Professor: *Moses Boudourides* **Office**: Link 104

Hours: TuTh 11:00AM-12:00PM, WeFri 3:00PM-5:00PM

Classroom: Trailer - Observatory Green **Schedule**: MoWe 10:00AM – 11:30AM

Labs: Mo 1:00PM – 2:00PM & 2:00PM – 3:00PM & 3:00PM – 4:00PM in Hilles 110

Teaching assistants: Hunter Loftis (hours: Tu: 6:00PM-7:00PM, Su: 4:00PM-6:00PM); Isaac Wasserman (hours: We 8:00PM-9:00PM, Fr: 1:00PM-2:00PM, both via Zoom at https://haverford.zoom.us/j/98671387129); Fatima Irfan (hours: Mo 6:15PM-7:15PM, Sa 2:30-3:30PM); Mia Ellis-Einhorn (hours: We: 4:30PM-5:30PM, Su: 3:00-4:00PM).

Required Textbook: *Discrete Mathematics: Introduction to Mathematical Reasoning* by Susanna Epp, 1st Ed. ©2011 Cengage. Be sure to get this shorter and less expensive "Brief Edition" (ISBN 0-495-82617-0).

Optional Supplement: *Student Solutions Manual and Study Guide for Discrete Mathematics: Introduction to Mathematical Reasoning* by Epp and Jenkyns. This is specifically for the brief edition (ISBN 0-495-82618-9).

Prerequisite: none (well, high school algebra, technically; you also need to know what a number is).

Corequisite: An introductory computer science course (or trying to enroll in one and being shut out).

Course Description: An introduction to discrete mathematics with strong applications to computer science. Topics include set theory, functions and relations, propositional logic, proof techniques, difference equations, graphs, and trees.

Materials: Moodle: https://moodle.haverford.edu/course/view.php?id=1069

Homework: There will be weekly problem sets with a combination of easy, moderate, and difficult problems. *Homework is always due at Sunday midnight, and no unexcused late homework will be accepted*. You must show your work to receive credit for a problem, and it is in your best interest to do so since partial credit may be awarded even for an incorrect answer. If a problem is too difficult, show how far you got, don't just leave it blank! Extra credit may also be awarded for the harder problems (marked with an asterisk). Aside from attending class, doing the homework is the most important factor for succeeding in this course.

Problem section: The Monday discussion sections will go over solutions to previous assignments as well as solving practice problems in class to provide guidance on current assignments.

Grading:

Participation	10%	(problem sessions)
Homework	30%	(12 assignments)
Midterms	30%	(2 examinations)
Final exam	30%	(1 comprehensive)

Rules and regulations: Although everything turned in for a grade must be your own work, collaboration is permitted and encouraged. *Ideas* on how to solve homework problems may be exchanged orally, but *not* specific detailed *written* solutions. You should also acknowledge any collaborators on your assignment. Electronic devices are not permitted in class, unless you are taking notes using a stylus on a tablet computer.

Accessibility: Haverford College is committed to providing equal access to students with a disability. If you have (or think you have) a learning difference or disability – including mental health, medical, or physical impairment, please contact the Office of Access and Disability Services (ADS) at hc-ads@haverford.edu. The Coordinator will confidentially discuss the process to establish reasonable accommodations.

Accommodations: Students who have already been approved to receive academic accommodations and want to use their accommodations in this course should share their verification letter with me and also make arrangements to meet with me as soon as possible to discuss the specific accommodations. Please note that accommodations are *not retroactive* and require advance notice to implement.

Recordings: It is a state law in Pennsylvania that individuals must be given advance notice if they are to be recorded. Therefore, any student who has a disability-related need to audio record in this class must first be

<h1 style="text-align:center">Tentative Schedule</h1>

approved for this accommodation from the Coordinator of Access and Disability Services and then must speak with me. Other class members will need to be aware that this class may be recorded.

Week	Date	Topic	Reading	Assignment
1	1/19	Introduction, Basic terminology; Logic of Compound Statements	Chapters 1,2	*HW 1,2 due 1/26*
2	1/24	Predicates and Quantified Statements I, II	3.1, 3.2	*HW 3 due 1/31*
	1/24	*General discussion; Practice problems*		
	1/26	Multiple Quantifiers and Arguments	3.3, 3.4	
3	1/31	Direct Proof and Counterexample I, II	4.1, 4.2	*HW 4a due 2/7*
	1/31	*General discussion; Practice problems; Solutions to previous HWs*		
	2/2	Direct Proof and Counterexample III, IV	4.3, 4.4	
4	2/7	Indirect Arguments I, II	4.5, 4.6	*HW 4b due 2/14*
	2/7	*General discussion; Practice problems; Solutions to previous HWs*		
	2/9	Sequences, series, and products	5.1	
5	2/14	Mathematical Induction I	5.2	*HW 5a due 2/21*
	2/14	*General discussion; Practice problems; Solutions to previous HWs*		
	2/16	Mathematical Induction II	5.3	
6	2/21	Strong Induction, Well-Ordering Principle	5.4, 5.5	*HW 5b due 2/28*
	2/21	*General discussion; Practice problems; Solutions to previous HWs*		
	2/22	Solving Recurrence Relations by Iteration	5.6	
7	2/28	Set Theory	6.1, 6.2	
	2/28	*General discussion; Practice problems; Solutions to previous HWs*		
	3/2	Disproofs and Algebraic Proofs, Boolean Algebras and Russell's Paradox	6.3, 6.4	**Midterm 1** (on Chapters 1-5)
		Fall Break		
8	3/14	Functions and their inverses	7.1, 7.2	*HW 6 due 3/21*
	3/14	*General discussion; Practice problems; Solutions to previous HWs*		
	3/16	Composition of Functions, Cardinality	7.3, 7.4	
9	3/21	Relations	8.1	*HW 7 due 3/28*
	3/21	*General discussion; Practice problems; Solutions to previous HWs*		
	3/23	Reflexivity, Symmetry, and Transitivity; Equivalence Relations	8.2, 8.3	
10	3/28	Modular Arithmetics	8.4	*HW 8 due 4/4*
	3/28	*General discussion; Practice problems; Solutions to previous HWs*		

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	3/30	The Euclidean algorithm	8.5	
11	4/4	Counting and Probability	9.1	
	4/4	*General discussion; Practice problems; Solutions to previous HWs*		
	4/6	The Multiplication and the Addition Rules	9.2, 9.3	**Midterm 2** (on Chapters 6-8)
12	4/11	The Pigeonhole Principle	9.4	*HW 9 due 4/18*
	4/11	*General discussion; Practice problems; Solutions to previous HWs*		
	4/13	Combinations, Pascal's Formula and the Binomial Theorem	9.5, 9.6	
13	4/18	Graphs	10.1	*HW10 Due 4/25*
	4/18	*General discussion; Practice problems; Solutions to previous HWs*		
	4/20	Trails, Paths, and Circuits	10.2	
14	4/25	Trees	10.3	
	4/25	*General discussion; Practice problems; Solutions to previous HWs*		
	4/27	Rooted Trees	10.4	
15	5/6	**End of exam period (at noon)**		**Final Exam** (on Chapters 9-10)