



Naval Architecture

The Art and Science of Yacht Design

Naval architecture is a related—but distinctly different—field of design compared to civil architecture and engineering. Sailboats must float, they are always in motion (sometimes violently so), they fly through both water and air, and there are many unique forces and performance issues that must be addressed during design. Decks are both living spaces and parts of working machines, and space below is often at a premium, necessitating compact and innovative interior arrangements. Moreover, the principal units of form are curves, rather than straight lines, giving rise to a whole range of special problems in design and construction—and a world of form that, at its best, is achingly beautiful.

This Spring, I will be offering a small 'Special Problems' course, with two objectives in mind: The first is to involve a small group of dedicated students in an ongoing professional design and research project, the design of *Leonora*, a 230-tonne, two-masted sail training schooner for deep-sea international voyages. At this point, the schematic design is complete. As we continue with design development, work will include refining the hull form, determining how to build the interior, further studies of the detailed arrangement and interior design of the boat; fabrication of wooden half-models utilizing CNC technology; development of a comprehensive model of the weight and centre of gravity of the boat, and sailing rig design and detailing.

The second objective is to provide a structured forum for participants to study the fundamentals of naval architecture, including: • preliminary design and planning; • hull form, yacht lines and hull geometry; • ship stability; • ship construction, considering both wooden and steel boats; • hydrodynamics of ship's hulls; • aerodynamics of sails and sailing vessels; • sailing rig design and balance; • various performance parameters.

This class will not be run like a typical subject elective with material presented in lecture format—students will be working on a real professional project. Students must be self-motivated, and both independent and team work will be expected. Background readings will be available, and we will meet as a small working group in seminar format to discuss issues ranging from theory and engineering to design process and aesthetics.

This class will be offered as a variable (2-6) credit class, and if taken for 4 or more credits, may count as an advanced technical elective. Admission to the class is by instructor permission only. *Interior architecture students are welcome.* In most cases, students will need to come into the class with well-established skills in AutoCad, Rhino, and possibly Grasshopper.

Class: ARCH 406/606 Special Projects. Instructor: Stephen Duff. Class meetings Wednesday evening 6:00-9:00 pm. Interested students please attend an informational meeting at 12:00 noon on either Thurs Feb 27 or Mon Mar 2 in LA 278.

