

FOUNDATIONS OF DISCRETE MATHEMATICS
MAD 2104 Spring 2006

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.

Instructor: Dr. Richard Caron (caron@math.ucf.edu) **Phone:** 823-2064

Office: MAP 236 **Office Hours:** WF 1:30-2:20, MWF 10:30-11:20

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

Exams: There will be 4 exams including a Final 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 - no collaboration is allowed. **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 for credit next class. (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**,1,3,6 - 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, Feb 3 (subject to change - stay tuned)
- 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 (1,3,5,6,8-12)
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],11-13,14, 16,18(inv),19(val))
18. Assignment: Read pp. 68-70, do p.71 (3-7), pp.89,90 (2,3,6,7,13)

19. Review day. Suggestion: complete DC through Chapter 3.
20. **Test 2.** Projected date: Fri, Feb 24 (subject to change).
- 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 and T21 using no theorem after T18; do **T22** and T24 using “double complement trick”; do T26 without reference to T25; do T25 using T26.
25. Assignment: Do T27, T28; do T31 without reference to T30; do T30 using T31 and “complement tricks” (6 steps)
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, Mar 29 (subject to change).
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. 69 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. 78-86
37. Induction in DC. Assignment: Exer. **87**, 88, 90, 92, 93
38. Assignment: pp. 147-8, (4, 5, 6, 12, 13, 14); learn Definition 5.6.
39. Assignment: Read Examples 5.9 and 5.10; do p.148 (7, 8, 10a)
40. Assignment: pp. 151 (9), p.154 (3, 5), Exer. 67 in DC.
41. 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} .
42. TBA

FINAL EXAM: Wed APR 26 10-12:50