

# CALCULUS FOR THE LIFE SCIENCES WITH APPLICATIONS II

The University of Toledo

Mathematics & Statistics Department, College of Natural Sciences and Mathematics

MATH1760-0XX, CRN XXXXX

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<b>Instructor:</b>	(Insert Name)	<b>Class Location:</b>	(Insert Building/Room)
<b>Email:</b>	(Insert Email Address)	<b>Class Day/Time:</b>	(Insert Days/Time)
<b>Office Hours:</b>	(Insert Days/Time)	<b>Lab Location:</b>	(Insert Bldg/Office #, if applicable)
<b>Office Location:</b>	(Insert Building/Office #)	<b>Lab Day/Time:</b>	(Insert Days/Time, if applicable)
<b>Office Phone:</b>	(Insert Phone Number)	<b>Credit Hours:</b>	3
<b>Term:</b>	(Insert Semester/Year)		

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## COURSE DESCRIPTION

Indefinite and definite integrals, probability, functions of several variables, least squares, differential equations.

## STUDENT LEARNING OUTCOMES

The successful MATH1760 student should be able to:

- **Indefinite integrals:** Construct antiderivatives analytically. Find indefinite integrals by using integration formulas and by the methods of substitution and integration by parts.
- **Definite integrals:** Use Riemann sums to estimate and to evaluate definite integrals. Evaluate definite integrals by use of the Fundamental Theorem of Calculus. Identify a definite integral of a function in terms of areas of regions between the graph of the function and the x-axis, and use definite integrals to calculate areas of planar regions.
- **Differential equations:** Determine whether a function is a solution of a differential equation. Solve separable differential equations. Use differential equations to model a variety of real-life situations. Determine the equilibrium solutions of autonomous differential equations and classify their stability.
- **Probability:** Use the Multiplication Principle, permutations, and combinations to determine the number of possible outcomes in a given situation. Describe sample spaces of experiments. Compute probabilities if outcomes are equally likely. Compute the probabilities of complementary events and OR-events, apply the multiplication rule for independent events, and compute conditional probabilities. Use probability distributions, including the binomial distribution and the normal distribution, to compute probabilities.
- **Vectors:** Represent vectors graphically in rectangular coordinates. Perform basic vector operations graphically and algebraically - addition, subtraction, and scalar multiplication. Compute the dot product and the cross product of vectors.

## PREREQUISITES

You must have minimum grade of C- in Calculus for the Life Sciences with Applications I (MATH 1750), or equivalent (MATH 1850, MATH 1830, MATH 1920, or transfer credit).

**TEXTBOOK:** *Calculus for Biology and Medicine*, Prentice Hall, 3rd Ed., 2011 MyMathLab access code (for online homework) NOT MyMathLabPlus! The loose-leaf edition, ISBN 9781256873778, includes a MyMathLab access code.

## UNIVERSITY POLICIES:

## **POLICY STATEMENT ON NON-DISCRIMINATION ON THE BASIS OF DISABILITY (ADA)**

The University is an equal opportunity educational institution. Please read The University's Policy Statement on Nondiscrimination on the Basis of Disability Americans with Disability Act Compliance.

### **ACADEMIC ACCOMMODATIONS**

The University of Toledo is committed to providing equal access to education for all students. If you have a documented disability or you believe you have a disability and would like information regarding academic accommodations/adjustments in this course please contact the Student Disability Services Office (Rocket Hall 1820; 419.530.4981; studentdisabilitysvs@utoledo.edu) as soon as possible for more information and/or to initiate the process for accessing academic accommodations. For the full policy see: <http://www.utoledo.edu/offices/student-disability-services/sam/index.html>

### **ACADEMIC POLICIES:**

#### **STUDENT PRIVACY**

Federal law and university policy prohibits instructors from discussing a student's grades or class performance with anyone outside of university faculty/staff without the student's written and signed consent. This includes parents and spouses. For details, see the "Confidentiality of student records (FERPA)" section of the University Policy Page at <http://www.utoledo.edu/policies/academic/undergraduate/index.html>

#### **MISSED CLASS POLICY**

If circumstances occur in accordance with The University of Toledo Missed Class Policy (found at <http://www.utoledo.edu/policies/academic/undergraduate/index.html> ) result in a student missing a quiz, test, exam or other graded item, the student must contact the instructor in advance by phone, e-mail or in person, provide official documentation to back up his or her absence, and arrange to make up the missed item as soon as possible.

#### **ACADEMIC DISHONESTY**

Any act of academic dishonesty as defined by the University of Toledo policy on academic dishonesty (found at <http://www.utoledo.edu/dl/students/dishonesty.html> will result in an F in the course or an F on the item in question, subject to the determination of the instructor.

#### **GRADING AND EVALUATION**

The syllabus should describe the methods of evaluation whether quizzes, exams, or graded assignments. The usual procedure is to give at least two one-hour in class exams and a two-hour final exam. If quizzes are not used as a portion of the grade, then three one-hour exams are recommended. A description of a grading method that includes the proportion that each evaluating method counts toward the grade should be described. If the grading method uses a grading scale it should be clearly stated. It should be kept in mind when scheduling quizzes and exams that the last day to add/drop the class is the end of the second week of classes and the last day to withdraw from the class is the end of the tenth week. By these dates, students like to have some measure of their progress in the class.

#### **IMPORTANT DATES**

The instructor reserves the right to change the content of the course material if he perceives a need due to postponement of class caused by inclement weather, instructor illness, etc., or due to the pace of the course.

#### **MIDTERM EXAM:**

## FINAL EXAM:

## OTHER DATES

The last day to drop this course is:

The last day to withdraw with a grade of "W" from this course is:

## STUDENT SUPPORT SERVICES

Free math tutoring on a walk-in basis is available in the Math Learning and Resources Center located in Rm B0200 in the lower level of Carlson Library (phone ext 2176). The Center operates on a walk-in basis. MLRC hours can be found at <http://www.math.utoledo.edu/mlrc/MLRC.pdf>

## CLASS SCHEDULE

Syllabus should provide a list of sections to be covered and it is advisable to give an exam and quiz schedule. A suggested course schedule is found above. Most instructors find the syllabus to be quite crowded, so the course needs to be well paced to avoid cramming too much material in at the end of the semester.

### Suggested Schedule for MATH 1760

Week	Subject	Sections
1	Antiderivatives	5.8
2	Definite Integral, Fundamental Theorem	6.1, 6.2
3	Integration of simple functions	6.2, 6.3
4	Substitution, (Exam)	7.1
5	Integration by Parts	7.2
6	Partial Fractions, Improper Integrals	7.3, 7.4.1
7	Differential Equations	8.1
8	Stability (Exam)	8.2
9	Counting Principles	12.1
10	Probability	12.2
11	Conditional Probability	12.3
12	Discrete Distributions (Exam)	12.4
13	Continuous Distributions	12.5
14	Vectors, Analytic Geometry, Review	9.4

### Time Allocation:

Chapter	Hours
5.8	2
6	6
7.1–7.3, 7.4.1	9
8.1–8.2	6
12.1–12.5	15
9.4	3
Exams, Review	4

## CLASS SCHEDULE

Chapter	Section	Topic/Learning Outcome	Hours
Chapter	5	Applications of Differentiation	(2 hours)
	5.8	Antiderivatives; <i>Indefinite integrals</i>	2.0
Chapter	6	Integration	(7 hours)
	6.1	The Definite Integral; <i>Definite integrals</i>	4.0
	6.2	The Fundamental Theorem of Calculus; <i>Definite integrals</i>	1.0
	6.3	Applications of Integration; <i>Definite integrals</i>	2.0
Chapter	7	Integration Techniques and Computational Methods	(7 hours)
	7.1	The Substitution Rule; <i>Indefinite integrals</i>	2.0
	7.2	Integration by Parts and Practicing Integration; <i>Indefinite integrals</i>	2.0
	7.3	Rational Functions and Partial Fractions; <i>Indefinite integrals</i>	1.0
	7.4.1	Improper Integrals (Unbounded Intervals); <i>Definite integrals</i>	2.0
Chapter	8	Differential Equations	(7 hours)
	8.1	Solving Differential Equations; <i>Differential equations</i>	4.0
	8.2	Equilibria and Their Stability; <i>Differential equations</i>	3.0
Chapter	12	Probability and Statistics	(15 hours)
	12.1	Counting; <i>Probability</i>	3.0
	12.2	What Is Probability; <i>Probability</i>	3.0
	12.3	Conditional Probability and Independence; <i>Probability</i>	3.0
	12.4	Discrete Random Variables and Discrete Distributions; <i>Probability</i>	3.0
	12.5	Continuous Distributions; <i>Probability</i>	3.0
Chapter	9	Linear Algebra and Analytic Geometry	(3 hours)
	9.4	Analytic Geometry; <i>Vectors</i>	3.0
		Total Number of Lecture Hours	41.0

The instructor reserves the right to change the content of the course material if he/she perceives a need due to postponement of class caused by inclement weather, instructor illness, etc., or due to the pace of the course. Students are responsible for any announcement made in class. If you have to send an email, email with clear subject, course and section number, most importantly, do not reply to one of the earlier emails. If you have any issues talk to your instructor during office hours or before or after the class, do not completely rely on emails.