The University of New Haven
The College of Arts and Sciences
Department of Mathematics

Course: MATH 3305
Title: Discrete Structures
Semester: Fall 2013
Meeting Times: TTh 12:15–13:30
Classroom: Maxcy 203
Credit Hours: 3

Instructor Contact Information
Landon Rabern

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Office Hours: TTh 13:30pm–15:00

MATH 3305 Discrete Structures

Course Description

Prerequisite: MATH 1108. Methods of proof, the integers, induction, prime numbers, recursive algorithms, greatest common divisors, the Euclidean algorithm, the fundamental theorem of arithmetic, congruences. 3 credits.

Required Text

A Friendly Introduction to Number Theory, Joseph H. Silverman, Pearson (2013), ISBN 13: 978-0-321-81619-1.

Recommended Additional Text

Proofs from the Book, Martin Aigner, Gunter M. Ziegler, 4th ed. (2009).

Content

MATH 3305 provides an introduction to the integers and their fundamental nature. In rigorously investigating the integers, students will learn the basic proof techniques used in all of mathematics and increase their mathematical maturity.

Grading

Students will be evaluated on the basis of three exams (worth 30 points each) and one project (worth 10 points). Total points (T) map to grades as follows.

T			grade
97	–	∞	A+
93	–	96	A
90	–	92	A-
87	–	89	B+
83	–	86	B
80	–	82	B-

T			grade
77	–	79	C+
73	–	76	C
70	–	72	C-
67	–	69	D+
63	–	66	D
$-\infty$	–	62	F

More precisely, exams 1, 2 and 3 are given scores E_1, E_2, E_3, the project is given score P and we let $T = \max\{E_1, E_3\} + \max\{E_2, E_3\} + E_3 + P$. The $\max\{E_1, E_3\}$ and $\max\{E_2, E_3\}$ terms serve the following purpose: as exam 3 covers all material in the course, a student that does well on it should get a good grade overall. For example, a student getting 0 points on exam 1, exam 2 and the project, but getting 30 points on exam 3 will get $T = \max\{0, 30\} + \max\{0, 30\} + 30 + 0 = 90$ which is an $A-$.

Exams will have bonus problems at the end that require some cleverness to solve. A correct answer to a bonus problem is worth $+1$ point; an incorrect answer doesn't lose a point, but a correct answer wins a point. By symmetry, exams will also have malus problems that every student should be able to answer (most often these will just be asking for basic definitions). An incorrect answer to a malus problem is worth -1 point; a correct answer doesn't gain a point, but an incorrect answer loses a point.

The Project

There will be a project involving the programming language FRACTRAN (http://en.wikipedia.org/wiki/FRACTRAN). This is an extremely simple language that uses prime exponents as registers. More details about the project will come after we have introduced prime numbers and factorization.

Homework

Homework does not count for points; however, since the exam problems will be similar to homework problems, it would be irrational to not work the assigned problems.

Further Considerations and Rules

- *Electronic devices*: The use of phones and electronic devices, except in an emergency or unless otherwise approved by the instructor, is disallowed in class. The use of any electronic device, except those explicitly approved for use during any exam, will result a non-positive grade equal to the number of malus points on that exam. If in doubt, please inquire prior to using the electronic device.
- *Scheduling conflicts*: It is the student's responsibility to contact the instructor concerning any scheduling conflicts which may result in late papers, or other scheduling conflicts, e.g., an absence for an exam.

Course Outline Schedule

Fall 2013 classes are from Thursday, August 23 to Monday, December 10. The last day to drop classes is Monday, September 9. Semester holidays are on: Labor Day, September 2; Fall Break, Monday/Tuesday October 14–15; Thanksgiving, November 26 – November 29. The final exam is scheduled for Thursday December 12, from 14:00 to 16:00 in Maxcy 203. A schedule of all assignments due will be available on blackboard.

day	date	reading or task	assignment due
01	**Tu 08/27**	chapter 1	
02	**Th 08/29**	chapter 2	1.2, 1.3, 1.4, 1.6
03	**Tu 09/03**	chapters 3 and 4	2.1, 2.2, 2.7, 2.8
04	**Th 09/05**	chapter 5	TBD
05	**Tu 09/10**	chapter 6	TBD
06	**Th 09/12**	chapter 7	TBD
07	**Tu 09/17**	exam 1	TBD

day	date	reading or task	assignment due
08	**Th 09/19**	FRACTRAN	TBD
09	**Tu 09/24**	exam 1 discussion	TBD
10	**Th 09/26**	chapter 8	TBD
11	**Tu 10/01**	chapter 8 continued	TBD
12	**Th 10/03**	chapter 9	TBD
13	**Tu 10/08**	chapter 10	TBD
14	**Th 10/10**	chapter 11	TBD
15	**Tu 10/15**	no class	midterm break, 10/14 and 10/15.
16	**Th 10/17**	chapter 12	TBD
17	**Tu 10/22**	chapter 14, Lucas—Lehmer primality test	TBD
18	**Th 10/24**	chapter 15	TBD
19	**Tu 10/29**	chapter 16	TBD
20	**Th 10/31**	exam 2	TBD
21	**Tu 11/05**	magic squares	TBD
22	**Th 11/07**	exam 2 discussion	TBD
23	**Tu 11/12**	chapter 20	TBD
24	**Th 11/14**	chapter 21	TBD
25	**Tu 11/19**	chapter 35	TBD
26	**Th 11/21**	chapter 36	TBD
27	**Tu 11/26**	chapter 24	TBD
28	**Th 11/28**	no class	thanksgiving holiday, 11/26 to 11/29.
29	**Tu 12/03**	review	
30	**Th 12/05**	review	FRACTRAN project
31	**Tu 12/10**	no class	reading day
32	**Th 12/12**	exam 3	Thursday December 12, from 14:00 to 16:00.
33	**Tu 12/17**		

The Undergraduate Academic Calendar is found at http://www.newhaven.edu/academics/13324/, and the date for final exam dates can be found at http://www.newhaven.edu/academics/29258/. A summary of important dates can also be found at http://www.newhaven.edu/academics/12592/.

Department, College and University Expectations and Policies

Adding/Dropping a Class

Prior to the Add/Drop deadline, a student may withdraw from registration in the course through the Registrar's Office or system. The students name is removed from the class roll, and the instructor is not involved. After the Add/Drop period, a grade of W will be considered under appropriate circumstances. A grade of W will not be given once the final exam is attempted. The Add/Drop deadline is Monday, September, 9, as discussed at http://www.newhaven.edu/academics/13324/, and the University Add/Drop policy is outlined at http://www.newhaven.edu/academics/13324/.

Attendance

University attendance policy guidelines require that:

> All students are expected to attend regularly and promptly all their classes, appointments, and exercises. While the university recognizes that some absences may occasionally be necessary, these should be held to a minimum. A maximum of two weeks of absences will be permitted for illness and emergencies. The instructor has the right to dismiss from class any student who has been absent more than the maximum allowed. After the last date to drop as published in the academic calendar, a student will receive a failure (F), if failing at that point, or a W, if passing at the time of dismissal.

Students are to adhere to the policy attendance policy guidelines outlined in the University Catalog at http://www.newhaven.edu/academics/16648/.

Academic Integrity Policy

This class fully adheres to the Academic Integrity Policy:

> Academic integrity is a core university value that ensures respect for the academic reputation of the University, its students, faculty and staff, and the degrees it confers. The University expects that students will conduct themselves in an honest and ethical manner and respect the intellectual work of others. Please be familiar with the UNH policy on Academic Integrity. Please ask about my expectations regarding permissible or encouraged forms of student collaboration if they are unclear.

Students are required to adhere to the Academic Integrity Policies specified in the Student Handbook at http://www.newhaven.edu/academics/16246/.

Coursework Expectations

This course will require significant in-class and out-of-class commitment from each student. The University estimates that a student should expect to spend two hours outside of class for each hour they are in a class. For example, a three credit course would average six [6] hours of additional work outside of class. Coursework expectations are detailed at http://www.newhaven.edu/academics/16697/.

University Support Services

The University recognizes students often can use some help outside of class and offers academic assistance through several offices. In addition to talking with your instructor and advisor, we recommend you contact the Office of Academic Services (OAS) for help with your academic studies (call 203.932.7234 or visit Maxcy 208). The Center for Learning Resources (CLR) in Peterson Library is equipped to help you with writing, mathematics, biology and physics.

Special needs

Students with disabilities are encouraged to share, in confidence, information about needed specific course accommodations. The Campus Access Services office (CAS) provides comprehensive services and support that serve to promote educational equity and ensure that students are able to participate in the opportunities available at the University of New Haven. Contact 203.932.7331, Sheffield Basement, or http://www.newhaven.edu/student-life/CampusLife_StudentAffairs/Campus_Access_Services/.

Religious Observance Policy for Students

The University of New Haven respects the right of its students to observe religious holidays that may necessitate their absence from class or from other required university-sponsored activities. This class

fully adheres to these ideals and responsibilities:

> Students who wish to observe such holidays should not be penalized for their absence although, in academic courses, they are responsible for making up missed work. Instructors should try to avoid scheduling exams or quizzes on religious holidays, but where such conflicts occur, should provide reasonable accommodations for missed assignment deadlines or exams. If a class, an assignment due date, or exam interferes with the observance of such a religious holiday, it is the student's responsibility to notify the class instructor, preferably at the beginning of the term, but otherwise at least two weeks before the holiday. In a similar vein, students who will not participate in other required activities due to religious observance should notify the staff or faculty member who oversees the program with the same lead-time.

More information about religious observance policies can be found in the Student Handbook.