

## Mathematics 35 – Introduction to Pure Mathematics

Claremont McKenna College, Spring 2010

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Office Hours: TTh 10:00 11:50 AM and by appt.

The texts for this course are *Introductory Mathematics: Algebra and Analysis* by Geoff Smith and *Intuitive Topology* by V.V. Prasolov. Class is from 11:00 to 11:50 AM in BC 36. every Monday, Wednesday and Friday. Regular attendance is encouraged.

Topics we will cover in this course include set theory, theorems and their proofs, number systems, vector spaces, matrices and linear transformations, symmetry groups, abelian groups, permutation groups, categories, infinite sequences and series, limits, continuity,  $n$ -dimensional manifolds, homeomorphisms, deformations, knots and links in  $\mathbb{R}^3$  and knot invariants.

Attached is an approximate course calendar showing which sections I intend to cover on which days. Each day, I will give a lecture explaining concepts and showing illustrative examples. You should also read the corresponding section(s) in the book and try a few of the book's exercises, as these will prepare you to solve the homework problems. If you do the required reading (and at least a few practice problems from the book), pay attention in the lectures, and make sure to ask questions when things don't make sense (my office hours are for **your** questions!), you have every reason to expect success in the course.

Grading will be as follows:

- 30%** - weekly take-home assignments
- 40%** - two midterms
- 30%** - final exam (**Tuesday, May 11 9:00 AM - 12:00 PM**)

My grading policy is explained on my website, which you should read carefully. In summary, we will use a 5-point scale for grading problems, designed to ensure uniform and fair grading.

30% of your grade will come from weekly take-home assignments. These will be handed out in class and also posted to my website, in case you need a new copy. We will drop the lowest homework score when determining the final grade.

The midterms will have around eight problems plus some bonus problems. The final will be cumulative, will have around sixteen problems plus some bonus problems and will be given in BC 36 on Tuesday, May 11 from 9:00 AM to 12:00 PM. Before each exam, I will post a practice exam and separate solutions page to the above-listed website. These practice exams can be helpful in identifying weaknesses in your understanding of the material. However, the fact that a certain type of problem does not show up on the practice exam does **not** mean that a problem of that type will not show up on the actual test. In particular, doing the practice exam is not a substitute for working the practice problems throughout the semester.

Since late take-home assignments will not be accepted, we will drop the lowest homework score. Make-up exams will be permitted only with a valid reason and should be scheduled ahead of time. Calculators are permitted but are neither required nor necessarily helpful – you cannot simply write a number or formula and expect to receive credit, as your grade is based on your *explanation* of your answer, not just the answer itself. Cheating in any form will not be tolerated.

You are encouraged to come to my office hours with any questions or concerns you might have; my office hours are there for you. You can also send me questions through email at [Sam.Nelson@cmc.edu](mailto:Sam.Nelson@cmc.edu), via AOL or Yahoo! instant messengers at [ProfSamNelson](http://ProfSamNelson), or via SMS or Facebook.

## Math 35 Approximate Calendar, Spring 2009

### January

M	W	F
	20 Intro	21 L1
25 L2	26 L3	29 L4

### February

M	W	F
1 L5	3 L6	5 L7
8 L8	10 L9	12 L10
15 L11	17 L12	19 L13
22 L14	24 L15	26 L16

### March

M	W	F
1 Review	3 Mid 1	5 L17
8 L18	10 L19	12 L20
15 Break	17 Break	19 Break
22 L21	24 L22	26 Break
29 L23	31 L24	

### April

M	W	F
		2 L25
5 L26	7 L27	9 L28
12 L29	14 L30	16 L31
19 Review	21 Mid 2	23 L32
26 L33	28 L34	30 L35

### May

M	W	F
3 L36	5 Review	

**FINAL EXAM:**  
**Tuesday, May 11 9:00 AM - 12:00 PM**

### Lecture Topics

L1 Sets	L13 Matrices	L25 Derivatives
L2 Mappings	L14 Determinants	L26 Integrals
L3 Relations	L15 Groups	L27 Continuity
L4 Theorems	L16 Symmetry groups	L28 Topological Spaces
L5 Theorems II	L17 Permutation groups	L29 Topological Spaces II
L6 Induction	L18 Abelian groups	L30 $n$ -manifolds
L7 Number systems	L19 Homomorphisms	L31 Homeomorphisms
L8 Complex numbers	L20 Categories	L32 Continuous deformations
L9 Modular arithmetic	L21 Sequences	L33 Surfaces
L10 Functions	L22 Infinite series	L34 Knots and links
L11 Vectors	L23 Taylor series	L35 Knot invariants I
L12 Linear transformations	L24 Limits	L36 Knot invariants II