Course Syllabus	**EECS 4980 – Algorithms**

Credits & Contact Hours   3 credit hours & 150 minutes lecture contact per week

Coordinator   Dr. Henry Ledgard

Textbook   J. Kleinberg, E. Tardos. Algorithm Design. Addison Wesley, 2005.

Course Information   Techniques for devising efficient computer algorithms. Topics include divide-and-conquer techniques, dynamic programming, linear programming, graph algorithms, greedy algorithms, NP and P complexity classes, and approximation algorithms for NP complete problems.

Prerequisites: EECS 2520 and EECS 4100

Elective course

Specific Goals-Student Learning Objectives   Upon completion of this course, students will be able to
1. Understand and solve the Stable Matching Problem
2. Become competent at determining Big-O notation for an algorithm
3. Solve problems in Graph Connectivity and Graph Traversal
4. Apply Greedy Algorithms to solve problems such as Interval Scheduling and Optimal Caching.
5. Use Recurrence Relations to solve problems such as Counting Inversions and Closest Pair of Points
6. Use Dynamic Programming to solve problems such as Weighted Scheduling and Spell Checking.
7. Understand and solve the Maximum Flow Problem.
8. Develop approximate solutions to NP and NP-complete problems.
9. Identify the characteristics of problems for which no computational solution exists.

Topics
1. Techniques for devising efficient computer algorithms
2. Solutions to the Stable Matching Problem
3. Greedy algorithms
4. Divide-and-conquer techniques
5. Solutions for finding the Closest Pair of Points
6. Dynamic programming,
7. Weighted Interval Scheduling
8. Solutions for Optimal Sequence Alignment
9. Network Flow Algorithms
10. Graph algorithms
11. NP and P complexity classes
12. Approximation algorithms for NP complete problems.
13. Problems in P-Space