2011-2013 EDUCATIONAL SKILL REQUIREMENTS
Facilities Engineering
1101 Subspecialty
470x Curriculum

1. Curriculum Number: 470A (Construction Option)


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 Name: Approval Date: 5100 CDR Jeff Deviney 1 August 2011

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.

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

   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.

Enclosure (3)
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.

e. Knowledge of problems meeting the growing energy demand. Selection of energy sources and their corresponding advantages and disadvantages.

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

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

h. 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.

i. 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.

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

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(Sponsor's Name/Date)  

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(DATE)

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(NPS/SIGNATURE)  

12/14/11  
(DATE)

Curriculum Review Approved:

Director, Training and Education Division (N15)
EDUCATIONAL SKILL REQUIREMENTS
Facilities Engineering
1101 Subspecialty
470x Curriculum

1. Curriculum Number: 470B (Environmental Option)


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 Name Approval Date
   5100 CDR Jeff Deviney 1 August 2011

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.

   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.

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

e. Ability to understand and apply chemical principles to aqueous and gas phase kinetics that permit pollutant capture, transformation or destruction in pollution control systems.

f. Working knowledge of solid and hazardous waste disposal concepts and methods to minimize/recover/recycle these wastes.

g. Understanding of water transport in open channels and closed piping systems, as well as groundwater flow and monitoring.

h. 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.

i. Knowledge of problems meeting the growing energy demand. Selection of energy sources and their corresponding advantages and disadvantages.

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

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

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.

m. 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.

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(NPS/SIGNATURE)

DATE

Curriculum Review Approved:

Director, Training and Education Division (N15)
EDUCATIONAL SKILL REQUIREMENTS
Facilities Engineering
1101 Subspecialty
470x Curriculum

1. Curriculum Number: 470C (Geotechnical/Soils Option)


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.

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<td>1 August 2011</td>
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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.

   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.

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

   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.
e. Understanding of soil properties and characteristics, and physical and chemical factors that affect engineering soil properties.

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

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

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.

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.

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

k. Knowledge of problems meeting the growing energy demand. Selection of energy sources and their corresponding advantages and disadvantages.

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

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

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.

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.

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(Sponsor's Name/Date)

Approved
(NPS/Signature)

Curriculum Review Approved:

Director, Training and Education Division (N15)
EDUCATIONAL SKILL REQUIREMENTS
Facilities Engineering
1101 Subspecialty
470x Curriculum

1. Curriculum Number: 470D (Public Works Option)

2. Curriculum taught at Civilian Institutions: Florida, MIT, North Carolina State, 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 Name Approval Date
5100 CDR Jeff Deviney 1 August 2011

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.

   b. Familiarity with solid waste management and water/wastewater distribution, treatment, and disposal systems.

   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.

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

   e. Understanding of labor relations and collective bargaining.
f. Understanding of basic fundamentals of urban planning, effective land use development, and general real estate concepts.

g. Basic understanding of facility energy conservation techniques and environmental regulatory concepts.

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.

i. Knowledge of problems meeting the growing energy demand. Selection of energy sources and their corresponding advantages and disadvantages.

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

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

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.

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.

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.

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Curriculum Review Approved:

Director, Training and Education Division (N15)
EDUCATIONAL SKILL REQUIREMENTS
Facilities Engineering
1101 Subspecialty
470x Curriculum

1. Curriculum Number: 470E (Structural Option)


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 Name Approval Date
5100 CDR Jeff Deviney 1 August 2011

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.

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.

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.
d. Basic understanding of the probabilistic responses of various structures to seismic accelerations. Understanding of single and multi degrees of freedom in seismic modeling.

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.

f. Knowledge of problems meeting the growing energy demand. Selection of energy sources and their corresponding advantages and disadvantages.

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

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

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.

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.

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Curriculum Review Approved:

Director, Training and Education Division (N15)
EDUCATIONAL SKILL REQUIREMENTS
Facilities Engineering
1101 Subspecialty
470x Curriculum

1. Curriculum Number: 470F (Urban, Regional or City Planning Option)


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.

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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.

   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.

   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.

   d. Understanding and ability to incorporate economic dynamics in planning and design.
e. Working and practical knowledge of the development, financing, and execution of capital improvement programs.

f. Basic knowledge of architectural, landscape 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.

h. Knowledge of problems meeting the growing energy demand. Selection of energy sources and their corresponding advantages and disadvantages.

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

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

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.

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.

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(SPONSOR'S NAME/DATE)

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(DATE)

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(Director's Signature)

12/17/14

(DATE)

Curriculum Review Approved:

(Signature)

7 June 2012

Director, Training and Education Division (N15)
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 Name  Approval Date
5100  CDR Jeff Deviney  1 August 2011

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.

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

c. Understand private and public organizational financing, including corporate financial structures; cost and financial accounting; capital budgeting techniques; financial engineering, and financial analysis. Knowledge of the principles of economics, including monetary and fiscal theories.

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.

e. Understand methods to collect, process, analyze, and report information generated by organizations, based on approved financial and management accounting 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.

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.

h. Knowledge of problems meeting the growing energy demand. Selection of energy sources and their corresponding advantages and disadvantages.

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

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.

k. Satisfy Defense Acquisition Workforce Improvement Act requirements for 24 hours of business or business related courses for Acquisition Professional Community certification.

l. 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.

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 recapitalization 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 curricula.
EDUCATIONAL SKILL REQUIREMENTS
Facilities Engineering
1101 Subspecialty
470x Curriculum

1. Curriculum Number: 470H (Engineering Management Option)

2. Curriculum taught at Civilian Institutions: California State at
Northridge, 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.

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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.

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

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.

d. Knowledge of problems meeting the growing energy demand. Selection of energy sources and their corresponding advantages and disadvantages.

e. Basic understanding of data processing and computer techniques for application to engineering problems.
f. Working knowledge of and ability to apply business and financial accounting principles.

g. Technical analysis of process, organizational, and production issues encountered in the industry.

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.

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.

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.

Curriculum Review Approved:
EDUCATIONAL SKILL REQUIREMENTS
Facilities Engineering
1101 Subspecialty
470x Curriculum

1. Curriculum Number: 470I (Architecture and Urban Design Option)

2. Curriculum taught at Civilian Institutions: 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 Name Approval Date
5100 CDR Jeff Devinney 1 August 2011

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.

   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.

   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.

   d. Understanding and ability to incorporate economic dynamics in planning and design.

   e. Working and practical knowledge of the development, financing, and execution of capital improvement programs.
f. Basic knowledge of architectural, landscape 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.

h. Knowledge of problems meeting the growing energy demand. Selection of energy sources and their corresponding advantages and disadvantages.

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

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

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.

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.

CURRICULUM REVIEW APPROVED:

Director, Training and Education Division (N15)
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, Florida, Georgia Tech, Illinois at Urbana-Champaign, Maryland, North Carolina State, Penn State, Purdue, 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. The officer must understand the fundamental concepts and be familiar with the basic functional areas of Facilities Engineering (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.

   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.

   c. Working knowledge of protective devices and relays,

   d. Basic understanding of the functions of transformers, regulators, rectifiers, converters and inverters.

   e. Basic understanding of and ability to apply principles of control systems.

   f. Basic understanding of electromagnetic communications systems.

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

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

j. 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.