

**Portland State University**  
**CS 250**  
**Discrete Structures I**  
**Fall Quarter 2013**

CRN: 11019      Sec: 005  
Time: Monday      17:30 – 21:10  
Location: EB 325  
Instructor: Professor Bryant York  
Email: [york250@cs.pdx.edu](mailto:york250@cs.pdx.edu)  
Office: FAB 120-25  
Office Hours: Monday 12:00 – 14:00  
TA: Office Hours:      Rm:  
Text: Theory and Problems of Discrete Mathematics (3<sup>rd</sup> Edition), Lipschutz and Lipson, Schaum's Outline Series, McGraw-Hill, New York, 1997.  
(L&L)  
Mathematical Structures for Computer Science (6<sup>th</sup> Edition), Judith L. Gersting, W. H. Freeman & Co., New York, 2007 (GER).

**Catalog Description:**

Introduces discrete structures and techniques for computing. Sets. Graphs and trees. Functions: properties, recursive definitions, solving recurrences. Relations: properties, equivalence, partial order. Proof techniques, inductive proof. Counting techniques and discrete probability.

**Goals:** <http://www.pdx.edu/computer-science/cs-250-discrete-structures-i>

**Prerequisites: None**

- Recommended: High School Algebra I, II, High School Geometry

**Grading:**

Laboratory/class work	30%
Quiz 1	10%
Quiz 2	10%
Quiz 3	10%
Final Examination	40%
Total	100%

**Letter Grades:**

Letter Grade	Score Range		C+	70 - 74
A	95 - 100		C	60 - 69
A-	90 - 94		D+	55 - 59
B+	85 - 89		D	50 - 54
B	80 - 84		D-	45 - 49
B-	75 - 79		F	< 45

## Class/Lab Sessions

Date	Lab Topics	Readings in L&L	Readings in GER	HW Due
9/30	Overview; HS math review; Properties of Integers	Ch. 11, (except 11.3), Ch. 1	Ch 3.1, p.187-202	
10/7	<b>Review properties of Integers</b> Sets, subsets, Venn diagrams, algebra of sets, power sets, partitions, counting principle, cardinality	Ch. 2	Ch 4.1 p. 286 - 301	HW1
10/14	<b>Review of set theory</b> <b>Quiz 1</b> Relations, Cartesian products, composition, closure properties, types of relations, binary relations, n-ary relations	Ch. 3	Ch 4.4 p. 331 - 354	HW2
10/21	<b>Review of Integers, Set Theory, Relations</b> Functions, into, onto, 1-1, invertible, finite differences, math functions, polynomials, exponential, logarithmic, growth of functions	Ch. 5, Ch. 6, 6.1-6.5	Ch 3.2 – 3.4 p. 211 - 246	HW3
10/28	<b>Review of Integers, Sets, Relations, Functions</b> <b>Quiz 2</b> Counting principles, factorial, permutations, combinations, inclusion-exclusion, binomial coefficients, ordered and unordered partitions, Big Oh notation.	Ch. 7	Ch 3.5 – 3.6 p. 252 - 270	HW4
11/4	<b>Review of Integers, Sets, Relations, Functions, Counting</b> Finite Probability spaces, Sampling, Independent events, Independent repeated trials, Binomial distribution, Random variables	App A	Ch 4.6, p.382-390	HW5
11/11	<b>Holiday</b>			
11/18	<b>Review of Integers, Sets, Relations, Functions, Counting, Discrete Probability</b> <b>Quiz 3</b> Vectors and Matrices	Ch. 11, sec 11.3	Ch 2.2, p.100-111	HW6
11/25	<b>Review of Integers, Sets, Relations, Functions, Counting, Discrete Probability, Vectors/Matrices</b> Proof by Mathematical Induction	REVIEW	REVIEW	HW7
12/2	<b>Review of Integers, Sets, Relations, Functions, Counting, Discrete Probability, Vectors/Matrices, Mathematical Induction</b>	REVIEW	REVIEW	HW8
12/9	<b>Final Exam</b>			

### **Class/Lab Structure**

- Review of Signaled Problems
- Individual Problem Solving
- Team Problem Solving
- Reinforcement Individual Problem Solving
- Individual Problem Construction
- Computational Considerations
- Challenge Problem Session

### **Signaling Procedure**

- Students may send an email to the instructor containing the chapter and number or a description of the problem that he/she cannot understand or solve.
- A maximum of one problem per student can be submitted each week.
- Problems must be submitted by 5PM PT on Thursday in order to have a chance of being reviewed during the class on the following Monday
- As many problems as possible will be reviewed during the first 30 minutes of each class.

### **Class Participation**

- 30% of the grade is allotted for class participation.
- Each class is worth 10 points for a total of 90 points.
- There is a deduction of 1 point for every minute that a student is late.
- Student must participate in the entire class to get full credit.
- There is a deduction of 1 point for every minute that a student leaves class early.
- Late or missed class points **cannot** be made up.

### **Extra Credit Problems**

- From time to time extra credit problems may be posed during the Challenge portion of class.
- Extra credit problems may require computer programming.
- Extra credit cannot substitute for absence of base credit.
- Extra credit is used as a factor in deciding borderline grades.

## Homework

### HW1

1. Read L&L Chapter 11 Properties of Integers, Sections 11.1 – 11.2, 11.4 – 11.9
2. Review Solved Problems 11.1 – 11.7, 11.14 -11.19 – 11.23, 11.31-11.33, 11.38,11.39,11.41,11.43,11.45,11.46,11.49,11.51 – 11.55

### HW2

1. Read L&L Chapter 1 Sets, except section 1.8 on Mathematical Induction
2. Review Solved Problems 1.1 - 1.23

### HW3

1. Read L&L Chapter 2 Relations
2. Review Solved Problems 2.1 – 2.7, 2.9, 2.10, 2.13,2.16,2.18,2.19

### HW4

1. Read L&L Chapter 3 Functions and Algorithms, Sections 3.1 – 3.8
2. Review Solved Problems 3.1 – 3.6, 3.8, 3.10,3.11,3.15-3.19,3.20,3.22,3.23

### HW5

1. Read L&L Chapter 5 Techniques of Counting
2. Read L&L Chapter 6, Sections 6.1 – 6.5
3. Review Solved Problems 5.1-5.4, 5.7 – 5.18, 5.19 – 5.26, 5.27,5.30
4. Review Solved Problems 6.1 – 6.9

### HW6

1. Read L&L Chapter 7 Probability, Sections 7.1 – 7.7
2. Review Solved Problems 7.1 - 7.14, 7.15 – 7.21, 7.23 – 7.26,7.28-7.30, 7.32,7.33,7.35,7.36

### HW7

1. Read L&L Appendix A: Vectors and Matrices
2. Review Solved Problems A.1 – A.25

**Week 9:** HOLIDAY

### HW8

1. Read L&L Chapter 11, Sec 11.3
2. Review Solved Problems, 11.9 - 11.15

**Examinations:**

All exams and quizzes will be “closed book” and “closed notes”, and will be administered in the classroom or in one or more alternate rooms that will be posted prior to the exam. Backpacks, cell phones, laptops, tablets and any other communications device cannot be used during the exam. Whether or not calculators will be allowed will be announced prior to each exam. If a student wishes to leave the examination room for any reason after the exam has begun, the student must turn in his/her examination to the proctor and the examination is over for the student at that time. Makeup exams will not be given except in cases of severe medical or family emergencies. If an emergency arises and you are going to miss an exam or quiz, contact the instructor **BEFORE** the exam to arrange for a special circumstance.

**Workload**

The normal workload required for success in this course is three (3) hours of preparation outside of class for each hour (1) of class. Since the class meets for 3 hours and 40 minutes each week, students are expected to work 11 hours per week outside of class on the material for this course.

**Computing Resources**

Computer programming is not required in this course; however, some students may wish to solve some of the challenge problems by writing computer programs. This is strongly encouraged but not required. Students may code problems in any language of their choice; however, if the student wishes to have their code graded for extra credit then it must be written in one of the following languages: C, C++, Java, or Haskell. The CS department's Solaris and Linux networks will work fine for this. Your own home machine or laptop will probably work fine as well; however, your code must run on one of the CS Department's Solaris or Linux machines for grading purposes.

**Students Requiring Accommodation:**

If you are a student with a disability in need of academic accommodations, you should register with Disability Services for Students and notify the instructor immediately to arrange for special support and examination services.

**Cheating:**

Cheating of any kind is **unacceptable!** All written homework and programming projects are individual assignments. It is expected that each student will do his/her own work. It is permissible to discuss the assignments with other students, but each student must work out his/her own assignment solutions. The code turned in by a student must be his/her own. The penalty for cheating of any kind is a score of zero for the entire assignment or exam. Further action by the appropriate academic disciplinary committees may also be undertaken. If you have any questions about what is or is not appropriate, please contact the instructor.

## Staying In Touch

Keep an eye on the course web page for late-breaking announcements! Also, all students should subscribe to the course's mailing list [cs250ylist@cs.pdx.edu](mailto:cs250ylist@cs.pdx.edu); the subscription page for this list will be accessible from the course home page soon. The instructor will use this list to communicate important announcements, homework hints, etc.

## Other Resources:

- *Discrete Structures, Logic, and Computability* by James L. Hein, Jones and Bartlett Publishers, 2010 (Third Edition)
- *REA Problem Solvers: Finite and Discrete Math*, (revised Edition) 1985.
- *Discrete Mathematics with Graph Theory*, (3<sup>rd</sup> Ed), E. Goudaire and M. Parmentter, Prentice-Hall, 2006.
- *Discrete and Combinatorial Mathematics*, R. P. Grimaldi, Addison-Wesley, 1985.
- Khan Academy videos: <http://www.khanacademy.org/>