Illinois State University
Summer 2011

Math 146 Calculus II

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Text: *Calculus, Early Transcendentals, (6th Edition)*, by James Stewart, Brooks/Cole Publishing Co., 2008, ISBN 0-495-01169-X (Math 145 & 146) or ISBN 0-495-01166-5 (Math 145, 146, & 147). If you are **not** going to take Math 147, ISBN 0-495-01169-X is perhaps a cheaper option. Either book will be fine for our class. We will cover Sections 5.4–5.5 and Chapters 6–9, 11. Optional but useful supplementary books written especially to accompany Stewart's book are the *Student Solution Manual* ISBN 0-495-01240-8 and the *Study Guide* ISBN 0-495-01239-4.

Calculator: You are required to have a graphing calculator with computer algebra capabilities, TI-89 suggested. A TI-89 will be used for in-class demonstrations.

Prerequisites: C or better in MAT 145 or passing score on the placement exam. If you do not satisfy this prerequisite, please talk to your advisor or me. Your success in this course depends on having the necessary prerequisites.

Homework: Homework assignments from the text will be given. These homework assignments will be collected several times a week. Daily supplemental homework problems will be posted on the course web site. Usually, problems on the collected homework assignments will be taken from the supplemental homework problems posted on the course web site.

The homework assignments will give 300 points towards your final grade, with each collected homework assignment giving 25 points towards your homework grade. **Late homework will be accepted one class period after it is due for a 50% discount.** If you are unable to come to class, send your homework with another student or arrange to have your homework placed in my mailbox in the Math Department Office by class time, 1 P.M.

Exams: There will be **two** exams, each worth 125 points, scheduled for May 26 and June 9. Generally, there are no make-up exams. In the event of an emergency and with **prior** notification, alternatives can be discussed.

Final Exam: The final exam will be **comprehensive** and will be worth 250 points, weighted more heavily on Chapter 11. There are no make-ups on the final exam, unless there is an emergency. The final exam will be given on Thursday, June 23, from 1:00–3:40 P.M.

Grades: A breakdown of the points is as follows:

Homework	300
Exams	250
Final	250
Total	800

Grading Scale: Final grades for the course are **based** on the following point totals and their corresponding percentages:

A	720–800	[90, 100]
B	640–720	[80, 90)
C	560–639	[70, 80)
D	480–559	[60, 70)
F	0–479	[0, 59)

Math Tutoring Center: Tutoring will be available (free of charge) in Stevenson 330.

Special Needs: If you need an accommodation for which you are eligible, please inform me at the beginning of the semester so that this can be implemented.

Classroom Etiquette: Please be on time to class. It is disrupting to the flow of class when students arrive late. **Please do not get up and leave during class time.** Please turn off your cell phone or place it in silent mode. Please do not eat in class.

Email Etiquette: During the semester it is likely that you will contact me by email with a question about something from class. Please address your email with "Dr. Jordon." Also, you must sign your email, i.e., "John Smith," so that I know who the email is from. Please don't ask questions whose answers can be found on the course handouts or web site.

Tips for Success: Attend every class period! **Attendance** and **active participation** in this course are expected and encouraged. **You** are responsible for all material presented and all announcements made on the days you are absent. (The course web site is an excellent source of information if you must miss a class.) **Do the homework!** Attending class and participating in class discussions will be very helpful in preparing for exams and in doing the homework. To succeed in this course, you will most likely require **16 or more hours** per week in class attendance, daily study, and homework. If you find that you are having trouble with a particular section or topic, act quickly to catch up. This is especially important in this course as topics build on each other; that is, it is often the case that you will not be able to understand class unless you know the material previously covered. If you have any problems or questions, please seek extra help from me, the Math Tutoring center (STV 330), or the Julia N. Visor Academic Center (part of University College). It is also very helpful to have a "study buddy." Get to know someone in class and arrange to study/do homework together. Often times we really learn something when we explain it to others.

Course Description: Calculus involves the mathematical study of motion and change. Calculus was created about 300 years ago independently by Isaac Newton and Gottfried Leibniz. Although their intention was to solve particular measurement problems in geometry and physics, today the applications of calculus reach far and wide to not only the physical sciences and engineering, but to the social and biological sciences. In fact, rapid large-scale computing has increased the role of calculus in solving many of the outstanding problems in science and technology.

Here are some situations commonly explored using calculus:

- In a heart bypass operation, where should the new artery be stitched?
- Given the length of a car's skid marks, how fast was the car traveling before the brakes were applied?
- What is the best way to fit a line to a set of data?
- How accurately does a particular model estimate the employment rate of a new industry?
- At what point in the life cycle of an epidemic is it the most dangerous?

Course Content: Real world applications as well as the use of technology are interspersed throughout virtually every class as aids to understand the material. Most topics are considered three ways: geometrically, numerically, and algebraically. The course content includes:

- extended treatment of the definite/indefinite integral, together with applications to problems in physics, engineering, economics, and biology;
- modeling with differential equations and their applications to exponential growth and decay and predator-prey systems;
- the study of infinite sequences and series, using Taylor polynomials to approximate functional values, such as approximating the value of π.

Course Goals: At the end of the course, you are expected to be able to each of the following.

- Explain the concepts of definite integral, differential equation, and infinite series in writing and orally, using graphical, numerical, and algebraic ideas.
- Determine the antiderivative of an elementary function using various techniques for integration.
- Interpret the definite integral in a variety of problem settings.
- Solve differential equations using graphical, numeric, and algebraic techniques.
- Model basic problems using differential equations.
- Find Taylor series, Taylor polynomials, and other related approximations.
- Apply calculus to solve problems from a variety of fields.
- Recognize the need for/use of differentiation or integration in real world settings.

General Objectives for the Course: By attending and participating in this course, you should be able to do each of the following.

- See and appreciate the interdisciplinary role of calculus.
- Gain insight into how calculus can be used to describe the world around us.
- Learn how to apply the tools of calculus to solve both pure and applied problems.
- Enhance your critical thinking and reasoning skills;
- Use technology and see its interaction with pure and applied calculus.
- Learn to communicate mathematics through writing and oral communication.
- Move toward becoming an independent learner.

Communicating Mathematics: Communicating mathematics is an important theme in calculus. The ability to write and explain clearly is crucial to success in the workplace. There will be several opportunities to develop these skills in this course. For example, success in your chosen profession will be based as much on how well you communicate as on what you "know". Unlike most of the presentation that you complete in college, where you are communicating with professors, in your job you will often be faced with a much more difficult task–communicating with non-experts. In such situation, it is not enough to say, "Well, you know what I mean." The process of writing will also help you discover what you **don't** know. This is invaluable information. Consider the following questions as you write mathematics:

- How well have you followed the directions?
- Have you answered all the questions asked? (Have you answered every part of the question?)
- Is your work coherent and well organized?
- Can another calculus student read your work and learn from it?
- Did you use proper grammar, terminology, and symbols?

Opportunities to communicate orally will occur as you work in groups, explain problems to others, solve group problems, ask questions, respond to questions, and help your peers understand calculus. Opportunities to communicate in writing will occur as you prepare homework and complete exams and quizzes.