Department of computer science

College of science

University of Cihan/ Sulaimaniyah

Subject: Computation Theory 1

Course Book – Year 2

Lecturer's name: Mustafa Ghanem Saeed

Academic Year: 2015/2016

Course Book

1. Course name	**Computation Theory 1**
2. Lecturer in charge	**Mustafa Ghanem Saeed**
3. Department/ College	**Computer science**
4. Contact	**e-mail: mostafa.swe@gmail.com** **Tel:**
5. Time (in hours) per week	**Theory: 2**
6. Office hours	**All time except teaching hours**
7. Course code	**CSC2100**
8. Teacher's academic profile	**B.Sc. in software Engineering , University Of Mosul, M.Sc. in Software Engineering, University Of Mosul.** **Areas of Specialization: Software Engineering, software complexity metrics , Clean Code**
9. Keywords	

10. Course overview:

To have an introductory knowledge of automata, formal language theory and computability. Understanding of grammars and their automata. To have a knowledge of regular languages and context free languages. Knowing the relation between regular language, context free language and corresponding recognizers. Studying the Turing machine and classes of problems.

11. Course objective:

The course introduces some fundamental concepts in Types Of grammars (Chomsky Hierarchy), automata theory, and formal languages including grammar, finite automaton, regular expression, formal language.

12. Student's obligation

- The assignments that have work to be assessed will be given to the students in separate documents including the due date and appropriate reading material.
- Submit your homework covered with a sheet containing your name, course title and number, and type and number of the homework (e.g. tutorial, assignment, and project).

13. Forms of teaching

Duration: 16 weeks, 32 hours in total
Lectures: 32 hours (2 per week)

14. Assessment scheme

Midterm Examination	30 %
Quizzes	10 %
Final Examination	60 %

15. Student learning outcome:

- **Knowledge and understanding**
  - Understand the principles and tools of computation theory
  - Understand how computing accrue in different context
  - Understand the aspect of an automaton
  - professional including understanding the need for grammar
- **Cognitive skills (thinking and analysis).**
  - Solve a wide range of problems related to the **grammar, finite automaton, regular expression, formal language.**

16. Course Reading List and References:

- **Introduction to the Theory of Computation, by Michael Sipser, 2006.**
- **Introduction to Computer Theory. By Daniel I. A.Cohen. Prentice-Hall, Second Edition, 1997.**

17. The Topic

Week	Lecture No	Topic
(1) 12-16/ 10/2015	1	Introduction, terminology, definitions
	2	Sets and operations & languages
	3	
(2) 19-23 /10/2015	1	Regular Expressions RE
	2	Regular Expressions RE (Cont.)
	3	
(3) 26-30/ 10/2015	1	Regular Expressions RE ((Cont.)
	2	Regular Expressions RE (Cont.)
	3	
(4) 2-6/ 11/2015	1	Finite Automata FA
	2	Finite Automata FA (Cont.)
	3	
(5) 9-13/ 11/2015	1	Deterministic Finite Automaton DFA
	2	Non Deterministic Finite Automaton NDFA
	3	
(6) 16-20/ 11/2015	1	Language Accepted by Finite Automata 5
	2	Convert Regular Expression into NFA
	3	

(7) 23-27/ 11/2015	1	Constructing regular expression from Finite Automata
	2	Constructing regular expression from Finite Automata (Cont.)
	3	
(8) 30/11/2015 - 4/12/2015	1	Finite Automata with Epsilon moves
	2	
	3	
(9) 7-11/ 12/2015	1	Moore and Mealy machines
	2	
	3	
(10) 14-18/ 12/2015	1	Converting between Moore and Mealy machine
	2	
	3	
(11) 21-25/ 12/2015		Pumping lemma for regular languages
(12) 28/12/2015 - 1/1/2016	1	Kleene's Theorem
	2	
	3	
(13) 4- 8/1/2016	1	Regular Grammar
	2	Regular Grammar (Cont.)
	3	
(14) 11- 15/1/2016	1	
	2	
	3	
15) 18- 22/1/2016	1	Myhill-Nerode Theorem Minimization of DFA
	2	
	3	
	Final Examination	

18. Practical Topics (If there is any)

19. Examinations:

1. Compositional: In this type of exam the questions usually starts with Explain how, What are the reasons for…?, Why…?, How….?

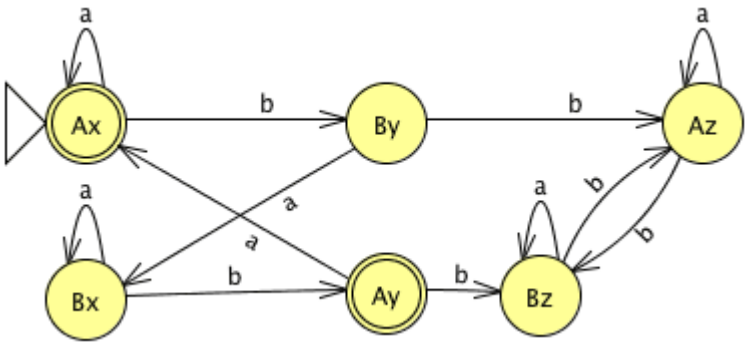
With their typical answers

Examples should be provided

Q. Find a DFA for the language over {a,b}:

{ w : w has an even number of b's **and** does not contain the substring bb }

Here are the two languages and their DFAs:



2. True or false type of exams:

In this type of exam a short sentence about a specific subject will be provided, and then students will comment on the trueness or falseness of this particular sentence.

Examples should be provided

3. Multiple choices:

In this type of exam there will be a number of phrases next or below a statement, students will match the correct phrase.

Q.The language which is generated by the grammar S-> aSa I bSb I a I b over the alphabet {a, b} is the set of

(A) Strings that begin and end with the same symbol
(B) All odd and even length palindromes
(C) All odd length palindromes
(D) All even length palindromes

ANSWER: All odd length palindromes

20. Extra notes:

21. Peer review