COMP SIENCE & ENGINEERING (CSEG)

CSEG 605 Convex Optimization for Large-Scale and Distributed Systems **3 Credits**
Grade Mode: Standard Letter, Audit/Non Audit

This course concentrates on solving convex optimization problems that arise in large-scale and distributed systems with applications to big data. It covers convex sets and functions, basics of convex analysis, least-squares, linear and quadratic programs, semidefinite programming, unconstrained and constrained optimization, duality theory, interior-point methods, sub-gradient and proximal gradient methods, splitting and alternating direction method of multipliers (ADMM).

CSEG 710 Advanced Algorithms and Data Structures **3 Credits**
Grade Mode: Standard Letter, Audit/Non Audit

The course covers general computational problems, with a focus on the principles used to design those algorithms. Efficient data structures will be discussed to support these algorithmic concepts. Topics are: run time analysis, divide-and-conquer algorithms, dynamic programming algorithms, network flow algorithms, linear and integer programming, large-scale search algorithms and heuristics, efficient data storage and query, and NP-completeness. This course will focus on the design and analysis of algorithms for general classes of problems.

CSEG 780 Principles of Computer System Design **3 Credits**
Grade Mode: Standard Letter, Audit/Non Audit

The course covers computer architecture, organization and design with an emphasis on the processor structure and functionality as well as memory hierarchy and IO devices. Topics include: Boolean algebra and digital logic; Combinatorial and sequential circuits; Processor datapath and control path; Memory hierarchy; IO devices; Static and dynamic CMOS circuits; low power techniques, design tools and methodologies. The course also contains several case-studies that explore recent real-world designs from the recent research literature. Students will design and verify small test circuits using commercial CAD tools.