Math 2325 **INTRO TO HIGHER MATH** Fall 2006
TuTh 1:30–2:50 **Syllabus**
BELL 130

Instructor: **Dr. Art Duval**
office: **Bell Hall 303**
phone: **747-6846**/office (24hrs./day; if I'm not in, please leave a message)
545-1788/home (9am-9pm only, please)
internet: `artduval@math.utep.edu`
`http://www.math.utep.edu/Faculty/duval/home.html`

Office hours: **Mon, 3–4, Wed, 11–12; Fri, 10–12.** 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/2325/064/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.

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.

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. 3 The Euclidean Algorithm
Ch. 9 Parametric Curve Representation
Ch. 2 Cyclic Difference Sets
Ch. 6 Randomized Response Surveys
Ch. 5 The Coloring of Graphs

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 27. 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, so please exercise the drop option judiciously.