



Department of Computer Science

CS301 - Theory of Automata FALL 2018

Instructor Name: Sobia Tariq
Email address: sobia.tariq@nu.edu.pk
Office Location/Number: N203
Office Hours: Mon, Wed 8:00-10:00

TA Name (if any): -
Email address: -
Office Location/Number: -
Office Hours: -

Course Information

Program: BS

Credit Hours: 3

Type:

Core

Pre-requisites: CS211 Discrete Structures

Course Website: \\sandata\Xeon\Fall 2018\Automata (A&B)

Class Meeting Time: *Section B:* Tues, Thurs 8:00-9:30, *Section A:* Tues, Thurs 9:30 - 11:00

Class Venue: Section A & B: CS-06

Course Description/Objectives/Goals:

Course Learning Outcomes (CLOs):		
At the end of the course students will be able to:	Domain	BT Level
Explain and manipulate the different concepts in automata theory and formal languages such as formal proofs, automata, regular expressions, Turing machines etc;		
Prove properties of languages, grammars and automata with rigorously formal mathematical methods		
Design of automata, RE and CFG		
Transform between equivalent NFAs, DFAs and Res		
Define Turing machines performing simple tasks.		
Differentiate and manipulate formal descriptions of languages, automata and grammars with focus on regular and context-free languages, finite automata and regular expressions		

Course Textbook

1. John C. Martin. *Introduction to Languages and the Theory of Computation*. Fourth Edition. McGraw-Hill. ISBN: 0-07-115468-X (International Students Edition).

Additional references and books related to the course:

1. John E. Hopcroft. Jeffery D. Ullman. *Introduction to Automata Theory, Languages, and Computation*. 1979. Addison-Wesley. ISBN 0-201-02988

2. Michael Sipser. *Introduction to the Theory of Computation*. 1997. PWS Publishing Company.
3. T.A. Sudkamp: *Languages and Machines* (Addison-Wesley, 2nd Edition, 1997)
4. Harry R. Lewis, Christos H. Papadimitriou *Elements of The Theory of Computation*. Second Edition. 1998.
5. Daniel I. A. Cohen. *Introduction to Computer Theory*. Second Edition. 1997. John Wiley & Sons. ISBN: 0-471-13772-3.

Tentative Weekly Schedule

Week	Topics to be covered	Readings	Assignments/ Projects
1	<ul style="list-style-type: none"> • Introduction • Language Definition Preliminaries 		
2	<ul style="list-style-type: none"> • Regular Languages (Focus of DFA) 		Assignment 1
3	<ul style="list-style-type: none"> • NFA, NFA null 		
4	<ul style="list-style-type: none"> • Closure Properties of FA • Regular Expressions • Kleene Theorem Part 1 		
5	<ul style="list-style-type: none"> • Kleene Theorem part 2 • Minimal DFA 		
6	<ul style="list-style-type: none"> • Pumping lemma of Non RL • Intro to CFL 		
7	<ul style="list-style-type: none"> • PDA, (deterministic and non-deterministic) 		Assignment 2
8	<ul style="list-style-type: none"> • CNF • CYK parser 		
9	<ul style="list-style-type: none"> • LL(1) grammar • Top down parser • Pumping Lemma for non-CFL 		
10	<ul style="list-style-type: none"> • Turing Machines (intro and variants) 		
11	<ul style="list-style-type: none"> • Turing Machines 		Assignment 3
12	<ul style="list-style-type: none"> • Turing Machines 		
13	<ul style="list-style-type: none"> • Decidability 		
14	<ul style="list-style-type: none"> • Context sensitive languages 		

	• Linear bounded automate		
--	---------------------------	--	--

(Tentative) Grading Criteria

- | | |
|--------------------------|-----|
| 1. Assignments + Quizzes | 20% |
| 2. Mid-I + Mid II | 35% |
| 3. Final | 45% |

Course Policies

1. Cheating in any respect will be treated as a big crime and your cases will be forwarded to DC.
2. Eligibility to pass this course, students should have to get at least 50% marks and 80% attendance.
3. Hand written assignments should be submitted in due time
4. Quizzes can be unannounced, covering contents of last two lectures.