01538 Math D044.23 TT Intro to Contemporary Mathematics, Fall 2014

Instructor: Dr. Karl Schaffer
Class meeting days: Tue/Thu
Class time 1:30-3:45 PM
Classroom: E-36
email: schafferkarl@fhda.edu

Office phone: 408-864-8214
Office**:** E-23A (see map on other sheet)
Office Hrs: **Mon/Wed/ 5:30-6:20 PM, Tue/Thu 12:30-1:20 PM**
       or by appointment
Class web site: http://nebula2.deanza.edu/~karl/
Class link login name: damath   password: 1234

Course content: A survey of selected topics from contemporary mathematics, including problem solving techniques and finding patterns, introduction to combinatorics and the theory of networks ("graphs"), symmetry and tessellations, scaling and fractals, topology, and number theory. Additional topics are to be selected by the instructor. The course will give students practice in all forms of mathematical communication, with reading assignments, writing assignments, and oral presentations.

Student Learning Outcomes:
 Analyze contemporary mathematical problems, apply problem solving techniques using a variety of methods, and communicate the results mathematically through a variety of forms.
 Demonstrate and correctly apply basic mathematical techniques in at least five of the following ten areas: symmetry, graph theory, fractals and chaos theory, topology, number theory, geometry, combinatorics, methods of social choice, probability and statistics, economics and personal finance.
 Examine and evaluate myths and realities about the contemporary discipline of mathematics and its practitioners.
Text: The Heart of Mathematics, 3rd Edition, by Burger and Starbird, Pub: Wiley, required. ISBN-13: 9780470424766

ISBN: 0470424761. We will study chapters 1,2, and 4-6, with additional handouts from the instructor. Read and work all the problems in chapter 1.4, #1-15, during the first 2 weeks (probably due Thursday of 2nd week). We will also be using sections of a new preliminary text, *Discovering the Art of Mathematics*, which is about the mathematics of music and dance, and which will be provided by the instructor.

REQUIREMENT: Students must have a scientific or graphing calculator, which they may use on all exams. All exams will be open book, open notes. **Not allowed:** computers or other communication capable devices may not be used during class time or timed exams. Please put them away and DO NOT use cell phones during class.

Grades: 90-100 A, 80-89 B, 70-79 C, 60-69 D, less than 60 F, based on:

12.5% **One one-hour exam**, NO MAKE-UPS! Date of exam: **Th., Oct. 16**

12.5% **Exam 2** will be given out on **Thu., Oct. 23** (Take-home), and due in class two weeks later on **Thu.,Nov. 6.** Lowest score of these two exams will automatically be replaced with final exam score, **ONLY** if final is higher.

20% Short class activities or quizzes, often unannounced. These will usually be group assignments. You may drop your lowest score.

20% Homework assignments. Homework is assigned in each class, may be collected at beginning of week or your homework binder may be checked periodically (not all homework will be collected). Homework is graded for completion, not correctness. NO LATE HOMEWORK ACCEPTED. EVER! For full credit, you need only complete 80% of each collected assignments; keep assignments in a loose-leaf binder. Homework grades are either 1 (full credit), ½, or 0.

20% Four Written/Oral reports - 5% each.

   (1) **Math autobiography** due one week after first class session, **Tue., Sep. 30** - see page 2 of this sheet for description.
   (2) **Biography** of a contemporary mathematician, written and oral report, due **Thu., Oct. 23.**
   (3) **Report** on an area of mathematics related to the course that sparks your interest, due **Thu., Nov. 13.**
   (4) **Final project**, subject to be decided by students, due **Tue., Dec. 2.**

15% Final Exam: mandatory, comprehensive, scheduled for: **Tuesday, December 9, 1:45-3:45 PM**

Attendance. Due to the importance of class work and participation, you may miss 3 class sessions during the quarter; if you miss more than three you will be dropped from the class. If you are late by more than 20 minutes or leave early by more than 20 minutes you will be marked absent for 1/2 class. If you are consistently late or consistently leave early, you may also be dropped.

Some background on the instructor: Ph.D. and MA in Mathematics from UC Santa Cruz, undergraduate work at University of Chicago and University of Alabama. Grew up in New England and Alabama. Do research in the mathematics of "networks," and am very active in math education for K-12. I am interested in and use collaborative learning and interdisciplinary learning techniques in the class. I am also a modern dance performer and choreographer, and company I co-direct does shows about math and dance, among other things. For more background on this see www.mathdance.org and/or www.movespeakspin.org.

Mathematical "autobiography." Due at start of third class session.

Turn in on TURNITIN.COM. Write a "mathematical autobiography." Think about experiences you have had doing mathematics, both in and out of school. Include at least one successful and one not-so-successful episode. You might write about teachers, particular math problems, courses, or real-life applications of mathematics that have affected you and of which you have strong recollections. Include the good, the bad, and the ugly, and be as entertaining as you like. This will give me an opportunity to get to know you a little better; it should also give you an opportunity to reflect on your own experiences with mathematics.

Please also include a statement as to the one math class you took most recently, which class it was, where you took the class, and how well you did.

Also include a paragraph explaining what are your most important values, and how you think they might be helpful to you in this course.
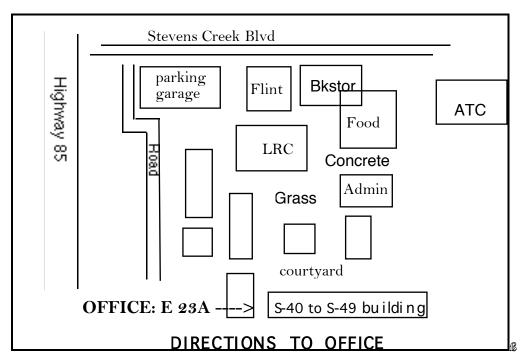
You must write at least 600 words - that's about one page SINGLE-SPACED typewritten. You should check the number of words using the "word count" command in most word processors – for example, in Microsoft Word, that command is found in the "Tools" menu. For full credit write a little TOO much! (These will *not* be read to the class! Write about anything you feel comfortable about having the teacher read.)

Many, if not all of us have had particularly negative experiences with mathematics and especially mathematics teaching. Perhaps you can remember a specific incident which seems to have affected your learning and study of mathematics since that time. Or your experiences might have been primarily positive and supportive: success in a difficult class, a teacher who acknowledged your skills at mathematics, an enjoyment in doing mathematics. Write about those experiences that have been most important to you in the greatest detail. Be specific and describe the circumstances and the people involved. Think about the later impact of your experiences - how do they still affect you today?

You might also want to think about how you actually use mathematical thinking in everyday life - diverse mathematical skills are used in building or designing or in doing craft work, estimating money or amounts, planning complex activities, collecting and organizing data. These activities might not necessitate the use of the quadratic formula, but they probably require good intuitions and understandings about geometric and quantitative knowledge. Write about activities you do which require this kind of mathematical insight.

Report on any cultural influences on your mathematical background. Have you learned ways of doing mathematics that you can identify as being from a culture other than the dominant one in this country? Did you begin learning mathematics in another country, and if so, what changes did you find when you moved here? Can you identify specific cultural influences on how you see your own mathematical knowledge and on your motivation to study mathematics?

Please do not simply list the classes you have taken and the grades received. I am much more interested in whether you were affected by the class, the teacher, and the experience, and in what ways. Describe in detail!

DIRECTIONS TO OFFICE

Homework from text

Ch. 1 #1-15, pg 28-32. This is the first assignment from the text and will be due Thursday of week 2.

Ch. 2.1 I: 4,6,9,10-12,14-18,21
Ch. 2.2: 1-7,16,18,21,24,26
Ch. 2.3: 1-3,6,7,13,14,19,20,22,37,39
Ch. 2.4 #3,4,5,7,9,19,28,29,30,32,33

Ch. 4.1 #2,11,12,13,15,18,19
Ch. 4.2 #5,7,9,11,21
Ch. 4.3 # 1-8
Ch. 4.4 # 1-5
Ch. 4.5: 11,12,15,16,21

Ch. 5.1: 4-6, 12,14,16,22,25,26,36
Ch. 5.2: Do any three of 8,9,10,13,14. Also do 18,19,22, any one of 26-28, 37
Ch. 5.3: 2,4,5,7-10
Ch. 5.4: 1-5,13,16,19,20

Chapter 6.1: 1,2,3,5,7,8
Chapter 6.2: 3,5,13,23
Chapter 6.3: 1-5, 15, 16
Chapter 6.5: #10, 12-19