MERCYHURST ✠ UNIVERSITY

MATH 171 – Calculus II
Course Syllabus · Spring 2019

INSTRUCTOR: Roger Griffiths

OFFICE: Old Main 305

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PHONE: 824-2123

CLASS TIME: Mon, Tues, Wed, Fri: 08:00 - 08:50, (4 semester credits)

LOCATION: Hirt M209

PREREQUISITE: Calculus I (C or better)

WEB: http://math.mercyhurst.edu/~griff/courses/m171/

TEXT: Calculus Early Transcendentals, (10th Edition) by Anton, Bivens, Davis;

OFFICE HOURS:

Mon: 09:00 - 09:50

Mon: 3:00 - 3:50

Tues: 08:50 - 09:20
(in Hirt M209)

Thur: 08:00 - 09:20
(in Hirt M209)

Thur: 2:00 - 2:50

Fri: 10:00 - 10:50

TOPICS

Integration, applications of the integral, transcendental functions, techniques of integration, brief overview of ordinary differential equations and infinite series. We will cover sections from Chapters 5-9. The specific sections covered can be found in the tentative course schedule.

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.

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

Graphing calculators are not required or even recommended for this course. While the textbook contains a few problems which involve the use of a calculator or computer, *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 and writing mathematics (the process) not in 'the answer'.

Homework

I do not collect or grade your written homework. You will be held accountable for the mastery of homework problems via the quizzes (which can occur any day). As such, you get no credit for *merely attempting the homework,* your goal is to master each type of problem assigned. The quizzes serve as an immediate assessment of the extent to which you mastered a particular assignment.

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. If you are unable to do a problem I expect you to find out how to do it. You have at your disposal several means of meeting this expectation.

  - You can stick with it until you figure it out yourself.
  - You can discuss the problem with a classmate or several classmates (strongly encouraged).
  - You can work through the problem with one of the mathematics tutors available for this course; see: http://math.mercyhurst.edu/Tutoring/ for more information.
  - You can see me individually during my office hours. I am always happy to talk to you during my office hours or at any other time if not otherwise committed; when coming to my office, be prepared to show me what you've already tried.
  - You can discuss the problem with anyone who can and is willing to help you.
  - You can ask me about the problem in class (time permitting).

- 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 a quiz or exam.

- Simply ignoring a problem that you are unable to solve is **not acceptable**.

- 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).

- Attending every class is not enough; mathematics can only be learned through practice (like anything worth mastering).

- 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. If you need further help on this important aspect of the class please see the mathematics tutors provided for this class. Please see *Grading Policy* above.

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.

SERVICES/SUPPORT:

TUTORING
Mercyhurst University and the Mathematics Department provide free tutoring for students enrolled in mathematics courses on the natural sciences track: *Mathematics for the Natural Sciences* through *Calculus II*. & *http://math.mercyhurst.edu/Tutoring/*.

LEARNING DIFFERENCES
In keeping with college policy, any student with a disability who needs academic accommodations must call Learning Differences Program secretary at 824-3017, to arrange a confidential appointment with the director of the Learning Differences Program during the first week of classes.

ASSESSMENT
This course will be used to assess the mathematics program; specifically Student Learning Outcome Mathematics #1: *Derives algebraic and analytic expressions from other such expressions using sound mechanical technique*. This learning outcome will be measured using your final exam. This assessment has no impact on your final grade. Rather, the results of this assessment may be used to modify or enhance our program where needed.

SUPPORT OF THE MERCY MISSION
This course supports the mission of Mercyhurst University by creating students who are intellectually creative. Students will foster this creativity by: applying critical thinking and qualitative reasoning techniques to new disciplines; developing, analyzing, and synthesizing scientific ideas; and engaging in innovative problem solving strategies.

QUIZZES

- You will be given quizzes regularly. 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, and should be expected any day (if you are paying attention in class, I generally suggest when the next quiz will occur).

- Everyone is allowed to miss one quiz 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 low quiz score. Athletes or other individuals missing for school activities are to let me know BEFORE missing the quiz (or it lands above).

- Quiz grades will not be based strictly on whether or not you found the correct answer. Your work must also be written clearly, and with proper notation, to receive full credit.

- 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 course, you must take immediate and corrective action if you ever do poorly on a quiz.

Exams

- There will be three midterm exams given throughout the semester, in addition to the final exam. The material on the exams will be similar to topics covered on quizzes and homework.

- 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. Athletes, carefully review our exam schedule looking for conflicts.

- 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.

- Important Dates to Remember:
    - Exam 1: Wednesday, February 13th.
    - Exam 2: Tuesday, March 26th.
    - Exam 3: Wednesday, May 3nd.
    - Final Exam: Wednesday, May 8th, 8:00-10:00 AM.

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 person.
- ✓ Don't use email as an excuse to avoid personal contact.
- ✓ Due to the overwhelming amount of email I receive, any email requests that involve more than a *yes* or *no* response may not get addressed, please come see me in that case.
- ✓ 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.

Evaluation

There will be regular quizzes, three exams, and a cumulative final exam. Homework will be assigned but not collected. We will occasionally discuss the homework in class, but students are expected to clear up questions using my office hours. Quizzes and tests will be closed-book and administered in class. In-class quiz problems will be very similar to the assigned homework problems. The final exam will be cumulative (and worth twice a mid-term exam).

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
- 200 points: **Final Exam**   Comprehensive Final exam worth 200 points
  600 points: **Total points** in the course

And assigned according to the following scale:

Total Class Points	Percent %	Letter Grade	Interpretation
540 - 600	90 to 100	A	Exceptional
522 - 539	87 to 89	B+	Outstanding
480 - 521	80 to 86	B	Very Good
462 - 479	77 to 79	C+	Good
420 - 461	70 to 76	C	Satisfactory
360 - 419	60 to 69	D	Unsatisfactory
0 - 359	Below 60	F	Failure

- ✓ Your overall performance in the course is measured by the total number of points you accumulate relative to the maximum 600 points possible. Your letter grade in this course will be based on the distribution above, the standard scale used in the Mathematics and Information Technology 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 clear indication that you have not read this syllabus, which you should think of as 'your class contract'.

Math 171 · Calculus II Tentative Course Schedule · Spring 2019

Monday	Tuesday	Wednesday	Friday
Jan 14 §§ 5.2 - 5.6: Integration Review (1) Assessment	Jan 15 §§ 5.2 - 5.6: Integration Review (2)	Jan 16 § 5.9: Definite Integrals by Substitution	Jan 18 § 3.6: L'Hopital's Rule
Jan 21 No Class	Jan 22 § 5.4: Sigma Notation (1)	Jan 23 § 5.4: Sigma Notation (2)	Jan 25 § 6.1: Area Between Two Curves (1)
Jan 28 § 6.1: Area Between Two Curves (2)	Jan 29 § 6.2: Volumes by Slicing	Jan 30 Classes Canceled Cold Weather	Feb 1 § 6.3: Volumes by Cylindrical Shells
Feb 4 §§ 6.2, 6.3: Volumes	Feb 5 § 6.6: Work (1)	Feb 6 § 6.6: Work (2)	Feb 8 § 7.1: Overview of Integration
Feb 11 § 7.2: Integration by Parts (1)	Feb 12 § 7.2: Integration by Parts (2)	Feb 13 § 7.3: Trigonometric Integrals	Feb 15 Exam 1
Feb 18 § 7.4: Trig Substitutions (1)	Feb 19 § 7.4: Trig Substitutions (2)	Feb 20 § 7.5: Partial Fractions (1)	Feb 22 § 7.5: Partial Fractions (2)
Feb 25 § 7.6: Integral Tables § 7.7: Numerical Integration (1)	Feb 26 Chap 7: Integration Review II	Feb 27 § 7.7: Numerical Integration (2)	Mar 1 § 7.8: Improper Integrals (1)
Spring Break			
Mar 11 § 7.8: Improper Integrals (2)	Mar 12 § 8.1: Modeling with Differential Equations (1)	Mar 13 § 8.1: Modeling with Differential Equations (2)	Mar 15 § 8.2: Introduction to Differential Equations
Mar 18 § 8.4: First-Order Differential Equations (1)	Mar 19 § 8.4: First-Order Differential Equations (2)	Mar 20 - REVIEW -	Mar 22 § Slope Fields; Differential Equations
Mar 25 § 9.1: Sequences	Mar 26 Exam 2	Mar 27 § 9.2: Monotone Sequences	Mar 29 § 9.3: Infinite Series (1)
Apr 1 § 9.3: Infinite Series (2)	Apr 2 No Class: Advising Day	Apr 3 § 9.3: Infinite Series (3)	Apr 5 § 9.4: Convergence Tests (1)
Apr 8 § 9.4: Convergence Tests (2)	Apr 9 § 9.5: Comparison and Ratio Tests (1)	Apr 10 § 9.5: Comparison and Ratio Tests (2)	Apr 12 *Last day to withdraw* § 9.5: Comparison and Ratio Tests (3)
Apr 15 § 9.6: Alternating Series (1)	Apr 16 § 9.6: Alternating Series (2)	Apr 17 § 9.6: Alternating Series (3)	Apr 19 No Class: Easter
Apr 22 No Class: Easter	Apr 23 - REVIEW -	Apr 24 § 9.7: Taylor Polynomials	Apr 26 § 9.8: Taylor Series Power Series (1)
Apr 29 § 9.8: Taylor Series Power Series (2)	Apr 30 § 9.10: Differentiating and Integrating Series	May 1 - REVIEW -	May 3 Exam 3
		Wednesday May 8	Final Exam 08:00 - 10:00

Section	Exercises
§ 5.2: The Indefinite Integral § 5.3: Integration by Substitution § 5.5: The Definite Integral § 5.6: The FTC	44,46 34,37,38,50,53,70 15,19,23,24,27,28,34,37 15,17,20,21,24,26,29
§ 5.9: Definite Integrals by Substitution	15,20,22,33,38,39,40,41,42,44,45,49,53
§ 3.6: L'Hopital's Rule	7,12,18,20,23,25,27,32
§ 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
Chapter 7 Review	Integration Worksheet 2
§ 7.6: Integral Tables (1)	5,7,13,19,31,37,55,60,90
§ 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

…continued on the next page…

Math 171 · Suggested Homework · Spring 2019

Section	Exercises
§ 8.2: Introduction to Differential Equations	2,6,7, 12,13,25, 29,33,35
§ 8.4: First-Order Differential Equations (1)	1,3,5,7,8,9
§ 8.4: First-Order Differential Equations (2)	21,22,23; & handout exercises
§ 8.3: Slope Fields	1,3,4,6,17; handout exercises; and § 8.4: 15,16
Exam 2	
§ 9.1: Sequences	1,4,7,9,12,13,15,17,23,25,27
§ 9.2: Monotone Sequences	3,5,7,10,11,17,19,21,23,24
§ 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)	35,36,38,40,41,44,45,46,47
§ 9.5: Comparison and Ratio Tests (3)	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)	
Chapter 9 Review	9.5: 37,39,53(b) 9.6: 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 (1)	5,7(a),8(a),9,11,19,21(b),27, 31(first 3 terms)
§ 9.10: Differentiating and Integrating (2)	13(a),19,22(b),26,32,36(a-d),37
Exam 3	