The Apprentice School Catalog

Winter 2025 – Fall 2025

NEWPORT NEWS SHIPBUILDING

A Division of HII

4101 Washington Avenue, Newport News, VA 23607

www.as.edu • 757-380-3809

The State Council of Higher Education for Virginia has certified the school to operate in Virginia.

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Introduction

Welcome to The Apprentice School at Newport News Shipbuilding-the place where careers are built. Our formal training program will allow you to receive thorough instruction and experience-both theoretical and practical-in the various aspects of a skilled trade. As you are acquiring these skills and knowledge, you will be well paid both on the waterfront and in the classroom.

This is an opportunity for you to experience the best educational program in our industry. The Apprentice School's curriculum will make available the latest techniques and information enabling you to be the best in your craft.

The Apprentice School is over 100 years old and you will stand in the tradition of a long line of journey workers and apprentices who have made us the standard for excellence in our industry.

Dr. Latitia McCane, Director of Education

History

The Apprentice School and its leadership are structured within Newport News Shipbuilding, a division of HII. The Apprentice School is an operating department of Newport News Shipbuilding (NNS), through which it is funded and controlled. NNS builds, modifies, repairs, refuels, and overhauls nuclear-powered aircraft carriers and submarines for the United States Navy. Newport News Shipbuilding was founded in 1886 and originally incorporated as the Newport News Shipbuilding and Dry Dock Company.

Early in its history the company recognized the need to attract, train, and develop shipbuilders through apprenticeship. The first certificate of apprenticeship was awarded in 1894 to Machinist Norwood Jones. By 1919 the company had experienced significant increases in scope and complexity of work reinforcing the need for a strong internal training program. Consequently, company president Homer L. Ferguson organized The Apprentice School with many of the features that characterize it today. The school as currently structured was formalized in 1919, and the first class under the revised concept graduated in 1923.

Since 1894, more than 11,000 apprentices have received certificates of apprenticeship, including approximately 3,100 current employees of NNS who serve in capacities ranging from craftsmen to directors to vice presidents. Alumni comprise approximately 21 percent of salaried personnel and, when combined with active apprentices, make up approximately 11 percent of hourly personnel.

Mission Statement

The mission of The Apprentice School is:

- To contribute to the profitability and growth of Newport News Shipbuilding by recruiting, training and developing men and women for careers in shipbuilding.
- To provide the company with a continuous supply of journeypersons who possess the skills, knowledge and pride of workmanship which have traditionally distinguished the shipbuilding craftsman.
- To develop core leadership principles in all students along with the character and technical competence that is required to fully meet the challenges of a shipbuilding career.

The Apprentice School provides quality training and education for Newport News Shipbuilding through the awarding of Associate of Applied Science degrees as well as through partnering with other educational institutions.

The Apprentice School offers apprenticeship programs and Associate of Applied Science degrees in 25 shipbuilding disciplines. Six of these areas are in the Optional Programs into which apprentices are selected after completing the required academic curriculum. Associate of Applied Science degrees are awarded by The Apprentice School to all apprentices who began their apprenticeship on or after July 27, 2020. Apprentices who began their apprenticeship prior to July 27, 2020 are awarded a certificate of apprenticeship, and those who are selected for Optional Programs may receive an associate degree from a partnering institution. Apprentices who complete the marine engineer Optional Program earn a bachelor's degree in engineering from Old Dominion University.

These 25 programs provide a critical pipeline of technically proficient graduates for all major areas of shipbuilding at NNS, including fabrication, production, quality control, design, and engineering. Through the academic curriculum, strategically timed job experiences, and on-the-job training, the school develops educated and highly skilled journeypersons who are well prepared for shipbuilding careers upon graduation and possess the potential to progress in leadership positions within the company.

All apprentices complete the required World Class Shipbuilder Curriculum (WCSC) and a minimum of 7,000 hours of on-the-job training in their shipbuilding discipline. Additionally, the school offers opportunities for personal growth and leadership development through participation in student athletics, student government, clubs, and professional societies. The culmination of the required academic coursework, on-the-job training, and extracurricular activities fulfills the school's mission to provide highly skilled, educated, and engaged employees for NNS.

Our Campus

The Apprentice School has one campus, located at Newport News Shipbuilding, 4101 Washington Avenue, Newport News, Virginia. There are over 85,000 square feet of classrooms, labs and office space on this campus. Each classroom is equipped with state-of-the-art technology. Additional information can be found at www.as.edu.

Accreditation and Licensure

State and federal certification and licensure are not requirements for employment with NNS, though apprentice employees must meet certain qualifications and certifications required to complete apprenticeships within their respective trades. All certification courses, practical exams, and tests are administered by NNS personnel.

The Apprentice School has registered standards of apprenticeship on file with the Virginia Department of Labor and Industry. Inquiries regarding this registration should be addressed to:

Department of Labor and Industry
Interstate Corporate Center, Bldg. 6
6363 Center Drive, Suite 101
Norfolk, VA 23502 Phone: (757) 455-0891
Fax: (757) 455-0899
Email: www.doli.virginia.gov

The Apprentice School is accredited by the Commission of the Council on Occupational Education. Inquiries regarding this accreditation status should be addressed to:

Council on Occupational Education
7840 Roswell Road
Building 300, Suite 325
Atlanta, Georgia 30350
Telephone: 770-396-3898
Fax: 770-396-3790
Email: www.council.org

Hours of Operation

The administrative office of The Apprentice School is open Monday-Friday 7 a.m. – 3:30 p.m. except for recognized holidays. Academic schedules for The Apprentice School are posted online at the beginning of each year. Classroom and trade hours are based on the same schedule and can vary by trade or season of the year.

The Apprentice School Administrators:

Kari Wilkinson
President
Newport News Shipbuilding
4101 Washington Ave.
Newport News, VA 23607

Dr. Latitia McCane
Director of Education
The Apprentice School
Newport News Shipbuilding
4101 Washington Ave.
Newport News, VA 23607

Jeff Egnot
Athletic Director
The Apprentice School
Newport News Shipbuilding
4101 Washington Ave.
Newport News, VA 23607

Jimmy Jessup
Manager, Craft Training
The Apprentice School
Newport News Shipbuilding
4101 Washington Ave.
Newport News, VA 23607

Cynthia Lear
Manager, Academics
The Apprentice School
Newport News Shipbuilding
4101 Washington Ave.
Newport News, VA 23607

Regina McLean
Manager, Academics, Admissions, Student Affairs, and Night School
The Apprentice School
Newport News Shipbuilding
4101 Washington Ave.
Newport News, VA 23607

Mark Tomlin
Manager, Business
The Apprentice School
Newport News Shipbuilding
4101 Washington Ave.
Newport News, VA 23607

The Apprentice School Program Administrators:

Charles Beamon
Lead Craft Instructor
Coatings Specialist, Insulator, Pipefitter,
The Apprentice School
Newport News Shipbuilding
4101 Washington Ave.
Newport News, VA 23607

Gary Smith II (interim)
Lead Craft Instructor
Electrician, Heating and Air Conditioning Worker, Maintenance Electrician, Welding Equipment Repairer
The Apprentice School
Newport News Shipbuilding
4101 Washington Ave.
Newport News, VA 23607

Nicholas Perry
Lead Craft Instructor
The Apprentice School
Machinist, Millwright, Molder, Outside Machinist, Patternmaker, Maintenance Pipefitter
Newport News Shipbuilding
4101 Washington Ave.
Newport News, VA 23607

Garry Carter
Training Manager
The Apprentice School
Mathematics, Mechanics, Physical Science, Ship Construction
Newport News Shipbuilding
4101 Washington Ave.
Newport News, VA 23607

David Blunt
Lead Craft Instructor
Heavy Metal Fabricator, Shipfitter, Welder
The Apprentice School
Newport News Shipbuilding
4101 Washington Ave.
Newport News, VA 23607

Linda McMillian
Lead Craft Instructor
Non-Destructive Tester, Rigger, Sheet Metal Worker
The Apprentice School
Newport News Shipbuilding
4101 Washington Ave.
Newport News, VA 23607

Bruce White
Lead Craft Instructor
Cost Estimator, Marine Designer, Metrology Technician, Nuclear Test Technician, Production Planner, Supply Chain Management
The Apprentice School
Newport News Shipbuilding
4101 Washington Ave.
Newport News, VA 23607

Joann Shuder
Training Manager
The Apprentice School
Business, Communications, Digital Shipbuilding & Technology, Drafting, History, Psychology
Newport News Shipbuilding
4101 Washington Ave.
Newport News, VA 23607

Holiday

New Year's Eve
New Year's Day
Martin Luther King Jr. Day
Memorial Day
Independence Day
Labor Day
Thanksgiving Day
Day after Thanksgiving
Floater Holiday
Christmas Eve
Christmas Day

Emergency Procedures and Closing

Fires: All students are urged to acquaint themselves with the location of the exits, fire alarm switches, fire escapes, and available fire extinguishers throughout the school. In case of fire, call the emergency operator by selecting a line and dialing *911 or by cell phone 757-380-2222 immediately. Give the operator the precise location of the fire and the fire department will be alerted by the operator.

Emergency Evacuation: When a fire alarm sounds, please proceed to the closest exit and assemble in the **PRIMARY ASSEMBLY AREA** which is across the courtyard, to far corner of parking garage. A designated **SECONDARY ASSEMBLY AREA** is across roadway to north side of Navy Parking Garage building if unsafe to proceed to the **PRIMARY ASSEMBLY**.

Police: To summon the police, select a line and dial *911, 0-2222 or by cell phone 757-380-2222, and the operator will alert the police department.

Accidents or Illness: When there is doubt as to procedure in the case of a medical emergency, immediate medical advice should be secured by selecting a line and dialing 911. The NNS Occupational Health Clinic responds to the healthcare needs of The Apprentice School's administration, faculty, staff, and apprentices. The clinic provides a broad range of occupational medicine, health and wellness education, and occupational safety services.

All Injuries, Illnesses or accidents involving Apprentices, Employees, and Visitors shall be reported by the individual involved as soon as safely possible and before leaving the Training Center premises, either to his/her Instructor, Coordinator, Health and Safety Director, Education Director, Assistant Education Director or an authorized representative.

Inclement Weather Policy

Liberal Leave is offered to NNS employees in times of inclement weather so that employees have the flexibility to make the safest decision for themselves and their families. Thus, apprentices can, and should, exercise this option in the event that travel is considered unsafe. Any class absences associated with Liberal Leave will be considered excused. This does not absolve apprentices from the responsibility of keeping up with class assignments; however, for apprentices in the Optional Programs at partnering institutions instructors will be made aware of the company's Liberal Leave status and accommodations will be requested for those electing to miss class.

Student Services

Student Services coordinates and monitors services for current apprentices and alumni. Many of the student services provided by the school are delivered through other functional areas of the school, including admissions, craft training, and academics. Student Services focuses on three major phases of apprentice life: (1) pre-employment through 4th term; (2) career development from 5th term through graduation; and (3) career resources post-graduation. Student services provided by The Apprentice School include: recruitment; registration; preadmission; admissions; housing assistance; career planning; counseling and assessment; student record maintenance; student activities; new hire and apprentice success orientation; tutoring and special learning needs support; and evaluation of services offered. Upon completion of the previously mentioned new hire and apprentice success orientation, apprentices are awarded a passing grade for Apprentice Success Skills which is reflected on apprentices' transcripts. Since all apprentices are full-time employees, upon graduating from The Apprentice School, apprentices retain their jobs at Newport News Shipbuilding and may apply for new positions within the company from the HII web site at hii.com. Although graduates are under no obligation to stay with the company, most do, and quickly move up the ranks within a variety of occupational areas.

The Apprentice School provides apprentices assistance and activities designed to ease the transition into a postsecondary education and training environment. Unlike traditional academic institutions, student services offered by the school are also designed to give apprentices a safe and less intimidating transition into a manufacturing environment, minimizing the barriers to learning on the job and in the academic classroom. Student Services seeks to promote a campus community, provide connection to resources and opportunities for self-development, and provide assistance to alumni.

Apprentice Interaction

The Apprentice School ensures interaction between apprentices and faculty as well as among fellow apprentices. In addition to quality interaction in the classroom environment, academic and craft instructors communicate with apprentices using Moodle, the Learning Management System used by the school. Moodle provides instructors and apprentices a platform to exchange information about assignment and course performance, course content, supplemental resources, academic probation status, and other issues pertaining to apprentices' course participation. Faculty provide daily and weekly feedback to apprentices about their knowledge and skill development, conduct, leadership, and overall performance. Faculty provide timely, quality feedback to apprentices on an ongoing basis. Additionally, apprentices' lead craft instructors are credentialed and qualified to advise on courses. They oversee apprentices' program areas, serve as apprentices' advisors, and provide timely responses. The names of these program advisors are published in the school catalog and also loaded into the apprentices' Moodle accounts.

The Apprentice School promotes interaction among apprentices. All apprentices are automatically members of the Apprentice School Student Association (ASSA). The mission of the ASSA is to provide an organization for the promotion of student activities, to provide a means of support for such activities, to encourage and develop leadership skills in its members, to foster an atmosphere of community service, and to transact all other business of general interest to the Student Body not otherwise provided for. There are several other student organizations apprentices may join. This include Apprentice Alumni Association which is established to encourage the development of Apprentice School alumni through participation in civic, social, and charitable activities; Apprentice Jaycees Student Chapter which is established to create leadership development, business, skills, and personal growth opportunities for apprentices through participation in community service, networking, and social events; Apprentice School Society of Manufacturing Engineers (Chapter S354) which is established to share knowledge of manufacturing through learning, networking, guided tours, guest speakers, and interaction with parent chapter members; The Apprentice School Chapter of the Society of Naval Architects and Marine Engineers which is established to advance the disciplines of naval architecture and marine engineering by sharing information, sponsoring research, and offering educational and career guidance to apprentices; and The Apprentice School Athletic Club which is established to create social and networking opportunities to sponsor and advance Builder Athletics. The Apprentice School also has 7 athletic teams including: baseball, men's basketball, women's basketball, football, golf, men's wrestling, and women's wrestling. In keeping with the excellence of the Apprentice School craft training and academic programs, the goal of the Apprentice School Athletic Program is to:

- **Enhance** the craft training, academic and leadership development of student-athletes.

- **Stimulate** a lasting attitude of leadership, discipline, sportsmanship, teamwork, ethical conduct, social responsibility and integrity.

- **Promote** student-athlete success in the Apprenticeship Program from start to finish and beyond in an environment that enables continuous learning, professional development, career preparation, the integration of personal and professional commitments, opportunities for advancement, and the attainment of maximum performance. These seven athletic teams and six apprentice organizations help ensure interactions among apprentices.

The Engineering & Robotics Club of The Apprentice School, established in 2015, strives to do the following:

- Expand the horizons and provide a venue for all apprentices to explore the engineering profession outside of academic curricula
- Provide a social setting for apprentices to interact with engineering professionals from within NNS as well as local industry and educational institutions through guest speakers, seminars, and site tours
- Allow teams from The Apprentice School to more effectively participate in engineering and design competitions by establishing continuity, camaraderie, and focused efforts throughout the year
- Promote The Apprentice School, its students, and the achievements of the institution at local and national levels through participation in conferences, competitions, etc.
- Provide service to the local community through partnerships with local schools to support engineering and STEM programs and activities

The Apprentice School also has a chapter of the National Society of Leadership and Success which was formally established in 2017. The organization's mission statement is "Building leaders who make a better world," and its vision statement is "*Be the benchmark by which all chapters operate and provide an effective platform for developing personal and corporate leadership.*" In order to receive an invitation, candidates must meet the below minimum criteria; there is an academic and craft faculty review process as well:

ACCEPTANCE CRITERIA (Minimum)

- 3.0 GPA – WCSC & Trade Theory Combined
- Shop GPA = 80 (min)
- No D's (Academic or Theory)
- Minimal to no Disciplinary Issues

Complaint Procedures

It is the policy of The Apprentice School to adhere to existing Company agreements and procedures in responding to apprentice grievances. These procedures include (1) Collective Bargaining Agreement (CBA)

between Newport News Shipbuilding and the United Steelworkers, February 7, 2022 through February 7, 2027 for hourly associates, which governs the terms and conditions of hourly apprentice employment and (2) CO H103 Dispute Resolution Process for salaried apprentices. For grievances found to be not within the CBA grievance process by an arbitrator or otherwise settled at the Company level, the apprentice may contact the Council on Occupational Education (COE is the accrediting agency for The Apprentice School), 7840 Roswell Road, Building 300, Suite 325, Atlanta, GA 30350 or may contact the State Council of Higher Education for Virginia (SCHEV), 101 N. 14th Street, 9th Floor, James Monroe Building, Richmond, VA 23219. The Apprentice School is certified to operate by the State Council of Higher Education for Virginia. Apprentices will not be subject to unfair actions as a result of initiating a complaint proceeding.

Counseling Services

HII's HERO program (HII Employees Reach Out) offers professional referrals, counseling, resources and more. All HII employees and their household family members are eligible to use the program and it is free and confidential.

Apprentices may call HERO if they're looking for advice concerning: child care, elder care, special needs care, pet care, identity theft protection, family therapy, blended families, work issues, stress management, financial counseling, and debt management.

HERO support is free to HII employees, dependents and household family members, regardless of the chosen medical plan or other benefits. All support is protected by HIPAA, the Health Insurance Portability and Accountability Act, and never shared with HII.

To learn more about HERO and reach out apprentices may call the 24/7 phone line at: 1-855-400-9185 or access the HERO secure website at: www.hiihero.com, code "Huntington Ingalls".

Rights, Privileges, and Responsibilities

Response to Sickness and Accidents

Apprentices who are injured or become ill while engaged in the educational program or while participating in an approved Apprentice School activity are treated by medical professionals through the company's clinic or athletic trainer or referred to outside specialists. The Apprentice School will respond quickly and

appropriately to apprentice sickness and accident situations when they occur. Faculty and staff of The Apprentice School are obligated to make the best decision for the employee and the company. While the apprentice's perspective of his or her condition is a factor, there will be times when it is necessary for faculty or staff to insist that an apprentice go to the NNS Occupational Clinic. When in doubt, faculty and staff will send the apprentice to the NNS Occupational Clinic.

Apprentices' work place accidents and injuries will be handled by HII worker's compensation policies. During periods of disability, for any other reason, apprentices are covered as indicated in HII disability policies and procedures.

Apprentice Records

Access to apprentice records by faculty and staff members is controlled and limited to those with a "need to know." Access to records by outside parties is granted only under subpoena or with the written permission of apprentices.

Apprentice Academic Status

Apprentices will routinely be kept informed of their academic status.

1. During regular classroom sessions, grades for all assignments will be provided preferably the next class meeting, but no later than two meetings following the class in which the assignment is due.
2. Notification of academic status will be made at the end of the academic quarter or period of instruction, whichever is applicable.
3. At the end of each quarter, apprentices enrolled in (WCSC) and/or Trade Related Education Curriculum (TREC) courses or the Optional Programs will be provided updated, unofficial copies of their academic transcripts.
4. Course grades are determined by evaluating apprentice performance on all course assessments. Individual grades are numerical.

GRADE	AVERAGE	MEANING
A	93-100	Excellent
B	85-92	Above average
C	77-84	Average
D	70-76	Below average
F	Below 70	Failure
I		Incomplete
P		Pass

W	Withdraw

5. An apprentice's Quality Point Average (QPA) will be computed by multiplying the quarter credits earned in each course by the quality point value of each assigned grade, summing quality points for all courses taken during the quarter, and dividing by the total number of quarter credits attempted.

Questions concerning grades can be addressed first with the course instructor and then with the Manager, Academics or Manager, Craft Training for WCSC and TREC courses respectively.

Apprentice Special Learning Needs

New apprentices are provided the contact information of the special learning needs coordinator at orientation. Apprentices who wish to disclose a special learning need are encouraged to contact and meet with the coordinator to determine the significance and validity of the need. The special learning needs coordinator identifies suitable accommodations, provides apprentices with a meeting verification card, and directs apprentices to meet with their instructors, at the apprentices' discretion, to disclose and plan for implementing the accommodations. Similarly, apprentices with suspected, undisclosed, or undetermined special learning needs can be referred to the special learning needs coordinator for possible testing through Regent University.

Tuition and Fees/Financial Aid

There is no tuition cost for apprentices who have been accepted into the program. Therefore, refunds are not applicable.

Apprentices are responsible for the costs of safety shoes, prescription safety glasses, personal computers, and certain tools/equipment depending on the program. Costs for safety shoes, prescription safety glasses, personal computers, and certain tools/equipment depending on the program are not refundable. Apprentices are required to have a laptop computer prior to beginning academic classes; the laptop computer must meet minimum computer requirements which are provided to students in their offer package. Costs for laptop computers may vary.

There is no current financial aid available beyond free tuition.

Apprentices also are assessed an ASSA fee of 2 percent which is deducted from apprentices' earnings; this fee is charged by the ASSA and not by The Apprentice School. Membership in the ASSA shall include all apprentices enrolled in The Apprentice School. A change in the amount of activity fees may be proposed by a majority vote of the Student Council and submitted to The Student Services Administrator for review.

An apprentice becomes a member of ASSA at the time of his/her enrollment in The Apprentice School and remains a member until completion or termination of his/her apprenticeship and shall be required to pay all activity fees as stated in the Constitution, Article VIII, Section 1. The activity fees are allocated between the ASSA and The Apprentice School Athletics Department, as well as other organizations as authorized by the Manager, Academics, Admissions, Student Affairs, and Night School or the designee.

For the Optional Programs offered by The Apprentice School at partnering institutions, costs of tuition and fees for the community college and university courses offered in these programs are paid for by Newport News Shipbuilding on behalf of participating apprentices to the partnering institution. Participating apprentices are expected to satisfactorily complete the courses with a grade of A, B, or C, or 2.0 on a scale of 4.0 or higher.

However, for those Optional Program apprentices whose course grade results in a 'D' or 'F' or who drop a course(s) at a partnering institution prior to completion but after the deadline to drop for a full refund may result in repayment of tuition fees. Prior to the beginning of each semester, apprentices who are enrolled in courses at a partnering institutions agree to repay HII by personal check or money order the costs of tuition and fees paid on apprentices' behalf by HII if (a) apprentices' performance in a course results in a D or F grade, or (b) apprentices drop the course(s) prior to completion, but after the deadline to drop for a full refund to be paid to HII. Such reimbursement payment will be made within 30 days of the community college or university issuance of course results or the date the course(s) was dropped, as applicable. In the event apprentices' employment with HII, Newport News Shipbuilding Division terminates prior to the completion of a course and after the deadline to drop for refund to be paid to HII, then apprentices must authorize the Payroll Department of HII to withhold from apprentices' final paychecks an amount equal to the cost of tuition and fees paid on their behalf. In the event apprentices' employment with HII, Newport News Shipbuilding Division is voluntarily terminated, then apprentices agree to repay the Company all the costs of tuition and fees paid on the apprentices' behalf within the prior 12 months. If the amount owed may not be fully deducted from apprentices' paychecks, such reimbursement amount shall constitute an unpaid debt, and HIImay pursue any remedies available at law or equity for its collection. The Director of Education, may waive some or all reimbursement requirements in cases of hardship. Such determinations will be made on an individual, case-by-case basis, and shall be at the sole discretion of the Director of Education whose decision is final.

Admissions

Recruitment and Admissions Policy Document

It is the policy of The Apprentice School to solicit, evaluate and admit qualified applicants.

To qualify for admission to The Apprentice School —

1.1. An external applicant must:

1.1.1. Be at least 18 years of age to begin the apprenticeship. High school seniors may apply before reaching age 18.

1.1.2. Have a high school diploma or GED with a minimum of four units passed in any combination of the following subjects: Algebra, Algebra 2, Geometry, Advanced Mathematics, Chemistry, Physics, Mechanical Drawing, Vocational Technical Education, Cpmputer Science, and Principles of Technology.

1.1.2.1. A 'unit' is considered to be one year of high school study or its equivalent.

1.1.3. Demonstrated college readiness in math and English is preferred. Applicants may submit post-secondary (college/university) transcripts that indicate readiness in math and English in lieu of community college testing.

1.1.4. Be physically able to perform the duties required in the trade requested or assigned.

1.1.5. Be drug free and have a background that will allow the company to obtain the proper government-furnished security clearance. U.S. citizenship required.

1.1.6. An internal candidate must meet all academic qualifications of external candidates. An internal candidate also must show and maintain good attendance and performance on the job.

Admission to The Apprentice School is competitive and selective. Therefore, meeting the minimum requirements does not guarantee selection.

All applicants must submit an online application and pay a non-refundable $45.00 processing fee. Applicants may apply online at www.as.edu/apply-now. The processing fee is waived for current Newport News Shipbuilding employees, current or former military personnel, and Good Life Solutions and Pre-Apprenticeship Students. Applicants must also request official transcripts from all high schools and post-secondary schools attended by mail to the following address: The Apprentice School Admissions Office, 4101 Washington Avenue, Building 1919, Newport News, VA 23607. Alternatively, applicants may order their official transcripts to be sent electronically to The Apprentice School via Parchment.com.

Attendance Policy

Hourly and salaried apprentices are subject to the same attendance guidelines as other hourly and salaried employees at NNS, respectively.

Apprentice attendance records (hourly and salaried) are kept using Systems, Applications & Products (SAP) software and monitored by apprentice craft instructors, managers, Product Training and the manager, Craft Training.

Vacation or personal time (PT) may be granted to apprentices during times in which academic or trade related classes are scheduled. Apprentices requesting vacation or PT during scheduled academic or trade related classes must complete a Vacation/PT Request Form and submit the form to their apprentice craft instructor or manager, Product Training in advance of the requested vacation or PT date(s). The manager, Craft Training is responsible for reviewing/approving vacation or PT requests.

Call-in vacation or PT will not be granted to apprentices during times in which academic or trade related classes are scheduled. The manager, Craft Training may consider exceptions based on extraordinary or extenuating circumstances.

The Manager, Academics, or his/her designee may temporarily drop an apprentice from scheduled classes for the following reasons:

1. The apprentice is unable to attend classes for *three or more* consecutive class days because of accident or illness.
2. The apprentice is required to perform active duty training for the armed forces reserve forces.
3. The apprentice needs time to resolve serious family, legal, or other severe personal problems.

No apprentice will be dropped from classes after the *6th* week of a quarter except for accident, illness, or an unanticipated emergency.

An apprentice or any of his instructors, who may be aware of a pending prolonged absence, should notify the Manager, Academics, or his/her designee when such information is firm.

Any apprentice who desires to be dropped from scheduled classes should:

1. Have a valid reason.
2. Discuss his reasons with his Apprentice Craft Instructor.
3. Discuss the matter with the Manager, Academics or his/her designee to determine if dropping classes appears to be the best course of action.
4. Submit a written request and statement of reasons for the request.

This option may be used only once during an apprenticeship except where there are extreme extenuating circumstances.

Transfer Credit

Apprentices who attended an accredited post-secondary educational institution prior to admittance to The Apprentice School can obtain transfer credit and be exempted from certain courses.

1. Consideration for academic credit will be granted based on review of the official transcripts from an accredited post-secondary educational institution and having met any of the conditions specified below.

    1.1 Must have a grade of "C" or better in a post-secondary math course equivalent to, or higher than, a college algebra course to be exempt from Mathematics I.

    1.2 Must have a grade of "C" or better in a freshman level college writing course to be exempt from Communications I.

    1.3 Must have a grade of "C" or better in a General College or University Physics I course to be exempt from Physical Science I and Physical Science II.

    1.4 Must have a grade of "C" or better in a college level Computer Aided Design (CAD) course to be exempt from drafting.

2. Apprentices who have AP or CLEP credit prior to admittance to The Apprentice School may obtain academic credit and be exempted from Mathematics I, Communications I, Physical Science I, Physical Science II, and Drafting courses.

    2.1 AP/ CLEP scores must be sent directly to The Apprentice School

    2.2 AP scores require a minimum score of 3.

    2.3 CLEP scores require a minimum score of 50.

3. Grade standard drafting exemption test.

    3.1 Exemption test only will be offered to apprentices who possess an AutoCAD certification or who have completed a similar college course for which The Apprentice School is unable to provide transfer credit due to equivalency not being met as stipulated in 1.4.

3.2 The drafting exemption test is optional.

3.3 Apprentices who score a grade of 80% or higher on the exemption test will not be required to take the Drafting course.

3.4 Failure to pass an exemption test will not affect the subsequent grade earned in the course.

4. Standardized exemption tests, prepared by the course developer, will be used for drafting.

5. NNS employees (commonly referred to as transfers) admitted to The Apprentice School may be granted a maximum of 1,000 hours of credit toward completion of their apprenticeship based on prior work experience at the company.

Apprentices must complete a minimum of 30% of their course work at The Apprentice School in order to be granted a degree from The Apprentice School.

Transfer Between Programs

Due to the company operating requirements and the lack of similarity among trades, apprentices may only transfer to a different program within the institution if they are accepted into the Associate of Applied Science Optional Programs or in unusual cases or extenuating circumstances. It is the policy of The Apprentice School not to consider transfers outside of the Associate of Applied Science Optional Programs unless one of the following conditions exists:

1. The transfer is between departments that have like or similar skill sets. Example: pipefitter and maintenance pipefitter.
2. The transfer is to satisfy a Company need.
3. The transfer of an hourly apprentice to a salaried trade. Example: Foundry to Patternmaker.
4. The transfer would alleviate a medical problem that was detected early in apprenticeship.
5. An otherwise satisfactorily performing apprentice is unable to master a specific skill or demonstrate a trade-specific aptitude that is a requirement of the assigned trade.

An apprentice or any instructor who may be aware of condition (3) or (4) above should notify the Manager, Craft Training immediately. Recommendation for Transfer forms are completed for apprentices being considered for transfer to other programs. The cognizant craft instructor completes the form and makes a recommendation. The Manager, Craft Training and Director of Education review and sign the form.

Transfer to Other Institutions

The Associate of Applied Science degrees awarded by The Apprentice School are terminal technical programs and credits generally earned in an Associate of Applied Science degree are not applicable to other degrees. Apprentices who wish to transfer credits for courses earned at The Apprentice School to other institutions should have their transcripts evaluated by the institution to which a transfer is being made. While The Apprentice School cannot guarantee that any credit earned at The Apprentice School will be accepted by any other institution, including credits for core curriculum academic courses, The Apprentice School does work to establish articulation agreement guidelines.

Academic Assistance/Advisement

During an academic quarter, provisions are made for assisting and retesting apprentices Monday through Friday. Instructors will be available for extra help between 6:00 a.m. and 7:00 a.m. prior to the start of the apprentices' shift, and may be available by appointment during lunch. The Manager, Academics will assign instructors to remain after work from 3:30 p.m. to 5:30 p.m. Monday through Thursday to provide extra help a minimum of twice weekly beginning the 2nd week of the quarter and continuing through the 11th week of the quarter. Additionally, The Manager, Academics, or his/her designee will assign instructors from 3:30 p.m. to 6:00 p.m. Monday through Thursday of the eleventh week to provide retesting. Details for extra help are posted weekly in apprentices' as.edu Outlook calendars.

Once accepted to The Apprentice School, Student Services, faculty, and staff are involved in counseling and advising to help apprentices acclimate to the environment and program performance requirements, resolve performance problems, and, on request, provide personal advising.

Student Services specifically is tasked to assist apprentices in their transition to the program and provide guidance and assistance in the areas of academic success, career planning, and continuing education throughout their apprenticeship and career with the company. In conjunction with their job responsibilities, administrative personnel periodically provide advising about the following topics: initial trade selection, discipline, special learning needs, career planning, and continuing education.

Library/Media Services

The network of NNS divisions and departments provides the necessary support to acquire and develop learning resources, access to media services, equipment, and supplies. The school has the benefit of full access to NNS Information Technology (IT), the Technical Library, and Training Services departments. The school's Media Services Plan ensures relevant educational materials, audio-visual

equipment, internet access, and other materials are readily available and easily accessible for faculty, staff, and apprentices. Due to the nature and scope of work performed at NNS by apprentices and the role they play in production, access to training resources and materials exclusively developed by NNS for use at The Apprentice School enables apprentices' development as highly skilled workers that make up a sizable portion of the NNS workforce.

The WCSC, TREC, and all facets of on-the-job training for apprenticeships in shipbuilding disciplines and Optional Programs are supported by a library media services plan. This plan provides for library media products and services from the NNS annual subscription to IHS Markit, the Training Services department, the Technical Library, and The Apprentice School Library. A brief description of each as follows:

1. IHS Markit provides technical information to assist in research and problem-solving. This subscription provides employees with access to the Engineering Workbench (industry standards and military/government documents), Haystack Gold (manufacturers parts and logistics information), McGraw Hill-Access Engineering (engineering reference books), and CatalogXpress (product and component information).

2. Apprentices and faculty can access presentations, videos, books, and classes through SkillSoft Powered by Percipio by using their company assigned personnel number.

3. Training Services is a department staffed by professionals with expertise in instructional media and media production and is responsible for assisting with the development of learning materials used at NNS, including computer-based training and shipyard-specific course curricula.

4. The Technical Library provides access to technical publications, periodicals, reference materials, textbooks, and standards and coordinates the acquisition of textbooks for The Apprentice School. Resources available through the Technical Library may be accessed by all NNS employees including apprentices. The Technical Library staff maintains circulation of publications, periodicals, reference materials, and textbooks. The library is located in Building 903-1.

5. The Apprentice School Library is located in Room 439 of The Apprentice School. This library provides access to a physical collection of reference materials and textbooks. The reference materials are categorized by subjects covering Business/Economics, Communications, History, Leadership, Information Technology/AutoCAD, Mathematics/Statistics, Physics/Chemistry, and Maritime. Apprentices check out material on the honor system by completing the check-out/check-in sheet when removing and returning items. A designated academic instructor is responsible for updating the library check-out/check-in sheet and maintenance of the room bi-weekly, and updating the library content sheet with additions or deletions of reference materials and textbooks. The Apprentice School manager, Academics, is responsible for evaluating individual requests and the need for updates to the library content annually.

The Apprentice School requires apprentices to bring their own device, however, the school also has computer labs and loaner laptops available. NNS IT provides an administrative function, including the purchase, repair, maintenance, and replacement of all computer hardware and software associated with the company's network. Media equipment is requested electronically and processed through the company's department. NNS IT also provides AV/IT support for the company's network and the school's educational network, as.edu.

In addition, a variety of materials and equipment provided by NNS is readily available and easily accessible to help fulfill the school's purpose while supporting its educational programs.

Internship Opportunities

The Apprentice School provides internship opportunities to all of its apprentices through Newport News Shipbuilding, a division of HII. These opportunities are clearly defined in the school catalog. The manager, Craft Training oversees scheduling these internships with Trades management to ensure each apprentice receives the necessary training. This work experience will enable the apprentice to be proficient in the trade when they graduate and become a craftsperson of the company. The Apprentice School provides qualified craft instructors in each degree field to administer training. Monthly craft evaluations are performed by the craft instructors to ensure proficiency in trade training.

1. Work experience will be documented on a craft documentation record for each apprentice as they change work areas. The minimum time spent in each area is defined on the craft documentation record and the program curriculum card. Program reviews are conducted yearly by the cognizant craft training manager and craft instructors to maintain operational relevance.
2. Skills in each program will be tracked on apprentice task evaluations at the end of each internship. A majority of the skills are required while some are optional. This criteria is set and reviewed yearly by the cognizant craft training manager and craft instructors.
3. An apprentice will be eligible to receive an Associate of Applied Science Maritime Technology degree in their curriculum once the apprentice receives a certificate of completion of apprenticeship from the Commonwealth of Virginia.

Distance Education

Please note in this section the term student is used to include apprentices and pre-apprentice students. Online hybrid program courses within the WCSC are identical in content, are taught by the same faculty, and utilize comparable resources to those taught on campus. The Apprentice School received final approval for institutional distance education in 2013 from the school's accrediting agency Council on Occupational Education (COE) and was granted programmatic distance education approval in 2021.

I. Telecommunication/distance education programs and courses adhere to the following:

1. Educational Objectives Related to Telecommunications/Distance Education.

The educational objectives for each program or course are clearly defined, simply stated, and achievable through telecommunications/distance education. All programs at The Apprentice School have clearly stated objectives and content relative to the business needs of NNS. Academic course objectives are defined based on the learning needs of students within each program of study and outlined in syllabi for the WCSC and TREC. Students are given an opportunity to provide feedback on the relevance of courses, the clarity of stated objectives, and quality of instruction in the WCSC and TREC at the completion of each academic quarter.

2. Instructional Materials and Technology Methods

Instructional materials and technology methods are appropriate to meet the stated objectives of the program or course.

a. Moodle

The Apprentice School uses the Learning Management System (LMS), Moodle. It was implemented in approximately 2010 in conjunction with face to face learning and is a component of hybrid program instruction.

Instructors use Moodle's question banks to create quizzes and tests with a variety of question types, as well as to upload course content and resources including videos, website links, online textbooks, PowerPoint slides, and course syllabi. Instructors use warm-ups to assess prior instruction, classwork to reinforce newly learned concepts, peer reviews to create opportunities for students to provide feedback, and writing projects such as papers, journals, and forums to encourage the assimilation of ideas.

Student interaction is facilitated with peer review of assignments, discussion board topics where students are required to reply and comment on students' responses, and through group work in collaboration forums. Students may communicate using the internal messaging system within Moodle, through Microsoft Teams, or through as.edu email accounts.

In addition to quality interaction in the classroom environment, WCSC and TREC instructors communicate regularly with students using Moodle, which provides instructors and students a platform to exchange information about assignment and course performance, academic probation status, and other issues pertaining to students' course participation. Students' grades are posted in Moodle's gradebook, and students upload files for grading within the LMS. Furthermore, instructors and students also may use the internal messaging system within Moodle, may communicate using Microsoft Teams, or through as.edu email accounts.

Graded assessments may be conducted fully online through Moodle or launched directly from Moodle. To maintain academic integrity for online assessments, students are required to install Respondus Lockdown Browser on their laptops and/or complete assessments in either an in-person or online proctored environment. Students often are asked to upload their written work to verify answers. Weekly grade reports are compiled from Moodle and shared with Student Services and students' advisors to help identify students who are struggling academically, and to provide guidance to these students to encourage their success. All students' academic statuses are handled as outlined in The Apprentice School Catalog.

b. MS Teams

In addition to the Learning Management System, Moodle, The Apprentice School may utilize Microsoft Teams to deliver instruction. Students are required actively to be online in the Microsoft Teams class during the scheduled class timeframe for synchronous classes. At the beginning of each session, instructors verbally verify attendance, and students are monitored during online courses by responding to instructors' questions, posting responses in a chat window, and through digital repositories of individual apprentice class activity. All students must abide by the outlined attendance policies.

Instructors deliver courses and enhance content within MS Teams by using live lectures, group discussion, PowerPoint presentations, document camera projections, or video links. Instructors may use warm ups to assess prior instruction, classwork to reinforce newly learned concepts, peer reviews to create opportunities for apprentices to provide feedback, and writing projects such as papers, journals, and forums to encourage the assimilation of ideas.

Within Microsoft Teams breakout rooms, student interaction is facilitated with peer review of assignments, through group projects, and guided reflection time. Students may collaborate through verbal communication, the chat board inside Microsoft Teams, by using Moodle, or through emailing as.edu accounts.

Graded assessments may be conducted synchronously online through Microsoft Teams and launched primarily through Moodle. Students often are required to upload their written work either to Microsoft OneNote or Moodle to verify answers. In addition, Microsoft Assignments has been used by instructors to review and verify assigned classwork during workshop time.

c. Instructional Materials

For course specific instructional materials, The Apprentice School utilizes Moodle for a central location. Course specific materials may include apps for practicing math facts or ship construction/business concepts, pdf textbooks/workbooks, Open Educational Resources (OER), YouTube videos, and different activities developed within the online platforms Moodle or MS Teams.

Various library resources are available to students enrolled in either face-to-face or hybrid programs. Further information regarding Library/Media Services is outlined in The Apprentice School Catalog.

d. Online Navigation of a Course or Program

Moodle is the central location for instructional material for each course or program. Online classes may be delivered through MS Teams. On the first day of a synchronous class, instructors review the course content within Moodle. For asynchronous courses, orientation is designed to provide students with an overview the course content within Moodle. The content for each course includes standard resources such as instructor information, syllabus, schedule, pdf textbook/workbook, and online resources. In addition, videos have been created to give instructions on how to complete certain tasks, i.e. using OneDrive to create a pdf of work for submission.

Course materials and assignments are in chronological order based on the class day and the content that will be covered. This is consistent for each course and maintains a consistent experience for the students. Direct links for course information are labeled easily to access materials such as files or videos. Instructors also assist students with where to find course content.

e. Attendance

In synchronous classes, students must log in at the predetermined class time each day for guided instruction to ensure they are counted as being present at the beginning of class. All students must abide by the outlined attendance policies.

If there are Wi-Fi connectivity issues, students are required to call The Apprentice School's IT department prior to the start of class to ensure not being counted as absent or late to synchronous classes. The IT department is available from 6:00 a.m. – 6:00 p.m. Monday through Thursday and from 7:00 a.m. – 6:00 p.m. Friday.

f. Assignment Submission

Students often are required to upload their written work to verify answers depending on the assessment or class assignment. In addition, Microsoft Assignments has been used by instructors to review and verify assigned classwork during workshop time.

Students must show all work, including the appropriate equations, any necessary unit conversions, the values for the variables in the equations, and the answer with the correct units in order to receive credit for problems involving math calculations. Students must provide adequate math work to justify his or her final answers to the satisfaction of the grading instructor.

Students are assigned classwork regularly to provide the essential practice necessary to reinforce learning and to sharpen skills. Completed classwork assignments are due as indicated by the instructor. Classwork may be collected and graded in lieu of, or in addition to, quizzes. If classwork is graded, the students must turn in the material as indicated by the instructor or receive a zero. In the case where a student is absent the day a classwork assignment is due, the student must turn in the assignment as indicated by the instructor or receive a zero. Should a student be absent the day classwork is assigned, the instructor may excuse the completion of that assignment.

g. Passing Grades

Course grades are determined as outlined in the Catalog.

h. Plagiarism Policy

The Apprentice School and its leadership are structured within Newport News Shipbuilding, a division of HII (HII). As such, The Apprentice School sets high ethical standards and upholds the HII values. Integrity is one of the core company values.

The Apprentice School ensures the quality of distance education in several ways. All students receive both a copy of The Apprentice School's honor pledge and academic ethics guidelines during orientation. Any breach of the honor pledge is considered a violation of the company's Yard Regulation #10 Falsification of Company Records. "Providing false or misleading information to the company" is expressly prohibited and will subject the offending employee to discharge or other discipline. The Apprentice School implements multiple deterrents to ensure the quality of distance education. Assessments generated from Moodle's question banks can be designed so that questions are randomized and shuffled throughout the students' assessment. To maintain academic integrity for online assessments, students are required to install Respondus Lockdown Browser on their laptops and/or complete assessments in either an in-person or online proctored environment. Instructors also monitor students' logs in Moodle for

indications of academic dishonesty. Moreover instructors permit students to use a note card on assessments in classes in which this form of testing supports the overall learning outcomes (e.g. Physical Science I and II); this is the same practice for face-to-face courses. In this way, The Apprentice School can discourage academic dishonesty.

Should an instructor have evidence of apparent cheating by a student on an assignment, test, retest, or other classroom evaluation instrument, the incident will be addressed. The instructor will document the suspected cheating incident in an email which will contain the details of the incident. The email will be sent to management for the incident to be investigated to determine if cheating has occurred. If it is determined that cheating occurred, then the student will receive an 'F' for the course letter grade and a '0' for the course numeric grade.

Instructors may use Microsoft Teams in conjunction with Moodle to deliver classes effectively. In this way, Microsoft Teams adds an additional level of quality and security for instructors' ability to give instructions, share screens, show where to access assessments, monitor the classroom, and answer any questions or assist with technical issues. Microsoft Teams enables the interaction needed between instructors and students necessary to conduct online synchronous classes.

i. Minimum Technology Specification for Students

Students are required to have a laptop computer prior to beginning academic classes; the laptop computer must meet minimum outlined laptop requirements. Costs for computers may vary.

j. Privacy, Safety, and Security of Data Contained within Institutional Networks and Technical Infrastructure Capabilities

The Apprentice School provides for the technical infrastructure to meet the demands of the programs being offered and provides for the privacy, safety, and security of information exchange and data. Moreover, the Information Technology (IT) division, onsite network administrators, Microsoft and Moodle hosting company ensure the privacy, safety, and security of data contained within the technical infrastructure of The Apprentice School's networks. NNS IT division provides IT solutions and services across the company, including for The Apprentice School. Key products and services include. Information Technology & Digital Transformation Division; Product Lifecycle Management & Application Solutions; Strategy, Architecture & Innovation; Cybersecurity, Compliance & Quality; Infrastructure & Operations; Business Transformation Office; Technology Business Management; and Enterprise Resource Planning Solutions.

To ensure the privacy, safety, and security of Microsoft data on as.edu, MS Exchange Center handles mail flow, protection, and compliance. MS SharePoint handles access control and sharing policy; MS Teams handles meeting policy, live event policy, and is restricted to only within the organization.

The Apprentice School has on-site as.edu network administrators. The administrators are in the school and are available to assist faculty, staff, and students for extended hours before and after the school day. For Microsoft on as.edu (Administration, Exchange, SharePoint, MS Teams, and Azure AD), the backup system and reliable delivery services are done via Microsoft support services.

The school's onsite administrators are responsible for the privacy, safety, and security of data contained on The Apprentice School's educational network. As a contractor, they ultimately are under the direction of the IT division and must uphold all IT requirements with respect to privacy, safety, and security of data. Privacy of student data is maintained through individual access to the as.edu network. To access the as.edu network, students must log on using an individual username and a unique password established by the school's onsite administrators.

The hosting company for Moodle ensures the safety of data contained in Moodle by backing up the server frequently. If the site goes offline, the hosting company is contacted for immediate support to restore the site. If an assignment or other course content is accidentally deleted from a course, the course can be restored to the most recent backup to recover the data. The hosting company protects the integrity of Moodle from security breaches, virus attacks, spam, or other unforeseen circumstances.

Student privacy is maintained as they must log on to Moodle using a unique username and password to access course content. Social Security, credit card, and checking account numbers and home addresses are not entered in Moodle. The user's school assigned email is entered, and the user may enter a telephone number.
In addition, NNS Standard Shipyard Procedures governs physical and environmental protection procedures for the company's network. The procedure's purpose is to ensure NNS has a comprehensive access control strategy. This strategy is a part of the defense-in-depth strategy implemented by Cybersecurity to protect the confidentiality, integrity, and availability of the NNS classified information system.

Specifically, the Cybersecurity department is responsible for the protection of NNS unclassified IT assets and computing infrastructure. Cybersecurity promotes effective security strategies in alignment with the company's goals and business drivers and offers guidance to position the company in gaining new business opportunities while adapting to the challenges of increasing external threats and vulnerabilities. Cybersecurity is promoted as a collaborative effort among all NNS employees with access to information assets and company information networks Furthermore, Cybersecurity protects the confidentiality, availability, and integrity of company data, networks, computing systems, and users.

Privacy of student data is maintained through individual access to NNSCORP, the company network. To access NNSCORP, apprentices must log on using an individual username generated through the IT division and a unique password.

3. Student and Faculty Interaction

The Apprentice School shall provide for methods for timely interaction between students and faculty.

a. Clear communication of expectations from instructors: Instructors will convey their expectations at the start of the course. Expectations will differ depending on the class and on the instructor.

b. Availability of instructors: Instructors will be available and responsive to students. Each instructor will: (a) respond in a timely fashion and (b) make clear, at the start of the course or when they begin working with students, when and how often they can typically expect a response.

Additionally, students can email administrators/faculty to ask questions or let them know of a problem. For forgotten passwords, students can click on the "forgot password" link and receive an email instructing them on how to reset their password without contacting an administrator directly. Moodle inquiries are answered within 24 hours.

c. Extra help: Extra help will be available both online and at the school.

d. Computer, telephone, email, or face-to-face meetings: Instructors regularly communicate with students by several means. During class time, within Microsoft Teams, they may verbally call on specific students for feedback or post announcements in the chat window. Alternatively, for more private topics instructors also may text students through the chat feature or contact students using the call function in Microsoft Teams. Instructors conduct office hours in Microsoft Teams as well as face-to-face. Furthermore, instructors and students also may use the internal messaging system within Moodle, may communicate using Microsoft Teams, or through as.edu email accounts.

4. Faculty Distance Education Training and Support Services

Several faculty members currently on staff have worked with Moodle since its inception at The Apprentice School in 2010. Academic faculty share best instructional practices both informally and formally during monthly faculty meetings, in-house professional development meetings, and course reviews. Additionally, academic faculty routinely attend professional development training opportunities where attendees share best practices and advance their Moodle skills.

There is a wealth of training available on Microsoft Teams. The Apprentice School has an IT department that provides information and ongoing support on Microsoft Teams use, best practices, and app integration. Additionally, several instructors either hold degrees in computer related areas or have familiarity through prior instruction. Faculty share best instructional practices both informally and formally during monthly faculty meetings, in-house professional development meeting, and course reviews; IT staff have joined faculty meetings as well.

5. Student Distance Education Training and Support Services

Students are provided with information to access both their Microsoft account and as.edu email accounts during orientation. The school's Moodle administrators, who are full time academic faculty, establish apprentices' Moodle accounts. Faculty and staff facilitate students' initial login during orientation and are available to provide support as needed. Students experiencing difficulties with Moodle also may contact the school's Moodle administrators either by email or phone.

Prior to the start of online classes, students are emailed a technology communication that outlines the steps for registering for Microsoft Teams. If apprentices have issues accessing Microsoft Teams, they should call The Apprentice School's IT department prior to the start of classes to ensure they are not being counted as being absent or late to class. The IT department is available from 6:00 a.m. – 6:00 p.m. Monday through Thursday and from 7:00 a.m. – 6:00 p.m. Friday.

To ensure students' success in online hybrid program courses, The Apprentice School, monitors students' progress, communicates regularly, and provides both initial training and ongoing support while upholding a high ethical standard which re-enforces HII values.

2025 ACADEMIC CALENDAR

WINTER QUARTER

Monday, January 6 through Thursday, March 13	WCSC in Session[1] (10-week Schedule)

SPRING QUARTER

Monday, April 7 through Thursday, June 12	WCSC in Session[2] (10-week Schedule)

SUMMER QUARTER

Monday, July 7 through Thursday, September 11	WCSC in Session[3] (10-week Schedule)

FALL QUARTER

Monday, September 29 through Thursday, December 4	WCSC in Session[4] (10-week Schedule)

2025 ACADEMIC CALENDAR KEY DATES

WCSC Winter Quarter
[1]No classes will be held on Monday, January 20 and Tuesday, January 21.

WCSC Spring Quarter
[2]No classes will be held on Monday, May 26 and Tuesday, May 27.

WCSC Summer Quarter
[3]No classes will be held on Monday, September 1 and Tuesday, September 2.

WCSC Fall Quarter
[4]No classes will be held on Wednesday, November 26 and Thursday, November 27.

Advanced Program Semester
[5]TNCC, TCC, and ODU dates may vary

The Apprentice School
Official Curriculum Guide

Craftsmanship, Scholarship, Leadership

Name: _____ **Start Date:** _____

Associate of Applied Science: Maritime Technology – Coatings Specialist

Nearly every component or structural element on a ship requires specific coatings. Coatings specialist apprentices are trained to properly apply a variety of marine coating systems. Coatings protect the steel and other surfaces from rust and corrosion, protect the underwater hull from marine life attachment and enhance the general appearance of the ship. Coatings specialist apprentices prepare the surfaces, cover areas that do not require paint, sandblast surfaces, apply the proper coating, and ensure suitable drying and curing conditions.

*** The Commonwealth of Virginia issued certification of completion of apprenticeship is required prior to conferring this degree.***

World Class Shipbuilder Curriculum (WCSC)

QUARTER 1

Course No.	Course Title	Credits	Prerequisites
MATH 111	Mathematics I (General Education)	4.5	None
COMM 111	Communications I (General Education)	4.5	None
HIST 111	History (General Education)	4.5	None
	QUARTER TOTAL	**13.5**	

QUARTER 2

Course No.	Course Title	Credits	Prerequisites
MATH 112	Mathematics II (General Education)	4.5	MATH 111
DRFT 111	Drafting (Technical Core)	4.5	None
SHCN 111	Ship Construction I (Technical Core)	3.5	COMM 111
	QUARTER TOTAL	**12.5**	

QUARTER 3

Course No.	Course Title	Credits	Prerequisites
SHCN 222	Ship Construction II (Technical Core)	3.5	SHCN 111
PHYS 221	Physical Science I (General Education)	4.5	MATH 112
SITE 211	Digital Shipbuilding & Technology (Technical Core)	1	None
PSYC 221	Psychology (General Education)	4	None
	QUARTER TOTAL	**13**	

QUARTER 4

Course No.	Course Title	Credits	Prerequisites
MECH 222	Mechanics (Technical Core)	4.5	PHYS 221
PHYS 222	Physical Science II (General Education)	4.5	PHYS 221
BUSI 222	Business Operations and Leadership (Technical Core)	4.5	None
	QUARTER TOTAL	**13.5**	
	WCSC TOTAL	**52.5**	

Trade Related Education Curriculum (TREC)

** Trades courses can be taken at various times during the apprenticeship.*

Coatings Specialist

Course No.	Course Title	Credits	Prerequisites
X33C 111	Paint and Surface Preparation	5.5	None
X33C 112	Blueprint Reading for Painters	1	None
X33C 135	Surface Preparation	12	None
X33C 136	Coating and Finishing	10	None
X33C 137	Inspection and Instrumentation	10	None
	TOTAL	**38.5**	

Total Credits 91

The Apprentice School
Official Curriculum Guide

Craftsmanship, Scholarship, Leadership

Name: _____ **Start Date:** _____

Associate of Applied Science: Maritime Technology - Electrician

Naval ships require several miles of cable to supply power, from its source, throughout the ship. Electrician apprentices learn to install, operate and test electrical systems on board ships. These systems include lighting, power distribution, machinery, interior communications, fire control/weapons systems, testing, and nuclear plant work. They will work with drawings to devise a plan for their jobs, so they can lay off equipment location and cable runs. Electricians construct and install various electrical components and are required to complete a rigorous series of electrical theory courses to complement on-the-job training.

The Commonwealth of Virginia issued certification of completion of apprenticeship is required prior to conferring this degree.

World Class Shipbuilder Curriculum (WCSC)

QUARTER 1

Course No.	Course Title	Credits	Prerequisites
MATH 111	Mathematics I (General Education)	4.5	None
COMM 111	Communications I (General Education)	4.5	None
HIST 111	History (General Education)	4.5	None
	QUARTER TOTAL	**13.5**	

QUARTER 2

Course No.	Course Title	Credits	Prerequisites
MATH 112	Mathematics II (General Education)	4.5	MATH 111
DRFT 111	Drafting (Technical Core)	4.5	None
SHCN 111	Ship Construction I (Technical Core)	3.5	COMM 111
	QUARTER TOTAL	**12.5**	

QUARTER 3

Course No.	Course Title	Credits	Prerequisites
SHCN 222	Ship Construction II (Technical Core)	3.5	SHCN 111
PHYS 221	Physical Science I (General Education)	4.5	MATH 112
SITE 211	Digital Shipbuilding & Technology (Technical Core)	1	None
PSYC 221	Psychology (General Education)	4	None
	QUARTER TOTAL	**13**	

QUARTER 4

Course No.	Course Title	Credits	Prerequisites
MECH 222	Mechanics (Technical Core)	4.5	PHYS 221
PHYS 222	Physical Science II (General Education)	4.5	PHYS 221
BUSI 222	Business Operations and Leadership (Technical Core)	4.5	None
	QUARTER TOTAL	**13.5**	
	WCSC TOTAL	**52.5**	

Trade Related Education Curriculum (TREC)

** Trades courses can be taken at varying times during an apprenticeship.*

Electrician

Course No.	Course Title	Credits	Prerequisites
X31 111	Applied Theory I: DC Concepts	7.5	None
X31 112	Applied Theory II: AC Concepts	7.5	X31 111
X31 137	Electrical Installation – Surface Ships	6	None
X31 139	Electrical Installation – Submarines	6	None
X31 212	Applied Theory III: Polyphase Systems and Controls	8	X31 112
X31 214	Programmable Logic Controllers	3	X31 212
	TOTAL	**38**	

Total Credits **90.5**

The Apprentice School
Official Curriculum Guide

Craftsmanship, Scholarship, Leadership

Name: _____ **Start Date:** _____

Associate of Applied Science: Maritime Technology – Heating and Air Conditioning

The shipyard's large facility requires a maintenance group to service heating, ventilation and air conditioning units. Heating and air conditioning apprentices learn to install, repair and maintain a wide variety of systems throughout the shipyard. These systems include water fountains, window air conditioners, heating units, air driers, chilled water systems, and 3- to 60-ton air conditioning systems. Apprentices also perform routine preventative maintenance on all systems to ensure they function properly. Heating and air conditioning apprentices will take detailed theory courses to prepare them for the field.

The Commonwealth of Virginia issued certification of completion of apprenticeship is required prior to conferring this degree.

World Class Shipbuilder Curriculum (WCSC)

QUARTER 1

Course No.	Course Title	Credits	Prerequisites
MATH 111	Mathematics I (General Education)	4.5	None
COMM 111	Communications I (General Education)	4.5	None
HIST 111	History (General Education)	4.5	None
	QUARTER TOTAL	**13.5**	

QUARTER 2

Course No.	Course Title	Credits	Prerequisites
MATH 112	Mathematics II (General Education)	4.5	MATH 111
DRFT 111	Drafting (Technical Core)	4.5	None
SHCN 111	Ship Construction I (Technical Core)	3.5	COMM 111
	QUARTER TOTAL	**12.5**	

QUARTER 3

Course No.	Course Title	Credits	Prerequisites
SHCN 222	Ship Construction II (Technical Core)	3.5	SHCN 111
PHYS 221	Physical Science I (General Education)	4.5	MATH 112
SITE 211	Digital Shipbuilding & Technology (Technical Core)	1	None
PSYC 221	Psychology (General Education)	4	None
	QUARTER TOTAL	**13**	

QUARTER 4

Course No.	Course Title	Credits	Prerequisites
MECH 222	Mechanics (Technical Core)	4.5	PHYS 221
PHYS 222	Physical Science II (General Education)	4.5	PHYS 221
BUSI 222	Business Operations and Leadership (Technical Core)	4.5	None
	QUARTER TOTAL	**13.5**	
	WCSC TOTAL	**52.5**	

Trade Related Education Curriculum (TREC)

** Trades courses can be taken at varying times during an apprenticeship.*

Heating and Air Conditioning

Course No.	Course Title	Credits	Prerequisites
X31 111	Applied Theory I: DC Concepts	7.5	None
X31 112	Applied Theory II: AC Concepts	7.5	X31 111
O43H 145	Heating Ventilation and Air Conditioning	12	None
X31 212	Applied Theory III: Polyphase Systems and Controls	8	X31 112
X31 214	Programmable Logic Controllers	3	X31 212
	TOTAL	**38**	

Total Credits 90.5

The Apprentice School
Official Curriculum Guide

Craftsmanship, Scholarship, Leadership

Name: _____ **Start Date:** _____

Associate of Applied Science: Maritime Technology – Heavy Metal Fabricator

There are many unique shapes that must be formed from massive pieces of steel to construct the several sections of a ship. Heavy metal fabricator apprentices learn the processes and procedures of the shipyard's Steel Fabrication Shop. They learn to use a variety of tools and machines that cut, burn, bend, move and press steel into shapes needed for ship construction. Apprentices also learn how to lay their work out to validate the shape prior to extracting it. They create a large portion of the parts and plates needed to build aircraft carriers and submarines.

The Commonwealth of Virginia issued certification of completion of apprenticeship is required prior to conferring this degree.

World Class Shipbuilder Curriculum (WCSC)

QUARTER 1

Course No.	Course Title	Credits	Prerequisites
MATH 111	Mathematics I (General Education)	4.5	None
COMM 111	Communications I (General Education)	4.5	None
HIST 111	History (General Education)	4.5	None
	QUARTER TOTAL	**13.5**	

QUARTER 2

Course No.	Course Title	Credits	Prerequisites
MATH 112	Mathematics II (General Education)	4.5	MATH 111
DRFT 111	Drafting (Technical Core)	4.5	None
SHCN 111	Ship Construction I (Technical Core)	3.5	COMM 111
	QUARTER TOTAL	**12.5**	

QUARTER 3

Course No.	Course Title	Credits	Prerequisites
SHCN 222	Ship Construction II (Technical Core)	3.5	SHCN 111
PHYS 221	Physical Science I (General Education)	4.5	MATH 112
SITE 211	Digital Shipbuilding & Technology (Technical Core)	1	None
PSYC 221	Psychology (General Education)	4	None
	QUARTER TOTAL	**13**	

QUARTER 4

Course No.	Course Title	Credits	Prerequisites
MECH 222	Mechanics (Technical Core)	4.5	PHYS 221
PHYS 222	Physical Science II (General Education)	4.5	PHYS 221
BUSI 222	Business Operations and Leadership (Technical Core)	4.5	None
	QUARTER TOTAL	**13.5**	
	WCSC TOTAL	**52.5**	

Trade Related Education Curriculum (TREC)

** Trades courses can be taken at varying times during an apprenticeship.*

Heavy Metal Fabricator

Course No.	Course Title	Credits	Prerequisites
X11 111	Hull Construction I	1.5	None
X15 112	Fundamentals of Fabrication	1.5	None
X15 135	Burning	12	None
X15 137	Small Forming	12	None
X15 139	Large Forming	12	None
	TOTAL	**39**	

Total Credits **91.5**

The Apprentice School
Official Curriculum Guide

Craftsmanship, Scholarship, Leadership

Name: _____ **Start Date:** _____

Associate of Applied Science: Maritime Technology - Insulator

Insulation ensures efficient operation of equipment, minimizes energy loss, reduces or eliminates noise transmission and prevents injury. Insulator apprentices learn to fabricate, manufacture and install various kinds of insulating materials. Apprentices cut and form insulation materials, make molded plastic forms, laminate fiberglass cloth and mix bonding materials such as cement, epoxies, and resins. They also learn to apply these skills through a variety of work experiences encompassing product lines, such as submarines, aircraft carriers, commercial ship construction and repair.

The Commonwealth of Virginia issued certification of completion of apprenticeship is required prior to conferring this degree.

World Class Shipbuilder Curriculum (WCSC)

QUARTER 1

Course No.	Course Title	Credits	Prerequisites
MATH 111	Mathematics I (General Education)	4.5	None
COMM 111	Communications I (General Education)	4.5	None
HIST 111	History (General Education)	4.5	None
	QUARTER TOTAL	**13.5**	

QUARTER 2

Course No.	Course Title	Credits	Prerequisites
MATH 112	Mathematics II (General Education)	4.5	MATH 111
DRFT 111	Drafting (Technical Core)	4.5	None
SHCN 111	Ship Construction I (Technical Core)	3.5	COMM 111
	QUARTER TOTAL	**12.5**	

QUARTER 3

Course No.	Course Title	Credits	Prerequisites
SHCN 222	Ship Construction II (Technical Core)	3.5	SHCN 111
PHYS 221	Physical Science I (General Education)	4.5	MATH 112
SITE 211	Digital Shipbuilding & Technology (Technical Core)	1	None
PSYC 221	Psychology (General Education)	4	None
	QUARTER TOTAL	**13**	

QUARTER 4

Course No.	Course Title	Credits	Prerequisites
MECH 222	Mechanics (Technical Core)	4.5	PHYS 221
PHYS 222	Physical Science II (General Education)	4.5	PHYS 221
BUSI 222	Business Operations and Leadership (Technical Core)	4.5	None
	QUARTER TOTAL	**13.5**	
	WCSC TOTAL	**52.5**	

Trade Related Education Curriculum (TREC)

** Trades courses can be taken at varying times during an apprenticeship.*

Insulator

Course No.	Course Title	Credits	Prerequisites
X33I 111	Theory of Insulation	4.5	None
X33I 112	Blueprint Reading for Insulators	1	None
X33I 135	Sound Damping	12	None
X33I 136	Piping Insulation	10	None
X33I 137	Bulkhead Insulation	10	None
	TOTAL	**37.5**	

Total Credits 90

The Apprentice School
Official Curriculum Guide

Craftsmanship, Scholarship, Leadership

Name: _____ **Start Date:** _____

Associate of Applied Science: Maritime Technology - Machinist

Several core components on naval vessels must be produced from metal with a high degree of accuracy. Machinist apprentices learn to operate all major types of manual and Computer Numerically Controlled (CNC) machine tools in the shipyard's machine shops. Some of the equipment includes: boring mills, lathes and milling machines of all sizes. After apprentices display competency in manual machine tools, they progress to CNC equipment to learn modern processes and programming with CAD/CAM software systems. They work a wide variety of metals to produce brackets, bolts, shafts, bushings, and other machined parts.

The Commonwealth of Virginia issued certification of completion of apprenticeship is required prior to conferring this degree.

World Class Shipbuilder Curriculum (WCSC)

QUARTER 1

Course No.	Course Title	Credits	Prerequisites
MATH 111	Mathematics I (General Education)	4.5	None
COMM 111	Communications I (General Education)	4.5	None
HIST 111	History (General Education)	4.5	None
	QUARTER TOTAL	**13.5**	

QUARTER 2

Course No.	Course Title	Credits	Prerequisites
MATH 112	Mathematics II (General Education)	4.5	MATH 111
DRFT 111	Drafting (Technical Core)	4.5	None
SHCN 111	Ship Construction I (Technical Core)	3.5	COMM 111
	QUARTER TOTAL	**12.5**	

QUARTER 3

Course No.	Course Title	Credits	Prerequisites
SHCN 222	Ship Construction II (Technical Core)	3.5	SHCN 111
PHYS 221	Physical Science I (General Education)	4.5	MATH 112
SITE 211	Digital Shipbuilding & Technology (Technical Core)	1	None
PSYC 221	Psychology (General Education)	4	None
	QUARTER TOTAL	**13**	

QUARTER 4

Course No.	Course Title	Credits	Prerequisites
MECH 222	Mechanics (Technical Core)	4.5	PHYS 221
PHYS 222	Physical Science II (General Education)	4.5	PHYS 221
BUSI 222	Business Operations and Leadership (Technical Core)	4.5	None
	QUARTER TOTAL	**13.5**	
	WCSC TOTAL	**52.5**	

Trade Related Education Curriculum (TREC)

** Trades courses can be taken at varying times during an apprenticeship.*

Machinist

Course No.	Course Title	Credits	Prerequisites
M53 111	Machinist Shop Theory	3	None
M53 125	Machinist Fundamentals	12	None
M53 137	Machinist Practical – Milling	8	M53 125
M53 139	Machinist Practical – Turning	8	M53 125
M53 222	CNC Programming/Lab	6	M53 111
M53 223	Advanced Programming Lab	1	M53 222
	TOTAL	**38**	

Total Credits **90.5**

The Apprentice School
Official Curriculum Guide

Craftsmanship, Scholarship, Leadership

Name: _____ **Start Date:** _____

Associate of Applied Science: Maritime Technology – Maintenance Electrician

The shipyard's numerous facilities require installation, maintenance and repair of all electrical systems and components. Maintenance electrician apprentices learn to provide power for new equipment and lighting. They also learn to maintain and troubleshoot virtually every electrical and electronic component in the shipyard. The work may take apprentices anywhere, from an underground transmission line to the top of a 23- story crane. They will take several theory courses to learn the importance of electrical safety. Work assignments can vary from installing a simple electrical outlet to repairing and maintaining complex numerically controlled equipment.

The Commonwealth of Virginia issued certification of completion of apprenticeship is required prior to conferring this degree.

World Class Shipbuilder Curriculum (WCSC)

QUARTER 1

Course No.	Course Title	Credits	Prerequisites
MATH 111	Mathematics I (General Education)	4.5	None
COMM 111	Communications I (General Education)	4.5	None
HIST 111	History (General Education)	4.5	None
	QUARTER TOTAL	**13.5**	

QUARTER 2

Course No.	Course Title	Credits	Prerequisites
MATH 112	Mathematics II (General Education)	4.5	MATH 111
DRFT 111	Drafting (Technical Core)	4.5	None
SHCN 111	Ship Construction I (Technical Core)	3.5	COMM 111
	QUARTER TOTAL	**12.5**	

QUARTER 3

Course No.	Course Title	Credits	Prerequisites
SHCN 222	Ship Construction II (Technical Core)	3.5	SHCN 111
PHYS 221	Physical Science I (General Education)	4.5	MATH 112
SITE 211	Digital Shipbuilding & Technology (Technical Core)	1	None
PSYC 221	Psychology (General Education)	4	None
	QUARTER TOTAL	**13**	

QUARTER 4

Course No.	Course Title	Credits	Prerequisites
MECH 222	Mechanics (Technical Core)	4.5	PHYS 221
PHYS 222	Physical Science II (General Education)	4.5	PHYS 221
BUSI 222	Business Operations and Leadership (Technical Core)	4.5	None
	QUARTER TOTAL	**13.5**	
	WCSC TOTAL	**52.5**	

Trade Related Education Curriculum (TREC)

** Trades courses can be taken at varying times during an apprenticeship.*

Maintenance Electrician

Course No.	Course Title	Credits	Prerequisites
X31 111	Applied Theory I: DC Concepts	7.5	None
X31 112	Applied Theory II: AC Concepts	7.5	X31 111
O43E 125	Maintenance Electrical Construction	12	None
X31 212	Applied Theory III: Polyphase Systems and Controls	8	X31 112
X31 214	Programmable Logic Controllers	3	X31 212
	TOTAL	**38**	

Total Credits **90.5**

The Apprentice School
Official Curriculum Guide

Craftsmanship, Scholarship, Leadership

Name: _____ **Start Date:** _____

Associate of Applied Science: Maritime Technology – Maintenance Pipefitter

There are piping systems throughout the entire shipyard that serve the facilities with water, gas and air. Maintenance pipefitter apprentices learn to maintain the various piping systems throughout the shipyard's 550- acre facility. Maintaining these piping systems and facilities is critical to shipyard operations. Apprentices in this trade become proficient in many skills and processes, including bending, threading, brazing and welding. They also learn how to overhaul valves and repair piping systems of various materials such as: steel, copper and PVC.

The Commonwealth of Virginia issued certification of completion of apprenticeship is required prior to conferring this degree.

World Class Shipbuilder Curriculum (WCSC)

QUARTER 1

Course No.	Course Title	Credits	Prerequisites
MATH 111	Mathematics I (General Education)	4.5	None
COMM 111	Communications I (General Education)	4.5	None
HIST 111	History (General Education)	4.5	None
	QUARTER TOTAL	**13.5**	

QUARTER 2

Course No.	Course Title	Credits	Prerequisites
MATH 112	Mathematics II (General Education)	4.5	MATH 111
DRFT 111	Drafting (Technical Core)	4.5	None
SHCN 111	Ship Construction I (Technical Core)	3.5	COMM 111
	QUARTER TOTAL	**12.5**	

QUARTER 3

Course No.	Course Title	Credits	Prerequisites
SHCN 222	Ship Construction II (Technical Core)	3.5	SHCN 111
PHYS 221	Physical Science I (General Education)	4.5	MATH 112
SITE 211	Digital Shipbuilding & Technology (Technical Core)	1	None
PSYC 221	Psychology (General Education)	4	None
	QUARTER TOTAL	**13**	

QUARTER 4

Course No.	Course Title	Credits	Prerequisites
MECH 222	Mechanics (Technical Core)	4.5	PHYS 221
PHYS 222	Physical Science II (General Education)	4.5	PHYS 221
BUSI 222	Business Operations and Leadership (Technical Core)	4.5	None
	QUARTER TOTAL	**13.5**	
	WCSC TOTAL	**52.5**	

Trade Related Education Curriculum (TREC)

** Trades courses can be taken at varying times during an apprenticeship.*

Maintenance Pipefitter

Course No.	Course Title	Credits	Prerequisites
X42 111	Introduction to Pipefitting	2	None
X42 113	Blueprint Reading Fundamentals and Procedures	2	X42 111
X42 121	Sketching and Bending Fundamentals	3.5	X42 113
X42 125	Pipefitting Fundamentals	2	None
O43P 140	Piping Facilities	15	X42 125
O43P 141	Shipyard Utilities	14	X42 125
	TOTAL	**38.5**	

Total Credits 91

The Apprentice School
Official Curriculum Guide

Craftsmanship, Scholarship, Leadership

Name: _____ **Start Date:** _____

Associate of Applied Science: Maritime Technology - Millwright

The shipyard is equipped with many cranes, machinery and vehicles that require maintenance. Millwright apprentices install, maintain, repair, and overhaul shipyard machinery. Apprentices learn to operate a number of machine tools including lathes, milling machines and drill presses in manufacturing parts used to repair production equipment. They also inspect and maintain cranes throughout the entire shipyard and repair machinery in the various waterfront shops. Apprentices will work in an automotive shop to repair company vehicles and other transportation equipment.

The Commonwealth of Virginia issued certification of completion of apprenticeship is required prior to conferring this degree.

World Class Shipbuilder Curriculum (WCSC)

QUARTER 1

Course No.	Course Title	Credits	Prerequisites
MATH 111	Mathematics I (General Education)	4.5	None
COMM 111	Communications I (General Education)	4.5	None
HIST 111	History (General Education)	4.5	None
	QUARTER TOTAL	**13.5**	

QUARTER 2

Course No.	Course Title	Credits	Prerequisites
MATH 112	Mathematics II (General Education)	4.5	MATH 111
DRFT 111	Drafting (Technical Core)	4.5	None
SHCN 111	Ship Construction I (Technical Core)	3.5	COMM 111
	QUARTER TOTAL	**12.5**	

QUARTER 3

Course No.	Course Title	Credits	Prerequisites
SHCN 222	Ship Construction II (Technical Core)	3.5	SHCN 111
PHYS 221	Physical Science I (General Education)	4.5	MATH 112
SITE 211	Digital Shipbuilding & Technology (Technical Core)	1	None
PSYC 221	Psychology (General Education)	4	None
	QUARTER TOTAL	**13**	

QUARTER 4

Course No.	Course Title	Credits	Prerequisites
MECH 222	Mechanics (Technical Core)	4.5	PHYS 221
PHYS 222	Physical Science II (General Education)	4.5	PHYS 221
BUSI 222	Business Operations and Leadership (Technical Core)	4.5	None
	QUARTER TOTAL	**13.5**	
	WCSC TOTAL	**52.5**	

Trade Related Education Curriculum (TREC)

** Trades courses can be taken at varying times during an apprenticeship.*

Millwright

Course No.	Course Title	Credits	Prerequisites
M53 111	Machinist Shop Theory	3	None
M53 125	Machinist Fundamentals	12	None
O43M 137	Millwright Practical – Crane Maintenance	10	M53 125
O43M 139	Millwright Practical – Equipment	12	M53 125
O43M 221	Introduction to Hydraulics	2	M53 111
	TOTAL	**39**	

Total Credits **91.5**

The Apprentice School
Official Curriculum Guide

Craftsmanship, Scholarship, Leadership

Name: _____ **Start Date:** _____

Associate of Applied Science: Maritime Technology - Molder

Many components are cast from molten metal because the unique shapes can be obtained easier than machining them from a solid piece. Molder apprentices work in the shipyard's foundry, one of the few foundries in the United States capable of pouring a large variety of ferrous and nonferrous metals. They receive an overview of each foundry operation and learn necessary processes to produce a finished casting from raw materials. Apprentices are exposed to everything from building the mold, pouring the molten metal into the form and cleaning up the castings with grinders to drawing specifications once they have cooled.

The Commonwealth of Virginia issued certification of completion of apprenticeship is required prior to conferring this degree.

World Class Shipbuilder Curriculum (WCSC)

QUARTER 1

Course No.	Course Title	Credits	Prerequisites
MATH 111	Mathematics I (General Education)	4.5	None
COMM 111	Communications I (General Education)	4.5	None
HIST 111	History (General Education)	4.5	None
	QUARTER TOTAL	**13.5**	

QUARTER 2

Course No.	Course Title	Credits	Prerequisites
MATH 112	Mathematics II (General Education)	4.5	MATH 111
DRFT 111	Drafting (Technical Core)	4.5	None
SHCN 111	Ship Construction I (Technical Core)	3.5	COMM 111
	QUARTER TOTAL	**12.5**	

QUARTER 3

Course No.	Course Title	Credits	Prerequisites
SHCN 222	Ship Construction II (Technical Core)	3.5	SHCN 111
PHYS 221	Physical Science I (General Education)	4.5	MATH 112
SITE 211	Digital Shipbuilding & Technology (Technical Core)	1	None
PSYC 221	Psychology (General Education)	4	None
	QUARTER TOTAL	**13**	

QUARTER 4

Course No.	Course Title	Credits	Prerequisites
MECH 222	Mechanics (Technical Core)	4.5	PHYS 221
PHYS 222	Physical Science II (General Education)	4.5	PHYS 221
BUSI 222	Business Operations and Leadership (Technical Core)	4.5	None
	QUARTER TOTAL	**13.5**	
	WCSC TOTAL	**52.5**	

Trade Related Education Curriculum (TREC)

** Trades courses can be taken at varying times during an apprenticeship.*

Molder

Course No.	Course Title	Credits	Prerequisites
A572 111	Foundry Processes	3	None
A572 112	Blueprint Reading for Molders	1.5	None
A572 137	Foundry Molding	12	None
A572 138	Foundry Melting Operations	12	None
A572 139	Foundry Finishing and Inspection	10	None
	TOTAL	**38.5**	

Total Credits 91

The Apprentice School
Official Curriculum Guide

Craftsmanship, Scholarship, Leadership

Name: _____ **Start Date:** _____

Associate of Applied Science: Maritime Technology – Non-Destructive Tester

All critical components on a ship must be tested to verify their integrity to ensure they will uphold to designed stresses. Non-Destructive Tester apprentices operate a variety of equipment which typically involve calibrating equipment, conducting the actual test, evaluating the results and writing an inspection report. They gain experience in radiographic, magnetic particle, liquid penetrant, ultrasonic and eddy current inspection methods. Apprentice training also provides experience in visual inspection, quality, planning, technical applications, quality standards, and codes interpretation.

The Commonwealth of Virginia issued certification of completion of apprenticeship is required prior to conferring this degree.

World Class Shipbuilder Curriculum (WCSC)

QUARTER 1

Course No.	Course Title	Credits	Prerequisites
MATH 111	Mathematics I (General Education)	4.5	None
COMM 111	Communications I (General Education)	4.5	None
HIST 111	History (General Education)	4.5	None
	QUARTER TOTAL	**13.5**	

QUARTER 2

Course No.	Course Title	Credits	Prerequisites
MATH 112	Mathematics II (General Education)	4.5	MATH 111
DRFT 111	Drafting (Technical Core)	4.5	None
SHCN 111	Ship Construction I (Technical Core)	3.5	COMM 111
	QUARTER TOTAL	**12.5**	

QUARTER 3

Course No.	Course Title	Credits	Prerequisites
SHCN 222	Ship Construction II (Technical Core)	3.5	SHCN 111
PHYS 221	Physical Science I (General Education)	4.5	MATH 112
SITE 211	Digital Shipbuilding & Technology (Technical Core)	1	None
PSYC 221	Psychology (General Education)	4	None
	QUARTER TOTAL	**13**	

QUARTER 4

Course No.	Course Title	Credits	Prerequisites
MECH 222	Mechanics (Technical Core)	4.5	PHYS 221
PHYS 222	Physical Science II (General Education)	4.5	PHYS 221
BUSI 222	Business Operations and Leadership (Technical Core)	4.5	None
	QUARTER TOTAL	**13.5**	
	WCSC TOTAL	**52.5**	

Trade Related Education Curriculum (TREC)

** Trades courses can be taken at varying times during an apprenticeship.*

Non-Destructive Tester

Course No.	Course Title	Credits	Prerequisites
X11 111	Hull Construction I	1.5	None
O38 137	Magnetic Particle Inspection	12	None
O38 139	Liquid Penetrant Inspection	14	None
O38 141	Ultrasonic Testing	10	None
	TOTAL	**37.5**	

Total Credits 90

The Apprentice School
Official Curriculum Guide

Craftsmanship, Scholarship, Leadership

Name: _____ **Start Date:** _____

Associate of Applied Science: Maritime Technology – Outside Machinist

Once all mechanical components are manufactured, purchased and obtained, they must be installed on board the ship. Outside machinist apprentices install, repair and test a ship's major machinery and other mechanical components. Many of these systems are responsible for the ships' propulsion, steering and weapons systems. They learn the safe operation of shop machines and hand and power tools to install and test systems on nuclear reactors, turbines, generators, pumps, propellers, rudders, elevators, periscopes and armaments. Apprentices also learn the function and operation of motors, pumps and valves.

The Commonwealth of Virginia issued certification of completion of apprenticeship is required prior to conferring this degree.

World Class Shipbuilder Curriculum (WCSC)

QUARTER 1

Course No.	Course Title	Credits	Prerequisites
MATH 111	Mathematics I (General Education)	4.5	None
COMM 111	Communications I (General Education)	4.5	None
HIST 111	History (General Education)	4.5	None
	QUARTER TOTAL	**13.5**	

QUARTER 2

Course No.	Course Title	Credits	Prerequisites
MATH 112	Mathematics II (General Education)	4.5	MATH 111
DRFT 111	Drafting (Technical Core)	4.5	None
SHCN 111	Ship Construction I (Technical Core)	3.5	COMM 111
	QUARTER TOTAL	**12.5**	

QUARTER 3

Course No.	Course Title	Credits	Prerequisites
SHCN 222	Ship Construction II (Technical Core)	3.5	SHCN 111
PHYS 221	Physical Science I (General Education)	4.5	MATH 112
SITE 211	Digital Shipbuilding & Technology (Technical Core)	1	None
PSYC 221	Psychology (General Education)	4	None
	QUARTER TOTAL	**13**	

QUARTER 4

Course No.	Course Title	Credits	Prerequisites
MECH 222	Mechanics (Technical Core)	4.5	PHYS 221
PHYS 222	Physical Science II (General Education)	4.5	PHYS 221
BUSI 222	Business Operations and Leadership (Technical Core)	4.5	None
	QUARTER TOTAL	**13.5**	
	WCSC TOTAL	**52.5**	

Trade Related Education Curriculum (TREC)

** Trades courses can be taken at varying times during an apprenticeship.*

Outside Machinist

Course No.	Course Title	Credits	Prerequisites
X43 111	Machinery Installation Theory	4	None
X43 125	Outside Machinist Fundamentals	8	None
X43 137	Machinery Installation – Submarines	10	X43 125
X43 139	Machinery Installation – Surface Ships	12	X43 125
X43 212	Ships Systems	4	X43 111
	TOTAL	**38**	

Total Credits **90.5**

The Apprentice School
Official Curriculum Guide

Craftsmanship, Scholarship, Leadership

Name: _____ **Start Date:** _____

Associate of Applied Science: Maritime Technology - Patternmaker

Foundry castings are dependent on the wooden pattern made in the shape of the finished part. Patternmaker apprentices learn the fundamentals of wood and tool selection and shaping, forming and joining techniques. They lay out and construct simple patterns before training progresses to more complex jobs, including collapsible, unusually shaped and large patterns. The quality of the casting weighs heavily on the quality of the pattern. Apprentices learn a variety of machines including: wood lathes, jointers, routers, planers and saws. They also will be exposed to CAD/CAM software systems that control modern processes and toolpaths.

The Commonwealth of Virginia issued certification of completion of apprenticeship is required prior to conferring this degree.

World Class Shipbuilder Curriculum (WCSC)

QUARTER 1

Course No.	Course Title	Credits	Prerequisites
MATH 111	Mathematics I (General Education)	4.5	None
COMM 111	Communications I (General Education)	4.5	None
HIST 111	History (General Education)	4.5	None
	QUARTER TOTAL	**13.5**	

QUARTER 2

Course No.	Course Title	Credits	Prerequisites
MATH 112	Mathematics II (General Education)	4.5	MATH 111
DRFT 111	Drafting (Technical Core)	4.5	None
SHCN 111	Ship Construction I (Technical Core)	3.5	COMM 111
	QUARTER TOTAL	**12.5**	

QUARTER 3

Course No.	Course Title	Credits	Prerequisites
SHCN 222	Ship Construction II (Technical Core)	3.5	SHCN 111
PHYS 221	Physical Science I (General Education)	4.5	MATH 112
SITE 211	Digital Shipbuilding & Technology (Technical Core)	1	None
PSYC 221	Psychology (General Education)	4	None
	QUARTER TOTAL	**13**	

QUARTER 4

Course No.	Course Title	Credits	Prerequisites
MECH 222	Mechanics (Technical Core)	4.5	PHYS 221
PHYS 222	Physical Science II (General Education)	4.5	PHYS 221
BUSI 222	Business Operations and Leadership (Technical Core)	4.5	None
	QUARTER TOTAL	**13.5**	
	WCSC TOTAL	**52.5**	

Trade Related Education Curriculum (TREC)

** Trades courses can be taken at varying times during an apprenticeship.*

Patternmaker

Course No.	Course Title	Credits	Prerequisites
M71 111	Patternmaker's Theory	1.5	None
A572 111	Foundry Processes	3	None
A572 112	Blueprint Reading for Molders	1.5	None
M71 136	Woodworking	10	None
M71 137	Pattern Construction	12	None
M71 139	Foundry Operations	10	None
	TOTAL	**38**	

Total Credits **90.5**

The Apprentice School
Official Curriculum Guide

Craftsmanship, Scholarship, Leadership

Name: _____ **Start Date:** _____

Associate of Applied Science: Maritime Technology - Pipefitter

A ship's pipes carry vital fluids and gases necessary for the ship and its crew to function. Pipefitter apprentices learn how to install, inspect, and test the many piping systems on board aircraft carriers and submarines. They go through pipe theory, learn how to tack weld and braze and learn the basic skills necessary to function as a pipefitter. Pipefitter apprentices help to put the complex piping network together by cutting, bending, prepping and hanging piping runs on ships. They are required to install valves and make up flanges where required by the drawings. Testing crews operate and inspect the systems for leaks or flaws.

The Commonwealth of Virginia issued certification of completion of apprenticeship is required prior to conferring this degree.

World Class Shipbuilder Curriculum (WCSC)

QUARTER 1

Course No.	Course Title	Credits	Prerequisites
MATH 111	Mathematics I (General Education)	4.5	None
COMM 111	Communications I (General Education)	4.5	None
HIST 111	History (General Education)	4.5	None
	QUARTER TOTAL	**13.5**	

QUARTER 2

Course No.	Course Title	Credits	Prerequisites
MATH 112	Mathematics II (General Education)	4.5	MATH 111
DRFT 111	Drafting (Technical Core)	4.5	None
SHCN 111	Ship Construction I (Technical Core)	3.5	COMM 111
	QUARTER TOTAL	**12.5**	

QUARTER 3

Course No.	Course Title	Credits	Prerequisites
SHCN 222	Ship Construction II (Technical Core)	3.5	SHCN 111
PHYS 221	Physical Science I (General Education)	4.5	MATH 112
SITE 211	Digital Shipbuilding & Technology (Technical Core)	1	None
PSYC 221	Psychology (General Education)	4	None
	QUARTER TOTAL	**13**	

QUARTER 4

Course No.	Course Title	Credits	Prerequisites
MECH 222	Mechanics (Technical Core)	4.5	PHYS 221
PHYS 222	Physical Science II (General Education)	4.5	PHYS 221
BUSI 222	Business Operations and Leadership (Technical Core)	4.5	None
	QUARTER TOTAL	**13.5**	
	WCSC TOTAL	**52.5**	

Trade Related Education Curriculum (TREC)

** Trades courses can be taken at varying times during an apprenticeship.*

Pipefitter

Course No.	Course Title	Credits	Prerequisites
X42 111	Introduction to Pipefitting	2	None
X42 113	Blueprint Reading Fundamentals and Procedures	2	X42 111
X42 121	Sketching and Bending Fundamentals	3.5	X42 113
X42 125	Pipefitting Fundamentals	2	None
X42 137	Pipefitting – Surface Ships	14	X42 125
X42 139	Pipefitting - Submarines	14	X42 125
	TOTAL	**37.5**	

Total Credits **90.0**

The Apprentice School
Official Curriculum Guide

Craftsmanship, Scholarship, Leadership

Name: _____ **Start Date:** _____

Associate of Applied Science: Maritime Technology - Rigger

There is always an apparent need to move material, equipment, and machinery to support all other trades. Rigger apprentices learn basic rigging fundamentals, how to properly hook up loads and how to signal to crane operators for movement. In addition, they learn to fabricate wire rope pendants for rigging aboard ships, install temporary services and work in the tool room. Apprentices are a part of large ship section lifts, blocking and shoring that supports the initial ship's construction, and they erect and assemble a variety of staging platforms to support the needs for the trades to safely accomplish their jobs.

The Commonwealth of Virginia issued certification of completion of apprenticeship is required prior to conferring this degree.

World Class Shipbuilder Curriculum (WCSC)

QUARTER 1

Course No.	Course Title	Credits	Prerequisites
MATH 111	Mathematics I (General Education)	4.5	None
COMM 111	Communications I (General Education)	4.5	None
HIST 111	History (General Education)	4.5	None
	QUARTER TOTAL	**13.5**	

QUARTER 2

Course No.	Course Title	Credits	Prerequisites
MATH 112	Mathematics II (General Education)	4.5	MATH 111
DRFT 111	Drafting (Technical Core)	4.5	None
SHCN 111	Ship Construction I (Technical Core)	3.5	COMM 111
	QUARTER TOTAL	**12.5**	

QUARTER 3

Course No.	Course Title	Credits	Prerequisites
SHCN 222	Ship Construction II (Technical Core)	3.5	SHCN 111
PHYS 221	Physical Science I (General Education)	4.5	MATH 112
SITE 211	Digital Shipbuilding & Technology (Technical Core)	1	None
PSYC 221	Psychology (General Education)	4	None
	QUARTER TOTAL	**13**	

QUARTER 4

Course No.	Course Title	Credits	Prerequisites
MECH 222	Mechanics (Technical Core)	4.5	PHYS 221
PHYS 222	Physical Science II (General Education)	4.5	PHYS 221
BUSI 222	Business Operations and Leadership (Technical Core)	4.5	None
	QUARTER TOTAL	**13.5**	
	WCSC TOTAL	**52.5**	

Trade Related Education Curriculum (TREC)

** Trades courses can be taken at varying times during an apprenticeship.*

Rigger

Course No.	Course Title	Credits	Prerequisites
X36 135	Stagebuilding and Safety	8	None
X36 137	Lifting and Handling - Ship	10	None
X36 139	Lifting and Handling - Cranes	12	None
X36 211	Stagebuilding, Blocking, and Shoring	3	None
X36 212	Lifting and Handling Equipment	3	None
X36 213	Mooring and Ventilation	3	None
	TOTAL	**39**	

Total Credits **91.5**

The Apprentice School
Official Curriculum Guide

Craftsmanship, Scholarship, Leadership

Name: _____ **Start Date:** _____

Associate of Applied Science: Maritime Technology – Sheet Metal Worker

The majority of a ship is fabricated from large pieces of steel, but a lot of the interior components are assembled from light gauge metal. Sheet metal apprentices learn to construct items, such as lockers, foundations, stowage bins and racks, workbenches, galley furniture, bulkheads, terminals, and ventilation duct work. They install all of these and many additional items, such as ventilation equipment, furniture, doors, ladders, handrails, and trim work on board ships. Additionally, apprentices learn to weld, develop patterns, interpret a wide range of trade drawings and use layout techniques for fabricating and installing a variety of sheet metal work.

The Commonwealth of Virginia issued certification of completion of apprenticeship is required prior to conferring this degree.

World Class Shipbuilder Curriculum (WCSC)

QUARTER 1

Course No.	Course Title	Credits	Prerequisites
MATH 111	Mathematics I (General Education)	4.5	None
COMM 111	Communications I (General Education)	4.5	None
HIST 111	History (General Education)	4.5	None
	QUARTER TOTAL	**13.5**	

QUARTER 2

Course No.	Course Title	Credits	Prerequisites
MATH 112	Mathematics II (General Education)	4.5	MATH 111
DRFT 111	Drafting (Technical Core)	4.5	None
SHCN 111	Ship Construction I (Technical Core)	3.5	COMM 111
	QUARTER TOTAL	**12.5**	

QUARTER 3

Course No.	Course Title	Credits	Prerequisites
SHCN 222	Ship Construction II (Technical Core)	3.5	SHCN 111
PHYS 221	Physical Science I (General Education)	4.5	MATH 112
SITE 211	Digital Shipbuilding & Technology (Technical Core)	1	None
PSYC 221	Psychology (General Education)	4	None
	QUARTER TOTAL	**13**	

QUARTER 4

Course No.	Course Title	Credits	Prerequisites
MECH 222	Mechanics (Technical Core)	4.5	PHYS 221
PHYS 222	Physical Science II (General Education)	4.5	PHYS 221
BUSI 222	Business Operations and Leadership (Technical Core)	4.5	None
	QUARTER TOTAL	**13.5**	
	WCSC TOTAL	**52.5**	

Trade Related Education Curriculum (TREC)

** Trades courses can be taken at varying times during an apprenticeship.*

Sheet Metal Worker

Course No.	Course Title	Credits	Prerequisites
X32 111	Sheet Metal Print Reading	4.5	None
X32 112	Materials and Machine Processes Theory	2	X32 111
X32 113	Sheet Metal Layout Theory	2	X32 112
X32 125	Fundamentals of Sheet Metal	4	None
X32 135	Sheet Metal Shop Work	6	X32 125
X32 137	Ventilation Installation	10	X32 125
X32 139	Equipment Installation	10	X32 137
	TOTAL	**38.5**	

Total Credits 91

The Apprentice School
Official Curriculum Guide

Craftsmanship, Scholarship, Leadership

Name: _____ **Start Date:** _____

Associate of Applied Science: Maritime Technology - Shipfitter

The ship's internal and external frame is constructed of large pieces of plate and then fitted with decks and bulkheads. Shipfitter apprentices contribute to all structural phases of the ship's hull construction including fabrication, assembly, and alignment of the ships structures. They position and fit steel together so that the pieces can be permanently welded in place. Apprentices learn to tack weld to prevent their assemblies from moving. They also install other structural components, such as hatches, doors and foundations to complete the steel work of the ship and gain experience in submarine and aircraft carrier construction and aircraft carrier overhaul.

The Commonwealth of Virginia issued certification of completion of apprenticeship is required prior to conferring this degree.

World Class Shipbuilder Curriculum (WCSC)

QUARTER 1

Course No.	Course Title	Credits	Prerequisites
MATH 111	Mathematics I (General Education)	4.5	None
COMM 111	Communications I (General Education)	4.5	None
HIST 111	History (General Education)	4.5	None
	QUARTER TOTAL	**13.5**	

QUARTER 2

Course No.	Course Title	Credits	Prerequisites
MATH 112	Mathematics II (General Education)	4.5	MATH 111
DRFT 111	Drafting (Technical Core)	4.5	None
SHCN 111	Ship Construction I (Technical Core)	3.5	COMM 111
	QUARTER TOTAL	**12.5**	

QUARTER 3

Course No.	Course Title	Credits	Prerequisites
SHCN 222	Ship Construction II (Technical Core)	3.5	SHCN 111
PHYS 221	Physical Science I (General Education)	4.5	MATH 112
SITE 211	Digital Shipbuilding & Technology (Technical Core)	1	None
PSYC 221	Psychology (General Education)	4	None
	QUARTER TOTAL	**13**	

QUARTER 4

Course No.	Course Title	Credits	Prerequisites
MECH 222	Mechanics (Technical Core)	4.5	PHYS 221
PHYS 222	Physical Science II (General Education)	4.5	PHYS 221
BUSI 222	Business Operations and Leadership (Technical Core)	4.5	None
	QUARTER TOTAL	**13.5**	
	WCSC TOTAL	**52.5**	

Trade Related Education Curriculum (TREC)

** Trades courses can be taken at varying times during an apprenticeship.*

Shipfitter

Course No.	Course Title	Credits	Prerequisites
X11 111	Hull Construction I	1.5	None
X11 112	Hull Construction II CVN Drawings and Work Packages	1	X11 111
X11 113	Hull Construction II VCS Drawings and Work Packages	1	X11 111
X11 137	Shipfitting Practical – Shops	10	None
X11 138	Shipfitting Practical – Submarines	12	None
X11 139	Shipfitting Practical – Surface Ships	12	None
	TOTAL	**37.5**	

Total Credits 90

The Apprentice School
Official Curriculum Guide

Craftsmanship, Scholarship, Leadership

Name: _____ **Start Date:** _____

Associate of Applied Science: Maritime Technology - Welder

Ships today are joined by weld in all areas, such as hull, bulkheads, decks, foundations, piping, and machinery. Welder apprentices will learn a range of manual, semiautomatic, and automatic welding processes in the shipyard's welding school. They learn how to check for metal preparation and how to interpret the many different types of weld symbols. Apprentices use a wide range of metals and welding processes to perform structural and pipe welds in all phases of submarine and aircraft carrier construction and overhaul. Welder apprentices also learn to safely use torches to preheat areas before they are welded.

The Commonwealth of Virginia issued certification of completion of apprenticeship is required prior to conferring this degree.

World Class Shipbuilder Curriculum (WCSC)

QUARTER 1

Course No.	Course Title	Credits	Prerequisites
MATH 111	Mathematics I (General Education)	4.5	None
COMM 111	Communications I (General Education)	4.5	None
HIST 111	History (General Education)	4.5	None
	QUARTER TOTAL	**13.5**	

QUARTER 2

Course No.	Course Title	Credits	Prerequisites
MATH 112	Mathematics II (General Education)	4.5	MATH 111
DRFT 111	Drafting (Technical Core)	4.5	None
SHCN 111	Ship Construction I (Technical Core)	3.5	COMM 111
	QUARTER TOTAL	**12.5**	

QUARTER 3

Course No.	Course Title	Credits	Prerequisites
SHCN 222	Ship Construction II (Technical Core)	3.5	SHCN 111
PHYS 221	Physical Science I (General Education)	4.5	MATH 112
SITE 211	Digital Shipbuilding & Technology (Technical Core)	1	None
PSYC 221	Psychology (General Education)	4	None
	QUARTER TOTAL	**13**	

QUARTER 4

Course No.	Course Title	Credits	Prerequisites
MECH 222	Mechanics (Technical Core)	4.5	PHYS 221
PHYS 222	Physical Science II (General Education)	4.5	PHYS 221
BUSI 222	Business Operations and Leadership (Technical Core)	4.5	None
	QUARTER TOTAL	**13.5**	
	WCSC TOTAL	**52.5**	

Trade Related Education Curriculum (TREC)

** Trades courses can be taken at varying times during an apprenticeship.*

Welder

Course No.	Course Title	Credits	Prerequisites
X11 111	Hull Construction I	1.5	None
X18 112	Welding Fundamentals: SMAW and GMAW	1	None
X18 137	Welding – Submarines	17	None
X18 139	Welding – Surface Ships	17	None
X18 212	Introduction to Non-Destructive Testing	1	None
	TOTAL	**37.5**	

Total Credits 90

The Apprentice School
Official Curriculum Guide

Craftsmanship, Scholarship, Leadership

Name: _____ **Start Date:** _____

Associate of Applied Science: Maritime Technology – Welding Equipment Repairer

The shipyard maintains welding equipment of all forms and sizes. Welding equipment repair apprentices receive training on the electrical system that provides power to the welding equipment before they move into learning to test, troubleshoot, repair, and maintain welding and burning equipment. As part of the training, apprentices are required to complete an extensive series of electrical theory courses to complement the mechanical and electronic on-the-job training needed when servicing a wide range of welding and burning equipment. Their training includes shop maintenance, as well as service calls to various areas in the yard and onboard ship.

The Commonwealth of Virginia issued certification of completion of apprenticeship is required prior to conferring this degree.

World Class Shipbuilder Curriculum (WCSC)

QUARTER 1

Course No.	Course Title	Credits	Prerequisites
MATH 111	Mathematics I (General Education)	4.5	None
COMM 111	Communications I (General Education)	4.5	None
HIST 111	History (General Education)	4.5	None
	QUARTER TOTAL	**13.5**	

QUARTER 2

Course No.	Course Title	Credits	Prerequisites
MATH 112	Mathematics II (General Education)	4.5	MATH 111
DRFT 111	Drafting (Technical Core)	4.5	None
SHCN 111	Ship Construction I (Technical Core)	3.5	COMM 111
	QUARTER TOTAL	**12.5**	

QUARTER 3

Course No.	Course Title	Credits	Prerequisites
SHCN 222	Ship Construction II (Technical Core)	3.5	SHCN 111
PHYS 221	Physical Science I (General Education)	4.5	MATH 112
SITE 211	Digital Shipbuilding & Technology (Technical Core)	1	None
PSYC 221	Psychology (General Education)	4	None
	QUARTER TOTAL	**13**	

QUARTER 4

Course No.	Course Title	Credits	Prerequisites
MECH 222	Mechanics (Technical Core)	4.5	PHYS 221
PHYS 222	Physical Science II (General Education)	4.5	PHYS 221
BUSI 222	Business Operations and Leadership (Technical Core)	4.5	None
	QUARTER TOTAL	**13.5**	
	WCSC TOTAL	**52.5**	

Trade Related Education Curriculum (TREC)

** Trades courses can be taken at varying times during an apprenticeship.*

Welding Equipment Repairer

Course No.	Course Title	Credits	Prerequisites
X31 111	Applied Theory I: DC Concepts	7.5	None
X31 112	Applied Theory II: AC Concepts	7.5	X31 111
O43W 142	Welding Equipment Repair	12	None
X31 212	Applied Theory III: Polyphase Systems and Controls	8	X31 112
X31 214	Programmable Logic Controllers	3	X31 212
	TOTAL	**38**	

Total Credits **90.5**

The Apprentice School
Official Curriculum Guide

Craftsmanship, Scholarship, Leadership

Name: _____ **Start Date:** _____

Associate of Applied Science: Maritime Technology – Cost Estimator

Cost Estimators perform an important role within the Contracts and Pricing section of the Business Management organization. Cost Estimators develop material and man-hour estimates, analyze and compare cost information for proposal variances, project funding progress, and compile estimate documentation to support contract negotiations. Estimating apprentices will evaluate customer requirement documents, participate in job scope development and budget distribution, assist with planning workflow for trades departments, and analyze performance to budget.

The Commonwealth of Virginia issued certification of completion of apprenticeship is required prior to conferring this degree.

World Class Shipbuilder Curriculum (WCSC)

QUARTER 1

Course No.	Course Title	Credits	Prerequisites
MATH 111	Mathematics I (General Education)	4.5	None
COMM 111	Communications I (General Education)	4.5	None
HIST 111	History (General Education)	4.5	None
	QUARTER TOTAL	**13.5**	

QUARTER 2

Course No.	Course Title	Credits	Prerequisites
MATH 112	Mathematics II (General Education)	4.5	MATH 111
DRFT 111	Drafting (Technical Core)	4.5	None
SHCN 111	Ship Construction I (Technical Core)	3.5	COMM 111
	QUARTER TOTAL	**12.5**	

QUARTER 3

Course No.	Course Title	Credits	Prerequisites
SHCN 222	Ship Construction II (Technical Core)	3.5	SHCN 111
PHYS 221	Physical Science I (General Education)	4.5	MATH 112
SITE 211	Digital Shipbuilding & Technology (Technical Core)	1	None
PSYC 221	Psychology (General Education)	4	None
	QUARTER TOTAL	**13**	

QUARTER 4

Course No.	Course Title	Credits	Prerequisites
MECH 222	Mechanics (Technical Core)	4.5	PHYS 221
PHYS 222	Physical Science II (General Education)	4.5	PHYS 221
BUSI 222	Business Operations and Leadership (Technical Core)	4.5	None
	QUARTER TOTAL	**13.5**	
	WCSC TOTAL	**52.5**	

Trade Related Education Curriculum (TREC)

** Trades courses can be taken at varying times during an apprenticeship.*

Cost Estimator

Course No.	Course Title	Credits	Prerequisites
X06C 111	Fundamentals of Cost Estimation	10	None
X06C 137	Cost Estimation – Initial Proposals	14	X06C 111
X06C 139	Cost Estimation – Change Proposals	14	X06C 111
	TOTAL	**38**	

Total Credits **90.5**

The Apprentice School
Official Curriculum Guide

Craftsmanship, Scholarship, Leadership

Name: _____ **Start Date:** _____

Associate of Applied Science: Maritime Technology – Marine Designer

Apprentices selected for this program will prepare a variety of engineering documents including drawings, liaison and discrepancy reports. Students will utilize PC based design software including computer aided drafting and specification/technical libraries. Design students will take courses specifically developed for the Marine Design apprenticeship including computer aided design and parametric solid modeling.

The Commonwealth of Virginia issued certification of completion of apprenticeship is required prior to conferring this degree.

World Class Shipbuilder Curriculum (WCSC)

QUARTER 1

Course No.	Course Title	Credits	Prerequisites
MATH 111	Mathematics I (General Education)	4.5	None
COMM 111	Communications I (General Education)	4.5	None
HIST 111	History (General Education)	4.5	None
	QUARTER TOTAL	**13.5**	

QUARTER 2

Course No.	Course Title	Credits	Prerequisites
MATH 112	Mathematics II (General Education)	4.5	MATH 111
DRFT 111	Drafting (Technical Core)	4.5	None
SHCN 111	Ship Construction I (Technical Core)	3.5	COMM 111
	QUARTER TOTAL	**12.5**	

QUARTER 3

Course No.	Course Title	Credits	Prerequisites
SHCN 222	Ship Construction II (Technical Core)	3.5	SHCN 111
PHYS 221	Physical Science I (General Education)	4.5	MATH 112
SITE 211	Digital Shipbuilding & Technology (Technical Core)	1	None
PSYC 221	Psychology (General Education)	4	None
	QUARTER TOTAL	**13**	

QUARTER 4

Course No.	Course Title	Credits	Prerequisites
MECH 222	Mechanics (Technical Core)	4.5	PHYS 221
PHYS 222	Physical Science II (General Education)	4.5	PHYS 221
BUSI 222	Business Operations and Leadership (Technical Core)	4.5	None
	QUARTER TOTAL	**13.5**	
	WCSC TOTAL	**52.5**	

Trade Related Education Curriculum (TREC)

** Trades courses can be taken at varying times during an apprenticeship.*

Marine Designer

Course No.	Course Title	Credits	Prerequisites
E06 125	Marine Design Fundamentals	14	None
E06 137	Marine Design – Submarines	12	E06 125
E06 139	Marine Design – Surface Ships	12	E06 125
	TOTAL	**38**	

Total Credits **90.5**

The Apprentice School
Official Curriculum Guide

Craftsmanship, Scholarship, Leadership

Name: _____ **Start Date:** _____

Associate of Applied Science: Maritime Technology – Metrology Technician

Apprentices selected for this program will perform comprehensive industrial measurement surveys of the ship and in-process manufactured structures and components. Metrology technician apprentices will utilize industrial measurement equipment for precision setting, alignment, and calibration of structures, weapon systems, machinery, and propulsion systems. Metrology technology apprentices also will develop accuracy control plans to predict and reduce the variability of fabricated, machined, and assembled products through the interim stages of the shipbuilding and manufacturing process.

The Commonwealth of Virginia issued certification of completion of apprenticeship is required prior to conferring this degree.

World Class Shipbuilder Curriculum (WCSC)

QUARTER 1

Course No.	Course Title	Credits	Prerequisites
MATH 111	Mathematics I (General Education)	4.5	None
COMM 111	Communications I (General Education)	4.5	None
HIST 111	History (General Education)	4.5	None
	QUARTER TOTAL	**13.5**	

QUARTER 2

Course No.	Course Title	Credits	Prerequisites
MATH 112	Mathematics II (General Education)	4.5	MATH 111
DRFT 111	Drafting (Technical Core)	4.5	None
SHCN 111	Ship Construction I (Technical Core)	3.5	COMM 111
	QUARTER TOTAL	**12.5**	

QUARTER 3

Course No.	Course Title	Credits	Prerequisites
SHCN 222	Ship Construction II (Technical Core)	3.5	SHCN 111
PHYS 221	Physical Science I (General Education)	4.5	MATH 112
SITE 211	Digital Shipbuilding & Technology (Technical Core)	1	None
PSYC 221	Psychology (General Education)	4	None
	QUARTER TOTAL	**13**	

QUARTER 4

Course No.	Course Title	Credits	Prerequisites
MECH 222	Mechanics (Technical Core)	4.5	PHYS 221
PHYS 222	Physical Science II (General Education)	4.5	PHYS 221
BUSI 222	Business Operations and Leadership (Technical Core)	4.5	None
	QUARTER TOTAL	**13.5**	
	WCSC TOTAL	**52.5**	

Trade Related Education Curriculum (TREC)

** Trades courses can be taken at varying times during an apprenticeship.*

Metrology Technician

Course No.	Course Title	Credits	Prerequisites
O68 111	Industrial Measurement - Instrumentation	5.5	None
O68 125	Metrology Fundamentals	12	None
O68 137	Metrology Technician Practical – Submarines	10	O68 111
O68 139	Metrology Technician Practical – Surface Ships	10	O68 111
	TOTAL	**37.5**	

Total Credits 90

The Apprentice School
Official Curriculum Guide

Craftsmanship, Scholarship, Leadership

Name: _____ **Start Date:** _____

Associate of Applied Science: Maritime Technology – Nuclear Test Technician

Nuclear Test Technicians (NTTs) perform an important role in the new construction and overhaul of naval nuclear ships. The NTT functions as the on-site representative of the Shift Test Engineer (STE) to oversee all elements of reactor plant testing, mechanical and electrical, as well as to coordinate testing with Trades, Inspection, Radiological Control, and Navy personnel. NTT apprentices participate in a three-year rotation plan that provides a variety of experience across various shipboard platforms as well as in procedure writing, planning, technical support and nuclear engineering training groups. NTT apprentices complete the program in an excellent position to enter the STE Qualification Program.

The Commonwealth of Virginia issued certification of completion of apprenticeship is required prior to conferring this degree.

World Class Shipbuilder Curriculum (WCSC)

QUARTER 1

Course No.	Course Title	Credits	Prerequisites
MATH 111	Mathematics I (General Education)	4.5	None
COMM 111	Communications I (General Education)	4.5	None
HIST 111	History (General Education)	4.5	None
	QUARTER TOTAL	**13.5**	

QUARTER 2

Course No.	Course Title	Credits	Prerequisites
MATH 112	Mathematics II (General Education)	4.5	MATH 111
DRFT 111	Drafting (Technical Core)	4.5	None
SHCN 111	Ship Construction I (Technical Core)	3.5	COMM 111
	QUARTER TOTAL	**12.5**	

QUARTER 3

Course No.	Course Title	Credits	Prerequisites
SHCN 222	Ship Construction II (Technical Core)	3.5	SHCN 111
PHYS 221	Physical Science I (General Education)	4.5	MATH 112
SITE 211	Digital Shipbuilding & Technology (Technical Core)	1	None
PSYC 221	Psychology (General Education)	4	None
	QUARTER TOTAL	**13**	

QUARTER 4

Course No.	Course Title	Credits	Prerequisites
MECH 222	Mechanics (Technical Core)	4.5	PHYS 221
PHYS 222	Physical Science II (General Education)	4.5	PHYS 221
BUSI 222	Business Operations and Leadership (Technical Core)	4.5	None
	QUARTER TOTAL	**13.5**	
	WCSC TOTAL	**52.5**	

Trade Related Education Curriculum (TREC)

** Trades courses can be taken at varying times during an apprenticeship.*

Nuclear Test Technician

Course No.	Course Title	Credits	Prerequisites
E06T 111	Nuclear Test Technician Fundamentals	10	None
E06T 137	Nuclear Testing and Work Control – Submarines	14	E06T 111
E06T 139	Nuclear Testing and Work Control – Surface Ships	14	E06T 111
	TOTAL	**38**	

Total Credits **90.5**

The Apprentice School
Official Curriculum Guide

Craftsmanship, Scholarship, Leadership

Name: _____ **Start Date:** _____

Associate of Applied Science: Maritime Technology – Production Planner

Apprentices selected for this program will become proficient in the use of various computer systems that are used for planning and controlling work on various product lines. They will rotate through related work areas to become experienced in program planning and scheduling, work breakdown structure, operational planning, and shop floor planning.

The Commonwealth of Virginia issued certification of completion of apprenticeship is required prior to conferring this degree.

World Class Shipbuilder Curriculum (WCSC)

QUARTER 1

Course No.	Course Title	Credits	Prerequisites
MATH 111	Mathematics I (General Education)	4.5	None
COMM 111	Communications I (General Education)	4.5	None
HIST 111	History (General Education)	4.5	None
	QUARTER TOTAL	**13.5**	

QUARTER 2

Course No.	Course Title	Credits	Prerequisites
MATH 112	Mathematics II (General Education)	4.5	MATH 111
DRFT 111	Drafting (Technical Core)	4.5	None
SHCN 111	Ship Construction I (Technical Core)	3.5	COMM 111
	QUARTER TOTAL	**12.5**	

QUARTER 3

Course No.	Course Title	Credits	Prerequisites
SHCN 222	Ship Construction II (Technical Core)	3.5	SHCN 111
PHYS 221	Physical Science I (General Education)	4.5	MATH 112
SITE 211	Digital Shipbuilding & Technology (Technical Core)	1	None
PSYC 221	Psychology (General Education)	4	None
	QUARTER TOTAL	**13**	

QUARTER 4

Course No.	Course Title	Credits	Prerequisites
MECH 222	Mechanics (Technical Core)	4.5	PHYS 221
PHYS 222	Physical Science II (General Education)	4.5	PHYS 221
BUSI 222	Business Operations and Leadership (Technical Core)	4.5	None
	QUARTER TOTAL	**13.5**	
	WCSC TOTAL	**52.5**	

Trade Related Education Curriculum (TREC)

** Trades courses can be taken at varying times during an apprenticeship.*

Production Planner

Course No.	Course Title	Credits	Prerequisites
X06P 135	Production Planning – Scheduling	14	None
X06P 137	Production Planning – Build Management	16	None
X06P 139	Production Planning – Production Control	8	None
	TOTAL	**38**	

Total Credits **90.5**

The Apprentice School
Official Curriculum Guide

Craftsmanship, Scholarship, Leadership

Name: _____ **Start Date:** _____

Associate of Applied Science: Maritime Technology – Supply Chain Specialist

The Supply Chain Specialist apprentice will be developing and managing purchase orders as well as building relationships with suppliers for both Navy contract work and purchasing for various areas in the company (Operations, Facilities and Maintenance, Construction, Manufacturing, etc.). Apprentices will also gain experience in the compliance office focusing on Purchasing, Property and Material Management and Accounting Systems. Apprentices will participate in the storage and movement of material, and utilize the practices, procedures and requirements associated with material management. This experience is gained by job rotations in various shipyard warehouses, storage facilities and working with the company's transportation department.

The Commonwealth of Virginia issued certification of completion of apprenticeship is required prior to conferring this degree.

World Class Shipbuilder Curriculum (WCSC)

QUARTER 1

Course No.	Course Title	Credits	Prerequisites
MATH 111	Mathematics I (General Education)	4.5	None
COMM 111	Communications I (General Education)	4.5	None
HIST 111	History (General Education)	4.5	None
	QUARTER TOTAL	**13.5**	

QUARTER 2

Course No.	Course Title	Credits	Prerequisites
MATH 112	Mathematics II (General Education)	4.5	MATH 111
DRFT 111	Drafting (Technical Core)	4.5	None
SHCN 111	Ship Construction I (Technical Core)	3.5	COMM 111
	QUARTER TOTAL	**12.5**	

QUARTER 3

Course No.	Course Title	Credits	Prerequisites
SHCN 222	Ship Construction II (Technical Core)	3.5	SHCN 111
PHYS 221	Physical Science I (General Education)	4.5	MATH 112
SITE 211	Digital Shipbuilding & Technology (Technical Core)	1	None
PSYC 221	Psychology (General Education)	4	None
	QUARTER TOTAL	**13**	

QUARTER 4

Course No.	Course Title	Credits	Prerequisites
MECH 222	Mechanics (Technical Core)	4.5	PHYS 221
PHYS 222	Physical Science II (General Education)	4.5	PHYS 221
BUSI 222	Business Operations and Leadership (General Education)	4.5	None
	QUARTER TOTAL	**13.5**	
	WCSC TOTAL	**52.5**	

Trade Related Education Curriculum (TREC)

** Trades courses can be taken at varying times during an apprenticeship.*

Supply Chain Specialist

Course No.	Course Title	Credits	Prerequisites
X06S 111	Fundamentals of Supply Chain Management	10	None
X06S 137	Supply Chain Management – Direct Procurement	14	X06S 111
X06S 139	Supply Chain Management – Indirect Procurement	14	X06S 111
	TOTAL	**38**	

Total Credits **90.5**

Course Descriptions for Apprentices that began their apprenticeship prior to July 27, 2020

World Class Shipbuilder Curriculum (WCSC)

A100 Apprentice Success Skills

18 Hours 1 Credit

Assists students in having a successful transition to the academic and craft demands of an apprenticeship. Academic related topics include: Skip Downing's student success strategies, academic policies, plagiarism prevention, algebra review, goal setting, study skills, and test-taking strategies. Craft related topics include: career and academic planning, safety orientation (personal protection equipment, confined spaces, and plant security). Topics are reinforced through real-life examples, discussion, and team-based approaches. Provides opportunity for apprentices to meet with student services, athletics, craft, and academic staff. Includes the math placement test. Required of all apprentices. Pass or fail.

B112 Problem Solving

42.75 Hours 4 Credits

Includes methods and tools for problem solving and decision making in industrial environments. Topics include: team concepts, systems analysis, identifying and documenting objectives, functional flow diagrams, timeline analysis, and statistical process modeling. Topics are reinforced through a team-based term project focusing on process improvement. Special emphasis is given to leadership principles and behaviors.

B122 Business Operations and Leadership

42.75 Hours 3 Credits

Introduces business and leadership concepts with specific application to the shipbuilding industry and leadership principles of Newport News Shipbuilding. Includes topics such as, product mix, business strategies, contracts, process improvement, quality programs, shipbuilding economics, teams and teamwork, communications, the principles of leadership and corporate values.

C111 Technical Communications I

52.25 Hours 3 Credits

Prepares apprentices to meet written and oral demands of a business environment. Includes instruction in writing and speaking skills, with application to business communications such as, written reports and procedures, memorandums, and oral presentations. Microsoft Office applications are utilized for writing, editing, and preparation of presentation materials

C211 Introduction to Computers

42.75 Hours 3 Credits

Provides students with the skills and knowledge related to computer use at Newport News Shipbuilding, which will support computer requirements in subsequent academic courses and prepare apprentices for tasks requiring computer usage after their apprenticeship. Includes an overview of hardware, software, operating systems, workstations, microcomputer processes, and NNS policies. Emphasizes the Microsoft Office Suite including Word, Excel, Access, PowerPoint, Outlook, Explorer, and Windows.

D111 Drafting

57 Hours 3 Credits

Exposes apprentices to the fundamentals and principles of engineering drafting as it relates to the shipbuilding industry. Skills taught include freehand sketching, and both 2D and 3D AutoCAD applications for orthographic projection, auxiliary and sectional views, isometric drawings, and solid modeling.

M010 Math Review

31.5 Hours, 0 Credits

A non-credit course that focuses on the math skills an apprentice will need to be successful in the WCSC. Topics include order of operations, laws of exponents, linear equations, and formulas, problem solving with unit conversions, polynomial operations including factoring, and reducing algebraic fractions by factoring. Apprentice School Developmental long-term math review course designed to prepare individual apprentices that require extra assistance for M111, Technical Mathematics I, in the World Class Shipbuilder Curriculum. Review of basic algebra skills to include signed numbers, order of operations, laws of exponents, and polynomial operations.

M111 Technical Math I

57 Hours 3 Credits

Supports the craft training programs. It provides apprentices with the basic skills necessary to be successful in the mathematics, science, and engineering courses of their academic curriculum and prepares apprentices for future educational opportunities. It includes linear equations, factoring, algebraic fractions, exponents, roots, radicals, quadratic equations, graphing, systems of equations, and application-related principles/problems.

M112 Technical Math II

57 Hours 3 Credits

Uses algebraic principles to solve shipbuilding applications of plane and solid geometry, right and oblique triangle trigonometry, and vector principles. Includes principles/problems from plane and solid geometry and trigonometry, Pythagorean Theorem, surface area and volume of various figures, trigonometric functions and solution of right triangles, oblique triangles using the Laws of Sines and Cosines, and vectors and equilibrium solutions of concurrent force systems.

M121 Mechanics

52.25 Hours 3 Credits

Mechanics builds the bridge between the analytical world of mathematics, science, and engineering and the practical world of shipbuilding design and construction. Includes application of free-body-diagrams (FBDs) to various force systems and the subsequent application of the equations of static equilibrium in finding the external support reactions of the FBDs. The reactions are used in strength of materials problems to determine the required dimensions of the various pieces of material.

N111 Ship Construction I

38 Hours 2 Credits

Introduces shipbuilding by providing a common vocabulary of shipbuilding terms, the basic elements of a ship, the concept of a process, the shipbuilding trades, and the company's quality program. Includes specific topics such as: the definition of a ship, ship's mission requirements, ship's hull design, drawings, lines and offsets, ship components of hull structure, the modern shipbuilding process and facilities, the fundamental force support systems, and the concepts of quality and process excellence used at NNS.

N222 Ship Construction II

38 Hours 3 Credits

Provides apprentices with an understanding of the typical propulsion plants and their associated components used in today's Navy. Includes the operation and major components of a ship's basic propulsion drive train including: resistances, a conventional steam cycle propulsion system, a pressurized water reactor propulsion system, a gas turbine propulsion system and a basic internal combustion propulsion system. Included are the scientific laws and principles involved.

P221 Physical Science I

57 Hours 3 Credits

Introductory physics course that integrates scientific theories with waterfront experiences. Topics include forces, velocity, acceleration, energy, work, power, and momentum (both translational and rotational modes), freely falling bodies, projectile motion, friction, centrifugal and centripetal forces.

P222 Physical Science II

57 Hours 4 Credits

Physical Science II is a continuation of physics introduced in Physical Science I. Topics include simple machines, the principles of fluids at rest and in motion. Emphasis is placed upon density, specific gravity, pressure, Pascal's law, Archimedes' principle, and Bernoulli's principle. The relationships between temperature change and the effect on the physical dimensions on material and the relationship among the various temperature scales is studied. Topics also include the quantity of heat, calorimetry, and latent heat.

S101 SafeStart

30 Hours 2 Credits

Employs the broad category of safety awareness and personal safety skills development. It focuses on the human factors that are involved in the majority of incidents and injuries. States like rushing, frustration, fatigue, and complacency lead to unintentional, risk-increasing errors like eyes and mind not on task, being in or moving into the line-of-fire or losing your balance, traction or grip.

COATINGS SPECIALIST

X331 Paint and Surface Preparation

40 Hours 2 Credits

Provides the apprentice with an understanding of safety, surface preparation, and typical paint installation techniques for new ship construction and overhaul. Describes the function and use of hand and mechanically operated trade tools used for surface coating calculation, preparation, application, and final surface presentation. Creating and maintaining safe work habits and conditions are stressed throughout the course.

X332 Blueprint Reading for Painters

10 Hours 1 Credit

Instructs the apprentice in reading, interpreting, and applying painting information from blueprints and other construction documents to new ship construction and overhaul. Includes the principles necessary to interpret and apply information from various types of blueprints, schedules, data sheets, charts, procedures, and other job related documents. Includes compartment and access plans, deck and wall coverings, painting schedules, inspection procedures, other trade documents and forms.

DIMENSIONAL CONTROL TECHNICIAN

O681 Industrial Measurement–Instrumentation Theory I

80 Hours 3 Credits

This course covers tasks associated with performing on-site visual inspections of components to determine measurement methodology, planning and coordinating phases of the measurement survey process and analyzing/interpreting data. This is an introduction and orientation to industrial measurements in a large manufacturing and industrial setting. This course will take a hands-on approach in which majority of the time will be spent using Metrology equipment and applicable software including Spatial Analyzer, V-Stars, and Excel. Specific Metrology equipment includes care and handling, compensation, and utilization of the Total Station, Laser Tracker, Photogrammetry, Coordinate Measurement Machines and Precision Measurement Instruments.

O682 Industrial Measurement–Trades Processing Theory II

80 Hours 3 Credits

An overview of the trades that O68 provides data and how they will use the information. This course will take a hands-on approach to identify the trades build sequence and the requirement that must be achieved including tolerances and job specific activities. Trades modules will have files within SA to process using the transformation techniques used for majority of the job classifications.

ELECTRICIAN

X311 Applied Theory I: DC Concepts

90 Hours 5 Credits

Introduction to DC theory is a prerequisite for subsequent electrical theory classes as well as, a provider of essential information on electrical safety. This course introduces the effects of DC voltage, current and power in resistive circuits (including series, parallel, and series-parallel networks with emphasis on Kirchhoff's voltage and current laws), and voltage divider and current divider rules. Circuit analysis includes source conversion, mesh analysis, superposition, and Thevenin's and Norton's theorems. Practical lab exercises incorporate standard test equipment, classroom theory, troubleshooting skills, and electrical safety.

X312 Applied Theory II: AC Concepts

90 Hours 5 Credits

This course completes DC concepts by presenting transient effects of capacitors and inductors and discussing magnetic circuits. AC theory concepts and applications are introduced using general sinusoidal format for AC voltage, current, power and frequency as it applies to resistive and reactive series, parallel and series-parallel networks. Circuit analysis includes mesh analysis, superposition, and Thevenin's and Norton's theorems. Practical lab exercises incorporate standard test equipment, classroom theory, troubleshooting skills, and electrical safety. Prerequisite: X311

X313 Applied Theory III: Polyphase Systems and Controls

115 Hours 6 Credits

This course continues AC theory concepts including resonance, filters, AC power, polyphase systems and transformers. Information on motor controls begins with the principles and applications of DC and AC generators and motors and continues with examples of DC and AC electromechanical controls including schematic symbols, wiring and schematic diagrams, relays and contactors, motor overload devices, time delay circuitry, reduced voltage starting methods, and deceleration methods. The student learns the most effective methods and strategies used to troubleshoot complex electromechanical control systems through hands on laboratory exercises emphasizing electrical safety, electromechanical circuit design and troubleshooting. Prerequisites: X311 and X312

X316 Programmable Logic Controllers

66 Hours 2 Credits

The course begins with an introduction to digital electronics including numbering systems, gate logic and combinational logic, and continues with applications of digital electronics through encoders, decoders, flip-flops and counters. The course continues with programming, hook-up and troubleshooting of programmable logic controllers (PLCs). Industry standard PLCs and programming software are used for specific training on ladder logic diagrams, input/output instructions, internal relays, timers, counters, compare and math functions, control instructions, sequencers, retrofitting, and program design. Prerequisite: X313

HEATING & AIR CONDITIONING WORKER

All Electrical Theory Courses (See ELECTRICIAN)

043H Air Conditioning and Refrigeration I

90 Hours 4 Credits

Studies refrigeration theory, characteristics of refrigerants, temperature, and pressure, tools and equipment, soldering, brazing, refrigeration systems, system components, compressors, evaporators, and metering devices. Presents charging and evaluation of systems and leak detection. Explores servicing the basic system. Explains use and care of oils and additives and troubleshooting of small commercial systems.

HEAVY METAL FABRICATOR

X111 Hull Construction Theory I (See SHIPFITTER)

X151 Fundamentals of Fabrication

16 Hours 1 credit

Develops an understanding of efficient heavy metal fabrication machinery, processes, and procedure.

INSULATOR

X333 Theory of Insulation
40 Hours 2 Credits
Provides apprentice with an understanding of safety, application and installation of insulation materials for new ship construction and overhaul. Describes the function and use of hand and mechanically operated trade tools used on various insulation compositions, application and installation, and safe work practices while working with hazardous materials.

X334 Blueprint Reading for Insulators
11 Hours 1 credit
Instructs the apprentice in reading, interpreting, and applying insulation information from blueprints and other construction document to new ship construction and overhaul. Includes the principles necessary to interpret and apply information from various types of blueprints, schedules, data sheets, charts, procedures, and other job related documents.

MACHINIST

M531 Machinist Shop Theory
30 Hours 2 Credits
This course is designed to cover basic machine shop safety, hand tools, measuring tools (including precision measuring tools), metric measurement, tapers and angles, and basic machine theory. Included are tools and attachments for machines such as the drill press, shaper, slotter, planer, milling machine, and engine lathe. Identification of machines and their principal parts and machine operation are also covered. Apprentices will be introduced to drawings and cover basic shop work practices. Proficiency evaluations include tests.

M533 Computer Numerical Control Programming/Lab
80 Hours 3 Credits
Introduces the concepts of Computer Numerical Controlled (CNC) programming. Apprentices will write detailed programs using "G" code and "M" code as they learn various machining operations. These operations include using fixed cycles and subroutines, linear and circular interpolation, tool radius compensation as well as modern touch-off approaches using electronic probing. This course includes an operator section to teach each student responsibilities of the programmer and the specifics within the machine. This class is the second trade related theory course that all machine shop apprentices are required to complete. This course provides knowledge of CNC programming which would allow the apprentice to read and analyze a numerically controlled program in order to run their first CNC machine successfully. Prerequisite: M531

MAINTENANCE ELECTRICIAN

****All Electrical Theory Courses (See ELECTRICIAN)***

MAINTENANCE PIPEFITTER

****X421 Introduction to Pipefitting (See PIPEFITTER)***
****X422 Blueprint Reading Fundamentals and Procedures (See PIPEFITTER)***

MILLWRIGHT

***M531 Machinist Shop Theory* (See MACHINIST)**

0431 Introduction to Hydraulics

30 Hours 3 Credits

Provides an understanding of hydraulic systems, associated components, and their schematics found in the shipyard. Covers introductory hydraulics including air and fluid power principles, hydraulic power system components, different types of hydraulic fluids, hydraulic strainers and filters, hydraulic reservoirs and accumulators, hydraulic piping, tubing and fittings, hydraulic directional control valves, hydraulic pressure control valves, hydraulic cylinders, hydraulic motors, and rotary activators.

MODELING AND SIMULATION

EGR 218 Introduction to Modeling and Simulation

45 Hours 3 Credits

Introduces basic concepts in modeling, simulation, and visualization. Includes applications in various phases of product creation and development; use of software and hardware interfaces to improve use and understanding of simulations; and current topics and future directions in modeling, simulation, and visualization.

EGR 230 Discrete Event Simulation

60 Hours 4 Credits

Introduces fundamentals of modeling and simulating discrete-state, event-driven systems. Includes basic simulation concepts and terms, queuing theory models for discrete event systems, structure of discrete event simulations, problem formulation and specification, input data representation, output data analysis, verification and validation, and the design of simulation experiments.

MOLDER

A5721 Foundry Processes

40 Hours 3 Credits

The scope of this course covers the fundamental processes of metal casting in the Newport News Shipbuilding Foundry. It includes a look at the history of the Foundry and begins with the design parameters originating in the Pattern Shop and includes all processes of the Foundry through the Inspection Process. The goal of this course is to equip Foundry Apprentices with knowledge foundational to making intuitive decisions on the job. Proficiency is tested at all levels to validate learning using written tests that include applications for problem solving.

A5722 Blueprint Reading for Molders

15 Hours 1 Credits

This course is designed to encourage best practices for interpreting, visualizing and communicating industrial drawing contents. The sessions include learning the skills required to recognize the components of a drawing and their contents and be able to relate the parts to each other. Use of appropriate measuring tools, identifying and interpreting lines and symbols, recognizing and interpreting various drawing views, locating information blocks, introduction of necessary vocabulary and abbreviations, and fraction and decimal math computations are included. A comparison of a NNS drawing with a commercial drawing is also investigated. Proficiency evaluations include tests, sample drawings and models.

NON-DESTRUCTIVE TESTER

X111 Hull Construction I (See SHIPFITTER)

O382 Magnetic Particle Testing

40 Hours 2 Credits

Develops a general understanding of safe and efficient Magnetic Particle Testing methods. Including the terms, definitions, procedures and requirements involved in the Magnetic Particle Testing process.

O384 Liquid Penetrant Testing

40 Hours 2 Credits

Develops a general understanding of safe and efficient Liquid Penetrant Testing methods. Including the terms, definitions, procedures and requirements involved in the Liquid Penetrant Testing process

O386 Ultrasonic Testing

40 Hours 2 Credits

Develops a general understanding of safe and efficient Ultrasonic Testing methods. Including the terms, definitions, procedures and requirements involved in the Ultrasonic Testing process.

OUTSIDE MACHINIST

X431 Machinery Installation Theory

40 Hours 3 Credits

Includes an introduction to measurement tools, drawings and blueprints, flanges, gaskets, fastener/material control, and identification and information on shop machines and portable machines. Also covered in this course are the care and handling of machines and the safety requirements for working with rotating machinery. Finally, students taking the class will get a short overview of the material that will be covered in the X433 Ship Systems course.

X432 Introduction to Hydraulics

30 Hours 2 Credits

With specific applications to shipboard environments, covers introductory hydraulics which includes air and fluid power principles, hydraulic power system components, different types of hydraulic fluids, hydraulic strainers and filters, hydraulic reservoirs and accumulators, hydraulic piping, tubing and fittings, hydraulic directional control valves, hydraulic pressure control valves, hydraulic cylinders, hydraulic motors, rotary activators, and system troubleshooting.

X433 Ship Systems

40 Hours 3 Credits

This course is intended to provide each student in-depth knowledge of various major shipboard systems. The following topics will be covered in the course: Hydraulic systems, Aircraft Carrier (Navigation/Surveillance/Weapons systems); Submarine (Surveillance and Weapons systems); Main Propulsion systems; Auxiliary systems; Aircraft Carrier (Deck Machinery); and, Aircraft Launch and Recovery systems (ALRE).

PATTERNMAKER

M711 Patternmaker's Theory

60 Hours 4 Credits

This is a blended course in which the students gain knowledge and understanding of all the types of work a patternmaker is required to know how to do, including patternmaking for the Foundry and various kinds of woodworking. Practical applications are made including the actual operation of Pattern Shop machines and tools as well as the construction of 6 different patterns from a single layout.

A5721 Foundry Processes

40 Hours 3 Credits

The scope of this course covers the fundamental processes of metal casting in the Newport News Shipbuilding Foundry. It includes a look at the history of the Foundry and begins with the design parameters originating in the Pattern Shop and includes all processes of the Foundry through the Inspection Process. The goal of this course is to equip Foundry Apprentices with knowledge foundational to making intuitive decisions on the job. Proficiency is tested at all levels to validate learning using written tests that include applications for problem solving.

PIPEFITTER

X421 Introduction to Pipefitting

24 Hours 1 Credit

Provides the apprentice with an understanding of basic hand tools, material identification (pipe / fittings / valves), trade math, and rule reading / measurement.

X422 Blueprint Reading Fundamentals and Procedures

24 Hours 1 Credit

Provides the apprentice with the basic principles of blueprint reading and procedures used in pipefitting. Areas covered include blueprint terminology and navigation, drawing scales, material lists, welding, brazing, and NDT procedures.

X423 Sketching and Bending Fundamentals

60 Hours 3 Credits

Provides the apprentice with the principles of sketching and bending for various piping configurations. Areas covered include determining sizes of bending heads, true lengths between bends, calculating roll and bend angles, bending flat and rolling offsets, and determining bent pipe characteristics mathematically.

X424 Piping Systems

12 Hours 1 Credit

Provides the apprentice with principles of shipboard piping systems and their operation. Piping systems discussed include propulsion, seawater, hydraulics, plumbing drains, potable water, lube oil, JP-5, and various nuclear piping components and systems in shipbuilding.

RIGGER

X361 Stagebuilding, Blocking, and Shoring Theory

30 Hours 2 Credits

Provides the apprentice with a basic understanding of rigging safety, stagebuilding, blocking, and shoring for new ship construction and overhaul.

X362 Lifting and Handling Equipment Theory

30 Hours 2 Credits

Provides the apprentice with a basic understanding of rigging safety, lifting/handling equipment and the development of lift plans used in new ship construction and overhaul.

X363 Mooring and Ventilation Theory

31 Hours 2 Credits

Provides the apprentice with a basic understanding of safe handling of ship lines during the mooring process of ships and submarines as well as an overview of the procedures and calculations needed to design and install proper ventilation for ship construction and overhaul.

SHEET METAL WORKER

X321 Blueprint and Group Sheet Reading

15 Hours 1 Credit

Provides the apprentice with a thorough knowledge of basic print reading and grouping that is essential to the sheet metal trade. This course covers fundamental drawing information, including isometric and orthographic objects, weld symbols, ship terms and abbreviations, scaling, types and parts of drawings, and work packages. Also includes interpreting group sheets and computer bills of material.

X322 Materials, Machine Processes, Drilling and Tapping

20 Hours 1 Credit

Exposes the apprentice to various sheet metal materials as well as the machinery and processes involved in the fabrication and installation of sheet metal products. This course includes material identification and characteristics along with types of fasteners and pipe sizes. In addition, the course covers basic sheet metal tools and machines, machine processes, shielded metal arc welding, drilling, and tapping operations, with emphasis placed on safe work practices.

X323 Sheet Metal Layout

18 hours 1 Credit

Introduces the apprentice to the concepts of planning, designing, and shaping complex sheet metal components using applied math and geometry. This course covers sheet metal and heavy metal layout for breaking, forming, rolling, and notching to form material into three dimensional objects and components. The course includes square breaks, radius breaks, and rolling by hydraulic presses, hand brakes, and hand and power rollers, with an emphasis on safe, efficient work practices.

X324 Advanced Print Reading

34 Hours 2 Credits

Provides a wide-ranging exposure to the sheet metal blueprints and drawings that relate to specific areas of shipbuilding, including carriers, submarines, and shops. This course provides comprehensive instruction on a variety of Sheet Metal drawings including the information and makeup of 24 different arrangement, detail, and list drawings. Additional topics include the major categories of work performed in the Sheet Metal Department.

SHIPFITTER

X111 Hull Construction I

18 Hours 1 Credit

Develops a general understanding of safe and efficient shipbuilding manufacturing practices and the tools involved in these practices. Includes hull trade apprentice shipyard safety responsibilities, tools of the trade, ship nomenclature, hull construction, basic ship lines, structural shapes, fractions and plate weight conversions. Also includes, interpretation of drawings, work packages, material layoff, joint fit-up, workmanship, and weld symbols.

X113 Hull Construction II CVN Drawings and Work Packages

8 Hours 1 Credit

Develops an understanding of efficient shipbuilding manufacturing practices through detailed drawing and work package interpretation. Includes analysis of carrier construction documents.

X114 Hull Construction II VCS Drawings and Work Packages

8 Hours 1 Credit

Develops an understanding of efficient shipbuilding manufacturing practices through detailed drawing and work package interpretation. Includes analysis of submarine construction documents.

X115 Hull Construction III

24 Hours 1 Credit

Develops a more advanced understanding of safe and efficient shipbuilding and manufacturing practices. It builds on information, skills and experiences gained in X111 and rotation experiences. It offers more specific application of tool safety, math calculations, material layoff, and joint fit-up and workmanship.

WELDER

****X111 Hull Construction I (See SHIPFITTER)***

X183 Welding Fundamentals: SMAW and GMAW

18 Hours 1 Credit

Develops a general understanding of safe and efficient welding practices and the tools involved in these practices. Includes shipyard safety, fundamentals of SMAW electrical circuits, terms and definitions, weld symbols, the structural joint numbering system, and proper welding sequence. Consists of an examination of GMAW components and electrical characteristics of the system.

X185 Introduction to Non Destructive Testing

8 Hours 1 Credit

Develops an academic and hands-on understanding of non-destructive weld testing techniques. Includes the most common types of weld discontinuities, the most commonly used NDT methods, and the advantages and limitations of each. The course also includes the interrelationships between welding processes, discontinuities, and inspection methods.

WELDING EQUIPMENT REPAIRER

****All Electrical Theory Courses (See ELECTRICIAN)***

Course Descriptions for Apprentices that began their apprenticeship on or after July 27, 2020

World Class Shipbuilder Curriculum (WCSC)

BUSI 222 Business Operations and Leadership
47.5 Hours 4.5 Credits

Introduces business and leadership concepts with specific application to the shipbuilding industry and leadership principles of Newport News Shipbuilding. Includes topics such as, product mix, business strategies, contracts, process improvement, quality programs, shipbuilding economics, teams and teamwork, communications, the principles of leadership and corporate values.

COMM 111 Communications I
47.5 Hours 4.5 Credits
Prepares apprentices to meet written and oral demands of a business environment. Includes instruction in writing and speaking skills, with application to business communications such as, written reports and procedures, memorandums, and oral presentations. Microsoft Office applications are utilized for writing, editing, and preparation of presentation materials.

DRFT 111 Drafting
57 Hours 4.5 Credits
Exposes apprentices to the fundamentals and principles of engineering drafting as it relates to the shipbuilding industry. Skills taught include freehand sketching, and both 2D and 3D AutoCAD applications for orthographic projection, auxiliary and sectional views, isometric drawings, and solid modeling.

HIST 111 History
47.5 Hours 4.5 Credits

Examines the history of shipbuilding from its beginning with the advent of civilization through the modern era. Focus will be on shipbuilding in the United States and Newport News Shipbuilding, and the role shipbuilding played in The Apprentice School at Newport News Shipbuilding.

MATH 111 Mathematics I
57 Hours 4.5 Credits
Supports the craft training programs. It provides apprentices with the basic skills necessary to be successful in the mathematics, science, and engineering courses of their academic curriculum and prepares apprentices for future educational opportunities. It includes linear equations, factoring, algebraic fractions, exponents, roots, radicals, quadratic equations, graphing, systems of equations, and application-related principles/problems.

MATH 112 Mathematics II
57 Hours 4.5 Credits
Uses algebraic principles to solve shipbuilding applications of plane and solid geometry, right and oblique triangle trigonometry, and vector principles. Includes principles/problems from plane and solid geometry and trigonometry, Pythagorean Theorem, surface area and volume of various figures, trigonometric functions and solution of right triangles, oblique triangles using the Laws of Sines and Cosines, and vectors and equilibrium solutions of concurrent force systems. Prerequisite: MATH 111.

MECH 222 Mechanics

47.5 Hours 4.5 Credits

Mechanics builds the bridge between the analytical world of mathematics, science, and engineering and the practical world of shipbuilding design and construction. Includes application of free-body-diagrams (FBDs) to various force systems and the subsequent application of the equations of static equilibrium in finding the external support reactions of the FBDs. The reactions are used in strength of materials problems to determine the required dimensions of the various pieces of material. Prerequisite: PHYS 221.

PHYS 221 Physical Science I

57 Hours 4.5 Credits

Introductory physics course that integrates scientific theories with waterfront experiences. Topics include forces, velocity, acceleration, energy, work, power, and momentum (both translational and rotational modes), freely falling bodies, projectile motion, friction, centrifugal and centripetal forces. Prerequisite: MATH 112.

PHYS 222 Physical Science II

57 Hours 4.5 Credits

Physical Science II is a continuation of physics introduced in Physical Science I. Topics include simple machines, the principles of fluids at rest and in motion. Emphasis is placed upon density, specific gravity, pressure, Pascal's law, Archimedes' principle, and Bernoulli's principle. The relationships between temperature change and the effect on the physical dimensions on material and the relationship among the various temperature scales is studied. Topics also include the quantity of heat, calorimetry, and latent heat. Prerequisite: PHYS 221.

PSYC 221 Psychology

42.75 Hours 4 Credits

Introduction to the basic psychology concepts of decision-making and evaluation of risk as it relates to safety in the shipbuilding environment and outside of work. The student is introduced to fundamental psychological concepts dealing with behavior; learning; perception; motivation; personality; and social processes. An emphasis is placed on application of these fundamental concepts of psychology as they contribute to the State to Error risk patterns outlined in the SafeStart Program and how to utilize Critical Error Reduction Techniques (CERT's) to reduce injuries.

SHCN 111 Ship Construction I

38 Hours 3.5 Credits

Introduces shipbuilding by providing a common vocabulary of shipbuilding terms, the basic elements of a ship, the concept of a process, the shipbuilding trades, and the company's quality program. Includes specific topics such as: the definition of a ship, ship's mission requirements, ship's hull design, drawings, lines and offsets, ship components of hull structure, the modern shipbuilding process and facilities, the fundamental force support systems, and the concepts of quality and process excellence used at NNS. Prerequisite: COMM 111.

SHCN 222 Ship Construction II

38 Hours 3.5 Credits

Provides apprentices with an understanding of the typical propulsion plants and their associated components used in today's Navy. Includes the operation and major components of a ship's basic propulsion drive train including: resistances, a conventional steam cycle propulsion system, a pressurized water reactor propulsion system, a gas turbine propulsion system and a basic internal combustion propulsion system. Included are the scientific laws and principles involved. Prerequisite: SHCN 111.

SITE 211 Digital Shipbuilding and Technology

14.25 Hours 1 Credit

Introduces students to Integrated Digital Shipbuilding (iDS), Newport News Shipbuilding's vision to transform shipbuilding for the digital age. Apprentices will see demonstrations of the technologies NNS is using to create a future where shipbuilders will be constantly connected to a digital ecosystem of real-time accurate information, driving a new level of performance, making NNS a more attractive business, and providing our customer more ships at a reduced cost.

COATINGS SPECIALIST

X33C 111 Paint and Surface Preparation
56 Hours 5.5 Credits

Provides the apprentice with an understanding of safety, surface preparation, and typical paint installation techniques for new ship construction and overhaul. Describes the function and use of hand and mechanically operated trade tools used for surface coating calculation, preparation, application, and final surface presentation. Creating and maintaining safe work habits and conditions are stressed throughout the course.

X33C 112 Blueprint Reading for Painters
10 Hours 1 Credit

Instructs the apprentice in reading, interpreting, and applying painting information from blueprints and other construction documents to new ship construction and overhaul. Includes the principles necessary to interpret and apply information from various types of blueprints, schedules, data sheets, charts, procedures, and other job related documents. Includes compartment and access plans, deck and wall coverings, painting schedules, inspection procedures, other trade documents and forms.

X33C 135 Surface Preparation
360 Hours 12 Credits

Provides apprentices with experience in preparation of surfaces for coating. Apprentices will learn to safely remove paint using hand tools, power tools, solvents, and blasting. The surfaces will have to meet specific criteria in order to be ready for coating. This production work experience is conducted on surface ships and submarines. Pass or fail.

X33C 136 Coating and Finishing
300 Hours 10 Credits

Apprentices are given coating and finishing work experience on surface ships, submarines, and in shops. This experience uses a variety of coating systems with different criteria and procedures. Apprentices will learn to apply coating systems by using brush and roll methods. The apprentice is taught environmental monitoring to ensure that both safety procedures and application requirements are met. Pass or fail.

X33C 137 Inspection and Instrumentation
300 Hours 10 Credits

Once surfaces have been prepped and coated inspection is required to ensure that design specifications have been met to ensure long lasting protection. Apprentices will learn the coating system inspection process and how to interpret specifications. Apprentices also learn the proper use of inspection tools such as wet and dry film thickness gauges, adhesion gauges, and surface profile gauges. This work requires apprentices to inspect coated surfaces for sags, runs, holidays, dirt, and debris in accordance with drawings and procedures. Pass or fail.

COST ESTIMATOR

X06C 111 Fundamentals of Cost Estimation
300 Hours 10 Credits

Exposes apprentices to the basics of cost estimation by introducing the apprentice to different terminology and acronyms they will use on the job. They will also gain experience in various computer programs utilized in cost estimation. Apprentices will learn the

fundamentals of how to produce a fair and equitable quote of what it costs for the company to perform work. Apprentices will be shown the importance of quality of work, attention to detail, and working as a collaborative team in high stress situations. Pass or fail.

X06C 137 Cost Estimation – Initial Proposals
420 Hours 14 Credits

Provides work experience in creating cost proposals based on a Request for Quote (RFQ). This on- the- job training teaches apprentices how to read and interpret engineering documents to research and create cost proposals to be submitted to our customers. Apprentices will learn the importance of good communication skills and networking skills as they will have to defend their position as to why their estimates are fair and equitable. Apprentices will also be part of negotiations with customers on the contracts for the products we will be building. Pass or fail. Prerequisite: X06C 111.

X06C 139 Cost Estimation – Change Proposals
420 Hours 14 Credits

In this practical, apprentices will obtain experience creating change order proposals. These change orders will give the apprentice a fast- paced, high- volume work experience. Apprentices will utilize their researching skills to find information from previous work and reach out to other departments to get firsthand expertise. This experience will teach the importance of time management, organizational skills, and stress management. The importance of teamwork and attention to detail will be emphasized as apprentice work through these high-volume change order proposals. Pass or fail. Prerequisite: X06C 111.

ELECTRICIAN

X31 111 Applied Theory I: DC Concepts
90 Hours 7.5 Credits

Introduction to DC theory is a Prerequisite: for subsequent electrical theory classes as well as, a provider of essential information on electrical safety. This course introduces the effects of DC voltage, current and power in resistive circuits (including series, parallel, and series-parallel networks with emphasis on Kirchhoff's voltage and current laws), and voltage divider and current divider rules. Circuit analysis includes source conversion, mesh analysis, superposition, and Thevenin's and Norton's theorems. Practical lab exercises incorporate standard test equipment, classroom theory, troubleshooting skills, and electrical safety.

X31 112 Applied Theory II: AC Concepts
90 Hours 7.5 Credits

This course completes DC concepts by presenting transient effects of capacitors and inductors and discussing magnetic circuits. AC theory concepts and applications are introduced using general sinusoidal format for AC voltage, current, power and frequency as it applies to resistive and reactive series, parallel and series-parallel networks. Circuit analysis includes mesh analysis, superposition, and Thevenin's and Norton's theorems. Practical lab exercises incorporate standard test equipment, classroom theory, troubleshooting skills, and electrical safety. Prerequisite: X31 111.

X31 137 Electrical Installation – Surface Ships
180 Hours 6 Credits

In this practical, apprentices will obtain production work experience on surface ships. This includes learning the layout of surface ships and the various compartments and decks. Electrician apprentices will utilize work instructions, drawings, and direction from work control to layoff, install, cut-in, hookup and test shipboard electrical systems and equipment. Apprentices learn the importance of teamwork, collaboration, and how we work with our customers. The importance of on-the- job safety and quality of work is emphasized. Pass or fail.

X31 139 Electrical Installation – Submarines
180 Hours 6 Credits

Provides hands on work experience on a submarine. This on- the- job training teaches how to read and interpret submarine program work instructions and drawings and also emphasizes the importance of adhering to submarine methods of installation and quality requirements. Electrician apprentices will layoff, install, cut-in, hookup and test electrical systems and equipment. Instructors will explain how the systems work and train apprentices to ensure they meet engineering requirements. Pass or fail.

X31 212 Applied Theory III: Polyphase Systems and Controls
100 Hours 8 Credits

This course continues AC theory concepts including resonance, filters, AC power, polyphase systems and transformers. Information on motor controls begins with the principles and applications of DC and AC generators and motors and continues with examples of DC and AC electromechanical controls including schematic symbols, wiring and schematic diagrams, relays and contactors, motor overload devices, time delay circuitry, reduced voltage starting methods, and deceleration methods. The student learns the most effective methods and strategies used to troubleshoot complex electromechanical control systems through hands on laboratory exercises emphasizing electrical safety, electromechanical circuit design and troubleshooting. Prerequisites: X31 112.

X31 214 Programmable Logic Controllers
45 Hours 3 Credits

The course begins with an introduction to digital electronics including numbering systems, gate logic and combinational logic, and continues with applications of digital electronics through encoders, decoders, flip-flops and counters. The course continues with programming, hook-up and troubleshooting of programmable logic controllers (PLCs). Industry standard PLCs and programming software are used for specific training on ladder logic diagrams, input/output instructions, internal relays, timers, counters, compare and math functions, control instructions, sequencers, retrofitting, and program design. Prerequisite: X31 212.

HEATING & AIR CONDITIONING WORKER

X31 111 Applied Theory I: DC Concepts (See ELECTRICIAN)
X31 112 Applied Theory II: AC Concepts (See ELECTRICIAN)
X31 212 Applied Theory III: Polyphase Systems and Controls (See ELECTRICIAN)
X31 214 Programmable Logic Controllers (See ELECTRICIAN)

043H 145 Heating Ventilation and Air Conditioning
360 Hours 12 Credits

In this practical, apprentices receive training in basic refrigeration processes as well as sophisticated building climate controls systems throughout the plant. With an emphasis on safety they will utilized acquired qualifications for Lock-out/Tag-out procedures on electrical systems, CPR training, and Low Voltage certifications. They will also apply National Electrical Code as related to HVAC. HVAC apprentices will troubleshoot and repair a variety of small portable systems such as window units, environmental control systems for waterfront manufacturing and warehouses, and environmental control systems for engineering product development buildings. Pass or fail.

HEAVY METAL FABRICATOR

X11 111 Hull Construction I (See SHIPFITTER)

X15 112 Fundamentals of Fabrication
16 Hours 1.5 credit

Develops an understanding of efficient heavy metal fabrication machinery, processes, and procedures.

X15 135 Burning
360 Hours 12 credit

Exposes apprentices to a production work environment where they learn to safely use burning torches to cut flat metal into various shapes. Apprentices will learn to safely and properly hook up and operate a burning torch. Apprentices will learn to lay off shapes accurately in according with drawings and work instructions and to make cuts on various types of steels and shapes. Emphasis is placed on hot work safety and personal protective equipment. Numerically controlled burning machines are also used Pass or fail.

X15 137 Small Forming
360 Hours 12 credit

To meet the design criteria for the shape of a ship's hull, flat plates of steel must be pressed and formed into rounded shapes. The apprentice will learn the different processes used to form and shape metal such as bending, shearing, rolling, pressing, forging, and indenting. Apprentices will learn safety precautions when using hydraulic and electric heavy metal forming tooling such as rollers and presses. The apprentice will learn to layoff bend points and shaping locations in accordance with drawings and will operate heavy metal presses and rollers to accurately produce shapes of hull and structure. Pass or fail.

X15 139 Large Forming
360 Hours 12 credit

Forming large, thick steel plates is necessary for ship construction. The apprentice will learn the different processes used to form and shape metal such as bending, shearing, rolling, pressing, forging, and indenting on large machinery. Apprentices will learn safety precautions to be taken when using large hydraulic and electric heavy metal forming tooling such as rollers and presses. Pass or fail.

INSULATOR

X33I 111 Theory of Insulation
48 Hours 4.5 Credits

Provides apprentice with an understanding of safety, application and installation of insulation materials for new ship construction and overhaul. Describes the function and use of hand and mechanically operated trade tools used on various insulation compositions, application and installation, and safe work practices while working with hazardous materials.

X33I 112 Blueprint Reading for Insulators
10 Hours 1 credit

Instructs the apprentice in reading, interpreting, and applying insulation information from blueprints and other construction documents for new ship construction and overhaul. Documents used include various types of blueprints, schedules, data sheets, charts, and procedures.

X33I 135 Sound Damping
360 Hours 12 credit

Noise is the enemy of stealth. In order to make ships quiet the sound generated by machinery and other components must be quieted. Insulator apprentices learn how to install sound damping materials in accordance with drawings and procedures to ensure required noise cancelling levels are achieved. Apprentices will acquire skills in a production environment to successfully install different types of sound damping materials and install studs to support the materials. Apprentices will work in teams to complete quality work while learning the processes. Pass or fail.

X33I 136 Piping Insulation
300 Hours 10 credit

Piping on a ship carry a range of pressures and temperatures of fluids and gasses. Some systems need to stay warm and others need to stay cold. Insulator apprentices will learn how to install insulation onto piping systems and components to ensure efficient operation. The apprentice will acquire skills in reading and interpreting drawings and procedures, material handling, and mudding techniques. The importance of quality and safety are also taught. Pass or fail.

X33I 137 Bulkhead Insulation
300 Hours 10 credit

Exposes apprentices to production work experience installing insulation on bulkheads. Apprentices will learn to interpret work documents to determine correct insulation materials and requirements and to install different insulation materials and thicknesses based on the purpose of the space. Insulation installed by apprentices will be for climate control, sound control and acoustics, and habitability. Pass or fail.

MACHINIST

M53 111 Machinist Shop Theory
34 Hours 3 Credits

This course is designed to cover basic machine shop safety, hand tools, measuring tools (including precision measuring tools), metric measurement, tapers and angles, and basic machine theory. Included are tools and attachments for machines such as the drill press, shaper, slotter, planer, milling machine, and engine lathe. Identification of machines and their principal parts and machine operation are also covered. Apprentices will be introduced to drawings and cover basic shop work practices. Proficiency evaluations include tests.

M53 125 Machinist Fundamentals
360 Hours 12 Credits

Exposes apprentices to basic machining principles and concepts on drill presses, lathes, and milling machines. Machine shop safety is introduced and practiced. Apprentices will be shown how to read and interpret the sketch of a part and apply given tolerances. The importance of quality will be explained and why all parts must meet specification. Instructors will teach apprentices how to use indicators to properly secure metal stock to machine basic shapes. Standard measuring tools such as a steel rule, micrometers, calipers, and calibrated gauges will be applied to all machined parts. Machine cleanliness and tool care will be discussed during this training. Pass or fail.

M53 137 Machinist Practical - Milling
240 Hours 8 Credits

Provides hands on work experience on a milling machine. Apprentices will be expected to show competency in milling applications such as drilling and tapping holes, milling slots, precision boring, countersinking and counterboring. Instructors will discuss the geometry and different grades of carbide inserts and explain when each should be used. This enhances the apprentice's ability to plan and troubleshoot work. Production expectations will be introduced so apprentices understand time allocation and work flow. Pass or fail. Prerequisite: M53 125.

M53 139 Machinist Practical - Turning
240 Hours 8 Credits

Provides practical experience on a turning center. Apprentices will be expected to show proficiency in basic turning applications such as facing, turning, boring, drilling, and parting off. Instructors will explain the geometry of carbide inserts and advise when each should be used. Production drawings are introduced and apprentices will learn how to read and interpret them. This experience will reinforce the apprentice's ability to plan jobs from start to completion. Apprentices are expected to provide suggestions to problems they may encounter with their work. Pass or fail. Prerequisite: M53 125.

M53 222 Computer Numerical Control Programming/Lab
80 Hours 6 Credits

Introduces the concepts of Computer Numerical Controlled (CNC) programming. Apprentices will write detailed programs using G and M-code as they learn various machining operations. These operations include using fixed cycles and subroutines, linear and circular interpolation, tool radius compensation as well as modern touch-off approaches using electronic probing. This course includes an operator section to teach each student responsibilities of the programmer and specifics within the machine. This class is the second trade related theory course that all machine shop apprentices are required to complete. It provides knowledge of CNC programming which will allow the apprentice to read and analyze a numerically controlled program in order to run their first CNC machine successfully. Prerequisite: M53 111.

M53 223 Advanced Programming Lab
24 Hours 1 Credits

Uses a computer based Computer Numerical Controlled software to provide authentic operation and a part programming environment. This course will teach apprentices how to create part programs on a CNC machine with conventional G-code editors or using conversational programming. It will prepare apprentices to use programming software on the machines control. Advanced Programming will teach both milling and turning applications. Pass or fail. Prerequisite: M53 222.

MAINTENANCE ELECTRICIAN

X31 111 Applied Theory I: DC Concepts (See ELECTRICIAN)
X31 112 Applied Theory II: AC Concepts (See ELECTRICIAN)
X31 212 Applied Theory III: Polyphase Systems and Controls (See ELECTRICIAN)
X31 214 Programmable Logic Controllers (See ELECTRICIAN)

O43E 125 Maintenance Electrical Construction
360 Hours 12 Credits

In this practical, apprentices receive training in general industrial electrical construction throughout the plant through both practice and production work. With an emphasis on safety they will initially acquire qualifications for Lock-out/Tag-out procedures on electrical systems, CPR training, and Low Voltage certifications. They will also study the National Electrical Code to learn the standards for installations of electrical components. Apprentices will install a wide range of electrical systems consisting of switches, disconnects, receptacles, lights, and they will learn the art of conduit bending, mounting and wire/cable installation. Pass or fail.

MAINTENANCE PIPEFITTER

X42 111 Introduction to Pipefitting (SEE PIPEFITTER)
X42 113 Blueprint Reading Fundamentals and Procedures (SEE PIPEFITTER)
X42 121 Sketching and Bending Fundamentals (SEE PIEPFITTER)
X42 125 Pipefitting Fundamentals 141 Shipyard Utilities (See PIPEFITTER)

O43P 140 Piping Facilities
450 Hours 15 Credits

Provides hands on work experience with plumbing and pipefitting to support shipyard operations. Apprentices will work with city water systems, temporary ship services, river water, restrooms, and their associated components. The apprentice will learn to interpret diagrams and drawings, find flow restrictions, and successfully install and test piping systems and components. Pass or fail. Prerequisite: X42 125.

O43P 141 Shipyard Utilities
420 Hours 14 Credits

Provides practical work experience supporting the numerous services needed for successful shipyard production. Apprentices will learn the operation, production, and maintenance of steam, service air, inert gas, nitrogen, and flammable gas services. The apprentice will also work on the sewer and drain system, and roads and grounds. The apprentice will learn to work in a team environment to successfully produce first time quality work. Pass or fail. Prerequisite: X42 125.

MARINE DESIGNER

E06 125 Marine Design Fundamentals
420 Hours 14 Credits

This work experience exposes apprentices to the basics and perspectives of engineering and designs for a large industrial manufacturing company. Instructor-led training will include an introduction to 2D and 3D design software to prepare the apprentice for design production work. Marine Design apprentices will learn the fundamentals of design elements, manufacturing processes, and integrated manufacturing. This training includes skill development in design applications for the installation of structural, electrical, machinery, piping, and ventilation components aboard ship as well as concepts for non-nuclear, naval applications utilizing various materials through liaison support mechanisms. This prepares apprentices to develop and modify electronic plans which support electronic 2D and 3D drawings used in production, manufacturing and design processes. Pass or fail.

E06 137 Marine Design - Submarines
360 Hours 12 Credits

Provides hands on work experience to support the submarine program in engineering and design. This on- the- job training teaches apprentices to develop and modify electronic plans and drawings. Marine Design apprentices prepare a variety of engineering documents such as visual work instructions, liaison reports, discrepancy items, and equipment purchase orders. Apprentices utilize the training received in Marine Design Fundamentals to produce drawings for manufactured structures, systems, and machinery. Apprentices will utilize engineering and design tools and resources to include computer aided drafting and design software and specification/technical libraries. Apprentices will apply their knowledge of the submarine manufacturing process to assist engineering and trades to meet job requirements. Apprentices build on the importance of teamwork and collaboration to support our customers. Pass or fail. Prerequisite: E06 125.

E06 139 Marine Design – Surface Ships
360 Hours 12 Credits

In this practical, apprentices will obtain production work experience in engineering and design programs for surface ships. This on-the- job training teaches apprentices how to develop and modify electronic plans and drawings. Marine Design apprentices also prepare a variety of engineering documents such as visual work instructions, liaison reports, discrepancy items, and equipment purchase orders. Apprentices utilize the training received in Marine Design Fundamentals to produce drawings for manufactured structures, systems, and machinery. Apprentices will utilize engineering and design tools and resources to include computer aided drafting and design software and specification/technical libraries. Apprentices will apply their knowledge of the surface ship manufacturing process to assist engineering and trades to meet job requirements. Apprentices build on the importance of teamwork and collaboration to support our customers. Pass or fail. Prerequisite: E06 125.

METROLOGY TECHNICIAN

O68 111 Industrial Measurement - Instrumentation
80 Hours 5.5 Credits

This course covers tasks associated with performing on-site visual inspections of components to determine measurement methodology, planning and coordinating phases of the measurement survey process and analyzing and interpreting data. This is an introduction and orientation to industrial measurements in a large manufacturing and industrial setting. This course will take a hands-on approach in which most the time will be spent using metrology equipment and applicable software. Specific metrology equipment includes care and handling, compensation, and utilization of total Station, laser tracker, photogrammetry, coordinate measurement machines and precision measurement instruments. An overview of the department, laser safety, and ergonomics will be covered. The departmental and industry best practices and procedures for surveying, analyzing, reporting, and checking processes will be discussed throughout the course.

O68 125 Metrology Fundamentals
360 Hours 12 Credits

Exposes apprentices to the basics of Metrology work in an industrial environment. Apprentices will learn the fundamentals of planning, data collection, analysis, and reporting. Importance of safety, quality of work, instrumentation set-up, and job planning is taught. This training includes skill development of alignment, line layoff, pre-cut, pipe details, liners, and general inspection. Dimensional Control apprentices will perform industrial measurement surveys and detailed analysis of manufactured structures, components, and assemblies for surface ships and submarines. This experience prepares apprentices to work safely in a production environment by utilizing proper work methods. Pass or fail.

O68 137 Metrology Technician Practical - Submarines
240 Hours 10 Credits

Provides hands on work experience for the submarine program. This on the job training teaches apprentices how to read and interpret electronic accuracy control plans and drawings. Apprentices utilize the training received in Industrial Measurement-Instrumentation to perform industrial measurement surveys utilizing metrology instrumentation. Apprentices will utilize 3D software to perform analysis of manufactured structures, components, and assemblies for submarines. Apprentices will understand submarine design and as-built tolerances to ensure engineering and job requirements are met. Apprentices learn the importance of teamwork, collaboration, and how we work with our customers. Pass or fail. Prerequisite: O68 111.

O68 139 Metrology Technician Practical – Surface Ships
240 Hours 10 Credits

In this practical, apprentices will obtain production work experience on surface ships. This on the job training teaches apprentices how to read and interpret electronic accuracy control plans and drawings. Apprentices utilize the training received in Industrial Measurement-Instrumentation to perform industrial measurement surveys utilizing metrology instrumentation. Apprentices will utilize 3D software to perform analysis of manufactured structures, components, and assemblies for surface ships. Apprentices will understand surface ships design and as-built tolerances to ensure engineering and job requirements are met. Apprentices learn the importance of teamwork, collaboration, and how we work with our customers. Pass or fail. Prerequisite: O68 111.

MILLWRIGHT

M53 111 Machinist Shop Theory (See MACHINIST)

M53 125 Machinist Fundamentals (See MACHINIST)

043M 137 Millwright Practical – Crane Maintenance
300 Hours 10 Credits

Allows apprentices to gain hands on work experience in crane maintenance. The fundamentals of crane maintenance will be taught and each apprentice will have the opportunity to apply their skills. The apprentice will be working alongside experienced crane mechanics and crane engineering. Apprentices will have the opportunity to perform preventative maintenance and repairs of various types of cranes. This practical allows them to work on gantry cranes, whirley cranes, and mobile cranes that support our shops, dry docks, and piers. Tasks range from crane lubrication to drivetrain and brake work. Pass or fail. Prerequisite: M53 125.

043M 139 Millwright Practical – Equipment Maintenance
360 Hours 12 Credits

Provides millwright apprentices experience working on industrial equipment and performing routine machine maintenance. Experience is gained while working alongside experienced millwrights and receiving instruction from facilities engineering. Exposure to preventative maintenance teaches the apprentices how to properly care for hydraulic, pneumatic, and air powered equipment. Apprentices will also work on critical pieces of equipment in need of repair to support shops, piers, and dry docks. During this time they will learn how to troubleshoot and find the root cause of problems. Pass or fail. Prerequisite: M53 125.

043M 221 Introduction to Hydraulics
30 Hours 2 Credits

Provides an understanding of hydraulic systems, associated components, and their schematics found in the shipyard. Covers introductory hydraulics including air and fluid power principles, hydraulic power system components, different types of hydraulic fluids, hydraulic strainers and filters, hydraulic reservoirs and accumulators, hydraulic piping, tubing and fittings, hydraulic directional control valves, hydraulic pressure control valves, hydraulic cylinders, hydraulic motors, and rotary activators. Prerequisite: M53 111.

MODELING AND SIMULATION PROGRAM ANALYST

The Modeling And Simulation Program Analyst Program was discontinued in February 2025

X06M 125 Modeling and Simulation - Fundamentals
420 Hours 14 Credits

Apprentices will learn the aspects and requirements to collect and input data for use in a simulation. Software will be used in conjunction with data collection and presentation as a part of various projects and classroom experiences. Apprentices will also be exposed to programming language. Small programs will be written to gain an understanding of the basic coding requirements to develop a simulation. The agile management techniques that are used within the industry and department will be explained to understand the roles and responsibilities of the team members. This rotation will enhance apprentices' verbal communication skills by participating in meetings to elaborate on the status of assigned projects. Pass or fail.

X06M 137 Modeling and Simulation - Development
360 Hours 12 Credits

Apprentices will use various software and programming techniques to develop models and simulations to satisfy the needs of the customer. A representation of the system will be used to study attributes which cannot be accomplished easily with the real system or in real-time. The type of model can be developed in various forms, but is typically accomplished using a digital model. The development of the model and simulation is accomplished by using a system of equations which identifies the specific parameters of the system. The concepts of the agile management techniques will be applied to obtain the solution for the customer. This includes teamwork, collaboration, and leadership experience on the portion of the project assigned. Communication skills will be enhanced through conversations with customers on the problem faced to determine the best methodology to generate the desired solution. Pass or fail. Prerequisite: X06M 125.

X06M 139 Modeling and Simulation - Analysis
360 Hours 12 Credits

Apprentices will use various software programs to perform the analysis of the optimized solution. The output of the data produced will need to be evaluated to determine if the results match the preconceived notion of what the final results should be. This may involve statistical analysis, testing, and troubleshooting the entity developed. The different solutions will need to be analyzed based on the requirements and needs of the customer. The apprentice will be expected to communicate the results with the customer to verify the data and output achieves the goal of the simulation. The final output will need to be formatted to present the solution to the customer. Pass or fail. Prerequisite: X06M 125.

MOLDER

A572 111 Foundry Processes
30 Hours 3 Credits

This course covers the fundamental processes of metal casting in a foundry. It includes a look at the history of the foundry and begins with design parameters originating in the Pattern Shop and includes all processes of the foundry through the inspection process. The goal of this course is to equip foundry apprentices with knowledge foundational to making intuitive decisions on the job. Proficiency is tested at all levels to validate learning using written tests that include applications for problem solving.

A572 112 Blueprint Reading for Molders
15 Hours 1.5 Credits

This course encourages best practices for interpreting, visualizing and communicating industrial drawing contents. The sessions include learning the skills required to recognize the components of a drawing and their contents and be able to relate the parts to each other. Use of appropriate measuring tools, identifying and interpreting lines and symbols, recognizing and interpreting various drawing views, locating information blocks, introduction of necessary vocabulary and abbreviations, and fraction and decimal math computations are included. A comparison drawings is also conducted. Proficiency evaluations include tests, sample drawings and models.

A572 137 Foundry Molding
360 Hours 12 Credits

Apprentices will use patterns in the shape of a final part to create molds out of sand. These molds are then filled with molten metal and cooled to become a casted part. This work experience teaches apprentices how to read and interpret sketches and then build a mold according to instructions. The training will include production work on set up, washing and dressing of patterns, building of gates and risers, mold building and sand compacting for castings. Apprentices also learn the proper way to pull patterns from a mold. Pass or fail.

A572 138 Foundry Melting Operations
360 Hours 12 Credits

This training teaches apprentices how to properly heat metal prior to pouring it into a sand mold. Apprentices will learn to inspect molds, heat metal to a molten state, and pour it in sand molds to create a metal casting. In this training, apprentices are able to cast ferrous and non-ferrous metal alloys. Along with the melting processes, apprentices learn to brick line ladles and decarburization vessels, run production heats, and clean furnaces and ladles after pours. Instructors also emphasize the importance of proper metallurgy, heating, and cooling of metals. Pass or fail.

A572 139 Foundry Finishing and Inspection
300 Hours 10 Credits

After a casting has been poured and cooled, it has to go through a rigorous finishing and inspection process. Apprentices will learn to finish castings by burning and arcing leftover risers and gates, grinding and chipping to fair shapes and remove defects, and blasting. The casting will be inspected using visual, dimensional, particle, and chemical inspection techniques to find flaws and porosity. The flaws found will then be repaired and inspected to ensure quality. Molder apprentices will learn each of the processes mentioned as well as learning about safety and quality in their work. Pass or fail.

NON-DESTRUCTIVE TESTER

X11 111 Hull Construction I (See SHIPFITTER)

O38 137 Magnetic Particle Inspection
360 Hours 12 Credit

Exposes apprentices to production experience inspecting for surface defects and discontinuities using magnetic yoke or prod on carbon materials. Apprentices will work under the supervision of a qualified inspector until certification is achieved. Apprentices work in shops and on ships while learning safety, quality, cost and schedule standards. The apprentice will learn to work in a team environment to inspect in accordance with drawings, procedures, and technical specifications. Pass or fail.

O38 139 Liquid Penetrant Inspection
420 Hours 14 Credits

Weld joints need to be inspected for cracks and defects which can be achieved by the liquid penetrant process. Apprentices will work under tutelage of a qualified inspector to check welds on ships and in shops. Apprentices work towards receiving their liquid penetrant testing qualification. This makes apprentices efficient and competent to inspect welds to ensure they withstand designed stresses. Apprentices follow procedures and work instructions to verify all correct criteria is met. Pass or fail.

O38 141 Ultrasonic Testing
300 Hours 10 Credits

Ultrasonic testing is a non-destructive technique used to inspect metals for discontinuities using ultrasonic waves. Apprentices will use a Pulse Echo Receiver and a probe, called a transducer, to transmit ultrasonic pulse waves into materials to detect internal flaws and material thickness requirements. This work experience will be performed in both shops and shipboard applications. They will spend time being properly trained, certified and be given several opportunities to apply their training. Pass or fail.

NUCLEAR TEST TECHNICIAN

E06T 111 Nuclear Test Technician Fundamentals
300 Hours 10 Credits

Exposes apprentices to the basics of how a nuclear reactor works and procedures for testing. During this time apprentices will sit through instructor- led training for new hires and quality assurance. Apprentices will learn the fundamentals of the components that will be tested. Instructors teach the importance of safety, quality of work, cleanliness, and job planning. This experience prepares apprentices to work safely in a production environment by utilizing proper work methods. Pass or fail.

E06T 137 Nuclear Testing and Work Control - Submarines
420 Hours 14 Credits

Provides hands on work experience on a submarine program. This on-the-job training teaches apprentices how to read, write and interpret technical work documents, testing procedures and work authorizations. Apprentices utilize the training received in Nuclear Test Technician Fundamentals to assist on performing tests on both nuclear and non-nuclear systems. Apprentices will be required to facilitate, explain, and perform tests on different components. Lead Test Engineers and Shift Test Engineers will explain how the systems work and train apprentices to ensure they meet engineering requirements. Pass or fail. Prerequisite: E06T 111.

E06T 139 Nuclear Testing and Work Control – Surface Ships
420 Hours 14 Credits

In this practical, apprentices will obtain production work experience on aircraft carriers. This experience will allow apprentices to use knowledge they learned about the ship layout. Apprentices will interact closely with our customers and other trades to ensure all testing is performed within guidelines. Apprentices learn the importance of good communication skills, teamwork, and deadlines. The importance of system cleanliness and quality of work is continually being emphasized no matter the task they are performing. Pass or fail. Prerequisite: E06T 111.

OUTSIDE MACHINIST

X43 111 Machinery Installation Theory
40 Hours 4 Credits

Includes an introduction to measurement tools, drawings and blueprints, flanges, gaskets, fastener identification, material control, and shop and portable machines. The proper care and handling of machines and the safety requirements for working with rotating machinery is covered. Finally, students taking the class will get a short overview of the material that will be covered in the X43 212 Ship Systems course.

X43 125 Outside Machinist Fundamentals
240 Hours 8 Credits

Exposes apprentices to the basics of outside machinist work in a shop environment. Apprentices will learn the fundamentals of basic hand tools, layout, drilling, tapping, boring, precision measuring tools, grinding, assembling parts, and pump alignments. Instructors teach the importance of safety, quality of work, cleanliness, and job planning. This training includes numerous qualifications needed

for production work such as lockwire, pump alignment, flange facing, and valve packing. This experience prepares apprentices to work safely in a production environment by utilizing proper work methods. Pass or fail.

X43 137 Machinery Installation - Submarines
300 Hours 10 Credits

Provides hands on work experience on a submarine program. This on-the-job training teaches apprentices how to read and interpret work instructions and drawings. Apprentices utilize the training received in Outside Machinist Fundamentals (X43 125) to set and layout equipment with dimensional control support and drill precision holes for equipment installations. Apprentices will be required to take liner sizes to make up the gaps between the foundations and the equipment location. Once the liners are received, apprentices will secure the equipment in its final location. Instructors will explain how the systems work and train apprentices to ensure engineering requirements are met. Pass or fail. Prerequisite: X43 125.

X43 139 Machinery Installation – Surface Ships
360 Hours 12 Credits

In this practical, apprentices will obtain production work experience on surface ships. This includes learning the layout of surface ships and the various compartments and decks. Outside machinist apprentices will utilize work instructions, drawings, and direction from work control to assemble, repair, and operate systems. Apprentices learn the importance of teamwork, collaboration, and how we work with our customers. The importance of system cleanliness and quality of work is emphasized. Other skills experienced during this course will include flange make up and valve operations. Pass or fail. Prerequisite: X43 125.

X43 212 Ship Systems
40 Hours 4 Credits

This course is intended to provide each student in-depth knowledge of various major shipboard systems and their operation. The following topics will be covered in the course: Hydraulic systems, Aircraft Carrier (Navigation/Surveillance/Weapons systems); Submarine (Surveillance and Weapons systems); Main Propulsion systems; Auxiliary systems; Aircraft Carrier (Deck Machinery); and, Aircraft Launch and Recovery systems (ALRE). Prerequisite: X43 111.

PATTERNMAKER

A572 111 Foundry Processes (see MOLDER)

A572 112 Blueprint Reading for Molders (see MOLDER)

M71 111 Patternmaker's Theory
15 Hours 1.5 Credits

This course will introduce patternmaker's history in shipbuilding and the basics of pattern making. The course is taught using instructor-led lectures with a series of quizzes and tests to ensure proficiency. Patternmaker's theory will provide an overview of history, patternmaker responsibilities, machine safety, procedures, pattern types, shop products, woodworking, box molds, and foundry knowledge.

M71 136 Woodworking
300 Hours 10 Credits

Patterns are made out of different woods and synthetic materials therefore the operation of woodworking and tools is vital to an apprentice's success. Apprentices will learn how to safely use basic hand tools such as saws, planes, rules, and chisels. Instructors will also demonstrate the use of power machine tools including saws, jointers, planers, drill presses, and sanders. The importance of accurate measurement will be emphasized and practiced. Synthetic materials used include lexan, plexiglass, and arboron. Patterns created will be used in the foundry to form molds and apprentices will learn the importance of material and time management. Instructors will emphasize machine safety and proper tool care. Pass or fail.

M71 137 Pattern Construction
360 Hours 12 Credits

Proper pattern construction is vital to a quality casting. Apprentices will learn how to construct and inspect outer patterns and cores. Instructors will teach apprentices how to use drawings to lay out and construct patterns. Build methods include staved, solid,

segmented, and collapsible on small to large patterns. Core construction and prints will be taught as well as hands on experience refurbishing patterns. Apprentices learn the importance of quality andcalendar working together as a team. Pass or fail.

M71 139 Foundry Operations
300 Hours 10 Credits

To better understand the role of patterns in creating castings, apprentices perform a rotation in the foundry and become a customer to the pattern shop. This ensures understanding of the importance of a pattern's quality. Work experience includes molding, inspection, production control, and planning. Apprentices learn sand compaction, mold dressing, and gate and riser setup where they directly work with the patterns their shop produces. The inspection, production control, and planning work gives the apprentice a better understanding of what goes on ensure work flows smoothly. Pass or fail.

PIPEFITTER

X42 111 Introduction to Pipefitting
24 Hours 2 Credit

Provides the apprentice with an understanding of basic hand tools, material identification (pipe / fittings / valves), trade math, and rule reading / measurement.

X42 113 Blueprint Reading Fundamentals and Procedures
24 Hours 2 Credit

Provides the apprentice with the basic principles of blueprint reading and procedures used in pipefitting. Areas covered include blueprint terminology and navigation, drawing scales, material lists, welding, brazing, and non-destructive testing procedures. Prerequisite: X42 111.

X42 121 Sketching and Bending Fundamentals
60 Hours 3.5 Credits

Provides the apprentice with the principles of sketching and bending various piping configurations. Areas covered include determining sizes of bending heads, true lengths between bends, calculating roll and bend angles, bending flat and rolling offsets, and determining bent pipe characteristics mathematically. Prerequisite: X42 113.

X42 125 Pipefitting Fundamentals
60 Hours 2 Credits

Exposes apprentices to the basics of pipefitting work in a shop environment. Apprentices learn the operation of hand tools and power tools and be taught to measure, cut, bend, fit, and end-prep pipes. Apprentices learn to cut pipe square and straight using grinders, saws, and cutting machines and to prep ends for welding. Apprentices will learn how to bend and fit a pipe to a drawing and tack weld it in place. Safety skills in a production environment are stressed. Pass or fail.

X42 137 Pipefitting – Surface Ships
420 Hours 14 Credits

Provides work experience on surface ships allowing apprentices to apply knowledge learned in X42 125 in a production environment. Apprentices will install pipe detail assemblies, hangars, and fabricate pipes in place. Work will be accomplished in accordance with drawing and procedure specifications while ensuring the piping systems and components are kept free of debris and foreign material. Pass or fail. Prerequisite: X42 125.

X42 139 Pipefitting – Submarines
420 Hours 14 Credits

Provides work experience on submarines in the installation of piping systems. Apprentices work to meet drawing criteria in a team setting while learning to fit piping and weld hangers within tolerance. Apprentices will tack weld joints and hangers, install mechanical fittings, and groom piping systems to be turned over for inspection and testing. The apprentice will learn to inspect jobs for completion and errors. Pass or fail. Prerequisite: X42 125.

PRODUCTION PLANNER

X06P 135 Production Planning - Scheduling
420 Hours 14 Credits

Apprentices will gain experience using various software programs to perform scheduling functions for shipbuilding work. Business management terminology will be explained to gain an understanding of the critical path and the corresponding impact to the schedule if modifications to workable dates are required. The production capacity constraints are explored and incorporated into the project schedule. This rotation will enhance the apprentices' written and verbal communication skills when supporting customers to identify the job requirements and sequences needed for production. Pass or Fail

X06P 137 Production Planning – Build Management
480 Hours 16 Credits

Apprentices will gain experience in incorporating product manufacturing information into product models to create work instructions in support of shipbuilding operations. Work sets, visuals, and data will assist with a detailed project plan in an integrated system to provide information for the critical chain. The focus is on maximizing production workflow through constraining work activities and proper use of resources. Additionally, this rotation will provide a foundation in planning through drawing breakdown, bill of material analysis, preparation of build sequences, footprint scheduling, and other detail specific tasks associated with work scope execution. This rotation will build upon the importance of effective communication and collaboration to accomplish jobs efficiently. Pass or Fail.

X06P 139 Production Planning – Production Control
240 Hours 8 Credits

Apprentices will provide support to the construction team to assist in work package development and implementation. Production control experience contributes to the overall level of competency by offering a hands-on application of planning products which are utilized in material management, regulating work in process, and realizing throughput. This experience emphasizes the importance of communication with internal customers and enables the apprentice to visualize how products are progressed from a value stream perspective. This will emphasize the importance of effective communication skills and will afford an opportunity to provide direct support to the customers of the production planning organization. Pass or fail.

RIGGER

X36 135 Stagebuilding and Safety
240 Hours 8 Credits

Staging is required for trades to work safely at elevated heights. A rigger apprentice will work on surface ships, submarines, and in shops to build adequate support and staging. Apprentices will learn the proper techniques, tools, and requirements to build safe staging. The apprentice will get experience with steel and wood trestles, scaffolding, frame staging, and suspended platform staging. The apprentice will learn and be able to demonstrate the ability to understand and follow pertinent sketches and drawings and complete inspection and discrepancy reports. Certification is given deeming the apprentice proficient in stagebuilding. Pass or fail.

X36 137 Lifting and Handling - Ship
300 Hours 10 Credits

Equipment and machinery must be rigged on location inside of ships where a traditional crane cannot access. Rigger apprentices will learn proper lifting and handling techniques of material and equipment. The apprentices learns to spot lift pads, establish appropriate lifting points, use approved materials to lash equipment to be moved, utilize proper equipment to lift and carry equipment through a ship and assist other trades with the installation of equipment. The apprentice will also learn to establish a proper lift plan and work to engineering instructions. This learning experience is in a production work environment. Pass or fail.

X36 139 Lifting and Handling - Cranes
360 Hours 12 Credits

Equipment and machinery must be rigged on location inside of ships where a traditional crane cannot access. Rigger apprentices will learn proper lifting and handling techniques of material and equipment. The apprentices learns to spot lift pads, establish appropriate lifting points, use approved materials to lash equipment to be moved, utilize proper equipment to lift and carry equipment through a ship and assist other trades with the installation of equipment. The apprentice will also learn to establish a proper lift plan and work to engineering instructions. This learning experience is in a production work environment. Pass or fail.

X36 211 Stagebuilding, Blocking, and Shoring Theory
34 Hours 3 Credits

Stagebuilding, Blocking and Shoring theory will cover terms, procedures and techniques for the safe installation of staging and support of vessels under construction and dry-docking operations. Topics will include calculating loads, blocking drawings, applicable staging forms, and principal types of staging. By the completion of the course, students will be able to design staging using present technology.

X36 212 Lifting and Handling Equipment Theory
32 Hours 3 Credits

Lifting and Handling Theory will cover the terms, tools, procedures most often used by X36 for safe rigging operations. It will include load and center of gravity calculations, evaluating and resolving scenarios. At the conclusion of the course, students will be able to develop a lift plan in teams and individually.

X36 213 Mooring and Ventilation Theory
34 Hours 3 Credits

The mooring section of this course is designed to provide a general knowledge of the mooring process of both aircraft carriers and submarines. The ventilation theory section of this course is designed to build on the knowledge gained in the Temporary Ventilation Training course and to learn more about the responsibilities of Temporary Ventilation Foremen.

SHEET METAL WORKER

X32 111 Sheet Metal Print Reading
48 Hours 4.5 Credit

Provides the apprentice with a thorough knowledge of basic print reading and grouping that is essential to the sheet metal trade. This course covers fundamental drawing information, including isometric and orthographic objects, weld symbols, ship terms and abbreviations, scaling, types and parts of drawings, and work packages. Also includes interpreting group sheets and computer bills of material.

X32 112 Materials and Machine Processes Theory
24 Hours 2 Credit

Exposes the apprentice to various sheet metal materials as well as the machinery and processes involved in the fabrication and installation of sheet metal products. This course includes material identification and characteristics along with types of fasteners and pipe sizes. In addition, the course covers basic sheet metal tools and machines, machine processes, shielded metal arc welding, drilling, and tapping operations, with emphasis placed on safe work practices. Prerequisite: X32 111.

X32 113 Sheet Metal Layout Theory
24 hours 2 Credit

Introduces the apprentice to the concepts of planning, designing, and shaping complex sheet metal components using applied math and geometry. This course covers sheet metal and heavy metal layout for breaking, forming, rolling, and notching to form material into three dimensional objects and components. The course includes square breaks, radius breaks, and rolling by hydraulic presses, hand brakes, and hand and power rollers, with an emphasis on safe, efficient work practices. Prerequisite: X32 112.

X32 125 Fundamentals of Sheet Metal
120 Hours 4 Credits

Exposes apprentices to the basics of sheet metal work in a shop environment. Apprentices start by learning the functions and use of basic hand and measurement tools, grinders, and safety procedures. Apprentices learn advanced skills such as the use of sheet metal breaks, rollers, saws, rivets, punches, dies, shears, and sanders. The skill of welding thin metals using different processes is taught. Apprentices will learn proper layout and assembly in accordance with drawings and work documents. Pass or fail.

X32 135 Sheet Metal Shop Work
180 Hours 6 Credits

This practical provides the apprentice with production shop work experience. Apprentices experience the stages of sheet metal fabrication and learn and use breaks, rollers, and shears to fabricate assemblies and then use numerous welding processes to join and finish them. Pass or fail. Prerequisite: X32 125.

X32 137 Ventilation Installation
300 Hours 10 Credits

Provides hands on work experience on surface ships and submarines. Apprentices install and test ventilation equipment including the fit-up of vents, installation of fans and climate control equipment, and grooming systems for completion. This requires working in a team environment in accordance with drawings and procedures. Apprentices will apply knowledge learned in X32 125 in a shipboard production environment. Pass or fail. Prerequisite: X32 125.

X32 139 Equipment Installation
300 Hours 10 Credits

Apprentices work to construct and outfit compartments while using drawings and work documents to meet engineered specifications. The construction requires welding, riveting, layout, measurement, and assembly. Apprentices will learn to work a process from beginning to completion and including inspection. Pass or fail. Prerequisite: X32 125.

SHIPFITTER

X11 111 Hull Construction I
18 Hours 1.5 Credit

Develops a general understanding of safe and efficient shipbuilding manufacturing practices and the tools involved in these practices. Includes hull trade apprentice shipyard safety responsibilities, tools of the trade, ship nomenclature, hull construction, basic ship lines, structural shapes, fractions and plate weight conversions. Also includes, interpretation of drawings, work packages, material layoff, joint fit-up, workmanship, and weld symbols.

X11 112 Hull Construction II CVN Drawings and Work Packages
8 Hours 1 Credit

Develops an understanding of efficient shipbuilding manufacturing practices through detailed drawing and work package interpretation. Includes analysis of carrier construction documents. Prerequisite: X11 111.

X11 113 Hull Construction II VCS Drawings and Work Packages
8 Hours 1 Credit

Develops an understanding of efficient shipbuilding manufacturing practices through detailed drawing and work package interpretation. Includes analysis of submarine construction documents. Prerequisite: X11 111.

X11 137 Shipfitting Practical - Shops
300 Hours 10 Credit

Provides apprentices with practical experience on submarine and surface ship components in shop and platen environments. Apprentices learn safe use of grinding, burning, and welding equipment and are taught to work to drawing and procedure requirements. The apprentice will prep and fit plates and structures into modules for ships by grinding and burning pieces to drawing

specifications and then tack welding into place. The apprentice will learn to work at a production-level pace and meet all guidelines. Pass or fail.

X11 138 Shipfitting Practical - Submarines
360 Hours 12 Credit

Provides practical shipfitting experience working on a submarine. While shipboard, apprentices will work on hull structures, foundations, bulkheads, and tanks. Apprentices will learn to work to the applicable drawings and procedures while maintaining a safe environment. The apprentice will weld, grind and fit steel assemblies and structures to the submarine. Also, tanks will be opened and closed and apprentices will perform burning jobs making precise cuts. The apprentice will work as part of a team and will also learn to work with the customer. Pass or fail.

X11 139 Shipfitting Practical – Surface Ships
360 Hours 12 Credit

Provides practical shipfitting experience on a surface ship. While shipboard, apprentices will work on hull structures, foundations, bulkheads, and tanks. Apprentices will learn to work to the applicable drawings and procedures while maintaining a safe environment. The apprentice will weld, grind and fit steel assemblies and structures to the surface ship. Also, foundations for machinery will be set, tanks will be opened and closed, and burning jobs performed requiring precise cuts. Pass or fail.

SUPPLY CHAIN SPECIALIST

X06S 111 Fundamentals of Supply Chain Management
300 Hours 10 Credit

Exposes apprentices to the basics of supply chain management, the procurement process, and compliance and storage requirements for all materials purchased. Apprentices will learn the fundamentals of purchase orders, supplier compliance, federal and state requirements as well as warehousing. Apprentices will be shown the importance of quality of work, attention to detail, and working with suppliers. This experience prepares apprentices to work efficiently on their own and learn procedural requirements. Pass or fail.

X06S 137 Supply Chain Management – Direct Procurement
420 Hours 14 Credit

Provides hands on work experience in direct contract procurement. This on-the-job training teaches apprentices how to read and interpret engineering documents to create different types of documents to send to suppliers such as a Request for Quote (RFQ). Apprentices will learn the importance of good communication and networking skills as they negotiate a fair price for the materials they are purchasing. Apprentices will also get to research for possible new suppliers available to ensure that the proper supplier is being selected. Pass or fail. Prerequisite: X06S 111.

X06S 139 Supply Chain Management – Indirect Procurement
420 Hours 14 Credit

In this practical, apprentices will obtain experience purchasing a variety of equipment for the facilities planning, facilities engineering, and many other departments within the shipyard. This will include having to facilitate meetings or briefs about projects. Apprentices will utilize information and contacts learned in Supply Chain Management Fundamentals to work with warehousing to store and distribute material to job sites. This experience will be high paced and apprentices will learn the importance of time management, organizational skills, and stress management. The importance of team work and attention to detail will be emphasized as apprentices work with high volume purchase orders. Pass or fail. Prerequisite: X06S 111.

WELDER

X11 111 Hull Construction I (See SHIPFITTER)

X18 112 Welding Fundamentals: SMAW and GMAW
18 Hours 1 Credit

Develops a general understanding of safe and efficient welding practices and the tools involved in these practices. Includes shipyard safety, fundamentals of SMAW electrical circuits, terms and definitions, weld symbols, the structural joint numbering system, and proper welding sequence. Consists of an examination of GMAW components and electrical characteristics of the system.

X18 137 Welding - Submarines
510 Hours 17 Credit

Provides practical experience welding in a production environment on submarines and related components. Apprentices will utilize proper procedures to include numbered joints to produce quality welds that will withstand designed stresses. Apprentices will learn to work using submarine drawings and weld maps to include inspecting to ensure proper criteria is met. The weld processes used will include SMAW, GMAW, FCAW, and GTAW. Apprentices will have to use proper heating sources, set machine parameters, and troubleshoot machine issues. Apprentices will learn to work in a team environment towards a common goal. Pass or fail.

X18 139 Welding – Surface Ships
510 Hours 17 Credit

Provides work experience performing welding operations to support construction on surface ships. Apprentices will weld related components in different stages of construction using hull drawings and proper procedures. Apprentices will use basic weld processes in SMAW, GMAW, GMAW-P, FCAW, and GTAW. Proper weld sequencing will be observed and apprentices will use proper gauges for pre-inspection and preheating techniques. Machine parameters such as gas flow, power supply and wire feed are set in accordance with job standards and procedures. Apprentices will weld multiple joint designs including butt, fillets, corners, and tees. Pass or fail.

X18 212 Introduction to Non Destructive Testing (NDT)
8 Hours 1 Credit

Develops an academic and hands-on understanding of non-destructive weld testing techniques. Includes the most common types of weld discontinuities, the most commonly used NDT methods, and the advantages and limitations of each. The course also includes the interrelationships between welding processes, discontinuities, and inspection methods.

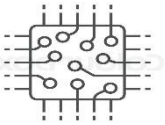
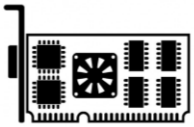
WELDING EQUIPMENT REPAIRER

X31 111 Applied Theory I: DC Concepts (See ELECTRICIAN)
X31 112 Applied Theory II: AC Concepts (See ELECTRICIAN)
X31 212 Applied Theory III: Polyphase Systems and Controls (See ELECTRICIAN)
X31 214 Programmable Logic Controllers (See ELECTRICIAN)

O43W 142 Welding Equipment Repair
360 Hours 12 Credit

In this practical, apprentices receive training in general welding equipment repair and welding power supplies throughout the plant directly servicing production areas. With an emphasis on safety they will utilize acquired qualifications for Lock-out/Tag-out procedures on electrical systems, CPR training, and Low Voltage certifications. They will also apply National Electrical Code as related to welding processes. Welding repair apprentices will troubleshoot and repair a variety of peripheral equipment including wire feeders, a variety of welding power supplies, and a variety of automatic and semi-automatic welding apparatus. Pass or fail.

Minimum Laptop Requirements:

Operating System 	A laptop computer with at least Windows 10 operating system (64-bit only, version 1803 or higher) is required no more than 4 years old. **Since Chromebooks and Macs do not provide for the functionality needed for drafting they are not allowed.**
Processor 	2.5 – 2.9 GHz (3+ GHz recommended) (based on turbo speed) **Recommended:** Intel 8th gen i5 or better AMD Ryzen 5 2600 or better
Memory 	8 GB (16 GB recommended)
Display Card 	1GB GPU with 29 GB/s Bandwidth and DirectX 11 compliant (4 GB GPU with 106 GB/s Bandwidth and DirectX 11 compliant)(based on AutoCad website) **Recommended:** Integrated graphics will work as long as they can share at least 2gb with system RAM
Disk Space 	6.0 GB
Mouse 	A mouse is recommended to assist with completing online assessments and drawings.
Printer 	A printer is recommended.
	At least a 15.6” screen is recommended because using AutoCAD on a smaller monitor is more challenging since the interface takes up so much of the window.

Enrollment and Graduation Data

Program Name	Enrollment Count (as of 12-31-23)	Enrollment Percentage (as of 12-31-23)	Graduation Count (as of 12-31-23)	Graduation Percentage (as of 12-31-23)
Maritime Technology – Coatings Specialist	21	3.4%	0	0%
Maritime Technology – Electrician	91	14.7%	0	0%
Maritime Technology – Heating and Air Conditioning	4	0.6%	0	0%
Maritime Technology – Heavy Metal Fabricator	10	1.6%	0	0%
Maritime Technology – Insulator	28	4.5%	0	0%
Maritime Technology – Machinist	21	3.4%	0	0%
Maritime Technology – Maintenance Electrician	11	1.8%	0	0%
Maritime Technology – Maintenance Pipefitter	0	0%	0	0%
Maritime Technology – Millwright	9	1.5%	0	0%
Maritime Technology – Molder	6	1.0%	0	0%
Maritime Technology – Non-Destructive Tester	13	2.1%	0	0%
Maritime Technology – Outside Machinist	87	14.1%	0	0%
Maritime Technology – Patternmaker	0	0%	0	0%
Maritime Technology – Pipefitter	73	11.8%	0	0%
Maritime Technology – Rigger	30	4.8%	0	0%
Maritime Technology – Sheet Metal Worker	35	5.7%	0	0%
Maritime Technology – Shipfitter	45	7.3%	0	0%
Maritime Technology – Welder	78	12.6%	0	0%
Maritime Technology – Welder Equipment Repairer	1	0.2%	1	100%
Maritime Technology – Cost Estimator	3	0.5%	0	0%
Maritime Technology – Metrology Technician	14	2.3%	0	0%
Maritime Technology – Marine Designer	13	2.1%	0	0%
Maritime Technology – Modeling and Simulation Program Analyst (discontinued 2/2025)	0	0%	0	0%
Maritime Technology – Nuclear Test Technician	10	1.6%	0	0%
Maritime Technology – Production Planner	7	1.1%	0	0%
Maritime Technology – Supply Chain Specialist	9	1.5%	0	0%
Total	619	~100.0%	1	100%

Associate of Applied Science: Maritime Technology degrees began to be offered in July 2020, the first apprentice to graduate from the programs was in 2023.