Syllabus

Course. Calculus II, MATH 2414, Section 201, Spring 2010, MTWR 1:30–2:20, KWRC 131.

Instructor. Dr. David Milovich, Assistant Professor, Dept. of Engineering, Mathematics, and Physics, david.milovich@tamiu.edu.

Office. Canseco Hall, 313C. Phone: (956) 326-2570. Office Hours: TR 10:30–11:30, MTWR 2:30–3:30, and by appointment.

You're welcome come to my office at times other than those listed above. If you want to make sure I'm there before you come, then call ahead and/or email me.

Course description. Techniques and applications of integration: area between curves, volumes of solids of revolution, work, areas of surfaces of revolution, arc-length, introduction to differential equations, parametric equations and polar coordinates, sequences and series. Prerequisite: MATH 2413.

Student learning outcomes. Upon successful completion of this course, the student will be able to:

- interpret the definite integral of a function geometrically as the area of a region, and use the Fundamental Theorem of Calculus to compute antiderivatives and definite integrals;
- apply different methods of integration, such as substitution, integration by parts, trigonometric integrals and partial fraction decomposition to compute antiderivatives as well as definite integrals;
- set up and compute integrals to solve problems in the computation of areas, volumes, work, arc-length, surface area of a surface of revolution, as well as be able to solve first order differential equations of linear and separable type, and be able to determine if a given improper integral converges;
- use a method of numerical integration to approximate a definite integral using several methods of approximation, including the left point, right point, trapezoid and Simpson's rule. Students will also be able to estimate the error in the computation of such approximations;
- identify curves given in terms of parametric equations, as well as write a curve in terms of a parameter. Students will also be able to apply integration to compute areas enclosed by a parametric curve, as well as to find its arc-length or area of revolution around an axis;
- approximate a given real analytic function using Taylor or Maclaurin series, be able to estimate the error, including determining if such series

converges to the function, and use these techniques to compute limits of functions, estimate definite integrals or approximate the value of a function at a point.

Textbook. Required: *Calculus: Early Transcendentals.* Sixth edition. James Stewart. Brooks Cole. ISBN-10: 0-495-01166-5, ISBN-13: 978-0-495-01166-8.

Homework. Expect homework each week, unless there is an exam coming up. For homework and exam problems, your submitted solutions should include final answers and an organized presentation of the nontrivial steps you used to reach those answers. If you get the right answer but use a wrong step to get there, you probably won't receive full credit. Also, it's a good idea to initially solve problems on scratch paper and then write up more organized solutions. Finally, if you're not sure whether a step is trivial enough that you don't need to write it down in your submitted solution, ask yourself these questions. 1) Does the professor usually skip this kind of step in his lectures? 2) Was this step easy enough to do in my head, or did I need to write some things down?

In summary, **show your work and show it neatly.**

Ideally, every homework problem will be graded, but for each homework assignment I reserve the option to grade a selected subset of the homework problems.

Calculators. Calculators will be needed occassionally for homework assignments, but most homework problems will not require a calculator. Warning: calculators may be required for some exams, but not permitted other exams.

Exams. There will be two midterm exams and a final exam. The final exam will be comprehensive.

- Midterm I, in class, Wednesday, February 24.
- Midterm II, in class, Tuesday, April 6.
- Final Exam: during final exam week; exact time and place TBA.

Grading. Components: Homework 20%; Midterm I 25%; Midterm II 25%; Final Exam 30%. Final letter grade, given a total score of x%: A: $x \geq 90$; B: $80 \leq x < 90$; C: $70 \leq x < 80$; D: $60 \leq x < 70$; F: $x < 60$.

Make-ups. There are no make-ups for missed work, except by situations covered by university rules.

Extra credit. A written presentation about an application of calculus is worth two homeworks' worth of extra credit. Ask me about the details if you're interested.

Approximate Schedule of Topics

Day	Date	Sections	Topic
T	19-Jan		intro/review
W		Appendix E	summation notation
R		6.1	areas between curves
M	25-Jan	6.2	volumes from cross-sectional areas
T		6.2	washer method
W		6.3	cylindrical shell method
R			volumes recap
M	1-Feb	6.4	work
T			
W		7.1	integration by parts
R			
M	8-Feb	7.2	trigonometric integrals
T			
W		7.3	trigonometric substitution
R			
M	15-Feb	7.4	partial fractions
T			
W		7.5	review for MT1
R		7.7	approximate integration: left, right, midpoint
M	22-Feb	7.7	trapezoid rule
T		7.7	Simpson's rule
W		6.1–7.5	midterm 1
R		7.8	improper integrals
M	1-Mar	7.8	comparison tests
T		8.1	arc length
W		8.2	area of surface of revolution
R		9.3	separable differential equations
M	8-Mar	9.5	linear differential equations
T		10.1	parametric curves
W			
R		10.2	calculus with parametric curves

Approximate Schedule of Topics (continued)

Day	Date	Sections	Topics
M	22-Mar		
T		10.3	polar coordinates
W			
R		11.1	sequences
M	29-Mar		
T		11.2	series
W			
R			review for MT2
M	5-Apr	11.3	integral test
T		7.7–10.3	midterm 2
W		11.4	direct comparison test
R		11.4	limit comparison test
M	12-Apr	11.5	alternating series
T			
W		11.6	absolute, conditional convergence
R		11.6	ratio test
M	19-Apr	11.6	root test
T		11.7	testing strategy
W		11.8	power series
R			
M	26-Apr	11.9	power series as functions
T			
W		11.10	Taylor series
R			
M	3-May	11.11	Applications of Taylor series
T			
W			
R			review