Naval Architecture at the United States Naval Academy!

http://www.usna.edu//NAOE

One of the oldest engineering professions, naval architecture is also one of the broadest and most advanced. Naval architects design the largest manmade objects that move

(over 1500 feet long), and the most complex (aircraft carriers and nuclear subs)! Projects range from underwater vessels, to warships, sailboats, unmanned robotic craft and advanced sea skimming vehicles such as surface effect and wing-in-ground effect craft. Naval architects have also helped design every other type of engineered system, including land vehicles, airplanes and even space craft!

A top-ranked program, the USNA "ENA" major typically attracts 20-30 students each year. Often called, "the major with the most toys", it is a very hands-on major, with lots of design projects, labs and small classes. Its world-class facilities and renowned faculty have received numerous awards, yet due to its small size, it retains a family-like atmosphere.

Like all programs at USNA, the major begins with the fundamental core subjects of calculus, chemistry, physics and the humanities. In common with the other engineers, naval architecture students learn the core engineering concepts of mechanics and materials. ENA majors analyze, design, build and test projects from their first naval arch course. Not only do these projects develop their skills, they are also fun! During the summer many of our students attend internships at design offices, shipyards and research facilities. Some 1/C opt to work on independent R&D projects, which gives them the chance to explore in-depth a topic of their choice. Often they will build and test their projects and their results may even find their way in to service! A good example is the 14 students who worked on projects related to the new Navy 44. Their results and recommendations significantly contributed to the new boat's design!

After graduation, a degree in naval architecture allows for numerous career paths in both the military and civilian sectors. With an identified critical shortage of naval architects (both military and civilian) in the coming decades, multiple opportunities exist. USNA ENA graduates may attain any military rank with officers serving in all service communities. On the civilian side our graduates are working as naval architects on all vessel designs from offshore power and sail boats, to subs, surface warships, commercial vessels and exotic craft. Given their solid backgrounds in design and analysis, our graduates are also working as designers and managers in almost every other technical field. The majority of our graduates have earned additional degrees in virtually every field. These include the MBA, PhD, JD and even MD degrees. They can be found running major government programs, Fortune 500 businesses as well as start-up companies!

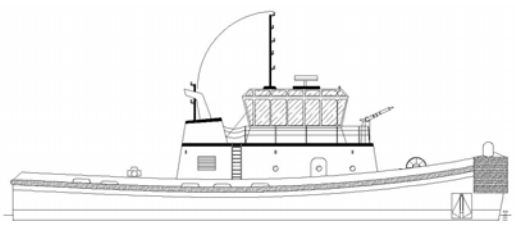
What does it take to succeed as a naval arch student? Most importantly you should enjoy hands-on opportunities, applying your creative skills and working on problems that have multiple solutions!

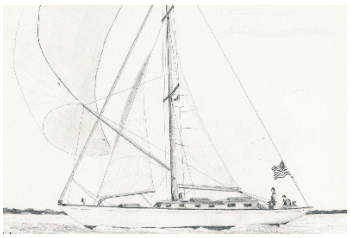
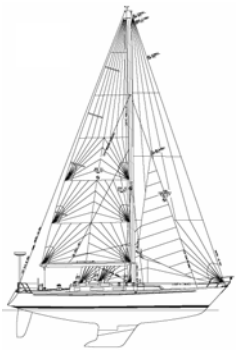
Perhaps you are not sure if naval architecture is for you? Feel free to stop by the Hydro Lab and ask questions, or visit the ENA faculty on the third floor of Rickover!

(See reverse side)

Below is the course matrix for the Class of 2010 and following years. The top section shows the USNA core courses; classes that all midshipmen take. The middle section shows the courses required of all engineers. The bottom section shows the naval architecture major courses. Each course provides interesting and applicable information for those interested in careers related to the marine industry. The "math, science, engineering elective" allows the student to explore a topic of their interest from a broad range of technical subjects, while the major electives provide over a dozen opportunities to learn diverse fields such as marine fabrication, advanced marine vehicle design, engineering economics or submarine design. Our students are given the opportunity to explore fields that match their interests.

Freshman Year		Sophomore Year		Junior Year		Senior Year	
4/c Fall	4/c Spring	3/c Fall	3/c Spring	2/c Fall	2/c Spring	1/c Fall	1/c Spring
NS101 1 - 2 - 2 Seamanship	NN101 1 - 2 - 2 Intro to Navigation	NN200 1 - 2 - 2 Navigation and Piloting		NS300 0 - 2 - 1 Fleet Operations	NL310 3 - 0 - 3 Leadership Theory and Applications		NL400 2 - 0 - 2 Law for the Junior Officer
SC111 3 - 2 - 4 Chemistry I	NL110 2 - 0 - 2 Preparing to Lead	SP211 3 - 2 - 4 General Physics I	SP212 3 - 2 - 4 General Physics II	EE331 3 - 2 - 4 Electrical Engineering I	EE334 3 - 2 - 4 Electrical Engrg & IT Systems	ES360 0 - 2 - 1 Control Systems Lab	ES300 3 - 0 - 3 Naval Weapons Systems
SM111 4 - 0 - 4 Calculus I	SM112 4 - 0 - 4 Calculus II	SM221 4 - 0 - 4 Calculus III					NS42x 0 - 2 - 1 Junior Officer Practicum
HE111 3 - 0 - 3 English I	HE112 3 - 0 - 3 English II	NE203 3 - 0 - 3 Ethics & Moral Reasoning					
FP130 3 - 0 - 3 U.S. Government	HH104 3 - 0 - 3 Naval History			HH216 3 - 0 - 3 Western Civilization II			
	SC112 3 - 2 - 4 Chemistry II		SM212 4 - 0 - 4 Differential Equations			3 - 0 - 3 Hum/SS Elective	3 - 0 - 3 Hum/SS Elective
			HH2xy 3 - 0 - 3 Western Civilization I				
		EN221 3 - 2 - 4 Engr Mech w/ Marine Apps 1	EN222 3 - 2 - 4 Engr Mech w/ Marine Apps 2	EM318 3 - 0 - 3 Applied Fluid Mechanics	EM319 3 - 0 - 3 Engineering Thermodynamics	3 - 0 - 3 Math, Sci, Eng Elective	
		EN247 0 - 4 - 2 Principles of Naval Architecture	EN342 3 - 2 - 4 Stability & Buoyancy	EN330 3 - 0 - 3 Probs & Stats w/ Ocean Appls	EN353 3 - 2 - 4 Resistance and Propulsion	EN455 3 - 2 - 4 Seakeeping and Maneuvering	
				EN380 3 - 0 - 3 Naval Mat'l Sci. and Engineering	EN358 3 - 2 - 4 Ship Structures	EN471 2 - 2 - 3 Ship Design I	EN476 0 - 6 - 3 Ship Design II
						3 - 0 - 3 Major Elective #1	3 - 0 - 3 Major Elective #2





Senior Design Projects