

CALCULUS II FOR MATHEMATICIANS, SCIENTISTS AND EDUCATORS

The University of Toledo
Mathematics & Statistics Department, College of Natural Sciences and Mathematics
MATH1840-0XX, CRN XXXXX

Instructor:	(Insert Name)	Class Location:	(Insert Building/Room)
Email:	(Insert Email Address)	Class Day/Time:	(Insert Days/Time)
Office Hours:	(Insert Days/Time)	Lab Location:	(Insert Bldg/Office #, if applicable)
Office Location:	(Insert Building/Office #)	Lab Day/Time:	(Insert Days/Time, if applicable)
Office Phone:	(Insert Phone Number)	Credit Hours:	4
Term:	(Insert Semester/Year)		

COURSE DESCRIPTION

Techniques of integration, polar coordinates and calculus of plane curves, infinite series and Taylor series. Of interest to students requiring a conceptual understanding of calculus.

STUDENT LEARNING OUTCOMES

A more detailed list of learning objectives is given below. At least 70% of the course time will be devoted to these essential outcomes. These objectives are listed again in the chronological list of topics at the end of this syllabus. The successful Calculus II student should be able to:

- **Definite Integrals:** Use antiderivatives to evaluate definite integrals and apply definite integrals in a variety of applications to model physical, biological or economic situations. Whatever applications (e.g. determining area, volume of solids of revolution, arc-length, area of surfaces of revolution, centroids, work, and fluid forces) are chosen, the emphasis should be on setting up an approximating Riemann sum and representing its limit as a definite integral.
- **Techniques of Integration:** Employ a variety of integration techniques to evaluate special types of integrals, including substitution, integration by parts, trigonometric substitution, and partial fraction decomposition.
- **Improper Integrals:** Evaluate improper integrals, including integrals over infinite intervals, as well as integrals in which the integrand becomes infinite on the interval of integration.
- **Sequences and Series:** Determine the existence of and find algebraically the limits of sequences. Determine whether a series converges by using appropriate tests, including the comparison, ratio, root, and integral.
- **Power Series:** Find the n th Taylor polynomial at a specified center for a function and estimate the error term. Use appropriate techniques to differentiate, integrate and find the radius of convergence for the power series of various functions.
- **Parametric Curves:** Analyze curves given parametrically and in polar form and find the areas of regions defined by such curves.

PREREQUISITES

Minimum grade of C- in MATH 1830 or Math 1850 (Calculus I)

TEXTBOOK: *Calculus – Volume II*, OpenStax (Print ISBN-13: 978-1-938168-06-2; Digital ISBN-13: 978-1-947172-14-2), Senior Contributing Authors: Edwin “Jed” Herman and Gilbert Strang. The ebook is available for free at <https://openstax.org/details/books/calculus-volume-2>.

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

Your syllabus should describe the methods of evaluation, whether by quizzes, exams or graded assignments. (There should be at least two one-hour in-class exams. If quiz scores are not included in the final grade computation, there should be three one-hour exams.) If a grading scale is used, it should be clearly stated. A statement of the proportion that each evaluation component contributes toward the final grade should also be included. A sample reasonable distribution for this class would be:

Component	points
Homework and/or Quizzes	30%
Midterm Exams	40%
Final Exam	30%

In scheduling quizzes and exams, it should be kept in mind 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 should have sufficient data to realistically gauge 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

Students should be made aware of the tutoring help available during each week of the semester in the Mathematics Learning and Resource 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 on their web page at <http://www.math.utoledo.edu/mlrc/MLRC.pdf>.

CLASS SCHEDULE

The syllabus should provide a list of sections to be covered and ideally, should indicate the material that might be covered on each in-class examination. Please include in your syllabus a list of important dates, including mid-term exam dates, the drop and withdrawal dates, and the time and place of the final exam.

A recommended schedule of the class time to be devoted to each section is listed below. While individual experiences may vary somewhat, the schedule is a template for completing all of the topics in the course and it should be consulted periodically to ensure that you are on track to complete the syllabus with an appropriate amount of time devoted to each section. Most students passing this course will proceed to MATH 2850. (If you are not familiar with our calculus sequence, please consult the course coordinator.) **It is critically important that you do not shortchange them or hamper MATH 2850 instructors by skipping important sections or by rushing through the introduction to integration because of poor planning.**

SUGGESTED SCHEDULE

Chapter	2	Applications of Integrals	(total 6 hr)
	2.1	(Op.) Areas between Curves; <i>Definite Integration</i>	
	2.2	Determining Volumes by Slicing; <i>Definite Integration</i>	2
	2.3	Volumes of Revolution: Cylindrical Shells; <i>Definite Integration</i>	2
	2.4	Arc Length of a Curve and Surface Area	1
	2.5	Physical Applications	1
	2.6	(Op.) Moments and Centers of Mass	
	2.7	(Op.) Integrals, Exponential Functions, and Logarithms	
	2.8	(Op.) Exponential Growth and Decay	
	2.9	(Op.) Calculus of the Hyperbolic Functions	
Chapter	3	Techniques of Integration	(total 10 hr)
	3.1	Integration by Parts; <i>Techniques of Integration</i>	2
	3.2	Trigonometric Integrals; <i>Techniques of Integration</i>	1
	3.3	Trigonometric Substitution; <i>Techniques of Integration</i>	2
	3.4	Partial Fractions; <i>Techniques of Integration</i>	2
	3.5	(Op.) Other Strategies for Integration	
	3.6	(Op.) Numerical Integration	
	3.7	Improper Integrals; <i>Improper Integrals</i>	3
Chapter	5	Sequences and Series	(total 10 hr)
	5.1	Sequences; <i>Sequences and Series</i>	2
	5.2	Infinite Series; <i>Sequences and Series</i>	2
	5.3	The Divergence and Integral Tests; <i>Sequences and Series</i>	2
	5.4	Comparison Tests; <i>Sequences and Series</i>	1
	5.5	Alternating Series; <i>Sequences and Series</i>	1
	5.6	Ratio and Root Tests; <i>Sequences and Series</i>	2
Chapter	6	Power Series	(total 7 hr)
	6.1	Power Series and Functions; <i>Power Series</i>	2
	6.2	Properties of Power Series; <i>Power Series</i>	2
	6.3	Taylor and Maclaurin Series; <i>Power Series</i>	2
	6.4	Working with Taylor Series; <i>Power Series</i>	1
Chapter	7	Parametric Equations and Polar Coordinates	(total 6 hr)
	7.1	Parametric Equations; <i>Parametric Curves</i>	1
	7.2	Calculus of Parametric Curves; <i>Parametric Curves</i>	2
	7.3	Polar Coordinates; <i>Parametric Curves</i>	2
	7.5	Area and Arc Length in Polar Coordinates; <i>Parametric Curves</i>	1
	7.6	(Op.) Conic Sections	
		Total Hours	39