MATH 150-08 Elements of Calculus I

Esmeralda Nastase

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Instructor: Dr. Esmeralda Năstase  
Office: 133 Hinkle Hall  
Office Phone: 745-3260  
E-mail: nastasee@xavier.edu  
Office Hours: MW 11:00 - 12:00, T 2:30-3:30, or by appointment

CORE: This course fulfills one or more requirements of the Core Curriculum.

PREREQUISITES: The prerequisite for MATH 150 is MATH 120 - Elementary Functions, or its equivalent. In particular, you should be familiar with the graphs and basic properties of linear, quadratic, cubic, exponential, and logarithmic functions. You should be able to do routine algebra when necessary.

TEXT: Calculus Concepts - An Informal Approach to the Mathematics of Change, 5th ed., by LaTorre, Kennelly, Fetta Reed, Harris, & Carpenter

COURSE DESCRIPTION: Calculus is the mathematics used to describe processes of change. Differential calculus is used to study rates at which change occurs, and integral calculus is used to calculate how much change accumulates given that the rate of change is known. MATH 150 is an informal introduction to both differential and integral calculus, designed for a general audience. We will begin with learning to “model”, i.e. “imitate”, “mimic”, real data using “functions”, which are determined using the TI-83 graphing calculator. We will then use ideas from calculus to analyze these models (functions) and draw conclusions about the situation which generated the data. We will use the numerical and graphical capabilities of the TI-83 in our analysis and more generally to enhance our understanding of the basic calculus concepts. Thus, a three-fold development of calculus (numerical, graphical, and algebraic) replaces the traditional (purely algebraic) development. Strong emphasis in MATH 150 is placed on clearly communicating questions and interpretations of the results obtained, and to provide logical and convincing arguments for the results.

COURSE OBJECTIVES / STUDENT LEARNING OUTCOMES:

I. Core Curriculum learning goals and student learning outcomes

- Students will analyze and interpret texts, images, objects, artifacts, and quantitative and qualitative data.
- Students will evaluate the use of science and mathematics in society and everyday life in an informed manner.
- Students will utilize their imagination and creativity, individually and collectively, to innovate and generate new perspectives to problems.
- Students will organize and express their ideas in writing and orally. Thus, students will be effective communicators both in writing and orally.
II. Other learning goals and student learning outcomes

- Students will be able to identify the properties of linear, quadratic, cubic, exponential, and logistic functions.
- Students will be able to model real-life data using both polynomial and non-polynomial functions. In particular, students will be able to use linear, quadratic, cubic, exponential, and logistic functions to model real-life numerical and verbal data.
- Students will be able to apply calculus concepts to interpret real-life situations.
- Students will be able to understand and put in practice calculus concepts from algebraic, numerical, verbal, and graphical points of view.
- Students will demonstrate the necessary skills to differentiate linear, quadratic, cubic, exponential, logarithmic and logistic functions.
- Students will be able to grow and practice their mathematical understanding and interpretation of real-life data through both written and oral communication.
- Students will demonstrate confidence and proficiency in applying calculus concepts.

CALCULATORS: A Texas Instruments TI-83 or TI-84 is required for this course. You will need it in class, for homework, and on the exams.

ATTENDANCE: Class attendance is crucial. The class meetings provide the introduction and explanation of new topics, you will see how the calculator is used, and you will see how problems are solved. Class notes are to be used in conjunction with the text, in order to elicit a full understanding of the concepts and procedures we cover. Please, be courteous and come to class on time. If you have to miss class for any reason, please inform me ahead of time, in person, via email, or telephone. If you miss classes excessively (more than three) I reserve the right to lower your semester grade by one letter.

CLASS PREPARATION: In preparation for each class, you should read (maybe 15-20 minutes per section) and write a short list of key words, questions, and a brief summary for the section indicated for the next class day. Ask them in class when appropriate, or ask me outside of class if you prefer.

HOMEWORK: Every class, homework will be assigned. You are expected to work all assigned exercises, keeping in mind that these exercises are not necessarily repetition of things that were done in class, but are often a tool to bring out questions, to push a topic we discussed further, or to ask you, the student, to apply recently discussed concepts and procedures creatively. It is important for your success in this class that you take the homework seriously, that you practice answering in complete sentences, and that you provide reasons for your solutions/conclusions. These will be asked of you on quizzes and exams. If you want feedback on any particular exercise, I invite you to come and see me. It is your responsibility to do this. Bring your questions to class; I will take questions about the homework at the beginning of each class session. Homework will be collected, to be graded, on Fridays.

GETTING HELP: One of the best resources for additional help is the Mathematics Tutoring Lab in CLC 419. This room is staffed by mathematics tutors who are just waiting to help someone!

GROUP WORK: I encourage you strongly to study and to do homework with your classmates. Working in a group is beneficial, as long as you make sure that everyone is making contributions and that no one
is left out. However, after discussing the homework, everybody should produce their own write-up, as this will be requested on the exams.

**QUIZZES**: Weekly quizzes will be given on Thursdays. Makeup quizzes will not be given. Quizzes will not be given during exam weeks.

**EXAMS**: The *tentative* exam dates are given below in the *Important Dates* section. There will be NO makeup exams unless you have an *exceptional* (this will be determined on a case by case basis by me) and documented reason for missing an exam. Not showing up to take an exam because of oversleeping will result in a grade of 0.

**GRADING**:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Class Participation</td>
<td>5%</td>
</tr>
<tr>
<td>Homework</td>
<td>5%</td>
</tr>
<tr>
<td>Quizzes</td>
<td>10%</td>
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<tr>
<td>Exam 1</td>
<td>20%</td>
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<tr>
<td>Exam 2</td>
<td>20%</td>
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<tr>
<td>Exam 3</td>
<td>20%</td>
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<tr>
<td>Final Exam</td>
<td>20%</td>
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</tbody>
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Letter grades will be assigned according to the following scale:

- $93 \leq A \leq 100\%$
- $83 \leq B < 87\%$
- $73 \leq C < 77\%$
- $60 \leq D < 67\%$
- $F < 60\%$

*Any intermediate percentages to the above scale will be assigned letter grades at my discretion.*

**IMPORTANT DATES**:

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
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<tbody>
<tr>
<td>Jan. 20</td>
<td>Martin Luther King Jr. Holiday</td>
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<tr>
<td>Feb. 6</td>
<td>Exam 1</td>
</tr>
<tr>
<td>Mar. 3-7</td>
<td>Spring Break</td>
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<tr>
<td>Mar. 13</td>
<td>Exam 2</td>
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<tr>
<td>Apr. 10</td>
<td>Exam 3</td>
</tr>
<tr>
<td>Apr. 17-21</td>
<td>Easter Holiday</td>
</tr>
<tr>
<td>May 8th, 10:30-12:20</td>
<td>Final Exam</td>
</tr>
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**ACADEMIC HONESTY**: According to the Undergraduate Academic Policies and Regulations “All work submitted for academic evaluation must be the students own. Certainly, the activities of other scholars will influence all students. However, the direct and unattributed use of another's efforts is prohibited as is the use of any work untruthfully submitted as one's own. Penalties for violations of this policy may include one or more of the following: a zero for that assignment or test, an F in the course, and expulsion from the University.”
HOW TO DO WELL IN THIS COURSE: Come to class. Be alert. Read the text. Do the homework. Try the problems. Study hard. Go to the Math Lab. Come visit me during office hours. Make sure you keep up with the material covered in class; read the class notes! Most important of all: if you feel that you are falling behind, or that you do not understand a topic, please come and see me!