FOUNDATIONS OF ADVANCED MATHEMATICS 1:20-2:20 & 2:30-3:30PM MWF SPRING 2021

Instructor:	Jonathan White
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Chair:	Gavin Cross, gcross@coe.edu
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Office:	Stuart 311
Office Hours:	9:30-10:00am MWF, 10-10:30am TTh, and by appointment (Link on web page)
Office Phone:	399-8280
Text:	*Foundations of Advanced Mathematics*, 0.12th 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 elsewhere.
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 $[92.0\%, +\infty) \to A$, $[90\%, 92\%) \to A-$, $[87\%, 90\%) \to B+$, $[82\%, 87\%) \to B$, $[80\%, 82\%) \to B-$, $[77\%, 80\%) \to C+$, $[72\%, 77\%) \to C$, $[70\%, 72\%) \to C-$, $[67\%, 70\%) \to D+$, $[62\%, 67\%) \to D$, $[60\%, 62\%) \to D-$, $(-\infty, 60\%) \to F$ 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

1/25 Parity	1/27 Beyond Parity	1/29 Divisibility
2/1 Modular Arithmetic	2/3 Basic Logic	2/5 Quantification
2/8 Proof Techniques: Contradiction	2/10 Proof Techniques: Induction	2/12 Proof Techniques: Cases
2/15 **Examlet 1**	2/17 Sets	2/19 Operations on Sets
2/22 Arbitrary $\bigcup$ and $\bigcap$	2/24 No Class – Break	2/26 Inequalities
3/1 Real Intervals	3/3 Absolute Values	3/5 Cartesian Products
3/8 Russell's Paradox	3/10 **Examlet 2**	3/12 Functions
3/15 Operations on Functions	3/17 Composition	3/19 Injectivity & Surjectivity
3/22 Inverses	3/24 Countability	3/26 Uncountability / Continuum
3/29 **Examlet 3**	3/31 Relations	4/2 Properties of Relations
4/5 Equivalence Relations	4/7 Relations as Sets	4/9 Functions as Relations
4/12 Graphs	4/14 Directed Graphs	4/16 **Examlet 4**
4/19 Combinatorics	4/21 Probability	4/23 The Peano Axioms
4/26 The Peano Axioms		
Final Exam – 1pm Friday 4/30 & 3:30pm Thursday 4/29		

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.

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Course Objectives: By the end of the course, students should have practiced...

- writing mathematical proofs
- verbally communicating mathematical ideas
- critiquing others' arguments
- other life skills that are more impactful for students to ponder than to enumerate here

College-wide Policies:

Mission Statement: Coe College is a national, residential liberal arts college offering a broad array of programs in the arts, sciences, and professions. Our mission is to prepare students for meaningful lives and fulfilling careers in a diverse, interconnected world. Coes success will be judged by the success of our graduates.

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 precondition 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. "The 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. Even with the 13.3 week term, the same number of contact hours (in person or remote) will be achieved with longer class meetings. Contact hours are per credit and do not change with modality. A credit is a credit.

Requesting Academic Accommodations Coe College is committed to creating a learning environment that meets the needs of its diverse student body. If you anticipate or experience any barriers to learning in this course, please visit my office hours to discuss these concerns with me. If you have a medical, physical, psychological, or learning need documented by a healthcare provider, or experience an unforeseen obstacle during the semester, you can make an appointment with Laura Hayes, Accessibility Services Coordinator, to request an official accommodation under the Americans with Disabilities Act. You can find more information about the Accessibility Services Office by visiting the Learning Commons website or by emailing accessibility@coe.edu. If you have already been approved for accommodations through Accessibility Services, please meet with me so we can develop a plan for your success together.

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 keep the 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 Life at 319-399-8843 or emailing titleix@coe.edu, Safety, and Security at 319-399-8888, Emily Barnard (college counselor) at 319-399-8843, or visit Coe's Title IX website for more information.

Face coverings will be required in all indoor public spaces, which includes the classrooms, labs, and between classes. Any students without a face covering will be asked to leave the classroom or lab. Anyone who is not compliant with the classroom and lab protocols will be asked to leave the classroom until compliance can be maintained. If a student refuses to follow college guidelines upon request, the faculty member should cancel class and contact the Provost immediately. Refusal to comply with classroom protocols will be considered as deliberately impeding other students work and will be addressed by the Provosts Office.