

Course Outline

1. Document Information

Degree Program	Computer Science
Course Number	MATH/CS 447
Course Title	Introduction to Graph Theory
Semester Hours	3
Course Coordinator	Math Department
Revision Term	
Latest Revision	

2. 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 also plays an increasingly important role within computer science. Topics include: trees, coverings, planarity, colorability, digraphs, depth-first and breadth-first searches.

3. Textbooks

- Chartrand, Gary, and Ping Zhang. *Introduction to Graph Theory*. Boston: McGraw-Hill, 1st Edition, 2005. ISBN: 978-007-320-4161.

4. References

5. Course Learning Outcomes

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

6. Assessment of the Contribution to Student Outcomes

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

7. Prerequisites by Topic

Mathematics 349 with C or better.

8. 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}