

CALCULUS FOR ENGINEERING TECHNOLOGY II

The University of Toledo

Mathematics & Statistics Department, College of Natural Sciences and Mathematics

MATH2460-0XX, 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

Transcendental functions, methods of integration, applications of the integral, polar coordinates, vectors and vector operation, lines and planes, parametric equations.

STUDENT LEARNING OUTCOMES

Upon successful completion of this class a student should be able to:

- **Definite Integrals:** Use antiderivatives to evaluate definite integrals and apply definite integrals in a variety of applications including center of mass, moments of inertia, work, fluid pressure, and average value.
- **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. Polar Coordinates: Analyze curves given in polar form and find the areas of regions defined with polar coordinates.
- **Three-Space:** Use partial derivatives to find the tangent lines, critical points, and relative maximum or minimum of a function of two variables. Evaluate double integrals to find the volume of a solid.
- **Vectors:** Perform and apply vector operations, including the dot and cross product of vectors, and use them to derive analytic descriptions of lines and planes.
- **Differential Equations:** Use the method of separation of variables and integrating factor to solve differential equations. Apply differential equations in a variety of engineering applications including radioactive decay, electric circuits, mixtures, and temperature change.

PREREQUISITES

Minimum grade of C- in Math 2450 or Math 1850 or Math 1920. Students who enroll in Math 2460 but have not the prerequisite course may be administratively dropped from the class. General education curriculum core course meets the skills requirements in mathematics.

TEXTBOOK: *Technical Calculus with Analytic Geometry Fifth Edition*, by Kuhfittig (ISBN:9781133945192), Brooks/Cole Cengage Learning. Students have the option to subscribe to Cengage Unlimited <https://www.cengage.com/unlimited> to bundle all of their Cengage textbooks at one cost for eBooks. Then a physical textbook may be rented from Cengage. *APEX Calculus III*, by Gregory Hartman. This is a free textbook located at <http://www.apexcalculus.com/downloads/>

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:

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. Please note that any use of, or visibility of, a cell phone or smart watch (or any other device capable of connecting to the internet or storing information, or anything not approved by the instructor) during a test, quiz or exam will be considered academic dishonesty.

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>

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 3 hour in-class exams and a two hour final exam. If quizzes are not used as a portion of the grade, then three 4 hour exams are recommended. How each evaluation method is to count toward the class grade should be described and a grading scale or description of a grading procedure should be provided. 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 schedule. See the list of suggested number of periods needed for each section.

Suggested Schedule for MATH 2460

Chapter	Section	Topic	Hours	Learning Objectives
Chapter	6	Derivatives of Transcendental Functions	6 hours	
	6.6	Exponential and Logarithmic Functions	1.0	
	6.7	Derivative of the Logarithmic Function	1.0	
	6.8	Derivative of the Exponential Function	1.0	
	6.9	L'Hospital's Rule	1.0	
	6.10	Applications	2.0	
	6.11	Newton's Method (Optional)	1.0	
Chapter	7	Integration Techniques	10.5 hours	
	7.1	The Power Formula Again	1.0	Techniques of Integration
	7.2	The Logarithmic and Exponential Forms	1.0	Techniques of Integration
	7.3	Trigonometric Forms	1.0	Techniques of Integration
	7.4	Further Trigonometric Forms	1.0	Techniques of Integration
	7.5	Inverse Trigonometric Forms	0.5	Techniques of Integration
	7.6	Integration by Trigonometric Substitution	2.0	Techniques of Integration
	7.7	Integration by Parts	2.0	Techniques of Integration
7.8	Integration of Rational Functions	2.0	Techniques of Integration	
Chapter	8	Parametric Equations, Vectors, and Polar Coordinates	6 hours	
	8.1	Vectors and Parametric Equations	1.0	Three-Space
	8.2	Arc Length	1.0	Definite Integrals
	8.3	Polar Coordinates	1.0	Polar Coordinates
	8.4	Curves in Polar Coordinates	1.0	Polar Coordinates
	8.5	Areas in Polar Coordinates; Tangents	2.0	Polar Coordinates
Chapter	9	Three-Dimensional Space; Partial Derivatives; Multiple Integrals	9 hours	
	9.1	Surfaces in Three Dimensions	1.0	Three-Space
	9.2	Partial Derivatives	1.0	Three-Space
	9.3	Applications of Partial Derivatives	2.0	Three-Space
	9.4	Iterated Integrals	2.0	Three-Space
	9.5	Volumes by Double Integration	1.0	Three-Space
	9.6	Mass, Centroids, and Moments of Inertia (Optional)	2.0	Three-Space
Chapter	10	Vectors (APEX Calculus)	7 hours	
	10.2	An Introduction to Vectors	2.0	Vectors
	10.3	The Dot Product	1.5	Vectors
	10.4	The Cross Product	1.5	Vectors
	10.5	Lines	1.0	Vectors
	10.6	Planes	1.0	Vectors
Chapter	11	First Order Differential Equations	5.5 hours	
	11.1	What is a Differential Equation?	1.0	Differential Equations
	11.2	Separation of Variables	2.0	Differential Equations
	11.3	First-Order Linear Differential Equations	1.0	Differential Equations
	11.4	Applications of First-Order Differential Equations	1.5	Differential Equations
		Total Hours	44	