School of Computing
UNIVERSITY OF GEORGIA

Course Information Sheet

CSCI 4690

Graph Theory

Brief Course Description (50-words or less)	Elementary theory of graphs and digraphs. Topics include connectivity, reconstruction, trees, Euler's problem, hamiltonicity, network flows, planarity, node and edge colorings, tournaments, matchings, and extremal graphs. A number of algorithms and applications are included.
Extended Course Description / Comments	This course is cross-listed with MATH 4690. This is a 3 credit hour course.
Pre-Requisites and/or Co-Requisites	MATH 3000 or MATH 3500 or MATH 3500H AND CSCI 2610 or MATH 3200
Required, Elective or Selected Elective	Selected Elective Course
Approved Textbooks (if more than one listed, the textbook used is up to the instructor's discretion)	Author(s): Geir Agnarsson and Raymond Greenlaw Title: *Graph Theory: Modeling, Applications, and Algorithms* Edition: any ISBN-13: 9780131423848
Specific Learning Outcomes (Performance Indicators)	This course is an introduction to graph theory. At the end of the semester, all students will be able to do the following: 1. Tell if two given graphs of small size are isomorphic. 2. Prove the equivalence of several definitions of tree. 3. Convert a Prufer sequence to a labeled tree. 4. State an algorithm for testing connectivity of a given graph 5. Determine the number of labeling of a given unlabeled graph. 6. Use the matrix tree theorem to determine the number of spanning trees in a given graph. 7. Decide if a given graph can be properly 3-colored, or 4-colored. 8. Give the adjacency information for the line graph of a given graph. 9. Determine the 2-connected components of a given connected graph 10. Use either Prim's or Kruskal's algorithm for determining the minimum cost spanning tree of a given edge-weighted graph 11. State three real-world processes model by a graph

Relationship Between Student Outcomes and Learning Outcomes

	ABET Learning Outcomes						
ABET Specific Learning Outcomes		A	B	C	D	E	F
	1	•		•			
	2	•					
	3	•		•			
	4	•		•			
	5	•					
	6	•	•				
	7	•	•				
	8	•	•				
	9	•	•	•			
	10	•	•				
	11	•	•				

Major Topics Covered
(Approximate Course Hours)

3 credit hours = 37.5 contact hours
4 credit hours = 50 contact hours

Note: Exams count as a major topic covered

Propositional logic (3.5-hours)
Predicate logic (3.5-hours) Proofs:
types of proofs (4-hours)
Sets, set logic and set operations (2-hours)
Functions (2-hours)
Sequences and summations (2-hours)
Integer algorithms (3-hours) Modular arithmetic (.5-hours) Mathematical induction (3.5-hours) Counting (2.5-hours)
The pigeonhole principle (.5-hours) Permutations and combinations (2.5-hours) Finite probabilities (4-hours)
Relations (2.5-hours)
Using graphs to represent relations (1.5-hours)

Course Master Dr. Bill Hollingsworth

Last modified on 3/18/2024 by Bill Hollingswoth