Instructor: Jonathan White

E-Mail: JWhite@Coe.Edu

Web Page: http://www.coe.edu/~jwhite/

Office: Stuart 316

Office Hours: 11:00-11:25 MWF, 2:00-2:50 T, 3:00-3:50 W, and by appointment

Office Phone: 399-8280

Home Phone: 841-5111 (between 7am and 10pm)

Text: *Sets, Functions, and Logic: An Introduction to Abstract Mathematics*, 3rd ed., Devlin

Problem Sets: There will be several problem sets during the semester. Together these will be worth 200 points (20% of the final grade)

Participation: Day-to-day class participation, presentations, and snap quizzes will be a prominent aspect of this class, and together will be worth 200 points (20% of the final grade)

Math Culture Points: Math Culture Points will constitute 200 points (20% of the final grade). These will be earned through participation in various activities outside of class, as detailed on page 3 of this syllabus.

Exams: There will be four small in-class exams administered during class time. The dates of these are indicated in the schedule on the back side of this sheet. These examlets will be worth 50 points (5% of the final grade) each.

                The final exam will be held during finals week at the date and time indicated on the back side of this sheet. The final will be worth 200 points (20% of the final grade).

Grading: Grading will approximately follow a 90% A, 80% B, 70% C, 60% D scale.

Makeups: Late work of any sort will generally not be accepted, and if accepted due to extenuating circumstances will generally be subject to a penalty of 20% of the possible points for each day past due.

This class is intended to achieve several goals, but primary among them is to give some accurate idea of what mathematics actually is. The specific content of the course is secondary, but my hope is to give a good exposure to many topics which are helpful or necessary to further study in mathematics and related fields. These include, but are not limited to, the basics of set theory, functions, logic, and combinatorics.

This course will be profoundly different, both in subject matter and in daily conduct, than what most of you are accustomed to in a math class. Please understand that it's different on purpose, with very clear reasons in mind. You will probably have to find different ways to learn things in this class than in any math class you've taken before. Don't let that be overwhelming, and remember that I'm around to help.

> *"Doubt everything at least once, even the proposition that two times two equals four."*
> – Georg Christoph Lichtenberg (1742-1799)

Tentative Schedule

		Friday, January 11th §1.1 - §1.5
Monday, January 14th §2.1 The Language of Math	Wednesday, January 16th §2.2 Truth and Implication	Friday, January 18th §2.3 Quantification
Monday, January 21st §2.4 More on Quantification	Wednesday, January 23rd §2.5 Proof Techniques	Friday, January 25th §2.5 Proof Techniques
Monday, January 28th §2.6 The Integers	Wednesday, January 30th §2.7 Mathematical Truth	Friday, February 1st **Examlet 1**
Monday, February 4th §3.1 Sets	Wednesday, February 6th §3.2 Operations on Sets	Friday, February 8th §3.3 Real Intervals
Monday, February 11th §3.4 Absolute Values	Wednesday, February 13th §3.5 Inequalities	Friday, February 15th §3.6 Arbitrary ∪ and ∩
Monday, February 18th §3.7 Cartesian Products	Wednesday, February 20th §3.8 History of Set Theory	Friday, February 22nd **Examlet 2**
Monday, February 25th §4.1 Introduction to Functions	Wednesday, February 27th §4.2 Examples of Functions	Friday, February 29th §4.3 History of Functions
Monday, March 3rd §4.4 Injectivity and Surjectivity	Wednesday, March 5th §4.5 Composition and Inverses	Friday, March 7th §4.6 Countability
Spring Break		
Monday, March 17th §4.7 Uncountability	Wednesday, March 19th The Continuum Hypothesis	Friday, March 21st **Examlet 3**
Monday, March 24th §5.1 Binary Relations	Wednesday, March 26th §5.2 Properties of Relations	Friday, March 28th §5.3 Relations as Sets
Monday, March 31st §5.4 Relations as Graphs	Wednesday, April 2nd **Student Research Symposium**	Friday, April 4th §5.5 Equivalence Relations
Monday, April 7th §5.6 Functions as Relations	Wednesday, April 9th §5.7 $\mathbb{R}$	Friday, April 11th **Examlet 4**
Monday, April 14th §5.8 Completeness	Wednesday, April 16th §5.9 Sequences	Friday, April 18th The Peano Axioms
Monday, April 21st The Peano Axioms	Wednesday, April 23rd The Peano Axioms	
Final Exam – 8am on Friday, April 25th		

Any students with disabilities which might affect their performance in this class should contact me as soon as possible to arrange accommodations.

Coe's faculty has adopted an academic integrity policy. It is your responsibility to understand and follow it.

Diversity, in all its forms, is valuable.

One of the profound puzzles inherent in teaching mathematics is the question of how to teach students to actually do math. That doesn't mean just carrying out algorithms – the routine procedures that solve routine problems are readily taught by demonstration and practice. But doing math means far more than performing those routine rituals, and unfortunately involves tasks that are not so readily learned by demonstration. For instance, mathematicians are able to read math books – something notoriously difficult for math students, and something with which observation provides little help. Mathematicians are also able to do problems of types they have never seen before – a task for which drill work provides only very limited help.

> *"The true function of the teacher is to create the most favorable conditions for selflearning.*
> *True teaching is not that which gives knowledge, but that which stimulates pupils to gain it.*
> *One might say that he teaches best who teaches least."*
>
> – John Milton Gregory, 1884

Math Culture Points

A significant portion of the grade for this course will take the form of Math Culture Points. These will be earned through activities outside of class including, but not necessarily limited to, those listed below:

Activity	Points	Maximum
Colloquium Attendance	10	–
Colloquium Presentation	20	2

Meeting Attendance
    Iowa Section of the MAA (April 25-26th)
    Midwest Undergraduate Mathematics Symposium (April 4-5th)
    Nebraska Conference for Undergraduate Women in Mathematics (Feb. 8-10th)
	30	2

Mathematics Competition Participation
    Iowa Collegiate Mathematics Competition (March 8th)
    Mathematical Contest in Modeling (Feb. 14-16th)
	20	2

Math Culture Reading
    Some weeks specific readings will be posted on the course web page
    With approval, any column on MAA.org
    With approval, an article from *Math Horizons*, *CMJ*, etc.
	10	–
		5
		5

Math Club Activities (when appropriate) Winter Break Book, Movies, Pi Day celebration, Speakers, etc.	10	5

Generally Math Culture Points can be earned for at most two activities in any given week, so you should plan to spread your participation throughout the semester. In each case above, credit assumes both full participation and posting a brief summary/response on Moodle. These reflections should generally be between 100 and 300 words, and include both a brief summary and your personal thoughts on the event.