MGF 1107 Mathematics for Liberal Arts II
3 Credits
Spring Term 2008-2

Instructor : Bernard F Mathon
Office : Room 1526
Office Hours : Will be posted on the office door.
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Technology : Students will be allowed to use scientific calculators on most exams.

PREREQUISITE: MAT 1033 with a grade of C or better, or acceptable CPT, SAT or ACT scores.

Introduction

This is a special section of MGF 1107. We will attempt to give non math majors a feel for
the presence of mathematics in the visual arts from a historical as well as a technical point
of view. Students will also be introduced to the concepts of financial mathematics, linear
and exponential growth, numbers and number systems as well as voting techniques.

Course Goals

The goals of the course are to provide the student with an understanding of

• numbers and number systems
• linear and exponential growth
• basic concepts of financial mathematics
• some of the mathematical ideas or techniques used in the Arts
• voting techniques

Course Objectives

The student will be able to

• describe a number system and its use, convert numbers written in one base to
  another and perform the operation of addition and subtraction of numbers in bases
  other than base 10;
• use the coordinate plane to graph equations of linear and exponential functions, as
  well as geometric figures;
• use space coordinates to plot points and geometric figures in three dimensions;
• perform translations and reflections of plane geometric figures in the coordinate
  plane;
• use some of the basic principles of one point perspective;
• do a presentation on the presence of mathematics in the Arts;
• differentiate between simple and compound interest;
- calculate the present and future value of a lump sum of money deposited in a savings account;
- determine the amount financed, the installment price, the finance charge and the annual percentage rate (APR) for a fixed loan;
- distinguish between different types of Voting Methods

How do the course objectives relate to the Miami-Dade Learning Outcomes?

What follows below is a list of the ten learning outcomes that have recently been prepared by Miami Dade faculty and administrators.

As graduates of Miami Dade College, students will be able to:

1. Communicate effectively using listening, speaking, reading, and writing skills.
2. Use quantitative analytical skills to evaluate and process numerical data.
3. Solve problems using critical and creative thinking and scientific reasoning.
4. Formulate strategies to locate, evaluate, and apply information.
5. Demonstrate knowledge of diverse cultures, including global and historical perspectives.
6. Create strategies that can be used to fulfill personal, civic, and social responsibilities.
7. Demonstrate knowledge of ethical thinking and its application to issues in society.
8. Use computer and emerging technologies effectively.
9. Demonstrate an appreciation for aesthetics and creative activities.
10. Describe how natural systems function and recognize the impact of humans on the environment.

Each course taken at the college addresses some of these learning outcomes. This section of Mathematics for Liberal Arts II (MGF 1107) addresses outcomes 1, 2, 3, 4, 5, 8, 9.

- **Communicate effectively using listening, speaking, reading, and writing skills.**
  This course requires reading and understanding the material covered in the textbook. A short group research paper accompanied with a verbal presentation is also required. The paper will give students the opportunity to effectively use their listening, speaking, reading and writing skills. Each group participant will need to contribute to the editing process, ensuring that the collective effort results in a well written paper and an entertaining presentation.

- **Use quantitative analytical skills to evaluate and process numerical data.**
  The student will develop these skills mostly in analyzing real world data that can be modeled by linear or exponential functions and in using compound interest formulas to analyze investment or loan opportunities.
• **Solve problems using critical and creative thinking and scientific reasoning.**
  In analyzing the flaws of voting methods, students will need to use critical and creative thinking.

• **Formulate strategies to locate, evaluate, and apply information.**
  In preparing their papers and Power Point presentations, students will formulate strategies to locate and evaluate the validity of the information they find from a variety of sources. They will need to creatively apply the information they find to establish the connection between mathematics and art.

• **Demonstrate knowledge of diverse cultures, including global and historical perspectives.**
  This course is a survey of different areas of mathematics and as such it touches lightly on the role played by different cultures in the development of mathematics, as well as the use made by people in these cultures of mathematical concepts or applications. Examples include the Babylonian, the Mayan, the Egyptian, the Hindu-Arabic and the Roman civilizations. Students will learn to convert Babylonian, Mayan and Egyptian numerals to the Hindu-Arabic base ten numerals used in modern civilizations. They will also have access to short articles on the numeration systems used in ancient and modern civilizations. In addition, the use of number bases in modern technology will be briefly discussed.

• **Use computer and emerging technologies effectively.**
  Most homework assignments and quizzes will be posted on line on the Course Compass/My Math Lab website. Students will develop the ability to use these computer resources to monitor their progress in the course and to help them reach a better understanding of the concepts, ideas and applications discussed in the course. They will also have the opportunity to use the external links posted on the website to explore topics related to the course goals and objectives.

• **Demonstrate an appreciation for aesthetics and creative activities.**
  Most of the geometry topics discussed in the course will help students see the connection between mathematics and the arts. Students will learn some basic geometric constructions using ruler and compass, they will learn how to plot points in a 3D coordinate system. The use of proportions in similar triangles will be discussed to help understand the mathematics behind the principles of linear perspective. The different symmetry operations in mathematics and their use in tessellations will be connected to the role they play in the decorative arts in many different cultures. The mathematics and art topics discussed in class as well as the student research papers and presentations will contribute to the students’ appreciation for the beauty of mathematics, as well as their appreciation for creative artistic activities.
Attendance and Homework

The course builds upon the material covered each day. Most of the activities involving Arts and Mathematics will be based on handouts as well as group activities. Regular attendance and completion of homework assignments are thus extremely important for the dynamics of the class and successful completion of the course. Keep in mind that one learns mathematics only by doing mathematics. Consequently, students with excessive absences may be dropped from the class. Homework will be assigned on a regular basis. Students are expected to always complete the homework exercises for each section covered in class. Be an active student of mathematics rather than a passive one. If you can be ahead of the topics that will be discussed in class, you will be even better off. Read the section(s), try the examples... “it’s far better to be ahead of the game at the beginning than to play catch up at the end”.

Evaluation

There will be a total of 3 in-class tests, some online quizzes and one Final Exam. The lowest of the test scores will be dropped, and no make-up will be administered. If a student misses a test, it will be the grade dropped. A brief group research paper (5 to 7 pages type-written and double-spaced) on the subject of Arts and Mathematics is also required of all students. The paper may be on a mathematician who has contributed to the artistic field, or on an artist who has used mathematics in his/her artistic work. The paper must include a short biography of the selected individual and a summary of his/her contributions to the artistic or mathematics field. Some personal reflections on the person’s life and work should also be included. To avoid duplicate presentations, each group of students must get their paper approved by the instructor.

The Final Exam is a cumulative exam and required of all students. It will be administered in class during the period of April 27th to May 1st, 2009.

Grades for the course will be based on the following:

<table>
<thead>
<tr>
<th>Tests</th>
<th>40%</th>
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<tbody>
<tr>
<td>Paper and Oral Presentations</td>
<td>20%</td>
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<tr>
<td>Homework and Assignments</td>
<td>10%</td>
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<tr>
<td>Quizzes</td>
<td>10%</td>
</tr>
<tr>
<td>Final</td>
<td>20%</td>
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Grading Scale

- 90 - 100 A
- 80 - 89 B
- 70 - 79 C
- 60 - 69 D
- 0 - 59 F

Withdrawal Policy

A student may withdraw from the course and receive a grade of "W" up until the last day to drop, which is Wednesday March 18, 2009 for this term (2008-2). The student who decides to withdraw from the course must fill out a "Drop Card" available at the registrar's or the academic advisement office. It is the student's responsibility to do so. Students must be aware though, that too many withdrawals may affect their academic standing at the college.
Support Services

Should you encounter any difficulty with a section or a chapter, seek help right away. Stop by and see me during my office hours, stop by the Math Lab, or seek the help of a tutor. In the Math Lab, Room 2223, you will find video equipment and computer software that may be of assistance to you. You may also come to the Math Lab to interact with other students of mathematics, seek help in solving homework problems or to ask questions concerning the course material. DO NOT EXPECT TO BE TUTORED IN THE LAB THOUGH. The Lab hours are posted on the door at the entrance of the Lab. The services provided in the Lab are free.

Online Resources

In addition to the services offered at the college, students will find additional practice exercises, links to Mathematics and Arts articles or websites as well as video lectures on the “My Math Lab/Course Compass” web site. Online homework and quizzes will be posted on the topics that are included in the textbook. Students will have two attempts for each quiz. This will help you assess your level of mastery of the topics before taking the class exams. The new edition of the textbook purchased at the bookstore comes packaged with a Student Access kit for “My Math Lab”. Included is a student access code that may be used to enroll for the online activities of the course. The course ID is mathon10733. These online resources should be of great help to ensure a clear understanding of the topics discussed in class. Make use of the ones that suit you the best, and most importantly, do not give up. You can do it if you try hard enough!

Classroom Etiquette and Discipline

Students are expected to arrive to class and leave on time. All beepers and cell phones must be turned off before class as a courtesy to your instructor and to your classmates.