

Operations Research: A New Major for the Class of 2014

A new major, Operations Research, is available to the Class of 2014. For more information ask your calculus instructor—and drop by the Open House in Chauvenet Hall on the evening of February 22nd.

What is Operations Research?

Operations Research is a modern, interdisciplinary subject that uses mathematical techniques to solve large-scale optimization problems in the real world. The field grew out of urgent problems faced by the Allies during World War II and guided military planners in their decision-making. For example, operations research showed that to minimize the losses of trans-Atlantic shipping to German U-Boats it was better to use a small number of large convoys rather than a large number of small convoys. After the war, operations research extended its influence to all logistical and scheduling problems in the military. Civilian applications also proliferated. For instance, the synchronization of stop-lights for smooth traffic flow throughout a city is an important type of problem in operations research. Also, Major League Baseball and other professional sports leagues hire consultants specializing in operations research to construct the schedule for each season.

The Naval Academy Mathematics Department has long taught several classes in operations research (e.g., SA302 Analysis of Naval Tactics and SA410 Applications of Search and Detection Theory) and is expanding its course offerings to support the new major. Midshipmen majoring in Operations Research will also take traditional mathematics courses in probability, statistics, and matrix theory.

Mathematics Faculty Profile

Captain Joshua Jabin graduated from the United States Naval Academy in 2001 with a degree in Economics. Following graduation from The Basic School and the Marine Aviation Supply Officer Course, he served in Marine Aviation Logistics Squadron (MALS) 36 in Okinawa, Japan and MALS-11 in San Diego, California. He was also forward deployed with MALS-16 (fwd) in Al Asad, Iraq. While at MALS, he held various billets including managing warehouse operations, managing financial accounts, and analyzing supply operations. In 2009, Capt Jabin received a Masters degree in Operations Analysis from the Naval Postgraduate School. His graduate research evaluated alternative supply-chain network configurations and resource allocations for deployed Marine Corps aviation logistics units. Based on the results of his thesis, Capt Jabin co-authored the article, “Trading in the Iron Mountain”, which appeared in the October 2010 issue of *Marine Corps Gazette*. The article argues that a suitable network of smaller intermediate supply depots could decrease the amount of time aircraft are unavailable due to maintenance.

An Operations Research Problem: Minimum Cost Spanning Tree

Here is a small-scale problem from operations research for you to try. We seek to connect all the nodes in the given network using a *minimum cost spanning tree*—a selection of suitable links with minimum total cost. A spanning tree with total cost 14 is shown. Can you find a spanning tree with smaller cost? Can you find a spanning tree with the minimum possible cost?

