MERCYHURST UNIVERSITY

MATH 171 – Calculus II
Course Syllabus · Spring 2023

INSTRUCTOR:	Roger Griffiths	**OFFICE HOURS:**
OFFICE:	Old Main 305	Tues: 09:00 - 10:20
EMAIL:	rgriffiths@mercyhurst.edu	Tues: 1:00 - 1:50
PHONE:	(814) 824-2123	Wed: 10:00 - 10:50
CLASS TIME:	Mon, Tues, Wed, Fri: 08:00 - 08:50, (4 semester credits)	Thur: 08:00 - 09:20 (Zoom)
LOCATION:	Hirt M214	Fri: 10:00 - 10:50
PREREQUISITE:	Calculus I	
WEB:	www.integral-domain.org/rgriffiths/courses/m171/	
TEXT:	Calculus Early Transcendentals, (10th Edition) by Anton, Bivens, Davis;	

COURSE DESCRIPTION

Any student who has completed Calculus I should take Calculus II to obtain a complete study of the calculus of one variable. Topics follow the early transcendentals path, included are the integral, anti-derivatives, the Fundamental Theorem, integration techniques, interesting applications of integration, an introduction to differential equations, series, sequences. Prerequisite: MATH 170. 4 credits.

LEARNING OBJECTIVES

By the end of this course, you will have acquired many mathematical power tools which include the ability to:

- use integration to find areas between curves, volumes of solids formed by revolution, lengths of plane curves;
- find derivatives and integrals involving exponential and logarithmic functions;
- find derivatives and integrals involving the inverse trigonometric functions;
- evaluate integrals using a variety of integration techniques;
- solve first-order separable differential equations;
- evaluate improper integrals;
- find the limit of a sequence;
- determine whether a given series converges or diverges;
- find the power series expansion of a function and its radius of convergence;
- further our understanding and ability to *write mathematics*;
- For most of you, this understanding of the language of mathematics, together with your further developed mathematical reasoning will yield the most significant long term benefits of this course; overshadowing the more commonly identified role of this course as learning more mathematical methods (the items listed above);
- read a theorem in a calculus text, check the hypotheses in a particular situation, and draw appropriate conclusions.

CLASS MEETINGS

This class will meet in-person everyday (in our class room). This class will not meet *virtually* unless mandated by health authorities or the university; we will follow a pre-COVID in-class routine.

Textbook

Calculus Early Transcendentals, 10th Edition by Anton, Bivens, Davis. You will need this textbook, and be sure to check both the edition and version when purchasing; other editions have similar material, but the assigned problems may be different. Other then a lot of notebook paper and pencils, no other materials are required for this class. You do NOT need to purchase a subscription to WileyPLUS or pay to access any other online resources. If you prefer to purchase an electronic version or the binder version of the text, you're welcome to do so.

Calculators

Calculators are not required or even recommended for this course, and **you will not be permitted to use a calculator or computer on any quiz or exam**.

You are strongly encouraged to avoid using a calculator while working on homework. *All of our examinations are carefully designed to be taken "closed book" without the use of calculators, computers or "crib sheets".* Examination problems will focus on the basic formulas and problem solving techniques which every student of calculus must know without a calculator or textbook. This policy reinforces our stated learning objectives, in particular, furthering our understanding of the language of mathematics. We will be interested in learning mathematics (the process) not in answers.

Homework

I do not collect or grade your written homework. You will be held accountable for the mastery of homework problems via the quizzes and exams. As such, you get no credit for *merely attempting the homework*, your goal is to master each type of problem assigned.

Homework Suggestions

- **Homework is far and away the single most important part of any mathematics course** because this is when most (all) of the learning takes place. Homework problems will be assigned regularly and I expect you to do them.
- In studying mathematics, you must be careful not to let a tutor or friend *think* for you. It is essential that you can work problems **completely on your own, without help from any resource,** by the time of an exam.
- You should continue to work problems of a given type (even beyond the assigned problems) until you see the pattern yourself, without assistance of any type (i.e. without using your notes, worked examples, or any prior problems).
- This 'PRACTICE' is how you master the material. You will want to practice in the manner you will be accessed. That means *write mathematics*, your focus should not be on 'the correct answer', but rather, what you write as your solution.

  Recall, one of our learning objectives in this class: advancing our ability to *write mathematics*.
- Remember, the general rule of thumb for a college level class is that one should put in at least 2 hours of work outside class for every hour in class. This means that you should be working on calculus for at least eight hours a week outside of class.

Quizzes

- You will be given quizzes regularly, provided we remain in-person. Keeping up with the homework, as detailed above, will ensure that you are prepared for the quizzes.

- The quizzes will be based largely on the suggested homework.

- Everyone is allowed to miss two quizzes without penalty (for any reason); thus, there are NO make up quizzes. If you end up taking all of the quizzes, you may drop your two lowest quiz scores. Athletes or other individuals missing for school activities are to let me know BEFORE missing the quiz (or it lands above).

- The quizzes serve as an immediate assessment of the extent to which you mastered a particular assignment. Good quiz results should serve as positive feedback, but poor quiz results suggest that you must go back and master that material. Repeatedly failing quizzes will almost certainly lead to failing the next exam, you must take immediate and corrective action if you ever do poorly on a quiz.

EXAMS

IF WE REMAIN IN-PERSON:

- There will be three (written) exams given throughout the semester, in class.
- We will have a (written) cumulative final exam during finals week, in class.
- Students are required to take all exams at the scheduled hour as they appear on the syllabus and course schedule.
- There will be no late *'make-up'* exams, as this is unfair to the rest of the class. If you know in advance you are going to miss a scheduled exam, let me know well in advance of the exam.
- A missed exam will result in the final exam being worth 300 points (you do not loose any points for the missed exam, those points simply roll into the final exam). A second missed exam will receive a grade of 0 (zero).
- Our goal is not simply a 'correct answer'. But rather, you are to demonstrate the extent to which you understand each problem, this means *write mathematics*. A good write-up includes: connecting your work, proper notation, and an explanation of steps as you see necessary.

EVALUATION - IN PERSON

Your letter grade in this course will be based on:

- 100 points: **Quizzes**   Quiz average, will drop 2 quiz scores
- 300 points: **Exams**   3 exams at 100 points each
- 200 points: **Final Exam**   Comprehensive Final exam worth 200 points
- 600 points: **Total points** in the course

GRADING SCALE - IN PERSON

Letter Grade	A	B+	B	C+	C	D
Total Class Points	540	522	480	462	420	360
Percent	90%	87%	80%	77%	70%	60%

✓ Your overall performance in the course is measured by the total number of points you accumulate relative to the maximum points possible. Your letter grade in this course will be based on the distribution above, the standard scale used in the Mathematics department.

✓ These are the only points possible in this class, there is no extra credit (or 'make up'), your asking for extra credit is a pretty clear indication that you have not read this syllabus, which you should think of as 'your class contract'.

IF WE MOVE TO VIRTUAL DELIVERY:

- We will have the three exams during the semester, but there will NOT BE A FINAL EXAM.
- There will be no late exams. If you miss an exam, the grade for that missed exam will be replaced at the end of the semester by your average on the other exams. A second missed exam will receive a grade of 0 (zero).

EVALUATION - VIRTUAL DELIVERY

If we move to virtual delivery, your letter grade in this course will be based on:

- 100 points: **Quizzes**   Quiz average out of 100 points, will drop 1 quiz score
- 300 points: **Exams** 3 exams at 100 points each (total points in the course)
- 400 points: **Total points** in the course

GRADING SCALE - VIRTUAL DELIVERY

Letter Grade	A	B+	B	C+	C	D
Total Class Points	360	348	320	308	280	240
Percent	90%	87%	80%	77%	70%	60%

Course Policies

✓ You are responsible for all that is announced or covered in class even if you are absent.

✓ You are responsible for all the material in a given section unless told otherwise, use the course schedule and suggested homework as a guide.

✓ A prerequisite for additional help outside the classroom is regular class attendance.

✓ Every student is required to establish a *class contact*, that is, a fellow classmate that you may contact in case you are having a problem with a particular homework exercise at night/weekend or in the event you miss class, you can get the class notes from them.

✓ If you miss class, you are responsible for getting the notes from your 'class contact' (see above).

✓ Email is great for **simple** communications, but more complex issues must be handled in office hours.

✓ I expect you to read this syllabus and get clarification of any items you do not understand the first week of class. After that, if you send me an email asking me about something covered in this syllabus, that email will likely be disregarded.

University Resources and Policies

COVID Related Suggestions

· Face masks are not required, but please feel free to wear one if that is your preference. If you have any sort of cough you are strongly encouraged to wear one.

· A water bottle or cup with a lid (and preferably a straw) is permitted to be used in classrooms and labs.

· If you have a fever, shortness of breath or difficulty breathing, new loss of taste or smell, cough, or feel sick at all, please do not come to our classroom. Your health and the health of the Mercyhurst community is the first priority.

ADA Accommodations/Academic Support

Mercyhurst University values inclusion and is committed to the goal of providing equal opportunities for all. Mercyhurst abides by federal, state, and local laws in admissions, employment, academic programs, and all services provided.

Mercyhurst University is committed to complying with its obligations under the Americans with Disabilities Act (ADA), Section 504 of the Rehabilitation Act and the Fair Housing Act to ensure that a person with a disability is granted reasonable accommodations, when such accommodations are necessary, to afford that person equal opportunity to obtain a Mercyhurst education and use university facilities. Please refer to the HUB:
https://lakersmercyhurst.sharepoint.com/sites/StudentsHub
and select the Services tab, then ADA Accommodations from the dropdown for instructions to request an accommodation. You may also contact Susan Reddinger, ADA Coordinator, ADA@mercyhurst.edu, 814-824-2362, Egan Hall 200.

For students with questions about Academic Support, please refer to the HUB:
https://lakersmercyhurst.sharepoint.com/sites/StudentsHub
and select the Academic Resources tab, then Academic Support for more information.

TITLE IX Sexual Misconduct/Sexual Harassment Reporting

Mercyhurst is committed to providing an environment free from sex discrimination, including sexual harassment and sexual violence. Please refer to the HUB:
https://lakersmercyhurst.sharepoint.com/sites/StudentsHub
and select the Resources tab, then Title IX – Sexual Respect from the dropdown for more information. If you would like to file a sexual misconduct complaint, please contact Ann Miller, Title IX Coordinator and Compliance Officer, titleix@mercyhurst.edu, 814-824-2363. Please be aware that in compliance with Title IX, educators must report incidents of sexual assault/harassment, stalking, and domestic/dating violence. If you disclose any of these situations in class, in papers, or to me personally, I am required to report it to the Title IX Coordinator (or any of the Deputy Title IX Coordinators).

Academic Honesty

Students are required to uphold academic integrity throughout the course. In particular, the use of unauthorized materials or collaboration on quizzes or exams and other incidences of academic dishonesty will be handled according to the policies set forth in the Student Handbook.

Math 171 · Calculus II Tentative Course Schedule · Spring 2023

Monday	Tuesday	Wednesday	Friday
Jan 16 §§ 5.2 - 5.6: Integration Review (1)	Jan 17 §§ 5.2 - 5.6: Integration Review (2)	Jan 18 §§ 5.2 - 5.6: Integration Review (3)	Jan 20 *Add/Drop Deadline* § 5.9: Definite Integrals by Substitution (1)
Jan 23 § 5.9: Definite Integrals by Substitution (2)	Jan 24 § 3.6: L'Hopital's Rule (1)	Jan 25 § 3.6: L'Hopital's Rule (2)	Jan 27 - REVIEW -
Jan 30 § 5.4: Sigma Notation (1)	Jan 31 § 5.4: Sigma Notation (2)	Feb 1 § 6.1: Area Between Two Curves (1)	Feb 3 § 6.1: Area Between Two Curves (2)
Feb 6 § 6.2: Volumes by Slicing	Feb 7 § 6.3: Volumes by Cylindrical Shells	Feb 8 §§ 6.2, 6.3: Volumes	Feb 10 § 6.6: Work (1)
Feb 13 § 6.6: Work (2)	Feb 14 § 7.1: Overview of Integration	Feb 15 § 7.2: Integration by Parts (1)	Feb 17 § 7.2: Integration by Parts (2)
Feb 20 § 7.3: Trigonometric Integrals	Feb 21 Exam 1	Feb 22 § 7.4: Trig Substitutions (1)	Feb 24 § 7.4: Trig Substitutions (2)
Feb 27 § 7.5: Partial Fractions (1)	Feb 28 § 7.5: Partial Fractions (2)	Mar 1 § 7.6: Integral Tables	Mar 3 Chap 7: Integration Review II
Spring Break			
Mar 13 § 7.7: Numerical Integration (1)	Mar 14 § 7.7: Numerical Integration (2)	Mar 15 § 7.8: Improper Integrals (1)	Mar 17 § 7.8: Improper Integrals (2)
Mar 20 § 8.1: Modeling with Differential Equations	Mar 21 No Class: Advising Day	Mar 22 § 8.2: Introduction to Differential Equations (1)	Mar 24 § 8.2: Introduction to Differential Equations (2)
Mar 27 § 9.1: Sequences	Mar 28 Exam 2	Mar 29 § 9.2: Monotone Sequences	Mar 31 § 9.3: Infinite Series (1)
Apr 3 § 9.3: Infinite Series (2)	Apr 4 § 9.3: Infinite Series (3)	Apr 5 No Class: Easter	Apr 7 No Class: Easter
Apr 10 No Class: Easter	Apr 11 § 9.4: Convergence Tests (1)	Apr 12 § 9.4: Convergence Tests (2)	Apr 14 § 9.5: Comparison and Ratio Tests (1)
Apr 17 § 9.5: Comparison and Ratio Tests (2)	Apr 18 § 9.5: Comparison and Ratio Tests (3)	Apr 19 - Catch up -	Apr 21 *Pass/Fail Deadline* § 9.6: Alternating Series (1)
Apr 24 § 9.6: Alternating Series (2)	Apr 25 § 9.6: Alternating Series (3)	Apr 26 § 9.7: Taylor Polynomials	Apr 28 *Last day to withdraw* - REVIEW -
May 1 § 9.8: Taylor Series Power Series (1)	May 2 § 9.8: Taylor Series Power Series (2)	May 3 § 9.10: Differentiating and Integrating Series	May 5 Exam 3
Monday May 8 Final Exam 08:00 - 10:00			

Math 171 · Suggested Homework · Spring 2023

Section	Exercises
§ 5.2: The Indefinite Integral § 5.3: Integration by Substitution § 5.5: The Definite Integral § 5.6: The FTC	20, 25, 32, 44, 46 34, 37, 38, 46, 50, 53, 58, 59, 70, 71 15, 19, 23, 24, 27, 28, 34, 37, 38 15, 17, 20, 21, 24, 26, 29
§ 5.9: Definite Integrals by Substitution	15, 20, 22, 33, 36, 38, 39, 40, 41, 42, 43, 44, 45, 49, 50, 53
§ 3.6: L'Hopital's Rule	7, 10, 12, 18, 20, 21, 23, 24, 25, 27, 28, 32, 42
§ 5.4: Sigma Notation	1, 3, 5, 7, 8, 13, 15, 19, 27, 35 (we will ignore mid-point method portions)
§ 6.1: Area Between Two Curves (1)	1, 3, 6, 7, 12, 13, 49
§ 6.1: Area Between Two Curves (2)	4, 11, 14, 15, 16, 35
§ 6.2: Volumes by Slicing	1, 2, 11, 13, 17, 18, 34, 40
§ 6.3: Volumes by Cylindrical Shells	2, 5, 9, 10, 11, 25, 29
§ 6.2: Volumes by Slicing (2) § 6.3: Volumes by Cylindrical Shells (2)	23, 24, 26, 41, 42, 43, 44 4, 13, 16, 30
§ 6.6: Work (1)	1, 2, 5, 6, 9, 14, 19(a)
§ 6.6: Work (2)	3, 8, 15 - 18, 20, 21, 23
§ 7.1: Overview of Integration	1, 3, 4, 6, 8, 9, 10, 11, 14, 18; & Integration Worksheet 1
§ 7.2: Integration by Parts (1)	1, 5, 7, 9, 10, 11, 13, 14, 15, 17, 29, 35
§ 7.2: Integration by Parts (2)	18, 19, 21, 24, 25, 26, 30, 36, 38
Exam 1	
§ 7.3: Trigonometric Integrals	9, 17, 25, 29, 30, 33, 34, 39, 43, 45, 48
§ 7.4: Trig Substitutions (1)	3, 7, 11, 13, 19, 21, 23, 37
§ 7.4: Trig Substitutions (2)	5,16, 17, 25, 39, 47
§ 7.5: Partial Fractions (1)	3, 9, 13, 15, 17, 21, 25
§ 7.5: Partial Fractions (2)	5, 16, 24, 29, 33, 39
§ 7.6: Integral Tables (1)	5, 7, 13, 19, 31, 37, 55, 60, 90
Chapter 7 Review	Integration Worksheet 2
§ 7.6: Integral Tables (2) § 7.7: Numerical Integration (1 & 2)	21, 23, 61, 64, 71, 93 1, 5 (n=10 for all), 25, 41, 43, 45, 52 [All problems: ignore midpoint method]
§ 7.8: Improper Integrals (1)	1, 3, 7, 8, 10, 15, 17, 19
§ 7.8: Improper Integrals (2)	5, 16, 25, 28, 47, [read 52], 55(re-read 52a)
§ 8.1: Modeling with Differential Equations	1, 3, 6, 7, 10, 13, 14(b), 16, 19, 20, 35

Section	Exercises
§ 8.2: Introduction to Differential Equations	2, 6, 7, 9, 12, 13, 25, 29, 33 (#9: look up integral for $\csc x$)
Exam 2	
§ 9.1: Sequences	1, 4, 7, 9, 12, 13, 15, 17, 23, 25, 27
§ 9.2: Monotone Sequences	3, 5, 10, 11, 12, 17, 19, 21, 23, 24
§ 9.3: Infinite Series (1)	1a,3, 5, 11, 13, 15
§ 9.3: Infinite Series (2)	1c, 2, 7, 9, 12, 14, 16(a, b), 17-20
§ 9.3: Infinite Series (3)	6, 10, 28 & get caught up
§ 9.4: Convergence Tests (1)	3, 5, 7, 9, 14, 15, 18, 23
§ 9.4: Convergence Tests (2)	11, 12, 17, 19, 21, 22, 31-34, Read: 36
§ 9.5: Comparison and Ratio Tests (1)	1, 3, 4, 5, 9, 14, 15, 25, 27, 28, 30, 31, 33, 34, 43
§ 9.5: Comparison and Ratio Tests (2)	35 - 41, 44, 45, 46, 47, 49
§ 9.5: Comparison and Ratio Tests (3)	37, 39, 53(b) & get caught up
§ 9.6: Alternating Series (1)	2, 7, 9, 13-17, 21, 23
§ 9.6: Alternating Series (2)	11, 19, 22, 24, 26, 27, 28, (read 51)
§ 9.6: Alternating Series (3)	18, 20 & get caught up
§ 9.7: Taylor Polynomials § 9.8: Taylor Series	6, 7, 12, 19, 24, 25, 37 1, 6, 13, 18
§ 9.8: Taylor Series; Power Series (1)	3, 17, 19, 29, 31, 36, 42
§ 9.8: Taylor Series; Power Series (2)	21, 43, 44, 45, 47, 48, 49, 50
§ 9.10: Differentiating and Integrating	5, 7(a), 8(a), 21(b), 22(b), 26, 31(first 3 terms), 32, 36(a-d), 37
Exam 3	