MAC1140: Precalculus Algebra and Mathematical Reasoning

August 21, 2019

Syllabus

Course Description

This is MAC1140 "Precalculus Algebra". The goal of this course is to provide the mechanical and conceptual tools necessary to continue on to either; 'Calculus One' (MAC2311) except for trigonometry, which can be taken separately by taking MAC1114 "Trigonometry", or 'Business Calculus' (MAC2233). Alternatively one can take the accelerate combined Precalculus algebra and trigonometry class MAC1147 instead of taking MAC1140 and MAC114.

A minimum grade of C (not C-) in MAC 1140 satisfies three credits of the university General Education Math requirement.

Prerequisites

MAC1140 does not require any prerequisites, but it does assume basic numerical literacy. Students should be able to do basic arithmetic without a calculator. If the pace or level of course material appears to be beyond your experience I highly suggest you look into taking MAC1105 "College Algebra" instead. You may switch courses at `https://student.ufl.edu/` during the drop-add period.

Course Materials

There are no required materials for this course; specifically there is no required textbook, clicker, or online homework code that you must purchase for this course.

In this course we will utilize a free online homework system known as Xronos. This work is supported by the Office of the Provost and the College of Liberal Arts and Sciences. The platform is accessible through the Canvas site. More details will be given in class.

Online Resources

E-learning Canvas, a UF course management system, is located at `elearning.ufl.edu`. Use your Gatorlink username and password to login. All course information including your grade, course homepage, syllabus, lecture videos, office hours, test locations, mail tool, discussion forum, free help information, etc. can be accessed from this site. **You are responsible for verifying that your grades are accurate. There is no grade dispute at the end of the semester** (see below for the One Week Policy).

One Week Policy

Please be aware of the **One Week Policy**: Once you receive a grade on an assignment, you have **one week** to contest the grade and initiate any grade disputes. Once this one week passes, **there are no further disputes**. In particular, once the end of the semester nears, you *cannot* start disputing, say, grades from the first week or two.

Calculators

A graphing calculator and Wolframalpha are useful as study and learning tools when used appropriately, **but they are not essential.** I also recommend the online graphing calculator Desmos (`www.desmos.com`), and the app GeoGebra (`www.geogebra.org`) to help you as you learn the material, but mathematics is a collection of ideas that are not mastered through calculator skills. **No calculators are allowed on quizzes or exams.**

Lectures

This course serves a number of goals.

- First and foremost this course is intended to get studens prepared for the UF calculus sequence. The calculus sequence is *considerably* more rigorous and difficult than high school or advanced placement (AP) type courses, and the precalculus courses are similarly much more difficult in preparation of this. In particular, even students that routinely have gotten A's in their math courses in high school will likely find this course quite challenging.

- This course also aims to get everyone on the same mathematical level in terms of notation, communication, and terminology before students move forward. As such there will inevitably be times when you will find the content boring or otherwise elementary. This is because not everyone will be familiar with any given aspect, which means we must cover everything to some extent. However, due to the quantity of material that we need to cover from this, each of these excursions will be only a brief overview.

- In this course we also aim to instill the basics of mathematical reasoning. This means teaching how to problem solve when presented with content that is otherwise unfamiliar. Importantly this means that *you should expect to be confronted with problems that you have not seen before.* If you have always had problems that are variations on examples that have been demonstrated for you already, then your teachers have done you a grave disservice.

- **Expect to have to reason and think on the fly during exams, quizzes, and homework.** You will almost certainly see questions on your assessments that are unfamiliar. Remember that part of lecture is teaching you **how to recognize aspects of a problem to see what techniques to use**.

- Finally, remember that math, by it's nature, is cumulative. The listed content below for each exam is the *focus* of the exam, but *not the only skills necessary for the exam.* Clearly we will not list on every exam things like 'addition' or 'multiplication' as exam topics. Similarly, most of the content that we will cover in this class, by it's nature, will be used in future content of this same course. Thus you should consider all exams as "cumulative" with the listed content for the exam being the primary *focus* of the exam.

- Lectures are given (and thus recorded) every Monday and Wednesday; 11:45-12:35pm.* Typically the video services at UF makes those videos available to me within a few hours, but *it can take up to 48 hours* before I get the video and can post it to the canvas shell for you to watch. Thus you should try to plan your schedule accordingly to ensure you can watch the lecture material in time for relevant quizzes and exams.

Grading Scheme

See the tables below to see what will contribute to your grade, and what is necessary to attain a specific grade.

Assignment	Point Value	Total Points
Xronos	50	50
Quizzes (10 of 13)	10	100
Exams (4 total)	50	200
Final	100	100
Total Points		450

Grade	Point Range	Grade	Point Range
A	405-450	C	315-329
A−	390-404	C−	300-314
B+	375-389	D+	285-299
B	360-374	D	270-284
B−	345-359	D−	255-269
C+	330-344	E	0-254

Online Coursework

In this course we will utilize an in-house interactive online homework system developed by the math department at UF. This platform, called Xronos, is free of charge and will be explained during class. There is a single Xronos 'assignment' in Canvas which is an interactive set of course notes that follows our course. It has numerous interactive features as well as examples and problems scattered throughout. The entire assignment is due after the final exam, but I will be posting regular updates about where you should be, and what sections you should cover, in preparation for each exam. I recommend you do not try to complete the entire assignment at the end. First, there is simply too much to do all at once, and second it is intended as a supplemental source of learning for the exams and content. Your best bet is to be diligent and do them while you learn the material.

There are some notes to keep in mind about how Xronos works:

- You **MUST** access Xronos via Canvas **every single time you do your homework.** Do not bookmark the page, do not save the page, do not access Xronos directly via a link – you **MUST** go through Canvas **EVERY TIME**. If you do not – you will not receive credit for the problems you solve. This cannot be stressed enough.

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*Except, obviously, on holidays or other days when classes are not normally held on campus

- Canvas may (and almost certainly will, often) tell you that a grade has been submitted for the "Xronos assignment" whenever you work on it. Rest assured that canvas really means that a grade **update** has been submitted, not a final grade. You can continue working on Xronos and accumulating points, right up until the Xronos assignment is due; there is no "final submission" of a grade prior to that, regardless of what canvas might try to tell you.

- Throughout the text there are problems embedded in the text to monitor learning and give examples. These are counted as part of the grade, and you are required to complete these to get credit for the assignment. These are static problems, ie each student will have the same problems with no randomization. You are free to work together on these problems, but keep in mind they are intended as practice, and as such **you are responsible for knowing the material covered in the homework**.

- In addition to the Xronos text, additional "Xronos practice" assignments will periodically be published. These problems will *not* count for any credit and is entirely optional, but will give access to unlimited practice problems for the previous content. In each review page there will be a "Try Another" button at the top; whenever you wish to have a new set of problems, simply click this button to regenerate fresh problems. **Something to keep in mind:** randomly generated problems, no matter how well written, are susceptible to the occasional (unfortunate) confluence of randomization that make problems unreasonable to solve. If this seems to be the case, rather than slamming your head against the wall trying to solve it, hit the "Try Another" button to get a different problem to solve. *If this seems to happen several times in a row* for the same problem, you should see your TA to see if you are misunderstanding the problem/solution method, or perhaps the problem is broken (this is unlikely but it is in beta after all). Either way, your TA will be able to help you, either by showing you how to correctly solve the problem, or by determining that the problem is broken and referring it to me to be fixed.

Quizzes

Quizzes will be administered inside canvas. These will be twenty-five minute assessments to keep you up to date on the content as we progress through the course. There are thirteen quizzes offered, but we will count the top ten grades (meaning you get to drop three quizzes). Keep in mind, with the way the course is structured, assessments will get progressively harder as we go through the semester. This means if you skip a quiz early on and decide it will be a "drop" quiz, that you will be trading a much easier quiz for a much harder one later on.

Since we are dropping three quizzes, we will **not be offering makeup quizzes**. Keep this in mind when you are considering your scheduling for the semester.

Exams

Exams in this course will be proctored using a proctoring service called Proctor-U. Keep in mind this requires that students sign up for proctoring services well ahead of time, so make sure you sign up for a time slot to get your exams proctored as soon as you know the dates and times that the exams are available. Further information on how to sign up for Proctor-U will be posted to canvas.

There are four exams during the semester, with a final at the end (for a total of five tests). The content listed below for each exam *is tentative*, exact content for each exam will be given as we get close to the dates. The time and (goal/tentative content) for each exam are as follows:

Exam	Date	Content
Exam 1	September 20th	Topics: Xronos §3 (everything through generalized models)
Exam 2	TBA	Topics: Xronos §4 through §7
Exam 3	TBA	Topics: Xronos §8 and §9
Exam 4	TBA	Topics: Xronos §10 and §11
Final	December 7th	Cumulative: All Content (Xronos: §4 +)

Keep in mind that this class is a pilot program and as such the content may take more or less time to get through. This means the "Content" section above is the *intended* content for that exam, but it may require some adjustment depending on how the pace of the course turns out. There will be notification well ahead of time if there is any intended changes to the content of any given exam, both in lecture and via email/announcements on Canvas.

An Important Note About Exam Design

Another remark about the exams is necessary. Typically, for most math courses, the class mean average exam score is in the $63\% - 68\%$ range. This often comes as a (rather unpleasant) shock to students, especially those that are newer to UF and are use to getting consistently excellent grades. The instructor and TA(s) will provide all the help they can, and there is unlimited practice offered as well (see 'On-line homework' above), but ultimately you are on your own for exams, and they are exceptionally challenging. The exams are *not* written with the intention that the problems are ones that you have already seen with different numbers. The purpose of this course is to teach you how to use mathematical tools to solve mathematical problems, which requires knowledge, understanding, and creativity to figure out which tool to use, when to use it, and how to use it correctly. We aren't trying to teach you to (only) follow a preset list of instructions. We are trying to teach you to be a problem solver; one who can utilize their knowledge and skills to unravel a completely new problem when they are confronted with one.

Final

There will be a final exam on Saturday, December 7th. Your final will be cumulative, thus any content covered this semester is "fair game" for the final (including any content covered after the fourth exam). The exact format of the final will be announced as we get closer to the date. Since the final is cumulative, I will replace your lowest exam score with half the points you earn on the final (only if it helps. Notice that the final is worth twice the points of a standard exam, thus half the points on the Final will be equivalent to the number of points on a single exam). This will be done automatically, **You do not need to request this**.

Makeup Policies

- **Xronos**: There are no make-ups for Xronos.

- **Discussion Quizzes:** Due to the extra quizzes, there are no makeups for discussion quizzes.

- **Exams:** In order to get a makeup exam you must have a documented (and valid) reason to miss the exam. Otherwise you must rely on the half-final-grade option mentioned above. Only one makeup will be offered, and *it will be held at the end of the semester*. Thus if you missed Exam 1 and have a valid (and documented) reason that warrants a makeup, it will still not be held until the end of the semester. Since there is only one makeup time, **only one makeup exam will be offered**. Even if you miss more than one exam, you may only make up **at most** one exam.

Incomplete Policy

A grade of I (incomplete) will be considered only if you meet the Math Department criteria which is found at `http://www.math.ufl.edu`. If you meet the criteria you must see the instructor before the beginning of finals week to be considered for an I. A grade of I only allows you to make up your incomplete work. You cannot redo any previously completed work.

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`. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at `https://evaluations.ufl.edu/results/`.

Advising and Help

For all concerns with MAC1140, please talk to your TA! Office hours will be posted and are regular times when they are available to answer questions, discuss grades, advise students on future classes, or help students in any available way. You do **not** need an appointment to visit during office hours. If you need to meet outside of office hours, please contact your TA for an appointment.

In addition, there are several other free resources available to you:

- For those that are close enough to campus; the Teaching Center Math Lab, located at SE Broward Hall, offers free informal tutoring. You may want to attend different hours to find the tutors with whom you feel most comfortable. Also the Little 215 Tutoring Center provides free tutoring for courses up to Calculus 1. Go to `http://www.teachingcenter.ufl.edu` to find their hours. You can also request free one-on-one tutoring.

- A list of qualified tutors for hire is available at `http://www.math.ufl.edu`.

Honor Code

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.

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 conduct set forth hereinafter constitutes a violation of the Academic Honesty Guidelines (University of Florida Rule 6C1-4.017). 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/`.

Students with Disabilities

Students requesting classroom accommodation must first register with the Dean of Students Office `www.dso.ufl.edu/drc/`. The DOS will provide documentation to the student who must then provide this documentation to the course instructor. Any accommodations must be submitted as soon as possible. If a student does not supply the appropriate documentation in a timely fashion, the instructor may not be able to accommodate the student in a timely manner.

Calendar

August

Sun	Monday	Tuesday	Wednesday	Thursday	Friday	Sat
18	19 **End Drop/Add**	20	21 First Day of Class **Lecture:** Intro & Syllabus	22 **Discussion Class**	23	24
25	26 **Lecture:** Intro to Mathematical Reasoning	27	28 **Lecture:** Intro to Mathematical Reasoning (Continued)	29 **Quiz 1**	30	31

September

Sun	Monday	Tuesday	Wednesday	Thursday	Friday	Sat
1	2 **Holiday: No Class**	3	4 **Lecture:** Applying Mathematical Reasoning to (Numeric) Models	5 **Quiz 2**	6	7
8	9 **Lecture:** Extending Numeric Models	10	11 **Lecture:** Functions and their Roles in Models	12 **Quiz 3**	13	14
15	16 **Lecture:** Functions and their Roles in Models (Continued)	17	18 **Lecture:** Graphing Functions	19 **Quiz 4**	20 **Exam 1:** Topics: Xronos §3[†]	21
22	23 **Lecture:** Graphing Functions (Continued)	24	25 **Lecture:** Introduction to Library of Functions	26 **Quiz 5**	27	28
29	30 **Lecture:** Introduction to Library of Functions (Continued)					

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† The "content" listed for each exam should be considered **very** tentative. When the exam approaches, the exact content will be given.

October

Sun	Monday	Tuesday	Wednesday	Thursday	Friday	Sat
		1	2 **Lecture:** Universal Manipulation of Functions	3 **Quiz 6**	4 **Homecoming**	5
6	7 **Lecture:** Universal Manipulation of Functions (Continued)	8	9 **Lecture:** In-Depth Investigation of Polynomials	10 **Quiz 7**	11	12
13	14 **Lecture:** In-Depth Investigation of Polynomials (Continued)	15	16 **Lecture:** In-Depth Investigation of Polynomials (Continued)	17 **Quiz 8**	18	19
20	21 **Lecture:** In-Depth Investigation of Polynomials (Continued)	22	23 **Lecture:** In-Depth Investigation of Radicals	24 **Quiz 9**	25	26
27	28 **Lecture:** In-Depth Investigation of Radicals (Continued)	29	30 **Lecture:** In-Depth Investigation of Exponentials	31 **Quiz 10**		

November

Sun	Monday	Tuesday	Wednesday	Thursday	Friday	Sat
					1 **Holiday: No Class**	2
3	4 **Lecture:** In-Depth Investigation of Exponentials (Continued)	5	6 **Lecture:** In-Depth Investigation of Logarithms	7 **Quiz 11**	8	9
10	11 **Lecture:** In-Depth Investigation of Logarithms (Continued)	12	13 **Lecture:** TBD (Catchup day)	14 **Quiz 12**	15	16
17	18 **Lecture:** TBD (Catchup day)	19	20 **Lecture:** TBD (Catchup day)	21 **Quiz 13**	22	23
24	25 **Lecture:** TBD (Catchup day)	26	27 **Holiday: No Class**	28 **Holiday: No Class**	29 **Holiday: No Class**	30

December

Sun	Monday	Tuesday	Wednesday	Thursday	Friday	Sat
1	2	3	4	5 **Reading Day**	6 **Reading Day**	7 **Final Exam:** All Content (Xronos: §4 +)†
8	9 **Xronos Due**	10	11	12	13	