

**Fall 2022:**

## **Math 1452-021 Calculus II**

<b>Instructor:</b> Dr. Alexander Solynin	<b>Place:</b> MATH 011
<b>Office Hours:</b> MW 12:00-2:00pm or by appointment	<b>Text:</b> <i>Calculus</i> , 7 <sup>th</sup> Edition by K. Smith/M. Strauss/M. Toda
<b>Office:</b> MA 231	<b>Time:</b> 11:00-12:50 TR
<b>Email:</b> alex.solynin@ttu.edu	<b>Prerequisites:</b> Math 1451 or equivalent

**About the Course:** We will cover **Chapters 6 – 9**.

Students should develop an understanding of the basic transcendental functions and of their importance. In particular students should have a good understanding of the meaning of the terms exponential growth and logarithmic growth, and how they relate to polynomial growth. Students should experience a variety of applications of the definite integral. Sufficient attention will be devoted to logical thinking, and simple proofs that emphasize deductive reasoning. Logical reasoning should prevail with respect to mechanical memorization on integration techniques or integration formulas. Students are expected to become familiar with polar coordinates, areas and volumes as obtained by integration, and the most common integration techniques, including certain trigonometric substitutions and integration by parts. They should be familiar with some of the most common formulas for antiderivatives of elementary functions, in order to compute others. Infinite sums (series) and criteria for convergence should be given sufficient attention. It is important to emphasize on the other hand, that most antiderivatives cannot be written in terms of elementary functions. Covering fundamental notions of vector analysis in 2-d and 3-d Euclidean spaces is of crucial importance.

M1452 satisfies the university core curriculum requirement in Mathematics: “Students graduating from Texas Tech University should be able to demonstrate the ability to apply quantitative and logical skills to solve problems.” It meets the TTU general education student learning outcome for mathematics that students will: (a) Apply arithmetic, algebra, geometry, and statistics to solve problems; (b) Represent and evaluate basic mathematical information numerically, graphically, and symbolically; (c) Interpret mathematical models such as formulas, tables, and schematics, and draw inference from them.

**Calculators:** Graphing calculators are allowed and may be useful in class. **Calculators are NOT allowed on the Final, in-class Exams, and Quizzes.** Time will not be spent in class on calculator instruction.

**Expected Student Learning Outcomes:** Upon successful completion of this course, students will become proficient in techniques of integration and the use of integration to solve real world problems. They also will understand the basic properties of convergent series and sequences. In particular, the students will be able to

1. Set up and evaluate integrals to find areas and volumes
2. Set up and evaluate integrals to solve real world problems involving selected concepts from physics and engineering
3. Evaluate integrals by hand using a variety of techniques including substitutions, integration by parts, and partial fractions
4. Analyze the convergence of sequences and evaluate their limits
5. Analyze the convergence of series and evaluate their sums
6. Perform elementary operations in vector analysis

**Methods for Assessment of Learning Outcomes:** The expected learning outcomes for the course will be assessed through graded activities and ungraded activities. The graded activities include exams, homework, and quizzes. The ungraded activities will be used to monitor your progress. A variety of these ungraded assessment techniques may be employed, including problems to be completed during class, direct

questioning of students, answering students questions in class, one-minute classroom assessment techniques, and discussions during office hours.

### **General Policies:**

In general, no missed in class exams and quizzes will be made up and no homework will be accepted after the deadline. Whether an absence is excused or unexcused is determined solely by the instructor with the exception of absences due to religious observance and officially approved trips described below.

***Absence due to religious observance:*** The Texas Tech University OP 34.19 states that a student who intends to observe a religious holy day should make that intention known in writing to the instructor prior to the absence. A student who is absent from classes for the observance of a religious holy day shall be allowed to take an examination or complete an assignment scheduled for that day within a reasonable time after the absence. As your instructor, I request that notification be made in writing and submitted no later than the 15th class day of the semester.

***Absence due to officially approved trips:*** The Texas Tech University OP 34.04 states department chairpersons, directors, or others responsible for a student representing the university on officially approved trips must notify the student's instructors of the departure and return schedules. The instructor so notified must not penalize the student, although the student is responsible for material missed. Any student absent because of university business must be allowed to make up missed work within a reasonable span of time or have alternate grades substituted for work due to an excused absence. Students absent because of university business must be given the same privileges as other students.

***Academic Integrity (extracted from OP 34.12):*** It is the aim of the faculty of Texas Tech University to foster a spirit of complete honesty and high standard of integrity. The attempt of students to present as their own any work not honestly performed is regarded by the faculty and administration as a most serious offense and renders the offenders liable to serious consequences, possibly suspension.

Scholastic dishonesty includes, but is not limited to, cheating, plagiarism, collusion, falsifying academic records, misrepresenting facts, and any act designed to give unfair academic advantage to the student (such as, but not limited to, submission of essentially the same written assignment for two courses without the prior permission of the instructor) or the attempt to commit such an act.

***Civility in the Classroom:*** Incivility is any action that interferes with the classroom learning environment. This includes, but is not limited to, eating, arriving late, leaving early, a ringing cell phone, text messaging, sleeping, chatting during class, dominating the class discussion by not allowing other students to speak, and putting books away before the end of class. Be respectful to the instructor and to your fellow students. I will ask anyone participating in what I perceive to be inappropriate behavior to stop immediately.

***Accommodation for Students with Disabilities (extracted from OP 34.22):*** Any student who, because of a disability, may require some special arrangements in order to meet course requirements should contact the instructor as soon as possible to make the necessary arrangements. Students should present appropriate verification from Student Disability Services during the instructor's office hours. Please note instructors are not allowed to provide classroom accommodations to a student until the appropriate verification from Student Disability Services has been provided. For additional information, you may contact the Student Disability Services office at 335 West Hall or 806-742-2405.

### **Title IX Syllabus Statement - TTU Resources for Discrimination, Harassment, and Sexual Violence:**

Texas Tech University is committed to providing and strengthening an educational, working, and living environment where students, faculty, staff, and visitors are free from gender and/or sex discrimination of any kind. Sexual assault, discrimination, harassment, and other [Title IX violations](#) are not tolerated by the University. Report any incidents to the *Office for Student Rights & Resolution*, (806)-742-SAFE (7233) or file a report online at [titleix.ttu.edu/students](http://titleix.ttu.edu/students). Faculty and staff members at TTU are committed to connecting you to resources on campus. Some of these available resources are: **TTU Student Counseling Center**, 806-742-3674, <https://www.depts.ttu.edu/scc/> (*Provides confidential support on campus.*) **TTU Student Counseling Center 24-hour Helpline**, 806-742-5555, (*Assists students who are experiencing a mental health or interpersonal violence crisis. If you call the helpline, you will speak with a mental health counselor.*) **Voice of Hope Lubbock Rape Crisis Center**, 806-763-7273, [voiceofhopelubbock.org](http://voiceofhopelubbock.org) (*24-hour*

hotline that provides support for survivors of sexual violence.) **The Risk, Intervention, Safety and Education (RISE) Office**, 806-742-2110, [rise.ttu.edu](http://rise.ttu.edu) (Provides a range of resources and support options focused on prevention education and student wellness.) **Texas Tech Police Department**, 806-742-3931, <http://www.depts.ttu.edu/ttpd/> (To report criminal activity that occurs on or near Texas Tech campus.)

**COVID-19 related Absences: Students who are experiencing COVID-19 related symptoms should isolate.** If you test positive for COVID-19, report your positive test through TTU's reporting system: <https://www.depts.ttu.edu/communications/emergency/coronavirus/>

Once you report a positive test, the portal will automatically generate a letter that you can distribute to your professors and instructors. You will be allowed to take missed test due to COVID later only if you provide me this automatically generated letter.

Students are responsible for the review of missed topics due to illness and have 10 days to complete missed assignments after their return to class.

**Important Dates:**

Tuesday, August 30 - Last day to add a course.

Monday, September 12 - Last day to drop a course without academic penalty.

Thursday, September 22 - Last day to withdraw from the university and receive a partial refund.

Monday, November 21 - Last day to drop a course.

Wednesday - Sunday, November 23-27 Thanksgiving Vacation.

November 30 -December 7 – Period of no examinations.

Tuesday, December 6 - Last Day of classes.

**Thursday, December 8 - 10:30 a.m. – 1:00 p.m. Final Exam.**

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## STUDENT EVALUATION:

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◆ <b>Thursday, December 8 FINAL EXAMINATION 10:30 a.m. – 1:00 p.m.</b>	<b>200 pts</b>
This is a <b>Departmental Common Final Exam</b> written by the Course Coordinator. Exam is scheduled before the semester begins. Date and time of this exam cannot be changed. Students should <b>eliminate any conflicts NOW</b> . Room for the Final Exam will be announced later.	
● <b>IN-CLASS EXAMS:</b> September 22, October 25, November 17 Each exam consists of 8-12 problems	<b>3×100 = 300 pts</b>
● <b>15 min QUIZZES:</b> Each 15-minute quiz consists of 2 problems: 2×10 = 20 pts	<b>6×20 = 120 pts</b>
● <b>5 min QUIZZES:</b> There will be several 5 minute quizzes (usually first 5 minutes of a class), where students will be asked to write a particular formula/definition/theorem/etc.	<b>total = 40 pts</b>
● <b>HOMEWORK:</b> I will collect homework eight times – approximately every third class and I will grade 6-12 problems of these homework assignments. Each homework is worth 15 pts:	<b>8×15 = 120 pts</b>
● <b>Perfect attendance</b> (≤2 missed classes, all excused absences must be supported by official notes).	<b>20 pts</b>
● <b>MAXIMAL TOTAL (100%):</b>	<b>800 pts</b>

## GRADING PROCEDURE:

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<b>A</b>	-	90 - 100%
<b>B</b>	-	80 - 89%
<b>C</b>	-	70 - 79%
<b>D</b>	-	60 - 69%
<b>F</b>	-	$\leq 59\%$

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### Course Calendar

Date	Textbook	Tentative Lecture Topics
Aug. 25	Section 6.1	Area between two curves.
Aug. 30	Section 6.2	Volume.
Sep. 1	Section 6.3	Polar forms and areas.
Sep. 6 <b>Q1</b>	Section 6.4	Arc length and surface area.
Sep. 8	Section 6.5	Physical applications.
Sep. 13	Section 7.1	Review of substitution and integration by table.
Sep. 15 <b>Q2</b>	Section 7.2	Integration by parts.
Sep. 20	Section 7.3	Trigonometric methods
<b>Sep. 22</b>	<b>Lecture Exam #1</b>	<b>covered Sections 6.1 – 6.5 &amp; 7.1 – 7.3</b>
Sep. 27	Section 7.4	Method of partial fractions.
Sep. 29	Section 7.5	Summary of integration techniques.
Oct. 4 <b>Q3</b>	Section 7.6	First-order differential equations.
Oct. 6	Section 7.7	Improper integrals.
Oct. 11	Section 8.1	Sequences and their limits.
Oct. 13 <b>Q4</b>	Section 8.2	Introduction to infinite series. Geometric series.
Oct. 18	Section 8.3	The integral test; p-series.
Oct. 20	Section 8.4	Comparison tests.
<b>Oct. 25</b>	<b>Lecture Exam #2,</b>	<b>covered Sections 7.4 – 7.7 &amp; 8.1 – 8.4.</b>
Oct. 27	Section 8.5	The ratio test and the root test.
Nov. 1	Section 8.6	Alternating series; Absolute and conditional convergence.
Nov. 3	Section 8.7	Power series.
Nov. 8 <b>Q5</b>	Section 8.8	Taylor and Maclaurin series.
Nov. 10	Review of Series	
Nov. 15	Section 9.1	Vectors in $\mathbf{R}^2$ .
<b>Nov. 17</b>	<b>Lecture Exam #3,</b>	<b>covered Sections 8.5 – 8.8 &amp; 9.1.</b>
Nov. 22	Section 9.2	Coordinates and Vectors in $\mathbf{R}^3$ .
Nov. 29 <b>Q6</b>	Section 9.3	The dot product.
Dec. 1	Section 9.4	The cross product.
Dec. 6	Review of the course.	
<b>December 8</b>	<b>Thursday</b>	<b>10:30a.m. – 1:00 p.m. FINAL EXAM</b>

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## Tentative Homework Assignments

Section	Assignment
<b>HW1</b>	
6.1	2 – 10 even (Setup – do not evaluate), 14,16,20,26,32,34,
6.2	(Setup: 10, 12, 18, 22, 24, 26-32 even)
6.3	8, 10, 12,30,34, 42,46
<b>HW2</b>	
6.4	2,4,6, 8, 12, 16,26,30,32,34
6.5	6,8,12,22,28,30,34
7.1	2 – 24 even, 40, 42
<b>HW3</b>	
7.2	2 – 14 even, 18, 20,32,36
7.3	6, 10,14,22,24,34,36,42,46
7.4	2,6,10,16,20,24,36,40,42
<b>HW4</b>	
7.5	2,6,10,12,20,26,30,36,42
7.6	2,6,8,12,18,20,34,36
7.7	4,6,12,14,18,20,28,30,36,38,48
<b>HW5</b>	
8.1	4,6,8,14,20,26,28,32,36
8.2	4,8,12,14,16,18,20,24,26
8.3	4,8,10,14,16,22,24,30,32,36,40,44
<b>HW6</b>	
8.4	6,10,12,16,20,22,28,34,38,
8.5	4,6,10,12,16,20,30,34,36,44,46
8.6	4,8,10,12,20,24,26,28,32,36
<b>HW7</b>	
8.7	2,4,8,12,16,20,24,26,30,32,38,40,44
8.8	4,8,16,18,22,26,30,32,38,44,48,52
9.1	2,6,10,14,18,22,24,26,30,32,36,42,44,48
<b>HW8</b>	
9.2	2,4,6,10,12,14,16,22,24,26,30,34,38,40,50
9.3	4,6,8,12,16,20,24,28,32,34,40,46,50
9.4	2,4,8,12,14,16,18,20,22,28,30,32