



# Naval Architecture at the United States Naval Academy!

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

## Info for the Class of 2013



Naval architecture (or Ship Design Engineering) 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 design projects, labs and small classes. It has world-class facilities and award-winning faculty, yet due to its small size it retains a close-knit atmosphere.



In common with all majors at USNA, "narchs" study the fundamental core subjects of calculus, chemistry, physics and the humanities. Along with the other engineering majors, our students learn the engineering concepts of mechanics, fluids and materials. ENA majors are hands-on, designing, building and testing 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 students may 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 and the highly successful SailBot team.

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 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, managers and leaders throughout the naval and business worlds. Most graduates earn 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, start-up enterprises and Fortune 500 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 problems that have multiple solutions.

Perhaps you are not sure if naval architecture is for you? Stop by the Hydro

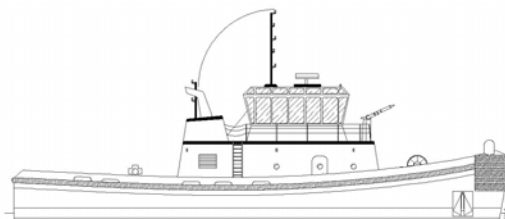


Lab and ask questions, or visit the ENA faculty on Rickover's third floor!

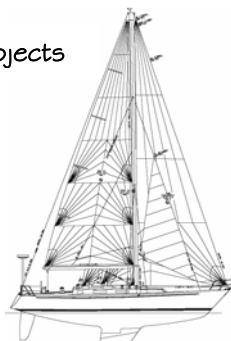
Below is the course matrix for the Class of 2013. The top five rows show the USNA core courses; classes that all midshipmen take. The middle rows show the courses required of all engineers. The bottom rows show the naval architecture major courses. Each course provides interesting and applicable information 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. Our major also provides the voluntary opportunity for students to focus their interests in specific elective tracks such as Design, Construction Management, Marine Power Systems, and Materials and Structures. Coming soon is an ENA Honors major and the addition of a marine engineering course. 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		
SM111 4-0-4 Calculus I	SM112 4-0-4 Calculus II	SM221 4-0-4 Calculus III				ES360 0-2-1 Control Systems Lab	ES300 3-0-3 Naval Weapons Systems
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				NS42x 0-2-1 Junior Officer Practicum
			HH2XY 3-0-3 Western Civilization I			3-0-3 Hum/SS Elect. #1	3-0-3 Hum/SS Elect. #2
		EN221 3-2-4 Engr Mech w/ Marine Apps 1	EN222 3-2-4 Engr Mech w/ Marine Apps 2	EM316 2-2-3 Thermo Fluids 1	EM317 2-2-3 Thermo Fluids 2	EN455 3-2-4 Seakeeping and Maneuvering	
		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	EN471 2-2-3 Ship Design I	EN476 0-6-3 Ship Design II
				EN380 3-0-3 Naval Mat'l Sci. and Engineering	EN358 3-2-4 Ship Structures	3-0-3 Math, Sci, Eng. Elective	
						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



24-Sep-09