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Course url: http://web.csulb.edu/~jchang9/flipped_precalculus.html

Class information: Section 07, Code 9345, Tue/Thur 2:00 pm – 3:15 pm, PH1-140.

The conditions under which students may withdraw and the documents which must be submitted are detailed in University Policy Statement 09-07, and described in the CSULB Catalog. The most current information on CSULB withdrawals is posted at: http://web.csulb.edu/depts/enrollment/registration/details.html#anchor1. No instructor or office staff can add or change a class for you. Only you, the student, can add or change classes in your schedule. You may either add classes on-line through your MyCSULB account or in person at Enrollment Services during the registration period. If you received permission to register for a closed class section, only you can enroll for the course. It is the student's responsibility to complete the registration process before the dates indicated in the Schedule of Classes. **I reserve the right to alter anything on this syllabus at any time.**

Office hours: Tue/Thur 1:00 pm – 1:50 pm; Wed 9:00 – 10:00 am; and by appointment. Any office hour may be canceled due to illness or necessary appointments. Students should secure any necessary signatures or other requirement well in advance of any deadline.

Prerequisite: Appropriate ELM score, ELM exemption, or MAPB 11.

Textbook: *College Algebra, Hybrid*, 6th edition, by James Stewart, Lothar Redlin, Saleem Watson with Enhanced WebAssign, Cengage Learning.

Make sure you buy a hybrid book that comes bundled with Enhanced WebAssign (our on-line homework system). The bookstore has it, and you can find it on-line. Buying the text, even used, and access to the homework system separately will be more expensive. You can access your on-line WebAssign homework free for a couple of weeks, so you have time to order a textbook, without losing class credit.

Objectives: Equations, inequalities. Functions, their graphs, inverses, transformations. Polynomial, rational functions, theory of equations. Exponential, logarithmic functions, modeling.

Learning Goals: "*The best way to learn is to do; the worst way to teach is to talk.*" — Paul Halmos. This class will be run as a **flipped classroom**. This means, you, the student, will be put in the center of the learning where you will preview the course materials before each class meeting, actively engage in the discussions during class, and assess your learning through regular assignments and self reflections. I will play the role of the facilitator in this process as you initiate, synthesize, and analyze knowledge.

This class is meant to prepare you for the upcoming 3-semester Calculus sequence, it is extremely important that you develop a **habit of mathematical mind** where you are able to create knowledge independently and collaboratively, solve problems using multiple approaches, and making connections to the real-world problems around you. Table 1 lists the six major learning goals for this course. Be mindful as you progress through the course and check-in from time to time to see how many on the list you have mastered!

Homework: You are **required** to do the WebAssign Homework sets listed on the course website. The deadlines for these assignments can be accessed via WebAssign directly. Typically, problem sets up to each exam are due by actual the exam time. This will contribute to 6% of your overall grade.

Class participation/attendance: Given the collaborative, activity-based nature of this class, daily attendance is **required**, as many discussions and activities are nearly impossible to replicate outside of class. I expect you to be actively engaged during each class meeting. Your daily participation is imperative and plays a major role in determining your group's quiz grade. Your attendance is recorded daily when you turn in your quiz. **Students with perfect attendance at the end of the semester receives extra 2% towards the calculation of their final grade.**

Quiz: We will have roughly 22 *in-class* **group quizzes** throughout the semester. This is worth 15% of your overall grade. These quizzes are available on the course website at all times. You are **encouraged** to work on these quizzes **prior** to class meetings while you are watching the video lectures to gauge your level of understanding, which makes the in-class learning more effective.

Each person is responsible for working out their solutions with assistance from peers and instructors. With these group activities, you will learn to communicate the mathematics with your peers and be exposed to alternative ways of problem-solving. **Everyone is required to turn in their work** at the end of the class; however, only one paper from each group will be graded for completion and correctness. Everyone in the group receives the same grade for that assignment.

Exams: You will have three in-class midterm exams that is each worth 18% of your grade and a **comprehensive final exam** that is worth 25%. Tentative dates for the exams are listed below. Please make a note of these dates immediately. *No make-up exams will be given.* However, for verified emergencies, arrangements can be made ahead of the scheduled exam time.

Exam 1	Thursday, 9/17/15
Exam 2	Thursday, 10/15/15
Exam 3	Thursday, 11/12/15
Final Exam	Thursday, 12/10/15 (12:30 pm - 2:30 pm)

Evaluation: Graded work will be returned at the next class meeting. Final grades will be based upon the total combined points and will be approximately 90% = A, 80% = B, 70% = C, 60% = D, and below 60% = F.

WebAssign Homework	6%
In-Class Group Quiz	15%
Midterm Exams	54%
Final Exam	25%

Academic honesty: Cheating and plagiarism are serious academic crimes. Work that you submit (whether handing in a hard-copy or submitting electronically) is assumed to be original unless your source material is documented appropriately.

Special accommodation: Request for special need for accommodation of a University verified dis-

ability should be submitted within the first two weeks with all necessary documentation.

Disclaimer: Because this class is run as a flipped class, it will take some getting used to. If you are unsure whether you can put in enough efforts to earn a desirable grade in this class, please arrange a time to discuss with me before the drop deadline. For those who decide to join the class, I am fully committed to your success and willing to do anything to ensure that happens. *There are* **serious side effects** *of learning in this class. You will experience an elevated level of knowledge retention and confidence; you will make life-long friends; and your view of the world will change.* No pain, no gain though!

1. Students relate representations of mathematics.
We represent mathematics in different ways, depending on what we want to do and with whom we are communicating. These representations include algebraic formulas, numerical data, graphs and verbal descriptions. One goal of this precalculus program is for students to translate between these ways of understanding mathematical concepts, so they are ready to apply what they know, no matter how it is presented in context.
2. Students develop a repertory of common mathematical objects.
Some types of functions (like quadratic, linear, exponential and log functions, and monomials, like x^n or $\frac{1}{x^n}$), and geometric objects (like circles, or right triangles) arise frequently in a variety of applications. One goal of precalculus algebra is to prepare students to readily identify these, and use related facts and techniques from memory.
3. Students use the language and notation of functions.
A function is a rule that assigns an output to each input in a given domain. Questions about functions ask what happens to the output as you vary the input. For example, you might be asked to find inputs for which function is increasing or decreasing, or find inputs at which a function achieves its maximum value. One goal of precalculus is to prepare students to use the language of functions to analyze and describe quantities that arise in engineering and science.
4. Students manipulate algebraic expressions and equations into equivalent convenient forms; students identify which forms of algebraic expressions and equations are convenient.
In many cases using a formula to answer a questions means rewriting the formula in another way, so that the answer is evident. For example, by expressing the equation for a parabola in its standard Form $f(x) = a(xh)^2 + k$, you can immediately see the vertex (h, k) and which direction the graph opens ($a > 0$ means it opens up, and $a < 0$ means it opens down). Another more basic example of manipulating an algebraic expression is solving an equation. We start with an equation like $3x + 7 = 12$, and manipulate it into the equivalent form $x = 5/3$. One goal of precalculus is to enable students to practice manipulating algebraic expressions, and identifying when changes to an expression leave its meaning unchanged. (Is the operation "legal"? No! the algebra police are coming!)
5. Students construct models.
A model is a function whose input and output represent something in the real world. Some common models include exponential models, of the form, $n(x) = n_0 e^{rt}$, where n_0 is an initial value, and r is the percent relative rate of growth, or a linear model $f(x) = b + mx$, where b is the initial value and m is the rate of change, or slope. When you know something in the real world is changing linearly or exponentially, for example, you use what information you have to find the parameters in the model (like n_0, r, b, and m). One goal for precalculus is for students to construct models given verbal descriptions of the quantities of interest, and use the models to answer questions about the real world.
6. Students use correct mathematical reasoning and notation.
Correct notation and reasoning makes communication about mathematical concepts possible. One goal of precalculus is to enable students to practice their work in writing, correctly and without ambiguity.

Table 1: Content learning goals. I set high expectations for my students and I believe all of you can achieve them!