. Letter grades will be assigned based on the final average using the following scale: 0.00-59.9 = F, 60.0-69.9 = D, 70.0-79.9 = C, 80.0-89.9 = B, 90.0-100.0 = A. Plus/minus grades might also be used at the discretion of the instructor.

POLICIES

1. **Attendances**: Regular and punctual attendance is expected and will be monitored. Excessive absences (more than two) will result in the denial of makeup test, additional office hours, and bonus points.

2. **Makeup**: No make-up test will be given unless illness or emergency. Instructor must be notified in advance or on the test day. Make-up test will be given on the earliest available date. No late homework. No makeup for the final exam for any reason.

3. **Academic Honor Code and Seahawk Respect Compact:** Please refer to Section V in your student handbook and Dean of Students' website (http://www.uncw.edu/stuaff/doso/) about Academic Honor Code for the definition

and procedures about academic dishonesty offenses. The Seahawk Respect Compact (http://www.uncw.edu/diversity/src.html) expresses the core values essential to an open, respectful learning and working environment.

4. **Disability**:   UNCW Disability Services supplies information about disability law, documentation procedures and accommodations that can be found at http://www.uncw.edu/stuaff/disability/. To obtain accommodations the student should first contact Disability Services and present their documentation to the coordinator for review and verification.

5. **Religious Observance Policy**
    In accordance with NC SL 2010-211, you are entitled to two excused absences for religious observances **per academic year**. You must inform me in writing the first week of class if you will be missing any classes due to religious observance and using one of the two permissible absences for the academic year. In addition, please inform the Registrar the first week of class who will then confirm your intentions to miss class with the impacted course instructors. Any absence for religious purposes will be considered unexcused unless you submit the request in writing the first week to either me or the Registrar.

6. **The UNCW Statement on Diversity in the University Community**
    As an institution of higher learning, the University of North Carolina Wilmington represents a rich diversity of human beings among its faculty, staff, and students and is committed to maintaining a campus environment that values that diversity. Accordingly, the university supports policies, curricula, and co-curricular activities that encourage understanding of and appreciation for all members of its community and will not tolerate any harassment or disrespect for persons because of race, gender, age, color, national origin, ethnicity, creed, religion, disability, sexual orientation, political affiliation, marital status, or relationship to other university constituents.

7. **Zero Tolerance Policy**
    UNCW practices a zero tolerance policy for violence and harassment of any kind. For emergencies contact UNCW CARE at 962-2273; Campus Police at 962-3184; or Wilmington Police at 911. For University or community resources visit: http://www.uncw.edu/safe-relate/campusResources.htm.Violence prevention information and resources available at http://www.uncw.edu/safe%2Drelate/. We will focus several class discussions on the importance of reducing violence and increasing tolerance in schools and at UNCW.

8. **Cell Phones, PDAs, Laptops**
    Please silence your cell phone and do not make calls, access applications or text during class. If you have a personal, urgent matter for which you need to be on call, please let me know in advance. In addition, please do not have active any PDAs or laptops/netbooks/iPads open and active unless the activity warrants. We will use these devices in selected activities and they are permissible then.

Course Catalog Description: MAT 151-152. Basic Calculus with Applications (3-3) Prerequisite: for MAT 151: MAT 111 or 115 or the equivalent preparation in algebra; for MAT 152: MAT 112 or 115 or the equivalent preparation in algebra and trigonometry and MAT 151. This calculus sequence is intended for majors that emphasize techniques and applications rather than theory and derivations. Differentiation and integration of algebraic and certain transcendental functions, partial differentiation, sequences and series.

Goal of the Course: MAT 151 is the initial half of the standard two-semester university basic calculus sequence. The intended audiences are students majoring in biological sciences, business, and social sciences. Its principal goal is to show how calculus has served as the primary quantitative language of applications arising from these fields. It provides the basic theoretical ideas used to model change. Students in this course will develop the mathematical skills found in the core topics of limits, differentiation, and integration. Students will investigate the wider application of these skills in the natural and social sciences and communicate the results of these investigations.

MAT 151 will count for the Mathematics and Statistics requirement in University Studies by supporting all the Common Student Learning Outcomes (MS) for that category. If another course is used to meet the Mathematics and Statistics requirement of University Studies, MAT 151 may count for the Quantitative and Logical Reasoning requirement by supporting all the Common Student Learning Outcomes (QRE) for Quantitative and Logical Reasoning.

Course Student Learning Objectives: Upon completing MAT 151, students should be able to:
- Use graphical, numerical, analytical and verbal representations of functions, limits, derivatives and integrals. (MS 1; QRE 1)
- understand the meaning of the derivative in terms of a rate of change and use derivatives to solve a variety of problems. (MS 1 & 2; QRE 1 & 2)
- understand the meaning of the definite integral both as a limit of Riemann sums and as the net accumulation of change and use integrals to solve a variety of problems. (MS 1 & 2; QRE 1 & 2)
- understand the relationship between the derivative and the definite integral as expressed in the Fundamental Theorem of Calculus. (MS 1; QRE 1)
- use correct mathematical syntax to explain solutions in both written and graphic forms. (MS 3; QRE 3)
- model a variety of applications using the concepts of calculus. (MS 2 & 3; QRE 2 & 3)
- use technology to help solve problems, interpret results, and verify and communicate conclusions. (QRE 1 & 2)

▪ determine the reasonableness of solutions, including sign, size, relative accuracy, and units of measurement. (MS 2 & 3; QRE 1, 2 & 3)

Chapter 1: Linear Functions

8/19	§1.1	Slopes and Equations of Lines	
8/21	§1.2	Linear Functions and Applications	

Chapter 2: Nonlinear Functions

8/24	§2.1	Properties of Functions	
	§2.2	Quadratic Functions; Translation and Reflection	
	§2.3	Polynomial and Rational Functions	
	§2.4	Exponential Functions	
	§2.5	Logarithmic Functions	
	§2.6	Growth and Decay; Mathematics of Finance	

Chapter 3: The Derivatives

9/11	§3.1	Limits	
	§3.2	Continuity	
	§3.3	Rates of Change	
9/21	**9/23**	**Review and Test 1**	
9/25	§3.4	Definition of Derivative	
	§3.5	Graphical Differentiation	

Chapter 4: Calculating the Derivatives

9/30	§4.1	Techniques for Finding Derivatives	
	§4.2	Derivatives of Products and Quotients	
	§4.3	The Chain Rule	
	§4.4	Derivatives of Exponential Functions	
	§4.5	Derivatives of Logarithmic Functions	

Chapter 5: Graphs and the Derivative

10/14	§5.1	Increasing and Decreasing Functions	
	§5.2	Relative Extrema	
	§5.3	Higher Derivatives, Concavity, 2nd D. Test	
	§5.4	Curve Sketching	

Chapter 6: Applications of the Derivative

10/23	§6.1	Absolute Extrema	
10/26	**10/28**	**Review and Test 2**	
10/30	§6.2	Applications of Extrema	
	§6.4	Implicit Differentiation	
	§6.5	Related Rates	

Chapter 7: Integration

11/6	§7.1	Antiderivatives	
	§7.2	Substitution	
	§7.3	Area and the Definite Integral	
	§7.4	The Fundamental Theorem of Calculus	
	§7.5	The Area Between Two Curves	
11/18	**11/20**	**Review and Test 3**	

11/30		Review	
12/2		Review	
12/7		**Final Exam**	

IMPORTANT DATES: 8/26 Last Day of D/A. 10/7 Last Day to Withdraw with W.