Syllabus & Instructor Information Sheet Form

University of Puerto Rico at Mayagüez
College of Engineering

Fall 2014

ICOM 4075: Foundations of Computing

Lectures' time: **Time:** L/W 6:00-7:15 pm **Room**: S-228
(Section 120)

Course webpage: https://ecourses.uprm.edu/enrol/index.php?id=599
Office Hours: Office hours are for recitation class for solving problems (attendance in recitation classes is highly recommended) and for helping students with their doubts. A Doodle poll would be utilized to find a time for office hours such that the maximum number of students can attend. The time for office hours will be set upon the poll result and will be announced in the course webpage.

Instructor: Hiva Samadian
Office: The classroom TBA
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1. Course Description:

Discussion of discrete structures frequently encountered in computer science and engineering, with an emphasis in problem solving skills and algorithms. Topics include set theory, proof techniques, graphs and trees, functions, recursive functions and procedures, inductively defined sets, grammars, equivalence, inductive proof, counting, discrete probability, and their applications to computing problems.

2. Pre-requisites: None

3. Textbook, Supplies and Other Resources:

- Required:
  - Kenneth H. Rosen. **"Discrete Mathematics and its Applications"** McGraw Hill. Seventh Edition. ISBN-10: **0073383090**

- References:
  - James L. Hein, "**Discrete Structures, Logic, and Computability**", Second Edition, Jones and Bartlett, 2002.
  - D. J. Velleman, "**How to Prove It"**, Cambridge University Press, 1995.
  - W. K Grassmann and J-P Tremblay, **"Logic and Discrete Mathematics - A Computer Science Perspective,"** Prentice Hall, 1996.

4. Purpose:

Undergraduate computer science and software engineering core course. The purpose is to develop the mathematical maturity of students within a computer science and engineering context.

5. Course Goals:

At the end of this course, students will have the following skills:

1. Understanding of discrete structures concepts including logic and proofs, induction, combinatorial analysis and set theory, graph theory, probability, stochastic processes and computational models.
2. Ability to apply abstraction techniques in order to deeply understand and effectively attack computer science and engineering problems.
3. Ability to apply discrete structures to the formalization of computer science and engineering problems.
4. Ability to critique and judge different formal methods applied in computer science and engineering.
5. Awareness of the fundamental limits of computing.
6. Awareness of advanced concepts in computer science and engineering areas where formalization has been applied successfully.
7. Ability to communicate effectively with peers in computer science and engineering related disciplines.

6. Requirements:

1. Attendance
2. Quizzes
   The quizzes are taken during some lectures. They would not be announced in advance.
3. Assignments
   There are approximately 10 assignments that introduce recommended questions/problems to solve by students among which maximum 8 questions/problems in each assignment are marked as required so that the students need to submit their solutions for them.
4. Partial exams
   Three partial exams will be offered.
5. Final exam

7. Laboratory/Field Work (If applicable): None

8. Department/Campus Policies:

Please see the Campus Undergraduate Catalog for further information.

9. Grading:

Your final class score will be computed as a weighted average of your scores in all the required quizes, exams and assignments using the following weights:

1. Attendance 5%
   Attendance to class is compulsory as established by the UPR Regulations. Attendance will be evaluated not only based on the students' presence in the classroom but also based on their participation and contributions to class discussions as judged by the instructor.
2. Quizzes 10%
   All the quizzes will be graded.
3. Assignments 10%
   At least one problem in each assignment will be graded. The question(s) to be graded will be chosen by the instructors before handing out the assignments, but will remain secret until the due date.
4. Three partial exams 15% each (45% total)
5. Final Exam: 30%

Grades will be assigned according to the following scale:

Final Score	Grade
>= 90	A
>= 80	B
>= 65	C
>= 55	D
< 55	F

10. Tentative Agenda of the course:

PERIOD	TOPIC	Sections in Textbook
	CHAPTER 1	
1-2	Propositional Logic and applications	1.1, 1.2
3	Propositional Equivalences	1.3
4	Predicates and Quantifiers	1.4
5	Nested Quantifiers	1.5
6-7	Mathematical Proof Techniques	1.6-1.8
	CHAPTER 2	
8-9	Sets, Set Operations	2.1-2.2
10-11	Functions	2.3
12	Sequences, Summations	2.4
Exam1		
	CHAPTER 3	
13-14	Algorithms & Complexity	3.1-3.3
	CHAPTER 4	
15	Divisibilty & Modular Arithmatic	4.1
16	Primes andGreatest Common Divisors	4.3
	CHAPTER 5	
17-18	Mathematical Induction	5.1-5.2
19-20	Structural Induction	5.3
21-22	Recursive Algorithms	5.4
Exam 2		
	CHAPTER 6	
23	Counting Basics	6.1-6.2
24	Permutation & Combinations	6.3
	CHAPTER 8	
25	Recurrence Relations	8.1-8.2
26	Inclusion Exclusion	8.5
	CHAPTER 9	
27	Relations and Their Properties	9.1, 9.3
28	Equivalence Relations	9.5
Exam 3		
	CHAPTER 10	
29	Graphs Basics	10.1-10.3
30	Connectivity and Path Problems	10.4-10.6