

CS 1800
Discrete Structures
Syllabus

MEET YOUR INSTRUCTOR

Dr. Mark Fienup, Associate Professor of Computer Science

Dr. Fienup is an Associate Professor of Computer Science. He received his B.A. from the University of Northern Iowa in Mathematics and Chemistry. He earned both his M.S. and Ph.D. in Computer Science at Iowa State University. He has been a faculty member of the Computer Science Department at the University of Northern Iowa since 1985.

Dr. Fienup regularly teaches Introduction to Computing, Data Structures, Discrete Structures, Computer Organization, and Computer Architecture. His current research activity centers on the Parallel Computing on Graphics Processing Units (GPU), and Computer Science Educational tools.

COURSE OVERVIEW

This course is a non-programming and assuming NO previous programming experience. It is intended for students thinking about majoring or minoring in Computer Science. The goal of this course is to prepare you mathematically for "Discrete" topics needed by much of a Computer Science major or minor.

COURSE OBJECTIVES

After this course, you should have developed the mathematical maturity to:

- Understand and create a correct mathematical arguments (i.e., *proofs*)
- Understand the terminology and important properties of discrete structures: sets, functions, sequences, and summations.
- Understand the meaning of an *algorithm* and the ability to analyze an algorithm to determine its computational complexity (big-oh and big-Theta notation)
- Understand mathematical induction and recursion
- Understand the basics of counting: pigeonhole principle, permutations, and combinations
- Apply the inclusion-exclusion principle for common counting problems
- Understand an introduction to discrete probability and expected value
- Develop recurrence relations for divide-and-conquer algorithms and to determine their complexity using the *Master* Theorem.
- Understand relations, their closures, their properties, and applications to databases

COURSE ORGANIZATION

Prerequisites: None

Textbooks:

Kenneth H. Rosen, *Discrete Mathematics and Its Applications*, Seventh Edition, 2012, ISBN-13: 978-0-07-338309-5

Student's Solution Guide to accompany Discrete Mathematics and Its Applications, Seventh Edition, 2012, ISBN-13: 978-0-07-735350-6.

Assignments:

Assignments are organized around sections of chapters 1 through 9 of the textbook which you should cover sequentially. For each chapter, you should follow these steps:

- 1) read the chapter sections thoroughly.
- 2) work through the *homework assignment* related to the chapter. Each homework assignment will consist of problems and short-answer questions selected from the even-numbered textbook exercises. Often you will want to look at the solution to similar exercises for the odd-numbered problems in the *Student's Solution Guide*. You may use a word processor program (Word, Open-Office, etc.) to electronically develop your homework solution, but you might find it easier to write your solutions using pencil-and-paper and submitting a scan or digital photographs. Either way, please number your pages and submit an electronic version of your homework assignment via the **Assignments** tool.
- 3) take the True/False and Multiple Choice *chapter quiz* via the **Assessments** tool.
- 4) take the practice test for the chapter at the end of the *Student's Solution Guide*. The *Student's Solution Guide* contains solutions to these practice tests.

Examinations:

There will be two proctored exams. A mid-term exam after chapters 1 through 4 and a Final exam covering chapters 5 through 9. Examination request forms are included at the appropriate places in the **Course Content**. In preparation for these tests, it is highly recommended that you take the practice tests at the end of the *Student's Solution Guide*. The *Student's Solution Guide* contains solutions to these practice tests.

Mid-Term/Test 1 Course Schedule:

Unit/Home work Assignment	Chapter Sections	Section Exercises
1	1.1	8c-g, 14, 16, 18, 24acdf, 32, 44
	1.2	2, 8, 12, 14, 40, 42
	1.3	6, 8, 14, 24, 46, 48
	1.4	2, 8, 10, 16, 24, 36, 38
	1.5	4, 10a-h, 14, 28, 38
	1.6	4, 10, 16, 24, 28
	1.7	2, 6, 18, 26, 38
	1.8	2, 8, 38
2	2.1	2, 6, 8, 16, 18, 20, 36
	2.2	2, 4, 18ace, 26, 32, 52, 54, 56, 58
	2.3	2, 4, 8, 12, 14, 22, 30, 36, 60, 66
	2.4	4, 26a-f, 30, 34, 44, 46
	2.5	2, 4
	2.6	2, 4, 10, 26
3	3.1	6, 34, 38, 46, 52, 56
	3.2	2, 12, 14
	3.3	2, 4, 18, 22, 26, 34, 36
4	4.1	10, 22, 28
	4.2	2, 4, 8, 12, 21ab, 24ab
	4.3	2, 4, 14, 24, 26
	4.4	Skip section 4.4
	4.5	2, 4, 6, 24, 32
Mid-Term Test 1: Covers Chapters 1 to 4 sections above		

Final/Test 2 Course Schedule:

Homework Assignment	Chapter Sections	Section Exercises
5	5.1	4, 16, 18, 32, 50
	5.2	4, 10, 14
	5.3	2, 8, 24
	5.4	2, 8, 16, 44, 50, 54
	5.5	Skip section 5.5
6	6.1	4, 10, 14, 26, 30, 40, 52, 64
	6.2	4, 16, 32, 44
	6.3	4, 10, 20, 32
	6.4 & 6.5	Skip sections 6.4 & 6.5
	6.6	2, 6, 8
7	7.1	6, 10, 14, 24, 26, 28, 34, 36
	7.2 & 7.3	Skip sections 7.2 & 7.3
	7.4	2, 4, 6, 8, 10
8	8.1	2, 8, 14, 24
	8.2	Skip section 8.2
	8.3	8, 12, 18
	8.4	Skip section 8.4
	8.5	2, 8, 10, 20
	8.6	Skip section 8.6
9	9.1	2, 4, 12, 30, 32
	9.2	4, 10, 12, 16, 18, 28
	9.3	2, 4, 8, 14, 22
	9.4	6, 18abcde, 26c, 28c
	9.5 & 9.6	Skip sections 9.5 & 9.6
Final/Test 2: Covers Chapters 5 to 9 sections above		

Grading policy:

Course components are weighted as:

On-line Chapter Quizzes:	25 %
Homework Assignments:	25 %
Mid-term/Test 1:	25 %
Final/Test 2:	25 %

Course grades will be assigned based on the following grading scale:

100 - 90	A
89 - 80	B
79 - 70	C
69 - 60	D
Below 59	F

Plus and minus grades will be assigned for scores within two percentage points from a grade cutoff (e.g., 91.9 to 90 is an A-, and 89.9 to 88 is a B+).