EFTP

MAC 2311: CALCULUS 1

COURSE GUIDE (tentative)

SUMMER B 2016

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MAC 2311 – Calculus 1 Course Policies and Syllabus

Tentative Schedule

M	T	W	TH	F
June 27 **L1** Pretest	June 28 **L1/L2**	June 28 **L2/L3**	June 30 **L3/L4**	No class
July 4 Holiday	July 5 **L4/L5**	July 6 **L5/L6**	July 7 **L6/L7** QUIZ1 HW L1-L3 due	No class
July 11 **L7/L8**	July 12 **L8/L9** HW L4-L6 due	July 13 **L9/Review**	July14 EXAM1	No class
July 18 **L10/L11** HW L7-L9 due	July 19 **L11/L12**	July 20 **L12/L13**	July 21 **L13/L14**	No class
July 25 **L14**	July 26 **L14/L15** QUIZ2 HWL10-L12 due	July 27 **L15/L16**	July 28 **L16/L17**	No class
Aug 1 **L17**	Aug 2 **L17/Review**	Aug 3 HWL13-L17 due EXAM2	Aug 4 Post test	No class

QUIZ1 covers L1-L4

EXAM1 covers L1-L9

QUIZ2 covers L10-L13

EXAM2 covers L10-L17

Lecture	Topics	Book Section	UF equivalent lectures
L1	Precalculus Review	1.1-1.5	L1-L5
L2	Velocity, Sided Limits, Infinite Limits	2.1, 2,2	L6-L7
L3	Limit Laws, Indeterminate Forms, Continuity	2.3-2.5	L8-L9
L4	Trig Limits, Limits at Infinity, Review of Limits	2.6-2.7	L10-L11
L5	Derivative Definition, Differentiability	3.1-3.2	L12-L13
L6	Derivative as Function, Derivative Rules	3.2-3.3	L14-L15
L7	Trig Derivatives, Chain Rule	3.6-3.7	L17–L18
L8	Rate of Change, Higher Derivatives	3.4,3.5	L16
L9	Implicit Differentiation, Derivatives of Inverse Functions	3.8-3.10	L19-L20
L10	Linear Approximations, Extreme Values	4.1-4.2	L23-L23
L11	Mean Value Theorem, First Derivative Test	4.3-4.4	L24-L25
L12	Second Derivative Test, Curve Sketching	4.4,4.6	L26-L28
L13	Related Rates, Optimization	3.11,4.7	L21,L29
L14	L'Hopital's Rule, Antiderivatives as Area	4.5,4.9	L27,L30
L15	Area Approximations, Definite Integral	5.1,5.2	L31-L32
L16	Fundamental Theorem, Antiderivatives	5.3-5.5	L33-L34
L17	U-Sub	5.6-5.7	L35

2. INTRODUCTION

2a COURSE CONTENT: MAC 2311 is the first in the three-semester sequence MAC 2311, MAC 2312, MAC 2313 covering the basic calculus. Intended topics will include limits, differentiation, applications of the derivative and introduction of integration. A minimum grade of C (not C-) in MAC 2311 satisfies four credits of the university General Education Math requirement.

2b PREREQUISITES: MAC 2311 assumes that you have essential precalculus skills (both algebra and trigonometry) necessary to succeed in calculus. Students should be able to do arithmetic without a calculator. To enroll in MAC 2311, you must have earned a grade of C or better in MAC 1147 (or its equivalent, both MAC 1140 and MAC 1114), earned calculus credit through an exam or earlier coursework, or have taken the ALEKS placement assessment and attained the required minimum score. You may take the ALEKS assessment through the ISIS homepage isis.ufl.edu; click on Placement under My Online Services. For more complete information, check the page isis.ufl.edu/aleksinfo.html. Note the following paragraph: "The Department of Mathematics encourages you to take the assessment even if you have met one of the prerequisites for MAC 2311. Quite often, your algebra and trigonometry skills may need review and your placement assessment can provide information and specific areas for additional study." You can check with an advisor in your college or in the main math office (Little 358) to be sure that you are eligible for MAC 2311. MAC 2311 begins with a short review of precalculus topics. You should already be competent in working this material. We strongly recommend that students who are having difficulty with the precalculus review material consider first taking MAC 1147, a four credit precalculus course reviewing essential calculus skills. You may switch courses on ISIS during the drop-add period. In an agreement with the registrar's office, you have one additional week to drop back to MAC 1147. After the drop-add period, the paperwork to move back to precalculus MAC 1147 must be completed through the math department.

2c REQUIRED MATERIALS: NO TEXTBOOK IS REQUIRED FOR SUMMER BRIDGE CALCULUS! HOMEWORK WILL BE PROVIDED ONLINE. FOR SUMMER BRIDGE, WE WILL USE INTERNET QUIZZES. Calculators: A graphing calculator and Wolfram Alpha can be useful for study and learning.

2d E-LEARNING CANVAS: E-learning Canvas, a UF course management system, is located at lss.at.ufl.edu. Use your Gatorlink username and password to login. All course information including homework assignments, lecture outline, office hours and test locations and reviews are posted on this site. Canvas provides a mail tool and discussion forum for communication. All grades are posted in the Canvas gradebook. You are responsible for verifying that those grades are accurate. You have one week after a score has been posted to contact your TA or the instructor to resolve any grade concerns. We will not consider these grading disputes at the end of the semester. Be sure to save all original documents in case of grading questions. Please note: Important course information is clearly communicated in this syllabus and the MAC 2311 homepage in Canvas. We will update with announcements both in lecture and through Canvas. Check regularly for announcements which are also sent to your email so you can check easily on your smartphone. Due to the volume of email your instructors receive, we cannot reply to each request for information that is already posted online. Check those resources first. **There is a discussion forum in Canvas**. Please use this to post questions and to supply answers to your fellow students. Your instructors will check the discussion forum regularly and respond to questions as a way to communicate to the whole class.

2e LECTURES: The lecture provides the main presentation of course material, and will follow as closely as possible the calendar and lecture outline provided in this guide. Attendance in lecture is required. You are responsible for learning lecture material missed due to an excused absence. Please be on time to class, and if you must leave early, sit in the back of the lecture hall. When your lecturer

or a fellow student is talking to the class, please do not talk to your neighbor. Even in a large lecture hall this can disturb students

2g FREE HELP: In addition to visiting your discussion leader, lecturer or the course coordinator, during their office hours, the following aids are available. The Teaching Center Math Lab, located at SE Broward Hall, is a tutorial service staffed by trained math and science students to provide help with your calculus questions and homework. Tutors will be glad to provide guidance on specific problems after you have attempted them on your own. You may want to attend different hours to find the tutors with whom you feel most comfortable. You can also request free one-on-one tutoring. The math lab also offers a more structured tutoring program for MAC 2311, called supplemental instruction. A tutor, assigned specifically to MAC 2311, provides weekly help sessions. More details will be provided in lecture. In addition, the Broward teaching center tutors hold reviews on the evenings before each exam. They also provide videos of review and sample test problems. Check the webpage, teachingcenter.ufl.edu, for a map of the location, tutoring hours and test review dates and locations. All students are encouraged to use the teaching center. Office of Academic Support offers free one-on-one and small group tutoring sessions to any UF students. See https://oas.aa.ufl.edu/tutoring.aspx for details. UF Counseling Center provides information and workshops on developing Math Confidence. The center also offers counseling support in case of issues with academics, adjusting to the stress of college life, or personal challenges. Please use this resource before you get overwhelmed! You may also speak to _____ or an advisor in your college if you are having difficulties. You may contact the center at www.counseling.ufl.edu. Textbooks and solution manuals are located at the reserve desk at Marston Science Library. Private Tutors: If after availing yourself of these aids, you feel you need more help, you may obtain a list of qualified tutors for hire at www.math.ufl.edu. Search for "tutors."

2h SUCCESS: Other than having a strong precalculus background, success in MAC 2311 depends largely on your attitude and effort. Attendance and participation in class is critical. It is not effective to sit and copy notes without following the thought processes involved in the lecture. For example, you should try to answer the questions posed by your lecturer. Students who do not actively participate have much more difficulty. However, be aware that much of the learning of mathematics at the university takes place outside of the classroom. You need to spend time reviewing the concepts of each lecture before you attempt homework problems. It is also important to look over the textbook sections to be covered in the next lecture to become familiar with the vocabulary and main ideas before class. That way you will better be able to grasp the material presented by your lecturer. As with most college courses, you should expect to spend a minimum of 2 hours working on your own for every hour of classroom instruction (at least 10 hours per week). It can also be very helpful to study with a group. This type of cooperative learning is encouraged, but be sure it leads to a better conceptual understanding. You must be able to work through the problems on your own. Even if you work together, each student must turn in his or her own work, not a copied solution, on collected individual assignments. In studying calculus, you must be careful not to let a tutor, friend, or calculator "think" for you. Be sure that you can work problems completely on your own, without help, by the time of a quiz or exam. Use the resources available as you study! We encourage you to seek help from your lecturer and TA during office hours. Please contact us for an appointment if your classes conflict with our office hours, or in the case of an emergency. We also encourage you to use the Broward Teaching Center and OAS for group and private tutoring. WebAssign offers videos and other study aids. If you are having difficulty with calculus, do not get discouraged! See your lecturer or course TA right away when you have questions. Our hope is that through focused study and practice you will gain a real appreciation for the important concepts of calculus and their application. We want you to success in this class! But you must keep up with the course material and take the initiative to see us and get help in time, before you get too far behind. Students with a positive attitude who are intellectually engaged in learning the material will get the

most from the course.

2i STUDENTS WITH DISABILITIES: Students requesting class and exam accommodations must first register with the Dean of Students Office Disability Resource Center (DRC), www.dso.ufl.edu/drc/. That office will provide a documentation letter to present to the course lecturer. This must be done as early as possible in the semester, at least one week before the first exam, so there is adequate time to make proper accommodations.

2j ACADEMIC HONESTY: Remember that you committed yourself to academic honesty when you registered at the University of Florida. All students are bound to The Honor Pledge We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." Academic Honesty Guidelines: "All students are required to abide by the Academic Honesty Guidelines which have been accepted by the University. The academic community of students and faculty at the University of Florida strives to develop, sustain and protect an environment of honesty, trust, and respect. Students are expected to pursue knowledge with integrity. Exhibiting honesty in academic pursuits and reporting violations of the Academic Honesty Guidelines will encourage others to act with integrity. Violations of the Academic Honesty Guidelines shall result in judicial action and a student being subject to the sanctions in paragraph XIV of the Student Code of Conduct." The Mathematics Department expects you to follow the Student Honor Code. We are bound by university policy to report any instance of suspected cheating to the proper authorities. You may find the Student Honor Code and read more about student rights and responsibilities concerning academic honesty at the link www.dso.ufl.edu/sccr/. In addition, we remind you that lectures given in this class are the property of the University/faculty member and may not be taped without prior permission from the lecturer and may not be used for any commercial purpose. Students found to be in violation may be subject to discipline under the Student Conduct Code.

3. TESTING

3a SEMESTER EXAMS: Two semester exams will be administered on the dates shown on the calendar in this guide. These will be scored on a scale of 0 to 100 points and will consist of multiple-choice and fill-in-the-blank questions.

3b PRE/POST TEST: Mandatory testing for the Summer Bridge program that will not affect your scores.

3c IMPORTANT EXAM POLICIES: EXAMS WILL BE ADMINISTERED ONLINE FOR SUMMER BRIDGE CALCULUS.
Students are responsible for material covered in lectures, reading assignments, and text problems. Questions will test mastery of concepts and include challenging calculation problems. A command of related algebraic and trigonometric concepts is assumed (see the Prerequisites in this guide).

4. GRADING

4a COURSE GRADE: Your course grade is based on the following schedule:

2 Canvas Quizzes 20% (10% each)
Homework assignments = 20%, no late homeworks are accepted but the lowest score is dropped.

Class participation points = 10% (short in-class worksheets and/or attendance)
2 Exams = 50% (25% each)
Total Possible = 100%

Your percentage letter grade according to the following scale. The course grade is determined by the number of points you earn, not by the percentage, and will be strictly enforced. Scores within 0.5 POINT of the next cutoff will round up. There will be no additional curve in this course, and extra assignments for individual students to improve a grade are NOT possible.

A 90%-100%
A− 86%-89%
B+ 83% -85%
B 80%-82%
B− 77% -79%
C+ 73% -76%
C 67% - 72%
C−∗ 63% - 66%
D+ 60%-62%
D 53%-59%
D− 50% - 52%
E 0%-49%

∗NOTE: A grade of C− DOES NOT give Gordon Rule or General Education credit! For those taking the S-U option: S [63% - 100%] U [0 - 62%] Approval of the S-U option must be obtained from your instructor. The deadline for filing an application with the Registrar and further restrictions on the S-U option are given in the Undergraduate Catalog. For a complete explanation of current policies for assigning grade points, refer to the UF undergraduate catalog: catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx NOTE: We will not review disputed points at the end of the semester. All grade concerns must be settled within one week of the return of the paper.

4b WRITTEN HOMEWORK: The written assignments present the minimum number of problems you should do in each section. An important part of each assignment is reading and understanding the concepts of the lecture and text material, and previewing the next lecture before class. Of course working problems is essential. Calculus material is cumulative, so you should complete each assignment as thoroughly as possible before your next class. While some problems may look similar, they demonstrate a unique detail of a calculus skill. If you are having difficulty with any assignment, you may seek help from instructor during scheduled office hours as well as the tutors at the Broward Teaching Center. Be sure to start problems early so you have time to get your questions answered! Some homework problems may suggest the use of a graphing calculator. They are designed to help you visualize important concepts and to reinforce the mathematical processes involved. The use of a calculator is recommended but not required. **Because solutions will be posted immediately after assignments are due, late homeworks will not be accepted**. However, the lowest homework score will be dropped.

4d QUIZZES: Two quizzes are administered the dates listed in the course calendar. Each will be graded on a scale of 0 to 100%. The quiz are taken online in Canvas and will be based on recent lectures and homework assignments.

4e CLASS PARTICIPATION POINTS: Up to 10% of your grade may be earned by attendance in lecture and completing worksheets. They are a significant part of your grade, to reflect their importance

in understanding course concepts. You will upload pictures of your worksheets to a dropbox in Canvas.

4f MAKE-UP POLICY: You must sign up for all makeup work with your instructor.
• Exam Conflicts - UF during Term Assembly Exam Policy
(catalog.ufl.edu/ugrad/current/regulations/info/exams.aspx):
If MAC 2311 is the lower course number, students must inform their instructor in person at least ONE WEEK in advance of the exam date so that appropriate accommodations can be made. Otherwise it may not be possible to reschedule.
• Make-up Exams: If you are participating in a UF sponsored event or religious observance, you may make up an exam only if you bring documentation to your instructor at least ONE WEEK PRIOR to the event. If illness or other extenuating circumstances cause you to miss an exam, contact your instructor immediately (no later than 24 hours after the exam) by email. Then, as soon as possible after you return to campus, bring the appropriate documentation to your instructor. You will be allowed to take a makeup exam during the last week of the semester.
Make-up Quizzes: Quizzes are taken online.
Make-up Class Participation points: If you have an excused absence, are observing a religious holiday or are participating in a University of Florida sponsored event, you may make up the work if you bring documentation to your instructor within 48 hours.
Make-up HW: There are no make-ups. Solutions will be posted immediately after class so there are no makeups. However, the lowest HW score will be dropped.
EXAMS. In case of emergency a makeup exam will be administered.

4g 10-MINUTE POLICY: Only the students who are present within the first 10 minutes of the class and stay for the entire period will be allowed to participate in the class activities.

4h INCOMPLETE: A student who has completed a major portion of the course with a passing grade but is unable to complete the final exam or other course requirements due to illness or emergency may be granted an incomplete, indicated by a grade of "I". This allows the student to complete the course within the first six weeks of the following semester. The student must contact the instructor before finals week to sign an incomplete grade contract (http://clas.ufl.edu/forms/incomplete-grade-contract. pdf), and must provide documentation of the extenuating circumstances preventing him or her from taking the final exam. The grade of "I" is never used to avoid an undesirable grade, and does not allow a student to redo work already graded or to retake the course. See the official policy at http://www.math.ufl.edu/department/ incomplete-grades/.

5. GENERAL EDUCATION INFORMATION MAC 2311 has been designated a General Education course that can be counted towards the Mathematical Science (M) requirement. Course Objective – The General Education Objectives for Mathematics courses: "Courses in mathematics provide instruction in computational strategies in fundamental mathematics including at least one of the following: solving equations and inequalities, logic, statistics, algebra, trigonometry, inductive and deductive reasoning. These courses include reasoning in abstract mathematical systems, formulating mathematical models and arguments, using mathematical models to solve problems and applying mathematical concepts effectively to real-world situations." The primary goal of the course is to help students understand and apply the fundamental principles of differential and integral calculus. These objectives are accomplished through the lectures, homework, quizzes and discussion sections.
Student Learning Outcomes (SLOs) – The general education student learning outcomes describe the knowledge, skills and attitudes that students are expected to acquire while completing a general education course at the University of Florida.

I. Content: Content is knowledge of the concepts, principles, terminology and methodologies used within the discipline. Students demonstrate competence in the terminology, concepts, theories and methodologies used within the discipline. • Understand the fundamental concept of limit. • Understand the definition of the derivative and be competent at calculating derivatives using the product, quotient, and chain rules. • Understand the definition of the definite integral via Riemann sums and gain competence in evaluating them directly from the definition.

II. Communication: Communication is the development and expression of ideas in written and oral forms. Students communicate knowledge, ideas and reasoning clearly and effectively in written and oral forms appropriate to the discipline. • Communicate mathematical findings clearly and effectively using written and/or graphic forms.

III. Critical Thinking: Critical thinking is characterized by the comprehensive analysis of issues, ideas, and evidence before accepting or formulating an opinion or conclusion. Students analyze information carefully and logically from multiple perspectives, using discipline specific methods, and develop reasoned solutions to problems.

• Apply techniques of derivatives and critical thinking effectively to solve applied problems including related rates and optimization problems.

• Analyze properties of functions using derivatives including regions of increase/decrease, inflection points, local maxima/minima.

• Apply the Fundamental Theorem of Calculus to the evaluation of definite integrals and understand the link between differentiation and integration.

These SLOs are assessed through weekly discussions, homework assignments and quizzes, three semester exams and final exam.

6. ONLINE COURSE EVALUATION Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at https://evaluations.ufl.edu. COURSE EVALUATIONS WILL BE FOR THE INSTRUCTOR'S BENEFIT AND DESCRIBED LATER.

PREREQUISITES FOR MAC 2311

This course assumes that you have a sound precalculus background. The following is a summary of some important concepts used in solving calculus problems. The textbook provides a more complete review of these essential topics.

ALGEBRA

1. Basic Geometric Formulas: (b = base, l = length, h = height, w = width)

    Triangle: area $= \dfrac{1}{2}bh$

    Circle: area $= \pi r^2$; circumference $= 2\pi r$

    Parallelogram: area $= bh$

    Rectangular box: volume $= lwh$
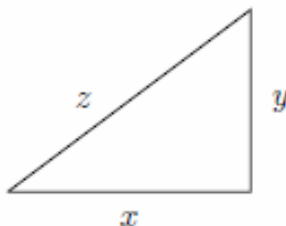
    Sphere: volume $= \dfrac{4}{3}\pi r^3$; surface area $= 4\pi r^2$

    Right circular cylinder: volume $= \pi r^2 h$;   surface area $= 2\pi rh + 2\pi r^2$

    Right circular cone: volume $= \dfrac{1}{3}\pi r^2 h$;   surface area $= \pi r\sqrt{r^2 + h^2}$

    Facts about similar triangles

    Pythagorean theorem: $x^2 + y^2 = z^2$

2. **Basic Functions and their graphs:**

$f(x) = x$; $f(x) = x^2$; $f(x) = x^3$; $f(x) = |x|$; $f(x) = \sqrt{x}$; $f(x) = 1/x$;

$f(x) = b^x$, $b > 0$ and $b \neq 1$, such as $f(x) = 2^x$

3. **Factoring:**

$$x^3 + y^3 = (x + y)(x^2 - xy + y^2); \quad x^3 - y^3 = (x - y)(x^2 + xy + y^2); \text{ etc.}$$

4. **Fractions:** $\dfrac{a}{b} + \dfrac{c}{d} = \dfrac{ad + bc}{bd}$, etc.

5. **Exponents:** $x^n y^n = (xy)^n$; $x^n x^m = x^{n+m}$;

$$\dfrac{x^n}{x^m} = x^{n-m}; \quad (x^n)^m = x^{nm}$$

6. **Roots, including rationalizing the denominator or numerator.**

$$\sqrt[n]{x} = x^{\frac{1}{n}}; \quad x^{-n} = \dfrac{1}{x^n}, \text{ etc.}$$

7. **Inequalities and absolute values:**

$|x| \leq a \qquad -a \leq x \leq a; \qquad\qquad |x| > a \qquad x > a \text{ or } x < -a$

8. **Equation solving:** Finding solutions for x if

$$ax + b = 0; \quad ax^2 + bx + c = 0; \text{ etc.}$$

9. **Logarithms:** If $x > 0$, $\log_a x = y$ if and only if $x = a^y$

If $m > 0$ and $n > 0$, then

$$\log(nm) = \log(n) + \log(m) \qquad \log\left(\dfrac{n}{m}\right) = \log(n) - \log(m)$$

$$\log(n^c) = c\log(n)$$

TRIGONOMETRY

1. Identities:

$$\sin(-\theta) = -\sin\theta \qquad \cos(-\theta) = \cos\theta \qquad \tan(-\theta) = -\tan\theta$$

$$\sin\left(\frac{\pi}{2}-\theta\right) = \cos\theta \qquad \cos\left(\frac{\pi}{2}-\theta\right) = \sin\theta \qquad \tan\left(\frac{\pi}{2}-\theta\right) = \cot\theta$$

$$\sin^2\theta + \cos^2\theta = 1 \qquad \sec^2\theta = 1 + \tan^2\theta \qquad \csc^2\theta = 1 + \cot^2\theta$$

2. Sum and Difference Formulas:

$$\sin(A \pm B) = \sin A \cos B \pm \cos A \sin B$$

$$\cos(A \pm B) = \cos A \cos B \mp \sin A \sin B$$

$$\tan(A \pm B) = \frac{\tan A \pm \tan B}{1 \mp \tan A \tan B}$$

3. Double Angle Formulas:

$$\sin 2\theta = 2\sin\theta\cos\theta$$

$$\cos 2\theta = \cos^2\theta - \sin^2\theta = 2\cos^2\theta - 1 = 1 - 2\sin^2\theta$$

4. Half-Angle Formulas:

$$\sin^2\theta = \frac{1 - \cos 2\theta}{2} \qquad \cos^2\theta = \frac{1 + \cos 2\theta}{2}$$

4. Trigonometric Values:

θ	0	$\pi/6$	$\pi/4$	$\pi/3$	$\pi/2$
$\sin\theta$	0	$1/2$	$\sqrt{2}/2$	$\sqrt{3}/2$	1
$\cos\theta$	1	$\sqrt{3}/2$	$\sqrt{2}/2$	$1/2$	0
$\tan\theta$	0	$\sqrt{3}/3$	1	$\sqrt{3}$	undef