Massasoit Community College

Course: Discrete Math
Course Number: MATH 218 - xx
Semester:
Classroom:
Day and Time:

Instructor:
Office:
Email:
Phone:
Office Hours:

Course Description: This course is designed to give necessary mathematical background to students in computer science programs. Topics include logic, sets, basic number theory, induction and recursion, counting, relations, and graphs. Prerequisite: C- or higher in MATH217 Precalculus; waiver by placement testing results; or departmental approval.

Required Text and Materials: Discrete Mathematics and Its Applications (Seventh Edition) by Rosen. Published by McGraw-Hill

Teaching Procedures: This course will be taught in a lecture/discussion format with ample opportunity for student questions. Generally, class will begin with a question and answer session on the most recent homework assignment. New material will then be presented in a lecture format and homework be assigned to reinforce the topics covered in class.

Instructional Objectives:

COURSE OUTCOMES	**SAMPLE OUTCOMES ACTIVITIES**	**SAMPLE ASSESSMENT TOOLS**
Upon successful completion of this course students should:	To achieve these outcomes students may engage in the following activities:	Student learning may be assessed by:
1. Demonstrate an understanding of logic and proofs; (QL)	• Express written statements as statements using propositional logic notation • Use propositional logic to determine truth values of statements • Examine strategies for writing mathematical proofs and for avoiding mistakes in writing proofs	• Homework • In-class problem sets • Quizzes • Exams
2. Demonstrate an understanding of set notation, matrices, and functions; (QL)	• Use set notation to represent a collection of objects • Perform set operations • Examine properties and operations of functions • Develop notation for sequences and summations • Examine notation and operations involving matrices • Describe growth rates of functions using big-O notation	• Homework • In-class problem sets • Quizzes • Exams

3. Demonstrate an understanding of necessary concepts from introductory number theory; (QL)	• Perform operations using modular arithmetic • Convert numbers between different bases • Determine whether values are prime and use the Euclidean algorithm to find the greatest common divisor • Solve congruences	• Homework • In-class problem sets • Quizzes • Exams
4. Prove mathematical statements using induction; (QL)	• Determine when mathematical induction serves as an appropriate proof technique • Perform proofs by induction by constructing appropriate basis and inductive steps • Determine when strong induction or the well-ordering property should be used in proofs • Define functions recursively and perform proofs involving recursively defined functions	• Homework • In-class problem sets • Quizzes • Exams
5. Use counting techniques for problem solving; (QL)	• Use the product, sum, inclusion-exclusion, and division rules to solve counting problems • Use the Pigeonhole Principle to solve counting problems • Determine the difference between combinations and permutations and using each in solving counting problems • Solve applications of recurrence relations	• Homework • In-class problem sets • Quizzes • Exams
6. Demonstrate an understanding of the relationship between elements of sets; (QL)	• Determine when a relation is reflexive, symmetric, antisymmetric, and/or transitive • Represent relations using matrices and/or graphs. • Find equivalence classes	• Homework • In-class problem sets • Quizzes • Exams
7. Demonstrate an understanding of graphs; (QL)	• Examine definitions and terminologies of basic graph theory • Construct graphs • Classify paths and connectivity of graphs • Determine whether a graph has an Euler circuit or an Euler path • Determine whether a graph has a Hamiltonian path	• Homework • In-class problem sets • Quizzes • Exams

This course includes the following core competencies: Quantitative Literacy (QL).

Basis for Student Grading: Grades for this course will be assigned as follows:

Grade	Average
A	93%-100%
A-	90%-92%
B+	87%-89%
B	83%-86%
B-	80%-82%
C+	77%-79%

Grade	Average
C	73%-76%
C-	70%-72%
D+	67%-69%
D	63%-66%
D-	60%-62%
F	0-59%

The grade you earn is the grade you will receive in this course. Grades are not negotiable. You will not be allowed to make up work, substitute alternative assignments, or submit extra assignments in order to improve your grade during the semester or after the semester ends.

Grades of incomplete are given only in situations when extenuating circumstances prevent a student from taking the final exam or fulfilling a specific requirement in the course. The grade of "I" cannot be used to give students additional time to complete course assignments in order to raise their grade.

Basis for Evaluating Student Performance: The grade for this course will be weighted based on the following categories:

- *Exams (70%)*: There will be four in-class exams given throughout the semester, approximately every 3 weeks. Exams must be taken during the regular class time and no make-up exams will be given. The lowest exam grade will be dropped. Your exam average will account for 60% of your final grade.
- *Final Exam (30%)*: The course will culminate in a cumulative final exam. It will be worth 30% of your final grade.

There is no extra credit available for this course.

Tentative Test Schedule/Assignment(s) Schedule:

Assignment:	Tentative Date:
Test 1	
Test 2	
Test 3	
Test 4	
Final Exam	

Attendance: Attendance for this course is mandatory. After the third absence, students will lose two points per absence thereafter from their final average. I will take attendance at the beginning of every class, and students not present at that time will be marked absent for the class, even if they show up late. If you must miss a regular class, you are still responsible for the material that was presented in class. The average student needs to attend all class meetings in order to be successful in this course.

Accommodations Statement: Massasoit's Disability Services office provides accommodations to students who qualify for services based on a documented disability. Students interested in accessing classroom or testing accommodations must contact Disability Services directly. In an effort to avoid any lapse in services, new and returning students are encouraged to contact Disability Services at the beginning of each semester to receive an Accommodation Letter for the current semester. Students on all campuses can contact Disability Services at 508-588-9100 X 2132 or by e-mail at DisabilityServices@massasoit.edu for further information or questions.

Title IX Statement: Massasoit Community College is committed to providing a safe learning and work environment for all. If you believe you have experienced discrimination, sexual harassment, sexual assault, domestic/dating violence, stalking, or retaliation, we encourage you to report it to *Yolanda Dennis, Chief Diversity Officer and Title IX Coordinator, Office of Diversity and Inclusion, at 508-588-9100, x1309 or* ODI@massasoit.edu. While you may talk to a faculty member, understand that as a "responsible employee" of the College, the faculty member must report what you share to the College's Title IX Coordinator. On and off campus resources and interim measures are available to assist you. Information about both of these policies can be found at www.massasoit.edu/title-ix and www.massasoit.edu/eeo. We are here to support you.

Academic Integrity: Academic dishonesty will not be tolerated. In particular, the use of cellphones is prohibited during exams and any use will result, at a minimum, of a grade of 0 for the exam. Please see the following URL for more information on the college's policies on academic integrity:
http://www.massasoit.mass.edu/admin_depts/college_policies/acad_honesty.cfm

Course Outline

Week/Dates	Scheduled Topical Coverage	Other Notes
Week 1	• Course Introduction • Section 1.1 (Propositional Logic) • Section 1.2 (Applications of Propositional Logic)	
Week 2	• Section 1.3 (Propositional Equivalences) • Section 1.7 (Introduction to Proofs) • Section 1.8 (Proof Methods and Strategy)	
Week 3	• Section 2.1 (Sets) • Section 2.2 (Set Operations) • Section 2.3 (Functions)	
Week 4	• Section 2.4 (Sequences and Summations) • **Exam 1**	
Week 5	• Section 2.6 (Matrices) • Section 4.1 (Divisibility and Modular Arithmetic) • Section 4.2 (Integer Representations and Algorithms)	
Week 6	• Section 4.3 (Primes and Greatest Common Divisors) • Section 4.4 (Solving Congruences) • Section 5.1 (Mathematical Induction)	
Week 7	• Section 5.2 (Strong Induction and Well-Ordering) • Section 5.3 (Recursive Definitions and Structural Induction) • Section 5.4 (Recursive Algorithms)	
Week 8	• Section 5.5 (Program Correctness) Optional • **Exam 2**	
Week 9	• Section 6.1 (The Basics of Counting) • Section 6.3 (Permutations and Combinations) • Section 8.1 (Applications of Recurrence Relations)	
Week 10	• Section 8.2 (Solving Linear Recurrence Relations) • Section 9.1 (Relations and Their Properties) • Section 9.2 (*n*-ary Relations and Their Applications)	
Week 11	• Section 9.3 (Representing Relations) • **Exam 3**	
Week 12	• Section 9.4 (Closures of Relations) • Section 10.1 (Graphs and Graph Models)	
Week 13	• Section 10.2 (Graph Terminology and Special Types of Graphs) • Section 10.3 (Representing Graphs and Graph Isomorphism)	
Week 14	• Section 10.4 (Connectivity) • **Exam 4**	
Week 15	• Section 10.5 (Euler and Hamilton Paths) • **Review for final**	
	• **Final Exam Period**	