This is a draft of the syllabus that will be used in my MATH 165 course this winter. A few things may change, but the overall format and policies are fixed. If you have questions, feel free to email me mcnichol@iastate.edu.

DRAFT SYLLABUS
Calculus I
MATH 165, Section W5
Winter, 2020-21

Instructor information

- *Instructor*: Dr. Timothy H. McNicholl
- *Phone Number*: (515) 294-5865
- *email*: mcnichol@iastate.edu. **POLICY ON EMAIL** Only emails concerning an emergency situation or an appointment request will receive a timely response. Examples of emergencies: 1) a medical situation. 2) a family emergency (such as death of a relative). Questions on homework, lecture notes, or course policies should be posted on Piazza (see below) and/or asked during WebEx office hours.

Course information

- *Text*: Thomas' Calculus, Early Transcendentals, 14th Edition, by George Thomas, Jr., Maurice D. Weir and Joel Hass. (Only access code required.)
- *Catalog description*: Differential calculus, applications of the derivative, introduction to integral calculus. Only one of MATH 151 or MATH 160 or the sequence MATH 165-MATH 166 may be counted towards graduation.
- *Lectures* will be delivered asynchronously; that is, by pre-recorded videos. A couple of videos will be available for each topic.
- *Office hours/instructor communication* will be a mixture of synchronous and asynchronous. The instructor will hold one hour of synchronous office hours via WebEx every week on Mondays from 10 - 11am. In addition, the instructor will check Piazza for questions and respond throughout the day. Piazza will not be checked after 5p.m. nor on weekends.

- *Assessments* will be delivered online either through MyLabsPlus or Canvas.

Outcomes Upon successfully completing this course, the student will be able to:

1. Evaluate limits.
2. Compute derivatives.
3. Compute basic antiderivatives.
4. Use the Fundamental Theorem of Calculus to compute definite integrals.
5. Apply differentiation and integration to problems in geometry, physics, and other sciences.

Topics covered

- Basics of differentiation
  - Average and instantaneous rate of change
  - Limits; limit rules; one-sided limits; limits involving infinity
  - Continuity; types of discontinuities (e.g. removable, jump, ...)
  - Limit definition of derivative
  - Derivative at a point; derivative as a function
  - Higher order derivatives; notation
  - Find tangent lines to curves
  - Sum, product, quotient rules for differentiation
  - Derivatives of x^k, e^x, $\sin(x)$, $\cos(x)$, $\tan(x)$, $\sec(x)$
  - Differentiation and motion (velocity and acceleration)
  - Chain rule
- Advanced differentiation
  - Implicit differentiation; derivative of inverse function
  - Derivatives of $\ln(x)$, $\arctan(x)$, $\arcsin(x)$, $\operatorname{arcsec}(x)$

  - Logarithmic differentiation
  - Linearization and approximating function
  - Related rates problems
  - Absolute and local maximums and minimums
  - Mean Value Theorem
  - Identify critical points; classify critical points by use of either the first or second derivative tests
  - Setting up and solving optimization problems
  - Identifying when functions are increasing/decreasing; identifying when functions are concave up/down
  - Sketching functions
  - L'Hospital's rule for working with indeterminant limits

- Basics of integration
  - Finding antiderivatives of basic functions x^k, e^x, $\sin(x)$, $\cos(x)$, $\sec^2(x)$, $\sec(x)\tan(x)$, $1/(1+x^2)$, $\sec(x)$, and $\tan(x)$.
  - Use Riemann sums to approximate totals; definite integrals
  - Using basic properties of definite integrals (constant multiple, sums, inequalities, breaking into multiple parts, reversing order)
  - State and use both versions of the Fundamental Theorem of Calculus
  - Use substitution for definite and indefinite integration
  - Find the net area under a curve or between two curves I
  - Integration and motion

Course Prerequisite Satisfactory performance on placement assessment, 2 years of high school algebra, 1 year of geometry, 1 semester of trigonometry; or minimum of C- in MATH 143

Grading: Your grade for the course will be calculated as follows.

- Homework 30%
- Weekly minitests: 60%

- Piazza participation 5%

Homework All homework is administered online via MyLabsPlus. See the 'RedShelf Course Materials' link on the course Canvas page. There will be 4 - 6 assignments per week.s

Minitests: Each minitest will consist of 5 problems. These will be administered online. The due dates are as follows.

- Minitest 1: December 17
- Minitest 2: December 23
- Minitest 3: December 30
- Minitest 4: January 7
- Minitest 5: January 14
- Minitest 6: January 21

Piazza Piazza is an online platform that facilitates communication between students and the instructor as well as between students and other students. To access Piazza, click on the 'Piazza' link on the Canvas course page. Earn credit by posting substantive questions about homework problems and the lecture videos. I will endorse substantive questions. Questions end with question marks not periods. "I did not understand...." is NOT a question. Think before you post. You can also earn credit by posting correct answers to other students' questions. I will endorse correct answers. Your Piazza participation grade will be determined as follows.

1. 2 or more endorsed answers: A
2. 1 endorsed answer: A-
3. No endorsed answers, but at least 4 endorsed questions: B+
4. No endorsed answers, but at least 2 endorsed questions: B-
5. No endorsed answers, but at least 1 endorsed question: C+

6. No endorsed answers or questions, but at least 75% of posts read: C
7. No endorsed answers or questions, but at least 50% of posts read: D
8. No endorsed answers or questions, but less than 50% of posts read: F

Grading scale

- 0 - 60 % F
- 60 - 63% D-
- 63% - 67% D
- 67% - 70% D+
- 70% - 73% C-
- 73% - 77% C
- 80% - 83% B-
- 83% - 87% B
- 87% - 90% B+
- 90% - 93% A-
- 94% - 100% A

Policy on extensions An extension on a homework or minitest will be given only for one of the following reasons.

- A very well documented medical excuse. A note from a doctor on a prescription pad is sufficient documentation as are hospital discharge papers.
- A family emergency.
- An official university function.
- Military service.

- Jury duty or other mandatory court appearances.

Policy on academic dishonesty Any attempt to use another person's work as your own, in whole or in part, is academic dishonesty. Any attempt to gain an unfair advantage over other students on a quiz or test is academic dishonesty. The first incident of academic dishonesty will result in a grade of 0 on the entire assignment. A second incident will result in a grade of F for the entire course. Please review the student handbook's statement on academic honesty at *http://dept.lamar.edu/studentaffairs/handbook.htm#Academic %20Policies*
%20and%20Procedures.

Policy on disabilities Reasonable accommodation will be made for students with documented disabilities. Such students must give me a letter from Disabled Student Services that documents their disability and the accommodation requested.

All policies on this syllabus are subject to change. Students will be given proper notice of any changes in writing.