

Math 2325 (3 credits)
TuTh 1:30–2:50
PSCI 218

INTRO TO HIGHER MATH
Syllabus

Fall 2008

Instructor: **Dr. Art Duval**

office: **Bell Hall 303**

phone: **747-6846**/office (24hrs./day; if I'm not in, please leave a message)

747-6502/fax (include a cover sheet with my name, please)

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<http://www.math.utep.edu/Faculty/duval/home.html>

Office hours: **Mon, 3:00–4:00; Tue, Fri, 10:00–11:00; Wed, 11:00–12:00.** Please feel free to come by my office any time during scheduled office hours. You are welcome to come at other times, but in that case you might want to make an appointment, just to make sure that I will be there then. You can make an appointment simply by talking to me before or after class, by calling me at my office or at home, or by sending e-mail. You may also ask any questions directly via phone or e-mail. If I'm not in when you call, please leave a message on the voice-mail or answering machine with your name, number, and a good time for me to call you back. I will try to respond to your phone or e-mail message as soon as possible.

Website: <http://www.math.utep.edu/Faculty/duval/class/2325/084/home.html>

Here you will find this syllabus with relevant links, including assignment details and dates for the whole semester, as they are announced, and the location and times of open labs. Other resources may become available.

Pre-requisite: Calculus I (Math 1411), which you may take concurrently. We will not use calculus, though we will occasionally need some topics from pre-calculus. The pre-requisite is for mathematical maturity, and to encourage you to complete your calculus sequence.

Course Philosophy and Objectives: This course is built on the proposition that you learn mathematics, and how to construct mathematical proofs, better when you formulate the questions and discover the answers yourself. Upon successful completion of the course, you will be able to investigate mathematical questions, big and small, both experimentally and theoretically. You will be able to communicate your findings in writing, and begin to write mathematical proofs.

This is very different from courses like pre-calculus, calculus and differential equations, which are primarily focused on computations. Although there are computations in this course, they are a tool for discovering, and proving, more general mathematical truths.

Textbook: Laboratories in mathematical experimentation: A Bridge to higher mathematics, by Mount Holyoke College. This book consists of 16 mathematical “labs”. We will go through the following labs, at the rate of two weeks per lab, in the order listed:

- Ch. 1 Iterations of Linear Functions
- Ch. 9 Parametric Curve Representation
- Ch. 3 The Euclidean Algorithm
- Ch. 14 Iteration of Quadratic Functions
- Ch. 5 The Coloring of Graphs
- Ch. 6 Randomized Response Surveys

You may also go through one additional lab, or another topic of your choosing (with my approval), on your own, at the end of the semester (more details about this option are below).

Labs: Class time will be devoted exclusively to labs. Each lab will start with a brief explanation of the question or problem to be explored. You will perform experiments (usually with a computer or programmable calculator) and gather data. The data will lead you to make your own conjectures, which you will then test and refine by further experimentation. Finally, when you are more certain of your conjectures, you may prove them carefully. (In practice, this process is rarely as straightforward and linear as outlined here. You will often revisit earlier steps as you carry out later steps.)

You may work in small groups of your choosing in class (as well as out of class). There will also be whole-class discussions about your experimental and theoretical discoveries.

After two weeks of work in class (and while you are starting the next lab), you will have a week or two to write up your discoveries, both experimental and theoretical, into a clearly-written report. (Guidelines and suggestions for how to write and format your report are on pp. xvii–xviii of the text; more details, and a rubric, are on a separate handout.) Although you may work with other students during the lab, you must write your report yourself. **You may not consult any outside resources (including the internet) without my approval.**

After each report is graded and returned to you, you will have approximately one more week to revise your report for a better grade, if you like, up to one letter grade higher than the grade of your initial report. Revised reports must be complete; in other words, it should be possible to understand your revised report without reading your original report. (But do turn in your original report with the revision.)

Grades: The final grade for each lab will be the grade on your revised report, if you turn one in; otherwise, it will simply be the grade of your initial report.

At the end of the semester, you will have the option of turning in one extra revision of one lab; in this case, the grade you receive on the extra revision will replace the grade on that lab (still, only up to one letter grade higher than the grade on your initial report). Alternatively, you may investigate, on your own, an additional lab, or another topic of your choosing (with my approval); in this case, the grade you receive on the additional lab will replace your lowest final grade from among the first six, if this helps your grade. Note that you may turn in an extra revision *or* an additional lab (or neither), not both.

Your grade for the course will be the average of the final grades for each of the six labs.

Drop date: The deadline for student-initiated drops with a W is Friday, October 31. After this date, you can only drop with the Dean's approval, which is granted only under extenuating circumstances.

I hope everyone will complete the course successfully, but if you are having doubts about your progress, I will be happy to discuss your standing in the course to help you decide whether or not to drop. You are only allowed three enrollments in this course, and students enrolled after Fall 2007 are only allowed six withdrawals in their entire academic career, so please exercise the drop option judiciously.

Policies:

Academic dishonesty: It is UTEP's policy, and mine, for all suspected cases or acts of alleged scholastic dishonesty to be referred to the Dean of Students for investigation and appropriate disposition. See Section 1.3.1 of the Handbook for Operating Procedures.

Attendance: There is no particular penalty for attendance in this course, but if you miss a class, then I expect you to work on the lab on your own time before the next class, so you do not fall behind your classmates.

Courtesy: We all have to show courtesy to each other, and the class as a whole, during class time. Please arrive to class on time (or let me know when you have to be late, and why); do not engage in side conversations when one person (me, or another student) is talking to the whole class; turn off your cell phone (or at least set it to not ring out loud), and do not engage in phone, email, or text conversations during class.

Disabilities: If you have, or suspect you have, a disability and need an accommodation, you should contact the Disabled Student Services Office (DSSO) at 747-5148, dss@utep.edu, or Union East room 106. You are responsible for presenting to me any DSS accommodation letters and instructions.

Exceptional circumstances: If you anticipate the possibility of missing large portions of class time, due to exceptional circumstances such as military service and/or training, or childbirth, please let me know as soon as possible.