



ARAB ACADEMY FOR SCIENCE, TECHNOLOGY, AND MARITIME TRANSPORT

College of Computing and Information Technology

Department of Computer Science

COURSE FILE SUMMARY

MPC3/2

Course Information			
College / Institute / Centre	Computing and Information Technology	Department	Computer Science
Programme Title	Computer Science	Programme Code	CS
Course Title	Theory of Computation	Course Code	CS311
# Hours	2	2	3
	Lecture	Tutorial	Credit
Pre Requisites : CS202 Discrete Structures			

Course Aim

This course introduces the fundamental mathematical models of computation. The course presents both inherent capabilities and limitations of these computational models as well as their relationships with formal languages. Topics to be covered include: Finite automata and regular languages, deterministic and nondeterministic computations, pumping lemma for regular languages, context-free grammars and languages, pushdown automata, pumping lemma for context-free languages, and Turing machines and their variants.

Course Objectives

- Understand automata, computability theory, and complexity theory.
- Understand different methods of proof and essential mathematical background.
- Understand and design finite state automata, non-deterministic finite state automata, regular expressions, pumping lemma, context-free grammars, push-down automata.
- Appreciate the limitations of computational models.
- Create proofs for statements regarding formal computational models.
- Understand how to use Turing machines to represent computable functions.
- Construct Turing Machines to describe languages.
- Understand what time and space complexity is.

Staff Requirements


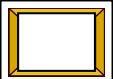







	Qualifications	Special Skills	Number
Lectures	Ph.D.		1
Tutorials	GTA or TA		1

Lecture Schedule

Lecture			Description
#	Week	Hrs	
1	1	2	Introduction
2	2	2	Deterministic Finite State Automata
3	3	2	Non-Deterministic Finite State Automata
4	4	2	Regular Expressions
5	5	2	Non-Regular Languages
6	6	2	Context-Free Grammars
7	7	2	7 th week Exam
8	8	2	Push-Down Automata
9	9	2	Non-Context Free Languages
10	10	2	Turing Machines
11	11	2	Turing Machines (continued)
12	12	2	12 th week Exam
13	13	2	Complexity Theory
14	14	2	Complexity Theory (continued)
15	15	2	Revision.
16	16	2	Final Exam.

Text Books			
Code*	Description		
TB	Michael Sipser, Introduction to the theory of Computation, Second Edition. Thomson Course Technology.		
Reference Books			
Code*	Description		
Tutorial Schedule			
Tutorial			Topic
#	Week	Hrs	
1	1	2	Introduction
2	2	2	Solve Problems on Deterministic Finite State Automata
3	3	2	Solve Problems on Non-Deterministic Finite State Automata
4	4	2	Solve Problems on Regular Expressions/Quiz
5	5	2	Solve Problems on Non-Regular Languages
6	6	2	Solve Problems on Context-Free Grammars
7	7	2	Quiz
8	8	2	Solve Problems on Push-Down Automata
9	9	2	Solve Problems on Non-Context Free Languages
10	10	2	Solve Problems on Turing Machines
11	11	2	Solve Problems on Turing Machines (continued)
12	12	2	Quiz
13	13	2	Solve Problems on Complexity Theory
14	14	2	Solve Problems on Complexity Theory (continued)
15	15	2	Revision.

Laboratory Workshop Schedule									
Laboratory			Description						
#	Week	Hrs.							
Computer Usage									
Lectures: Display the PowerPoint presentations.									
Grading and Assessment Method									
Week #	Points	Written	Tutorial	Continuous					
7	30	20	10						
12	20	15	5						
1-15	10			10					
16	40	40							

Reading Material								
Code*	Description							
LN	PowerPoint presentations.							
*TB : Text Book RB: Reference Book ST: Standards / Codes LN: Lecture Notes								
Supplementary Material								
Code*	Description							
SW	High level programming language IDE.							
*PR: Periodical SW: Software VT: Video Tape OS: Overhead Slide MD: Model AC: Audio Cassette								
Educational Resources								
								
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Prepared by :

Designation

Name Dr. Nahla A. Belal

Sign

Date

Approved by :

Designation

Name

Sign

Date