

FOUNDATIONS OF DISCRETE MATHEMATICS

MAD 2104 Fall 2007

Text: *Logic and Proof* (Sherwood, Norman and Barr). UCF bookstore has it.

Also required: *The Discrete Companion*, available as PDF on the web site below.

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Office Hours: MW 9:30-11:00, F 9:30-11:30

Web Site: <http://pegasus.cc.ucf.edu/~caron> (click on Discrete Math.)

Exams: There will be 4 exams. The 4th test may be given during Finals Week. No grades will be dropped and only University approved makeups can be given. No exceptions can be made for early travel, etc. Please plan accordingly.

Other grade considerations: Attendance will be taken regularly. Poor attendance could lower your grade. Also, there will be turn-in problems. These will comprise up to 10% of your grade. All work turned in must be your own. **Note:** no +/- grades will be used in this class. The NC grade is not available in this class

Disclaimer: All information in this syllabus is subject to change. Please pay attention in class for any changes.

Assignments: Line numbers refer to **class number**. Each assignment is due **next** class. Problems in **bold underline** are to be turned in the next class. They will be graded. (Note: page numbers refer to the Text, DC refers to the Discrete Companion)

1. Assignment: GET THE BOOK. Do p.6 (all), p.16,17 (1,3-6)
 2. Assignment: pp.16, 17 (2,**7**,8,10,12,15,18,20)
 3. Assignment: p.23 (1,3), Exer 2 from DC
 4. Assignment: pp.35,36 (2,**3**,9,10), Exer 3 from DC
 5. Assignment: pp.36,37 (4-8) (Hint for 6: use Addition Taut. twice)
 6. Assignment: pp.41,42 (1,2,3,**4**,5,11,12), Exer 4 from DC
 7. Assignment: p.47 (1-4,6,10), Exer 7 from DC
 8. Assignment: p.54 (4,**5**,1,2,6 - recommended order)
 9. Assignment: p. 57 (1,2,5,6,7)
 10. Review day. Suggestion: complete DC through Chapter 2.
 11. **Test 1**. Projected date: Fri, Sept 14 (subject to change - stay tuned)
- NOTE Assignment for next class:** read pp. 59-63, do 1-6, p. 64.

12. Assignment: p.67 (1,3,4,6,7,8,10,12)
13. Assignment: p.82 (4,6,**7**,9,13,18), Exer 17 from DC, learn Logician's Oath
14. Assignment: pp.81,82, (1,3,8,11,**14** [do not use FED in #14],15,16) Challenge: #12
15. Assignment: pp.89,90 (1,3,6,8-12)
16. Assignment: pp.97,98 (1,**2**,3-5,7)
17. Assignment: pp.98,99 (10 w/o IP[see Examples 3.18 and 3.35],11-13)
18. Assignment: pp.98,99 (14, 16,18(inv),19(val))

19. Review day. Suggestion: complete DC through Chapter 3.
 20. **Test 2.** Projected date: Fri., Oct 5 (subject to change - stay tuned).
- NOTE Assignment for next class:** Read sec. 4.1-4.4 and do pp. 103-4 (1a,c,d,2), p.105 (1), p.106 (1-4), pp. 107-8 (1,3,4)
21. Assignment: Exer 32 in DC; in text, complete T4, T5, T6.
 22. Assignment: In text, finish T7, do **T8**, T9, T11 (4 steps), T12.
 23. Assignment: a) Demonstrate: $\vdash A \subset B \leftrightarrow \overline{B} \subset \overline{A}$ (4 steps, “biconditional method”)
 - b) do T14 (begin as in text, 5 steps)
 - c) do demonstration of T15 using T6 (also, use shortcut discussed in class)
 - d) Exer 34 in DC.
 - e) Exer 35 in DC.
 24. Assignment: Finish demo. of T17; do T19, **T21**, T23 and T26 using no theorem after T18 .
 25. Assignment: Do T27, T28, T29 and T31.
 26. Introduction to informal proofs. Assignment: Exercises 38 - 42 in DC.
 27. Informal proofs. Assignment: Exercises 43 - 47 in DC.
 28. Introduction to Strings. Assignment: Exercises 50-59 in DC.
 29. Strings. Assignment: Exercises 60-66 in DC.
 30. Review day
 31. **Test 3.** Projected date: Wed, Oct 31 (subject to change - stay tuned).
 32. Assignment: Read Ex. 1, p. 177, and Ex. 5, p. 180; do pp. 182-3 (1-4, informal PMI)
 33. Assignment: p.183 (10, 11), Exer. 70 in DC.
 34. Assignment: p.183 (6-9), Exer. **71** in DC.
 35. Induction in DC. Assignment: Exer. 72-77.
 36. Induction in DC. Assignment: Exer. 81-88
 37. Assignment: pp. 147-8, (4, 5, 6, 12, 13, 14); learn Definition 5.6.
 38. Assignment: Read Examples 5.9 and 5.10; do p.148 (7, 8); do Exer. 67 in DC.
 39. Assignment: p.154 (3, 5), Exer. 68 in DC.
 40. Assignment: pp. 158-9 (7, 8, 9, 10), Also:

Exercise A: Let F be the function whose domain is \mathbb{R} and whose value at any $x \in \mathbb{R}$ is given by the formula $F(x) = |x + 2|$. Prove F does not map \mathbb{R} onto \mathbb{R} .
 41. Assignment: pp. 166-7 (5, 8, 9, 10) Also:

Exercise B: Let F be the function whose domain is $D = [0, \infty)$ and whose value at any $x \in D$ is given by the formula $F(x) = x^2$. Prove $F : [0, \infty) \xrightarrow{1-1} \mathbb{R}$.
 42. TBA

Test 4 TBA (possibly Mon, Dec 3)