Calculus I: MA131 Course Outline / Syllabus - Fall 2013

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<u>Text:</u> Essential Calculus Early Transcendentals (2e) by James Stewart, ISBN 9781133112280 NOTE – WebAssign will be **required** as part of this course. The textbook bundle sold in the bookstore includes the purchase of access to that program. Bundle ISBN: 9781133425946.

Description: This course meets three times per week in lecture with your professor and once a week in recitation with your teaching assistant (TA), with recitation providing a small-group setting to encourage discussion of questions about the homework and review of material from the lecture, while also providing a time to conduct quizzes. The course will cover Chapters 1-5 of the text.

Course Learning Objectives: At end of the semester you should understand the concepts of derivative and integral. You should know the derivative as a limit of a difference quotient and be able to interpret it geometrically and as a rate of change. You should be able to compute derivatives of the elementary functions with facility and accuracy. You should know how to use derivatives to solve applied problems. You should know the integral as a Riemann sum and be able to interpret it geometrically and as total change. You should be able to compute integrals by finding antiderivatives and making simple substitutions with facility and accuracy.

Course Outcomes: Upon completing this course you should:

- Be familiar with elementary functions (polynomials, rational, trig, logarithmic and exponential)—properties, values and graphs.
- Calculate limits and derivatives via limits.
- Know derivatives of elementary functions and be able to accurately find derivatives using differentiation rules.
- Be able to find maxima/minima, intervals of increase/decrease, and concavity for elementary functions.
- Be able to set up models and solve elementary related rates and optimization problems.
- From the graph of a function, be able to make a rough sketch of its derivative; from the graph of a derivative be able to roughly sketch a possible function.
- Be able to recognize elementary antiderivatives.
- Be able to compute integrals by finding elementary antiderivatives.
- Understand functions defined by integrals and find their derivatives.
- Be able to determine integrals by simple substitution.

Grading Breakdown:

12%	Projects (There will be 2 projects for this semester)
15%	Quizzes and Special Assignments (or as additionally specified by instructor)
13%	Homework
45%	Monthly, one-hour (in class) Exams. (15% each exam. Tentative dates: Sep 16, Oct 21, and Nov 18.)
15%	Final Exam – Cumulative final exam, common to all instructors, is required for ALL students.

- Letter grades are determined on the following scale: A(90-100), B+(85-89), B(80-84), C+(75-79), C(70-74), D+(65-69), D(60-64), F(0-59). Additionally, to receive a grade of C or better, you must pass a "Calculus ABC" test with a score of 90% or better.

- No calculators, books, or notes are permitted during exams, but projects may involve a technology component— typically using either EXCEL, MAPLE, MATLAB, or a graphing calculator.

- You need to notify the instructor in advance of any missed exams so that alternative arrangements can be made. Failure to make prior arranges may result in your being assigned a failing grade for that test.

<u>Calculus ABCs</u>: In order to pass this course with a grade of C or better, you must pass a "Calculus ABC" test with a score of 90% or better. The exam covers material from pre-calculus which is absolutely a basic prerequisite to this course. (The material is essential, which is why the 90% score is required to pass.) The exams will be given on five **evenings** during the semester (Aug 29, Sep 5, Sep 12, Oct 3, and Oct 31) and on the day of the final exam. Room locations for these exams are TBD. You must take the exam until you have passed it. For more information about exams, grading and sample exams, go to the following website: http://www.clarkson.edu/class/calcabcs/

Exclusion of Calculator: Although calculators are not allowed on exams, do not be intimidated. This exclusion allows us to focus on important *concepts*, and forces us to avoid difficult *computations*. It also means that you will not be taught (nor will you be responsible for) "button pushing methods." You may need to insert a few more "math facts" into your bag of knowledge, but most students typically do not find this requirement to be a significant challenge.

<u>Co-Calculus (MA041)</u>: All MA131 students are enrolled in MA041 and must remain in that course for at least the first two weeks of the semester, as some essential MA131 materials will be covered in MA041 during this period. Students will be allowed to drop Co-Calculus after passing the ABC Exam. Those students who pass one of the first two ABC exams of the semester will be dropped from MA041 at the end of the second week.

Attendance: All students are expected to attend class, participate when appropriate and maintain a positive attitude.

Homework: You learn Calculus by doing problems and so it is obvious to the instructors that HOMEWORK is the most important part of the course learning. The homework strategy for this course is divided into three components:

- 1. **Suggested** homework will be posted on the course webpage, Moodle, or WebAssign and will vary by instructor. It is your responsibility to do these problems. The recitation quizzes will be closely related to the homework from the text. Although these suggested homework problems will not be graded, you will need to do them to be successful in the course.
- 2. WebAssign, a web based homework question and grading will be used as a primary source of EVALUATING your understanding of basic exercise material. The questions are automatically graded, and the instructors will use these grades as a component to your homework score. The program will tell you if you are correct, and will give you several opportunities to fix any incorrect answers before it "locks out." If you are locked out, you must go to your TA or your instructor for extra instruction before the lock is removed. You may work through this process as many times as you like as long as you submit the assignment before the due date.
- 3. Written Solutions. Occasionally, your instructor will require you to submit SOLUTIONS to some selected problems of interest. A SOLUTION is not simply the answer; it is a sequence of mathematical steps with associated written words and sentence explanations that clearly show the reader how the answer is determined. These submissions will be graded based on the quality of the SOLUTION, not simply the correctness of the answer. These grades, along with the grades from WebAssign, will determine your overall score for HOMEWORK.

<u>Additional WebAssign Info:</u> The textbook bundle included multi-term access to enhanced WebAssign (EWA). The multiterm access allows you to use that material (without paying another fee) in Co-Calculus, Calc II, and Calc III. When your instructor is ready for you to enroll, he or she will give you the CLASS KEY, which will ensure you enroll in the correct section. Instructions for how to enroll came with the EWA came with your bundle. WARNING – do not lose the registration/activation number that came with your EWA materials, as it is required to prove that you have already paid.

<u>Clickers:</u> Some of the sections may be experimenting with the use of "clickers," the same device that is being used in the Physics and Chemistry courses. For sections applying the clickers, they may be used (at instructor discretion) for quizzes as well as monitoring class participation, and would be considered in those components of your grade, and your instructor <u>may</u> require that you bring one to class. Clickers can be purchased in the bookstore.

Projects: Although many students have written History papers and English papers, most high school students have not been asked to write *technical* or *mathematical* papers. Projects are designed to assess your ability to tackle something more complex than a standard homework as well as develop your ability to communicate in proper written style. The first project will emphasize effective communication and technical writing. The latter project will expect you to use these skills while addressing an involved, multistep application problem. A successful project will require you to use deeper problem-solving approaches, combine knowledge from multiple sections of the course, and properly communicate your ideas.

Exams: The monthly exams are IN CLASS and happen during your regular class period.

Academic Integrity:

"The Clarkson student will not present, as his or her own, the work of another, or any work that has not been honestly performed, will not take any examination by improper means, and will not aid and abet another in any dishonesty." (Clarkson Regulations)

The following specific guidance applies:

HOMEWORK: You are welcome, and encouraged, to work with other students on the homework. However, you must hand in your own work, and it must represent your own understanding of the assignment. For WebAssign problems, no additional action is required. For submitted written assignments, *you should indicate any assistance or group work involved*, for example:

- "I got help from John Doe on problem 28b."
- "Peter, Paul, Mary and I worked on these problems together."

PROJECTS: The written projects should be the sole work of you and your partner. The only other PEOPLE that may assist are the instructors and TAs. More guidance will be issued with the projects.