

# Fall 2014

## EE 7790: Structure of Computers and Computations - II

Fall 2014

*Course time:* 2:30-3:20 MWF

*Text:* T. H. Cormen, C. E. Leiserson, R. L. Rivest, and C. Stein (2009), *Introduction to Algorithms*, 3rd ed., MIT Press, Cambridge, MA.

*Instructor:* Jerry Trahan

*Topics:*

- ◆ Graph algorithms
- ◆ NP-completeness and approximation algorithms
- ◆ Other selected topics

*Description:* This course will focus on sequential algorithms relevant for graduate study in computer engineering. More important than the specific algorithms, the goal of this course is to develop in students the ability to analyze problems, so that the analysis leads to solidly-grounded conclusions (about correctness of attempted solutions, about time requirements, about memory requirements, and so on). This ability to grapple successfully with abstract problems applies beyond the specific problems covered in the course.

About the topics:

- Often, graphs can model problems so as to make clear the essential issues involved in their solution. The course begins with algorithms for spanning trees, shortest paths, and maximum flow.
- Many problems relevant to computer engineering, in scheduling, VLSI layout, reliability, network design, and other areas, cannot be solved exactly within a reasonable amount of time. These problems can be proven to be computationally intractable, or NP-complete. The last portion of the course covers NP-completeness and some methods for coping with such problems, such as approximation algorithms.

*Prerequisite:* Background in data structures and algorithm analysis; it is not necessary to have taken EE 4790.

