



Naval Architecture at the United States Naval Academy!

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

Info for the Class of 2012



Naval architecture is one of the oldest, broadest and most advanced engineering disciplines. 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 helped design every type of engineered system, including land vehicles, airplanes and even space craft!

A top-ranked program, the USNA "ENA" major typically attracts about 25 students each year. Often called "the major with the most toys", it is very hands-on, 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 close-knit atmosphere.



Like all programs at USNA, the major begins with the fundamental core subjects of calculus, chemistry, physics and the humanities. In common with other engineers, "naval arch" students learn the core engineering concepts of mechanics and materials. ENA majors design, build and test projects from their first naval arch course 3/C year. Not only do these projects develop important skills, they are also fun! During the summer many students have internships at design offices, shipyards and research facilities. Some 1/C opt to work on independent individual or team projects, giving 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! Good examples are the 22 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 are admirals, astronauts and



America's Cup designers. Some are working as naval architects on designs ranging 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 field. The majority of our graduates have earned additional degrees in virtually every field. These include the MS, 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 and analytical skills to working on problems that have multiple solutions!

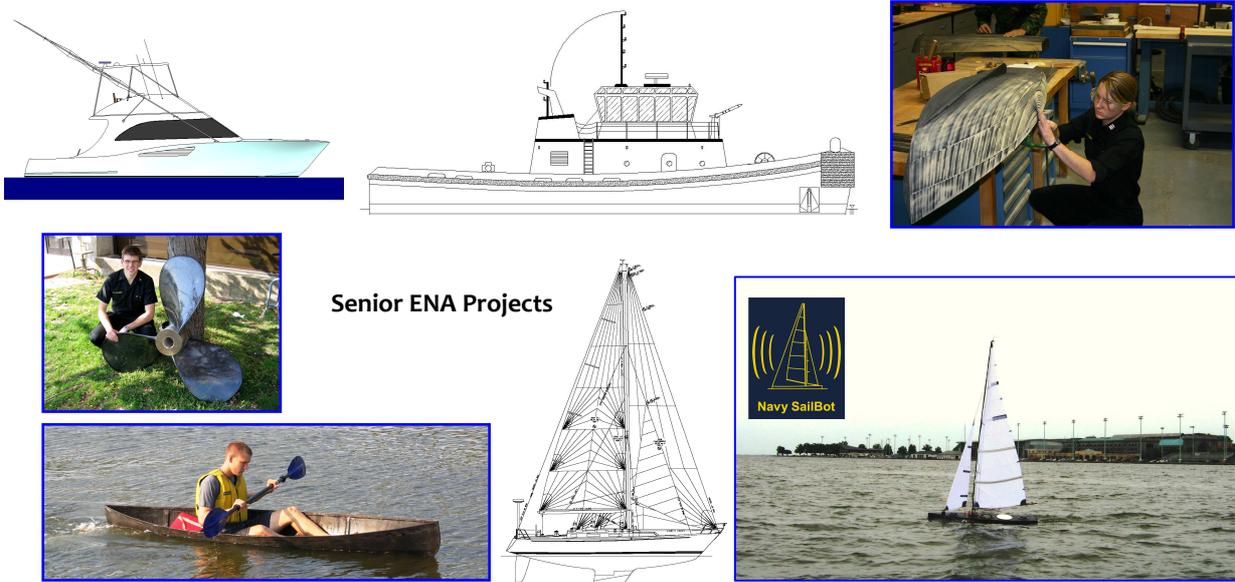
Perhaps you are not sure if naval architecture is for you? Feel free to stop by the Hydro Lab and ask questions, or visit the ENA faculty on the third floor of Rickover!



Below is the course matrix for the Class of 2012 and following years. The top five rows show 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 opportunities to learn diverse fields such as marine fabrication, advanced marine vehicle design, engineering economics or submarine design. New this year is the opportunity for students to focus their interests in specific tracks such as Design, Construction Management, Marine Power Systems, and Materials and Structures. Also in the works is an ENA Honors major. If you are interested in engineering and the sea, naval architecture may be for you!

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

“Would you recommend naval architecture as a major? 100% of 2008 graduates said “Yes!”



Senior ENA Projects