

MATH 2513–002 Discrete Mathematical Structures

This is the information sheet for Discrete Mathematics, MATH 2513–Section 002, for the Fall Semester 2014. It is your responsibility to acquaint yourself with all the information in this handout, and with any modifications to it that may be announced in class.

Instructor: Dr. Noel Brady.

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Class Times: The class meets 3 days per week: on Mondays, Wednesdays and Fridays in 117 PHSC from 9:30AM to 10:20AM.

Course Web Page. <http://math.ou.edu/~nbrady/teaching/f14-2513>

Office Hours. Mon 1:15pm–2:15pm; Tue 10:00am–11:00am; Thu 1:00pm–2:00pm. Also by appointment.

Who are we? We're a mixed bunch! Please keep our diversity of backgrounds and perspectives in mind when working in groups and when chatting with your classmates. Working in diverse groups requires us to “think outside of the box,” to look beyond common frameworks and paradigms of (say) two engineering or math majors, and to frame ideas in very general terms. This bridge-building and generalization is an invaluable skill later on in our lives.

We include an Accounting major, an Architecture major, a Biochemistry major, a Biology major, a range of Engineering majors (Aero., Chem., Indust., Petrol., Physics), several Exploratory track students, a Geography major, a High School student, a Linguistics major, several Mathematics majors (both BS and BA tracks), several Mathematics Education majors (Coll. of Ed.), several Meteorology majors, a Physics major, and a Sociology major. Welcome all! I look forward to your unique insights and perspectives.

The instructor, Noel Brady, was born and raised in the environs of Dublin, Ireland. Sometime during the previous millennium he obtained a mathematics BA degree from Trinity College Dublin (with a heavy physics/engineering emphasis) and a PhD in Geometric Group Theory (with a heavy pure mathematics emphasis) from UC Berkeley. He has taught mathematics courses at the University of Utah, Cornell University, and OU (since 1998). Since joining OU, he has spent extended time (measured in semesters/years) at Texas A&M University, the Centre de Recerca Matematica (in Bellaterra, Barcelona, Spain), Grinnell College (IA), and the National Science Foundation (Washington, DC).

Text and Course Outline. We shall cover most of the textbook; *Mathematical Reasoning: Writing and Proof* by Ted Sundstrom. This text is open source and available under the **Introduction to Proofs** section of <http://aimath.org/textbooks/approved-textbooks/>, the American Institute of Mathematics page of approved open source mathematics textbooks. As time permits, we will explore some topics in more detail. I would like to say something about group theory, and permutation groups in particular. I would also like for us to think deeper about infinite cardinalities, a little more than is done in the textbook. I will provide notes on the group theory. A good resource for the cardinality material can be found in *Book of Proof* by Richard Hammack, which is available in the same section of the AIM page <http://aimath.org/textbooks/approved-textbooks/>. I will also provide information about cardinality.

The direct link to the textbook is here <https://sites.google.com/site/mathematicalreasoning3ed/>. It includes a link to a collection of youtube videos of screenshots which accompany the textbook: <https://www.youtube.com/playlist?list=PL2419488168AE7001>. This collection of screenshot videos is a great resource.

The textbook (and alternate texts) are open source and freely available. There are low cost hard-copy versions of these texts available if you wish to avail of this format.

In this course we will learn some basic logic, set theory, and explore the concepts of relations (emphasizing equivalence relations) and functions. There will be applications to elementary number theory, an introduction to group theory, and the theory of infinite cardinalities. The emphasis will be on writing clear and concise mathematical proofs and arguments. This course is an excellent background for more advanced mathematics courses, including courses on: measure theory and analysis, point set topology, abstract linear algebra, abstract algebra, number theory, cryptography, combinatorics, and graph theory.

Lectures. You are expected to attend all lectures, and are responsible for all information given out during them. In particular, this includes any changes to the midterm dates or content.

Furthermore, since class participation counts for one tenth of the overall course grade, it is important that you not miss class on a regular basis.

Grading Scheme. Grades will be assigned by weighting your totals from Homework, Webwork, Midterms, and a Final Examination as follows:

<i>Homework</i>	20%
<i>Class Participation</i>	10%
<i>Midterm Total</i>	40%
<i>Final Examination</i>	30%

The total number of points in the course is 100. Grades are assigned on the following scale:

$$A : 85 - 100, \quad B : 70 - 84, \quad C : 55 - 69, \quad D : 40 - 54, \quad F : 0 - 39.$$

Here are more details about each of these components.

Homework. Homework should be turned in at the **start** of class on due dates. You are responsible for ensuring that your homework gets turned in on time. Late homework will not be accepted; it disrupts the grading process and is unfair to other students.

Class Participation. Class participation counts for one tenth of the overall grade. You will work in small groups on assigned projects in the first half of a class session. The results of these group activities will be turned in to me and will be graded. Some of the group activities will involve oral presentations of ideas/arguments to others in the group or to other groups.

Midterms. There are three midterms, two of which are held during regular lecture times in the usual classroom, and the third is a set of extra homework. They are held/due on the following dates:

Midterm 1: 10% of overall course grade. Monday, Sept. 08.

Midterm 2: 15% of overall course grade. Monday, Oct. 13.

Midterm 3: 15% of overall course grade. Monday, Nov. 24.

Final Examination. The final examination is cumulative. It is scheduled for Friday, December 12 from 8:00AM until 10:00AM, and is held in the usual classroom — PHSC 117.

Taking Examinations. All examinations must be taken at scheduled times, except in *extreme circumstances*. So be careful not to make travel arrangements that conflict with examination times. If you cannot take an examination at a scheduled time, you should contact me *well in advance of the test time*. Otherwise, an absence at an exam will result in a score of zero.

Policy on W/I Grades. You can find the Fall 2014 academic calendar at http://www.ou.edu/content/admissions/academic_calendar.html

Until August 29, there is no record of grade for dropped courses. From Sept 1 through Oct 24, you may withdraw and receive an automatic W grade, *no matter what scores you have so far achieved*. From Oct 27 on, University regulations specify that you may withdraw only with the permission of the College Dean.

Students who are failing the course should not expect to receive an “I” grade in place of a “W” grade. I will only consider assigning an “I” grade if the situation satisfies the following criteria.

1. the student is already maintaining a passing grade,
2. the student has completed most of the course work, and
3. the student can demonstrate that he/she is unable to complete the work at this time due to circumstances beyond his/her control.

Academic misconduct. You should be familiar with University policy regarding academic misconduct <http://integrity.ou.edu>.

Accommodation of Disabilities. The University of Oklahoma is committed to providing reasonable accommodation for all students with disabilities. If you require special accommodation in this course you are requested to speak with me as early in the semester as possible (preferably by the end of the first week). Students with disabilities must be registered with the Office of Disability Services prior to receiving accommodations in this course. The Office of Disability Services is located in Goddard Health Center, Suite 166, phone (405) 325-3852 or TDD only (405) 325-4173. Their website is at <http://drc.ou.edu>.

Religious Holidays. It is the policy of the University to excuse absences of students that result from religious observances and to provide without penalty for the rescheduling of examinations and additional required class work that may fall on religious holidays.

Students who plan to observe a religious holiday which may conflict with a class time, should notify me as soon as possible (preferably within the first week of the semester), so that we can make appropriate arrangements.

Mathematics Department student resource page. The [Undergraduate Information](#) page on the Mathematics Department server is a good resource. It has links to the Math Center, the OU MathClub blog, and has information about obtaining a Mathematics minor or major.

The OU MathClub Blog. The [OU MathClub blog](#) is an excellent way of finding out what’s going on math-wise at OU.