Dept Number	MATH/CS 447	Course Title	Introduction to Graph Theory
Semester Hours	3	Course Coordinator	Math Department
Catalog Description	Graph theory is an area of mathematics which is fundamental to future problems such as computer security, parallel processing, the structure of the World Wide Web, traffic flow, and scheduling problems. It is also playing an increasingly important role within computer science. Topics covered include: trees, coverings, planarity, color ability, digraphs, and depth first and breadth-first searches.		

Textbooks

Introduction to Graph Theory, by Chartrand and Zhang, 1st ed.

References

Course Learning Outcomes

- To learn the basic concept of graph theory.
- To learn to apply graph theory to computer science.

Assessment of the Contribution to Program Outcomes

Outcome →	1	2	3	4	5	6	7	8	9	10
Assessed →	X									X

Prerequisites by Topic

Mathematics 349 or consent of instructor.

Major Topics Covered in the Course

1. Introduction to graphs, sub graphs, special graphs, operations on graphs, and degree sequences {4 classes}
2. Paths, cycles, cut-vertices, bridges, Eulerian graphs, and blocks {4 classes}
3. Trees and their characterizations, centers, and centroids, cycle spaces, co cycle spaces, and spanning sub trees {5 classes}
4. Euler's formula, non planar graphs, Kuratowski's theorem {4 classes}
5. N-connected and N-edge-connected graphs, Menger's theorem {2 classes}
6. Sufficient conditions for Hamiltonian graphs {2 classes}
7. Sufficient conditions for Hamiltonian graphs {3 classes}
8. Map colorings, the four color theorem, and the Heawood map coloring theorem {5 classes}
9. Networks, flows and cuts, Ford-Fulkerson algorithm and applications {6 classes}
10. Pert and critical path analysis {5 classes}