Formal Languages and Automata Course Specifications

Faculty: Computer and Informatics

Department: Scientific Computing

Program(s) on which the course is given: Bachelor in Computer and Information Sciences

Major or Minor element of programs   **:** All majors

Department offering the program   **:** Scientific Computing

Department offering the course   **:**   Computer Science

Academic year / Level   **:** 3rd year / B Sc

Date of specification approval   **:** 4/10/2009

A- Basic Information

Title: Formal Languages and Automata   **Code:** CSC 341

Lectures: 3 hrs/week   **Practical: ---**

Tutorial: 2 hrs/week   **Credit Hours: ---**

Total: 5 hrs/week

B- Professional Information

1. Overall Aims of Course:

The aims of the course are:

1. To give an understanding of the basic theory formal languages and automata.

2. To introduce the types of formal grammars.

3. To study the relations between automata, languages and grammars.

4. To give some applications to compilers.

2. Intended Learning Outcomes of Course (ILOs):

a. Knowledge and Understanding

a1- List the basic models of computation such as DFA, NFA, PDA and TM.

a2- Understand the languages recognized by those models of computation.

a3- Understand the concepts of Automata, and Formal Languages.

a4- Understand the relationships between the grammars and abstract machines and Expressions.

a5- Understand the properties and theorms on languages.

a6- Identify and follow basic mathematical arguments couched in terms of abstract models.

b. Intellectual Skills

b1- Determine the type of a formal language by using the grammar tools.

b2- Use regular expressions to analyze regular languages.

b3- Use context free grammar to analyze context free languages .

b4- Analyze whether a language is or isn't regular or context-free .

b5- Construct simple parsers (Top down and Bottom up)and prove the grammar

is ambiguous or not.

c. Professional and Practical Skills:

c1- Inject abstract concepts .

d. General and Transferable Skills:

d1- Presenting any real life problem as state machine which are useful in

determining whether the given problem can be solved on computer or not.

e. Attitude:

e1. A knowledge and respect of ethics and ethical standards in relation to a major area of study.
e2. Relationship Emphasis a successful with other students.
e3. Learn how to make relation with other, and the limit of this relation.

3. Contents:

Topic	No. of hours	Lecture	Tutorial/ Practical
Alphabets , languages , grammars	5	3	2
Regular expressions and regular languages	5	3	2
Finite state automata (DFA , NFA)	5	3	2
Transforming NFA into DFA	5	3	2
Regular expressions and NFA	5	3	2
Regular grammars and NFA	5	3	2
Minimum state DFA , Kleene Theorem	5	3	2
Non –regular languages , the pumping lemma	5	3	2
Homomorphisms of Languages FA with output ,Applications	5	3	2
CF-LANGUAGES and CF- grammars	5	3	2
Pushdown automata PDA	5	3	2
CF-GRAMMARS and PDA	5	3	2
Non-CF-LANGUAGES	5	3	2
The Turing Machine Model TM	5	3	2