Foundations of Advanced Mathematics   10am MWF   Fall 2019   SML CCBA

Instructor:	Jonathan White
E-Mail:	JWhite@Coe.Edu
Web Page:	http://public.coe.edu/~jwhite/
Office:	Stuart 311
Office Hours:	9:20-9:50am MWF and by appointment
Office Phone:	399-8280
Text:	*Foundations of Advanced Mathematics*, 0.11th Edition, White (available via Jon's Central Page)
Participation:	Day-to-day class participation, presentations, and snap quizzes will be a prominent aspect of this class, and together worth 200 points.
Problem Sets:	There will be problem sets due most weeks of the semester. Together these will be worth 200 points.
Math Culture:	Math Culture Points will constitute 200 points. These are earned through various activities outside of class, as detailed on page 3 of this syllabus.
Exams:	There will be four small in-class examlets 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 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.
Grading:	Grading will approximately follow a [92.0%,+∞) → A, [90%, 92%) → A−, [87%, 90%) → B+, [82%,87%) → B, [80%, 82%) → B−, [77%, 80%) → C+, [72%, 77%) → C, [70%, 72%) → C−, [67%, 70%) → D+, [62%, 67%) → D, [60%, 62%) → D−, (−∞, 60%) → F scale.
Makeups:	For fairness to those who follow the schedule, makeups for exams will be allowed only in extenuating circumstances, with documentation and advance notice when humanly possible. Late problem sets will be penalized 20% of points possible for each day late, and only accepted until others are returned.

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 number theory, 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. It is extremely important that you come to class each day prepared to do several of the upcoming problems. 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)

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Tentative Schedule

	8/21 Parity	8/23 Beyond Parity
8/26 Divisibility	8/28 Modular Arithmetic	8/30 Basic Logic
9/2 No Class – Labor Day	9/4 Quantification	9/6 Proof Techniques: Contradiction
9/9 Proof Techniques: Induction	9/11 Proof Techniques: Cases	9/13 **Examlet 1**
9/16 Sets	9/18 Operations on Sets	9/20 Arbitrary $\bigcup$ and $\bigcap$
9/23 Inequalities	9/25 Real Intervals	9/27 Absolute Values
9/30 Cartesian Products	10/2 Russell's Paradox	10/4 **Examlet 2**
10/7 Functions	10/9 Operations on Functions	10/11 No Class – Fall Break
10/14 Composition	10/16 Injectivity & Surjectivity	10/18 Inverses
10/21 Countability	10/23 Uncountability / Continuum	10/25 **Examlet 3**
10/28 Relations	10/30 Properties of Relations	11/1 Equivalence Relations
11/4 Relations as Sets	11/6 Functions as Relations	11/8 Graphs
11/11 Graphs	11/13 Directed Graphs	11/15 **Examlet 4**
11/18 Combinatorics	11/20 Probability	11/22 The Peano Axioms
No Class – Thanksgiving Break		
12/2 The Peano Axioms	12/4 The Peano Axioms	12/6 The Peano Axioms
Final Exam – 8am Wednesday 12/11		

Math Culture Points

A 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. Note that none of these are mandatory – there are far more opportunities than necessary to earn full credit. You should be able to select activities that are particularly relevant to you.

Activity	Points	Max #
Colloquium Attendance	10	
Colloquium Presentation	10-30	2
Conference Attendance		2
Midwest Sports Analytics Meeting (11/23/19)	30	
Mathematics Competition Participation	30	2
Iowa Mathematical Modeling Competition (?)		
Putnam Competition (12/7/19)		
Math Culture Reading		
Some weeks specific readings will be posted on Moodle	10	–
Articles from *Math Horizons*	10	5
With approval, articles from *Math. Magazine, The College Math. Journal*, etc.	10	3
Math Club Activities (when appropriate)	10-20	5
Movies, Math Club portion of the Playground of Science, Speakers, Workshops, etc.		
Other Appropriate Coe or Outreach Activities		
Chess Club Meeting	10	4
Job Shadowing in any relevant field	20	1
Volunteer outreach (Garfield Elementary, McKinley Middle School, etc. – see Jon)	10	5

You should plan to spread your participation through the semester. In each case, credit assumes both full participation and posting a brief summary/response on Moodle **in a timely manner**. These reflections should generally be between 100 and 300 words, and include both a brief summary and your personal thoughts on the event, and **must be submitted within one week of the event**, or within the specified time window for other activities. Up to three units of credit may be submitted after normal deadlines in the "Math Culture – Late" category on Moodle, but otherwise exceptions will not be made without serious extenuating circumstances.

The Provost has mandated that the material below this line appear on all syllabi:

¢ Academic Integrity At Coe College, we expect academic integrity of all members of our community. Academic integrity assumes honesty about the nature of ones work in all situations. Such honesty is at the heart of the educational enterprise and is a pre-condition for intellectual growth. Academic dishonesty is the willful attempt to misrepresent ones work, cheat, plagiarize, or impede other students academic progress. Academic dishonesty interferes with the mission of the College and will be treated with the utmost seriousness as a violation of community standards. Please refer to the Coe College Academic Catalog for complete information regarding Academic Integrity: www.coe.edu/academics/academic-resources/provosts-office/academic-integrity-policy

¢ FERPA ¢ Students should be aware of their rights regarding the privacy of their educational records. Detailed information about your rights can be found under the FERPA (Family Educational Rights and Privacy Act of 1974) section in the Academic Catalog and online here: https://www.coe.edu/academics/academic-resources/registrar/ferpa ¢ In line with FERPA restrictions, students should be aware that an instructor cannot publicly post grades by student name, institutional student identification number, or social security number without first having obtained students written permission

¢ The Definition of a Course Credit & Expected Workload: One course credit at Coe College constitutes 180 hours worth of student work over the course of the term. "Department of Education has defined one hour to be 50 minutes, so 150 60-minute hours is equivalent to 180 50-minute hours." This figure includes both the time spent in class and out of class completing course work. In other words, students are expected to devote a considerable amount of time outside of class to this course. For courses that meet in a standard MWF or T-Th slot, students should be expected to work seven hours a week outside of the three hours in class.

¢ Students with Disabilities: Request for Accommodation Coe College, in compliance with equal access laws, will make reasonable accommodations for persons with ADA qualifying disabilities. If you have a hidden or visible disability, or believe you may have a disability, that affects your learning, and may require classroom or test accommodations I encourage you to visit my office during office hours or email to schedule an appointment at a mutually suitable time so we can discuss ways to support your learning within our class. Additionally, in order to receive accommodations in higher education, students must meet with Kim Pierson, the Accessibility Services Coordinator, to verify disability and establish appropriate accommodations. The Accessibility Services Office is located in the Learning Commons in the lower level of Stewart Memorial Library (near the Testing Center desk). This office is responsible for coordinating accommodations and services for students with disabilities. Please call 319-399-8844 or email accessibility@coe.edu to schedule an appointment.

¢ Reporting of Sexual Assault or Misconduct As an instructor, one of my responsibilities is to help create a safe learning environment on our campus. I also have a mandatory reporting responsibility related to my role as a faculty member. It is my goal that you feel able to share information related to your life experiences in classroom discussions, in your written work, and in any one-on-one meetings. I will seek to keep information you share with me private to the greatest extent possible. However, I am required to share information regarding sexual misconduct or students who may be in danger to themselves or to others. Students may speak to someone confidentially by contacting Student Development at 319-399-8843, Safety and Security at 319-399-8888, or Emily Barnard (college counselor) at 319-399-8843.