Syllabus for
MAT 113--Mathematical Analysis I
3 Credit Hours
Fall 2007

I.   COURSE DESCRIPTION

A treatment that develops the concepts of number systems, absolute value, inequality, domain, range, local extremes, zeros, relations, and functions. Functions studied include those that are linear, polynomial, radical, absolute value, exponential, and logarithmic. (Does not count toward a major or minor in mathematics.)

II.   COURSE GOALS

This course is the first of a two course series in mathematical analyses that provide the prerequisites for the study of calculus. This course, in concert with Mathematical Analysis II (MAT 114), enables the student in pre-medicine, computer science, and pre-engineering (as well as other scientific disciplines) the opportunity to develop the background required for the science or mathematics courses required in their chosen field.

III.   STUDENT LEARNING OUTCOMES FOR THIS COURSE

A.   Objectives
        As a result of successfully completing this course the student will be able to do the following:
        1.   Identify number sets and apply their basic operations.
        2.   Define function and relation.
        3.   Define and determine the domain and range of a given function.
        4.   Determine symmetries of a graph that relate to the x-axis, y-axis, origin and the line y = x.
        5.   Identify functions as increasing, decreasing, odd, even, continuous, and discontinuous.
        6.   Graph given functions that are polynomials, exponentials, and logarithmic.
        7.   Construct sum, difference, product, and quotient functions from other functions.
        8.   Discuss the end behavior of a given function.
        9.   Find zeros of polynomial functions through various methods such as graphing, factoring and synthetic division.
        10.   Define composite functions and apply this definition to given functions.
        11.   Define a rational function.
        12.   List the location of the vertical and horizontal asymptotes of a given function.
        13.   Describe the function behavior near asymptotes.
        14.   Define exponential and logarithmic functions.
        15.   List the characteristics of a basic exponential graph.
        16.   List the characteristics of a basic logarithmic graph.
        17.   Discuss the best fit equation for several regression models.

B. Objectives for Students in Teacher Preparation Programs
The course goals for the Teacher Preparation Program now meet the "competency-based" requirements established by the Oklahoma Commission on Teacher Preparation. This course meets Subject Competencies 5,6,7,8, and 9.

SC5: Has a broad and deep knowledge of the concepts, principles, techniques, and reasoning methods of mathematics that is used to set curricular goals and shape teaching.
SC6: Understands significant connections among mathematical ideas and the applications of these ideas to problem solving in mathematics, in other disciplines, and in the world outside of school.
SC7: Has experiences with practical applications of mathematical ideas and is able to incorporate these in curricular and instructional decisions.
SC8: Is proficient in, at least, the mathematics content needed to teach the mathematics skills described in Oklahoma's core curriculum, from multiple perspectives. This includes, but is not limited to, a concrete and abstract understanding of number systems and number theory, geometry and measurement, statistics and probability, functions, algebra, discrete mathematics, and calculus necessary to effectively teach the mathematics skills addressed in the sixth through twelfth grade in the Oklahoma core curriculum. (The depth and breadth of knowledge should be much greater than for the Intermediate Mathematics certification.)
SC9: Is proficient in the use of a variety of instructional strategies to include, but is not limited to, cooperative learning, use of concrete materials, use of technology (i.e., calculators and computers), and writing strategies to stimulate and facilitate student learning.

IV. TEXTBOOKS AND OTHER LEARNING RESOURCES

Required Materials
A. Textbooks
Margaret Lial, John Hornsby, and David Schneider. Precalculus New York: Addison-Wesley, 2005.
B. Other
A graphing calculator is required. The instructor will be using the TI-83 Plus throughout the course.

V. POLICIES AND PROCEDURES

A. University Policies and Procedures
1. Attendance at each class or laboratory is mandatory at Oral Roberts University. Excessive absences can reduce a student's grade or deny credit for the course.
2. Students taking a late exam because of an unauthorized absence are charged a late exam fee.
3. Students and faculty at Oral Roberts University must adhere to all laws addressing the ethical use of others' materials, whether it is in the form of print, video, multimedia, or computer software. By submitting an assignment in any form, the student gives permission for the assignment to be checked for plagiarism, either by submitting the work for electronic verification or by other means.
4. Final exams cannot be given before their scheduled times. Students need to check the final exam schedule before planning return flights or other events at the

end of the semester.

5. Students are to be in compliance with University, school, and departmental policies regarding ePortfolio requirements. Students should consult the ePortfolio handbooks for requirements regarding general education and the students' majors.

 a. The penalty for not submitting electronically or for incorrectly submitting an ePortfolio artifact is a zero for that assignment.

 b. By submitting an assignment, the student gives permission for the assignment to be assessed electronically.

B. Department Policies and Procedures

1. Each Student who uses the computer is given access to the appropriate computer resources. These limited resources and privileges are given to allow students to perform course assignments. Abuse of these privileges will result in their curtailment. Students should note that the contents of computer directories are subject to review by instructors and the computer administrative staff.

2. A fee of $15.00 will be assessed for all late exams. This policy applies to all exams taken without notifying the professor prior to the regularly scheduled exam time, and to all exams taken late without an administrative excuse.

3. Any student whose unexcused absences total 33% or more of the total number of class sessions will receive an F for the course grade.

C. Course Policies and Procedures

1. Evaluation Procedures: The weight distribution of course work is as follows:
 In-class Examinations: Three counting 100 points each.
 Project: One that counts 100 points.
 Daily Assignments and quizzes: Counting up to 200 points.
 Final Exam (comprehensive): One counting from 150 to 200 points.
 The overall course grade will be assigned as follows: 90-100%, A; 80-89%, B; 70-79%, C; 60-69%, D; Below 60%, F.

2. ePortfolio Requirements
 This course does not require an ePortfolio artifact.

3. Other Policies and Procedures

 a. Homework. Completing the homework is essential. Because mathematics builds upon previously developed concepts, your progress in the learning process depends upon proper pacing. The best way to ensure maximum learning is for each student to give immediate attention to each assignment presented. Specific homework assignments are given in Part VI of this syllabus. An asterisk notes "Write-up" problems. Students should refer to the instructor's handout for the correct procedure on "Write-up" problems.

 b. Credit by Examination. All Oral Roberts University students are expected to take one college-level mathematics course. If the material in this course along with the material in Math Analysis II (MAT 114) was studied in high school, the student is expected to take Calculus I (MAT 201). Consequently, credit by examination is not possible in this course.

VI.   COURSE CALENDAR

Day	Section	Topic	Homework Assignment	#
		Chapter 1: Equations and Inequalities		
1	1.1	Linear Equations	pp. 90-92: # 1-5, 11, 14, 17, 19, 22, 40, 44	1
2	1.2	Linear Applications and Modeling	pp. 100-107: # 1, 6, 8, 11, 21, 36, 43, 44	2
3	1.3	Complex Numbers	pp. 113-115: # 7, 9, 18, 27, 32, 44, 46, 52, 56, 70, 83, 93	3
4,5	1.4	Quadratic Equations	pp. 123-125: # 14,16,20, 23, 25, 31, 34, 47,50, 59	4
6	1.5	Quadratic Applications and Modeling	pp. 130-136: # 1, 3, 4, 6, 9, 17, 18, 26	5
7	1.6	Other Types of Equations	pp. 144-145: # 8, 12, 15, 20, 24, 29, 34, 40	6
8	1.7	Inequalities	pp. 156-160: # 1, 8, 15, 20, 26, 40, 69, 72	7
9	1.8	Absolute Value Equations and Inequalities	pp. 164-166: # 1, 4, 10, 27, 34, 42, 51	8
10		REVIEW		
11		TEST (Chapter 1)		
		Chapter 2: Graphs and Functions		
12	2.1	Graphs of Equations	pp. 192-196: # 4, 12, 24, 33, 46, 49, 57,64, 72, 78	9
13	2.2	Functions	pp. 209-213: # 5, 8, 13, 14, 19, 20, 21, 42, 44, 50, 73	10
14	2.3	Linear Functions	pp. 221-226: # 2, 5, 12, 17, 20, 26, 28, 34, 38, 40, 49, 58, 62	11
15,16	2.4	Equations of Lines and Curve Fitting	pp. 236-240: # 1, 4, 5, 8, 12, 14, 15, 20, 28, 30, 36, 37	12
17	2.5	Graphs of Basic Functions	pp. 249-252: # 2, 5, 7, 8, 9, 14, 18, 21, 23, 29	13
18,19	2.6	Graphing Techniques	pp. 264-267: # 1, 3(a, c, f, g), 4, 5, 8, 19, 24, 27, 32, 34, 37, 42, 44	14

20	2.7	Function Operations and Composition	pp. 276-280: # 2, 4, 9, 23(a, b), 41, 46, 57, 70	15
21 22		REVIEW TEST (Chapter 2)		

Chapter 3: Polynomial and Rational Functions

23,24	3.1	Quadratic Functions and Models	pp. 303-312: # 2, 5, 6, 12, 14, 17, 19, 44, 45, 57, 66	16
25	3.2	Synthetic Division	pp. 319-320: # 1, 6, 10, 19, 24, 31, 40, 44	17
26	3.3	Zeros of Polynomial Functions	pp. 329-331: # 5, 17, 20, 29, 35, 49, 73, 78	18
27,28	3.4	Polynomial Functions: Graphs, Applications, and Models	pp. 342-345: # 1-3, 6, 9, 13, 14, 22, 25, 31, 37, 44, 53, 89	19
29,30	3.5	Rational Functions: Graphs, Applications, and Models	pp. 362-368: # 9, 10, 12, 14, 17, 20, 37, 40, 41, 51, 59, 64, 70	20
31 32		REVIEW TEST (Chapter 3)		

Chapter 4: Exponential and Logarithmic Functions

33	4.1	Inverse Functions	pp. 398-402: # 2, 4, 5, 7, 10, 33, 34, 36, 40,50, 53, 67, 70, 71	21
34,35	4.2	Exponential Functions:	pp. 414-418: # 4, 5, 10, 13, 16, 26, 44, 47, 52, 54, 66, 75	22
36	4.3	Logarithmic Functions	pp. 427-430: # 1(a-c), 4, 10, 12, 14, 19, 23, 33, 39, 40, 58, 65, 67, 74	23
37		Assign Project		
38	4.4	Evaluating Logarithms and the Change of Base Theorem	pp. 438-442: # 12, 20, 34, 35, 38, 49a, 50a, 67	24
39, 40	4.5	Exponential and Logarithmic Equations	pp. 448-452: # 5, 8, 11, 15, 23, 30, 33, 36, 38, 55, 66	25
41, 42	4.6	Applications and Models of Exponential Growth and Decay	pp. 458-452: # 1-4, 5, 9, 14, 19, 25, 26	26
43 44		REVIEW Quiz (Chapter 4)		
45		REVIEW for Final Examination		

Course Inventory for ORU's Student Learning Outcomes

MAT 113--Mathematical Analysis I
Fall 2007

This course contributes to the ORU student learning outcomes as indicated below:
Significant Contribution – Addresses the outcome directly and includes targeted assessment.
Moderate Contribution – Addresses the outcome directly or indirectly and includes some assessment.
Minimal Contribution – Addresses the outcome indirectly and includes little or no assessment.
No Contribution – Does not address the outcome.

The Student Learning Glossary at http://ir.oru.edu/doc/glossary.pdf defines each outcome and each of the proficiencies/capacities.

OUTCOMES & Proficiencies/Capacities		Significant Contribution	Moderate Contribution	Minimal Contribution	No Contribution
1	**Outcome #1 – Spiritually Alive** Proficiencies/Capacities				
1A	Biblical knowledge				X
1B	Sensitivity to the Holy Spirit			X	
1C	Evangelistic capability				X
1D	Ethical behavior			X	

2	**Outcome #2 – Intellectually Alert** Proficiencies/Capacities				
2A	Critical thinking	X			
2B	Information literacy			X	
2C	Global & historical perspectives			X	
2D	Aesthetic appreciation				X
2E	Intellectual creativity	X			

3	**Outcome #3 – Physically Disciplined** Proficiencies/Capacities				
3A	Healthy lifestyle				X
3B	Physically disciplined lifestyle				X

4	**Outcome #4 – Socially Adept** Proficiencies/Capacities				
4A	Communication skills		X		
4B	Interpersonal skills		X		
4C	Appreciation of cultural & linguistic differences				X
4D	Responsible citizenship			X	
4E	Leadership capacity			X	