

## CIIC 3075 - Course Syllabus

### 1. General Information:

Alpha-numeric codification: CIIC 3075  
Course Title: Fundamentals of Computing  
Number of credits: 3  
Contact Period: 3 hours of lecture per week

Equivalent Course: ICOM 4075

### 2. Course Description:

**English:** Discrete structures in computer sciences and engineering with emphasis on problem-solving skills and algorithms. Topics include: set theory, logic and proof techniques, graph theory, computability, and discrete probability applied to computing problems.

**Spanish:** Estructuras discretas en ciencia de computación e ingeniería con énfasis en destrezas de solución de problemas y algoritmos. Los temas incluyen: teoría de conjuntos, lógica y técnicas de demostración, teoría de grafos, computabilidad y probabilidad discreta aplicada a problemas de computación.

### 3. Pre/Co-requisites and other requirements:

Prerequisite: CIIC 3015 or CIIC 3011 or INGE 3016  
Corequisite: MATE 3031

### 4. Course Objectives:

Students will learn the fundamental mathematical and logical concepts and algorithms used in the modeling and analysis of computing systems. Students will work on the development of proof to find bounds on running times for algorithms and program invariants.

### 5. Instructional Strategies:

conference discussion computation laboratory  
seminar with formal presentation seminar without formal presentation workshop  
art workshop practice trip thesis special problems tutoring  
research other, please specify:

### 6. Minimum or Required Resources Available:

Students will use the Departmental facilities to complete course projects.

**7. Course time frame and thematic outline**

Outline	Contact Hours
Logical statements and predicates	3
Proof techniques	4
Sets and set operations	2
Ordered structures: tuples and lists,	4
Counting formulas and techniques	3
Graphs and trees	4
Relations and functions	4
Equivalence relations	2
Order relations	2
Topological sorting and well-founded orders	3
Inductively defined sets	2
Recursive functions	4
Proofs by induction	4
Tests	4
<b>Total hours: (equivalent to contact period)</b>	<b>45</b>

**8. Grading System**

Quantifiable (letters)  Not Quantifiable

**9. Evaluation Strategies**

	Quantity	Percent
<input checked="" type="checkbox"/> Exams	3	65%
<input checked="" type="checkbox"/> Final Exam	1	25%
<input checked="" type="checkbox"/> Short Quizzes	5-8	10%
<b>Oral Reports</b>		
<input type="checkbox"/> Monographies		
<input type="checkbox"/> Portfolio		
<b>Projects</b>		
<input type="checkbox"/> Journals		

<input type="checkbox"/> Other, specify:		
<b>TOTAL:</b>		<b>100%</b>

**10. Bibliography:**

1. Kenneth H. Rosen, *Discrete Mathematics and Its Applications: And Its Applications*, 7th ed., McGraw-Hill, 2011.
2. Susanna S. Epp, *Discrete Mathematics with Applications*, 4th ed., Cengage Learning, 2010.
3. Gary Chartrand, and Ping Zhang, *Discrete Mathematics*, Waveland, 2011.
4. Kirby McMaster, and Nicole Anderson, *Discrete Math with Programming: Better Together*, in Proc. 2007 ACM SIGCSE. <http://dx.doi.org/10.1145/1227504.1227348>. [Available via ACM Digital Library, UPRM General Library Databases]

**11. Course Outcomes**

Upon successful completion of this course, the student will be able to:	Program Outcomes
1. explain fundamental mathematical concepts applicable to computing	C1, E1
2. formulate basic mathematical proofs, including proofs based on contradiction and mathematical induction	C1, E1 C3, E3
3. apply mathematical structures and concepts to solve computing problems	C6

**12. According to Law 51**

Students will identify themselves with the Institution and the instructor of the course for purposes of assessment (exams) accommodations. For more information please call the Student with Disabilities Office which is part of the Dean of Students office (Office #4) at (787)265-3862 or (787)832-4040 extensions 3250 or 3258.

**13. Academic Integrity**

-The University of Puerto Rico promotes the highest standards of academic and scientific integrity. Article 6.2 of the UPR Students General Bylaws (Board of Trustees Certification 13, 2009-2010) states that academic dishonesty includes, but is not limited to: fraudulent actions; obtaining grades or academic degrees by false or fraudulent simulations; copying the whole or part of the academic work of another person; plagiarizing totally or partially the work of another person; copying all or part of another person answers to the questions of an oral or written exam by taking or getting someone else to take the exam on his/her behalf; as well as enabling and facilitating another person to perform the aforementioned behavior. Any of these behaviors will be subject to disciplinary action in accordance with the disciplinary procedure laid down in the UPR Students General Bylaws. —