CLASS: MAT 311-001 11:00-11:50 MWF BR 164 Fall, 2012

INSTRUCTOR: Dr. Kenneth Gurganus (gurganus@uncw.edu) **OFFICE**: BR 220 **PHONE**: 962-3297

TEXT: Real Analysis: A First Course (2nd edition) by Russell A. Gordon, Addison-Wesley

SYLLABUS (with tentative hour test dates): Chapters 1 & 2 (Sept. 14); Chapters 3 & 4 (Oct. 12). Chapters 5 (Nov. 2). Chapters 6 & 7 will be included on the cumulative final exam held on Wednesday, Dec. 12, from 11:30-2:30 PM.

Other important dates: Aug. 29—last day to add or drop without grade; Oct. 11—last day to withdraw for undergraduates; Dec. 5—last day of classes; no classes will be held on the following University holidays: Sept. 3, Oct. 8-9, Nov. 21-23. The class period before each test will contain a review/problem session.

Office Hours (August 24): 9:00-10:30 AM MTWRF with additional times by arrangement. These hours are subject to change during the semester. If you see me and need help regardless of the time, just ask.

Grading: Each of the hour tests and the final will be graded on a ten point scale: 90-100 A; 80-89 B; 70-79 C; 60-69 D. If I feel it is justified, some adjustment downward may be made at times. "Plus or minus grading may be awarded at the discretion of the faculty [UNCW Undergraduate Catalogue]." The hour test average will count approximately 60% of the final grade and the final exam approximately 25% of the final grade.

Homework will be regularly assigned but generally not collected only because you should do much more homework than I can possibly have graded. You will be notified in advance that some assignments will be graded. Other graded assignments of generally no more than one or two problems may be assigned, done, and collected within a single class meeting with or without prior notice. They may be open or closed book assignments. Such assignments along with homework will account for approximately 15% of the final grade. **Attendance** is to be regularly taken and is expected of every student. It is definitely your responsibility to learn all material covered and this can best be achieved by regular class attendance and by keeping up with the daily pace of the class.

Make-up tests will not be given unless you have a reason for missing a test that I determine valid. Even then I reserve the option of using the corresponding portion of the final exam for a make-up test. If you know that you will miss a test, let me know before the test if possible. In any case, inform me as soon as possible.

The final exam will cover the entire course and will be graded two ways. The entire final exam grade will count approximately 25% of the final grade. If there is improvement over any hour test grade (or homework average), that hour test grade will be replaced by the weighted average of the final exam grade and the test grade, with the higher exam grade weighted three times more than the hour test grade.

Students with Disabilities: If you have a disability and need reasonable accommodation in this course, you should inform the instructor of this fact in writing within the first week of class or as soon as possible. If you have not already done so, you must register with the Office of Disability Services in De Paolo Hall and obtain a copy of your Accommodation Letter. You should then meet with your instructor to make mutually agreeable arrangements based on the recommendations of the Accommodation Letter

UNCW's Academic Honor Code applies to all members of the university community. All students are expected to read and abide by the Academic Honor Code that is in the Student Handbook and Code of Student Life.

The Purpose of MAT 311 in Your Mathematics Program at UNCW

Before starting MAT 311 (Intermediate Analysis), you should have completed MAT 161-162 (Calculus I-II) and MAT 275 (Axiomatic Systems) or the equivalent elsewhere. MAT 261 (Multivariate Calculus) is also listed in the catalogue as a prerequisite, but it's requirement has more to do with mathematical maturity rather than material that is prerequisite to MAT 311 as currently designed.

"Ever since its 'invention' by Newton and Leibniz in the second part of the 17th century, calculus has been worked on by many intellectual giants. The concepts of calculus are often deep and sophisticated, and the best mathematicians struggled for 200 years before a sound formulation of calculus was obtained in the late

19th century. [From a Calculus II description at Gettysburg College]." In MAT 161-162 to get to many of the applications of calculus to the physical and social sciences, much of that "sound formulation" has been replaced with a more intuitive, less rigorous approach. The primary purpose of MAT 311 is to revisit the key concepts of calculus with the aim of providing that sound formulation.

A student who successfully completes MAT 311 should be able to:

(a) independently and actively read , investigate and apply statements regarding the major themes of single variable calculus

(b) write proofs of elementary theorems and proof-based solutions to problems related to the topics within the MAT 311 catalogue description:

MAT 311. Intermediate Analysis (3) Prerequisite: MAT 261 and 275. Thorough treatment of the topology of the real line, functions and limits, convergence, continuity, differentiation and integration of functions of a real variable. Infinite series, uniform convergence.

Sections Covered in our Text:

1.1. What is a Real Number?
1.2 Absolute Value, Intervals, and Inequalities
1.3 The Completeness Axiom
1.4 Countable and Uncountable Sets
1.5 Real-Valued Functions
2.1 Convergent Sequences
2.2 Monotone Sequences and Cauchy Sequences
2.3 Subsequences
2.4 Supplementary Exercises and Review
Test 1
3.1 The Limit of a Function
3.2 Continuous Functions
3.3 Intermediate and Extreme Values
3.4 Uniform Continuity
3.5 Monotone Functions
3.6 Supplementary Exercises
Test 1
4.1 The Derivative of a Function
4.2 The Mean Value Theorme
4.3 Further Topics on Differentiation
4.4 Supplementary Exercises and Review
Test 2
5.1 The Riemann Integral
5.2 Conditions for Riemann Integrability
5.3 The Fundamental Theorem of Calculus
5.4 Further Properties of the Integral
5.5 Numerial Integration
5.6 Supplementary Exercises and Review
Test 3
6.1 Convergence of Infinite Series
6.2 The Comparison Tests
6.3 Absolute Convergence
6.4 Rearrangements and Products
6.5 Supplementary Exercises and Review

7.1 Pointwise Convergence
7.2 Uniform Convergence
7.3 Uniform Convergence and Inherited Properties
7.4 Power Series
7.5 Taylor's Formula
7.6 Several Miscellaneous Results
Review
Final Exam

Fall 2012 Calendar:

S	M	T	W	T	F	S	
19	20 Convocation	21	22 First Day of Class-1	23	24-2--3	25	Aug.
26	27-3--4	28	29 Last Day to Add-4--6	30	31-5--8	1	Sept.
2	3 Labor Day NO CLASSES	4	5--6--10	6 General Faculty Meet.	7--7--12	8	
9	10--8--13	11	12--9--15	13	14 TAC Raleigh--10-17	15	
16	17--11--18	18	19--12--20	20	21--13--22	22	
23	24--14--23	25	26--15--25	27	28--16--27	29	
30	1--17--28	2	3--18--30	4	5--19--32	6	Oct.
7	8 Fall Break NO CLASSES	9 Fall Break NO CLASSES	10--20--33	11 Last Day to Withdraw	12--21--35	13	
14	15--22--36	16	17--23--38	18	19--24--40	20	
21	22--25--41	23	24--26--43	25	26--27--45	27	
28	29--28--46	30	31--29--48	1	2 EMPT (1-3) C Hill--30--50	3	Nov.
4	5--31--51	6	7--32--53	8	9--33--55	10	
11	12--34--56	13	14--35--58	15	16--36--60	17	
18	17--37--61	20	21 State Holiday	22 State Holiday	23 State holiday	24	
25	26--38--63	27	28--39--65	29	30--40--67	1	Dec.
2	3--41--68	4	5 Last Day of Class-42-70	6 Reading Day	7	8	
9	10 11:30-2:30 (361)	11	12 8-11(161) 11:30-2:30(311)	13	14 TAC Wilmington	15 Grad.	
16	17 Grades due at 2 PM	18	19	20	21	22	