Meeting Times/Place: MWF 12:00-12:50 in VSC Room 201

Course Description/Content:

- “Basic logic and set theory, and methods of proof, induction, relations and functions.”
- This course builds heavily on material from MATH 131 - Discrete Mathematics but is more abstract.
- Our primary focus is the reasoning necessary to create and understand mathematical proof.

Prerequisites and Follow-Ups:

- Prerequisites: MATH 225 – Calculus I and MATH 131 - Discrete Mathematics
- Mathematics majors must have a C or better in both of these prerequisite courses.
- Follow-up coursework: Mathematics majors must earn at least a C in this course to enroll in upper-division mathematics coursework.

Text: A Transition to Advanced Mathematics by Smith, Eggen, and Andre (7th ed.)

Classroom behavior:

- Do not use your cell phone or other technology during class.
- **I CANNOT PERMIT FOOD OR DRINKS** in the room due to a documented health condition.
- Plain, unflavored water will be permitted, but no other beverages. (See above.)
- Please see me immediately if these accommodations conflict with your own documented needs.

Office Hours and Contact:

- My email address is lyn.miller@sru.edu; my office phone number is 724-738-2878.
- I’ll typically reply to email or voicemail within 24 hours during the week.
- Drop-in office hours are M-F 2:00-3:00; I’m also available by appointment, as well as by “capture” for Modern Concepts: You are welcome to ask any time you see me whether I am free to help, but realize that I may sometimes have to say “no.”
- My office is 200-B VSC inside the Mathematics Department offices.
- Please do not bring food or beverages into my office. You may leave them in the kitchenette.
- My web page is granite.sru.edu/~lmiller. (No “www.” and no D2L except for exam grades)
- Assignments, other information will be posted regularly on my web page, NOT on D2L.

Calculators:

- You **ARE** permitted to use a calculator in this course, but on exams, it cannot be one with text-based memory (so no TI graphing calculators).

Final Exam:

- The Final is Wednesday, May 6, 1:00-3:00.
- You MUST take the Final at the scheduled time. Do NOT plan travel that conflicts with it.
- The Final Exam is cumulative; it MAY have a take-home portion due at the scheduled time also.
Grading:

- **100 points** - Homework Score - computed as a percentage of best assignments (see below)
- **300 points** - Exams #1, #2, and #3 - three in-class exams at 100 points each (see below)
- **150 points** - Cumulative Final Exam (see below)

- The point total for the entire course is **550 points**.
- $A = 90 - 100%; B = 80 - 89%; C = 70 - 79%; D = 60 - 69%; F = 0 - 59%.$

Homework Policy:

- Homework will be collected roughly once a week, probably on Fridays. 
- Point values for different assignments may vary, depending on their length.
- Email, phone, or see me about difficulties in advance so that you are ready to turn in your HW.
- Homework is due on my desk at the START of each class; otherwise, it’s late.
- This course is VERY verbal, so write legibly and leave plenty of room for me to comment.
- I don’t accept late/make-up HW, but instead drop your lowest 10-15% of scores.
- This is typically 1-2 assignments; exact number determined at semester’s end.
- Solutions must show your own work, not just be copied from the text, web, study partners, etc.
- Lack of sufficient original work counts as a zero, including for all study partners involved.
- Solutions (sometimes partial) to original problems will typically be posted on my web site.
- Solutions to textbook problems will NOT be posted to honor copyright, intellectual property laws.

Exams:

- You’ll get a Topics List listing the concepts on each exam one week prior to its date.
- There are also old exams on my web page, but they are NOT representative of our content.
- Students say the best way to study is to use the Topics List to make your own study guide.
- For each item listed, review notes, reading, and HW to see what we have said/done about it.
- Copy down precise statements and examples, as well as cautions, on your study guide.
- Begin to prepare as soon as the Topics List comes out; don’t cram at the last minute.
- Exams MAY have take-home components as well, depending on necessary length.
- TENTATIVE dates: Exam #1: around 2/19; Exam #2: around 3/31; Exam #3: around 4/26.

Attendance and Make-Up Policy:

- Regular and prompt attendance is expected but does NOT count toward your grade.
- An attendance sheet will circulate daily for SRU record-keeping.
- Late and make-up HW: NONE! Remember, I count only your best 85-90%.
- Make-up Exams:
  1. These do require a documented reason and meaningful efforts to contact me in advance.
  2. Separate make-up exams typically are not given; rather, make-up exam scores are determined by using your percentage score on the Final Exam score at the end of the semester to replace the missed score.
- If you are absent, get the notes from a classmate. This is YOUR responsibility.
- When you return from an absence, be prepared to hand in any HW that is due on that day.
- SEEK HELP EARLY AND OFTEN!
1. Students will demonstrate an understanding of and competence in working with logic. This includes the following topics.
   (a) Propositional calculus
   (b) Quantifiers
   (c) Methods of proof

2. Students will demonstrate an understanding of and competence in writing proofs relating to sets. This includes the following topics.
   (a) Operations on sets
   (b) Infinite families of sets

3. Students will demonstrate an understanding of and competence in using mathematical induction and recurrence in proofs.

4. Students will demonstrate an understanding of and competence in writing proofs relating to relations and functions. This includes the following topics.
   (a) Equivalence relations
   (b) Operations on relations
   (c) Orders

5. Students will demonstrate an understanding of and competence in writing proofs relating to countable and uncountable sets. This includes the following topics. (optional)
   (a) Cardinality
   (b) The Schroder Bernstein and Cantor theorems