The Islamic University of Gaza
Faculty of Information Technology
Department of Computer Science
Second Semester 2022-2023

الجامعة الإسلامية بغزة
كلية تكنولوجيا المعلومات
قسم علم الحاسوب
الفصل الثاني 2022-2023

COURSE SYLLABUS

CSCI 3304: Automata Theory

Prerequisite	Concepts of programming languages CSCI3306		Semester	Second, 2021/2022
Instructors	Dr. Basem O. Alijla	Office/phone	I317 / 2952	Email	balijla@iugaza.edu
Office hour	See timetable	Classroom	I116 / I101	Class time	NT 8-9:30, 9:30-11

COURSE DESCRIPTION

This course aims to introduce the concepts in automata theory, theory of computation, programming languages and formal languages grammar design models. By the end of the course students should understand the importance and the core concepts in automata theory and formal languages. He should be able to design grammars and automata (recognizers) for different language classes. In addition to that, the student will be able to identify formal language classes and prove theorems of automata and language properties.

COURSE OBJECTIVES

The objectives of this course are:

- **Course objectives**:
    - Introduce concepts in automata theory and theory of computation
    - Identify different formal language classes and their relationships
    - Design grammars and recognizers for different formal languages
    - Prove or disprove theorems in automata theory using its properties

TEXT BOOK(S)

Text Books:

Introduction to Automata Theory, Languages, and Computation, 3rd Edition by Hopcroft, John E.; Motwani, Rajeev; Ullman, Jeffrey D, **Pearson** *2006.*
Introduction to Languages and the theory of Computation, 4th Edition by John C Martin, *MC Graw Hill 2010.*

COURSE TOPICS

Please note the following schedule is tentative and may be changed at the discretion of the instructor.

CLASSROOM SESSIONS		
serial	*Topic*	
1	Course introduction, introduction to automata theory	Chapter 1
2	Finite Automata (DFA & NFA)	Chapter 2
3	Equivalence of DFA & NFA, epsilon transitions	Chapter 3
4	Regular expressions	
5	Regular language properties: pumping lemma	Chapter 4
6	Closure properties	
7	Decision properties of regular languages	
8	Equivalence & minimization of DFAs	
9	Context free grammars & languages	Chapter 5
10	Pushdown Automata	Chapter 6
11	PDA	
12	CFL properties: simplification, normal forms	Chapter 7
13	Pumping Lemma for CFLs	
14	Closure properties for CFL	Chapter 8
15	Turing machines	Chapter 9
16	Turing machines & extensions, RE languages ... (Optional)	

ASSESSMENT

The course will have several homework assignments distributed throughout the semester. Each will be a combination of programming problems and written problems. There will be a midterm exam and a final exam. All will be closed book and closed notes.

The final grade will be a weighted sum of the following:

Attendance	Homework, Assignments, and quizzes	Midterm	Final
5%	15%	30%	50%

CONTACT ME

Attendance: Students should arrive at the classroom punctually or before the class starts to avoid disturb others. Attendance is mandatory. **If your absence more that 25% of the semester lectures, the course will be dropped.**

Classroom behavior: Students should behave properly during class time so as to facilitate the teaching and learning. You should turn off all electronic devices (such as cell phones) that may affect the class. If you need to leave early, please let your instructor know beforehand.