

Planning and Quality Assurance Affairs

Form (A)

Course Specifications

General Information

Course name	Discrete Structures
Course number	ITCS2311
Faculty	
Department	
Course type	Major Needs
Course level	2
Credit hours (theoretical)	3
Credit hours (practical)	0
Course Prerequisites	

Course Objectives

- 1 - Describe the definitions and properties of a variety of specific types of discrete structures.
- 2 - Correctly read, represent and analyze various types of discrete structures using standard notations.
- 3 - Introduce logic and the methods of proofs.
- 4 - Explore the basics of counting techniques.
- 5 - Study the concepts of relations.
- 6 - Introduce the concepts of graphs, trees and groups.

Intended Learning Outcomes

Knowledge and Understanding	* a1. Explain the concepts of relations and their properties, and equivalence relations. * a2. Discuss and identify core of analysis, algebra and applied mathematics.
Intellectual Skills	* b1. Identify appropriate methods of proof * b2. Identify a range of solutions and critically evaluate and justify proposed design solutions. * b3. Perform comparisons between (methods, techniques...etc). * b4. Summarize the proposed solutions and their results. * b5. Restrict solution methodologies upon their results. * b6. Establish criteria, and verify solutions
Professional Skills	* c1. Solve related problems in sets, sequences and series. * c2. Apply basic the logic principles * c3. Solve related problems in graphs and tree. * c4. Apply tools and techniques for the design and development of applications.
General Skill	* d1. Communicate effectively by oral, written and visual means. * d2. Work effectively as an individual and as a member of a team. * d3. Exhibit appropriate numeracy skills in understanding and presenting cases involving a quantitative dimension * d4. Develop Creativity and imagination skills, Self-assessment ability and Critical thinking and analytic ability.

Course Contents

1 - Logic and truth tables
2 - Universal proof techniques: Implications, converse, inverse, direct proof. Proof by counterexample, contraposition, and contradiction mathematical Induction
3 - Relations, sets, functions, recurrence relations
4 - Graphs and trees: Undirected graphs, directed graphs, trees, spanning trees
5 - Counting methods: Permutations and combinations

Teaching and Learning Methods

1 - Lectures
2 - Exercises
3 - Projects

Students Assessment

<u>Assessment Method</u>	<u>TIME</u>	<u>MARKS</u>
Mid-Term Exam	6th week	30
project and/ or Assignments	12th week	20
Final Exam	16th week	50

Books and References

Essential books	Kenneth H. Rosen, Discrete Mathematics and Its Applications, McGrawHill Science, 2006.
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Knowledge and Skills Matrix

Main Course Contents	Study Week	Knowledge and Understanding	Intellectual Skills	Professional Skills	General Skill
Logic and truth tables	1-3	a1, a2	b1-b6	c1, c4	d1-d4
Universal proof techniques: Implications, converse, inverse, direct proof. Proof by counterexample, contraposition, and contradiction mathematical Induction	4-6	a2	b1-b6	c2, c4	d1-d4
Sets, Relations, Functions and recurrence relations	7-9	a2	b1-b6	c4	d1-d4
Graphs and trees: Undirected graphs, directed graphs, trees, spanning trees	10-12	a2	b1-b6	c3, c4	d1-d4
Counting methods: permutaions and combinations	13-15	a2	b1-b6	c4	d1-d4