

Math 270–01 (2882): Introduction to Abstract Mathematics

Course Information Sheet and Syllabus

Fall 2014

Instructor: Dr. Susan Cooper

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Office Hours: Mondays & Fridays 11:00 a.m. – 11:50 a.m.; Wednesdays 9:00 a.m. – 9:50 a.m.;
or by appointment

Correspondence: The most reliable way to contact me is via email.

Class Times and Location: MWF 10:00 a.m. – 10:50 a.m., Walster Hall – Room 220

Prerequisites: Math 166

Credit Hours: 3

Course Web-Page: We will use *Blackboard* which can be found at <https://bb.ndsu.nodak.edu/>.

Textbook: *Proofs and Fundamentals*, Second Edition, by Ethan D. Bloch

Course Description: Topics include sets, symbolic logic, propositions, quantifiers, methods of proof, relations and functions, equivalence relations, math induction and its equivalents, infinite sets, cardinal numbers, number systems.

Course Objectives:

“Mathematics is the music of reason.”
James Joseph Sylvester

One aim of this course is to bridge the gap between your previously experienced calculation-based mathematics training and theoretical-based higher-level mathematics. Indeed, one of the great advantages of studying mathematics is that it helps one develop the ability to handle abstract ideas. We will be covering most of Chapters 1 through 6 of your textbook. Time-permitting, we will also investigate special topics seen in Chapter 7. The material will provide exposure and mastery to topics seen in more advanced mathematics courses.

Mathematics is a precise language in itself and requires great care when communicating. In this course, you will learn what a mathematical proof is, why it is needed, strengths of a well-written proof, and weaknesses of a poorly-written proof. Moreover, by considering concrete examples, you will make conjectures and then try to verify or disprove them. While being exposed to mathematics as a profession, you will become confident that you can do mathematics and you will experience the joy of discovering hidden patterns and mathematical truths.

Problem Sets and Quizzes: Mathematics is not a spectator sport. The best way to learn mathematics is by doing mathematics. A collection of exercises, namely *Problem Sets* and *Quiz Sets*, will be assigned regularly. Solutions to Problem Sets will be submitted and a subset of the problems will be graded based on correctness, clarity, and style/creativity. Quizzes will be given based on the Quiz Set exercises and definitions from class. The quizzes are intended to gauge your understanding of the material while presenting opportunities for you to practice writing proofs in a timed-setting. All feedback is meant to improve your mathematical abilities and communication. You will be given a week to prepare the Problem and Quiz Sets. In addition, you will be expected to adhere to the policies outlines on the handout “Guidelines for Problem and Quiz Sets”.

Daily Homework and Participation: *Daily Homework* consisting of readings and problems will be regularly assigned (but not collected). These assignments will be used to gauge how you are keeping up with the course, expose you to the joy of reading mathematics, and to help you develop the crucial skill of communicating mathematics with peers. It will be expected that you have completed the daily homework. As such, students may be asked to present solutions and ideas to the class or to work on activities in small groups. Please take your turn in these activities – it will greatly improve your understanding of the material.

Reading Mathematics: It is important to note that reading mathematics is quite different than reading most other subjects. For tips on how to approach this new type of reading, you are encouraged to read *How to Read a Math Book* by Stan Brown found at <http://www.tc3.edu/instruct/sbrown/math/read.htm>.

Dictionary and Theorem Notebook: The mastery of mathematics requires knowing and understanding many definitions and theorems. You will be required to construct and maintain a working dictionary and theorem notebook. The details of this project will be discussed in class. This will be submitted during each of the midterm and final examinations.

Exams: There will be two 50-minute midterm exams and one cumulative 2-hour final examination. The schedule is:

Exam	Date	Time and Location
Exam 1	Friday, October 3	In Class
Exam 2	Friday, November 21	In Class
Final Exam	Wednesday, December 17	8:00 a.m. – 10:00 a.m., Walster Hall – Room 220

Books, notes, and calculators will not be permitted on exams.

Blue Books: Each student will be required to supply blank blue books to be used for their exams.

Missed/Late Work Policies: Late submissions of Problem Sets and make-up quizzes and exams will only be granted for unavoidable, documented circumstances as described below:

Circumstance	Required documentation
Illness or other medical situation	Official note from clinic, hospital, doctor, nurse, or other health care provider
Military service	Official military activation orders
Funeral or other family emergency	Official documentation from newspaper, funeral, or medical official
Sports or other official NDSU activity	Official documentation from NDSU athletics or activity's faculty adviser

Please note that recreational activities do not qualify for make-ups or late submissions. If you have a pre-existing conflict with an exam or quiz date, you are expected to make alternative arrangements *beforehand*. You are also permitted to submit an assignment before its given deadline.

Course Grades: Final course grades will be determined as follows:

Task	Percentage of Grade	Percentage Grade	Grade Earned
Dictionary & Theorem Notebook	5%	90% – 100%	A
Problem Sets	20%	80% – 89%	B
Quizzes	20%	70% – 79%	C
Midterm Exams	15% each	60% – 69%	D
Final Exam	25%	0% – 59%	F

Attendance: This course will be very different from your calculus-based prerequisite courses. It covers a large amount of material and may seem very fast-paced. Your understanding of the course material will be greatly supported by regular attendance and engagement in class meetings. Indeed, a given topic will depend heavily on previously explored topics and so missing one class can make a huge difference in your understanding the material. Although you are expected to attend every class meeting, attendance will only be taken on the first two meetings of the class. You are responsible for any missed material when absent. Veterans and student service members with special circumstances or who are activated are encouraged to notify the instructor as soon as possible and are encouraged to provide Activation Orders.

Course Schedule: Please see the handout titled “Tentative Schedule” for important dates and an overall outline of the course.

Other Resources: Please note the following:

- *Notes:* It is important to prepare clear and thorough notes – these will provide you with clarifying examples and reasoning behind the theory seen in class.
- *Email Announcements:* At times, course announcements will be sent to you via Blackboard. It is your responsibility to set your email address with Blackboard and check this email address regularly.

Special Needs: Any students with disabilities or other special needs, who need special accommodations in this course are invited to share these concerns or requests with the instructor and contact the Disability Services Office as soon as possible. For more information, see <http://www.ndsu.edu/disabilityservices/>.

Academic Honesty: The academic community is operated on the basis of honesty, integrity, and fair play. NDSU Policy 335: Code of Academic Responsibility and Conduct applies to cases in which cheating, plagiarism, or other academic misconduct have occurred in an instructional context. Students found guilty of academic misconduct are subject to penalties, up to and possibly including suspension and/or expulsion. Student academic misconduct records are maintained by the Office of Registration and Records. Informational resources about academic honesty for students and instructional staff members can be found at www.ndsu.edu/academichonesty.

Any student found guilty of academic dishonesty will receive a grade of 0 for the task in question. In addition, every such student will be reported to the Chair of Mathematics, the Dean of their major college, the Dean of the College of Science and Mathematics, the Provost, and the Registrar. The Registrar will add any such student to NDSU's Student Academic Misconduct Database. (Multiple entries in this database may result in additional sanctions from NDSU.) Students found guilty of a second offense of academic dishonesty in this class will receive a course grade of F, and will not be allowed to drop or withdraw from the course.

Classroom Atmosphere: A part of learning is making mistakes. We want to establish a classroom atmosphere where the inevitable false starts and mistakes become an opportunity to improve – not an opportunity for embarrassment. Please be constructive and polite in questioning your colleagues in class.

Expectations and Tips for Success: I ask that you have a well-defined sense of professionalism, that you always put forth your best effort, and that you develop a sense of responsibility to your educational community. I ask that you exhibit a persistent desire to learn. In return I will provide you with significant support. Also:

- Be positive, open, and responsive to feedback.
- Be an active participant - mathematics is learned by doing; this includes participating fully in classroom activities (please, turn your cell phones off during class), completing the Daily Homework, critically thinking about the mathematics during and outside of class. *In order for this class to be successful, it is imperative that you commit to coming to class regularly, that you commit to coming to class prepared, and that you commit to participating in class!*
- Be/become a “risk taker”.
- Be committed, take pride in your work, and take your work seriously.
- Be patient with yourself - it takes time to master newly learned things. Ask for assistance when it is needed. Constantly try to improve yourself as a mathematician.
- Starting with the first class, study in-depth and regularly. This means, for example, that you should do the assigned exercises *before* the next class period.
- It is tempting to just copy available solutions. However, struggling through the exercises on your own is an important phase of the learning process.
- Get help as soon as you need it: ask questions in class and office hours; form a study group with your classmates; consider getting a tutor, etc.
- For exam preparation, practice exercises that have not been assigned.
- Everyone wants you to succeed. Please speak with me regarding any concerns you may have.
- Relax and have fun with the course!