

COLLIN COLLEGE
COURSE SYLLABUS SPRING 2020

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| Course Information |
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Course Number: MATH 2414

Course Title: Calculus II

Course Description: Differentiation and integration of transcendental functions; parametric equations and polar coordinates; techniques of integration; sequences and series; improper integrals. Graphing calculator required. Lab required.

Course Credit Hours: 4

Lecture Hours: 3

Lab Hours: 3

Prerequisite: MATH 2413

Student Learning Outcomes:

- **State-mandated Outcomes:** Upon successful completion of this course, students will:
 1. Use the concepts of definite integrals to solve problems involving area, volume, work, and other physical applications. (Critical Thinking, Communication Skills)
 2. Use substitution, integration by parts, trigonometric substitution, partial fractions, and tables of anti-derivatives to evaluate definite and indefinite integrals.
 3. Define an improper integral. (Communication Skills)
 4. Apply the concepts of limits, convergence, and divergence to evaluate some classes of improper integrals.
 5. Determine convergence or divergence of sequences and series. (Critical Thinking)
 6. Use Taylor and MacLaurin series to represent functions.
 7. Use Taylor or MacLaurin series to integrate functions not integrable by conventional methods.
 8. Use the concept of polar coordinates to find areas, lengths of curves, and representations of conic sections.
- **Additional Collin Outcome:** Upon successful completion of this course, students will:
 1. Approximate definite integrals using the Trapezoidal, Midpoint, and Simpson's Rules. (Empirical/Quantitative Skills)

Withdrawal Policy: See the current *Collin Registration Guide* for last day to withdraw.

Collin College Academic Policies: See the current *Collin Student Handbook*.

Americans with Disabilities Act Statement: *In compliance with applicable law, Collin College provides equal access to education and safeguards against discrimination by offering specialized services and reasonable accommodations to qualified students with a disability.*

If you anticipate or experience any barriers to learning based on disability, please contact the ACCESS Office (<https://rainier.accessiblelearning.com/Collin/ApplicationStudent.aspx>)

Note: *Instructors will provide reasonable accommodations only to students who present a Course Accessibility Letter issued by the ACCESS Office.*

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| INSTRUCTOR |
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Instructor's Name: Dr. Katerina Vishnyakova

Office Number: LH-122 (inside the faculty suite LH-117) Lawler's Hall Frisco campus

Office Hours:

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|-----------|-------------------------------------|
| MW | 9:00 – 10:50 am; 12:20 – 12:50 pm |
| W | 5:45 – 6:45 pm |
| TR | 8:45 – 9:45 am |
| F | and other times by appointment ONLY |

Phone Number: (972) 377-1532

Email: kvishnyakova@collin.edu. You can e-mail me with homework questions or concerns. **Send all e-mail correspondence to me through Collin College CougarMail.** I cannot discuss any class or confidential information with students through external e-mail addresses. E-mails from external accounts will be checked last and might not be answered at all if subject matter is considered confidential. Always include your name and course number when writing e-mails. Please allow 24 hours for instructor's response. Please address me as "Professor" or "Doctor" in your e-mails. Any e-mails that include texting jargon rather than formal language (for example, "u" instead of "you") will not be answered.

Website: <http://faculty.collin.edu/kvishnyakova>

Class Information:

Section Number: P06

Meeting Times: TR 10:00 am – 12:45 pm

Meeting Location: LH-140

Census Day: February 3, 2020

College Repeat Policy: Beginning Fall 2016, Texas residents attempting a course more than twice at Collin College are subject to regular tuition plus an additional \$50 per semester credit hour. Refer to the Collin College website for a complete list of courses exempt from the course repeat tuition and how to qualify for exemptions from the higher tuition rate: <http://www.collin.edu/gettingstarted/register/withdrawal.html>

Course Resources: Enhanced WebAssign Access Code for online assignments and textbook Calculus: Early Transcendentals, 8th edition, Stewart, 2016, Cengage Learning.
ISBN: 978-1-285-74155-0

Supplies: A graphing calculator is required and the TI 83, TI 83 Plus, or TI 84 is preferred. The TI-Nspire calculator is only allowed with the TI-84 faceplate or CS model. **Students are NOT allowed to use a calculator that has any computer algebra system (CAS) built in.** (For example, you may not use a TI-89/TI-92 calculator in this class.)

Student Technical support: Now provided 24/7 at (972) 377-1777 or sts@collin.edu

Lateral Transfer Policy:

Lateral transfers will not be granted after the 4th week of class or after the first exam, whichever comes first. Exceptions to this may only be for a documented change in work schedule and/or family

emergencies. If a student does transfer to another section, **all previous grades will accompany the student.**

Course Requirements: Attend class as scheduled and complete the required tests, lab assignments, and final examination, and any other assignments required by the instructor.

- Participation in class discussions is strongly encouraged. Be engaged and ask questions to ensure understanding of the material.
- Be courteous to your fellow classmates. Respect their opinions.
- All electronic devices (except calculator) must be **turned off or silenced** before entering the classroom. No text messaging and no open laptop computers in class. Students may be asked to leave the classroom if in violation of this policy. If such an event occurs, it will count as a tardy. After a second offense, the student will be reported to the Dean of Students office. If an emergency arises which necessitates the use of a cell phone, the student must obtain an exception from the instructor in advance.
- College rules do not permit you to eat or drink in the classroom.

ATTENDANCE POLICY: Attendance is expected of all students. If a student is unable to attend, it is his/her responsibility to obtain missed material/notes. Missing a class is not an excuse to be unprepared or not knowing the material. If there is no contact from a student regarding an absence initiated within a week after the absence, the student will receive a zero on any material or assignment that was missed.

Attendance will be taken each class period. **You will receive a tardy mark if you leave early or come in later than 5 minutes after the class starts. Three tardy marks are equivalent to an absence.** The time will be decided by the clock found on the wall in the classroom. If the clock is off, the time will be determined by the instructor's watch. Disruptive or disrespectful behavior of any kind will not be tolerated. If you cannot participate positively in class, you will be asked to leave. In accordance with section *Classroom Dismissal by Faculty Member* "If a student is disruptive in class ... a faculty member has the right to temporarily dismiss the student from class ..."

I understand that at times there are **unexpected one-time events** (for example, traffic accident, family issues). I suggest that you have the contact information of one of your peers to inform them on such occasion. It should be considered as an emergency situation and not as a regular excuse for being late. If you arrive to class late, please be discreet. Enter the class quietly holding the door until it is completely closed, have all your notes and supplies in your hands so you don't need to distract your peers by taking objects from your bag. Please take the back seat in the classroom. **If an assignment is due at the beginning of the class, don't try to hand it to me when you join the class.** We can discuss that after the class. Please consider that you might NOT be able to submit it.

METHOD OF EVALUATION: Your grade will be determined by using the following:

Average of the Tests: 50%

Labs: 15%

Homework: 10%

In-class quizzes, activities and participation: 10%

Comprehensive final exam: 15%

GRADING RATIONALE:

90 – 100 - **A** 80 – 89 - **B** 70 – 79 - **C** 60 – 69 - **D** 0 – 59 - **F**

An "I" grade will only be assigned in extreme, well-substantiated circumstances, passing grades only.

Homework: There will be a [Enhanced WebAssign Homework](#) assignment for **every** section covered in class. You will be responsible to register using a WebAssign student access code. This code may be purchased online or through the bookstore. The class key for this course is **collin 0773 9720**.

Homework is very important and is absolutely necessary for the successful completion of the course. Homework exercises are **automatically assigned** after the corresponding section is covered in class. The student is expected to complete the work by the due date indicated in the course calendar. If you are not satisfied with your score for a particular homework you can rework the assignment until all the problems are correct before the assigned due date. No late assignments will be received. **It is important to understand that a non-submitted assignment will result in a grade of zero that will affect your homework and final average.** Your grade will automatically be recorded in my gradebook. Please refer to the separate WebAssign instructions for creating an account.

Furthermore, in preparation for each lecture please read ahead the sections covered that day. Leave the classroom with answers, not questions.

In-class quizzes and activities: Periodic in-class quizzes are given during the semester and will be based on examples discussed in class and homework problems. The quizzes are graded on a point system. Your goal is to accumulate as many points as possible by the end of the semester. You **must show your work** to receive maximum quiz points. There are **no make-ups for quizzes**, which are normally administered at the beginning of class.

Labs: There will be four Lab assignments due as listed on the tentative schedule. We will be working on handwritten labs in class to be turned in for a lab grade. **NO LATE LABS WILL BE ACCEPTED.**

Examinations for this course include four class tests and a comprehensive final examination (2 hours). Please write ALL your work on the exam in an orderly fashion. Questions will be very similar to those found in the assignments/reviews. You must show your work to receive maximum test points. Write neatly! If I can't read it – I can't grade it! All examinations will be given as outlined in the tentative calendar. All exams will be taken in the classroom. If you know ahead of time that you will have to miss a test, you can plan to take it early. Talk to me in person and e-mail me with the details. Extreme well-documented emergencies will be taken into consideration on an individual basis. The graded tests will be returned within a week after the test was taken. If you have a question about the exam grade, please make an appointment and come to my office to discuss any issues. All grade issues must be resolved within one week after graded papers are returned to class. If you missed the day the test was returned you can pick it up during my office hours, but you will not have an extension for grade discussion.

All tests are closed book, no notes. If for any reason you miss one test during the semester, your final exam score will replace the zero score for the test. If all tests are taken as scheduled throughout the semester, the final exam score can replace the lowest test score if it's in student's best interest.

I will not give out grades over e-mail or by phone. If you have any questions about your progress in class or your grades, you are welcome to talk to me during office hours or to make an appointment.

TESTING GUIDELINES: The expectations for Tests are as follows:

- You must turn off your cell phone and put it away. **If you are seen with your cell phone out, your test will be collected and you will not be able to finish it at another time.**
- You cannot leave the room until you have turned in your test. **Go to the restroom before the exam.**

- You cannot ask any questions during the exams. If you feel there is an issue you can write a comment on the test.
- All hats must be worn backwards.
- No drinks/food allowed on your desk.
- If you arrive to take the test after a classmate has turned in their test you will not be allowed to take your test. Arrive to class on time.
- Any talking during the test is not allowed.
- Students may be asked to show Student ID card.

POLICY ON MISSED TESTS AND ASSIGNMENTS: Make-up examinations will not be given unless an unavoidable circumstance prevented you from taking the test in class. Notify the instructor if a special situation occurs. The course calendar provides the due dates for all upcoming assignments and tests, and it is student's responsibility to know the due dates and be in class on time to turn in work and take the test. If you know in advance that you'll miss the day when the test is scheduled, notify your instructor so that special arrangements can be made (for example, you may be allowed to take the test a day earlier.) If for any reason you miss one test during semester, your final exam score will replace the zero score for the test.

There are some class rules regarding missed coursework and exams that students should be aware of:

- 1. Class policy is that no make-up exams/assignments will be given automatically.** If a student cannot be present in class to take the quiz or exam, the student must contact me immediately by e-mail through Cougar Mail or leaving a message on my office phone within seven (7) hours of missing the class.
- 2. Do not assume that you are eligible for a make-up test.** Only students with documented excuses (hospital or court papers, doctor's note, death in the family, etc) will be considered for a make-up. Professor reserves the right to make decisions on a case by case basis.

RESOURCE MATERIAL: Any student enrolled in class has access to the Math Lab located in F148. The Lab is staffed with faculty and tutors; in addition, it offers free tutorial help, graphing calculators, and computer assistance. Collin students may arrange for tutoring with the Disability Services by completing a tutor request form on their website.

WITHDRAWAL POLICY: Students who enroll as an entering freshman or a first-time college student in undergraduate courses at any Texas public community college, technical institute, health sciences institution, or any public university offering undergraduate courses must comply with the legislation of TEC51.907. TEC51.907 states that students who enroll for the first time during the fall 2007 semester or any subsequent semester are subject to the *course drop limit of six course drops*. This includes any course a transfer student has dropped at another institution. For exemptions, visit the Collin website: <http://www.collin.edu/gettingstarted/register/withdrawal.html>

Drops **after** the term census date are considered **withdrawals** and appear as a "**W**" on the transcript. Students cannot withdraw on CougarWeb. The last day to withdraw from spring 2020 semester is **Friday, March 20, by 5 p.m.** Students who fail to withdraw, will receive a performance grade. Please consult your instructor before you withdraw and check the current Collin Registration Guide for the withdrawal procedure.

Technology Use in the Classroom: The use of a cell phone, Bluetooth, and/or laptop is PROHIBITED during class. Cell phones must be turned off or put on silent (not vibrate) during

class. If your cell phone continually rings during class, it will be considered disruptive behavior resulting in disciplinary action through the Dean of Students office. Other electronic devices are prohibited without prior approval of the instructor. **No videotaping or recording of an instructor or classmates is allowed** without prior permission from the instructor. If a student wishes to record lectures, he/she will need to make an appointment to discuss policy on use of an electronic device and sign an agreement. It is understood that if permission for recordings is given, it is for student's **individual use ONLY** and may not be distributed to others or posted on any online platform without permission from the instructor.

ACADEMIC ETHICS: Every member of the Collin College community is expected to maintain the highest standards of academic integrity. Collin College may initiate disciplinary proceedings against a student accused of scholastic dishonesty. Scholastic dishonesty includes, but is not limited to, statements, acts, or omissions related to applications for enrollment or the award of a degree, and/or the submission of one's own work material that is not one's own. Scholastic dishonesty may involve, but is not limited to, one or more of the following acts: cheating, plagiarism, collusion, use of annotated texts or teacher's editions, use of information about exams posted on the Internet or electronic medium, and/or falsifying academic records. While specific examples are listed below, this is not an exhaustive list and scholastic dishonesty may encompass other conduct, including any conduct through electronic or computerized means:

Plagiarism is the use of an author's words or ideas as if they were one's own without giving credit to the source, including, but not limited to, failure to acknowledge a direct quotation.

Cheating is the willful giving or receiving of information in an unauthorized manner during an examination; collaborating with another student during an examination without authority; using, buying, selling, soliciting, stealing, or otherwise obtaining course assignments and/or examination questions in advance, copying computer or Internet files, using someone else's work for assignments as if it were one's own; or any other dishonest means of attempting to fulfill the requirements of a course.

Collusion is intentionally or unintentionally aiding or attempting to aid another in an act of scholastic dishonesty, including but not limited to, failing to secure academic work; providing a paper or project to another student; providing an inappropriate level of assistance; communicating answers to a classmate about an examination or any other course assignment; removing tests or answer sheets from a test site, and allowing a classmate to copy answers. **See the current Collin Student Handbook for additional information.**

If a student is found responsible for academic dishonesty, a **penalty** ranging from a 0 on an assignment to an F in the course will be assigned based on the **instructor's interpretation** of the severity of the situation. Contact the Dean of Students at 972.881.5771 for the student disciplinary process and procedures or consult the *Collin Student Handbook*.

SOBI

Collin College's Strategies of Behavior Intervention (SOBI) team is an interdisciplinary, college wide team whose mission is to support students, faculty, and staff, and to facilitate a positive and effective learning environment. In order to accomplish this, the SOBI team has designed a process for assisting students that may display various levels of concerning behavior (e.g., strange or unusual behavior; change in dress, personal hygiene, or physical appearance; threats of harm to self or others; etc). Any behavior that becomes a concern to you or that negatively affects your ability to succeed as a student at Collin College may be referred to SOBI.

Please note that SOBI is not a disciplinary committee, and SOBI actions are not a substitute for disciplinary procedures. Reports of Student Code of Conduct (Code) violations will be referred directly to the Dean of Students for disciplinary actions.

SUBMISSION GUIDELINES FOR WRITTEN ASSIGNMENTS: The following standards apply to all homework, class work, and other turned-in assignments. The instructor reserves the right to not accept or deduct points from assignments that do not follow these guidelines.

- Assignments without **student's name, course number, and section number** will not be graded.
- Problems should be worked down (not across) the page in the **order** they were assigned.
- Multiple pages should be **stapled**.
- Illegible and/or incomprehensible work (as determined by the instructor) will not be graded.
- Assignments with frayed "spiral" edges will not be accepted.
- Answers should be **boxed or circled** for clarity. Always give exact answers unless asked for approximations. (i.e. fractions are preferred over rounded-off decimals)
- **Show ALL your work** and that work must support the answer. If there is absolutely no work for the problem, copy the problem and state the solution(s).
- Simplify your answers. If the problem asks to graph, please show the graph.
- Assignments are due when called for; late work will NOT be accepted!!!

Tutoring Services: All students are expected to study daily for this course. The material you learn today will be used tomorrow. If you find that you need extra help, please:

- Come by my office during office hours and I will help you. If your schedule will not allow you to come to my office house, see me and we can schedule an appointment for another time.
- Take advantage of the Math Lab. It is a free tutoring center for math students enrolled at Collin. There are math labs on all three campuses. The Frisco math lab is located in room F-148. Call 972-377-1639 for hours.
- Fill out a tutor request form at the Disability Services office in F118 (Frisco Campus). The ACCESS office provides each student with FREE group tutoring, and/or FREE on-line tutoring. You can get additional information and tutoring schedule at <http://www.collin.edu/studentresources/tutoring/> Please contact Amy Myrick at 972-881-5950 or Suzanne Chase at 972-377-1785 if you have additional questions.
- You can check out graphing calculator for 4 hours in the library on a daily basis.
- Form a study group with a few classmates. The best way to learn is to teach.

TENTATIVE MATH 2414.P06 COURSE CALENDAR:

| | DATE | MATERIAL TO COVER | COMMENTS/DUE DATES |
|----------|-------------------|---|---|
| 1 | January 21 | Introductions, Syllabus, Enhanced WebAssign Accounts; Review of U-substitution (section 5.5); 6.1 Areas Between Curves | WELCOME! ☺ |
| | January 23 | 6.1 Areas Between Curves; 6.2 Volumes; 6.3 Volumes by Cylindrical Shells | HW 5.5 Review is due; Lab 1 Part 1 |
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| 2 | January 28 | 6.4 Work | HW 6.1 & 6.2 due; |
| | January 30 | 6.5 Average Value of a Function; 7.1 Integration by Parts | HW 6.3 is due Census day – February 3 |
| 3 | February 4 | 7.2 Trigonometric Integrals; 7.3 Trigonometric Substitution | HW 6.4 & 6.5 are due; Lab 1 Part 2 |
| | February 6 | 7.3 Trigonometric Substitution; <i>Review for Test 1/</i> Lab 1 Part 3 | HW 7.1 is due; LAB 1 is due |
| 4 | February 11 | <i>Review for Test 1; Test 1 in class;</i> 7.4 Integration of Rational Functions by Partial Fractions | HW 7.2 & 7.3 are due |
| | February 13 | 7.4 Integration of Rational Functions by Partial Fractions; 7.5 Strategy for Integration | |
| 5 | February 18 | 7.5 Strategy for Integration; 7.6 Integration Using Tables; 7.7 Approximate Integration | HW 7.4 is due |
| | February 20 | 7.8 Improper Integrals; 8.1 Arc Length | HW 7.5 & 7.6 are due; Lab 2 |
| 6 | February 25 | 8.2 Area of a Surface of Revolution; 8.3 Applications to Physics and Engineering | HW 7.7 & 7.8 due |
| | February 27 | <i>Review for Test 2/ Lab 2</i> | HW 8.1 & 8.2 are due; LAB 2 is due |
| 7 | March 3 | <i>Review for Test 2/ Test 2 in class;</i> 10.1 Curves defined by Parametric Equations | HW 8.3 is due |
| | March 5 | 10.2 Calculus with Parametric Equations; 10.3 Polar Coordinates | |
| 8 | March 17 | 10.4 Areas and Lengths in Polar Coordinates; 11.1 Sequences | HW 10.1 & 10.2 are due |
| | March 19 | 11.2 Series; 11.3 The Integral Test and Estimates of Sums | HW 10.3 & 10.4 are due; Last day to withdraw – March 20 |
| 9 | March 24 | 11.3 The Integral Test and Estimates of Sums; 11.4 The Comparison Tests | HW 11.1 & 11.2 are due |
| | March 26 | 11.5 Alternating Series; 11.6 Absolute Convergence and the Ratio and Root Tests | HW 11.3 is due |
| 10 | March 31 | 11.7 Strategy for Testing Series; <i>Review for Test 3/</i> Lab 3 | HW 11.4, 11.5 & Remainders are due; LAB 3 is due |
| | April 2 | <i>Review for Test 3/ Test 3 in class</i> | HW 11.6 & 11.7 are due |
| 11 | April 7 | 11.8 Power Series; 11.9 Representations of Functions as Power Series | |
| | April 9 | 11.9 Representations of Functions as Power Series; 11.10 Taylor and Maclaurin Series | HW 11.8 is due |

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| 12 | April 14 | 11.10 Taylor and Maclaurin Series ; 11.11 Applications of Taylor Polynomials | HW 11.9 is due |
| | April 16 | 9.1 Modeling with Differential Equations; 9.2 Direction Fields and Euler's Method | HW 11.10 & 11.11 are due |
| | | | |
| 13 | April 21 | 9.3 Separable Equations; 9.4 Models for Population Growth | HW 9.1 & 9.2 are due |
| | April 23 | 9.4 Models for Population; 9.5 Linear Equations | HW 9.3 is due |
| | | | |
| 14 | April 28 | 9.5 Linear Equations | HW 9.4 is due |
| | April 30 | Review for Test 4/ Lab 4 | HW 9.5 is due; LAB 4 is due |
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| 15 | May 5 | Review for Test 4/Test 4 in class | |
| | May 7 | Review for Final Exam | |
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| 16 | May 12 | Final Exam 10:00 am – 12:00 pm (room LH 140) | |
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Note: The instructor reserves the right to make changes to this syllabus during the semester. Changes will be provided in writing during class hours.

Expectation: Maintaining a positive learning environment

As your instructor and as a student in this class, it is our shared responsibility to develop and maintain a positive learning environment for everyone. Your instructor takes this responsibility very seriously and will inform members of the class if their behavior makes it difficult for him/her to carry out this task. As a fellow learner, you are asked to respect the learning needs of your classmates and assist your instructor achieve this critical goal.

Creating Opportunities for Learning

As your instructor, it is my responsibility to present learning opportunities through the course syllabus, lectures, labs, in-class and out-of-class exercises and assignments. It is your responsibility to do the learning by completing the readings, by attending class and by participating in the class discussions and assessment/lab exercises.

Tracking Your Success at Learning

Your instructor will conduct quizzes, exams and assessments that you can use to determine how successful you are at achieving the course learning outcomes (mastery of course content and skills) outlined in the syllabus. If you find you are not mastering the material and skills, you are encouraged to reflect on how you study and prepare for each class. Your instructor welcomes a dialogue on what you discover and may be able to assist you in finding resources on campus that will improve your performance.

COURSE CONTENT: Proofs and derivations will be assigned at the discretion of the instructor. The student will be responsible for knowing all definitions and statements of theorems for each section outlined in the following modules.

MODULE 1: APPLICATIONS OF INTEGRATION

The student will be able to:

1. Use the definite integral to find the area between two curves.
2. Use the definite integral to find the volume of a solid by slicing and with disks and washers.
3. Use the definite integral to find the volume of a solid of revolution with cylindrical shells.
4. Use the definite integral to find the work done by a variable force.
5. Use the definite integral to find the average value of a function.

MODULE 2: TECHNIQUES OF INTEGRATION

The student will be able to:

1. Use integration by parts to evaluate definite and indefinite integrals.
2. Evaluate trigonometric integrals- definite and indefinite.
3. Use the method of trig substitution to evaluate definite and indefinite integrals.
4. Use the method of partial fractions to evaluate definite and indefinite integrals for rational functions.
5. Know the basic integration formulas and apply them strategically.
6. Use integral tables to evaluate definite and indefinite integrals.
7. Approximate definite integrals using the Trapezoidal, Midpoint, and Simpson's rules.
8. Evaluate improper integrals.

MODULE 3: FURTHER APPLICATIONS OF INTEGRATION

The student will be able to:

1. Use the definite integral to find the arc length of a curve.
2. Use the definite integral to find the area of a surface of revolution.
3. Apply the definite integral to problems in physics and engineering (calculate hydrostatic force and pressure and moments and centers of mass). Also, apply the Theorem of Pappus to find volumes of revolution.
4. (OPTIONAL) Apply the definite integral to problems in economics and biology.

MODULE 4: DIFFERENTIAL EQUATIONS

The student will be able to:

1. Model problems with differential equations.
2. Construct a slope field for a differential equation and use it to sketch solution curves.
3. Use Euler's method to construct approximate solutions to initial value problems.
4. Solve separable differential equations and various applications (e.g. orthogonal trajectories and mixing problems).
5. Examine and use various models for population growth (e.g. exponential and logistic growth).
6. (OPTIONAL) Solve first-order linear differential equations and applications.

MODULE 5: PARAMETRIC EQUATIONS AND POLAR COORDINATES

The student will be able to:

1. Use, sketch and derive parametric equations for plane curves.
2. Do calculus with parametric curves: find slope, area, arc length and surface area.
3. Review the polar coordinate system and how to plot points and curves, convert to and from polar coordinates and check for symmetry.
4. Find tangents to polar curves.
5. Calculate areas and lengths in polar coordinates, including applications to conic sections.

MODULE 6: INFINITE SEQUENCES and SERIES

The student will be able to:

1. Work with infinite sequences and find the limit of a sequence.
2. Work with and understand the convergence and divergence of infinite series, including geometric series.
3. Use the Test for Divergence.
4. Use the Integral Test and use the Remainder Estimate to estimate the sum of a series. Determine the convergence or divergence of p -series.
5. Use the Direct and Limit Comparison Tests.
6. Use the Alternating Series Test and the Alternating Series Estimation Theorem.
7. Understand absolute and conditional convergence and apply the Ratio and Root Tests.
8. Apply the various series convergence tests strategically to determine convergence or divergence of a given series.
9. Understand power series and find the radius of convergence and interval of convergence.
10. Work with the power series representation of a given function.
11. Find Taylor and Maclaurin series for a given function. Find binomial series. Use power series to integrate functions and calculate limits.
12. Use Taylor polynomials to approximate functions.