Syllabus for

LMAT 151--Mathematics and Society

3 Credit Hours

I. COURSE DESCRIPTION

A study of the pattern and order in the universe, including creative thought in making conjectures based on inductive reasoning and application in problem-solving using deductive reasoning. Covers problem-solving, statistics, finance and logic. (Does not count toward a major or minor in mathematics. Writing-intensive sections are available.)

II. COURSE GOALS

The purpose of this course is to enable the student to do the following:

- **A.** Recognize God's pattern and order in the universe.
- **B.** Become mathematically literate.
- **C.** Engage in proportional, hypothetical, logical, and indirect reasoning.
- **D.** Construct inductive and deductive arguments.
- **E.** Develop the ability to use numbers to describe and model natural phenomena in daily life in order to better understand the world around them and solve real-world problems.
- **F.** Develop the ability to use inductive and deductive reasoning to recognize, extend, and generalize patterns and arguments.
- **G.** Learn George Polya's four-step problem-solving framework and apply it in a variety of problem-solving experiences.
- **H.** Learn to use statistics to evaluate and interpret the vast amount of information that is presented in the media today.
- **I.** Make wise financial decisions in the areas of sales, insurance, annuities, loan payments, credit card interest, and mortgages.

III. STUDENT LEARNING OUTCOMES FOR THIS COURSE

A. Terminal Objectives

As a result of successfully completing this course, the student will be able to do the following:

1. **1.** Perform problem solving
2. **2.** Use logic and critical thinking
3. **3.** Apply statistics to everyday problems
4. **4.** Calculate the solutions to finance problems.

As a result of successfully completing each unit, the student will be able to do the following:

1. Unit 1— Problem Solving and Patterns

   Upon successful completion of this unit, the student will be able to do the following:

   a. Describe the difference between inductive and deductive reasoning.
   b. Identify different types of sequences and determine a general rule for some types of sequences.
   c. Use Polya's problem-solving framework to solve problems.
   d. Identify the Fibonacci sequence and discuss its relationship to objects in nature.

e. Discuss applications of the golden ratio.
f. Discuss Pascal's triangle and its applications.
g. Describe fractals and their applications.
h. Research and report as part of a team of students on a topic relating mathematics to other areas of life, such as nature, history, fine arts, etc.

2. Unit 2—Logic and Critical Thinking

Upon successful completion of this unit, the student will be able to do the following:

a. Identify and use the basics of mathematical logic.
b. Write a negation.
c. Construct truth tables.
d. Decide whether a statement is true or false.
e. Determine whether statements are equivalent.
f. Write the converse, inverse, and contrapositive of an "if then" statement.
g. Analyze arguments and identify fallacies.
h. Determine the validity and soundness of deductive arguments.

3. Unit 3— Statistics

Upon successful completion of this unit, the student will be able to do the following:

a. Determine the believability of a statistical study.
b. Construct the following types of graphs from a given set of data.
    i. Vertical bar graph
    ii. Horizontal bar graph
    iii. Comparative bar graph
    iv. Pictogram
    v. Circle graph
    vi. Frequency distribution table
    vii. Histogram
    viii. Frequency polygon
c. State four measures of central tendency and distinguish among them.
d. Compute the mean, median, mode, and midrange for a given set of data.
e. Determine the shape of a given distribution.
f. Find the five number summary of a set of data.
g. State two measures of dispersion and distinguish between them.
h. Compute the range, variance, and standard deviation for a given set of data.
i. Calculate what percentage of normally distributed data is within a given number of standard deviations from the mean.
j. Determine the margin of error of a given set of data.
k. Discuss the possible validity of a statistical study.

4. Unit 4— Finance

Upon successful completion of this unit, the student will be able to do the following:

a. Convert a percent to a decimal or fraction and convert decimals and fractions to percentages.
b. Discuss the uses and abuses of percentages.
c. Use estimation to solve problems and make projections.
d. Compute simple interest.
e. Compute compound amount and compound interest.
f. Find the effective annual interest rate of a given loan or investment.
g. Calculate the monthly payments for principal and interest for loans of various lengths at various interest rates.
h. Calculate interest and new balance forcredit cards.
i. Calculate the annuity necessary to save a given amount of money for

retirement.

j. Calculate the amount in a saving plan after depositing a given annuity at certain intervals into a savings plan.

k. Demonstrate sound reasoning in making financial decisions by working with a team and completing a project written report.

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,and 7.

SC5: 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.

SC6: Has experiences with practical applications of mathematical ideas and is able to incorporate these in curricular and instructional decisions.

SC7: 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 first through eighth grade in the Oklahoma core curriculum

IV. TEXTBOOKS AND OTHER LEARNING RESOURCES

Textbook(s) and materials for the course are listed using standard citation style (APA, MLA, Chicago, Turabian, etc.). Since other styles may be used in disciplines other than the one used in this course or school, the ORU Citing and Documenting Sources pages offer a collection of styles students may choose from. This course asks that students be consistent in whatever style they use throughout the course.

The ORU Bookstore carries print as well as eTexts of assigned textbooks.
http://www.bkstr.com/oralrobertsstore/home

Required Materials

Textbook:

Miller, Charles D. *Mathematical Ideas, 13th Edition.* Pearson Education, 2016
[ISBN: Physical: 9780321977076; Digital: 9780134462714] (Includes textbook, Student Solutions Manual, and MyMathLab access code)

Note: A MyMathLab packet (access code) should be packaged with the textbook. The student will also have the option to purchase a separate MyMathLab packet in order to be able to complete the homework assignments. The MyMathLab packet includes an online version of the textbook.

Other required materials:

A scientific calculator (a programmable calculator is not recommended)

V. POLICIES AND PROCEDURES

A. University Policies and Procedures

1. Participation: Participation in each online class through discussion forums, assignments, and all other course activities is mandatory at Oral Roberts University. This counts as your attendance in the course. Excessive absences can reduce a student's grade or deny credit for the course.

2. Plagiarism: The ORU Catalog explicitly addresses the issue of plagiarism. Make sure you know

ORU's policy on plagiarism and what is considered plagiarism.

3. Privacy: By law, students are entitled to privacy regarding their records. The Family Educational Rights and Privacy Act of 1974 (FERPA), as amended and available in the ORU University Catalog, sets forth requirements designed to protect the privacy of student education records. The law governs access to records maintained by educational institutions and the release of information from those records.

4. Whole Person Assessment Requirements:

a. An e-portfolio artifact is required for this course. The artifact for this course is a 200-250 word reflection paper that summarizes ideas discovered in the semester research project for unit one.

b. Artifacts not submitted electronically or incorrectly submitted receive a zero for that assignment.

B. School and/or Department Policies and Procedures

1. Class Assignments

a. Students need to have the appropriate textbooks, course materials, and other supplies as designated by the professor.

b. Professors may refuse to accept an assignment if it has inappropriate content, does not meet the assignment's criteria (e.g., not typed, incorrectly documented), is incomplete, is suspected of plagiarism, or is turned in too late.

2. Late Work

a. The student is responsible for obtaining class assignments and materials, and all work is expected to be completed as scheduled. Late work may not be accepted by the professor, or it may result in a lower grade. Computer or Internet malfunctions do not constitute an excuse for late work; students should have their work prepared in time to ensure that they can get it completed, edited, and proofread prior to the instructor's due date. These responsibilities assist the student in professional development.

b. Generally, assignments missed from a serious sickness or family crises can be made up and the instructor should be notified as soon as possible to reach an agreement on due dates and possible penalties. Each instructor has his or her own late-work policy. Instructors use their own judgment in accepting late work.

3. Incompletes

On rare occasions, the grade of "I" may be given for work that is incomplete at the time grades are given. It is given only after the instructor and the department chair or college dean approve a petition submitted by the student that his or her work is incomplete for good cause. Good cause typically consists of a catastrophic event in which the student is prevented from completing the course requirements. It is the responsibility of the student to initiate the petition through http://petitions.oru.edu, make up any incomplete work, and ask the instructor to submit a grade change to the registrar. If the work is not completed by the end of the subsequent session, the incomplete will automatically convert to an "F." For graduating seniors, the degree will be awarded in the term that the student completes his or her course work, not the final term of enrollment.

C. Online Programs Policies and Procedures

1. Communicating with your Instructor: All email communication between students and faculty will be through their ORU.edu emails.

2. Learning Community: Online learning community is established through active participation in the threaded weekly discussions. The mutual exchange of ideas, information, and experiences is an essential part of the learning process, and students are encouraged to use the discussion forum as virtual classroom platform.

3. ADA and Students with Disabilities:

- Click here (http://www.brightspace.com/about/accessibility/) to view Desire2Learn's "Accessibility Resources for Students with Disabilities."
- Students requiring Disability Services from ORU, please click here: https://goo.gl/QGoK4x
- Desire2Learn (D2L) Accessibility Guidelines and Checklist: https://goo.gl/Ck4RwY
- D2L Accessibility Policy: https://www.d2l.com/accessibility/

4. Useful Links for Online Students:

- Student Learning Glossary
- Library: http://library.oru.edu.

- D2L Helpdesk: d2lhelp@oru.edu
- I.T. Student Helpdesk: studenthelpdesk@oru.edu
- Netiquette and Online Discussions: https://goo.gl/f744AY
- Contact the University: please fill out this online form. Please first contact your instructor for assistance with any matter specific to the course

D. Department Policies and Procedures

1. Evaluation Procedures

a. Homework assignment scores are worth 10 points each. All daily assignments are facilitated through mymathlab.com. Students are required to purchase access to this program in order to complete the homework assignments for each section.

b. There are four unit projects, each worth 50 points.

c. There is one midterm exam worth 100 points and one final exam worth 200 points.

2. Grading Scale: A=90-100% B=80-89% C=70-79% D=60-69% F=59% and below.

3. Other Policies and/or Procedures:

a. Any assignment turned in late may have points deducted. All homework problems completed after the due date will have a 20% penalty assessed. Everything completed correctly before the due date will have no penalty. The homework assignments do close on Saturday at 11:59 p.m. each week, so don't wait until Friday night to start your assignments. **Practice tests and chapter exams are not available after the due date.**

b. Completing the homework is essential. Because mathematics builds upon previously developed concepts, the student's progress in the learning process depends on proper pacing. The best way to ensure maximum learning is for each student to give immediate attention to each assignment presented.

c. Specific homework assignments are given in *MyMathLab* and a tentative schedule is listed in Part VI of the syllabus.

d. All math problems will be done online with *MyMathLab*. Discussions will be required and part of your grade.

e. Credit by examination. All ORU students are expected to take one college- level mathematics course. If the material in this course and MAT 105 were studied in high school, the student is expected to take Calculus I (MAT 201). Consequently, credit for this course by examination is not permitted.

f. If a syllabus revision is necessary for any reason, the instructor will notify the students on D2L and by email.

f. There is a practice before each exam that a student may take as many times as liked to obtain the best possible score. I will enter the highest score in the grade book on D2L.

g. Do not wait until the last minute to do any assignments – computer glitches happen, internet services occasionally go out, websites can go down. Working early helps keep these kind of issues from affecting your grade negatively**.**

VI. TENTATIVE COURSE CALENDAR

Lesson	Text	Topic	Schedule by week
1		Orientation videos and homework (MML)	**Week 1** ***(Introductory Discussion)***
2	*1.1*	Solving Problems by Inductive Reasoning	
3	*1.2*	Number Patterns: Sequences	
4	*1.3*	Strategies for Problem Solving	
5	*5.5*	Fibonacci Sequence and Golden Ratio	
6		***Project 1***	
7	*3.1*	Statements and Quantifiers	**Week 2**
8	*3.2*	Truth Tables	
9	*3.3*	The Conditional	
10	*3.4*	More on Conditional	
11	*3.5*	Analyzing Arguments (Euler Diagram)	
12		Whole Person Artifact	
13	*3.6*	Analyzing Arguments (Truth tables)	**Week 3** ***(Discussion 1 –Ind/Ded Reasoning)***
14	*9.8*	Fractals	
15	*10.4*	Pascal's Triangle	
16		***Project 2 due***	
17		Midterm Practice Test	**Week 4**
18		Midterm Exam	
19	*13.1*	Time Value of Money Visual	**Week 5** ***(Discussion 2 – Faith vs. Reason)***
20	*13.2*	Installment Buying (Credit)	
21	*13.3*	Truth in Lending	
22	*13.4*	Mortgages and Home Ownership	
23	*13.5*	Financial Investments	
24		***Project 3 due***	

Lesson	Text	Topic	Schedule by week
25	***12.1***	Visual Displays of Data	**Week 6**
26	***12.2***	Measures of Central Tendency	
27	***12.3***	Measures of Dispersion	
28	***12.4***	Measures of Position	
29	***12.5***	The Normal Distribution	
30	***12.E***		**Week 7 (*Discussion 3 - Stewardship)***
31		***Project 4***	
32		Practice Final Exam	
33		***COMPREHENSIVE FINAL EXAM***	

Course Inventory for ORU's Student Learning Outcomes
LMAT 151--Mathematics and Society

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**				
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	