Professor: David McClendon (2046 ASC, phone x2574 (231-591-2574 off campus), hours MWR 3-4, T 5-6 or by appointment, email: `mcclend2@ferris.edu`)

Lectures: Section 3: TR 12:00-1:15 PM in STR 120

Section 4: TR 1:30-2:45 PM in STR 120

Computer lab sessions: Section 3: M 12:00-12:50 PM in STR 105

Section 4: M 2:00-2:50 PM in STR 105

In most of these sessions, you will get a lab activity to complete; in others, we will review material from lecture.

Required materials: You will need my lecture notes, which can be obtained in two ways:

- as a course pack, available at the bookstore
- online, at my web page as a pdf file

You should bring the lecture notes to class every day as they contain the examples and notes from which I will teach the course.

You also need a piece of software called *Mathematica* for this course. Information about where and how to purchase this software is on the attached handout.

Web: This course has a Blackboard page (accessed through MyFSU). I also maintain a personal web page at `http://mcclendonmath.com/220.html`; this page contains handouts, old exams, and lecture notes. Check the Blackboard page regularly for announcements.

Prerequisite: Math 126 or 130 with a grade of C- or better, or the equivalent. Essentially this means the content of Chapter 1 of my lecture notes, centering on algebra and trigonometry. Some of this information will be quickly reviewed in the first week of class. The most useful information I'll expect you to know, all of which can be found in Chapter 1 of my notes, includes:

- Exponent rules
- Properties of logarithms
- Familiarity with function notation
- Values of the trigonometric functions at common angles
- Trigonometric identities

Course material: Functions, limits, differential calculus of functions of one variable, an introduction to the Riemann integral, and applications.

Learning outcomes: After completing Math 220, it is my hope and expectation that students understand what calculus is–that is, that students know the difference between mathematics that is and is not calculus, and that given some problem solved by calculus techniques, students can identify the approximation to the solution, the parameter of the approximation, and the limiting procedure which produces the solution.

It is also my hope and expectation that students will be able to:

1. Recite and interpret definitions of calculus concepts, and correctly use calculus notation.

2. Explain why a given limit, derivative or integral does or does not exist.
3. Infer information about a function from a limit statement, derivative or integral.
4. Estimate limits, derivatives, integrals and solutions to ODEs numerically and graphically, using technology as appropriate.
5. Compute limits, derivatives, integrals and solutions to separable ODEs, using technology as appropriate.
6. Solve problems which apply limits, derivatives and integrals, using technology as appropriate.

Grading policy: Class participation: 5%. Homework: 5%. Quiz average: 7%. Lab assignments: 13%. Midterm exams: 13% each. Final exam: 18%. Grades will be curved at the end of the semester, but an average of 90% guarantees you at least an A-, an average of 80% guarantees you at least a B-, etc.

Attendance policy: I have no formal attendance policy. That said, **nothing** is more correlated with strong performance in my classes than attendance in lectures.

Homework: There will be (almost) daily homework assignments. These assignments are **occasionally** collected on dates not announced in advance and graded not for correctness, but for completion. You receive full credit if it looks like you made a serious attempt to solve most of the problems, and you will not if it looks like you just copied answers or if you only did a small amount of the problems. While I don't deduct for errors, I will (time permitting) make comments on your homework while grading to help keep you from making the same mistakes on exams.

Quizzes: There will be ten in-class quizzes on the dates listed on the course calendar (I reserve the right to change these dates if necessary). These are ≤ 10 minutes long and cover the material that has been covered in class since the previous quiz or exam. The lowest three quizzes are dropped; the other seven are averaged to give your quiz average. Makeup quizzes are not given under any circumstances.

Lab assignments: Most days that we meet in the computer lab, you will be given a lab assignment which requires you to use the computer package *Mathematica*. You will be given time during the class session to start the lab, but will be required to finish the lab on your own time. These labs will be due one week after they are assigned, and are graded for correctness.

Midterms: There are four midterms given in class on the dates listed on the attached calendar: **September 28, October 20, November 10** and **December 9**. You will not be permitted to use any study aids, calculators or computers on the exams. The midterms are not directly cumulative, but mathematics is "inherently cumulative". You may make up an exam that you miss (whether your absence is excused or not) but the makeup exams are considerably more difficult. If you miss an exam, contact the professor; you are to make up the exam at the *earliest possible time*.

Final exam: The final exam is cumulative and as with the midterm, you will not be permitted to use any study aids or calculators. However, your final exam score is guaranteed to be no worse than the average of your two worst midterm exam grades.

Technology usage: Calculators are never, ever, ever permitted on any quiz or exam - questions on quizzes and exams use "easy" numbers and expressions that a calculus stu-

dent should reasonably be able to compute and manipulate by hand. That said, we will learn how to use a software package called *Mathematica* which you will use on lab assignments (and some homework).

Supplies: I also recommend bringing a couple of colored pens or pencils to class each day, as some of the pictures we will draw to explain concepts are much more easily understandable when drawn in color.

Getting help: The best place to receive help is my office. In class, I will not have time to take many homework questions, and I will not be able to present all perspectives on a topic. In office hours, I am able to discuss the material at a much more friendly pace and offer some alternate viewpoints that may help you understand the material better.

If you cannot make my scheduled office hours, you can come talk to me anytime my office door is open. Also, I am more than happy to make an appointment to discuss the material with you. Send me an email.

Students with disabilities who require reasonable accommodations to fully participate in course activities or meet course requirements should register with the Educational Counseling and Disability Services office (x3057, `ecds@ferris.edu`). While ECDS will send me a letter outlining the accomodations to make for you, I would appreciate it if you could contact me immediately for assistance with any necessary classroom accomodations.

Academic dishonesty: Papers will be monitored for "magic answers". Issues with academic dishonesty are taken very seriously, will almost always result in an F for the class, and will be referred to the Office of Student Conduct.

DATE		HW DUE	TOPIC
M 8.31			*Mathematica* lab 1: introduction / troubleshooting
T 9.1			1.1-1.2: exponent and log rules; function notation
R 9.3			1.3-1.4: lines; trigonometry
T 9.8		(1.5) 1-21	2.1: Introduction to the idea of the limit
R 9.10		(1.5) 22-30	2.2: One-sided limits
M 9.14		Lab 1	*Mathematica* lab 2: functions and graphs
T 9.15	Q1		2.3-2.4: Infinite limits; limits at infinity
R 9.17		(2.5) 1-9	3.1-3.2: Continuity; evaluating limits algebraically I
M 9.21		Lab 2	*Mathematica* lab 3: limits
T 9.22	Q2	(2.5) 10-30	3.2: Evaluating limits algebraically II
R 9.24		(3.3) 1-22	Review for Exam 1
M 9.28	**E1**	Lab 3	**EXAM 1**
T 9.29		(3.3) 23-57	4.1-4.2: Definition of the derivative
R 10.1			5.1-5.2: Derivative rules
M 10.5			*Mathematica* lab 4: introducing derivatives
T 10.6	Q3	(4.3) 1-8	5.3-5.5: Higher-order derivatives
R 10.8		(5.6) 1-12	6.1-6.3: Product and quotient rules
M 10.12		Lab 4	*Mathematica* lab 5: derivative rules
T 10.13	Q4	(5.6) 13-36	6.4: Chain rule
R 10.15		(6.7) 1-29	6.5: Implicit differentiation
M 10.19	Q5	Lab 5, (6.7) 30-70	Review for Exam 2
T 10.20	**E2**	(6.7) 71-91	**EXAM 2**
R 10.22			7.1-7.2: Introduction to optimization; critical points
M 10.26			*Mathematica* lab 6: applications of differentiation I
T 10.27	Q6	(7.5) 1-20	7.3: More on optimization
R 10.29		(7.5) 21-31	7.4: Examples of applied optimization problems
M 11.2		Lab 6	*Mathematica* lab 7: applications of differentiation II
T 11.3	Q7	(7.5) 32-54	8.1: Tangent line approximation and differentials
R 11.5		(7.5) 55-67	8.2: L'Hôpital's Rule
M 11.9	Q8	(8.5) 1-28, Lab 7	Review for Exam 3
T 11.10	**E3**	(8.5) 29-46	**EXAM 3**
R 11.12			9.1-9.2: Riemann sums
M 11.16			*Mathematica* lab 8: Riemann sums
T 11.17			9.3-9.5: The definite integral; Fund. Thm. of Calculus
R 11.19	Q9	(9.6) 1-16	10.1-10.2: Integration techniques
M 11.23		Lab 8	*Mathematica* lab 9 : integration
T 11.24		(9.6) 17-46	10.3: Integration by $u-$substitution
M 11.30	Q10	Lab 9	11.1,11.2: Qualitative analysis of vector fields
T 12.1		(10.4) 1-30	11.3: Solving separable differential equations
R 12.3	Q11	(10.4) 31-52	11.4,11.5: Exponential and logistic models
M 12.7		(11.5) 1-14	*Mathematica* lab 10: vector fields and ODEs
T 12.8		(11.5) 15-22	Review for Exam 4
R 12.9	**E4**	(11.5) 23-29	**EXAM 4**
M 12.14		Lab 10	
T 12.15			**SECTION 3 FINAL EXAM** (12 PM in STR 120)
W 12.16			**SECTION 4 FINAL EXAM** (2 PM in STR 120)

How to succeed in this class: I have taught this course many times before and at the end of the class, I have asked students to give advice to students taking the course in the future. Their responses, given below, can be divided into some recurring themes:

1. Attend class and take good notes:
   - Don't miss lectures / show up (x31).
   - Don't fall behind; this class builds on itself (x3).
   - Every class's notes are important.
   - Take good notes in class (x8).
   - Find a friend and take turns taking notes each class.
   - Pay attention in class (x4).
   - Write down everything the professor writes on the board.
   - Stay on top of every lesson.
   - Understand the lecture notes; don't just write them down.
   - Don't look over notes just before class. Study the notes regularly (x3).
   - Sit where you can see the projector.
   - Spend more time listening to lecture than trying to take notes - you can get the notes from a friend later.
2. Ask questions when you don't understand, and seek help outside of class if necessary:
   - Attend office hours (x28).
   - Ask questions outside of class (x5).
   - Take advantage of email to ask questions.
   - If something is unclear, ask! (x10)
3. Do all the homework:
   - Keep up with the homework - do all the problems (x24).
   - Make sure to understand how to do the homework problems; don't just copy the answers (x3).
   - Do the homework early, so you have practice before quizzes (x10).
   - Start studying the material early in the course.
   - Homework is important in learning basic skills. You only become good at it with practice.
   - Do the review problems (x2).
4. Other stuff:
   - Be organized (x2).
   - Be ready for anything he throws at you / expect everything on the exams (x2).
   - Memorize theorems and definitions (x4).
   - Review notes before lecture.
   - Look at previous exams on Blackboard not just the semester before's exams (x6).
   - Study (x3).
   - Study up on trig, like "what is $\sin(\frac{\pi}{2})$, $\cos(\frac{\pi}{3})$, etc. He likes to use these on tests and quizzes.
   - Don't freak out.
   - Form study groups.
   - If you need to, get a tutor early on.