Faculty of Computers & Information Technology

Theory of Computations

Information :

Course Code :	CSC 416	**Level**	: Undergraduate	**Course Hours :**	3.00- Hours

Department :	Department of Computer Science

Instructor Information :

Title	Name	Office hours
Associate Professor	Osama Fathy Saleh Hegazy	1
Teaching Assistant	YASMIN AMR AHMED ANWAR ALI BADR	5

Area Of Study :

This course deals with the theoretical foundations of computing, including abstract models of computing machines, the grammars those machines recognize, and the corresponding classes of languages. Topics include church's thesis; grammars, the m-recursive functions, and tuning computability of the m-recursive functions, the incompatibility: the halting problem, tuning innumerability, tuning acceptability, and tuning decidability, unsolvable problems about tuning machines and m-recursive functions, computational complexly: time – bounded tuning machines, rate of growth of functions, up – completeness, the complexity hierarchy, the prepositional calculus: syntax, truth – assignment, validity and satisfy, and equivalence and normal forms compactness, Recent correlated software packages should be used through labs.

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Course outcomes :

a.Knowledge and Understanding: :

1 -	Know the theoretical foundations of computing.
2 -	Understand advanced techniques for formal languages.
3 -	Understand Grammars those machines recognize,
4 -	Read, write, and manipulate an abstract specification describing the requirements of a computer system,
5 -	Apply various proof methods of computing and corresponding classes of languages.
6 -	Understand the abstract models of the process of computation such as Turing Machines, its variations, and Post Machines, and including abstract models of computing machines

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b.Intellectual Skills: :

1 -	Explain and illustrate by means of examples the terms finite, non finite, and pushdown automata, and context free grammars, un-decidability, equivalence and decision procedures
2 -	Describe and compare the main models of computing
3 -	Analyze the complexity of simple computing programs
4 -	Explain the use of formal systems in computers
5 -	Good students will be able to formally analyze simple properties of on topics of formal specifications through proof.

c.Professional and Practical Skills: :

1 -	Approach the advanced formal languages with confidence
2 -	Understand new advanced formal languages

d.General and Transferable Skills: :

1 -	Deploy communication skills
2 -	Deploy research skills
3 -	To work to tight deadlines
4 -	Justify students design decisions in a written document
5 -	Work more easily within a team to achieve an objective

Course Topic And Contents :

Topic	No. of hours	Lecture	Tutorial / Practical
Background to Theory of Formal Languages	4	2	2
Introduction to Formal Languages	4	2	2
Regular Expressions	4	2	2
Finite Automata	4	2	2
Non Deterministic Finite Automata	4	2	2
Midterm Exam I	4	2	2
Transition Graphs	4	2	2
Context-Free Grammars	4	2	2
Pushdown Automata	4	2	2
Equivalence of Computing Paradigms	4	2	2
Turing Machines	4	2	2
Midterm Exam II	4	2	2
Post Machines	4	2	2
Computers	4	2	2
Revision	4	2	2
Final Exam	4	2	2

Teaching And Learning Methodologies :

Lectures

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Exercises
Projects

Course Assessment :

Methods of assessment	Relative weight %	Week No	Assess What
Final Exam	40.00	16	
Midterm I	15.00	6	
Midterm II	15.00	12	
Project	15.00	4	
Quizes & Assignments	15.00	2	

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