5.b Applied Mathematics

Description: According to the Bureau of Labor Statistics (BLS, www.bls.gov), applied mathematicians use theories and techniques, such as mathematical modeling and computational methods, to formulate and solve practical problems in business, government, engineering, and the physical, life, and social sciences. Operations research analysts formulate and apply mathematical modeling methods to develop and interpret information that assists management with policy formulation and other managerial functions.

Job Market Information: Many jobs that are closely related to applied mathematics or operations research require a master’s degree or Ph.D. An exception to this rule is employment with the federal government. However, an undergraduate degree in mathematics can be attractive to employers in combination with a second area of interest, such as another STEM (Science, Technology, Engineering and Mathematics) or business-related field. Employers are often interested in programming skills, so students who intend to find employment after obtaining a bachelor’s degree should have computational experience as well.

Employment for mathematicians with graduate degrees is expected to grow much faster than average (21%), but keen competition for jobs is expected. Employment for operations research analysts is also expected to grow much faster than average (30%). Individuals who combine their undergraduate degree with a master’s or Ph.D. in operations research or management science should have excellent job opportunities.

Salary Information: According to the BLS, the median salary for Computer and Mathematical Science occupations was about $83,000, which includes workers holding graduate degrees. Like occupations in other disciplines, STEM occupations that require more education usually pay more than those that need less.

Course Requirements: In addition to the core requirements, at least three upper-division courses in mathematics that form a coherent program within the Applied Mathematics Option are required. These will be approved by your advisor.

Three suggested tracks are described below:


Computational Mathematics. Cpt S. 122, Math 364, 448 and one of Math 416, 440, or 466. Resource Faculty: Asaki, K. Cooper, Dillon, Dong, Lapin, Manoranjan, Schwartz, Tsatsomeros, Vixie, X. Wang, and Yin.

Mathematical Modeling. Three of Math 340, 415, 440, 448 and 486. Two of Math 364, 416, 423, or 441 are also recommended. A minor in an applied subject area, chosen in consultation with an adviser, is also strongly recommended. Resource Faculty: Asaki, K. Cooper, Dillon, Dimitrov, Dong, Khapalov, Krishnamoorthy, Lapin, Manoranjan, Panchenko, Schumaker, Schwartz, Vixie, X. Wang, and Yin.