

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)

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

Office hours: **Mon, 3:00–4:00; Wed, 11:00–12:00; Fri, 10:00–12:00.** 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 repond to your phone or e-mail message as soon as possible.

Website: <http://www.math.utep.edu/Faculty/duval/class/1319/074/home.html>

Here you will find this syllabus with relevant links, including homework and reading assignments for the whole semester, as they are announced. Other resources may become available.

Pre-requisites: An open mind, a healthy curiosity, and a willingness to learn new ideas.

Course Philosophy and Objectives: This course is designed to introduce you to the big picture of what mathematics is, and what it means to do mathematics. In contrast (probably) to your previous experiences with mathematics, this means more than applying rote formulas or watching someone else think. You will be actively engaged in (guided) discovery, retracing for yourself the highlights of some of the major developments in mathematics.

Upon successful completion of the course, you will know and understand some of the great ideas and recurring themes of mathematics. You will be able to express this understanding in verbal form, and by solving problems. You will be capable of applying, in a variety of settings, mathematical thinking, such as: following assumptions to their logical conclusions; finding and testing patterns; and representing the essential information of an involved situation.

Specific topics will come from the broad areas of numbers, infinity, geometry, and probability. Highlights include (but are not limited to) answering the following questions: Are there infinitely many primes? Can all numbers be written as fractions? Are there different kinds of infinity? What are the most symmetric 3-dimensional shapes we can build with straight lines? What is the fourth dimension, and how can we describe it? How likely are coincidences?

Textbook: **The Heart of Mathematics, 2nd ed., Burger and Starbird, Chs. 1, 2, 3, 4, 7.** We will skip some sections, and maybe include one or two sections from other chapters. The textbook is required at all class meetings.

Required Reading: “Welcome!”, pages xi–xiv.

Carefully read each section that we cover in class after each class (taking into account the suggestions of “how to use the book” in the “Travel Tips – Read the Book” subsection of the “Welcome” section). I will point out in class and on the web site which parts of each section, if any, you can skip.

This textbook is extraordinarily readable, and even entertaining, but also challenging and thought-provoking. The topics in the text (and the course) are selected to introduce you to deep mathematical ideas, made accessible by the authors’ unique style.

GRADES:

Participation (5%) A large portion of class time will be devoted to discussions and investigations in small groups and with the whole class. Your active engagement with the material is required at all times. You will not be able to get a good participation grade if you are absent too much.

Homework (25%) Individual homework will be assigned weekly, and will be due Wednesdays (with exceptions as announced in class). You are allowed to work together on homework (in fact, I encourage you to do so), but the paper you turn in you must write yourself. In order to receive substantial credit for a homework solution, you will need to explain your steps and reasoning, not just the answer.

Homework is due at the *beginning* of class (1:30 sharp); if you cannot make it to class, arrange to either deliver the homework to me early, or have someone else bring it to class for you. Your lowest homework score will be dropped.

Writing assignments (20%) There will be approximately four writing assignments, where you will reflect on what you have learned, explain key ideas, and investigate more involved problems.

Exams (10% each) There will be three in-class exams on the following days, covering approximately the following chapters:

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| Secs. 2.1–2.4 | Wed. 26 Sep. |
| Secs. 2.6–3.3 | Wed. 17 Oct. |
| Ch. 4 | Wed. 14 Nov. |

Makeup exams can be given only in extraordinary and unavoidable circumstances, and with advance notice.

Final (20%) comprehensive (including parts of Ch. 7).

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| Wed. 12 Dec., 4:00–6:45 p.m. |
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Drop date: The deadline for student-initiated drops with a W is Fri., 2 Nov. 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 new freshmen are only allowed six withdrawals in their entire academic career, so please exercise the drop option judiciously.