

2014-2016 EDUCATIONAL SKILL REQUIREMENTS  
Facilities Engineering  
1101 Subspecialty  
470x Curriculum

1. Curriculum Number: 470A (Construction Option)
2. Curriculum taught at Civilian Institutions: Alabama, Arizona State, California at Berkeley, Carnegie Mellon, UCLA, Cincinnati, Clemson, Colorado, Colorado State, Florida, Georgia Tech, Hawaii, Illinois at Urbana-Champaign, Kentucky, LSU, Maryland, UNLV, North Carolina State, Oregon State, Purdue, Rutgers, San Diego State, Stanford, Texas at Austin, Texas A&M, Virginia Tech, Washington, Wisconsin Madison.
3. Students are Fully Funded.
4. Curriculum Length in Months: 9-12 Months
5. APC Required: N/A
6. Community Managers have agreed to allow billets to be coded for Facilities Engineering/1101 and officers to be educated for this curriculum.

Designator	Officer Community Manager	Approval Date
5100	CDR Jason Wood	1 Aug 2014

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

a. Working knowledge of engineering terms common to construction operations, equipment and material procurement, maintenance, estimating and bidding techniques, work scheduling, quality control techniques, resource allocation, common construction practices, construction organizations, and financing. (General Engineering)

b. Familiarity with basic elements of a contract, types of specifications, general provisions, resolution of legal disputes, and negotiating strategies. (Construction Contracting)

c. Working knowledge of construction equipment to include selection and performance, estimating productivity, and equipment economics. Working knowledge of the physical, chemical, and mechanical properties of construction materials and their non-destructive testing including metals, concrete, timber, asphalt, and soil. **(Construction Estimating and Quality Control)**

d. At least one course which extends knowledge in any of the classical engineering disciplines. Can be in any technical area, such as structural engineering, pavement design, environmental engineering, soils analysis or design, hydraulics, hydrology, mechanical or electrical engineering. **(Classical Engineering)**

e. Familiarity with solid waste management and water/wastewater distribution, treatment, and disposal systems. **(Wastewater Management)**

f. Knowledge of problems meeting the growing energy demand. Selection of energy sources and their corresponding advantages and disadvantages. **(Energy Demand and Sources)**

g. Basic understanding of data processing and computer techniques for application to engineering problems. **(Data Processing)**

h. Working knowledge of and ability to apply business and financial accounting principles. **(Accounting)**

i. 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. **(Communication - Oral and Written)**

j. If a thesis or major report is required for the degree, the topic selected must be applicable to construction engineering and management problems found in the Navy facilities business or extends knowledge in a particular technical engineering area. **(Thesis/Project)**

Note: Construction Engineering option must be satisfied by courses that address the technical and administrative aspects of the construction process.

2014-2016 EDUCATIONAL SKILL REQUIREMENTS  
Facilities Engineering  
1101 Subspecialty  
470x Curriculum

1. Curriculum Number: 470B (Environmental Option)
2. Curriculum taught at Civilian Institutions: Alabama, Arkansas, Arizona State, California at Berkeley, Carnegie Mellon, Cincinnati, UCLA, Colorado, Colorado State, Connecticut, Florida, Georgia Tech, Hawaii, Illinois at Urbana- Champaign, Kentucky, Maryland, MIT, North Carolina State, ODU, Oregon State, Penn State, Purdue, Rutgers, San Diego State University, South Carolina, Stanford, Texas at Austin, Texas A&M, University of Nevada - Las Vegas, Virginia Tech, Washington, Wisconsin
3. Students are Fully Funded.
4. Curriculum Length in Months: 9-12 Months
5. APC Required: N/A
6. Community Managers have agreed to allow billets to be coded for Facilities Engineering/1101 and officers to be educated for this curriculum.

Designator	Officer Community Manager	Approval Date
5100	CDR Jason Wood	1 Aug 2014

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

a. Knowledge of environmental management and planning processes including political and economic considerations. Introduction to practical procedures and decisions that public servants, lawyers, engineers and citizens confront with regard to the environmental option. (Ethics)

b. Understanding of physical and chemical unit processes used for treatment of potable water and wastewater. Ability to interpret water quality/quantity data and knowledge of Federal, State and local requirements to design appropriate treatment and supply systems to meet Navy needs. (Water Quality)

c. Understanding of the effect of pollutants on the ecology and quality of waterways, including an introduction to computer transport modeling techniques. (Water Ecology)

d. Knowledge of fundamental aspects of microbiology and biochemistry as related to effects on water and soil environments, including an introduction to the concept of natural treatment systems and bioengineering for pollution control. (Biochemistry in Pollution Control)

d. Ability to understand and apply chemical principles to aqueous and gas phase kinetics that permit pollutant capture, transformation or destruction in pollution control systems. (Chemistry in Pollution Control)

e. Working knowledge of solid and hazardous waste disposal concepts and methods to minimize/recover/recycle these wastes. (Hazardous Waste Disposal)

f. Understanding of water transport in open channels and closed piping systems, as well as groundwater flow and monitoring. (Fluids)

g. Introduction to legal and regulatory processes that apply to environmental protection, including basic statutes and the role of the Federal, State and local government in environmental protection. (Environmental Law)

h. Knowledge of problems meeting the growing energy demand. Selection of energy sources and their corresponding advantages and disadvantages. (Energy Demand and Sources)

i. Basic understanding of data processing and computer techniques for application to engineering problems. (Data Processing)

j. Working knowledge of and ability to apply business and financial accounting principles. (Accounting)

k. 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. (Communication)

1. If a thesis or major report is required for the degree, the topic selected must be applicable to environmental problems found in the Navy or extends knowledge in a particular technical engineering area. (Thesis/Report)

2014-2016 EDUCATIONAL SKILL REQUIREMENTS  
Facilities Engineering  
1101 Subspecialty  
470x Curriculum

1. Curriculum Number: 470C (Geotechnical/Soils Option)
2. Curriculum taught at Civilian Institutions: Arkansas, Arizona State, California at Berkeley, Cincinnati, Clemson, Colorado, Colorado State, Connecticut, Florida, Georgia Tech, Hawaii, Kentucky, Maryland, MIT, North Carolina State, Oregon State, Penn State, Purdue, Rutgers, South Carolina, Stanford, Texas at Austin, Texas A&M, University of Nevada - Las Vegas, Virginia Tech, Washington, Wisconsin
3. Students are Fully Funded.
4. Curriculum Length in Months: 9-12 Months
5. APC Required: N/A
6. Community Managers have agreed to allow billets to be coded for Facilities Engineering/1101 and officers to be educated for this curriculum.

Designator	Officer Community Manager	Approval Date
5100	CDR Jason Wood	1 Aug 2014

7. The officer must understand the fundamental concepts and be familiar with the basic functional areas of Facilities Engineering (Geotechnical/Soils) within the Department of the Navy (DON) and the Department of Defense (DOD) including:

a. Working knowledge of soil and rock as a construction material for building foundations, embankments, dams, roads, earth retaining structures, channels and waterfront structures, including bulkheads, dry-docks and piers. (General Geotech)

b. Ability to apply theoretical principles of soil mechanics to geotechnical engineering problems related to deep and shallow foundations, retaining walls, slopes, braced cuts, embankments, tunnels, compaction of soil, and solid waste disposal. (Soil Mechanics)

c. Understanding of the properties of pavement components, design of flexible and rigid pavements, pavement evaluation, and design tests. (Pavement design)

d. Basic understanding of the techniques and limitations of laboratory and field testing including tests for soil and rock properties, capacity of foundations, and an understanding of field testing data for changes in site conditions that may change design. (Field Testing)

e. Understanding of soil properties and characteristics, and physical and chemical factors that affect engineering soil properties. (Soil Characteristics)

f. Understanding of techniques for the dynamic analysis of soils and foundations related to vibratory and seismic forces. (Dynamic Analysis)

g. Understanding of geotechnical engineering solutions and designs that relate to settlement and heave problems; possible engineering solutions or field testing that may result. (Settlement)

h. Understanding of principles and techniques involved in terrain evaluation by observable geologic surface features, vegetation or drainage patterns, aerial photography or relief mapping media. (Geology)

i. Understanding of principles and properties of groundwater seepage and porous media as related to engineering properties of soil and rock that affect engineering and environmental considerations. (Groundwater)

j. Understanding of engineering solutions of synthetic materials in design and construction applications to strengthen soils or provide seepage control. (Synthetic Materials)

k. Knowledge of problems meeting the growing energy demand. Selection of energy sources and their corresponding advantages and disadvantages. (Energy Demand and Sources)

l. Basic understanding of data processing and computer techniques for application to engineering problems. (Data Processing)

m. Working knowledge of and ability to apply business

and financial accounting principles. (Accounting)

n. 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. (Communication)

o. If a thesis or major report is required for the degree, the topic selected must be applicable to soils/geotechnical problems found in the Navy or extends knowledge in a particular technical engineering area. (Thesis/Project)

2014-2016 EDUCATIONAL SKILL REQUIREMENTS  
Facilities Engineering  
1101 Subspecialty  
470x Curriculum

1. Curriculum Number: 470D (Public Works Option)
2. Curriculum taught at Civilian Institutions: Florida, Purdue, Texas A&M
3. Students are Fully Funded.
4. Curriculum Length in Months: 9-12 Months
5. APC Required: N/A
6. Community Managers have agreed to allow billets to be coded for Facilities Engineering/1101 and officers to be educated for this curriculum.

Designator	Officer Community Manager	Approval Date
5100	CDR Jason Wood	1 Aug 2014

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

a. Understand the principles of and be able to organize, plan, direct, coordinate, and control activities where people, money, and materials are efficiently and economically combined to provide effective engineering and facilities support services. Implicit is an understanding of the technical and managerial instruments available for proposing and implementing objectives, policies, and programs; policy analysis, program planning, and budgeting; accounting, evaluation, and control; and manpower planning. **(Organizational Management)**

b. Familiarity with solid waste management and water/wastewater distribution, treatment, and disposal systems. **(Wastewater Treatment)**

c. General knowledge of systems analysis problems solving models, network analysis, benefit-cost analysis, and the role of

systems analysis in public works decision making. (Public Works Analysis)

d. Working knowledge of utilities, including generation, distribution, and conservation techniques. (Utilities)

e. Understanding of labor relations and collective bargaining. (Labor Relations)

f. Understanding of basic fundamentals of urban planning, effective land use development, and general real estate concepts. (Urban Planning)

g. Basic understanding of facility energy conservation techniques and environmental regulatory concepts. (Facility Energy Conservation)

h. At least one course which extends knowledge in any of the classical engineering disciplines. Course(s) can be in any technical area such as structural engineering, pavement design, environmental engineering, transportation design and analysis, soils analysis or design, hydraulics, hydrology, mechanical engineering or electrical engineering. (Technical Engineering)

i. Knowledge of problems meeting the growing energy demand. Selection of energy sources and their corresponding advantages and disadvantages. (Energy Demand and Sources)

j. Basic understanding of data processing and computer techniques for application to engineering problems. (Data Processing)

k. Working knowledge of and ability to apply business and financial accounting principles. (Accounting)

l. 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. (Communication)

m. If a thesis or major report is required for the degree, the topic selected must be applicable to public works engineering problems found in the Navy facilities business or extends knowledge in a particular technical engineering area. (Thesis/Project)

2014-2016 EDUCATIONAL SKILL REQUIREMENTS  
Facilities Engineering  
1101 Subspecialty  
470x Curriculum

1. Curriculum Number: 470E (Structural Option)
2. Curriculum taught at Civilian Institutions: Alabama, Arkansas, Arizona State, California at Berkeley, UCLA, Cincinnati, Clemson, Colorado, Colorado State, Connecticut, Florida, Georgia Tech, Hawaii, Illinois at Urbana-Champaign, Kentucky, LSU, Maryland, MIT, North Carolina State, Oregon State, Penn State, Purdue, Rutgers, San Diego State University, South Carolina, Stanford, Texas at Austin, Texas A&M, University of Nevada - Las Vegas, Virginia Tech, Washington, Wisconsin
3. Students are Fully Funded.
4. Curriculum Length in Months: 9-12 Months
5. APC Required: N/A
6. Community Managers have agreed to allow billets to be coded for Facilities Engineering/1101 and officers to be educated for this curriculum.

Designator	Officer Community Manager	Approval
5100	CDR Jason Wood	1 Aug 2014

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

a. In-depth knowledge of construction materials, particularly reinforced concrete and steel, and their performance characteristics including tensile strength, yield strength, modulus of elasticity, ductility, and toughness.  
(General Structures)

b. Working knowledge of matrix analysis techniques and the finite element method (FEM) of structural analysis; including capability to develop and provide design criteria for computer input and interpret the output in terms of magnitude and distribution of internal forces including moments and shears.

Note: The requirements for the public works engineering option should be satisfied by courses which emphasize the technical and administrative aspects of public works. Courses in the school of engineering should generally be taken in lieu of the more theoretical courses typically found in business administration curricula.

2014-2016 EDUCATIONAL SKILL REQUIREMENTS  
Facilities Engineering  
1101 Subspecialty  
470x Curriculum

1. Curriculum Number: 470F (Urban, Regional or City Planning Option)
2. Curriculum taught at Civilian Institutions: California at Berkeley, Clemson, Connecticut, Florida, Georgia Tech, Hawaii, Illinois at Urbana- Champaign, Purdue, Texas A&M, Washington
3. Students are Fully Funded.
4. Curriculum Length in Months: 15-18 Months
5. APC Required: N/A
6. Community Managers have agreed to allow billets to be coded for Facilities Engineering/1101 and officers to be educated for this curriculum.

Designator	Officer Community Manager	Approval Date
5100	CDR Jason Wood	1 Aug 2014

7. The officer must understand the fundamental concepts and be familiar with the basic functional areas of Facilities Engineering (Urban, Regional or City Planning) within the Department of the Navy (DON) and the Department of Defense (DOD) including:

a. Understanding of the demographic and socio-economic systems which make up a location including population characteristics and monitoring techniques, employment characteristics, revenue resources, and cultural factors. (Urban Design)

b. Basic understanding of political systems, including municipal organizations and services; multi-jurisdictional coordination; federal, state and regional policy, programs and support; and capital improvement programs. (Public Policy)

**(Finite Element Analysis)**

c. Capability to establish the limit of structural elastic response and its relation to the failure load and extend the analysis into the inelastic range through an understanding of plastic analysis or ultimate loading principles.  
**(Steel/Concrete/Timber Design)**

d. Basic understanding of the probabilistic responses of various structures to seismic accelerations. Understanding of single and multi-degrees of freedom in seismic modeling.  
**(Seismic Response)**

e. Sound foundation in the principles, techniques and methods of engineering and the related mathematical and physical sciences including the physical and chemical properties of engineering materials and the uses, limits, and benefits of these materials. **(Foundation Design)**

f. Knowledge of problems meeting the growing energy demand. Selection of energy sources and their corresponding advantages and disadvantages. **(Energy Demand and Source)**

g. Basic understanding of data processing and computer techniques for application to engineering problems. **(Data Processing)**

h. Working knowledge of and ability to apply business and financial Working knowledge of and ability to apply business and financial accounting principles.  
**(Accounting)**

i. 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. **(Communication)**

j. If a thesis or major report is required for the degree, the topic selected must be applicable to structural problems found in the Navy or extends knowledge in a particular technical engineering area often relied upon by the Navy.  
**(Thesis/Project)**

2014-2016 EDUCATIONAL SKILL REQUIREMENTS  
Facilities Engineering  
1101 Subspecialty or 3000 if member already holds 1101  
470x Curriculum

1. Curriculum Number: 470G (Facilities Financial Program Management Option)
2. Curriculum taught at NPS and Civilian Institutions:  
Florida, Hawaii, Rhode Island
3. Students are Fully Funded.
4. Curriculum Length in Months: 9-12 Months
5. APC Required: N/A
6. Community Managers have agreed to allow billets to be coded for Facilities Engineering/1101 or 3000 and officers to be educated for this curriculum.

Designator	Officer Community Manager	Approval
5100	CDR Jason Wood	Date
		1 Aug 2014

7. The officer must understand the fundamental concepts and be familiar with the basic functional areas of Facilities Engineering (Facilities Financial Program Management) within the Department of the Navy (DON) and the Department of Defense (DOD) including:

a. Working knowledge of engineering terms common to construction operations, equipment and material procurement, maintenance, estimating and bidding techniques, work scheduling, quality control techniques, resource allocation, common construction practices, construction organizations, and financing. **(General Engineering)**

b. Understand the operating processes and concepts of the private sector and apply these processes and concepts to acquisition of facilities and services through joint ventures and other innovative business practices. **(Facility Finance)**

c. Understand private and public organizational financing, including corporate financial structures; cost and financial

c. Working knowledge of land use planning including considerations of zoning regulations and laws; environmental concerns such as aesthetics, development density, open space, protection and preservation of scarce resources and cultural artifacts; and factors impacting housing, transportation, utilities, and waste treatment/disposal systems. **(Zoning Regulations)**

d. Understanding and ability to incorporate economic dynamics in planning and design. **(Economic Analysis)**

e. Working and practical knowledge of the development, financing, and execution of capital improvement programs. **(Capital Financing)**

f. Basic knowledge of architectural, landscape and urban design. **(Architectural and Urban Design)**

g. Introductory knowledge of physical science including geology, topology, meteorology, climatology, and hydrology. Understanding of bio-systems including terrestrial and marine ecosystems and habitat associations. **(Terrestrial Systems)**

h. Knowledge of problems meeting the growing energy demand. Selection of energy sources and their corresponding advantages and disadvantages. **(Energy Demand and Sources)**

i. Basic understanding of data processing and computer techniques for application to engineering problems. **(Data Processing)**

j. Working knowledge of and ability to apply business and financial accounting principles. **(Accounting)**

k. 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. **(Communications)**

l. If a thesis or major report is required for the degree, the topic selected must be applicable to planning issues found in the Navy. **(Thesis/Project)**

accounting; capital budgeting techniques; financial engineering, and financial analysis. Knowledge of the principles of economics, including monetary and fiscal theories. (Accounting)

d. Understand methods to develop and implement a financial planning structure in conformity with fiscal restraints and government policy. Implicit is an ability to employ various techniques for financial analysis, allocation of funds, and developing alternate sources and forms of financing for capital projects. (Economics)

e. Understand methods to collect, process, analyze, and report information generated by organizations, based on approved financial and management accounting concepts. (Accounting - Financial and Management Concepts)

f. Knowledge of the theories, principles, and techniques of interdisciplinary management of a complex business venture, including the disciplines of systems design, resource allocation, managerial theory, optimization techniques, and cost-benefit analysis. (Interdisciplinary Management of Complex Business - Systems, Optimization, Cost-benefit)

g. Knowledge of statistics relative to decision-making, probability theory, sampling techniques, contingency table analysis, hypothesis testing, simple and multiple regression analysis, and analysis of variance. (Probability and Statistics)

h. Knowledge of problems meeting the growing energy demand. Selection of energy sources and their corresponding advantages and disadvantages. (Energy Demand and Sources)

i. Basic understanding of information systems, data processing and computer techniques for application to financial problems. (Data Processing)

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

k. If a thesis or major report is required for the degree, the topic selected must be applicable to facilities acquisition or business practices relative to the Navy facilities business or extends knowledge in a particular technical engineering area. (Thesis/Project)

Note: The requirements for the facilities acquisition option should be satisfied by courses which emphasize the business practices and innovative acquisition strategies to improve capitalization and re- capitalization of Navy shore facilities. Courses in the school of business should generally be taken in lieu of the more specialized technical courses typically found in an engineering curriculum.

2014-2016 EDUCATIONAL SKILL REQUIREMENTS  
Facilities Engineering  
1101 Subspecialty  
470x Curriculum

1. Curriculum Number: 470H (Engineering Management Option)
2. Curriculum taught at Civilian Institutions: Alabama, California State at Northridge, Colorado, LSU, Maryland, ODU
3. Students are Fully Funded.
4. Curriculum Length in Months: 9-12 Months
5. APC Required: N/A
6. Community Managers have agreed to allow billets to be coded for Facilities Engineering/1101 and officers to be educated for this curriculum.

Designator	Officer Community Manager	Approval Date
5100	CDR Jason Wood	1 Aug 2014

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

a. Working knowledge of engineering terms common to equipment and material procurement, maintenance, estimating and bidding techniques, work scheduling, quality control techniques, resource allocation, common construction practices, construction organizations, and financing. **(General Engineering)**

b. Familiarity with basic elements of a contract, types of specifications, general provisions, resolution of legal disputes, and negotiating strategies. **(Construction Contracts)**

c. At least one course which extends knowledge in any of the classical engineering disciplines. Can be in any technical area, such as structural engineering, pavement design, environmental engineering, soils analysis or design, hydraulics, hydrology, mechanical or electrical engineering. **(Technical Engineering)**

d. Knowledge of problems meeting the growing energy demand. Selection of energy sources and their corresponding advantages and disadvantages. **(Energy Demand and Sources)**

e. Basic understanding of data processing and computer techniques for application to engineering problems. **(Data Processing)**

f. Working knowledge of and ability to apply business and financial accounting principles. **(Accounting)**

g. Technical analysis of process, organizational, and production issues encountered in the industry. **(Production analysis)**

h. Organizational analysis of language, concepts and principles related to integrating technical, structural, and human aspects of organizations. Identifying and resolving organizational issues within technical enterprises. **(Organizational Management)**

i. 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. **(Communication)**

j. If a thesis or major report is required for the degree, the topic selected must be applicable to engineering and management problems found in the Navy facilities business or extends knowledge in a particular technical engineering area. **(Thesis/Project)**

2014-2016 EDUCATIONAL SKILL REQUIREMENTS  
Facilities Engineering  
1101 Subspecialty  
470x Curriculum

1. Curriculum Number: 470I (Architecture and Urban Design Option)
2. Curriculum taught at Civilian Institutions: Georgia Tech, UCLA
3. Students are Fully Funded.
4. Curriculum Length in Months: 9-12 Months
5. APC Required: N/A
6. Community Managers have agreed to allow billets to be coded for Facilities Engineering/1101 and officers to be educated for this curriculum.

Designator	Officer Community Manager	Approval Date
5100	CDR Jason Wood	1 Aug 2014

7. The officer must understand the fundamental concepts and be familiar with the basic functional areas of Facilities Engineering (Architecture and Urban Design) within the Department of the Navy (DON) and the Department of Defense (DOD) including:

a. Understanding of the demographic and socio-economic systems which make up a location, including population characteristics and monitoring techniques, employment characteristics, revenue resources, and cultural factors. (Urban Demographics)

b. Basic understanding of political systems, including municipal organizations and services; multi-jurisdictional coordination; federal, state and regional policy, programs and support; and capital improvement programs. (Urban Policy and Programs)

c. Working knowledge of land use planning including considerations of zoning regulations and laws; environmental

concerns such as aesthetics, development density, open space, protection and preservation of scarce resources and cultural artifacts; and factors impacting housing, transportation, utilities, and waste treatment/disposal systems. (Urban Planning)

d. Understanding and ability to incorporate economic dynamics in planning and design. (Economic Planning and design)

e. Working and practical knowledge of the development, financing, and execution of capital improvement programs. (Capital Finance)

f. Basic knowledge of architectural, landscape and urban design. (General Urban Design)

g. Introductory knowledge of physical science including geology, topology, meteorology, climatology, and hydrology. Understanding of bio-systems, including terrestrial and marine ecosystems and habitat associations. (Terrestrial Systems)

h. Knowledge of problems meeting the growing energy demand. Selection of energy sources and their corresponding advantages and disadvantages. (Energy Demand and Sources)

i. Basic understanding of data processing and computer techniques for application to architecture/ engineering problems. (Data Processing)

j. Working knowledge of and ability to apply business and financial accounting principles. (Accounting)

k. Proficiency in oral and written communications and ability to identify, research, and recommend alternatives to various architecture/engineering problems for presentation to both technical and non-technical managers. (Communication)

l. If a thesis or major report is required for the degree, the topic selected must be applicable to facilities planning issues found in the Navy. (Thesis/Project)

2014-2016 EDUCATIONAL SKILL REQUIREMENTS  
Facilities Engineering  
1101 Subspecialty  
471 Curriculum

1. Curriculum Number: 471 Electrical Engineering (Shore Facilities)
2. Curriculum taught at Civilian Institutions: Arkansas, California at Berkeley, Colorado, Colorado State, Florida, Georgia Tech, Illinois at Urbana-Champaign, Maryland, North Carolina State, Penn State, Purdue, Rhode Island, South Carolina, Texas at Austin, Texas A&M, Washington
3. Students are Fully Funded.
4. Curriculum Length in Months: 9-12 Months
5. APC Required: N/A
6. Community Managers have agreed to allow billets to be coded for Facilities Engineering/1101 and officers to be educated for this curriculum.

Designator	Officer Community Manager	Approval Date
5100	CDR Jason Wood	1 Aug 2014

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

a. Theoretical and working knowledge of power systems engineering, including various power sources power supply protection, reliability and fault analysis, and systems grounding. (Power Systems)

b. Ability to plan and design electrical systems to include a working knowledge of load characteristics, voltage considerations, circuit arrangements and overhead and underground systems. (Electrical System Design)

c. Working knowledge of protective devices and relays.

(Electrical Systems - Circuits)

d. Basic understanding of the functions of transformers, regulators, rectifiers, converters and inverters. (Electrical Systems - Transformers)

e. Basic understanding of and ability to apply principles of control systems. (Electrical Systems - Control Systems)

f. Basic understanding of electromagnetic communications systems. (Electrical Systems - Communications)

g. Knowledge of problems meeting the growing energy demand. Selection of energy sources and their corresponding advantages and disadvantages. (Energy Demand and Sources)

h. Basic understanding of data processing and computer techniques for application to engineering problems. (Data Processing)

i. Working knowledge of and ability to apply business and financial accounting principles. (Accounting)

j. 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. (Communications)

k. If a thesis or major report is required for the degree, the topic selected must be applicable to electrical engineering problems found in the Navy facilities business or extends knowledge in a particular technical engineering area. (Thesis/Project)

2014-2016 EDUCATIONAL SKILL REQUIREMENTS  
Facilities Engineering  
1101 Subspecialty  
473x Curriculum

1. Curriculum Number: 473A Mechanical Engineering (Shore Facilities Option)
2. Curriculum taught at Civilian Institutions: Arkansas, California at Berkeley, Colorado, Colorado State, Connecticut, Florida, Georgia Tech, Hawaii, Illinois at Urbana-Champaign, Maryland, North Carolina State, Oregon State, Penn State, Purdue, Rutgers, South Carolina, Texas at Austin, Texas A&M, Washington
3. Students are Fully Funded.
4. Curriculum Length in Months: 9-12 Months
5. APC Required: N/A
6. Community Managers have agreed to allow billets to be coded for Facilities Engineering/1101 and officers to be educated for this curriculum.

Designator	Officer Community Manager	Approval Date
5100	CDR Jason Wood	1 Aug 2014

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

- a. Application of basic principles of thermodynamics, heat transfer, and fluid mechanics to the analysis and design of industrial system components and equipment. (Thermodynamics)
- b. Working knowledge of mechanical engineering problems associated with electrical power production in steam power plants, gas turbine engines, fossil fuel power plants and nuclear power plants. (Electrical Power Production)
- c. Understanding of basic heating, ventilating and air-conditioning system design, including central plant components

and equipment; understanding designs to control air pollutants; absorption and adsorption of gaseous pollutants; and air quality modeling/monitoring. (Heating and Ventilation)

d. Knowledge of problems meeting the growing energy demand. Selection of energy sources and their corresponding advantages and disadvantages. (Energy Demand and Sources)

e. Understanding of simulation methods of modeling techniques as methods of solving problems associated with mechanical design; including a basic understanding of data processing and computer techniques for application to engineering problems. (Mathematical Modeling)

f. Working knowledge of and ability to apply business and financial accounting principles. (Accounting)

g. 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. (Communication)

h. If a thesis or major report is required for the degree, the topic selected must be applicable to mechanical engineering problems found in the Navy facilities business or extends knowledge in a particular technical engineering area. (Thesis/Report)

i. Specialize in one of the three mechanical engineering specialty areas as detailed below. Curriculum course content shall provide coverage of the majority of subtopics shown under either "Thermal", "Fluids" or "Materials/Machine Design" as indicated. (Specialized Mechanical Engineering)

Fluids	Thermal	Materials/Machine Design
Navier-Stokes equations	Mass transfer and transport properties	Machine design - turbomachinery
Boundary layer theory	Droplet, particle and slurry dynamics	Pumps
Two-dimensional incompressible and compressible fluids	Flammability, ignition, extinction & flame stability	Compressors
Viscous flow in laminar and turbulent layers	Combustion in flow systems	Fans
Applications to turbomachinery	Sprays	Gears
Flow measurement techniques	Laminar and detonation waves	Robotics
Control methods for unsteady flow	Vapor/combustion/refrigeration/compression	Control systems
Analysis of fluid networks / devices		Hydraulics & Pneumatics

2014-2016 EDUCATIONAL SKILL REQUIREMENTS  
Facilities Engineering  
1101 Subspecialty  
473x Curriculum

1. Curriculum Number: 473B Mechanical Engineering (Energy Management Option)
2. Curriculum taught at Civilian Institutions: California at Berkeley, Colorado, Colorado State, University of Illinois at Urbana-Champaign, Maryland, North Carolina State, Carnegie Mellon
3. Students are Fully Funded.
4. Curriculum Length in Months: 9-12 Months
5. APC Required: N/A
6. Community Managers have agreed to allow billets to be coded for Facilities Engineering/1101 and officers to be educated for this curriculum.

Designator	Officer Community Manager	Approval Date
5100	CDR Jason Wood	1 Aug 2014

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

a. Understanding of the basic workings of the systems that supply, distribute, and utilize energy. This can include fossil fuels, nuclear energy, and renewable sources. (Energy Conversion and Supply)

b. Knowledge of current energy demands across various sectors and understanding of tools and technologies used to measure efficiencies and energy demand response. (Energy Demand and Utilization)

c. Understanding energy and environmental policy and the economic impacts of public policy related to the energy and environment. **(Energy Policy and Economics)**

d. Knowledge of renewable energy sources, availability, implementation and management of renewable resources. **(Renewable Energy)**

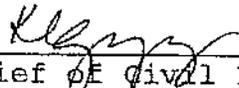
e. Understanding of simulation methods of modeling techniques as methods of solving problems associated with energy system; including a basic understanding of data processing and computer techniques for application to engineering problems. **(Mathematical Modeling)**

f. Working knowledge of and ability to apply business and financial accounting principles. **(Accounting)**

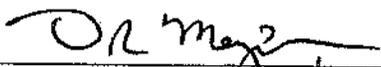
g. Proficiency in oral and written communications and ability to identify research and recommend alternatives to various engineering problems for presentation to both technical and non-technical managers. **(Communication)**

h. If a thesis or major report is required for the degree, the topic selected must be applicable to energy problems found in the Navy facilities business or extends knowledge in a particular technical energy area. **(Thesis/Project)**

2014-2016 EDUCATIONAL SKILL REQUIREMENTS  
Facilities Engineering  
1101 Subspecialty  
470/471/473 Curricula

APPROVED  7/21/15  
Chief of Civil Engineers (NAVFAC) (DATE)

APPROVED  AUG 28 2015  
President, Naval Postgraduate School (DATE)

APPROVED  10/13/2015  
Director, TEMTE (OPNAV N12) (DATE)