Syllabus for
MAT 114—Mathematical Analysis II
3 Credit hours
Fall 2000

I.   COURSE DESCRIPTION

A continuation of Math Analysis I, MAT 113, and is the second course in a two-semester sequence, preparing students for calculus. (Does not count toward a major or a minor in mathematics.) The concepts developed in the first course are expanded and considered in relationship to rational functions, trigonometric functions, and conic sections. Course prerequisite is Math Analysis I, MAT-113, or permission of the Computer Science/Mathematics Department.

As in the case of MAT 113, a graphics calculator is required to facilitate obtaining solutions and drawing conclusions.

II.   COURSE GOALS

This course is the second of a two-course series in mathematical analysis that provides the prerequisites for the study of calculus. This course, in concert with Mathematical Analysis I, provides students in premedicine, computer science, and pre-engineering (as well as other scientific disciplines) the background required in their science or mathematical courses.

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.

III. COURSE OBJECTIVES

A. Terminal Objectives

See Section B below.

B. Objectives for Students in Teacher Preparation Programs

The Teacher Preparation Program meets the competency-based requirements established by the Oklahoma Commission on Teacher Preparation. This course meets the following competencies; Subject Competencies (SC).

This course is designed to help students meet subject competencies:

SC 8:   Define the sine and cosine functions in terms of the unit circle.

SC 7,8:   Define other trig functions in terms of sine and cosine.

SC 6:   List and apply the fundamental identities for circular functions.

SC 5,6:   Prove trig identities by use of the fundamental identities.

SC 8:   State and use the sum-difference, reduction, and multiple value formulas of trig identities.

SC 6,8:   Solve trigonometric equations.

SC 8,9:   Graph the six trig functions and their modification with respect to amplitude,

period, phase, etc.

SC 8: Define and identify uses of the inverse functions of the six trig functions.

SC 8: Solve trigonometric problems involving triangles using the laws of sines, cosines, and other special cases.

SC 8: Convert measurement from degrees to radians, and conversely.

SC 6,7,8: Solve problems related to parabolas, ellipses, and hyperbolas.

IV. TEXTBOOKS:

A. Required Textbook

Demana, Waits, Clemens and Foley. Precalculus: Functions and Graphs. Third Edition. New York: Addison-Wesley, 1997

B. Required Materials

A graphing calculator is required.

V. POLICIES AND PROCEDURES

A. University Policies and Procedures

1. Attendance at each class or laboratory is mandatory at Oral Roberts University.
2. Double cuts will be assessed for absences immediately preceding or following holidays.
3. Excessive absences can reduce a student's grade or deny credit for the course.
4. Students taking a late exam because of an unauthorized absence will be charged a late exam fee.
5. Students and faculty at Oral Roberts University adhere to all laws addressing the ethical use of others' materials, whether it is in the form of print, video, multimedia, or computer software.

B. Course Policies and Procedures

1. Evaluation Procedure
   a. One-period examinations will count 100 to 120 points and the cumulative final examination 150 to 200 points.
   b. Quizzes (if given) and homework are worth up to a total of 300 points.
   c. Semester Test will be comprehensive and count from 150 to 200 points.
   d. The final grade will be determined by the percentage of the total points possible accumulated: 80-100%, A; 70-79%, B; 60-69%, C; 50-59%, D; below 50%, F.

2. Portfolio Requirements

   For Professional Education Program Students Only. Portfolio to include semester test.

3. Other Policies and Procedures

   a. Homework. Because mathematics builds upon previously developed concepts, the student's progress in the learning process depends on proper pacing. A continuos learning effort is required and cannot be replaced by a "cram session" the night before an examination. The best way to ensure maximum learning is for each

student to give immediate to each assignment presented. Specific homework assignments are given in Part VI of the syllabus.

b. Credit by Examination. All Oral Roberts University students are expected to take one college-level mathematics course. If the material in this course and MAT 113 was studied in high school, the student is expected to take Calculus I (MAT 201). Consequently, credit for this course by examination is not permitted.

VI.   COURSE CALENDAR

Lesson	Section	Topic	Assignments	#
		Chapter 5: Rational Functions		
1,2	5.1	Rational Functions and Asymptotes	1,2,5,9,11,13,15,17,21,23,25,29,33, 35,39,41,47,50	1
3	5.2	Graphing Rational Function, $n<m$	1,3,5,7,9,12,15,20,21,22,27,35	2
4	5.3	Graphing Rational Function, $n>m$	2,3,6,7,9,13,21,24,27,29,30,31	3
5	5.4	Rational Equations and Inequalities	1,4,7,8,11,14,17,25,29,33,35,36	4
6	5.5	Partial Fractions	1,2,3,5,7,11,13,14,21	5
7		Review		
8		Test: Chapter 5		
		Chapter 6: The Trigonometry		
9	6.1	Angles and Their Measures	1,2,5-15,18,19,20,21,23,25,27,32,35, 37,39,41,45,48-53,55,57,59,61	6
10,11	6.2	Trigonometric Functions of Acute Angles	1,4,5,8,11,12,17,21,30,40,45,51,55, 73,80,81,86,91	7
12,13	6.3	Extending Trigonometric Functions	3,8,14,25,28,30,33,35,36,41,42,43, 44,53,77	8
14,15	6.4	Graphs of Sine and Cosine Functions	3,5,8,12,14,17,18,21,23,26,27,29,35,3 9,45,46,59	9
16		Review		
17		Test: 6.1-6.4		
18,19	6.5	Graphs of Other Trigonometric Functions	1,2,5,10,17,20,27,39,42	10
20,21	6.7	Inverse Trigonometric Functions	1,4,5,8,11,13,17,21,23,25,28,31,35, 47	11
22	6.8	Applications of Trigonometric Functions	2,3,5,6,9,12,17,23	12
23		Review		
24		Test: 6.5-6.8		

Lesson	Section	Topic	Assignments	#
		Chapter 7: Analytic Trigonometry		
25	7.1	Applications of Fundamental Identities	1,7,9,11,13,17,21,27,31,39,46	13
26,27	7.2	Confirming Identities	1,3,5,7,9,11,19,25,27,31,39,43	14
28,29	7.3	Solving Trigonometric Equations	1,3,5,7,9,11,19,25,27,31,39,49	15
30,31	7.4	Sum and Difference Identities	1,3,5,7,9,11,15,19,23,27,35,37,41,45	16
32,33	7.5	Multiple-Angle Identities	1,3,7,9,11,13,19,21,25,31,33,35,39, 43,50 (Bonus Question, 5 points)	17
34		Review		
35		Test: Chapter 7		
		Chapter 8: Additional Applications of Trigonometry		
36,37	8.1	Law of Sines	1,3,5,7,9,11,13,15,19,21,25,37,39,45, 49 (Bonus Question, 5 points)	18
38,39	8.2	Law of Cosines	1,3,5,7,9,13,17,21,25,29,31,33,38 (Bonus Question, 5 points)	19
		Chapter 9: Parametric Equations, Conics, and Polar Equations		
40,41	9.2	Conic Sections	1,3,5,7,9,11,13,17,19,25,33,37,41,43, 47	20
43,44		Review for Final		

James McGinnis
Name of Instructor

MAT 114
Course #

Mathematical Analysis II
Title of Course

Computer Science/Math
Name of Department

MISSION

The lifestyle at ORU is rooted in the word "Wholeness." ORU seeks to educate the whole person with balanced emphasis placed on the development of mind, spirit, and body.

GENERAL OUTCOMES

1. Spiritual Development

2. Physical Development

3. Communication

4. Analysis

5. Problem Solving

6. Valuing in Decision making

7. Social Interaction

8. Global Perspectives

9. Effective Citizenship

10. Aesthetic Responsiveness

MAJOR OUTCOMES

Creative and Analytical Thinking/Communicating
Demonstrates ability to think abstractly, discern patterns, recognize relationships and order ideas into a sequence of logical deductions Effectively communicates his or her analyses to others in both symbolism and grammatically correct English.

Problem Solving Skills
Demonstrates ability to read and analyze problems, construct and implement strategies for resolving problems, and interpret and verify the resulting solutions.

Aesthetic Responsiveness
Appreciates the origin of mathematical ideas, relationships between ideas and processes for refining solutions, models and methodologies.

Social Interaction
Effectively learns teamwork while working with a group on open-ended multiple solution problems.

COURSE GOALS

Provide pre-engineering, pre-medicine, computer science, and mathematic students with the additional mathematic tools (to those gained in MAT 113) required for their major course work.

To demonstrate mastery the student will:
- graph/analyze given functions (exponential, logarithmic, rational, radical, trigonometric, etc.) and their inverses with the aid of a graphing calculator.
- solve problems involving exponential growth or decay.
- define other trig functions in terms of the sine and cosine functions.
- prove trigonometric identities using the fundamental trigonometric identities.
- solve trigonometric equations.
- graph the six trigonometric functions and their modifications and identify their amplitude, period, phase shift, etc.
- solve triangle problems using the Laws of Sine and Cosines.
- solve problems in the complex number field. identify and solve problems using arithmetic and geometric sequence and series.
- find permutations and combinations of numbers and events.

ASSESSMENT OF COURSE GOALS

STIMULI:

Examinations

Problem Solving

Individual Projects Written

Group Interaction

CRITERIA:

One-period examinations (up to 4 in number) will count 100 to 120 points and the cumulative final examination 150 to 200 points.

Quizzes (if given) and homework are worth up to a total of 150 points.

The final grade will be determined by the percentage of total points acumulated: 90-100%, A; 80-89%, B; 70-79%, C; 55-69%, D; Below 55%, F.