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Curriculum

Course Descriptions

Marine Technologies

Specialization in Boatbuilding

Associate in Applied Science 70 credit hours

The purpose of the Boatbuilding Technology specialty of the Marine Technology Associate in Applied Science curriculum is to prepare students for success in a broad range of entry-level positions in the boatbuilding/marine industry including boat construction, maintenance, and repair. Classes are conducted in a well-equipped boat shop at Deep Cove, Eastport, where students participate in the construction of boats from start to finish. Through a combination of technical instruction and practical boatbuilding experience, students acquire an understanding of the principles of boat design and drafting as well as the skills needed for lofting, building and maintaining wooden and composite boats. Students are also made aware of the techniques and importance of accurate cost estimating and of labor and materials cost control.

Career Opportunities

Successful completion of the program qualifies graduates for a variety of positions in boat construction, marine drafting, maintenance and repair in boatyards, marinas, and in private boatbuilding companies.

<u>Semester 1</u>		<u>Credits</u>
BOA102	Boatshop Safety	2
BOA111	Introduction to Boatbuilding	3
BOA112	Marine Drafting I	2
BOA113	Marine Drafting II	2
BOA130	Lofting	2
BOA150	Fiberglass Tech & Repair	2
BOA158	Boat Handling	2
MAT118	Intermediate Algebra	3
Total		18
<u>Semester 2</u>		
BOA144	Wooden Boat Construction or	8
BOA114	Marine Drafting III	3
ENG101	College Composition	3
PSY211	Human Relations	3
Total		17
<u>Semester 3</u>		
BOA164	Hull Survey	2

BOA171	Marine Joinery	3
BOA200	Marine Drive Train Selection	2
BOA 280	Wooden Boat Restoration	4
HIS110	Maritime History	3
PSY or SOC	Humanities Elective	3
Total		17

Semester 4

BOA190	Principles of Small Craft Design	3
BOA191	Optional lab for principals of SCD	1
BOA210	Composite Technology	3
BOA220	Composite Composition	5
MMT161	Marine Systems	3
DRG210	Computer Aided Drafting	3
Total		17 or 18

Boatbuilding Technology*Diploma 59 credit hours*

The Boatbuilding Technology Diploma program prepares students for entry into the boatbuilding industry. Through a combination of technical instruction and practical boatbuilding experience, students acquire an understanding of the principles of boat design and drafting as well as the skills needed for lofting, building and maintaining wooden and fiberglass boats. Students are also made aware of the techniques and importance of accurate cost estimating and of labor and materials cost control.

Career Opportunities

Graduates may find employment for a variety of positions in boat construction, maintenance and repair in boatyards, marinas and private boatbuilding companies.

Semester 1

BOA102	Boatshop Safety	2
BOA111	Introduction to Boatbuilding	3
BOA112	Marine Drafting I	2
BOA113	Marine Drafting II	2
BOA130	Lofting	2
BOA150	Fiberglass Technology and Repair	2
BOA158	Boat Handling	2
MAT106	College Mathematics for Tecnology	3
Total		18

Semester 2

BOA114	Marine Drafting III	2
BOA144	Wooden Boat Construction	8
COM100	Technical Communications	3
Total		13

Semester 3

BOA164	Hull Survey	2
BOA171	Marine Joinery	3
BOA200	Marine Drivetrain Selection	2
BOA280	Wooden Boat Restoration	4
HIS110	Maritime History	3
Total		14

Semester 4

BOA190	Principals of Small Craft Design	3
BOA191	Optional lab for Principals of SCD	1
BOA210	Composite Technology	3
BOA220	Composite Construction	3
BOA230	Corrosion 1 MMT161 Marine Systems	3
MMT186	Marine Engine Installation	1
Total		14 or 15

Marine Composites

Certificate 32 credit hours

The Marine Composites program will train students with no prior experience, in the safe use and application of commonly used composite materials and processes. A major portion of instruction will focus on current and emerging technologies. Projects will involve hand lamination, vacuum bag construction and repair; coldmold construction, interior hull components, decks and finish work. Curriculum will involve hands-on instruction in the safe use of stationary and portable power tools. Students will also learn basic woodworking skills and the

application of fasteners, adhesives and other materials peculiar to boatbuilding. This certificate can lead to an A.A.S. in Marine Technology.

Career Opportunities

The level of preparation received will enable graduates to be employed with entry level skills by businesses that primarily manufacture custom or stock fiberglass and wood composite vessels.

Semester 1

BOA102	Boatshop Safety	2
BOA111	Introduction to Boatbuilding	3
BOA112	Marine Drafting I	2
BOA113	Marine Drafting II	2
BOA130	Lofting	2
BOA150	Fiberglass Technology and Repair	2
BOA158	Boat Handling	2
MAT106	College Mathematics for Technology	3
Total		18

Semester 2

BOA114	Marine Drafting III	3
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BOA210 Composite Tech 3 BOA220 Composite Construction 5

COM100	Technical Communications	3
Total		14

Wooden Boatbuilding

Certificate 32 credit hours

This certificate option will introduce students to boatbuilding using wood as the primary construction material. This program will focus on traditional construction methods combined with an introduction to marine drafting and lofting. The level of preparation received will enable graduates to be employed with entry level skills by businesses that offer primarily wood boatbuilding or repair services. This certificate can lead to an A.A.S. in Marine Technology.

Career Opportunities

Graduates may find employment for a variety of positions in boat construction, maintenance and repair in boatyards, marinas and private boatbuilding companies.

Semester 1

BOA102	Boatshop Safety	2
BOA111	Introduction to Boatbuilding	3
BOA112	Marine Drafting I	2
BOA113	Marine Drafting II	2
BOA130	Lofting	2
BOA150	Fiberglass Technology and Repair	2
BOA158	Boat Handling	2
MAT106	College Mathematics for Technology	3

Total		18
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Semester 2

BOA114	Marine Drafting III	3
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BOA144	Wooden Boat Construction	8
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COM100	Technical Communicatons	3
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Total		14
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Marine Mechanics Technology

The Marine Mechanics Certificate program will prepare students for success in entry-level positions in the field of boat engine and systems installation, maintenance and repair. The program is designed with a systems approach to installation, diagnosis, maintenance, and repair of mechanical and electrical systems of commercial vessels and pleasure craft.

Career Opportunities

Graduates of this certificate program will find employment in boatyards, marinas, and in private boatbuilding companies. Students may elect to continue their education in the Marine Technology Associate Degree program.

Marine Mechanics Technology

Certificate 38 credit hours

Semester 1

BOA102	Boatshop	2
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BOA150	Fiberglass Technology and Repair	2
BOA158	Boat Handling Operation	2
MAT106	College Mathematics for Technology	3
MMT120	Heavy Duty Marine Electrical Systems	3
MMT130	Internal Combustion Engines	3
MMT145	Marine Gas and Diesel Systems	3
Total		18
 <u>Semester 2</u>		
BOA230	Corrosion	1
COM100	Technical Communications	3
MMT161	Marine Systems	3
MMT186	Marine Engine Installation	1
MMT205	Basic Outboard and PWC Service	2
MMT225	Marine Hydraulics	2
MMT230	Marine Drive Train	2
MMT250	Marine Wiring	3
WEL110	Introductory to Welding	3
Total		20

Course Descriptions

BOA102 BOAT SHOP SAFETY 2

This introductory course will cover safe use of stationary and portable power tools and basic woodworking and mechanical skills.

BOA111 INTRODUCTION TO BOATBUILDING 3

Construction of shop projects will be used for instruction in fasteners, adhesives, basic hull materials, shape and shop management. There will be an emphasis on improved woodworking skills and terminology. Prerequisite: BOA102 passed with a C or better.

BOA112 MARINE DRAFTING I 2

This is an introductory course. The student will learn basic mechanical and marine drafting techniques and practices. Instruction will be given in using a scale rule, drawing instruments, applied geometry, third angle projection, auxiliary views, dimensioning and related material.

BOA113 MARINE DRAFTING II 2

This course continues marine Drafting I to focus entirely on lines plans and reading construction drawings. Prerequisite: BOA112 with a C or better.

BOA114 MARINE DRAFTING III 3

This course builds upon the basic skills learned in BOA113. The student will develop lines plans, and construction plans, including scantling rules-of-thumb. Outboard profiles and accommodations are introduced. Prerequisite: BOA113 passed with a C or better.

BOA130 LOFTING 2

Lofting is a system of accurately drawing the boat full size in order to obtain molds, patterns and other important information necessary to construct any boat. Prerequisite: BOA113 passed with a C or better.

BOA144 WOODEN BOAT CONSTRUCTION 8

Continuing with the plank on frame design lofted in BOA130 the subjects studied will include set up, backbone assembly, mold construction, framing, planking,

interior construction, faring, and caulking Prerequisite: BOA111 and BOA130 passed with a C or better.

BOA150 FIBERGLASS TECHNOLOGY AND REPAIR 2

This course will cover the safe use and application of fabrics and resins. Topics introduced will include fabric types and their use; polyester, vinylester, and epoxy resins; secondary bonding; hand lamination; vacuum bagging; and repair techniques.

BOA158 BOAT HANDLING 2

A "hands on" course in piloting boats from mooring to dock and securing to dock. It also includes basic operation of a marine travelift.

BOA164 HULL SURVEY 3

Students will be instructed on various methods of determining condition of hull including metal components. During course various boats will be surveyed, damage documented and repair techniques suggested. Cost estimates and project management topics will also be studied.

BOA165 HULL REPAIR 2

Students will be instructed in the repair of hull structure applying skills learned in Hull Survey. To include planking, frames, backbone and other related components. Projects are live and vary yearly. Prerequisite: BOA270 passed with a C or better.

BOA171 MARINE JOINERY 3

This course moves on to finer woodworking skills. Subjects covered will include the selection of materials, both traditional and high tech, and the construction and

installation of components such as doors, drawers, bulkheads and trim.
Prerequisite: BOA111 passed with a C or better.

BOA190 PRINCIPLES OF SMALL CRAFT DESIGN 3

This is an introductory course. Subjects covered include physical support, hull types, speed/length ratios, lines, sail and propeller theory, powering, rig types and appearance. Prerequisite: BOA114 passed with a C or better.

BOA191 LAB FOR SMALL CRAFT DESIGN 1

This lab is designed to support the principles in BOA190. Projects include the actual preliminary design of a power boat to include, lines, profile, and layout. Prerequisite: BOA114 passed with C or better.

BOA195 BOATBUILDING WORK COOPERATIVE 1

Students work in an approved boatyard for a minimum of 4 weeks and are evaluated against a number of performance criteria by their on-site supervisor.

BOA200 MARINE DRIVETRAIN SELECTION 2

Students will determine powering needs, interpret propulsion specifications, select and locate propellers, shafts, bearings and related mechanical systems. Emphasis is on ABYC standards.

BOA201 MARINE PAINTING 2

This is a "Hands-on" course utilizing industry experts and live projects.

BOA202 RIGGING 2

This course is primarily focused on sailboat rigging. Mechanical

advantage, stepping and unstepping mast and routine maintenance are covered.

BOA210 COMPOSITE TECHNOLOGY 3

The student will be introduced to modern composite technologies. Subject areas will include the fundamentals of polymer resins, cores and laminates; mold making and various construction techniques to include vacuum bagging and cold molding. Projects will include the construction of laminates and the destructive testing of their properties. Prerequisite: BOA150 passed with a C or better.

BOA220 COMPOSITE CONSTRUCTION 5

This course covers advanced shop skills including cold-molded boat construction. Solid and cored fiberglass boat construction techniques will be studied. Open mold and vacuum bag techniques will be used. Prerequisite: BOA210 passed with a C or better.

BOA230 CORROSION 1

Lecture type course with lab demonstration showing results of galvanic and stray current corrosion and how to control them. Bonding and lightning protection per ABYC standards are also covered

BOA280 WOODEN BOAT RESTORATION 3

Students will be instructed in the construction and restoration of decks, cabins, interior components and related hull structure. Skills learned in hull survey will be applied. Prerequisite: BOA144 and BOA164 passed with a C or better.

BOA295 COMPUTER YACHT DESIGN 3

Students will be introduced to computer software designed specifically for yacht

design. The ability to utilize the software will be demonstrated by the successful completion of a design project. Prerequisites BOA 190 and DRG210 passed with a C or better.

MMT100 PRINCIPLES OF MARINE MECHANICS 2

Students will be trained in proper tool usage to include hand tools, power tools (both hand and stationary) plus measuring instruments commonly used in mechanical trades. General subjects include basic engine theory, fastenings, bearings, seals, gasketing methods, and areas of knowledge necessary to successfully function in a mechanical environment.

MMT120 HEAVY DUTY MARINE ELECTRICAL SYSTEMS 3

This course teaches basic electrical theory as it applies to DC and AC circuits and equipment found in typical marine applications. Theory, maintenance, troubleshooting and field repairs for components (batteries, starters, alternators, etc.) from the battery through to the main distribution panel are covered. Heavy emphasis will be placed on mastering the multimeter as a diagnostic tool in troubleshooting electrical problems.

MMT130 INTERNAL COMBUSTION ENGINES 3

This course teaches basic 4 cycle, gas and diesel theory plus terminology and operation of those engine components and systems common to reciprocating internal combustion engines. Diagnostic and trouble shooting methods to determine basic engine health will be developed in classroom and lab settings. The course will cover engine instrumentation, lubrication and cooling systems, as well as, routine maintenance, engine lay-up and start up practices. Prerequisite: BOA102, passed with a C or better.

MMT145 MARINE GAS & DIESEL SYSTEMS 3

This course expands upon MMT130 covering the gas and ignition systems associated with both carbureted and computer managed gas engines plus diesel fuel injection systems as applied to marine engines. Theory of operation, trouble shooting and field repairs of the systems plus routine maintenance will be

covered. Prerequisite: MMT130.

MMT161 MARINE SYSTEMS 3

In this course the students will gain experience in using ABYC standards for proper engineering and installation of the systems needed in today's fleet. Topics to include potable and non-portable water systems, sanitation systems, and engine systems. Basic repair and winterization will also be covered.

MMT165 MARINE ELECTRICAL SCHEMATIC 2 This course presents training in industry standards for small vessel electrical design specifications. Vessel electrical system schematics, including symbols, terminology and blue print reading will be covered. Layout and format for design will be presented to local small craft designers specifications and American Boat and Yacht Council (ABYC) standards. US Coast Guard requirements for inspected wiring and installation will also be covered.

MMT170 MARINE ELECTRICAL CODE 2

This course will be delivered based on American Boat and Yacht Council (ABYC) standards for wiring and installation on small craft. Topics will include product quality and liability, installation, component application and preparation for ABYC certification. This course can not administer ABYC certification testing but is designed as a component for preparation for certification.

MMT186 MARINE ENGINE INSTALLATION 1

This course will cover installation of common propulsion/drive train configurations. Students will get an overview of proper service and basic maintenance of the above. This is a lab-orientated course designed to provide hands-on experience through actual engine/drivetrain installation using live projects or mock-ups. This course supplements and puts to use knowledge from MMT230- Marine Drive Train. Prerequisite: BOA112 passed with a C or better.

MMT205 BASIC OUTBOARD & PERSONAL

WATERCRAFT SERVICES 2

This course will look at 2 and 4 cycle outboards, personal watercraft (jet skis), and their related systems. Students will perform basic maintenance, winterization, spring start-up, and troubleshooting. This course will be an overview of common maintenance and field repair procedures, not specific to one brand of manufacture. Prerequisite: MMT100 MMT120 passed with a C or better.

MMT215 MARINE SAFETY 1

Marine safety will introduce the student to requirements of small vessels with regard to safety equipment and its operation. Students will be trained in emergency operations of fire fighting equipment, VHF radio operation, distress signaling equipment, and cold water survival.

MMT225 MARINE HYDRAULICS 2

This course covers basic hydraulic theory and applications. The student will learn the basics of engineering and servicing marine type systems to include tanks, lines, pumps, motors, controls, and rams. Emphasis will be placed on marine hydraulic machinery and steering systems. Prerequisite: BOA112 passed with a C or better.

MMT230 MARINE DRIVE TRAIN 2

This course will cover marine clutches, reduction gears, stern drives, shaft bearing, and prop installation. Students will get an overview of proper service and basic maintenance of the above plus power train of jet drives. Labs will concentrate on trouble shooting and field repairs of the components involved in marine drive trains with special emphasis on marine transmissions. Prerequisite: BOA112 passed with a C or better.

MMT250 MARINE WIRING 3

This course combines ABYC preparation for certification as Marine Electrical Technician as described in MMT170 with a application lab. Through the lecture

and lab format the student will learn proper wire sizing, looming, termination, fusing, and grounding circuits in boats from battery switch to electronics. AC will be covered as relates to safety, basic shore tie, and installation of AC battery charges. Prerequisite: BOA112 passed with a C or better.

MMT260 ELECTRONIC AIDES TO NAVIGATION 3

This 30-hour course will cover proper installation and location of Radar, Global Positioning Satellite systems, weather faxes, antennas, plotters, electronic compasses, and Marine Radios. Along with installation, students will be exposed to the proper operation and function of the above equipment as is available on boats or with simulation.

MMT270 MARINE PLUMBING 2

The Marine Plumbing course will involve participants in schematic lay out of potable, non-potable, and sea water systems. Components, fixtures and their installation will be a major focus of the course. Sizing of pumps and delivery systems as well as, requirements in installation of holding systems and shore delivery will be covered. American Boat and Yacht Council standards will be guided criteria for all applicable systems in addition to US Coast Guard requirements for ballast and bilge pumping systems.

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