

Calculus for Engineering Technology I
Spring 2021 CRN: 15726 Credit Hours: 4
Math 2450 Sec. 01 TR 5:45 - 7:35 PM Room: Rocket Hall 1558

Instructor: Dr. David Gajewski
Office: University Hall 3014
Office Hours: W 10:30-11:30, 2-4, F 1-3, and also by appointment.
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COURSE DESCRIPTION

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

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.

CALCULATOR

A non-programmable, non-graphing calculator is allowed, and no other electronic devices.

GRADING AND EVALUATION

% Score	Grade
90-100	A range
80-89.99	B range
70-79.99	C range
60-69.99	D range
< 60	F

(Note that minus and plus grades will be awarded for grades within 2.5% of the lower and upper ends of the given ranges respectively, and that there are not A+ grades at The University of Toledo.)

Component	points
Homework	15%
Quizzes	15%
Three (3) Exams	45%
Final Exam	25%

ONLINE HOMEWORK

Homework for this course is online and is located at <http://www.webassign.net> and is also linked from Blackboard. Late homework will have a 40% penalty. Students must purchase a WebAssign Access Code.

QUIZZES

There will be weekly quizzes. The lowest two quiz scores will be dropped.

TESTS AND FINAL EXAM

There will be 3 tests one after each 4 weeks. Tentatively they will be held on February 25, March 25, April 22. The final is comprehensive and will be held on **Tuesday May 4 2021, 5-7pm** either online or in the regular classroom.

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.

Last day to add/drop this class: Tuesday February 2, 2021

Last day to withdraw from this class with a grade of W: Friday March 26, 2021

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. In particular, tests, quizzes and exams must be entirely the students own work and any use of outside websites, apps, technology or persons to assist with completing these items will be considered academic dishonestly.

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>

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>

OTHER UNIVERSITY POLICIES

Refer to the student handbook at <http://www.utoledo.edu/studentaffairs/pdfs/handbook.pdf>

RESOURCES

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>

MEDIA USE POLICY

Media produced by the course instructor are solely for class use by students currently registered for the course, and under no circumstances can they be posted, linked to, or made available for distribution or copying to any persons, institutions, or servers (for example, no portion of them may be downloaded and posted on YouTube or sent to friends). This includes media that appears on the course site and in VoiceThread. As the author of these teaching materials the instructor or university holds the copyright (though not to the commercial artworks contained within them), and the only authorized use by students is for the purposes of the course. Violating this policy constitutes a serious infraction of UTs computer use policy and may result in consequences up to and including expulsion from the University and legal action (both criminal and civil) from the various rights holders whose copyrights you may have infringed.

SPECIAL COURSE EXPECTATIONS DURING COVID-19

ATTENDANCE

The University of Toledo has a missed class policy. It is important that students and instructors discuss attendance requirements for the course. Students must perform a daily health assessment, based on based on CDC guidelines, before coming to campus each day, which included taking their temperature. Students who are symptomatic/sick should not come to class and should contact the Main Campus Health Center at 419-530-3451. Absences due to COVID-19 quarantine or isolation requirements are considered excused absences. Students should notify their instructors and these absences may not require written notice.

FACE COVERINGS

All students must wear face coverings while on campus, except while eating, alone in an enclosed space, or outdoors practicing social distancing. NO students will be permitted in class without a face covering. If you have a medical reason that prevents you from wearing a face covering due to a health condition deemed high-risk for COVID-19 by the Centers for Disease Control and Prevention (CDC), you should submit a request for an accommodation through the Student Disability Services Office (SDS) by completing the online application. Students will need to provide documentation that verifies their health condition or disability and supports the need for accommodations. If a student is already affiliated with SDS and would like to request additional accommodations due to the impact of COVID-19, should contact their accessibility specialist to discuss their specific needs.

SOCIAL DISTANCING

Students should practice social distancing inside and outside the classroom please follow signage and pay attention to the seating arrangements. Do not remove stickers or tape from seats and/or tables, this is there to provide guidance on the appropriate classroom capacity based on the recommended 6 feet of social distancing between individuals. Please be conscious of your personal space and respectful of others. Also be cognizant of how you enter and exit the room; always try to maintain at least 6 feet of distance between yourself and others. **DESKS AND WORK**

SPACES

Students will need to sanitize their desks and/or work space before class with the University provided sanitizing spray and paper towels their desks.

SPECIAL NOTES

Its important to note that based on the unpredictability of the COVID-19 virus things can change at any time so please be patience and understanding as we move through the semester. I also ask that you keep me informed of concerns you may have about class, completing course work/assignments timely and/or health concerns related to COVID.

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	

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.