CS317-001 Discrete Information Structures Spring 2019
MW 11:00 am – 11:50 am, EMS E190
DIS 601 W 2:00 pm – 3:45 pm, PHY 151
DIS 602 Th 12:00 pm – 1:45 pm, PHY 145
DIS 603 F 10:00 am – 11:45 am, EMS E212
DIS 604 F 12:00 pm – 1:45 pm, EMS E212

Instructor: Ichiro Suzuki, EMS 1219, 414-229-3718, `suzuki@uwm.edu`

Office Hours: Mon Wed 12:00 pm – 1:00 pm (till 5/9/19), or by appointment.

TA: Ritankar Mandal `rmandal@uwm.edu`, Mary Ejiwale `mejiwale@uwm.edu`, Julian Ziman `jfziman@uwm.edu`,

Office Hours TBA

Prerequisite: Math Placement A; C or better in CS250(P) (Introductory Computer Programming).

C or better in CS317 is required to take some other CS courses, including CS417, CS535 and CS537.

Course Homepage: D2L.

Textbook: K. Rosen, *Discrete Mathematics and its Applications, 8th Edition*, McGraw-Hill, ISBN 9781259676512.

Objectives: (Prof. Cheng) CS317 is one of the foundational classes in your CS curriculum. It is a direct or indirect prerequisite to courses in Algorithms, Theory of Computation, Compilers, Artificial Intelligence, Data Security, and Operating Systems. The class has three major themes:

1. *Mathematical Reasoning.* You will learn logic and proof techniques so you can show that a mathematical statement is true.
2. *Discrete Structures.* You will learn important mathematical structures – used to represent objects and their relationships – in Computer Science. These discrete structures include sets, functions, graphs, etc.
3. *Counting and Probability.* You will learn how to count! And once you know how to count, you will be able to compute the probabilities of various events. Both skills are important for designing algorithms.

Tentative Lecture Schedule: Discussion sections will mainly cover each week's lecture material and discuss HW problems.

1. Wed 1/23
   1.1 Propositional Logic
   1.2 Applications of Propositional Logic
2. Mon 1/28
   1.3 Propositional Equivalence
3. Wed 1/30
   1.4 Predicates and Quantifiers
4. Mon 2/4
   1.5 Nested Quantifiers
5. Wed 2/6
   1.7 Introduction to Proofs
   6.2 The Pigeonhole Principle (brief)
6. Mon 2/11
   1.7 Introduction to Proofs
   6.2 The Pigeonhole Principle (brief)
7. Wed 2/13
   5.1 Mathematical Induction
   2.4 Sequences and Summations (brief)
8. Mon 2/18
   5.1 Mathematical Induction
   2.4 Sequences and Summations (brief)

9. Wed 2/20
   2.1 Sets
10. Mon 2/25
    2.2 Set Operations
    8.5 Inclusion-Exclusion (brief)
    Some material may be covered in DIS.
11. Wed 2/27
    2.3 Functions
12. Mon 3/4
    2.5 Cardinality of Sets
    6.2 The Pigeonhole Principle (brief)
13. Wed 3/6
    10.1 Graphs and Graph Models
    10.2 Graph Terminology and Special Types of Graphs
    Review for Exam I in DIS 3/6, 3/7, 3/8
14. Mon 3/11
    Exam I
15. Wed 3/13
    10.3 Representing Graphs and Graph Isomorphism (brief)
    10.4 Connectivity
16. Mon 3/25
    10.5 Euler and Hamilton Paths
17. Wed 3/27
    10.5 Euler and Hamilton Paths
    10.7 Planar Graphs
18. Mon 4/1
    6.1 The Basics of Counting
19. Wed 4/3
    6.3 Permutations and Combinations
20. Mon 4/8
    6.4 Binomial Coefficients and Identities
21. Wed 4/10
    6.5 Generalized Permutations and Combinations
    Review for Exam II in DIS 4/10, 4/11, 4/12
22. Mon 4/15
    Exam II
23. Wed 4/17
    6.5 Generalized Permutations and Combinations
24. Mon 4/22
    7.1 An Introduction to Discrete Probability
    7.2 Probability Theory
25. Wed 4/24
    7.2 Probability Theory
26. Mon 4/29
    7.3 Bayes' Theorem
27. Wed 5/1
    7.4 Expected Value and Variance
28. Mon 5/6
    7.4 Expected Value and Variance
    Review for Final in DIS 5/1, 5/2, 5/3
29. Wed 5/8
    Left to finish any remaining topics
30. **Fri 5/17/19 10:00 – 12:00 Noon Final Exam**

Semester Grade:

1. Quizzes 5%
2. Homework 20%
3. Exam I (Mon 3/11/19 11:00 am – 11:50 am) 25%
4. Exam II (Mon 4/15/19 11:00 am – 11:50 am) 20%
5. Final Exam (Fri 5/17/19 10:00 AM – 12:00 Noon) 30%

The exams are closed books and notes. No electronic devices are permitted.

Grade scale (subject to adjustment): A for a total score (out of 100) of 93 or higher, A- for 90 or higher, B+ for 87 or higher, B for 83 or higher, B- for 80 or higher, C+ for 77 or higher, C for 73 or higher, C- for 70 or higher, D+ for 67 or higher, D for 63 or higher, D- for 60 or higher, and F for below 60.

Quiz Policies:

1. Quizzes are given in some DIS sessions.
2. No make-up quiz will be given. After all quiz scores are entered, the lowest (one) entry will be dropped. This policy is in place to give students flexibility in times of personal emergencies. Do not misuse it.

HW Policies:

1. Homework is due in class, at the **beginning** of lecture. No late homework will be accepted. After all homework

scores are entered, the lowest two entries will be dropped. This policy is in place to give students flexibility in times of personal emergencies. Do not misuse it.

2. You are allowed to collaborate with your peers. However, you must write up the solutions on your own and list your collaborators.
3. If you obtained your solution from a book, website, etc., you must indicate the title of the book and page number, the web address, etc. If this policy is violated, either deductions will be made or an academic misconduct report will be filed.

Other Policies:

1. If you miss a class, then please obtain notes and announcements from a fellow student. The course log in D2L may not always be updated in real time. Thus it is always best to talk to your classmates.
2. The exams are closed books and notes. No electronic devices are permitted unless otherwise instructed.
3. **You must obtain permission to miss an exam in advance.** Exceptions to this rule can be made only in extraordinary circumstances and only if you contact the instructor at the earliest possible opportunity via e-mail and phone at `suzuki@uwm.edu`, 414-229-3718 (Suzuki), 414-229-5252 (CS Department Secretary). ♣ Such permission will be given only for reasons that we consider legitimate, and only if an acceptable evidence is submitted. No arrangements will be made for missed exams (and you will receive a score of zero) unless these rules are followed. ♣ How we let you make up for what you legitimately miss will be determined on a case-by-case basis. Your missing score may be estimated based on your other actual scores.
4. Requests for assignment/exam grading reconsideration and reports of a missing score must be submitted within one week after the scores of the assignment/exam in question are made available to the class. After one week they will not be considered.
5. As per UWS Board of Regents Policy Doc. 77-5, no recording of the lectures is allowed without prior permission of the instructor.
6. If you have ARC approved accommodations, please contact the instructor during the first week of classes.
7. If you need accommodations for religious holidays and observances, please notify the instructor within the first three weeks of the beginning of classes (within the first week of summer session) of the specific days or dates on which you will request relief from an examination or academic requirement. (UWS 22 and UWM Fac. Doc. 1918)
8. Submitting someone else's work and calling it your own (as well as assisting others in such an act) is **academic misconduct**. Instances of academic misconduct will be handled according to Academic Misconduct Policies & Procedures. For more information, see `http://uwm.edu/deanofstudents/conduct/conduct_procedures/academic-misconduct/`
9. Please include **the course number** in the subject line in all correspondence.