EDUCATIONAL SKILL REQUIREMENTS
Ocean Engineering
1103 Subspecialty
472 Curriculum

1. Curriculum Number: 472 (Ocean Engineering)

2. Curriculum taught at Civilian Institutions: Florida Atlantic, Hawaii, New Hampshire, Oregon State, Rhode Island, Texas A&M

3. Students are Fully Funded.

4. Curriculum Length in Months: 15-18 Months

5. APC Required: N/A

6. The officer must understand the fundamental concepts and be familiar with the basic functional areas of Ocean Engineering within the Department of the Navy (DON) and the Department of Defense (DOD) including:

   a. Ability to measure and apply the environmental loading effects of wind, currents, waves, and, if available, seismic activity to the design of flexible and rigid structures.

   b. Working knowledge of seafloor sediment and rock, including types and properties, sampling and testing, and ability to use this knowledge to determine facility foundation and anchoring requirements. [Geotechnical course preferably including marine applications]

   c. Understanding of the types of marine materials, their engineering properties, principles of corrosion, and the techniques of cathodic protection for ocean facilities. [Materials course w/corrosion]

   d. Working knowledge of physical oceanography, including a thorough understanding of seawater properties, currents, tides, and meteorological conditions, and ability to predict operational and extreme environmental conditions through the application of advanced probability analysis of wave spectra and classical wave theories. [Physical Oceanography Course]

   e. Basic knowledge of water wave theory, the properties of ocean surface waves and the effects of ocean waves on fixed and floating ocean structures. [Ocean Wave Mechanics Course]
f. Understanding of coastal processes, storm surge, tides, and other physical factors that affect the static and dynamic coastal geomorphology and sediment transport. Ability to determine the effects on structures, shorelines, and harbors. [Coastal Processes and/or Coastal Engineering Course]

g. Understanding of hydrodynamics including fluid flow behavior, resistance determination, and modeling of facility behavior under scaled conditions. [Hydrodynamics or Advanced Fluid Mechanics Course]

h. Basic knowledge of ocean construction practices including methods and limitations of working in the offshore environment on fixed and floating facilities, pipelines, cables, and mooring systems. [Design Course - with ocean project as chosen design]

i. Basic knowledge of the principles of naval architecture including but not limited to hydrostatics, ship stability and operability, materials, fluid dynamics and propulsion.

j. Basic knowledge of project and program management, and systems engineering.

k. A thesis or major report is required for the degree. The topic selected must be applicable to the type of ocean engineering problems typically found in the Navy, or extends knowledge in a particular technical engineering area. POC for coordination of thesis topic is Deputy OFP Director, 202-433 5596.

**ELECTIVE Educational Skills Requirements:**

a. Working knowledge of design methodologies for ocean structures, including finite element and difference models, modal analysis, and general quasi-static analysis. Application of the principles of fatigue and fracture mechanics to the design of ocean facilities. [Numerical Modeling Course]

b. Basic knowledge of the classical branches of geological, biological, or chemical oceanography.

c. Working knowledge of advanced ocean construction practices including methods and limitations of working in the offshore environment on fixed and floating facilities, pipelines, cables, and mooring systems

d. Basic knowledge of the principles of at least one of the following topics: (1) underwater acoustics, (2) hyperbaric design, (3) data instrumentation engineering.
Professional Skill Requirements

a. Basic understanding of data processing and computer techniques for application to engineering problems.

b. Working knowledge of, and ability to apply, business and financial accounting principles.

c. Proficiency in oral and written communications and ability to identify, research, and recommend alternatives to various engineering problems for presentation to both technical and non-technical managers.

Candidates are required to complete all CORE ESRs over the course of the graduate degree and must also complete a minimum of one ELECTIVE ESR.

Professional Skill Requirements must be maintained and improved throughout the graduate degree process.