

**Discrete Mathematics II**  
**EAS 182 – Section 03 – Spring 2015**  
**Course Information and Syllabus**  
Updated February 24, 2015

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**Instructor:** Akil Narayan  
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**Phone:** 508-999-8318  
**Office:** LARTS 394C

**Office hours:** Tues 2-4pm, Thurs 9-11am, Wed 12-2pm (Wed only by appointment)  
**Office hours location:** LARTS 394C

**Class time and location:** TTh, 8:00am-9:15am, LArts 214

**Section webpage:** <http://www.math.umassd.edu/~anarayan/mth182>

**Text:** G. Chartrand and P. Zhang, *Discrete Mathematics*, Waveland Press, Inc. (2011), ISBN-10 1-57766-730-1, ISBN-13 978-1-57766-730-8 (required).

**Learning objectives:** The general objectives of this course involve understanding and manipulating basic mathematical constructs: sets, logic, proofs, relations, etc. At the end of this class, you will be able to

- prove formal mathematical statements with induction and deduction
- understand basic set theory properties for Euclidean-type spaces
- analyze and classify algebraic structures, functions, and relations
- understand elementary counting, combinatorics, and cryptography

**Prerequisites:** MTH 181. I will assume you are comfortable with chapters 1-3, and the beginning of chapter 4 of the textbook. This includes set theory and notation, logic and predicates, methods of proof, and mathematical induction.

**Course description:** Review of set algebra including mappings and relations, algebraic structures including semigroups and groups. Elements of the theory of directed and undirected graphs. Boolean algebra and propositional logic. Applications of these structures to various areas of computers.

**Homework:** Problem sets will be posted on a weekly basis, but these problem sets *will not be collected or graded*.

These problem sets are intended to be more difficult versions of problems that will appear on exams. Therefore, you should consider doing all these problems *mandatory* in order to do well in this class. Upon request, I will proofread and give feedback on any solutions you wish to submit for the problem sets.

**Exams:** This course will have 4 in-class midterm exams, in addition to a final exam. Each midterm exam is *not* cumulative, and will test concepts covered in the lectures and in problem sets. The exams will be held in class on February 19, March 12, April 9, and April 30.

The final exam is a cumulative exam in the same format as the midterm exams. The final exam will be held from 8:00am-11:00am on Tuesday, May 12 in LArts 214.

Unless otherwise specified, neither calculators nor notes of any kind are allowed on any of the exams.

**“Extra” credit:** There will be absolutely **no** extra-credit make-ups for bombed exams unless you have an extenuating circumstance and have approved it with me **beforehand**. In particular, if you need to schedule a make-up exam for a planned absence, you should inform me two weeks before the scheduled exam.

**Attendance:** I do *not* take attendance; attendance at lectures is not a factor in your grade. However, you are responsible for your own awareness of any course policies and practices that are announced in class. If you believe you will be absent for an extended period of time due to illness or other emergency, notify me immediately to arrange make-up of any assignments or evaluations that will be missed. In agreement with other class policies, no assignments or evaluations can be ‘made up’ after an absence, except in extenuating circumstances.

**“How to get an A”:** I try to ensure that the examinations test your learning and ability to reason and not your ability to perform routine mechanical calculations repeatedly. If you do the following things for class, then getting an A will not be a problem:

- Read the textbook. Reading the relevant section before class is optimal, but going through the book after lecture will definitely help.
- During lecture, pay attention and don’t necessarily concentrate on copying every letter from the blackboard; almost everything I cover will come from the text, so you already have very wordy set of notes for the lecture; if I cover something not in the book, I will be very explicit about it.
- After lecture, do the relevant problems. If possible, do this the same day of lecture when the material is still fresh. This serves two purposes: it ingrains the methodology and reasoning, and you will complete your homework in a smaller, more manageable chunks, rather than in one large torturous session before an exam.

If you do the above then you will be very well-prepared for the exams.

**Incomplete grades** An incomplete grade will be given only in exceptional circumstances at my discretion. You must be passing the class at the time of the request for an incomplete grade, or be sufficiently close to passing. If the work is not completed within one year of the recording of the incomplete grade, the grade will become an F(I). The incomplete policy for this course is that at least 70% of the course must be already completed and an exceptional circumstance (i.e. medical issue) must exist. If you feel you require an incomplete for an exceptional reason, you need to email me and state your reasons for the incomplete in writing. We will then schedule a meeting and decide how to proceed.

**Grading:** Your course grade will be computed as follows.

- Midterm exams ..... 70%
- Final exam ..... 30%

## Important dates:

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<b>Feb 5</b>		Last day to add, drop, or audit a course
<b>Feb 19</b>	<b>8:00am</b>	Midterm exam 1
<b>Feb 26</b>		Last day to file courses for pass/fail credit
<b>Mar 12</b>	<b>8:00am</b>	Midterm exam 2
<b>Apr 8</b>		Last day to withdraw from a course
<b>Apr 9</b>	<b>8:00am</b>	Midterm exam 3
<b>Apr 30</b>	<b>8:00am</b>	Midterm exam 4
<b>May 12</b>	<b>8:00am</b>	Final exam

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**Class communication:** An email list is set up with which I shall send out information not communicated during class. This email list will also be used to communicate class information in the case of unusual circumstances affecting the the logistics of the class. If you are not officially registered for the class but wish to be on the roster, please discuss it with me.

*If you are registered for the course, but do not receive the course email announcements to your UMassD email address, please notify me immediately.* It is not possible for me to arrange delivery of these emails to a non-UMass account.

The section website will also be used to communicate more technical matter of the class (e.g. problem sets, lecture summaries, etc.).

In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to change that may be necessitated by a revised semester calendar or other circumstances. The above two methods, in addition to the coursewide website, are reliable means of getting information about changes to the course.

**Students with disabilities:** If you have a documented disability and require accommodations to obtain equal access in this course, please meet with me at the beginning of the semester and provide the appropriate paperwork from the Center for Access and Success. The necessary paperwork is obtained when you bring proper documentation to the Center for Access and Success, which is located in Woodland Common, Room 111. Tel: 508-999-8711.

**Academic Integrity:** I'd like to remind you of UMass Dartmouth's code of academic integrity [1].

I am a trusting person and will generally give a student the benefit of the doubt, but if I deem a situation as a blatant attempt to circumvent ethical standards, I will pursue appropriate actions at the university level. In addition, a failing grade for the class is a standard penalty in such cases.

[1]: <https://www.umassd.edu/policies/activepolicylist/academicaffairs/academicintegritypolicyandreportingform/>

## Semester calendar

DAY	DATE	CHARTRAND & ZHANG SECTION(S)	TOPIC
Tuesday	January 27, 2015	—	Hello
Thursday	January 29, 2015	4.1-4.3	Review of mathematical induction
Tuesday	February 3, 2015	4.4	Strong mathematical induction
Thursday	February 5, 2015	5.1	Relations
Tuesday	February 10, 2015	—	<u>NO CLASS</u> : Class Cancelled
Thursday	February 12, 2015	5.2	Equivalence relations
Tuesday	February 17, 2015	—	<u>NO CLASS</u> : Follow Monday's schedule
Thursday	February 19, 2015	—	<b><u>EXAM 1</u></b>
Tuesday	February 24, 2015	5.3	Functions
Thursday	February 26, 2015	—	<u>NO CLASS</u> : Class cancelled
Tuesday	March 3, 2015	5.4	Bijjective Functions
Thursday	March 5, 2015	5.5	Set cardinality
Tuesday	March 10, 2015	6.1-6.2	Algorithms and operation complexity
Thursday	March 12, 2015	—	<b><u>EXAM 2</u></b>
Tuesday	March 17, 2015	—	<u>NO CLASS</u> : Spring break
Thursday	March 19, 2015	—	<u>NO CLASS</u> : Spring break
Tuesday	March 24, 2015	7.1-7.2	Divisibility and primes
Thursday	March 26, 2015	—	<u>NO CLASS</u> : Class cancelled
Tuesday	March 31, 2015	7.3	The division algorithm
Thursday	April 2, 2015	7.4	Congruence
Tuesday	April 7, 2015	7.5	Cryptography
Thursday	April 9, 2015	—	<b><u>EXAM 3</u></b>
Tuesday	April 14, 2015	8.1-8.2	The multiplication, addition, and inclusion-exclusion principles
Thursday	April 16, 2015	8.3	The pigeonhole principle
Tuesday	April 21, 2015	8.4	Permutations and combinations
Thursday	April 23, 2015	9.1	Pascal's triangle, the Binomial theorem
Tuesday	April 28, 2015	9.2	Permutationa and combinations with repetition
Thursday	April 30, 2015	—	<b><u>EXAM 4</u></b>
Tuesday	May 5, 2015	—	Final exam review
Tuesday	May 12, 2015	8:00am-11:00am	<b><u>FINAL EXAM</u></b>