University of Puerto Rico at Mayaguez
College of Engineering
Department of Computer Science and Engineering

Syllabus CIIC 5045: Automata and Formal Languages

Course Description

(3 credits, 3 contact hours) Study of basic theoretical models of computation and formal languages. Introduction to the theory of intractable and undecidable problems. Topics include: finite automata, regular languages, context-free languages, pushdown automata, Turing machine, halting problem, undecidability, and intractable problems.

Instructor

Jaime Seguel, PhD
Office Room: S-600
Phone: (787) 832-4040 Ext. 3523
Email: jaime.seguel@upr.edu (Email consultations are very welcomed. Please allow 24 hours to answer. Start your email subject with CIIC5045.)
Office Hours: Tuesday and Wednesday, 9:00 to 10:30 AM

Textbook: *"Introduction to the Theory of Computation"* Michael Sipser, 3rd Edition, Cenage (2013)

Lectures Notes: *Lectures Notes* based on this textbook will be made available timely.

Evaluation: There are **two midterm exams**, a **comprehensive final exam** and **homework assignments**.

i. Midterms are offered during class periods and are based on the material covered from the previous exam up to one week before the exam.
ii. Make up exams are offered only in cases where the student communicates her/his absence before the start of the exam and presents no later than a week after the exam, a reasonable[1] justification for not attending.
iii. A number between six to eight homework problems will be assigned. Unless instructed otherwise, reports are individual. Homework assignments are to be submitted before the specified deadline and in the specified format.
iv. Attendance is compulsory and will be taken in each class.

Grading is based on the scores from 0 to 100, each weighted as follows:

Evaluation activity	Weight
Class Attendance and Participation	05% (Excluding Oct. 30th – Nov. 8th)
Average of Midterm Exams	30%
Final Exam (Comprehensive)	25%
Homework	40%

Scores are translated to letter grades according with the next table:

Score	Grade
100 – 90	A
89 – 78	B
77 – 65	C
64 – 51	D
50 – 0	F

[1] The instructor will decide **on the basis of the evidence that has been provided** whether a justification is reasonable. In case of illness, medical certification is required. In case of a citation to a legal court, a copy of the citation is required; and in case of family grieving, medical death certificates or similar documents are also required.

Incompletes: Incomplete grades are not given by default. Students that request an incomplete must provide and document their justification for not completing all course requirements within the semester. At the time of assigning an incomplete the instructor will specify clearly the work that it is required to complete the course and a deadline for its delivery.

Exam Dates

Midterm	**Date** (tentative)	**Time**	**Room**
I	October 3rd, 2018	6:00 PM – 7:15 PM	S-228
II	November 28th, 2018	6:00 PM – 7:15 PM	S-228

Academic Integrity

Students are expected to follow the norms of **academic integrity**. In particular, the answers to exams and any other document submitted as part of the course evaluation must be the result of the student's work and not that of somebody else. An act of academic dishonesty results in an F and corrective actions. The "*Reglamento General de Estudiantes de la Universidad de Puerto Rico*" provides detailed information on academic integrity norms, procedures and sanctions.

Overview of Contents

Subject	References to the textbook
Introduction	Sec. 0.1
Strings and formal languages	Sec. 0.2
Regular languages	Sec 1.3
Finite state automata	Sec. 1.1, 1.2
Pumping lemma I	Sec. 1.4
Context-free grammars	Sec. 2.1
Chomsky normal form	Sec. 2.1
Pushdown automata	Sec. 2.2
Pumping lemma II	Sec. 2.3
Turing machine	Sec. 3.1, 3.2
Decidability	Sec. 4.1
Halting problem	Sec. 4.2
Reducibility	Sec. 5.1, 5.3
Time complexity classes	Sec. 7.1
P and NP classes	Sec. 7.2, 7.3
NP-Completeness and Cook-Levin Theorem	Sec. 7.4