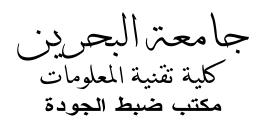
## UNIVERSITY OF BAHRAIN

## **College of Information Technology Quality Assurance Office**





## **Course Information Form (***QAO-1***)**

Code ITCS312	Title Automata	and Formal Languages	Credit Hours 3-2-3	
Pre/co-requisites	ITCS251	Web http://heshaaam.wordpress.com Page		
Course Instructor Hesham Al-Ammal	Email hesham at itc dot uob dot bh	Office Hours UTH 11am & T 8am S40-2076 Phone: 1743-7649	Course Coordinator Dr. Hesham Al-Ammal	

### **Course Description**

Introduces the concept of abstract machines and basic concepts in the foundations to computer science. Formal languages and their relation to automata; the Chomsky hierarchy of classes of grammars; normal forms, recognition of languages; finite state automata; finite transducers; push down transducers; Turing machines; conversion algorithms and decidability problems.

### **Learning Outcomes**

On successful completion of this course, students will be able to:

- 1. Discuss the concept of finite state machines and regular languages.
- 2. Identify and create context-free grammars and languages.
- 3. Design a deterministic finite-state machine to accept a specified language.
- 4. Provide examples of real world applications of automata and formal languages.
- 5. Determine a language's level in the Chomsky hierarchy (regular sets, context-free, contextsensitive, and recursively enumerable languages).
- 6. Convert among equivalently powerful notations for a language, including among DFAs, NFAs, and regular expressions, and between PDAs and CFGs.
- 7. Implement at least one algorithm for top-down or bottom-up parsing.
- 8. Explain the Church-Turing thesis and its significance.
- Define the classes P and NP.

#### **Textbook** Peter Linz, An Introduction to Formal Languages and Automata, 5th Edition, Jones and Bartlett, 2006 **Course Assessments Mid-Term Exams** Final Exam **Lab Assignments Ouizzes Project** 40% 10% 10% 40% **Test Dates Mid-Term Exams Final Exam** Midterm 1: Wed. 29/10 at 11:30am Date: Sunday 18 -January-2007. Midterm 2: Wed. 24/12 at 11:30am Time: 8:30-10:30

### **General Notes**

- Exam dates are final. No makeup exams.
- Test points will be carried forward to the final exam for students with valid approved absence reasons.
- Lab assignments can be submitted by teams of at most two students.

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جامعت البحرين كلية تقنية المعلومات مكتب ضبط الجودة

Course Weekly Breakdown (QAO-2a)

Week	Date	Topics to be Covered	Notes	Lab. Assignments		
1	15/9	1.1: Introduction				
	17/9	1.2: Languages, grammars and Automata 1.3: Some applications				
2	22/9 24/9	2.1-2.2: Finite automata: DFAs and NFAs 2.3: Equivalence of DFAs and NFAs		Lab1: Introduction to JFLAP		
3 29/9 1/10	3.1- 3.2: Regular expressions					
	1/10	Eid al-Fitr Holiday				
4	6/10 8/10	3.3: Regular grammars		Lab2: Regular Expressions in Ruby		
5	13/10 15/10	4.1-4.2: Properties of regular grammars				
6	20/10 22/10	4.3: Identifying non-regular languages 5.1: Context-free grammars				
7	27/10 29/10	5.2: Parsing and ambiguity 6.1: Methods of transforming grammars	<b>Midterm 1</b> : Wed. 29/10 at 11:30am			
8	3/11 5/11	6.2: Chomsky normal form		Lab3: Parsing and programming languages part 1		
9	10/11- 12/11					
10	17/11 19/11	7.1: Pushdown automata 7.2: Pushdown automata	20/11 Last day for withdrawal with W			
11	24/11 26/11	9.1-9.2: The standard Turing machine		Lab4: Simulation of a Turing machine		
12	1/12 3/12	9.3: Turing's thesis				
13	8/12	Eid al-Adha holiday		Lab5: Parsing and programming languages part 2		
14	15/12 17/12	11.1: A Hierarchy of formal languages				
15	22/12 24/12	12.1 Limits of Algorithmic Computation Computability, PCP, and undecidability	<b>Midterm 2</b> : Wed. 24/12 at 11:30am			
16	29/12 31/12	Hijri new year Review				
17	5/1	Last day of classes				