CALCULUS FOR ENGINEERING TECHNOLOGY I

The University of Toledo
Mathematics & Statistics Department, College of Natural Sciences and Mathematics
MATH2450-0XX, 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

Differential calculus of algebraic and trigonometric functions, including limits, curve sketching, motion, maxima/minima, related rates, integral calculus of algebraic functions.

STUDENT LEARNING OUTCOMES

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

- ***Derivative***: Use the concept of the limit definition to verify the power rule. Understand the product rule, quotient rule, implicit differentiation, and the chain rule. Apply the derivative to motion problems and find the tangent lines of curves.
- ***Applications of the Derivative***: Utilize several differentiation techniques and by understanding the first and second derivative tests, be able to sketch curves, identify relative maximums and minimums, and solve related rates problems.
- ***Derivative of Transcendental Functions***: Find the derivatives of trigonometric functions, their inverse functions, and exponential and logarithmic functions.
- ***The Integral***: Find indefinite integrals using integration formulas and the method of substitution. Find constants of integration and the area under a single curve.
- ***Applications of Integration***: Find the area between two curves and revolve a function about the x-axis and y-axis using both the disk method and shell method.

PREREQUISITES

A minimum grade of C- in MATH 1340 or a minimum grade of C- in both MATH 1320 and MATH 1330 or satisfactory placement test scores. Satisfactory placement test scores are a minimum score of 76 in Aleks math placement test or a minimum score of both (24 in ACT Math or 560 in SAT old Math score or 580 in SAT new math score or 15 in College Algebra placement test) and 12 in Trigonometry placement test. Students with marginal trigonometric placement test scores take MATH 1980 concurrently.

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 physcial textbook may be rented from Cengage.

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

Your syllabus should describe the methods of evaluation whether quizzes, exams, or graded assignments. The usual procedure is to give at least three 1-hour in-class exams and a two hour final exam. If quizzes are not used as a portion of the grade, then four 1-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`

Suggested Schedule for MATH 2450

Chapter	Section	Topic	Hours	Learning Objectives
Chapter	2	Introduction to Calculus: The Derivative	9.0 hours	
	2.1	Functions and Intervals (Optional)	0.5	
	2.2	Limits	1.5	Limits
	2.3	The Derivative (Optional)	0.5	Derivatives
	2.4	The Derivative by the Four-Step Process	1.5	Derivatives
	2.5	Derivatives of Polynomials	1.0	Derivatives
	2.6	Instantaneous Rates of Change	1.0	Limits
	2.7	Differentiation Formulas	2.0	Derivatives
	2.8	Implicit Differentiation	1.0	Derivatives
	2.9	Higher Derivatives	1.0	Higher Order Derivatives
Chapter	3	Applications of the Derivative	8 hours	
	3.1	The First-Derivative Test	1.5	Applications of Derivatives
	3.2	The Second-Derivative Test	2.0	Applications of Derivatives
	3.4	Applications of Minima and Maxima	2.5	Applications of Derivatives
	3.5	Related Rates	1.0	Higher Order Derivatives
	3.6	Differentials	1.0	Higher Order Derivatives
Chapter	4	The Integral	9.5 hours	
	4.1	Antiderivatives	1.0	Antiderivatives
	4.3	The Fundamental Theorem of Calculus	1.0	Antiderivatives
	4.4	The Integral: Notation and General Definition (Optional)	1.0	Definite Integration
	4.5	Basic Integration Formulas	2.0	Antiderivatives
	4.6	Area Between Curves	2.0	Definite Integration
	4.7	Improper Integrals	1.5	Definite Integration
	4.8	The Constant of Integration	1.0	Antiderivatives
	4.9	Numerical Integration	1.0	Definite Integration
Chapter	5	Applications of the Integral	11 hours	
	5.1	Means and Root Mean Squares	1.0	Definite Integration
	5.2	Volumes of Revolution: Disk Method and Washer Methods	2.0	Definite Integration
	5.3	Volumes of Revolution: Shell Method	2.0	Definite Integration
	5.4	Centroids	2.0	Definite Integration
	5.5	Moments of Inertia	2.0	Definite Integration
	5.6	Work and Fluid Pressure (Optional)	2.0	Definite Integration
Chapter	6	Derivatives of Transcendental Functions	5 hours	
	6.1	Review of Trigonometry	1.0	Derivatives of Transcendentals
	6.2	Derivatives of Sine and Cosine Functions	1.0	Derivatives of Transcendentals
	6.3	Other Trigonometric Functions	1.0	Derivatives of Transcendentals
	6.4	Inverse of Trigonometric Functions	1.0	Derivatives of Transcendentals
	6.5	Derivatives of Inverse Trigonometric Functions	1.0	Derivatives of Transcendentals
		Total Hours	42.5	

CLASS SCHEDULE

Syllabus should provide a list of sections to be covered and it is advisable to give an exam schedule. It is also important to list dates such as the last day to drop, the last day to withdraw, and exam dates. The suggested number of periods needed for each section is listed above. Given the fact that the class schedule includes two 1-hour recitations giving the class 5 contact hours per week, the suggested lecture time to be devoted to these topics leaves ample time for problem solving and review. Instructors find that providing ample time for review and working problems is important for student success in this course. Most students will enroll in MATH 2460 which has MATH

2450 as a prerequisite.