1. Curriculum Number: 590/593

2. Curriculum taught at NPS

3. Students are fully Funded

4. Curriculum Length in Months: 24

5. Months the program starts: Jan, Mar, Jun, Sep

6. APC Required 323

7. Community Managers have agreed to allow billets to be coded for 590/593 and Officers to be educated for these curricula.

**ESR 1: Mathematics:** The officer will have a thorough knowledge of mathematical tools, which are intrinsic to electrical and computer systems engineering, including but not limited to differential equations, vector analysis, linear algebra, probability, and Fourier and Laplace methods.

**ESR 2: Engineering Science and Design:** To acquire the requisite background needed to meet the other military education requirements, the officer will acquire proficiency in modern physics, electromagnetics, electronic devices and circuits, system theory, modern electronic system design, and integrated electrical power systems and their controls. In addition, proficiency will be gained in other appropriate fields, such as underwater acoustics, dynamics, fluid mechanics, thermodynamics, or energy science and technology that provide the requisite breadth to a military engineering education.

**ESR 3: Electronic and Electrical Engineering:** In order to provide officers skilled in the application of electronic systems to military needs, the officer will have competence in the broad area of electrical engineering including circuits, electronics, computer and communications networks, and systems engineering. To achieve depth and breadth of understanding, the officer shall specialize in a minimum of two from the following areas: (a) Electronics - Including semiconductor nanotechnology for defense-related
electronic technologies; reliability and radiation hardening for electronic military systems; solar cell photovoltaic components; engineering techniques for analog IC design, modeling and simulation (b) Communication Systems - including radio communications, modulation, forward error correction coding, electronic countermeasures, software defined radio, and other military issues (c) Guidance, Control & Navigation Systems - including robotics, unmanned systems, avionics systems, target tracking, sensors as applied to guidance and control, and data association (d) Power/Energy Systems - including shipboard electric machinery, converters for advanced shipboard electric power and the simulation and analysis of power electronic drives, or alternative energy generation and utilization, and energy conservation and storage (e) Signal Processing Systems - including signal analytics for efficient extraction, representation, and identification of information as applied to surveillance, signals intelligence, RF and underwater data acquisition and processing, imaging and other defense-related issues (f) Cyber Systems - including a rigorous treatment of the cyber infrastructure, reverse engineering of cyber systems, cyber systems vulnerabilities and risk assessment, cyber warfare systems, telecommunications systems engineering, and Internet engineering (g) Computer Systems - including logic design, FPGA and ASIC design, computer architecture and the hardware/software interface, parallel and distributed computing, embedded and real-time computing, high-reliability and reconfigurable computing, computer systems modeling, simulation, and analysis (h) Sensor Systems Engineering - including radar, sonar, RF and microwave devices, infrared and electro-optical imaging and tracking, antennas and propagation, network-enabled electronic warfare, and spectrum management (i) Network Engineering - including wireless networks, sensor networks, high speed data networking, the Internet and telecommunication systems.

**ESR 4: Conducting and Reporting Independent Investigation:**
The officer will demonstrate the ability to conduct independent investigation of a Navy and/or DOD relevant electronic systems problem, to resolve the problem, and to present the results of the analysis in both written and oral form.
Billet subspecialty coding is to be based on the minimum education/training/experience level required for optimum performance. Electrical Systems and Engineering/5300P subspecialty coding is justified when, in addition to the general criteria stated in NAVPERS 15839 series (Manual of Navy Officer Manpower and Personnel Classification) Part B, the following specific criteria are satisfied:

1. Subspecialty Coding Restriction
   a. Billets assigned to: Operations Test and Evaluation/Software Intensive Systems, Instructor Electrical Engineer, Instructor Aerospace Engineer, School Admissions/Associate Chair of Electrical Engineering.

2. Applicable Officer Designators
   d. 1000 - 1000 / 1001 - 1019 / 1020 - 1020 / 1021 - 1049 / 1050 - 1050 / 1051 - 1099
   e. 1100 - 1109 / 1110 - 1119 / 1120 - 1129 / 1130 - 1139 / 1140 - 1159 / 1160 - 1169 / 1170 - 1179 / 1180 - 1189 / 1190 - 1199
   f. 1200 - 1209 / 1200 - 1299 / 1300 - 1399 / 1400 - 1499 / 1510 - 1519 / 1800 - 1809 / 1810 - 1829

3. Applicable Billet Designator
   d. 5300P (Masters Level)
   e. 5300N (Engineers Degree)
   f. 5300D (Doctorate Level)

4. Significant Experience Criteria
   a. Electrical Systems and Engineering - 5300 S-coded billets are authorized when the following conditions are met:
      (1) The duties required detailed knowledge of, or experience in specific Electrical Engineering systems, processes, design, acquisition, management or leadership.
      (2) Appropriate training on specific systems, processes, design, acquisition, and management is available and accessible to qualified officers prior to assignment of billets.
b. Electrical Systems and Engineering - 5300 S-coded officers are authorized when:

(1) The Officer has filled one B, H, S, R, P, Q coded billet for more than 18 months and has no Subspecialty Code in this field.

(2) FITREP justifies that s/he has accomplished the task(s) indicated above for more than 18 continuous months.

c. Electrical Engineering - 5300 R-coded billets are authorized when, in addition to the requirement for S-coded billets, the billet must be filled by officers having filled a previous 5300-coded billet. A requirement for familiarity or experience in the specific duties, as though service in a previous billet, should characterize these billets.

d. Electrical Systems and Engineering - 5300 R-coded officers are authorized when:

(1) The Officer has filled one B, H, S, R, P, Q coded billet for more than 18 continuous months and has an S subspecialty code.

(2) Two FITREPs justifies that s/he has accomplished the task(s) indicated above for more than 18 months

5. Baccalaureate Criteria

a. Electrical Systems and Engineering - 5300 B-coded billet and officer codes are not authorized.

6. Elective Level Criteria

a. Electrical Systems and Engineering - 5300 H-coded billets are authorized for:

(1) Billets requiring expertise in Electrical Systems and Engineering where a masters level of knowledge is desirable but not essential for optimum performance.

7. Functional Education Criteria

a. Electrical Systems and Engineering - 5300 F-coded officers are authorized when:

(1) An Officer has not completed all required ESR's (not completed a Thesis at NPS).

(2) An Officer attends a Civilian Institution and completes two thirds or greater of the ESRs as determined by the Subject Matter Expert.

Enclosure(4)
b. Electrical and Systems Engineering - 5300 G-coded officers are not authorized/justified when:

(1) An Officer has an F code and completes a tour in a masters degree billet or higher.

8. Masters Criteria for Electrical Systems and Engineering

a. Electrical Systems and Engineering - 5300 P-coded billets are authorized when the billet requires all of the following:

(1) Primary duties requiring the CSRs and ESRs.

b. Electrical Systems and Engineering - 5300 P-coded officers are authorized when:

(1) The Officer completes Electrical Systems and Engineering master's degree at NPS. The officer will receive the F Subspecialty Code if a thesis is not completed. Utilization and obligations are still required.

(2) The officer completes a master's degree at an accredited institution of higher learning that satisfies all 5300 ESRs.

c. Electrical Systems and Engineering - 5300 Q-coded billets are authorized when the billet requires:

(1) All requirements of the P code an detailed knowledge of, or experience in, specific engineering systems, processes, design, acquisition, management or leadership.

d. Electrical Systems and Engineering - 5300 Q-coded officers are authorized when:

(1) They complete Electrical Systems and Engineering 5300 ESRs, either at NPS or another accredited institution, and have done at least 18 months in a master's degree coded billet or higher.

(2) Must have a P-code prior to a Q-coded tour.

(3) F coded officers cannot obtain Q codes. They will be authorized G codes.

9. Post-Masters

a. Electrical Systems and Engineering - 5300 P-coded billets are authorized when the billet requires all of the following:

Enclosure (4)
(1) Primary duties requiring the CSRs, ESRs and an Electrical Engineering degree.

b. Electrical Systems and Engineering - 5300 N-coded officers are authorized when:

(1) They complete Electrical Systems and Engineering 5300 ESRs, either at NPS or another accredited institution as well as earn an Electrical Engineering degree.

10. Doctorate Criteria

a. Electrical Systems and Engineering - 5300 D-coded billets and are authorized when the billet requires:

(1) Primary duties requiring the CSRs, ESRs and a Doctorate Degree in Electrical Systems and Engineering.

b. Electrical Systems and Engineering - 5300 D-coded officers are authorized when:

(1) They complete Electrical Systems and Engineering Doctorate Degree at NPS or another accredited institution.

11. Community Managers and the Budget Submitting Office (BSO) has agreed to allow billets to be coded for Electrical Systems and Engineering - 5300 officers to be educated for this Curriculum. BSO are as follows:

<table>
<thead>
<tr>
<th>BSO</th>
<th>COMMAND</th>
<th>POC</th>
<th>Approval Date</th>
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<tr>
<td>02</td>
<td>Central Operating &amp; Program Support Division (PERS-73)</td>
<td>Apryl Saahir</td>
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<td>11</td>
<td>Field Support Activity (OLM)</td>
<td>Margaret Reed</td>
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<td>Roderick French</td>
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<td>19</td>
<td>Commander, Naval Air Systems Command</td>
<td>Beckie Palmer, John Taroli</td>
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<td><a href="mailto:rebecca.palmer@navy.mil">rebecca.palmer@navy.mil</a></td>
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<td></td>
<td></td>
<td><a href="mailto:john.taroli@navy.mil">john.taroli@navy.mil</a></td>
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<tr>
<td>28</td>
<td>Joint Chief of Staff</td>
<td>Robert Ford</td>
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<td><a href="mailto:Robert.Ford@js.pentagon.mil">Robert.Ford@js.pentagon.mil</a></td>
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<td>29</td>
<td>Office of the Secretary of Defense (JCS Joint Staff J-1)</td>
<td>Samson Shabi</td>
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<td><a href="mailto:samson.shabi@whs.mil">samson.shabi@whs.mil</a></td>
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<tr>
<td>39</td>
<td>Commander, Space and Naval Warfare Systems Command</td>
<td>Daniel Montgomery</td>
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<td><a href="mailto:daniel.montgomery@navy.mil">daniel.montgomery@navy.mil</a></td>
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</tbody>
</table>

Enclosure (4)
60  Commander U.S. Fleet Forces  Susan Northcutt  susan.northcutt@navy.mil

70  Commander, U.S. Pacific Fleet  Jay Sokolowski  jay.sokolowski@navy.mil

76  Chief of Naval Education and Training  Debrah Lloyd  Deborah.lloyd@navy.mil

12. Sponsor and Subject Matter Expert

Sponsor: Rear Admiral James H. Rodman, Jr., Chief Engineer

Subject Matter Expert: CAPT Dan Hendricks, USN

Approved:

Rear Admiral James H. Rodman, Jr.
Chief Engineer
Space and Naval Systems Warfare Command

08FEB2012  Date

______________________________
Director, Total Force Programming and Manpower Management  Date
OPNAV N15

Enclosure (4)
2014-2016 CORE SKILL REQUIREMENTS
ELECTRICAL SYSTEM ENGINEERING
53XXP

NO SIGNIFICANT CHANGES RECOMMENDED

Billet subspecialty coding is to be based on the minimum education/training/experience level required for optimum performance. Electrical System Engineering/53XXP subspecialty coding is justified when, in addition to the general criteria stated in NAVPERS 15839 series (Manual of Navy Officer Manpower and Personnel Classification) Part B, the following specific criteria are satisfied:

1. Subspecialty Coding Restriction

   a. Billets assigned to: Operations Test and Evaluation/Software Intensive Systems, Instructor Electrical Engineer, Instructor Aerospace Engineer, School Admissions/Associate Chair of Electrical Engineering.

2. Applicable Officer Designators

   d. 1000-1000/1001-1019/1020-1020/1021-1049/1050-1050/
      1051-1099

   e. 1100-1109/1110-1119/1120-1129/1130-1139/1140-1159/
      1160-1169/1170-1179/1180-1189/1190-1199

   f. 1200-1209/1200-1299/1300-1399/1400-1499/1510-1519/
      1800-1809/1810-1829

3. Applicable Billet Designator

   d. 53XXP (Masters Level)

   e. 53XXN (Engineers Degree)

   f. 53XXD (Doctoral Level)

4. Significant Experience Criteria

   a. Electrical Systems and Engineering - 53XX S-codes billets are authorized when the following conditions are met:

      (1) The duties required detailed knowledge of, or experience in specific Electrical Engineering systems, processes, design, acquisition, management or leadership

Enclosure (5)
(2) Appropriate training on specific systems, processes, design, acquisition, and management is available and accessible to qualified officers prior to assignment of billets.

b. Electrical and Systems Engineering - 53XX G-coded officers are/ are not authorized/ justified when:

(1) An Officer has an F code and completes a tour in a master’s degree billet or higher.

8. Masters Criteria for Electrical Systems and Engineering

a. Electrical Systems and Engineering - 53XX P-coded billets are authorized when the billet requires all of the following:

(1) Primary duties require the CSRs and ESR

b. Electrical Systems and Engineering - 53XX P-coded officers are authorized when:

(1) The Officer completes Electrical Systems and Engineering master’s degree at NPS. The officer will receive the F Subspecialty Code if a thesis is not completed. Utilization and obligations are still required.

(2) The officer completes a master’s degree at an accredited institution of higher learning that satisfies all 53XX ESRs.

c. Electrical Systems and Engineering - 53XX Q-coded billets are authorized when the billet requires:

(1) All requirements of the P code and detailed knowledge of, or experience in, specific engineering systems, processes, design, acquisition, management or leadership.

d. Electrical Systems and Engineering - 53XX Q-coded officers are authorized when:

(1) They complete Electrical Systems and Engineering 53XX ESRs, either at NPS or another accredited institution, and have done at least 18 months in a master’s degree coded billet or higher.

(2) Must have a P-code prior to Q-code tour
(3) F coded officers cannot obtain Q codes. They will be authorized G codes.

9. Post - Masters

a. Electrical Systems and Engineering - 53XX N-coded billets are authorized when the billet requires all of the following:

(1) Primary duties requiring the CSR, ESRs and an Electrical Engineering degree.

b. Electrical Systems and Engineering - 53XX N-coded officers are authorized when:

(1) They complete Electrical Systems and Engineering 53XX ESRs, either at NPS or other accredited institution as well as an earn an Electrical Engineer’s Degree.

10. Doctorate Criteria

a. Electrical Systems and Engineering - 53XX D-coded billets are authorized when the billet requires:

(1) Primary duties requiring the CSR, ESRs and a Doctorate Degree in Electrical Systems and Engineering.

b. Electrical Systems and Engineering - 53XX D-coded officers are authorized when:

(1) They complete Electrical and Systems Engineering Doctorate Degree at NPS or another accredited institution.

11. Community Managers and the Budget Submitting Office (BSO) have agreed to allow billets to be coded for Electrical Systems and Engineering - 53XX and officers to be educated for this Curriculum. BSO are as follows:

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<td>28</td>
<td>Joint Chief of Staff</td>
<td>TBD</td>
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<td>Office of the Secretary of Defense</td>
<td>Samson Shabi</td>
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<td>39</td>
<td>Commander, Space and Naval</td>
<td>Daniel Montgomery</td>
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Enclosure (5)
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<td><strong>Warfare Systems Command</strong></td>
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<td><strong>National Security Agency</strong></td>
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<tr>
<td><strong>Commander U.S. Fleet Forces</strong></td>
<td>Susan Northcutt</td>
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<tr>
<td><strong>Commander, U.S. Pacific Fleet</strong></td>
<td>Jay Sololowski</td>
</tr>
<tr>
<td><strong>Chief of Naval Education and Training</strong></td>
<td>Debra Lloyd</td>
</tr>
</tbody>
</table>

12. Sponsor and Subject Matter Expert

**Sponsor:** VADM William H. Hilarides, Commander Naval Sea Systems Command

**Subject Matter Expert:** RDML James H. Rodman, Jr. Chief Engineer, Space & Naval Warfare Systems Command

**Approved:**

[Signature]

Rear Admiral James H. Rodman, Jr.  
Chief Engineer  
Space and Naval Systems Warfare Command  

14 Aug 2014  
Date

Director, Total Force Programming and Manpower Management  
OPNAV N15  

Enclosure (5)