BULLETIN 2016-08 December 23, 2015

U.S. Department of Labor Employment and Training Administration Office of Apprenticeship (OA) Washington, D.C. 20210	Distribution: A-541 Headquarters A-544 All Field Tech A-547 SD+RD+SAA+; Lab.Com ApprenticeshipUSA	Subject: New National Guidelines for Apprenticeship Standards for Department of the Navy, Naval Shipyards and Affiliates Code: 400.1
Symbols: DSNIP/KSL		Action: Immediate

PURPOSE: To inform the staff of OA and the State Apprenticeship Agencies (SAA), Registered Apprenticeship program sponsors and other Registered Apprenticeship partners of the approval of new National Guidelines for Apprenticeship Standards for the Department of the Navy, Naval Shipyards and Affiliates.

BACKGROUND: These new National Guidelines for Apprenticeship Standards submitted by Mr. Bryan Watland, Apprentice Program Administrator, on behalf of the Department of the Navy, Naval Shipyards and Affiliates, were approved by the OA Administrator on December 4, 2015. These new National Guidelines for Apprenticeship Standards are a model for developing local apprenticeship programs registered with the OA or an SAA for all occupations listed in these new National Guidelines for Apprenticeship Standards.

ACTION: The OA staff should familiarize themselves with this bulletin. A copy of the new National Guidelines for Apprenticeship Standards and the Work Process Schedule and Related Instruction Outlines are attached.

If you have any questions, please contact Kenneth Lemberg, Apprenticeship and Training Representative, Division of Standards and National Industry Promotion, at (202) 693-3836.

NOTE: This bulletin is being sent via electronic mail.

Attachments

- THE DEPARTMENT OF THE NAVY, NAVAL SHIPYARDS AND AFFILIATES APPRENTICESHIP PROGRAMS
- APPENDIX A - WORK PROCESS SCHEDULES FOR ALL OCCUPATIONS LISTED IN THESE STANDARDS

(SAMPLE)

STANDARDS OF APPRENTICESHIP

DEVELOPED BY

THE DEPARTMENT OF THE NAVY, NAVAL SHIPYARDS AND AFFILIATES APPRENTICESHIP PROGRAMS (INSERT NAME OF LOCAL SPONSOR SHIPYARD)

FOR ALL TRADES/OCCUPATIONS LISTED

APPROVED BY

(REGISTRATION AGENCY)

These "model" National Guidelines for Apprenticeship Standards are an example of how to develop apprenticeship standards that will comply with Title 29, CFR parts 29 and 30 when tailored to a sponsor's apprenticeship program. These model Standards do not create new legal requirements or change current legal requirements. The legal requirements related to apprenticeship that apply to registered apprenticeship programs are contained in 29 U.S.C. 50 and Title 29, CFR parts 29 and 30. Every effort has been made to ensure that the information in the model Apprenticeship Standards is accurate and up-to-date.

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FOREWORD

The Department of the Navy, Naval Shipyards and Affiliates apprenticeship programs and **(Insert Name of Local Activity)** Apprenticeship Standards have as their objective, the training of the skilled occupations listed in Appendix A for the maintenance and repair of United States Naval assets and facilities. The sponsor recognizes that in order to accomplish this, there must be well-developed on-the-job learning combined with related instruction.

This recognition has resulted in the development of these Standards of Apprenticeship. They were developed in accordance with the basic standards recommended by the U.S. Department of Labor, Office of Apprenticeship, as a basis from which the sponsor can work to establish an apprenticeship training program that meets the particular needs of the area.

DEFINITIONS

ACTIVITY: Local Sponsor via Shipyard facility.

APPRENTICE: Any individual employed by the employer meeting the qualifications described in the Standards of Apprenticeship who has signed an Apprenticeship Agreement with the local Sponsor providing for training and related instruction under these Standards, and who is registered with the Registration Agency.

APPRENTICE ELECTRONIC REGISTRATION (AER): Is an electronic tool that allows for instantaneous transmission of apprentice data for more efficient registration of apprentices and provides Program Sponsors with a faster turnaround on their submissions and access to their apprenticeship program data.

APPRENTICESHIP AGREEMENT: The written agreement between the apprentice and the Sponsor setting forth the responsibilities and obligations of all parties to the Apprenticeship Agreement with respect to the Apprentice's employment and training under these Standards. Each Apprenticeship Agreement must be registered with the Registration Agency.

APPRENTICESHIP ADVISORY COMMITTEE (COMMITTEE): Apprenticeship Advisory Committee (Committee) means those persons designated by the sponsor to advise in the administration of the program.

APPRENTICESHIP PROGRAM ADMINISTRATOR (APA): A position selected by the sponsor who directs and provides oversight for all aspects of administration and execution of apprenticeships registered by the command. Ensures regulatory compliance, maintains academic accreditation, and certifies program completers.

CAREER LATTICE: Career lattice apprenticeship programs include occupational pathways that move an apprentice laterally or upward within an industry. These programs may or may not include an interim credential leading to the Certificate of Completion of Apprenticeship credential.

CERTIFICATE OF COMPLETION OF APPRENTICESHIP: The Certificate of Completion of Apprenticeship issued by the Registration Agency to those registered apprentices certified and documented as successfully completing the apprentice training requirements outlined in these Standards of Apprenticeship.

ELECTRONIC MEDIA: Media that utilize electronics or electromechanical energy for the end user (audience) to access the content; and includes, but is not limited to, electronic storage media, transmission media, the Internet, extranet, lease lines, dial-up lines, private networks, and the physical movement of removable/transportable electronic media and/or interactive distance learning.

EMPLOYER: Means any person or organization employing an apprentice whether or not such person or organization is a party to an Apprenticeship Agreement with the apprentice.

JOURNEYWORKER: A worker who has attained a level of skill, abilities and competencies recognized within an industry as having mastered the skills and competencies required for the trade. (Use of the term may also refer to a mentor, technician, specialist or other skilled worker who has documented sufficient skills and knowledge of an apprenticeable occupation, either through formal apprenticeship or through practical on-the-job experience and formal training.)

O*NET-SOC CODE: The Occupational Information Network (O*NET) codes and titles are based on the new Standard Occupational Classification (SOC) system mandated by the federal Office of Management and Budget for use in collecting statistical information on occupations. The O*NET classification uses an 8-digit O*NET-SOC code. Use of the SOC classification as a basis for the O*NET codes ensures that O*NET information can be readily linked to labor market information such as occupational employment and wage data at the national, State, and local levels.

ON-THE-JOB LEARNING (OJL): Tasks learned on-the-job in which the apprentice must become proficient before a completion certificate is awarded. The learning must be through structured, supervised work experience.

PROGRAM SPONSOR: The Sponsor in whose name the Standards of Apprenticeship will be registered, and which will have the full responsibility for administration and operation of the apprenticeship program.

PROVISIONAL REGISTRATION: Means the 1-year initial provisional approval of newly registered programs that meet the required standards for program registration, after which program approval may be made permanent, continued as provisional, or rescinded following a review by the Registration Agency, as provided for in the criteria described in Title 29, CFR part 29.3 (g) and (h).

REGISTERED APPRENTICESHIP PARTNERS INFORMATION DATA SYSTEM (RAPIDS): The Federal system which provides for the automated collection, retention, updating, retrieval and summarization of information related to apprentices and apprenticeship programs.

REGISTRATION AGENCY: Means the U.S. Department of Labor, Office of Apprenticeship or a recognized State Apprenticeship Agency that has responsibility for registering apprenticeship programs and apprentices; providing technical assistance; conducting reviews for compliance with Title 29, CFR parts 29 and 30 and quality assurance assessments.

RELATED INSTRUCTION: An organized and systematic form of instruction designed to provide the apprentice with the knowledge of the theoretical and technical subjects related to the apprentice's trade. Such instruction may be given in a classroom, through trade or industrial courses, or by correspondence courses of equivalent value, electronic media, or other forms of self-study approved by the Registration Agency. Within this set of Standards, Related Instruction encompasses Core Academic Subjects and in particular to the specific occupation, Trade Theory Subjects.

STANDARDS OF APPRENTICESHIP: This entire document including all appendices and attachments hereto, and any future modifications or additions approved by the Registration Agency.

SUPERVISOR OF APPRENTICE(S): An individual designated by the program sponsor to supervise or have charge and direction of an apprentice.

TIME-BASED APPRENTICEABLE OCCUPATION: The time-based approach measures skill acquisition through the individual apprentice's completion of at least 2,000 hours of on-the-job learning as described in a work process schedule.

TRADE/OCCUPATION: Refers to a skilled job - typically one requiring manual skills and special training. This is synonymous with skilled or apprenticeable occupation for purposes of these Standards.

TRANSFER: A shift of apprenticeship agreement from one occupation to another occupation within that same program, where there is agreement between the apprentice and the affected occupations.

SECTION I – PROGRAM ADMINISTRATION

The Department of the Navy, Naval Shipyards and Affiliates apprenticeship programs are administered under the Production Department Training Superintendents. The Production Department Training Superintendent selects an Apprentice Program Administrator (APA). The APA and the apprentice program support staff oversee all operations and administrative functions of the program.

(Affiliates will insert their administration details similar to the Naval Shipyard programs. The local activity will insert a brief description of the administration of the apprenticeship program, as well as address the role of the APA and the connectivity of the committee to the APA.)

The APA carries out the responsibilities and duties required of the program sponsor as described in these standards.

The Apprentice Advisory Committee will advise and provide oversight for the administration of the program per Appendix D.

Responsibilities of the Apprenticeship Program Administrator (APA):

A. Cooperate in the selection of apprentices as outlined in this program.

B. Ensure that apprentices are under written Apprenticeship Agreements and register the local apprenticeship standards and agreements with the appropriate Registration Agency.

C. Review and recommend apprenticeship activities in accordance with this program.

D. Establish the minimum standards of education and experience required of apprentices.

E. Review records and progress of each apprentice in training and recommend improvement or modification in training schedules, schooling and other training activities.

F. Determine the quality and quantity of experience on the job which apprentices should have and to make every effort toward their obtaining it.

G. Hear and resolve all complaints of violation of Apprenticeship Agreements.

H. Monitor results of tests or evaluations for determining the apprentice's progress in manipulative skills and technical knowledge.

I. Maintain a record of all apprentices, showing their education, experience, and progress in learning the apprenticeable occupations.

J. Oversee curriculum that: (1) advises apprentices on the need for accident prevention and (2) provides instruction with respect to safety in the workplace.

K. Certify that apprentices have successfully completed their apprenticeship program.

L. Notify the appropriate Registration Agency of all new apprentices to be registered, credit granted, suspensions for any reason, reinstatements, extensions, completions and cancellations with explanation of causes and notice of completions of Apprenticeship Agreements.

M. Supervise all the provisions of the local standards and be responsible, in general, for the successful operation of the standards by performing the duties here listed by cooperating with public and private agencies which can be of assistance by obtaining publicity to develop public support of apprenticeship and by keeping in constant touch with all parties concerned: apprentices, employers and journeyworkers.

N. Provide apprentices with a copy of the written rules and policies and the apprentice will sign an acknowledgment receipt of same. This procedure will be followed whenever revisions or modifications are made to the rules and policies.

SECTION II - EQUAL OPPORTUNITY PLEDGE – Title 29 CFR 29.5(b)(21) and 30.3(b)

As Federal employers, the recruitment, selection, employment, and training of apprentices during their apprenticeship shall be without discrimination because of race, color, religion, national origin, or sex. The sponsor will take affirmative action to provide equal opportunity in apprenticeship and will operate the apprenticeship program as required under Title 29 of the Code of Federal Regulations (CFR), part 30.

SECTION III - QUALIFICATIONS FOR APPRENTICESHIP – Title 29 CFR 29.5(b)(10)

Eligibility

A prospective apprentice must meet the following requirements at the time of application:

Age: Shall be at least 18 years of age at the time of entry on duty (EOD).

Education: Must meet the academic placement requirements of the Sponsor's program. (insert the local Sponsor's requirements)
Other Requirements:

- Must meet the requirements for Federal Employment
- Must be a U.S. citizen

Selection

- Current resume submitted through USAJOBS website.
- Academic eligibility as established by the local program.
- Completion of the Supplemental Form as required by the Human Resources Department.
- Results of a personal interview.
- Successful completion of a physical examination and Physical Capacity Test (if applicable).
- Ability to obtain and maintain a security clearance.
- The Employer will ensure that apprentice candidates understand that there are special conditions and qualifications for employment for work in a Naval Shipyard/Intermediate Facility (IMF) or affiliate facility (e.g. nuclear qualification, respirator qualification, and travel).

Veterans

Applicants must submit a DD-214 to verify military training and/or experience if they are a veteran and wish to receive consideration for such training/experience.

SECTION IV - APPRENTICESHIP AGREEMENT – Title 29 CFR 29.5(b)(11)

After an applicant for apprenticeship has been selected, but before enrollment in related instruction, the apprentice will be covered by a written apprenticeship agreement (Appendix B) signed by the sponsor and the apprentice and approved by and registered with the Registration Agency. Such agreement will contain a statement making the terms and conditions of these standards a part of the agreement as though expressly written therein. A copy of each apprenticeship agreement will be furnished to the apprentice, the Sponsor, the Registration Agency, and the employer. An additional copy will be provided to the Veteran's State Approving Agency for those veteran apprentices desiring access to any benefits to which they are entitled.

The sponsor will provide a local document (Appendix C) that contains essential program requirements for eligibility maintenance standards, academic performance standards, promotions requirements and student responsibilities. The local document may also contain a transcript release statement/signature and an acknowledgement for program requirements.

Prior to signing the Apprenticeship Agreement, each selected applicant will be given an opportunity to read and review the sponsor's written rules and policies in the local document (Appendix C) and the Apprenticeship Agreement.

The Registration Agency will be advised within forty-five (45) days of the execution of each Apprenticeship Agreement and will be given all the information required for registering the apprentice.

SECTION V - RATIO OF APPRENTICES TO JOURNEYWORKERS – Title 29 CFR 29.5(b)(7)

Only such number of apprentices shall be employed as can be given proper supervision, training, safety, thorough knowledge and skill, as well as a reasonable opportunity for continuity of employment in the apprenticeable occupation after completion of the Apprenticeship Program.

The ratio of journeyworkers to apprentices will be at least one (1) journeyworker or qualified mechanic at the workplace for every two (2) apprentices where an apprentice is acquiring OJL.

SECTION VI - TERM OF APPRENTICESHIP – Title 29 CFR 29.5(b)(2)

The term of the apprenticeship will be generally four years with an OJL attainment of 7,200 hours (8,000 hours less 800 hours generally for leave and benefit hours) including the required hours of on-the-clock related instruction as stated on the Work Process Schedule and Related Instruction Outlines (Appendix A). Advanced credit for early completion per Section X would reduce the four year term by no more than six months, which helps keep a cohort of apprentices together. Full credit will be given for the probationary period.

OJL hours must be completed in work that progresses the skilled occupational competencies to the journeyworker level or which are directly related to increasing skilled occupational knowledge.

SECTION VII - PROBATIONARY PERIOD – Title 29 CFR 29.5(b)(8), (b)(20)

All applicants selected for apprenticeship will serve a probationary period. The probationary period cannot exceed one-year (1). The probationary period shall be (Insert Months/Hours) of OJL hours.

Appointments are subject to all the requirements and conditions governing term, career, or career-conditional employment, including investigation to establish an appointee's qualifications and suitability.

During the probationary period either the apprentice or the sponsor may terminate the apprenticeship agreement, without stated cause, by notifying the other party in writing. The records for each probationary apprentice will be reviewed prior to the end of the probationary period. Records may consist of periodic reports regarding progression made in both the OJL and related instruction, and any disciplinary action taken during the probationary period.

Any probationary apprentice evaluated as satisfactory after a review of the probationary period will be given full credit for the probationary period and continue in the program.

After the probationary period the apprenticeship agreement may be canceled at the request of the apprentice, or may be suspended or canceled by the sponsor for reasonable cause after documented due notice to the apprentice and a reasonable opportunity for corrective action. In such cases, the sponsor will provide written notice to the apprentice and to the Registration Agency of the final action taken.

SECTION VIII - HOURS OF WORK

Apprentices will be on a full time work schedule. A full time work schedule requires employees to work 80 hours during a bi-weekly pay period, except under unusual circumstances (e.g. Christmas closure, emergent closure, furloughs, etc.).

Apprentices will generally work the same hours as journeyworkers, except that no apprentice will be allowed to work overtime if it interferes with attendance in related instruction classes.

Apprentices who do not complete the required hours of OJL during a given segment will have the term of that segment extended until the required number of hours of training are accrued.

SECTION IX - APPRENTICE WAGE PROGRESSION – Title 29 CFR 29.5(b)(5)

Apprentices will be paid a progressively increasing schedule of wages during their apprenticeship based on the acquisition of increased skill and competence on-the-job and in related instruction. Before an apprentice is advanced to the next segment of training or to journeyworker status, the sponsor will evaluate all progress to determine whether advancement has been earned by satisfactory performance in their OJL and in related instruction courses. In determining whether satisfactory progress has been made, the sponsor will be guided by the work experience and related instruction records and reports.

The progressive wage schedule will be in alignment with the local Federal Wage Grade (WG) or Wage Trainee (WT) pay scale in accordance with 5 CFR 532.265 as required in Appendix D, item 9. The progression is dependent upon the promotion eligibility as shown in Appendix D, item 17. A sample of the promotion progression is shown below. In no case will the starting wages of apprentices be less than that required by any minimum wage law which may be applicable.

(Insert the local sponsor promotion progression plan)

SECTION X - CREDIT FOR PREVIOUS EXPERIENCE – Title 29 CFR 29.5(b)(12) and 30.4(c)(8)

Credit for previous experience must be in compliance with Appendix D, item 20. *"Programs will include written provision for evaluation of previous related experience and/or exceptional performance and accelerated skills acquisition."*

(Insert reference to local instruction (i.e. Appendix C paragraph #) regarding credit for previous experience)

The granting of advanced standing will be uniformly applied to all apprentices. Advanced credit will be applied to the last year of the program and will not exceed six-months. The Registration Agency will be advised of any credit granted and the wage rate to which the apprentice is advanced.

SECTION XI - WORK EXPERIENCE – Title 29 CFR 29.5(b)(3)

During the apprenticeship the apprentice will receive such OJL and related instruction in all phases of the trade necessary to develop the skill and proficiency of a skilled journeyworker. The OJL will be under the direction and guidance of the supervisor of the apprentice(s).

SECTION XII - RELATED INSTRUCTION – Title 29 CFR 29.5(b) (4)

During each segment of training each apprentice is required to participate in coursework related to the job as outlined for each trade/occupation in Appendix A. The recommended (4- year) term of the apprenticeship will include no less than 576 hours (144 x 4) of related instruction for all trades/occupations. Apprentices agree to take required courses listed in Appendix A. The sponsor may schedule the related instruction at any time during the term of the program. The sponsor will secure the instructional aids and equipment it deems necessary to provide quality instruction.

Apprentices will be paid for hours spent attending related instruction classes.

Apprentices will acquire credits from (insert the name of the educational institution) for academics listed in Appendix A.

Any apprentice who is absent from related instruction classes, unless officially excused, will satisfactorily complete all course work missed before being advanced to the next period of training. In cases of failure of an apprentice to fulfill the obligations regarding related instruction (or OJL) without due cause, the sponsor will take appropriate disciplinary action and may terminate the apprenticeship agreement after due notice to the apprentice and opportunity for corrective action.

To the extent possible, related instruction will be closely correlated with the practical experience and training received on-the-job. The sponsor will monitor and document the apprentice's progress in related instruction classes. The sponsor will secure competent instructors whose knowledge, experience, and ability to teach will be carefully examined and monitored.

SECTION XIII - SAFETY AND HEALTH TRAINING – Title 29 CFR 29.5(b)(9)

All apprentices will receive instruction in safe and healthful work practices both on-the-job and in related instruction that are in compliance with the Occupational Safety and Health Standards promulgated by the Secretary of Labor under 29 U.S.C. 651 et seq., as amended, dated December 29, 1970, and subsequent amendments to that law, or State Standards that have been found to be at least as effective as the Federal Standards

Apprentices will be taught that accident prevention is very largely a matter of education, vigilance, and cooperation and that they should strive at all times to conduct themselves in their work to ensure their own safety and that of their fellow workers.

SECTION XIV - SUPERVISION OF APPRENTICES – Title 29 CFR 29.5(b)(14)

The trade's senior management team is responsible for the training of the apprentice on the job. Apprentices will be under the general supervision of the trade and/or project management team and under the direct supervision of the supervisor and/or journey worker to whom they are assigned. The supervisor will be responsible for the apprentice's work assignments, and will ensure the apprentice is working under the direction of a skilled journeyworker. The supervisor is also responsible for the evaluation of work performance, and the completion and submittal of progress reports to the trade management.

SECTION XV - RECORDS AND EXAMINATIONS – Title 29 CFR 29.5(b)(6)

Each apprentice is responsible for maintaining a record of his/her work experience/training on-the-job and in related instruction and for having this record verified by his/her supervisor at the end of each (insert sponsor's grading period). The apprentice will authorize an effective release of his/her completed related instruction records from the local school authorities to the sponsor. The record cards and all data, written records of progress evaluations, corrective and final actions pertaining to the apprenticeship, will be maintained by and will be the property of the sponsor. This record will be included in each apprentice's record file maintained by the sponsor.

Before each period of advancement, or at any other time when conditions warrant, the sponsor will evaluate the apprentice's record to determine whether he/she has made satisfactory progress. If an apprentice's related instruction or on-the-job progress is found to be unsatisfactory, the sponsor may determine whether the apprentice will continue in a probationary status, or require the apprentice to repeat a process or series of processes before advancing to the next wage classification. In such cases, the sponsor will initiate a performance improvement plan with the apprentice.

Should it be found that the apprentice does not have the ability or desire to continue the training to become a journeyworker, the sponsor will, after the apprentice has been given adequate assistance and opportunity for corrective action, terminate the apprenticeship agreement.

SECTION XVI - MAINTENANCE OF RECORDS – Title 29 CFR 29.5(b)(23)

The sponsor will maintain for a period of five (5) years from the date of last action, all records relating to apprentice applications (whether selected or not), the employment and training of apprentices, and any other information relevant to the operation of the program. This includes, but is not limited to, records on the recruitment, application and selection of apprentices, and records on the apprentice's job assignments, promotions, demotions, layoffs, terminations, rate of pay, or other forms of compensation, hours of

work and training, evaluations, and other relevant data. The records will permit identification of minority and female (minority and non-minority) participants. These records will be made available on request to the Registration Agency.

SECTION XVII - CERTIFICATE OF COMPLETION OF APPRENTICESHIP – Title 29 CFR 29.5(b)(15)

Upon satisfactory completion of the requirements of the apprenticeship program as established in these Standards, the sponsor will so certify in writing to the Registration Agency and request that a Certificate of Completion of Apprenticeship be awarded to the completing apprentice(s). Such requests will be accompanied by the appropriate documentation for both the OJL and the related instruction as may be required by the Registration Agency.

SECTION XVIII - NOTICE TO REGISTRATION AGENCY – Title 29 CFR 29.3(2)(d) and (e) and 29.5(b)(19)

The Registration Agency will be notified within forty-five (45) days of all new apprentices to be registered, credit granted, suspensions for any reason, reinstatements, extensions, modifications, completions, cancellations, and terminations of apprenticeship agreements and causes.

SECTION XIX - CANCELLATION AND DEREGISTRATION – Title 29 CFR 29.5(b)(18) and 29.8(a)(2)

These Standards will, upon adoption by the sponsor, be submitted to the Registration Agency for approval. Such approval will be acquired before implementation of the program.

(INSERT NAME OF SPONSOR) reserves the right to discontinue at any time the apprenticeship program set forth herein. The Registration Agency will be notified promptly in writing of any decision to cancel the program.

Deregistration of these Standards may be initiated by the Registration Agency for failure of the sponsor to abide by the provisions herein. Such deregistration will be in accordance with the Registration Agency's regulations and procedures.

Within fifteen (15) days of cancellation of the apprenticeship program (whether voluntary or involuntary) the sponsor will notify each apprentice of the cancellation and the effect of same. This notification will conform to the requirements of Title 29, CFR part 29.8.

SECTION XX - AMENDMENTS OR MODIFICATIONS – Title 29 CFR 29.5(b) (18)

These standards may be amended or modified at any time by the sponsor provided that no amendment or modification adopted will alter any apprenticeship agreement in force at the time without the consent of all parties. Such amendment or modification will be submitted to the Registration Agency for approval and registration prior to being placed in effect. A copy of each amendment or modification adopted will be furnished to each apprentice to whom the amendment or modification applies.

SECTION XXI - ADJUSTING DIFFERENCES/COMPLAINT PROCEDURE – Title 29 CFR 29.5(b)(22), 29.7(k), and 30.11

The sponsor will have full authority to supervise the enforcement of these Standards. Its decision will be final and binding on the employer, the sponsor, and the apprentice, unless otherwise noted below.

If an applicant or an apprentice believes an issue exists that adversely affects his/her participation in the apprenticeship program or violates the provisions of the apprenticeship agreement or standards, relief may be sought through the established Federal employers' complaint resolution processes and EEO policies.

SECTION XXII - TRANSFER OF AN APPRENTICE AND TRAINING OBLIGATION – Title 29 CFR 29.5(b)(13)

The transfer of an apprentice within this apprenticeship program must be based on agreement between the apprentice and the affected apprenticeable occupations, and must comply with the following requirements:

a. The transferring apprentice must be provided a transcript of related instruction and on-the-job learning by the committee or program sponsor;

b. Transfer must not be to a higher journey worker wage grade; and

c. A new apprenticeship agreement must be executed when the transfer occurs between apprenticeable occupations or between program sponsors.

SECTION XXIII - RESPONSIBILITIES OF THE APPRENTICE

In signing the Apprenticeship Agreement, apprentices assume the following responsibilities and obligations under the apprenticeship program:

A. Perform diligently and faithfully the work of the skilled occupation and other pertinent duties assigned by the Sponsor and the employer in accordance with the provisions of these Standards.

B. Respect the property of the employer and abide by the working rules and regulations of the employer.

C. Attend and satisfactorily complete the required hours in the OJL.

D. Meet the academic requirements for required related instruction.

E. Maintain and make available such records of work experience and training received on-the-job and in related instruction as may be required by the Sponsor.

F. Develop and practice safe working habits and work in such a manner as to assure his/her personal safety and that of other fellow workers.

G. Work for the employer to whom the apprentice is assigned for the completion of apprenticeship plus any additional time required under a continued service agreement.

SECTION XXIV - TECHNICAL ASSISTANCE

Technical Assistance, such as that from the U.S. Department of Labor, Office of Apprenticeship, State Apprenticeship Agencies, and vocational schools, may be requested to advise the sponsor.

The sponsor is encouraged to invite representatives from industry, education, business, and private and/or public agencies to provide consultation and advice for the successful operation of their training program.

SECTION XXV - OFFICIAL ADOPTION OF APPRENTICESHIP STANDARDS:

The (Insert Sponsoring Activity) hereby adopts these Standards of Apprenticeship on this _____ day of (Insert Month/Year).

_____
Signature of Sponsor's
Apprentice Program Administrator

_____
Printed Name

APPENDIX A

WORK PROCESS SCHEDULES FOR ALL OCCUPATIONS LISTED IN THESE STANDARDS

This schedule is attached to and a part of these Standards for the above identified occupation.

1. TYPE OF OCCUPATION

☒ Time-based ☐ Competency-based ☐ Hybrid

2. TERM OF APPRENTICESHIP (See attached Work Process Schedules)

3. RATIO OF APPRENTICES TO JOURNEYWORKERS

The ratio of journeyworkers to apprentices will be at least one (1) journeyworker or qualified mechanic at the workplace for every two (2) apprentices where an apprentice is acquiring OJL.

4. APPRENTICE WAGE SCHEDULE

Apprentices shall be paid a progressively increasing schedule of wages based the approved federal government Wage Grade (WG)) wage scale.

5. WORK PROCESS SCHEDULE (See attached Work Process Schedule)

The sponsor may modify the work processes to meet local needs prior to submitting these Standards to the appropriate Registration Agency for approval.

6. RELATED INSTRUCTION OUTLINE (See attached Related Instruction Outline)

APPRENTICESHIP OCCUPATIONS OFFERED AT THE DEPARTMENT OF THE NAVY, NAVAL SHIPYARDS AND AFFILIATES (NAVSEA)

Shipfitter (Existing Title: Shipfitter (Ship & Boat)) **- O*NET-SOC Code: 51-4192.00 RAPIDS Code: 0513; *Journey Level Pay Rate WG 10Shop 11 -*** Manufacture, install, change, and repair interior and exterior components and structures of naval vessels. These structures include bulkheads, foundations, doors, decks, hatches, superstructures, tanks, sea chests, sponsons, and deck houses.

Electronic Industrial Control Mechanic (Existing Title: Electromechanical Technician) - O*NET-SOC Code: 17-3024.00 RAPIDS Code: 0167; Journey Level Pay Rate WG 11

Shop 31 EICM - Maintain, troubleshoot, and repair all linear, digital, and fiber optic electronics integrated into industrial systems such as numerical-control and computer-numerical-controlled machine tools, laser measuring systems, automatic welding systems, balancing and measuring machines and induction furnaces.

Sheet Metal Mechanic (Existing Title: Sheet Metal Worker) **- O*NET-SOC Code: 47-2211.00 RAPIDS Code: 0510; *Journey Level Pay Rate WG 10***

Shop 17 - Design, manufacture, install, and repair ventilation, furniture, lightweight bulkheads, and doors aboard naval vessels.

Welder (Existing Title: Welder, Combination) **- O*NET-SOC Code: 51-4121.02 RAPIDS Code: 0622; *Journey Level Pay Rate WG 10***

Shop 26 - Join various metals using complex thermal processes in the overhaul, repair, and construction of naval vessels.

Electroplater (Existing Title: Electrostatic Powder Coating Technician) **- O*NET-SOC: 51-9121.01 RAPIDS Code: 1036; *Journey Level Pay Rate WG 9***

Shop 31E - Accomplish functional and industrial tank plating of various metal surfaces and portable selective plating to restore shipboard components. Other processes include chemical cleaning and dimensional restoration of various metal surfaces using polishing techniques.

Machinist **- O*NET-SOC Code: 51-4041.00 RAPIDS Code: 0296;**
Journey Level Pay Rate WG 10

Shop 31M - Inside repair and testing of various ships' components. Manufacture of new parts using conventional and computer controlled machinery. Machines items from as little as 1/4" screws to as large as fifty-foot long propulsion shafting.

Production Machinery Electrician (Existing Title: Electrician, Maintenance) **-**
O*NET-SOC Code: 47-2111.00 RAPIDS Code: 0643; *Journey Level Pay Rate WG 10*

Shop 31 PME - Maintain, install, repair, retrofit, and troubleshoot many types of industrial machines, tools, and equipment. Machinery, tools and equipment includes: lathes, milling machines, presses, welding, and flame cutting equipment, heat sealers and rubber mills.

Production Machinery Mechanic (Existing Title: Machine Repairer) **- O*NET-SOC Code: 49-9041.00 RAPIDS Code: 0292; *Journey Level Pay Rate WG 10***

Shop 31 PMM - Inspect and repair shipyard production machinery including lathes, milling machines, presses, pipe benders, shears, hoists, drills, band saws and high-pressure air

compressors.

Marine Machinery Mechanic (Existing Title: Machine Repairer, Maintenance)* - O*NETSOC Code: 49-9041.00 RAPIDS Code: 0292; *Journey Level Pay Rate WG 10

Shop 38 - Troubleshoot, repair, replace, and maintain various mechanical systems on naval vessels. The work area covers the entire vessel from the mast antennas to the propellers, from the bow to the stern.

Marine Electrician (Existing Title: Electrician [Ship & Boat])* - O*NET-SOC Code: 47-2111.00 RAPIDS Code: 0771; *Journey Level Pay Rate WG 10

Shop 51 - Installation, connection, and operational testing of shipboard electrical systems and components that include electrical power and lighting systems, sound powered phones, electric heat and ventilation equipment.

Marine Pipefitter (Existing Title: Pipe Fitter [Ship & Boat])* - O*NET-SOC Code: 47-2152.01 RAPIDS Code: 0412; *Journey Level Pay Rate WG 10

Shop 56 - Install, repair, modify, and replace piping systems on board naval vessels. Systems include potable drinking water, aviation fuels and high-pressure steam.

Insulator* (Thermal) *(Existing Title: Insulation Worker)* - O*NET-SOC Code: 47-2131.00 RAPIDS Code: 0909; *Journey Level Pay Rate WG 10

Shop 57 - Install and remove insulation on piping, machinery, and ventilation systems on board naval vessels and shore installations.

Composite Plastic Fabricator (Existing Title: Insulation Worker)* - O*NET-SOC Code: 47-2131.00 RAPIDS Code: 0909; *Journey Level Pay Rate WG 10

Shop 64CPF - Install and remove noise reduction materials such as graphite tiles, sand tile, fiberglass and acoustic insulation on board naval vessels and shore installations.

Fabric Workers (Existing Title: Patternmaker, All-Around)* - O*NET-SOC Code: 51-4062.00 RAPIDS Code: 0857; Journey *Level Pay Rate WG 9

Shop 64FW - Design, lay out, construct, and install various containments and service items from canvas, herculite, shrink wrap, polyurethane, and leather materials.

Shipwright (Existing Title: Shipwright (Ship & Boat))* - O*NET-SOC Code: 47-2031.01 RAPIDS Code: 0979; *Journey Level Pay Rate WG 10

Shop 64S - Manufacture templates, erect, and remove scaffolding, and build keel block settings. Laser levels and optical instruments are used to maintain a ship's alignment while dry-docking.

Electronics Mechanic* - O*NET-SOC Code: 49-2011.00 RAPIDS Code: 0170; *Journey Level Pay Rate WG 11

Shop 67 - Troubleshoot, modify, repair, and overhaul electronic systems in the shop and shipboard. Systems include radar, communications, sonar, navigation, weapons, and tactical-display. Repair and calibrate mechanical and electrical test-equipment.

Painter (Existing Title: Painter, Shipyard)* - O*NET-SOC Code: 47-2141.00 RAPIDS Code: 0385; *Journey Level Pay Rate WG 9

Shop 71 - Accomplish state-of-the-art surface coating and surface preparation for naval vessels utilizing high volume/low pressure paints, epoxy coatings, powder and Teflon coatings.

Temporary Services Electrician (Existing Title: Electrician (Ship and Boat)) -
O*NET-SOC Code: 47-2111.00 RAPIDS Code: 0771; *Journey Level Pay Rate WG 10*
Shop: 99E - Provide temporary shore power, industrial power, refrigeration, and heat, telephones, and casualty control alarm systems to naval vessels.

Utilities Systems Repair Operator (Existing Title: Pipe Fitter (Ship and Boat)) -
O*NET-SOC Code: 47-2152.01 RAPIDS Code: 0412; *Journey Level Pay Rate WG 10*
Shop 99 - Operates and repairs mechanical equipment associated with the operations of dry-docks, pump wells and caissons. Controls, operates, inspects and repairs complex utility systems.

Temporary Services Pipefitter (Existing Title: Pipe Fitting and/or Plumbing) -
O*NET-SOC Code: 47-2152.01 RAPIDS Code: 0412; *Journey Level Pay Rate WG 10*
Shop 99P - Provide temporary ventilation, potable water, non-potable water, auxiliary sea water, steam, low pressure air, breathing air and collection, holding and transfer (CHT) connections.

Nondestructive Testing (Existing Title: Non-Destructive Tester) -
O*NET-SOC Code: 17-3029.00 RAPIDS Code: 1010*; Journey Level Pay Rate WG 11*
Code 135 - Perform inspections to detect internal, surface, and concealed defects or flaws in materials using techniques that do not damage or destroy the items being tested.

Crane Electrician (Electrician (Ship & Boat))* - O*NET-SOC Code: 47-2111.00 RAPIDS Code: 0771; *Journey Level Pay Rate WG 10
Code 730 HME - Repair and maintain all electrical systems of the cranes at the Shipyard. Repairs include electric motor repair, operation panels, safety systems, hoisting systems, and various other circuitries.

Crane Mechanic (Existing Title: Mechanic, Industrial Truck)* - O*NET-SOC Code: 49-3031.00 RAPIDS Code: 0153; Journey *Level Pay Rate WG 10
Code *730 HMM -* Repair and maintain all mechanical systems of the cranes at the Shipyard. Repairs include diesel repair, hydraulics, fastening systems, hoisting systems, and brakes.

Rigger* - O*NET-SOC Code: 49-9096.00 RAPIDS Code: 0474; *Journey Level Pay Rate WG 10
Code 740 - Perform a wide variety of jobs relating to the movement of material, and equipment using cranes, forklifts, hoists, dollies, and chain falls.

Wage Schedule:
Typically, the entry wage for the occupations listed above starts at 65% of the journeyworker wage. The remaining 35% of the journeyworker wage is broken up into 6 month (26 week) intervals. This general schedule is in line with 5 CFR 532.265, Special Wage Schedule for Apprentices and Shop Trainees, as alluded to in Section IX.

Summary Explanation of Work Process Schedule and Related Instruction Outline

There are several major components of Civilian Naval Shipyard (NAVSEA) occupational

training. A major piece is the On-the-Job Learning (OJL) portion for each occupation, with hours typically assigned per topic across four years. **OJL is reflected in Work Process Schedules. The Sponsor may modify the work processes to meet local needs prior to submitting these Standards to the appropriate Registration Agency for approval.**
For example, for Shipfitter, the Assembly aspect of OJL hours consists of 240, 240, 275, and 335 for years 1 through 4 respectively. Comparable hour distributions would exist for the OJL subjects of Foundations, Hulls, Structural, Tanks, Lead, and Miscellaneous Training.

A next major component of occupational training would be represented by "Qualification/Requalification" which is independent of the OJL topics mentioned above and independent of the Related Instruction (RI) subjects and hours. For Shipfitter, and other occupations, there are generally up to 200 hours allocated per apprenticeship year for "Qualified/Requalified." These 200 hours per year essentially represent certification or competency demonstration that the worker can do the specific work involved, and apply whether or not the worker is an apprentice.

RI consists of two major components: Core Academic subjects (which apply to all the occupations) and Trade Theory subjects that are specific to the occupation. The Core Academic typically consists of 480 hours (310 and 170, as per page A-7) taken over the first year of apprenticeship, followed by another 480 hours (again, 310 plus 170), and then by 320 hours in the third year (190 plus 130 hours), with up to 480 hours for electrical occupations in the third year. Core Academic training has been completed by the time the fourth year starts, therefore 0 hours are specified in that fourth year for "Apprentice School Hours (Related Instruction)."

Finally, there are the Trade/Occupational Theory course segments of RI specific to each occupation. There are typically eight of them, at 50 hours each, for a total 400 RI occupational specific hours for the non-electrical positions, and nine of them, at 50 hours each, for a total of 450 RI occupational specific hours for the electrical positions. Each of these 50 hour segments consists of topical study areas – for example, for Shipfitter, "Trade Theory 8" consists of Intersections, Foundations, Ship's Structures, and Watertight Members. Another occupation, Electronic Industrial Control Mechanic, is electrical in nature and has one more 50 hour course component, "Trade Theory 9," that consists of Programmable Logic Controllers Introduction, etc.

For additional explanation of the occupational curriculums, please see below:

Trade Training Plans: The Trade Training Plan (TTP) is a comprehensive signed document of record for each occupation participating in the Apprentice Program. The construction, content, assembly and certification of the TTP are directed by NAVSEA's Naval Shipyard Apprentice Program Policy and Guidelines (Appendix D).

The TTP delineates the related and supplemental instruction, representative content, outcomes and assessment methods of the trade/occupational theory curriculum, a schedule of the key work processes and the approximate time to be spent in each, including the method, means and process for accounting for the accumulating of OJL hours. The TTP is required to be updated and certified by the Trade Superintendent and the Apprentice Program Administrator (APA) on a biennial basis. The Trade Superintendent maintains the working copy and the APA holds the signed official copy. It is within the TTP that the Work Process Schedule and the Related Instruction Outlines reside.

Work Process Schedule

Each occupation participating in the Apprenticeship has established and maintains an updated list of Scheduled Work Experience in its TTP. This work process schedule provides the approximate time to be spent in each key process throughout the apprenticeship.

The enclosed summary sheets provide the Scheduled Work Experience as taken from the trade/occupational training plans. The Trade Superintendents are expected to review and if necessary, adjust the Key Processes and the hours allocated to each process according to anticipated workload and forecasted availabilities. The most current Work Process Schedules will be in the official copy of the TTP on file with the APA.

Related Instruction

There are four phases in the Apprenticeship. A phase typically aligns with each year of the apprenticeship.

Delivery of accredited related instruction is front loaded into the first three phases of the apprenticeships. In general, apprentices are scheduled for 480 hours of related instruction during Phase one and Phase two. Phase three provides 320 hours of related instruction for non-electrical trades/occupations and up to 480 hours of related instruction for electrical trades/occupations.

In addition and independent of the accredited related instruction, occupations allow up to 200 hours of qualification training in each of the four phases. Phase coursework may overlap with preceding or following year depending on workload and academic schedules.

The enclosed summary sheets show the delivery schedule for the related instruction for each occupation. Further break down of curriculum is available in the TTP's course outline.

Related instruction is delivered in academic sessions held on site. One academic session is similar to an academic quarter, although there are five academic sessions during the year. Apprentices attend academics on a rotational basis in assigned cohort groups by occupation and by year; not all apprentices attend every academic session. Typically an apprentice will attend at least three sessions during the year until all academics are complete.

Each session is made up of twenty, eight - hour days. The session is split in two; apprentices are assigned to the apprentice school for two weeks, then rotate back to their trade/occupation/ shop/ project for two weeks, and then return to finish their session for two extra weeks. Each session comprises 160 hours of instruction and includes typically two academic courses and a trade theory block. The session normally has two academic classes and the trade theory class, thus filling the eight-hour day.

Each Activity will submit a similar table with a list of accredited courses and course descriptions. Each occupation will have 480 Core Academic hours first year, etc.

List of Accredited Subjects

ACCREDITED COURSES AND CREDITS FOR NON-ELECTRICAL TRADES (99 Credits, 1280 Hours)			
Phase I (Typ)	**Phase II (Typ)**	**Phase III (Typ)**	**Phase IV (Typ)**
Certificate of Completion	Certificate of Specialization	Associate in Technical Arts Degree	
Math 94 (5)*	Math 100 (5)	OLRM 225 (5)	All Academics Complete
BSTEC 150 (5)	BSTEC 250 (5)	Tec-D 109 (4)	
Tec-D 107 (4)	Tec-D 200 (4)	Physics 270 (4)	
Physics 170 (4)	Physics 171 (4)	Trade Theory VII (3)	
OLRM 112 Seminars (1)	Physics 172 (4)	Trade Theory VIII (3)	All Trade Theory Complete
Trade Theory I, (4)	Trade Theory IV (3)		
Trade Theory II (4)	Trade Theory V (3)	Work Experience (4)	
Trade Theory III (4)	Trade Theory VI (3)		
Work Experience (6)	Work Experience (6)		
Total Credits (37)	Total Credits (37)	Total Credits (25)	0
310 hrs Accredited	310 hrs Accredited	190 hrs Accredited	0 hrs Accredited
170 hrs non Accredited	170 hrs non Accredited	130 hrs non Accredited	0 hrs non Accredited

ACCREDITED COURSES AND CREDITS FOR ELECTRICAL TRADES (101 Credits, 1280 hours)			
Phase I (Typ)	**Phase II (Typ)**	**Phase III (Typ)**	**Phase IV (Typ)**
Certificate of Completion	Certificate of Specialization	Associate in Technical Arts Degree	
Math 94 (5)*	Math 99 (5)	OLRM 225 (5)	All Academics Complete
BSTEC 150 (5)	BSTEC 250 (5)	Math 103 (5)	
Tec-D 107 (4)	Tec-D 200 (4)	Physics 270 (4)	
Physics 170 (4)	Physics 171 (4)	Trade Theory VII (3)	
OLRM 112 Seminar (1)	Physics 172 (4)	Trade Theory VIII (3)	All Trade Theory Complete
Trade Theory I, (4)	Trade Theory IV (3)	Trade Theory IX (3)	
Trade Theory II (4)	Trade Theory V (3)	Work Experience (4)	
Trade Theory III (4)	Trade Theory VI (3)		
Work Experience (6)	Work Experience (6)		
Total Credits (37)	Total Credits (37)	Total Credits (27)	0
310 hrs Accredited	310 hrs Accredited	190 hrs Accredited	0 hrs Accredited
170 hrs non Accredited	170 hrs non Accredited	130 hrs non Accredited	0 hrs non Accredited

Course Descriptions:

Academics: The academic core subjects are directed by NAVSEA's Naval Shipyard Apprentice Program Policy and Guidelines (Appendix D). Related academic training will take place at (Indicate where classes are held) or as designated by the Apprentice Program Administrator. Apprentices must earn a grade of (2.0) or better for successful completion of academic courses. The Employer will pay for all initial course tuition and college fees. Students will be in a paid status while taking core academic classes. Adjunct or tenured faculty assigned by the College will teach all core academic classes. All Apprentices and all Trades/Occupations, except as noted, will take the following core academic subjects:

Accredited Academic Course Descriptions:

BSTEC 150 – BUSINESS ENGLISH 5 Credits
A business-centered approach to improving writing skills by reviewing grammar, language usage, structure, English mechanics, editing, proofreading, and spelling.

BSTEC 250 – BUSINESS CORRESPONDENCE 5 Credits
Effective composition for business letters, memos, and reports. Includes writing style, tone, grammar, punctuation, and vocabulary.

CO-OP 121 – 228 COOPERATIVE WORK EXPERIENCE 1-13 Credits
Contracted work experience coordinated with employer, faculty and student to meet specific learning objectives for co-op students.

INDTT 170 – PHYSICS AND TECHNOLOGY I 4 Credits
First course in a sequence of four. Two and one third units are studied: Force and force-like quantities, Work and Mechanical rate. Each unit covers mechanical, fluid, electrical and thermal systems.

INDTT 171 - PHYSICS AND TECHNOLOGY II 4 Credits
Second in a 4 course sequence. Three units studied: Rate, resistance and mechanical energy. Mechanical, fluid, electrical and thermal systems.

INDTT 172 - PHYSICS AND TECHNOLOGY III 4 Credits
Third in a 4 course sequence. Four units studied: Energy, momentum, power and force transformer. Each unit covers mechanical fluid electrical and thermal systems.

INDTT 270 - PHYSICS AND TECHNOLOGY IV 4 Credits
Fourth course in 4 course sequence. Advanced theory and application of physics concepts studied. Topics include energy converters, transducers, and time constants.

MATH 94 - ELEMENTARY ALGEBRA 5 Credits
First quarter of the sequence of Elementary Algebra, Intermediate Algebra, and College Algebra. Basic algebraic concepts, first degree equations, polynomials, whole number and rational exponents, roots and radicals, word problems.

MATH 99 (Electrical Trades Only) - INTERMEDIATE ALGEBRA 5 Credits
Second course in the sequence of Elementary Algebra and Intermediate Algebra. Graphing linear and quadratic functions; systems of equations; rational expressions; radical expressions and rational exponents. A scientific calculator is required.

MATH 100 - APPLIED MATH 5 Credits
Integrated presentation of topics in arithmetic, algebra, and geometry; problem-solving, estimation, use of right triangle relationships; applications of math in practical, workplace-related problems.

MATH 103 (Electrical Trades Only) – APPLIED TRIGONOMETRY 5 Credits
Plane trigonometry for technical programs including trigonometric functions, inverse functions, right and oblique triangles, vectors, radians, identities, interpolations, complex numbers and graphing trigonometric functions.

ORLM 112 APPRENTICE SEMINAR 3 Credits
An introduction of critical job and academic skills to support success in COAPP work experience associated with the apprenticeship program.

OLRM 225 – **HUMAN RELATIONS IN ORGANIZATIONS** 5 Credits
The study of interactions between people in organizational settings. The course focuses on developing skills to communicate effectively with other people as an individual, group, and a team member including verbal, non-verbal language, and listening skills.

TEC-D 107 – **TECHNICAL DRAWING** 4 Credits
A beginning drawing course teaching both introductory hand drawing and computer drawing skills. Concepts taught include: care and use of instruments, line types, sketching, numbering of planes, lettering, and line work, orthographic projection, primary and secondary auxiliary projections, introduction to descriptive geometry, isometric drawing and isometric sections, orthographic sections, and an introduction to the theory of dimensioning.

TEC-D 109 – **DESCRIPTIVE GEOMETRY** 4 Credits
Introduction to principles of descriptive geometry used to solve 3 dimensional problems graphically via successive auxiliary projections. Study of space relationships for points, lines and planes that precede design. Also, an introduction to development of surfaces and intersections.

TEC-D 200 – COMPUTER-AIDED DESIGN I 4 Credits
Introduction to Computer-Aided Drafting using Autodesk ACAD software to create, edit, and plot engineering drawings.

(SAMPLE)

WORK PROCESS SCHEDULE
SHIPFITTER
(EXISTING TITLE: SHIPFITTER (SHIP & BOAT))
O*NET CODE: 51-4192.00 RAPIDS CODE: 0513

The Sponsor may modify the work processes to meet local needs prior to submitting these Standards to the appropriate Registration Agency for approval.

Scheduled Work Experience: Apprentice Year

	1	2	3	4	Totals	
Assembly	240	240	275	335	1090	
Foundations	255	255	280	350	1140	
Hulls	145	145	160	190	640	
Structural	265	265	295	375	1200	
Tanks	220	220	255	305	1000	
Lead	145	145	165	195	650	
Misc. Training	50	50	50	50	200	
Total Hours	1320	1320	1480	1800	5920	

Qualification/ Requalification (similar to certification)	200	200	200	200	800

RELATED INSTRUCTION OUTLINE
SHIPFITTER
(EXISTING TITLE: SHIPFITTER (SHIP & BOAT))
O*NET CODE: 51-4192.00 RAPIDS CODE: 0513

Academic Core Curriculum (Common to all non-electrical occupations)

Subject	Phase/Year 1	Phase/Year 2	Phase/Year 3	Phase/Year 4
Math or OLRM	5 credits	5 credits	5 credits	All Academics Complete
BSTEC or Tec-D	5 credits	5 credits	4 credits	
Tec-D or Physics	4 credits	4 credits	4 credits	
Physics or Trade Theory	4 credits	4 credits	3 credits	All Trade Theory Complete
OLRM Seminar/Physics/Trade Theory	1 credit	4 credits	3 credits	
Trade Theory	12 credits total	9 credits total		
Work Experience	6 credits	6 credits	4 credits	
Total Hours	480 (37 credits)	480 (37 credits)	320 (23 credits)	0

Please note: For more detail common to all occupations on Academic Core, please see page A-7 as reference.

Trade/Occupational Theory Curriculum (400 total hours – first 150 hours tend to be in the first year, second 150 in the second year, final 100 in the third year) – specific to Shipfitter:

Trade/Occupational Theory 1 50 hours
Responsibilities & Relationships, Industrial Safety for Shipfitters, Shipfitter Terminology, Compartmentation, Tooling, Geometric Construction & Layout, Trade Math

Trade/Occupational Theory 2 50 hours
Applying Right Angle Trigonometry, Arc-Angle Relationship, Trade Math, Structural Blueprints 1, OSHA Safety Manual – Grinding

Trade/Occupational Theory 3 50 hours
Shop Machinery, Machinery Set Up, Bend Allowance, Metals Properties, OSHA Safety Manual – Gas Free Standards, Shape Development, Materials Used in Ship's Structures, Assembly Techniques, and Distortion Control

Trade/Occupational Theory 4 50 hours
Ship's Reference Lines – Surface, Ship's Reference Lines – Submarines, Workmanship Inspections, Weld Joint Designs, Fit up Inspections, Parallel Line Development

Trade/Occupational Theory 5 50 hours
Non-Destructive Test Methods, Applied Descriptive Geometry, Welding Symbols, Radial Line Development, OSHA Manual – Lead Controls

Trade/Occupational Theory 6 50 hours
Triangulation, Stay Method, Common Welding Processes, Advanced Blueprint Reading, Advanced Assembly Techniques

Trade/Occupational Theory 7 50 hours
Level Line Development, Large Assembly Processes, Shipboard Assembly Techniques, Shipboard Drill & Test

Trade/Occupational Theory 8 50 hours
Intersections, Foundations, Ship's Structures, Watertight Members

(SAMPLE)

WORK PROCESS SCHEDULE
ELECTRONIC INDUSTRIAL CONTROL MECHANIC
(EXISTING TITLE: ELECTROMECHANICAL TECHNICIAN)
O*NET-SOC CODE: 17-3024.00 RAPIDS CODE: 0167

The Sponsor may modify the work processes to meet local needs prior to submitting these Standards to the appropriate Registration Agency for approval.

	Apprentice Year				
Scheduled Work	1	2	3	4	Totals
Conventional Machinery Maintenance	440	400	400	500	1740
High Pressure Air Systems	0	80	80	200	360
Welding Equipment Maintenance & Repair	400	320	320	300	1340
Sandblast Equipment	80	80	0	0	160
Machine Shop CNC Maintenance & Repair	400	440	600	800	2240
Totals	1320	1320	1400	1800	5840

Qualification/ Requalification (similar to certification)	480	480	400	0	1360

RELATED INSTRUCTION OUTLINE
ELECTRONIC INDUSTRIAL CONTROL MECHANIC
(EXISTING TITLE: ELECTROMECHANICAL TECHNICIAN)
O*NET-SOC CODE: 17-3024.00 RAPIDS CODE: 0167

Academic Core Curriculum (Common to all electrical occupations)

Subject	Phase/Year 1	Phase/Year 2	Phase/Year 3	Phase/Year 4
Math or OLRM	5 credits	5 credits	5 credits	All Academics Complete
BSTEC or Math	5 credits	5 credits	5 credits	
Tec-D or Physics	4 credits	4 credits	4 credits	
Physics or Trade Theory	4 credits	4 credits	3 credits	All Trade Theory Complete
OLRM Seminar/Physics/Trade Theory	1 credit	4 credits	3 credits	
Trade Theory	12 credits total	9 credits total	7 credits total	
Work Experience	6 credits	6 credits		
Total Hours	480 (37 credits)	480 (37 credits)	320 (27 credits)	0

Please note: For more detail common to all occupations on Academic Core, please see page A-7 as reference.

Trade/Occupational Theory Curriculum (450 total hours – first 150 hours tend to be in the first year, second 150 in the second year, third 150 in the third year) – specific to Electronic Industrial Control Mechanic:

Trade/Occupational Theory 1 50 hours
Trade Safety, Basic Concepts, Basic Electrical Measuring Instruments, Circuit Components, Basic DC Circuits, Complex DC Circuit Analysis

Trade/Occupational Theory 2 50 hours
Magnetism & Electromagnetism, AC and Voltage, Power in AC Circuits, Capacitance, Inductance, Transformers

Trade/Occupational Theory 3 50 hours
Ladder Diagrams, Semiconductors, Junction Diodes, Power Supplies, Bi-polar Junction Transistors, Amplifiers

Trade/Occupational Theory 4 50 hours
Operational Amplifiers, Oscillators, Thyristors, Regulated Power Supplies, Industrial Interfacing Devices, Industrial Controller Modes of Operation

Trade/Occupational Theory 5 50 hours
Variable Speed DC Motor Controls, Variable Speed AC Motor Controls, Process Control & Instrumentation, Detection Sensors, Motion Control

Trade/Occupational Theory 6 50 hours
Intro to Digital, Number Systems, Logic Gates, Logic Circuits, Integrated Circuit Specs & Interfacing, Seven Segment Displays, Flip-flops, Counters

Trade/Occupational Theory 7 50 hours
Shift Registers, Arithmetic Circuits, Memories, Digital Systems, Interfacing with Analog

Trade/Occupational Theory 8 50 hours
Intro to Micro-controllers, Fundamental Micro-controller Programming, Intro: Pico Programmable Logic Controllers, Advanced Pico Programmable Logic Controllers

Trade/Occupational Theory 9 50 hours
Programmable Logic Controllers Introduction, Programmable Logic Controllers Ladder Logic, Creating a Programmable Logic Controller Project, Interfacing Digital & Analog Applications

(SAMPLE)

WORK PROCESS SCHEDULE
SHEET METAL MECHANIC
(EXISTING TITLE: SHEET METAL WORKER)
O*NET-SOC CODE: 47-2211.00 RAPIDS CODE: 0510

The Sponsor may modify the work processes to meet local needs prior to submitting these Standards to the appropriate Registration Agency for approval.

Scheduled Work Experience: Apprentice Year

	1	2	3	4	Totals
Ventilation	240	240	275	335	1090
Furniture & Misc.	255	255	280	350	1140
Stowage's	145	145	160	190	640
Bulkheads/ Overheads	265	265	295	375	1200
Misc. Structures	220	220	255	305	1000
Fabrication	145	145	165	195	650
Other	50	50	50	50	200
Total Hours	1320	1320	1480	1800	5920
Qualification/ Requalification (similar to certification)	200	200	200	200	800

RELATED INSTRUCTION OUTLINE
SHEET METAL MECHANIC
(EXISTING TITLE: SHEET METAL WORKER)
O*NET-SOC CODE: 47-2211.00 RAPIDS CODE: 0510

Academic Core Curriculum (Common to all non-electrical occupations)

Subject	Phase/Year 1	Phase/Year 2	Phase/Year 3	Phase/Year 4
Math or OLRM	5 credits	5 credits	5 credits	All Academics Complete
BSTEC or Tec-D	5 credits	5 credits	4 credits	
Tec-D or Physics	4 credits	4 credits	4 credits	
Physics or Trade Theory	4 credits	4 credits	3 credits	All Trade Theory Complete
OLRM Seminar/Physics/Trade Theory	1 credit	4 credits	3 credits	
Trade Theory	12 credits total	9 credits total		
Work Experience	6 credits	6 credits	4 credits	
Total Hours	480 (37 credits)	480 (37 credits)	320 (23 credits)	0

Please note: For more detail common to all occupations on Academic Core, please see page A-7 as reference.

Trade/Occupational Theory Curriculum (400 total hours – first 150 hours tend to be in the first year, second 150 in the second year, final 100 in the third year) – specific to Sheet Metal Mechanic:

Trade/Occupational Theory 1 50 hours
Responsibilities & Relationships, Industrial Safety for Sheetmetal Mech, Trade Terminology, Compart mentation, Trade Tooling, Trade Math, Shop Machinery

Trade/Occupational Theory 2 50 hours
Structural Blueprints 1, Bend Allowance, Welding Symbols, OSHA Safety Manual – Gas Free Standards

Trade/Occupational Theory 3 50 hours
Fasteners, Drawing Basics, Geometric Construction, Right Angle Trig, Arc-Angle Relationships, Metals Properties, OSHA Safety Manual – Grinding

Trade/Occupational Theory 4 50 hours
Vent Standards, Component Sketching, Material ID & Records, Seams, Joints & Edges, Misc. Shop Standards, Production Paperwork

Trade/Occupational Theory 5 50 hours
Parallel Line Development, Radial Line Development, Ventilation Blueprints 1,
Foreign Material Exclusion

Trade/Occupational Theory 6 50 hours
Triangulation, Double Triangulation, Stay Method, Level Line Development, Ventilation Blueprints 2, Brake Angles

Trade/Occupational Theory 7 50 hours
Sketching Tubular Vent Systems, Ventilation Blueprints 3, Vent Sketching Techniques, Installation Procedures Ship Checks (vent), Workmanship & Fit Up Inspection

Trade/Occupational Theory 8 50 hours
Volumetric Airflow Testing, Ship Check (Components), Component Sketching Techniques, Misc. Installation Techniques

(SAMPLE)

WORK PROCESS SCHEDULE
WELDER
(EXISTING TITLE: WELDER, COMBINATION)
O*NET-SOC CODE: 51-4121.02 RAPIDS CODE: 0622

The Sponsor may modify the work processes to meet local needs prior to submitting these Standards to the appropriate Registration Agency for approval.

Scheduled Work Experience: Apprentice Year

	1	2	3	4	Totals
Shielded Metal Arc	550	360	475	560	1945
FCAW – Gas Shielded	130	100	110	100	440
GTAW	0	300	330	390	1020
GMAW (Pulse)	340	210	240	120	910
Oxy-Fuel Cutting	90	90	65	10	255
Misc. Welding Processes	160	160	160	190	670
Other	50	100	100	430	680
Total Hours	1320	1320	1480	1800	5920

Qualification/ Requalification (similar to certification)	200	200	200	200	800

RELATED INSTRUCTION OUTLINE
WELDER
(EXISTING TITLE: WELDER, COMBINATION)
O*NET-SOC CODE: 51-4121.02 RAPIDS CODE: 0622

Academic Core Curriculum (Common to all non-electrical occupations)

Subject	Phase/Year 1	Phase/Year 2	Phase/Year 3	Phase/Year 4
Math or OLRM	5 credits	5 credits	5 credits	All Academics Complete
BSTEC or Tec-D	5 credits	5 credits	4 credits	
Tec-D or Physics	4 credits	4 credits	4 credits	
Physics or Trade Theory	4 credits	4 credits	3 credits	All Trade Theory Complete
OLRM Seminar/Physics/Trade Theory	1 credit	4 credits	3 credits	
Trade Theory	12 credits total	9 credits total		
Work Experience	6 credits	6 credits	4 credits	
Total Hours	480 (37 credits)	480 (37 credits)	320 (23 credits)	0

Please note: For more detail common to all occupations on Academic Core, please see page A-7 as reference.

Trade/Occupational Theory Curriculum (400 total hours – first 150 hours tend to be in the first year, second 150 in the second year, final 100 in the third year) – specific to Sheet Metal Mechanic:

Trade/Occupational Theory 1 50 hours
Shipyard Indoct., Industrial Safety for Welders, Oxy-Fuel Cutting, Welding Terminology, Welding Process Instruction Overview, Quality Control, Trade Math

Trade/Occupational Theory 2 50 hours
All Welding Processes Overview, Shielded Metal Arc Welding, Flux Core Arc Welding, Safe Use of Inert Gas, Basic Welding Symbols, Welding Process Instruction 1688 & 1689

Trade/Occupational Theory 3 50 hours
Gas Metal Arc Welding, Shipboard Work, Hand Tool Safety, Grinding Techniques, Workmanship Inspections & Insp Tools, Air Carbon Arc Cutting, Blueprint Reading 1

Trade/Occupational Theory 4 50 hours
Gas Tungsten Arc Welding, Plasma Arc Cutting, Metallurgy, Welding Symbols 2, Blueprint Reading 2, Shop Math

Trade/Occupational Theory 5 50 hours
Stud Welding, Weld Process Review, Welding Symbols 3, Basic Joint Designs, Blueprint & Specifications Interpretations, Bend Allowance

Trade/Occupational Theory 6 50 hours
Aluminum Welding Techniques, Welding Symbols 4, Quality Assurance, Geometric Construction, Parallel Line Development, Precision Measuring Instruments

Trade/Occupational Theory 7 50 hours
Welding Padeyes, Visual Inspections, Welding Process Research & Presentation, Distortion Control, Welding Metallurgy 2, Radial Line Development

Trade/Occupational Theory 8 50 hours
Pipe Welding, Welding Containments, Quality Assurance & Tech Work Documents, Welding Metallurgy 3, Triangulation, Safety Paper and Audits

(SAMPLE)

WORK PROCESS SCHEDULE
ELECTROPLATER
(EXISTING TITLE: ELECTROSTATIC POWDER COATING TECHNICIAN)
O*NET-SOC CODE: 51-9121.01 RAPIDS CODE: 1036

The Sponsor may modify the work processes to meet local needs prior to submitting these Standards to the appropriate Registration Agency for approval.

Scheduled Work Experience: Apprentice Year

	1	2	3	4	Totals
Shop Functions	200	200	200	200	800
Chemical Cleaning	100	100	100	100	400
Tank/Hazmat Compliance	190	190	190	190	760
Surface Finishing	200	200	200	200	800
Tank Plating	250	250	250	250	1000
Selective Plating	500	500	500	500	2000
Non-Plating Surface Coatings	10	10	10	10	40
Enhancement Training	30	30	30	350	440
Total Hours	1480	1480	1480	1800	6240
Qualification/ Requalification (similar to certification)	40	40	200	200	480

RELATED INSTRUCTION OUTLINE
ELECTROPLATER
(EXISTING TITLE: ELECTROSTATIC POWDER COATING TECHNICIAN)
O*NET-SOC CODE: 51-9121.01 RAPIDS CODE: 1036

Academic Core Curriculum (Common to all non-electrical occupations)

Subject	Phase/Year 1	Phase/Year 2	Phase/Year 3	Phase/Year 4
Math or OLRM	5 credits	5 credits	5 credits	All Academics Complete
BSTEC or Tec-D	5 credits	5 credits	4 credits	
Tec-D or Physics	4 credits	4 credits	4 credits	
Physics or Trade Theory	4 credits	4 credits	3 credits	All Trade Theory Complete
OLRM Seminar/Physics/Trade Theory	1 credit	4 credits	3 credits	
Trade Theory	12 credits total	9 credits total		
Work Experience	6 credits	6 credits	4 credits	
Total Hours	480 (37 credits)	480 (37 credits)	320 (23 credits)	0

Please note: For more detail common to all occupations on Academic Core, please see page A-7 as reference.

Trade/Occupational Theory Curriculum (400 total hours – first 150 hours tend to be in the first year, second 150 in the second year, final 100 in the third year) – specific to Electroplater:

Trade/Occupational Theory 1 50 hours
Industrial Orientation, Trade Safety, Hazardous Materials, Ship's Terms & Compart mentation, Trade Tools & Equipment, Trade Math

Trade/Occupational Theory 2 50 hours
Trade Quality Assurance, Intro to Chemical Cleaning, Mechanical Cleaning for Electroplating

Trade/Occupational Theory 3 50 hours
Sanding, Polishing, Buffing

Trade/Occupational Theory 4 50 hours
Masking & Booting, Plastisol Coatings, Barrel Plating, Electroplating Metallurgy

Trade/Occupational Theory 5 50 hours
Process Instruction, Plating Procedures, Quality Standards

Trade/Occupational Theory 6 50 hours
Chemistry for Electroplaters, Electricity & Electrochemistry

Trade/Occupational Theory 7 50 hours
Chrome Plating, Tin Plating, Conversion Coatings

Trade/Occupational Theory 8 50 hours
Plating Bath Control, Hull Cell, Dimensional Restoration

(SAMPLE)

WORK PROCESS SCHEDULE
MACHINIST
O*NET-SOC CODE: 51-4041.00 RAPIDS CODE: 0296

The Sponsor may modify the work processes to meet local needs prior to submitting these Standards to the appropriate Registration Agency for approval.

Scheduled Work Experience: Apprentice Year

	1	2	3	4	Totals
Milling Machine Operations	300	0	320	0	620
Vertical Mills	300	0	320	0	620
Drilling Machines	200	0	40	0	240
Misc. Machining	20	0	100	0	120
Engines/Turret Lathes	500	0	160	140	800
Shaft Lathes	0	0	220	140	360
Grinders	0	0	100	300	400
EDM	0	0	80	220	300
Inspection	0	0	60	50	110
Heavy Tool	0	160	40	350	550
Air Room	0	20	0	200	220
Hydraulics	0	120	0	120	240
Misc. Eqpt	0	120	40	60	220
Pumps	0	120	0	100	220
Valves	0	120	0	120	240
Shipboard – S/38	0	660	0	0	660
Total Hours	1320	1320	1480	1800	5920
Qualification/ Requalification (similar to certification)	200	200	200	200	800

RELATED INSTRUCTION OUTLINE
MACHINIST
O*NET-SOC CODE: 51-4041.00 RAPIDS CODE: 0296

Academic Core Curriculum (Common to all non-electrical occupations)

Subject	Phase/Year 1	Phase/Year 2	Phase/Year 3	Phase/Year 4
Math or OLRM	5 credits	5 credits	5 credits	All Academics Complete
BSTEC or Tec-D	5 credits	5 credits	4 credits	
Tec-D or Physics	4 credits	4 credits	4 credits	
Physics or Trade Theory	4 credits	4 credits	3 credits	All Trade Theory Complete
OLRM Seminar/Physics/Trade Theory	1 credit	4 credits	3 credits	
Trade Theory	12 credits total	9 credits total		
Work Experience	6 credits	6 credits	4 credits	
Total Hours	480 (37 credits)	480 (37 credits)	320 (23 credits)	0

Please note: For more detail common to all occupations on Academic Core, please see page A-7 as reference.

Trade/Occupational Theory Curriculum (400 total hours – first 150 hours tend to be in the first year, second 150 in the second year, final 100 in the third year) – specific to Machinist:

Trade/Occupational Theory 1 50 hours
Precision Measurement, Trade Based Mechanical Drafting 1, Intro to the Machining Processes, Trade Hand Tools, Shop Safety, Trade Math

Trade/Occupational Theory 2 50 hours
Turning Machines, Level 2 Measuring, Algebra in the Machinist Trade, Trade Based Mechanical Drafting 2, Blueprint Reading 2, Welding Process Instruction 1688 & 1689

Trade/Occupational Theory 3 50 hours
Vertical Milling Machines, Horizontal Milling Machines, Indexing, Dividing the Circle, Basic Spur Gears, Applying Plane Geometry to the Trade, Trade Based Mechanical Drafting 3, Blueprint Reading 3

Trade/Occupational Theory 4 50 hours
Pump Theory, Valve Theory, Hydraulic Theory

Trade/Occupational Theory 5 50 hours
Dimensioning & Tolerancing, Datum(s), Material Condition & Boundary, Various Types of Tolerances, Cartesian Coordinate Systems, Trigonometric Problem Solving

Trade/Occupational Theory 6 50 hours
Basic CNC Programming, Turning Techniques, Milling Techniques, Compound Angles, Drafting Thread & Gear Forms

Trade/Occupational Theory 7 50 hours
Machine Shop Operations, Designing Parts, Planning Shop Use and Manning, Manufacture of Parts, Documentation of Manufacturing Process, Review and Analyze, Process Improvement

Trade/Occupational Theory 8 50 hours
Grinding, Computing Shop Math, including Trig, Metallurgy

(SAMPLE)

WORK PROCESS SCHEDULE
PRODUCTION MACHINERY ELECTRICIAN
(EXISTING TITLE: ELECTRICIAN, MAINTENANCE)
O*NET-SOC CODE: 47-2111.00 RAPIDS CODE: 0643

The Sponsor may modify the work processes to meet local needs prior to submitting these Standards to the appropriate Registration Agency for approval.

Scheduled Work Experience	Apprentice Year 1	2	3	4	Totals
Special Systems	0	160	160	160	480
Tool Repair	40	80	80	80	280
Shop Planning	0	0	0	80	80
Industrial Wiring	420	320	320	480	1540
Sand Blast	380	300	300	300	1280
Work Control Center	0	80	0	0	80
Industrial Machinery	420	320	360	480	1580
Misc. Shop Work	60	60	60	60	240
Nuclear Support Work	0	0	0	160	160
Totals	1320	1320	1280	1800	5720
Qualification/ Requalification (similar to certification)	200	200	320	200	

RELATED INSTRUCTION OUTLINE
PRODUCTION MACHINERY ELECTRICIAN
(EXISTING TITLE: ELECTRICIAN, MAINTENANCE)
O*NET-SOC CODE: 47-2111.00 RAPIDS CODE: 0643

Academic Core Curriculum (Common to all electrical occupations)

Subject	Phase/Yr 1	Phase/Yr 2	Phase/Year 3	Phase/Year 4
Math or OLRM	5 credits	5 credits	5 credits	All Academics Complete
BSTEC or Math	5 credits	5 credits	5 credits	
Tec-D or Physics	4 credits	4 credits	4 credits	
Physics or Trade Theory	4 credits	4 credits	3 credits	All Trade Theory Complete
OLRM Seminar/Physics/Trade Theory	1 credit	4 credits	3 credits	
Trade Theory	12 credits total	9 credits total	7 credits total	
Work Experience	6 credits	6 credits		
Total Hours	480 (37 credits)	480 (37 credits)	320 (27 credits)	0

Please note: For more detail common to all occupations on Academic Core, please see page A-7 as reference.

Trade/Occupational Theory Curriculum (450 total hours – first 150 hours tend to be in the first year, second 150 in the second year, third 150 in the third year) – specific to Production Machinery Electrician:

Trade/Occupational Theory 1 50 hours
Shop Safety, Trade Tools & Instruments, Fundamental Concepts, DC Series Circuits, DC Parallel Circuits

Trade/Occupational Theory 2 50 hours
DC Combination Circuits, Battery Theory, DC Work, Power & Energy, Wiring, DC Network Theorems

Trade/Occupational Theory 3 50 hours
Instrument Theory, Intro to AC Theory, Control System Design

Trade/Occupational Theory 4 50 hours
National Electric Code, AC Electrical Theory, Capacitance, Inductance, RCL AC Circuits

Trade/Occupational Theory 5 50 hours
Magnetic Circuits, Armature Winding Theory, DC Generator Theory, DC Motor Theory

Trade/Occupational Theory 6 50 hours
Transformers – Fundamental Principals, Poly-Phased Electrical Theory

Trade/Occupational Theory 7 50 hours
AC Generator Theory, AC Motor Theory

Trade/Occupational Theory 8 50 hours
Electronic Theory & Applications 1

Trade/Occupational Theory 9 50 hours
Electronic Theory & Applications 2, Digital Logic Control System Theory, Microprocessor Control System Theory

(SAMPLE)

WORK PROCESS SCHEDULE
PRODUCTION MACHINERY MECHANIC
(EXISTING TITLE: MACHINE REPAIRER)
O*NET-SOC CODE: 49-9041.00 RAPIDS CODE: 0292

The Sponsor may modify the work processes to meet local needs prior to submitting these Standards to the appropriate Registration Agency for approval.

Scheduled Work Experience	Apprentice Year 1	2	3	4	Totals
Plant Maintenance Areas *	960	960	1120	1360	4400
Maintenance Machine Shop	320	320	320	400	1360
Shop Administration **	40	40	40	40	160
Totals	1320	1320	1480	1800	5920

*Examples included (actual assignments depend on Production Plant needs): Bldg. 368 Pod Sand Blast, Chain Hoist, HP Air, Bldg. 460 POD Metal Fab., Bldg. 431 Machine Shop, Special Maint. & Reusable Support, Misc. Eqpt.

**Subcategories: Trouble Desk, Research & Tech. Support, Planning, Hazmat

Qualification/ Requalification (similar to certification)	200	200	200	200	800

RELATED INSTRUCTION OUTLINE
PRODUCTION MACHINERY MECHANIC
(EXISTING TITLE: MACHINE REPAIRER)
O*NET-SOC CODE: 49-9041.00 RAPIDS CODE: 0292

Academic Core Curriculum (Common to all non-electrical occupations)

Subject	Phase/Year 1	Phase/Year 2	Phase/Year 3	Phase/Year 4
Math or OLRM	5 credits	5 credits	5 credits	All Academics Complete
BSTEC or Tec-D	5 credits	5 credits	4 credits	
Tec-D or Physics	4 credits	4 credits	4 credits	
Physics or Trade Theory	4 credits	4 credits	3 credits	All Trade Theory Complete
OLRM Seminar/Physics/Trade Theory	1 credit	4 credits	3 credits	
Trade Theory	12 credits total	9 credits total		
Work Experience	6 credits	6 credits	4 credits	
Total Hours	480 (37 credits)	480 (37 credits)	320 (23 credits)	0

Please note: For more detail common to all occupations on Academic Core, please see page A-7 as reference.

Trade/Occupational Theory Curriculum (400 total hours – first 150 hours tend to be in the first year, second 150 in the second year, final 100 in the third year) – specific to Production Machinery Mechanic:

Trade/Occupational Theory 1 50 hours
Industrial Environments, Maintenance, Metrology – Intro., Basic Machines, Intro to Metallurgy, Manufacturing Processes, Hand Tools, Trade Math 1

Trade/Occupational Theory 2 50 hours
Basic Machine Tools, Complex Machine Tools, Lathes & Lathe Operations, Pedestal Grinders, Drills, Trade Math 2

Trade/Occupational Theory 3 50 hours
Vertical Milling Machines, Horizontal Milling Machines, Rotary and Indexing Attachments, Grinders, Trade Math 3

Trade/Occupational Theory 4 50 hours
Metallurgy 1, Lubrication, Trade Math 4

Trade/Occupational Theory 5 50 hours
Permanent Fasteners, Detachable Fasteners, Sealing Devices, Trade Math 5

Trade/Occupational Theory 6 50 hours
Power Transmission & Control, Power Transmission & Support, Torque – Speed Change, Torque – Rotary Power Transmission, Alignment of Rotary Elements

Trade/Occupational Theory 7 50 hours
Basic Symbols & Schematics, Basic Trouble Analysis, Geometric Dimensioning & Tolerancing

Trade/Occupational Theory 8 50 hours
Industrial Hydraulics, Pneumatics (LP – Air), Hydraulics Lab, Pneumatics Lab,
Trade Math 6

(SAMPLE)

WORK PROCESS SCHEDULE
MARINE MACHINERY MECHANIC
(EXISTING TITLE: MACHINE REPAIRER, MAINTENANCE)
O*NET-SOC CODE: 49-9041.00 RAPIDS CODE: 0292

The Sponsor may modify the work processes to meet local needs prior to submitting these Standards to the appropriate Registration Agency for approval.

Scheduled Work Experience: Apprentice Year

	1	2	3	4	Totals
Deck Machinery & Shafting Repair	300	300	180	0	780
Ordnance & Hatch Work	120	120	400	400	1040
Engineering, Submarines	300	300	300	500	1400
Engineering Surface Ships	300	300	300	500	1400
Special Projects & Ship Disassembly	300	300	300	400	1300
Total Hours	1320	1320	1480	1800	5920
Qualification/ Requalification (similar to certification)	200	200	200	200	800

RELATED INSTRUCTION OUTLINE
MARINE MACHINERY MECHANIC
(EXISTING TITLE: MACHINE REPAIRER, MAINTENANCE)
O*NET-SOC CODE: 49-9041.00 RAPIDS CODE: 0292

Academic Core Curriculum (Common to all non-electrical occupations)

Subject	Phase/Year 1	Phase/Year 2	Phase/Year 3	Phase/Year 4
Math or OLRM	5 credits	5 credits	5 credits	All Academics Complete
BSTEC or Tec-D	5 credits	5 credits	4 credits	
Tec-D or Physics	4 credits	4 credits	4 credits	
Physics or Trade Theory	4 credits	4 credits	3 credits	All Trade Theory Complete
OLRM Seminar/Physics/Trade Theory	1 credit	4 credits	3 credits	
Trade Theory	12 credits total	9 credits total		
Work Experience	6 credits	6 credits	4 credits	
Total Hours	480 (37 credits)	480 (37 credits)	320 (23 credits)	0

Please note: For more detail common to all occupations on Academic Core, please see page A-7 as reference.

Trade/Occupational Theory Curriculum (400 total hours – first 150 hours tend to be in the first year, second 150 in the second year, final 100 in the third year) – specific to Marine Machinery Mechanic:

Trade/Occupational Theory 1 50 hours
Trade Hand Tools, Precision Measurement, Torque Wrench Use & Care, Fastener Locking Devices, Shop Safety

Trade/Occupational Theory 2 50 hours
Intro to Valves, Packing & Gaskets, Shop Safety

Trade/Occupational Theory 3 50 hours
Mechanical Components – Disassembly & Reassembly, Portable Power Tools, Basic Naval Steam Cycle, Shop Safety

Trade/Occupational Theory 4 50 hours
Bluing & Scraping Techniques, Shaft & Coupling Alignments, Bearing Identification & Installation, Shop Safety

Trade/Occupational Theory 5 50 hours
Complex Portable Machines, Heat Exchangers, Shop Safety

Trade/Occupational Theory 6 50 hours
Steam Turbines, Intro to Pumps, Shop Safety

Trade/Occupational Theory 7 50 hours
Intro to Basic Hydraulic Fluid Power, Basic Fluid Power 2, Ballasting & List Control, Shop Safety

Trade/Occupational Theory 8 50 hours
Intro to Air Conditioning & Refrigeration, Ship's Atmosphere Control, Shop Safety

(SAMPLE)

WORK PROCESS SCHEDULE
MARINE ELECTRICIAN
(EXISTING TITLE: ELECTRICIAN (SHIP & BOAT))
O*NET-SOC CODE: 47-2111.00 RAPIDS CODE: 0771

The Sponsor may modify the work processes to meet local needs prior to submitting these Standards to the appropriate Registration Agency for approval.

Scheduled Work Experience	Apprentice Year 1	2	3	4	Totals
Interior Communications	100	100	100	150	450
Electronic Systems	150	100	100	150	500
Power & Lighting Distribution	250	175	175	230	830
Switchboards	50	75	75	100	300
Wireways	250	200	200	170	820
Topside	150	150	120	200	620
Engineering	150	200	150	250	750
Tanks	50	100	100	50	300
Connector Fabrication	0	50	50	140	240
Pre-Staging	50	50	50	80	230
Inside Shop Work	120	120	280	280	800
Totals	1320	1320	1400	1800	5840
Qualification/ Requalification (similar to certification)	200	200	320	200	

RELATED INSTRUCTION OUTLINE
MARINE ELECTRICIAN
(EXISTING TITLE: ELECTRICIAN (SHIP & BOAT))
O*NET-SOC CODE: 47-2111.00 RAPIDS CODE: 0771

Academic Core Curriculum (Common to all electrical occupations)

Subject	Phase/Yr 1	Phase/Yr 2	Phase/Year 3	Phase/Year 4
Math or OLRM	5 credits	5 credits	5 credits	All Academics Complete
BSTEC or Math	5 credits	5 credits	5 credits	
Tec-D or Physics	4 credits	4 credits	4 credits	
Physics or Trade Theory	4 credits	4 credits	3 credits	All Trade Theory Complete
OLRM Seminar/Physics/Trade Theory	1 credit	4 credits	3 credits	
Trade Theory	12 credits total	9 credits total	7 credits total	
Work Experience	6 credits	6 credits		
Total Hours	480 (37 credits)	480 (37 credits)	320 (27 credits)	0

Please note: For more detail common to all occupations on Academic Core, please see page A-7 as reference.

Trade/Occupational Theory Curriculum (450 total hours – first 150 hours tend to be in the first year, second 150 in the second year, third 150 in the third year) – specific to Marine Electrician:

Trade/Occupational Theory 1 50 hours
Intro & Basis for Training, Layout & Planning, Component Removal Procedures, Component Installation Procedures, Collars & Chafing Rings, Stuffing Tubes & Kick Pipes, Multi Cable Transits, Cable Installation, Cable Inspection & Repair, Electric Plant Installation Standard Methods, Shop Safety

Trade/Occupational Theory 2 50 hours
Soldering Procedures, Basic Soldering, Wire & Component Soldering, Final Project

Trade/Occupational Theory 3 50 hours
Connectors – Procedures, Front Release Connectors, Rear Release Connectors, Coaxial Cable Connectors, Trial Cable Connectors, Fiber-optic ST Connectors

Trade/Occupational Theory 4 50 hours
Fundamental Electrical Concepts, Power & Series, Circuit Characteristics & Parallel Circuits, Series/Parallel Circuits, Batteries

Trade/Occupational Theory 5 50 hours
Intro to Direct Current, Magnetism, DC Generators, DC Motors, DC Motor Controllers

Trade/Occupational Theory 6 50 hours
Intro to Alternating Current, Inductance, Capacitance, Inductance/Capacitance Reactance

Trade/Occupational Theory 7 50 hours
Complex AC Circuits, Alternators, Transformers, Polyphase Electrical System

Trade/Occupational Theory 8 50 hours
Induction Motors, Synchronous AC Motors & Single-Phase Motors, Synchros, AC Polyphase Motor Windings

Trade/Occupational Theory 9 50 hours
AC Motor Controllers, Fiber-Optic Systems, Solid State Devices,
AC Polyphase Motor Windings

(SAMPLE)

WORK PROCESS SCHEDULE
MARINE PIPEFITTER
(EXISTING TITLE: PIPE FITTER (SHIP & BOAT))
O*NET-SOC CODE: 47-2152.01 RAPIDS CODE: 0412

The Sponsor may modify the work processes to meet local needs prior to submitting these Standards to the appropriate Registration Agency for approval.

Scheduled Work Experience: Apprentice Year

	1	2	3	4	Totals
Shop Work	125	125	125	175	550
Shop Machines	100	100	100	50	350
Collecting/Holding/ Transfer Piping	75	75	175	115	440
Systems Test (Non-Nuclear)	150	150	150	150	600
Steam Systems Piping	250	250	250	250	1000
Fresh Water Piping	150	150	150	150	600
Salt Water Piping	150	150	150	250	700
Oil System Piping	160	160	180	250	750
Air/Gas Piping	160	160	200	160	680
Nuclear Work	0	0	0	250	250
Total Hours	1320	1320	1480	1800	5920

Qualification/ Requalification (similar to certification)	200	200	200	200	800

RELATED INSTRUCTION OUTLINE
MARINE PIPEFITTER
(EXISTING TITLE: PIPE FITTER (SHIP & BOAT))
O*NET-SOC CODE: 47-2152.01 RAPIDS CODE: 0412

Academic Core Curriculum (Common to all non-electrical occupations)

Subject	Phase/Year 1	Phase/Year 2	Phase/Year 3	Phase/Year 4
Math or OLRM	5 credits	5 credits	5 credits	All Academics Complete
BSTEC or Tec-D	5 credits	5 credits	4 credits	
Tec-D or Physics	4 credits	4 credits	4 credits	
Physics or Trade Theory	4 credits	4 credits	3 credits	All Trade Theory Complete
OLRM Seminar/Physics/Trade Theory	1 credit	4 credits	3 credits	
Trade Theory	12 credits total	9 credits total		
Work Experience	6 credits	6 credits	4 credits	
Total Hours	480 (37 credits)	480 (37 credits)	320 (23 credits)	0

Please note: For more detail common to all occupations on Academic Core, please see page A-7 as reference.

Trade/Occupational Theory Curriculum (400 total hours – first 150 hours tend to be in the first year, second 150 in the second year, final 100 in the third year) – specific to Marine Pipefitter:

Trade/Occupational Theory 1 50 hours
Shipyard Orientation & Safety, Trade Tools, Piping Components & Metallurgy, Foreign Material Exclusion (FME & Cleanliness), Intro to Air Conditioning & Refrigeration, Non-Nuclear Test, Trade Documentation

Trade/Occupational Theory 2 50 hours
Basic Blueprint Reading, Basic Layout Skills, Basic Noise Reduction, Basic Hangers, Basic Mechanical Joint Assembly/Disassembly

Trade/Occupational Theory 3 50 hours
Trade Drawing, Pipe Cut-off, Pipe End Preps, Weld Joint Designs 1, Valve Installation & Removal, Installation Checks

Trade/Occupational Theory 4 50 hours
Precision Measurement, FME & Cleanliness 2, Blueprint Reading, Advanced,
Basic Steam Cycle, Valve Packing, AC&R Basic Systems

Trade/Occupational Theory 5 50 hours
Advanced Layout Skills, Pipe Bending

Trade/Occupational Theory 6 50 hours
Advanced Hangers, Adv. Mechanical Joint Assembly/Disassembly, Trade Drawing

Trade/Occupational Theory 7 50 hours
Advanced Noise Reduction, Mechanical Locking Devices, Advanced Pipe Bending

Trade/Occupational Theory 8 50 hours
Target & Template Skills, Machine Cut-off, Machine End Prep, Weld Joint Designs 2, P3b Silver Brazing

(SAMPLE)

WORK PROCESS SCHEDULE
INSULATOR
(EXISTING TITLE: INSULATION WORKER)
O*NET-SOC CODE: 47-2131.00 RAPIDS CODE: 0909

The Sponsor may modify the work processes to meet local needs prior to submitting these Standards to the appropriate Registration Agency for approval.

Scheduled Work Experience: Apprentice Year

	1	2	3	4	Totals
Insulation Removal	700	400	200	200	1500
High Temperature Insulation	140	240	360	360	1100
Anti-Sweat Insulation	160	220	260	260	900
Fibrous Glass Installation	120	180	280	320	900
Misc. Insulation	100	100	120	180	500
Layout	0	60	120	180	360
Shop Work	100	120	140	140	500
Special Projects	0	0	0	160	160
Total Hours	1320	1320	1480	1800	5920
Qualification/ Requalification (similar to certification)	200	200	200	200	800

RELATED INSTRUCTION OUTLINE
INSULATOR
(EXISTING TITLE: INSULATION WORKER)
O*NET-SOC CODE: 47-2131.00 RAPIDS CODE: 0909

Academic Core Curriculum (Common to all non-electrical occupations)

Subject	Phase/Year 1	Phase/Year 2	Phase/Year 3	Phase/Year 4
Math or OLRM	5 credits	5 credits	5 credits	All Academics Complete
BSTEC or Tec-D	5 credits	5 credits	4 credits	
Tec-D or Physics	4 credits	4 credits	4 credits	
Physics or Trade Theory	4 credits	4 credits	3 credits	All Trade Theory Complete
OLRM Seminar/Physics/Trade Theory	1 credit	4 credits	3 credits	
Trade Theory	12 credits total	9 credits total		
Work Experience	6 credits	6 credits	4 credits	
Total Hours	480 (37 credits)	480 (37 credits)	320 (23 credits)	0

Please note: For more detail common to all occupations on Academic Core, please see page A-7 as reference.

Trade/Occupational Theory Curriculum (400 total hours – first 150 hours tend to be in the first year, second 150 in the second year, final 100 in the third year) – specific to Insulator:

Trade/Occupational Theory 1 50 hours
Industrial Organization, Trade Safety, Vessel Orientation, Tools of the Trade, Vessel Deactivation & Recycle, HazMat

Trade/Occupational Theory 2 50 hours
Heat Transfer, Heat & Insulation, Thermal Insulation, Material Characteristics, Corporate Reference Documents

Trade/Occupational Theory 3 50 hours
Calcium Silicate Sectional Insulation, Insulation Forms & Documents, Quality Assurance/Control, Portable Insulating Pads, Valve Installation & Removal, Installation Checks

Trade/Occupational Theory 4 50 hours
Submarine History, Submarine Terminology, Unique Submarine Systems, Submarine Noise Control, Noise Attenuating Curtain, Axial Stave Dampening

Trade/Occupational Theory 5 50 hours
Basic Steam Cycle, Pipe & Tube, Fittings & Valves, Fibrous Glass Insulation

Trade/Occupational Theory 6 50 hours
Thermal Glass Fiber Insulation Felt, Blueprint Reading, Ventilation Systems

Trade/Occupational Theory 7 50 hours

Calcium Silicate Block Insulation, Geometric Construction, Parallel Line Development, Radial Line Development, Triangulation

Trade/Occupational Theory 8 50 hours

Anti-Sweat Insulation, Air Conditioning & Refrigeration, Freeze Seal, Spray Shield Fabrication & Installation, Special Ships' Systems, Distilling Plants, Reverse Osmosis

(SAMPLE)

WORK PROCESS SCHEDULE
COMPOSITE PLASTIC FABRICATOR
(EXISTING TITLE: INSULATION WORKER)
O*NET-SOC CODE: 47-2131.00 RAPIDS CODE: 0909

The Sponsor may modify the work processes to meet local needs prior to submitting these Standards to the appropriate Registration Agency for approval.

Scheduled Work Experience: Apprentice Year

	1	2	3	4	Totals
Staging & Platforms	780	780	850	890	3300
Block Pile	50	50	54	56	210
Docking/Jacking/ Reference Lines	265	265	328	342	1200
Shrink Wrap	25	25	28	32	110
Safety/Planning	40	40	40	280	400
S64 Cross Training	115	115	130	140	500
Miscellaneous	45	45	50	60	200
Total Hours	1320	1320	1480	1800	5920
Qualification/ Requalification (similar to certification)	200	200	200	200	800

RELATED INSTRUCTION OUTLINE
COMPOSITE PLASTIC FABRICATOR
(EXISTING TITLE: INSULATION WORKER)
O*NET-SOC CODE: 47-2131.00 RAPIDS CODE: 0909

Academic Core Curriculum (Common to all non-electrical occupations)

Subject	Phase/Year 1	Phase/Year 2	Phase/Year 3	Phase/Year 4
Math or OLRM	5 credits	5 credits	5 credits	All Academics Complete
BSTEC or Tec-D	5 credits	5 credits	4 credits	
Tec-D or Physics	4 credits	4 credits	4 credits	
Physics or Trade Theory	4 credits	4 credits	3 credits	All Trade Theory Complete
OLRM Seminar/Physics/Trade Theory	1 credit	4 credits	3 credits	
Trade Theory	12 credits total	9 credits total		
Work Experience	6 credits	6 credits	4 credits	
Total Hours	480 (37 credits)	480 (37 credits)	320 (23 credits)	0

Please note: For more detail common to all occupations on Academic Core, please see page A-7 as reference.

Trade/Occupational Theory Curriculum (400 total hours – first 150 hours tend to be in the first year, second 150 in the second year, final 100 in the third year) – specific to Composite Plastic Fabricator:

Trade/Occupational Theory 1 50 hours
Intro – Safety & Hazmat, Ship's Nomenclature, Shop Math & Common Calculations, Applied Right Angle Trigonometry

Trade/Occupational Theory 2 50 hours
Wood – Raw Material, Tools of the Trade, Joinery, Fasteners, Construction - Framing

Trade/Occupational Theory 3 50 hours
Scaffolding, Ramps, Platforms & Shoring, Shrink Wrap, Stair Construction

Trade/Occupational Theory 4 50 hours
Documentation, Blueprint Reading, Freehand Sketching, Layout Techniques

Trade/Occupational Theory 5 50 hours
Acoustic & Thermal Insulation, Syntactic Foam, Glass Reinforced Plastic (GRP), Plastic Laminate

Trade/Occupational Theory 6 50 hours
Acoustic Sound Dampening, Exterior Hull Treatments

Trade/Occupational Theory 7 50 hours
Optical Instruments, Scaffolding

Trade/Occupational Theory 8 50 hours
Docking, Final Presentation/Project

(SAMPLE)

WORK PROCESS SCHEDULE
FABRIC WORKER
(EXISTING TITLE: PATTERNMAKER, ALL-AROUND)
O*NET-SOC CODE: 51-4062.00 RAPIDS CODE: 0857

The Sponsor may modify the work processes to meet local needs prior to submitting these Standards to the appropriate Registration Agency for approval.

Scheduled Work Experience: Apprentice Year

	1	2	3	4	Totals
Nuclear Waterfront Cell	680	600	650	770	2700
Refueling/Defueling Cell	300	420	530	970	2220
Non-Nuclear Cell	340	300	300	60	1000
Total Hours	1320	1320	1480	1800	5920
Qualification/ Requalification (similar to certification)	200	200	200	200	800

RELATED INSTRUCTION OUTLINE
FABRIC WORKER
(EXISTING TITLE: PATTERNMAKER, ALL-AROUND)
O*NET-SOC CODE: 51-4062.00 RAPIDS CODE: 0857

Academic Core Curriculum (Common to all non-electrical occupations)

Subject	Phase/Year 1	Phase/Year 2	Phase/Year 3	Phase/Year 4
Math or OLRM	5 credits	5 credits	5 credits	All Academics Complete
BSTEC or Tec-D	5 credits	5 credits	4 credits	
Tec-D or Physics	4 credits	4 credits	4 credits	
Physics or Trade Theory	4 credits	4 credits	3 credits	All Trade Theory Complete
OLRM Seminar/Physics/Trade Theory	1 credit	4 credits	3 credits	
Trade Theory	12 credits total	9 credits total		
Work Experience	6 credits	6 credits	4 credits	
Total Hours	480 (37 credits)	480 (37 credits)	320 (23 credits)	0

Please note: For more detail common to all occupations on Academic Core, please see page A-7 as reference.

Trade/Occupational Theory Curriculum (400 total hours – first 150 hours tend to be in the first year, second 150 in the second year, final 100 in the third year) – specific to Fabric Worker:

Trade/Occupational Theory 1 50 hours
Shipyard/Industrial Orientation, Trade Introduction, Shop Terms, Paperwork, Ship/Sub Nomenclature, Shop Math

Trade/Occupational Theory 2 50 hours
Sewing Machine Safety, Sewing Machine Maintenance, RF Sealer Machine Safety, RF Sealer Machine Operation, Shops' Standards Manual, Local Glove Bag Standards, Intro to Glove Bag Cell, Layout & Manufacture of Glove Bags

Trade/Occupational Theory 3 50 hours
Blueprint Interpretation, Design Component/Valve Glove Bags, Hand Sketching, Isometric Drawing, Smart sketch, Trade Safety

Trade/Occupational Theory 4 50 hours
Material Standards, General Intro to Refueling Instructions, Fabric Worker Refueling Instructions, Refueling Incorporated Drawings, Foreign Material Exclusion Standards, Plotter Cutter Safety, Plotter Cutter Operations

Trade/Occupational Theory 5 50 hours
Intro to Glove Bag Corporate Standards, Glove Bag Installation Requirements, Viton Disc Seals, Pipe Sleeve Installations, Zipper Installations, High Temperature Installation, Glove Bag Removal Requirements, Glove Bag Removal Techniques

Trade/Occupational Theory 6 50 hours
Interpret Containment Design Drawings, Design Walk-In Containments, Layout Walk-In Containments, Demonstrate Standard Construction, Install Walk-In Containment, Walk-In Containment Removal Requirements

Trade/Occupational Theory 7 50 hours
Nuclear Power Manuals, Glove Bag Review, Review of all Apprentice Coursework

Trade/Occupational Theory 8 50 hours
Safety Project, Engineering Library & Research, Presentation Skills, Presentation to Shop Superintendent.

(SAMPLE)

WORK PROCESS SCHEDULE
SHIPWRIGHT
(EXISTING TITLE: SHIPWRIGHT (SHIP & BOAT))
O*NET-SOC CODE: 47-2031.01 RAPIDS CODE: 0979

The Sponsor may modify the work processes to meet local needs prior to submitting these Standards to the appropriate Registration Agency for approval.

Scheduled Work Experience: Apprentice Year

	1	2	3	4	Totals
Staging & Platforms	780	780	850	890	3300
Block Pile	50	50	54	56	210
Docking/Jacking/ Reference Lines	265	265	328	342	1200
Shrink Wrap	25	25	28	32	110
Safety/Planning	40	40	40	280	400
S64 Cross Training	115	115	130	140	500
Miscellaneous	45	45	50	60	200
Total Hours	1320	1320	1480	1800	5920

Qualification/ Requalification (similar to certification)	200	200	200	200	800

RELATED INSTRUCTION OUTLINE
SHIPWRIGHT
(EXISTING TITLE: SHIPWRIGHT (SHIP & BOAT))
O*NET-SOC CODE: 47-2031.01 RAPIDS CODE: 0979

Academic Core Curriculum (Common to all non-electrical occupations)

Subject	Phase/Year 1	Phase/Year 2	Phase/Year 3	Phase/Year 4
Math or OLRM	5 credits	5 credits	5 credits	All Academics Complete
BSTEC or Tec-D	5 credits	5 credits	4 credits	
Tec-D or Physics	4 credits	4 credits	4 credits	
Physics or Trade Theory	4 credits	4 credits	3 credits	All Trade Theory Complete
OLRM Seminar/Physics/Trade Theory	1 credit	4 credits	3 credits	
Trade Theory	12 credits total	9 credits total		
Work Experience	6 credits	6 credits	4 credits	
Total Hours	480 (37 credits)	480 (37 credits)	320 (23 credits)	0

Please note: For more detail common to all occupations on Academic Core, please see page A-7 as reference.

Trade/Occupational Theory Curriculum (400 total hours – first 150 hours tend to be in the first year, second 150 in the second year, final 100 in the third year) – specific to Shipwright:

Trade/Occupational Theory 1 50 hours
Intro – Safety & HazMat, Ship's Nomenclature, Shop Math & Common Calculations, Applied Right Angle Trigonometry

Trade/Occupational Theory 2 50 hours
Wood – Raw Material, Tools of the Trade, Joinery, Fasteners, Construction – Framing

Trade/Occupational Theory 3 50 hours
Scaffolding, Ramps, Platforms & Shoring, Shrink Wrap, Stair Construction

Trade/Occupational Theory 4 50 hours
Documentation, Blueprint Reading, Freehand Sketching, Layout Techniques

Trade/Occupational Theory 5 50 hours
Acoustic & Thermal Insulation, Syntactic Foam, Glass Reinforced Plastic (GRP), Plastic Laminate

Trade/Occupational Theory 6 50 hours
Acoustic Sound Dampening, Exterior Hull Treatments

Trade/Occupational Theory 7 50 hours
Optical Instruments, Scaffolding

Trade/Occupational Theory 8 50 hours
Docking, Final Presentation/Project

(SAMPLE)

WORK PROCESS SCHEDULE
ELECTRONICS MECHANIC
O*NET-SOC CODE: 49-2011.00 RAPIDS CODE: 0170

The Sponsor may modify the work processes to meet local needs prior to submitting these Standards to the appropriate Registration Agency for approval.

Scheduled Work Experience	Apprentice Year 1	2	3	4	Totals
Display Systems	440	440	440	600	1920
Support Equipment	440	440	440	600	1920
Combat Systems	440	440	440	600	1920
Totals	1320	1320	1320	1800	5760
Qualification/ Requalification (similar to certification)	200	200	280	200	

RELATED INSTRUCTION OUTLINE
ELECTRONICS MECHANIC
O*NET-SOC CODE: 49-2011.00 RAPIDS CODE: 0170

Academic Core Curriculum (Common to all electrical occupations)

Subject	Phase/Yr 1	Phase/Yr 2	Phase/Year 3	Phase/Year 4
Math or OLRM	5 credits	5 credits	5 credits	All Academics Complete
BSTEC or Math	5 credits	5 credits	5 credits	
Tec-D or Physics	4 credits	4 credits	4 credits	
Physics or Trade Theory	4 credits	4 credits	3 credits	All Trade Theory Complete
OLRM Seminar/Physics/Trade Theory	1 credit	4 credits	3 credits	
Trade Theory	12 credits total	9 credits total	7 credits total	
Work Experience	6 credits	6 credits		
Total Hours	480 (37 credits)	480 (37 credits)	320 (27 credits)	0

Please note: For more detail common to all occupations on Academic Core, please see page A-7 as reference.

Trade/Occupational Theory Curriculum (450 total hours – first 150 hours tend to be in the first year, second 150 in the second year, final 150 in the third year) – specific to Electronics Mechanic:

Trade/Occupational Theory 1 50 hours
Policies & Expectations, Electrical Safety, Trade Tools, Basic Concepts,
Ohm's Law, Energy, & Power, Resistive Circuits

Trade/Occupational Theory 2 50 hours
Combination Circuits, Electrical Circuit Measurements, Magnetism,
Alternating Current & Voltage, Power in AC Circuits

Trade/Occupational Theory 3 50 hours
Capacitance, Inductance, Resistive, Capacitive, & Inductive Circuits

Trade/Occupational Theory 4 50 hours
Digital Electronics, Logic Levels, Test Equipment, Boolean Algebra, Troubleshooting,
Boolean Algebra Simplification

Trade/Occupational Theory 5 50 hours
Parallel Binary Adders, 1s & 2s Compliment, Floating Point Format,
Binary Code Decimal & ASCII, Multiplexers & Demultiplexer, Latches & Flip-Flops,
Counters, Troubleshooting

Trade/Occupational Theory 6 50 hours
Shift Register Operation, Applications of Shift Registers, Programmable Logic Devices, Programmable Array Logic, Basic Computer System, Basic Memory

Trade/Occupational Theory 7 50 hours
Analog Circuits, Semiconductors, Biasing a Semiconductor Diode, Amplifier Terms, Junction Field Effect Transistor, Metal-Oxide Semiconductor Field Effect Transistor, Troubleshooting

Trade/Occupational Theory 8 50 hours
Transformer-Coupled Amplifiers & Tuned Amplifiers, Compute DC & AC Parameters, Clampers, Limiters, & Peak Detectors, Basic Filter Characteristics, Active High & Law Pass Filters, Troubleshooting

Trade/Occupational Theory 9 50 hours
Instrument Amplifiers, Oscillators, 555 Timers, Line & Load Regulation, Regulators, Transducers, Troubleshooting

(SAMPLE)

WORK PROCESS SCHEDULE
PAINTER
(EXISTING TITLE: PAINTER, SHIPYARD)
O*NET-SOC CODE: 47-2141.00 RAPIDS CODE: 0385

The Sponsor may modify the work processes to meet local needs prior to submitting these Standards to the appropriate Registration Agency for approval.

Scheduled Work Experience: Apprentice Year

	1	2	3	4	Totals
Spray Application	0	100	100	200	400
Brush & Roller Application	240	400	200	200	1040
Blasting	800	500	180	0	1480
Prep & Support	280	320	800	800	2200
Shop Work	0	0	200	200	400
Special Projects	0	0	0	400	400
Total Hours	1320	1320	1480	1800	5920
Qualification/ Requalification (similar to certification)	200	200	200	200	800

RELATED INSTRUCTION OUTLINE
PAINTER
(EXISTING TITLE: PAINTER, SHIPYARD)
O*NET-SOC CODE: 47-2141.00 RAPIDS CODE: 0385

Academic Core Curriculum (Common to all non-electrical occupations)

Subject	Phase/Year 1	Phase/Year 2	Phase/Year 3	Phase/Year 4
Math or OLRM	5 credits	5 credits	5 credits	All Academics Complete
BSTEC or Tec-D	5 credits	5 credits	4 credits	
Tec-D or Physics	4 credits	4 credits	4 credits	
Physics or Trade Theory	4 credits	4 credits	3 credits	All Trade Theory Complete
OLRM Seminar/Physics/Trade Theory	1 credit	4 credits	3 credits	
Trade Theory	12 credits total	9 credits total		
Work Experience	6 credits	6 credits	4 credits	
Total Hours	480 (37 credits)	480 (37 credits)	320 (23 credits)	0

Please note: For more detail common to all occupations on Academic Core, please see page A-7 as reference.

Trade/Occupational Theory Curriculum (400 total hours – first 150 hours tend to be in the first year, second 150 in the second year, final 100 in the third year) – specific to Painter:

Trade/Occupational Theory 1 50 hours
Trade Safety, Industrial Organization, Shop Math, Surface Ship & Submarine Nomenclature, Trade Hand Tools, Trade Power Tools

Trade/Occupational Theory 2 50 hours
Current Safety Items, Corrosion, Surface Preps, Abrasive Materials, Blast Equipment, Work Documents

Trade/Occupational Theory 3 50 hours
Current Safety Items, 3 Major Coating Types, Industrial Coating by Category
Fluid Basics, Fluid Control, Coating Systems, Work Documents

Trade/Occupational Theory 4 50 hours
Current Safety Items, Spray Painting Methods, HVLP Spray Systems,
Comparing Systems/Methods, HVLP Spray Gun Maintenance, Booth Operation & Design, Work Documents

Trade/Occupational Theory 5 50 hours
Current Safety Items, Airless Systems, Airless Pumps, Definitions & Terminology,
Air Driven Motors, Troubleshooting, Work Documents

Trade/Occupational Theory 6 50 hours
Current Safety Items, Powder Coating, Epoxy Repair, Plasticol, Basic Wood Finishing, Work Documents

Trade/Occupational Theory 7 50 hours
Current Safety Items, Non-Skid Coatings, Special Hull Treatment, Tile Setting, Quality Assurance, Work Documents

Trade/Occupational Theory 8 50 hours
Current Safety Items, Group Project, Comprehensive Review & Final Exam, Safety Presentation

(SAMPLE)

WORK PROCESS SCHEDULE
TEMPORARY SERVICES ELECTRICIAN
(EXISTING TITLE: ELECTRICIAN (SHIP AND BOAT))
O*NET-SOC CODE: 47-2111.00 RAPIDS CODE: 0771

The Sponsor may modify the work processes to meet local needs prior to submitting these Standards to the appropriate Registration Agency for approval.

Scheduled Work Experience	Apprentice Year 1	2	3	4	Totals
Shop Work	1047	125	340	135	1647
Shop Staging	200	0	447	0	647
Communication Systems	0	255	160	40	455
Electrical Distribution	73	940	113	765	1891
Nuclear Work	0	0	260	760	1020
Planning	0	0	0	100	100
Totals	1320	1320	1320	1800	5760
Qualification/ Requalification (similar to certification)	200	200	200	200	

RELATED INSTRUCTION OUTLINE
TEMPORARY SERVICES ELECTRICIAN
(EXISTING TITLE: ELECTRICIAN (SHIP AND BOAT))
O*NET-SOC CODE: 47-2111.00 RAPIDS CODE: 0771

Academic Core Curriculum (Common to all electrical occupations)

Subject	Phase/Yr 1	Phase/Yr 2	Phase/Year 3	Phase/Year 4
Math or OLRM	5 credits	5 credits	5 credits	All Academics Complete
BSTEC or Math	5 credits	5 credits	5 credits	
Tec-D or Physics	4 credits	4 credits	4 credits	
Physics or Trade Theory	4 credits	4 credits	3 credits	All Trade Theory Complete
OLRM Seminar/Physics/Trade Theory	1 credit	4 credits	3 credits	
Trade Theory	12 credits total	9 credits total	7 credits total	
Work Experience	6 credits	6 credits		
Total Hours	480 (37 credits)	480 (37 credits)	320 (27 credits)	0

Please note: For more detail common to all occupations on Academic Core, please see page A-7 as reference.

Trade/Occupational Theory Curriculum (450 total hours – first 150 hours tend to be in the first year, second 150 in the second year, final 150 in the third year) – specific to Temporary Services Electrician:

Trade/Occupational Theory 1 50 hours
Industrial Organization, Trade Safety,The Temp Services Electrician Trade, Electrical Theory, Registers & the Use of the Ohmmeter, Work & Energy, Power

Trade/Occupational Theory 2 50 hours
Review of Process Instructions, Review of Work Documents, Review Maintenance Practices

Trade/Occupational Theory 3 50 hours
Series Circuits, Parallel Circuits, Complex Circuits, Batteries, Magnetism, Electromagnetism, Circuit Protective Devices

Trade/Occupational Theory 4 50 hours
Meters, Alternating Current, AC Measurement, Inductance, Capacitance

Trade/Occupational Theory 5 50 hours
RCL Circuits, Power in AC Circuits, Transformers, Solid State Circuits

Trade/Occupational Theory 6 50 hours
Motor Construction, Motor Operation, AC Motors, DC Motors, Rotating Magnetic Fields

Trade/Occupational Theory 7 50 hours
Motor Controllers, Components of Motor Controllers, Motor Controllers Operations, Electrical Diagrams

Trade/Occupational Theory 8 50 hours
Fundamentals of Troubleshooting, Diagnostic Equipment Used in Troubleshooting, Use of Diagrams & Schematics in Troubleshooting, Basic Refrigeration Systems

Trade/Occupational Theory 9 50 hours
Temp Service Layout for Naval Shipyard, Designing Service Layout, Planning & Estimating Material

(SAMPLE)

WORK PROCESS SCHEDULE
UTILITIES SYSTEMS REPAIR OPERATOR (DRY DOCKS)
(EXISTING TITLE: PIPE FITTER (SHIP AND BOAT))
O*NET-SOC CODE: 47-2152.01 RAPIDS CODE: 0412

The Sponsor may modify the work processes to meet local needs prior to submitting these Standards to the appropriate Registration Agency for approval.

Scheduled Work Experience: Apprentice Year

	1	2	3	4	Totals
Shop Work	145	130	120	130	525
Shop Machines	80	80	70	30	260
Collecting, Holding, & Transfer Piping	60	60	60	35	215
System Test	115	125	95	25	360
Dry Dock Service Gallery Systems	70	80	80	80	310
DD1	365	0	0	0	365
DD2	485	0	100	200	785
DD3	0	400	0	270	670
DD4	0	445	0	270	715
DD5	0	0	485	220	705
DD6	0	0	470	220	690
Roving Watch	0	0	0	320	320
Total Hours	1320	1320	1480	1800	5920

Qualification/ Requalification (similar to certification)	200	200	200	200	800

RELATED INSTRUCTION OUTLINE
UTILITIES SYSTEMS REPAIR OPERATOR (DRY DOCKS)
(EXISTING TITLE: PIPE FITTER (SHIP AND BOAT))
O*NET-SOC CODE: 47-2152.01 RAPIDS CODE: 0412

Academic Core Curriculum (Common to all non-electrical occupations)

Subject	Phase/Year 1	Phase/Year 2	Phase/Year 3	Phase/Year 4
Math or OLRM	5 credits	5 credits	5 credits	All Academics Complete
BSTEC or Tec-D	5 credits	5 credits	4 credits	
Tec-D or Physics	4 credits	4 credits	4 credits	
Physics or Trade Theory	4 credits	4 credits	3 credits	All Trade Theory Complete
OLRM Seminar/Physics/Trade Theory	1 credit	4 credits	3 credits	
Trade Theory	12 credits total	9 credits total		
Work Experience	6 credits	6 credits	4 credits	
Total Hours	480 (37 credits)	480 (37 credits)	320 (23 credits)	0

Please note: For more detail common to all occupations on Academic Core, please see page A-7 as reference.

Trade/Occupational Theory Curriculum (400 total hours – first 150 hours tend to be in the first year, second 150 in the second year, final 100 in the third year) – specific to Utilities Systems Repair Operator (Dry Docks):

Trade/Occupational Theory 1 50 hours
Dry Dock Types, Dry Dock Locations, Pumpwells Locations, Connecting Tunnels, Trade Math

Trade/Occupational Theory 2 50 hours
Trade Safety, Trade Tooling, Piping Components& Valves, Foreign Material Controls,

Trade/Occupational Theory 3 50 hours
Applying Foreign Material Controls, Basic Blueprint Reading, 3 View Pipe Diagrams, Hanger Installation, Assembly/Disassembly of Mechanical Joints,

Trade/Occupational Theory 4 50 hours
Byte Type, Flare and Triple lock Connections, Pipe Cut Off, Pipe Threading, Threaded Pipe Component Assembly, Piping System Components

Trade/Occupational Theory 5 50 hours
DD1 Systems, Caissons & Pumpwells, DD2 Systems, Caissons & Pumpwells DD3 Systems, Caissons & Pumpwells, DD4 Systems, Caissons & Pumpwells

Trade/Occupational Theory 6 50 hours
DD5 Systems, Caissons & Pumpwells, DD6 Systems, Caissons & Pumpwells

Trade/Occupational Theory 7 50 hours
Installation of Piping Systems, Removal of Piping Systems, Construction of Piping Mock-up, Hydro Testing

Trade/Occupational Theory 8 50 hours
Review of All USRO Responsibilities, Review of Operating Procedures for DD1 – 6,
Review of Roving Watch Responsibilities

(SAMPLE)

WORK PROCESS SCHEDULE
TEMPORARY SERVICES PIPEFITTER
(EXISTING TITLE: PIPE FITTING AND/OR PLUMBING)
O*NET-SOC CODE: 47-2152.01 RAPIDS CODE: 0412

The Sponsor may modify the work processes to meet local needs prior to submitting these Standards to the appropriate Registration Agency for approval.

Scheduled Work Experience: Apprentice Year

	1	2	3	4	Totals
Shop Work	480	200	215	295	1190
Gases	215	295	400	470	1380
Special Projects	85	105	85	160	435
Water	230	295	370	505	1400
Environmental	310	425	410	370	1515
Total Hours	1320	1320	1480	1800	5920
Qualification/ Requalification (similar to certification)	200	200	200	200	800

RELATED INSTRUCTION OUTLINE
TEMPORARY SERVICES PIPEFITTER
(EXISTING TITLE: PIPE FITTING AND/OR PLUMBING)
O*NET-SOC CODE: 47-2152.01 RAPIDS CODE: 0412

Academic Core Curriculum (Common to all non-electrical occupations)

Subject	Phase/Year 1	Phase/Year 2	Phase/Year 3	Phase/Year 4
Math or OLRM	5 credits	5 credits	5 credits	All Academics Complete
BSTEC or Tec-D	5 credits	5 credits	4 credits	
Tec-D or Physics	4 credits	4 credits	4 credits	
Physics or Trade Theory	4 credits	4 credits	3 credits	All Trade Theory Complete
OLRM Seminar/Physics/Trade Theory	1 credit	4 credits	3 credits	
Trade Theory	12 credits total	9 credits total		
Work Experience	6 credits	6 credits	4 credits	
Total Hours	480 (37 credits)	480 (37 credits)	320 (23 credits)	0

Please note: For more detail common to all occupations on Academic Core, please see page A-7 as reference.

Trade/Occupational Theory Curriculum (400 total hours – first 150 hours tend to be in the first year, second 150 in the second year, final 100 in the third year) – specific to Temporary Services Pipefitter:

Trade/Occupational Theory 1 50 hours
Shipyard Orientation & Safety, Shipyard Utilities & Sources, Technical Work Document, General Testing, Inspection & Installation: Hoses, Breathing Air Systems, Lockout/Tagout 1, Shop Math

Trade/Occupational Theory 2 50 hours
Freeze Protection, Temporary Ventilation, Ventilation Certification, Battery Well Ventilation, Valves, Fittings, & Metallurgy, Measuring Devices, Shore to Ship Services: Water

Trade/Occupational Theory 3 50 hours
Copper Tubing, Watertight & Fire Zone Boundary Integrity, Air Loop Project, Fire Hoses

Trade/Occupational Theory 4 50 hours
Pipe Threading Machine, Temporary Service Requirements, Pre-work Briefs: IABs & RABs, Lockout/Tag Out 2, Sewage Systems, Flange Assembly

Trade/Occupational Theory 5 50 hours
Potable Test Bench, Steam, Collection, Retention, & Pumping Station

Trade/Occupational Theory 6 50 hours
Oxygen, Chilled Water Delivery & Refrigeration, Fire Protection & Prevention, Demineralized/Deionized Water

Trade/Occupational Theory 7 50 hours
Safety Thesis, Air Compressors for Off Station, Task Group Instruction, High Pressure Air

Trade/Occupational Theory 8 50 hours
Safety Presentations, Trade Theory Thesis, Waterfront Practicals,
Comprehensive Review & Final

(SAMPLE)

WORK PROCESS SCHEDULE
NONDESTRUCTIVE TESTING (NDT)
(EXISTING TITLE: NON-DESTRUCTIVE TESTER)
O*NET-SOC CODE: 17-3029.00 RAPIDS CODE: 1010

The Sponsor may modify the work processes to meet local needs prior to submitting these Standards to the appropriate Registration Agency for approval.

Scheduled Work Experience: Apprentice Year
Eddy Current/Radiography/Ultrasonic NDT Apprentices (this chart applies to all three types of NDT)

	1	2	3	4	Totals
Magnetic Particle (MT)	390	330	270	270	1260
Liquid Penetrant	290	250	200	200	940
Visual (VT)	320	300	250	250	1120
Eddy Current (ET)	80	200	400	800	1480
Ultrasonic (UT)	80	80	80	80	320
Radiography (RT)	80	80	80	80	320
Miscellaneous	80	80	120	120	400
Total Hours	1320	1320	1400	1800	5920
Qualification/ Requalification (similar to certification)	200	200	200	200	800

RELATED INSTRUCTION OUTLINE
NONDESTRUCTIVE TESTING (NDT)
(EXISTING TITLE: NON-DESTRUCTIVE TESTER)
O*NET-SOC CODE: 17-3029.00 RAPIDS CODE: 1010

Academic Core Curriculum (Common to all electrical occupations)

Subject	Phase/Yr 1	Phase/Yr 2	Phase/Year 3	Phase/Year 4
Math or OLRM	5 credits	5 credits	5 credits	All Academics Complete
BSTEC or Math	5 credits	5 credits	5 credits	
Tec-D or Physics	4 credits	4 credits	4 credits	
Physics or Trade Theory	4 credits	4 credits	3 credits	All Trade Theory Complete
OLRM Seminar/Physics/Trade Theory	1 credit	4 credits	3 credits	
Trade Theory	12 credits total	9 credits total	7 credits total	
Work Experience	6 credits	6 credits		
Total Hours	480 (37 credits)	480 (37 credits)	320 (27 credits)	0

Please note: For more detail common to all occupations on Academic Core, please see page A-7 as reference.

Trade/Occupational Theory Curriculum (450 total hours – first 150 hours tend to be in the first year, second 150 in the second year, final 150 in the third year) – specific to Nondestructive Testing:

Trade/Occupational Theory 1 50 hours
Magnetic Particle Wet Method, Eddy Current Theory, Eddy Current Weld Surveillance Inspection

Trade/Occupational Theory 2 50 hours
Ultrasonic Theory, Ultrasonic Thickness & Liquid Level, Shop Safety

Trade/Occupational Theory 3 50 hours
Liquid Penetrant Zyglo Inspections, Radiography Theory

Trade/Occupational Theory 4 50 hours
Radiography Operator, Eddy Current Data Collector

Trade/Occupational Theory 5 50 hours
Eddy Current Analyst Phase 1, Radiographer Inspector Phase 1,
Ultrasonic Inspector Phase 1

Trade/Occupational Theory 6 50 hours
Eddy Current Dealloy Inspection, Ultrasonic Silver Braze

Trade/Occupational Theory 7 50 hours
Eddy Current Analyst Phase 2, Radiographer Inspector Phase 2,
Ultrasonic Inspector Phase 2

Trade/Occupational Theory 8 50 hours
Ultrasonic Barstock & Cladding, Lab

Trade/Occupational Theory 9 50 hours
Intro to Welding Processes, Quality Assurance Auditing,
NDT Technical Support, NDT Equipment Maintenance

(SAMPLE)

WORK PROCESS SCHEDULE
CRAIN ELECTRICIAN
(EXISTING TITLE: ELECTRICIAN (SHIP AND BOAT))
O*NET-SOC CODE: 47-2111.00 RAPIDS CODE: 0771

The Sponsor may modify the work processes to meet local needs prior to submitting these Standards to the appropriate Registration Agency for approval.

Scheduled Work Experience	Apprentice Year 1	2	3	4	Totals
Portal Cranes	770	770	770	1250	3560
Bridge Cranes	300	300	300	300	1200
Misc. Industrial SY Cranes	100	100	100	100	400
Special Assignments	150	150	150	150	600
Totals	1320	1320	1320	1800	5760
Qualification/ Requalification (similar to certification)	200	200	200	200	

RELATED INSTRUCTION OUTLINE
CRANE ELECTRICIAN
(EXISTING TITLE: ELECTRICIAN (SHIP & BOAT))
O*NET-SOC CODE: 47-2111.00 RAPIDS CODE: 0771

Academic Core Curriculum (Common to all electrical occupations)

Subject	Phase/Yr 1	Phase/Yr 2	Phase/Year 3	Phase/Year 4
Math or OLRM	5 credits	5 credits	5 credits	All Academics Complete
BSTEC or Math	5 credits	5 credits	5 credits	
Tec-D or Physics	4 credits	4 credits	4 credits	
Physics or Trade Theory	4 credits	4 credits	3 credits	All Trade Theory Complete
OLRM Seminar/Physics/Trade Theory	1 credit	4 credits	3 credits	
Trade Theory	12 credits total	9 credits total	7 credits total	
Work Experience	6 credits	6 credits		
Total Hours	480 (37 credits)	480 (37 credits)	320 (27 credits)	0

Please note: For more detail common to all occupations on Academic Core, please see page A-7 as reference.

Trade/Occupational Theory Curriculum (450 total hours – first 150 hours tend to be in the first year, second 150 in the second year, final 150 in the third year) – specific to Crane Electrician:

Trade/Occupational Theory 1 50 hours
Shop Safety, Trade Tools & Instruments, Fundamental Concepts, DC Series Circuits, DC Parallel Circuits

Trade/Occupational Theory 2 50 hours
DC Combination Circuits, Battery Theory, DC Work, Power & Energy, Wiring, Procedures, Electrical Symbols

Trade/Occupational Theory 3 50 hours
Electromagnetism, Intro to AC Theory, Diagram Reading, Control Logic

Trade/Occupational Theory 4 50 hours
Fundamental Principles of AC, Inductance, Capacitance, Inductance/Capacitance Reactance, Transformer Concepts

Trade/Occupational Theory 5 50 hours
Alternators, 3 Phase Motors, Squirrel Cage Motors, Wound Rotor Motors, Synchronous Motors, Single Phase Motors, Motor Protection

Trade/Occupational Theory 6 50 hours
Magnetism, DC Generators, DC Motors, Motor Controllers

Trade/Occupational Theory 7 50 hours
Transistors Circuits, Voltage Amplifiers, Power Amplifiers, Field Effect Transistors, Thyrister Devices, Operational Amplifiers, Diodes

Trade/Occupational Theory 8 50 hours
Digital Electronics, Logic Gates, Integrated Circuit Specifications & Interfacing, Encoding, Decoding & 7 Segment Displays, Digital Circuits, Interfacing

Trade/Occupational Theory 9 50 hours
Intro to the National Electric Code, Conduit, Wiring

(SAMPLE)

WORK PROCESS SCHEDULE
CRANE MECHANIC
(EXISTING TITLE: MECHANIC, INDUSTRIAL TRUCK)
O*NET-SOC CODE: 49-3031.00 RAPIDS CODE: 0153

The Sponsor may modify the work processes to meet local needs prior to submitting these Standards to the appropriate Registration Agency for approval.

Scheduled Work Experience: Apprentice Year

	1	2	3	4	Totals
Category 1 – Crane Maintenance	720	360	680	600	2360
Category 2 – Crane Maintenance	240	120	240	160	760
Category 3 & 4 – Crane Maintenance	0	480	0	0	480
Brake Systems	80	80	120	40	320
Hoist Drive Train Systems	80	80	120	40	320
Hydraulics	80	80	120	40	320
Internal Combustion Engines	80	80	120	40	320
Machine Shop	40	40	80	160	320
Inspection & Test	0	0	0	240	240
Shop Planning	0	0	0	240	240
Engineering	0	0	0	240	240
Total Hours	1320	1320	1480	1800	5920

Qualification/ Requalification (similar to certification)	200	200	200	200	800

RELATED INSTRUCTION OUTLINE
CRANE MECHANIC
(EXISTING TITLE: MECHANIC, INDUSTRIAL TRUCK)
O*NET-SOC CODE: 49-3031.00 RAPIDS CODE: 0153

Academic Core Curriculum (Common to all non-electrical occupations)

Subject	Phase/Year 1	Phase/Year 2	Phase/Year 3	Phase/Year 4
Math or OLRM	5 credits	5 credits	5 credits	All Academics Complete
BSTEC or Tec-D	5 credits	5 credits	4 credits	
Tec-D or Physics	4 credits	4 credits	4 credits	
Physics or Trade Theory	4 credits	4 credits	3 credits	All Trade Theory Complete
OLRM Seminar/Physics/Trade Theory	1 credit	4 credits	3 credits	
Trade Theory	12 credits total	9 credits total		
Work Experience	6 credits	6 credits	4 credits	
Total Hours	480 (37 credits)	480 (37 credits)	320 (23 credits)	0

Please note: For more detail common to all occupations on Academic Core, please see page A-7 as reference.

Trade/Occupational Theory Curriculum (400 total hours – first 150 hours tend to be in the first year, second 150 in the second year, final 100 in the third year) – specific to Crane Mechanic:

Trade/Occupational Theory 1 50 hours
Intro to Cranes, Tools of the Trade, Intro to Servicing Weight & Equipment

Trade/Occupational Theory 2 50 hours
Intro to Fasteners, Intro to Hoist Drive Train Systems, Intro to Bearings, Intro to Couplings, Intro to Brakes

Trade/Occupational Theory 3 50 hours
Intro to Engine Construction, Intro to Lubrication Systems, Intro to Cooling Systems, Intro to Intake Systems

Trade/Occupational Theory 4 50 hours
Intro to Shaft Alignment

Trade/Occupational Theory 5 50 hours
Rebuilding Engine Components

Trade/Occupational Theory 6 50 hours
Intro to Hydraulics, Controlling Hydraulic Energy, Hydraulic System Components, Hydraulic Actuators & Valves, Plumbing Hydraulic Systems, Hydraulic Schematics

Trade/Occupational Theory 7 50 hours
Intro to Electrical Theory, Electrical Circuits, Test Instruments, Electronic Schematics, Starting Circuits, Charging Circuits

Trade/Occupational Theory 8 50 hours
Intro to Wire Rope, Structural Components

(SAMPLE)

WORK PROCESS SCHEDULE
RIGGER
O*NET-SOC CODE: 49-9096.00 RAPIDS CODE: 0474

The Sponsor may modify the work processes to meet local needs prior to submitting these Standards to the appropriate Registration Agency for approval.

Scheduled Work Experience: Apprentice Year

	1	2	3	4	Totals
Loft Rigging	20	260	260	20	560
Testing of Gear	20	120	120	40	300
Machinery – Rig & Handle	500	400	200	400	1500
Electrical – Rig & Handle	250	75	125	150	600
Structural – Rig & Handle	230	65	165	590	1050
Dry Dock Area	150	250	360	200	960
Special Projects	150	150	250	400	950
Total Hours	1320	1320	1480	1800	5920
Qualification/ Requalification (similar to certification)	200	200	200	200	800

RELATED INSTRUCTION OUTLINE
RIGGER
O*NET-SOC CODE: 49-9096.00 RAPIDS CODE: 0474

Academic Core Curriculum (Common to all non-electrical occupations)

Subject	Phase/Year 1	Phase/Year 2	Phase/Year 3	Phase/Year 4
Math or OLRM	5 credits	5 credits	5 credits	All Academics Complete
BSTEC or Tec-D	5 credits	5 credits	4 credits	
Tec-D or Physics	4 credits	4 credits	4 credits	
Physics or Trade Theory	4 credits	4 credits	3 credits	All Trade Theory Complete
OLRM Seminar/Physics/Trade Theory	1 credit	4 credits	3 credits	
Trade Theory	12 credits total	9 credits total		
Work Experience	6 credits	6 credits	4 credits	
Total Hours	480 (37 credits)	480 (37 credits)	320 (23 credits)	0

Please note: For more detail common to all occupations on Academic Core, please see page A-7 as reference.

Trade/Occupational Theory Curriculum (400 total hours – first 150 hours tend to be in the first year, second 150 in the second year, final 100 in the third year) – specific to Rigger:

Trade/Occupational Theory 1 50 hours
Orientation & Responsibilities, Fundamentals of Marine Rigging, Handling Gear

Trade/Occupational Theory 2 50 hours
Lifting Equipment, Securing Loads, Free Hand Sketching, Blueprint Reading,
Sling Angle Tension Downgrade, D to d ratio Downgrade

Trade/Occupational Theory 3 50 hours
Crane Operations, Machinery Movement, Shipboard Lifting Points & Strength Determination,
Operational Risk Management

Trade/Occupational Theory 4 50 hours
Docking Operations, Mooring Ships & Barges, Block Factors

Trade/Occupational Theory 5 50 hours
Loft Rigging, Handling Equipment

Trade/Occupational Theory 6 50 hours
NS Recycle Program, Heavy Material Movement, Reactor Compartment Disposal, Center of Gravity Calculations

Trade/Occupational Theory 7 50 hours
Crane Types & Crane Team Briefings, Lift, Crane Operating Envelope: Operations & Safety, Mobile Crane Loads, Crane Communications, Crane Accident Prevention Program

Trade/Occupational Theory 8 50 hours
Rigger Documents & Procedures – Review, Leadership, Static and Strengths