

KINGSBOROUGH COMMUNITY COLLEGE  
OF  
THE CITY UNIVERSITY OF NEW YORK

**PROPOSAL**

**24-Credit Certificate Program in Marine Mechanic**

REC PROJ OCT23 8713-47

Sponsored by: The Department of  
Tourism and Hospitality, Office of  
Maritime Technology

Attachment B

B-1

A. **Name of Institution:** Kingsborough Community College

Specify campus where program will be offered if other than the main campus:

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B. **CEO or Designee:** President Regina S. Peruggi

THE SIGNATURE OF THE INSTITUTIONAL REPRESENTATIVE  
INDICATES THE INSTITUTION'S COMMITMENT TO SUPPORT THE  
PROPOSED PROGRAM.

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C. **Contact person, if different:** Anthony DiLernia, Director, Office of  
Maritime Technology

**Telephone:** 718-368-4558      **E-mail:** ADiLernia@Kingsborough.edu

D. **Proposed program title:** Marine Mechanic Certificate

E. **Proposed degree or other award:** Certificate

F. **Proposed HEGIS Code:** N/A                      **Total Credits:** 25

G. **If the program would be offered jointly with another institution, name the  
institution/branch:** N/A

IF THE OTHER INSTITUTION IS DEGREE GRANTING, ATTACH A  
CONTRACT OR LETTER OF AGREEMENT SIGNED BY THAT  
INSTITUTION'S DEO. IF IT IS NON-CREDIT GRNTING REFER TO  
MEMORANDUM TO CHIEF EXECUTIVE OFFICERS NO. 94-04.  
CONTACT THIS OFFICE IF YOU WOULD LIKE TO RECEIVE A COPY.

H. **If the program would lead to teacher certification other than a classroom  
teacher:** N/A

I. **Indicate the accrediting group:** N/A

J. **Indicates the expected date of accreditation:** N/A

## TABLE OF CONTENTS

	<u>PAGE</u>
I. PURPOSE AND GOALS .....	4
II. NEED AND JUSTIFICATION .....	5
III. CURRICULUM .....	6
IV. STUDENTS	
A. POTENTIAL STUDENTS .....	8
B. RECRUITMENT METHODS .....	8
V. ENROLLMENT REQUIREMENTS .....	9
VI. COST .....	9
VII. FACULTY .....	9
VIII. FACILITIES AND EQUIPMENT .....	9
IX. EVALUATION AND OUTCOMES ASSESSMENT .....	9

## I. PURPOSE AND GOALS

The growth in recreation boating, both in New York City and nationally, has spurred tremendous demand for qualified marine mechanics who can service boat engines and operate marinas. According to the Bureau of Labor Statistics, marine technician employment will grow as fast as the average for all occupations, and people with this training should enjoy good prospects. Rapid advances in marine propulsion technology require a high level of competency and training.

Kingsborough Community College of the City University of New York grants an A.A.S. degree in Maritime Technology. The 60-credit degree, offered by the Department of Tourism and Hospitality, Office of Maritime Technology, meets the educational requirements for graduates to become deckhands, mates and officers aboard tugboats, high speed ferries and dinner boats as well as crewmen aboard private yachts. This program differs from traditional Maritime training due to the fact that students are required to take both deck and engine courses. Most Maritime schools require students to take courses designed to train an individual to be engineers or deckhands. In addition to its degree program, Kingsborough Community College also offers a state-approved Deckhand Certificate program with college credit.

The marine mechanic specialty relates to all those jobs below-deck that pertain to the functioning of the ship's machinery, such as the engines that move the ship and the electricity for lighting. Motorboat mechanics, or marine equipment mechanics, repair and adjust the electrical and mechanical equipment of inboard and outboard boat engines. Most small boats have portable outboard engines that are removed and brought into the repair shop. Larger craft, such as cabin cruisers and commercial fishing boats, are powered by diesel or gasoline inboard or inboard/outboard engines, which are removed only for major overhauls. Most of these repairs are performed at the docks or marinas. Motorboat mechanics also may work on propellers, steering mechanisms, marine plumbing, and other boat equipment.

Like large engines, small engines require periodic service to minimize the chances of breakdowns and to keep them operating at peak performance. Mechanics use various techniques to diagnose the source and extent of the problem. After diagnosing the problem the mechanic makes the needed adjustments, repairs, or replacements. These skills are taught and best used through an organized, college-level program which grants a certificate, making the student more marketable in today's economy.

Kingsborough Community College (KCC) proposes the development of a Marine Mechanic Certificate Program which will be a subset of the existing registered A.A.S. Degree in Maritime Technology currently offered by the college. The mission of the certificate program is to provide required short-term, career-specific training that enables an individual to gain employment in the maritime field. The specific goals that are programmed to be accomplished include:

1. Develop in students the mechanical skills that can be applied to repairing and

- servicing both marine and land-based machinery;
2. Develop in students the basic skills necessary to make the student eligible for advanced training by marine manufacturers;
  3. Develop in students the skills which will either accelerate or eliminate the traditional apprenticeship time necessary to become a qualified marine mechanic;
  4. Create career opportunities for individuals with marine mechanical interests who are not interested in developing traditional maritime navigational and seamanship skills;
  5. Develop in maritime technology students the marketable skills necessary in the field of Marine Mechanics to increase their employability for entry level positions, and;
  6. Respond to the local marine industry's need for qualified marine mechanics.

## **II. NEED AND JUSTIFICATION**

Small engine mechanics held about 73,000 jobs in 2004. Motorboat mechanics held approximately 23,000 and outdoor power equipment and other small engine mechanics about 31,000. Almost half worked for motor vehicle dealers, an industry that includes retail dealers of motorcycles, boats, and miscellaneous vehicles; or for retail hardware, law and garden stores. The remainder were employed by independent repair shops, marinas and boatyards, equipment rental companies, wholesale distributors, and landscaping services. About 20 percent were self-employed, compared to about seven percent of workers in all installation, maintenance and repair occupations.

Over the next decade, more people will be entering the 40 and older age group, the group responsible for the largest segment of marine craft purchases. These potential buyers will help expand the market for motorboats, while maintaining the demand for qualified mechanics.

Employment of small engine mechanics is expected to grow about as fast as the average (defined by the US Department of Labor as 9 – 17%) for all occupations through the year 2014. The Empire State Marine Trades Association, a New York State industry association, projects an immediate need for 300 – 500 trained mechanics for the New York City/Long Island area alone to service the 560,000 recreational boats and 200,000 jet skis in New York State. Proportional needs exist for mechanics in the entire New York metropolitan area, (NY, NJ, and CT).

The reasons for these job openings are varied, including the reality that many experience small engine mechanics are expected to transfer to other occupations, retire, or stop working for other reasons. Job prospects are especially favorable for persons who complete mechanic training programs. Due to the increasing complexity of motorboats, most employers prefer to hire mechanics who have graduated from formal training programs for small engine mechanics.

Because the number of these specialized postsecondary programs is limited, most mechanics learn their skills on the job or while working in related occupations. This requires anywhere from three to five years of on-the-job training, which would be waived if the employee graduated from a recognized educational institution.

### III. CURRICULUM

The 24-credit Marine Mechanic Certificate is offered by the Kingsborough Community College Department of Tourism & Hospitality, Office of Maritime Technology, and consists of a 10-course program, seven of which are currently offered within the college and three new ones. It is planned that the student will be able to take and complete all courses during the fall, and spring semesters and be able to find employment in less than one year.

The ten courses are:

<u>COURSE</u>	<u>CREDITS</u>
1. MT 04300 – Marine Operations .....	3
2. MT 05000 – Outboard Motors .....	2
3. MT 05100 – Introduction to Diesel Engines .....	2
4. MT 05200 – Welding .....	2
5. MT 05300 – Fiberglass and Hydraulic Repairs .....	2
6. MT 05400 – Low Voltage Electrical Systems .....	2
7. MT 05500 – Marine Electronics .....	2
8. MT 05600 - <i>Advanced Outboards (Proposed New Course)</i> .....	3
9. MT 05700 - <i>Vessel Systems (Proposed New Course)</i> .....	3
10. MT 05800 - <i>Advanced Welding (Proposed New Course)</i> .....	3
Total credits .....	24

The course descriptions are as follows:

1. MT 04300 – Marine Operations (3 credits, 3 hours)

This course provides the students with the basic skills required to operate a full service marina or boatyard and includes: dock and storage facilities; parts and service department; boat engine sales; ship's store; business and marketing. In addition, students will learn about marina products in relation to operations and clientele.

2. MT 05000 – Introduction to Outboard Motors (2 credits, 3 hours)

The principles of the internal combustion gasoline engine are covered. Included are the topics of construction, testing and maintenance of these engines as well as the methods of converting the generated energy into vessel propulsion. Propulsion topics focus on outboards and out-drives, and propeller design and function.

3. MT 05100 – Introduction to Diesels (2 credits, 3 hours)

The principles of the diesel engines operation, construction, testing and maintenance are covered. Troubleshooting and the emergency repairs of these engines as well as the differences between two cycle and four cycle diesel are reviewed.

4. MT 05200 – Welding (3 credits, 3 hours)

This course covers the basic skills required for maintaining and repairing steel and aluminum vessels; also included is the fabrication of stainless steel items. Emphasis is placed on welding safety and making emergency repairs. Class work consists of one hour of lecture and two hours of laboratory each week.

5. MT 05300 – Fiberglass, Refrigeration and Hydraulic Repairs (2 credits, 3 hours)

This course covers the basic skills required for maintaining and repairing fiberglass hulls. The basic principles of hydraulic and refrigeration systems and common ship board system designs are presented. Installation application, operation, maintenance and troubleshooting of vessel hydraulic and refrigeration systems are covered. Class work consists of one hour of lecture and two hours of lab each week.

6. MT 05400 – Low Voltage Electrical Systems (2 credits, 3 hours)

This course is designed to give the student the background necessary to be able to read and implement the directions common in most marine electronics manuals. The course focuses on series and parallel circuits, low voltage AC and DC systems, hull wiring, and the installation of common marine electronics, including echo-sounders, chart plotters, RADAR, LORAN, GPS, VHF and SSB radios.

7. MT 05500 – Marine Electronics (2 credits, 3 hours)

This course is designed to give the student the background necessary to be able to read and implement the directions common in most marine electronics users' manuals as well as develop the skills necessary to properly operate representative models of the more common forms of marine electronics. Through lecture and lab work in the college's ship bridge simulator, the student will develop skills in radio telephones, RADAR, SONAR, GPS, and electronic chart plotters as well as LORAN-C. Utilizing the ship simulator students will learn proper radio protocol and procedures, and how to send a distress signal.

8. MT 05600 – Advanced Outboards (3 credits, 4 hours) (Proposed New Course)

*This course is designed to build upon the theory and practical knowledge learned in MT 05000, Introduction to Outboards, as it applies to current outboard technology. The course is divided into a theory/lecture section, (2 hrs.) and a laboratory (practical application) section, (2 hrs.), total 4 hrs. /week. The four major topics will be divided into three week modules and will cover: Ignition Systems; Electronic Fuel Injection Systems; Lower Units/Gear Cases; and Periodic Maintenance.*

9. MT 05700 – Vessel Systems (3 credits, 4 hours) (Proposed New Course)

*This course will train students to diagnose and repair a variety of auxiliary systems found aboard small crafts. Systems include, but are not limited to; fresh water,*

heating, sanitary, audio, video, safety, fire fighting, hydraulics, and air conditioning systems.

10. MT 05800 – Advanced Welding (3 credits, 4 hours) (Proposed New Course)

*This course builds on the knowledge and skills acquired in the prerequisite MT05200 - Welding course. Two new processes will be covered: Tungsten Inert Gas Welding (TIG) and Shielded Metal Arch Welding (SMAW). Emphasis is placed on safe and proper setup and operation of equipment as well as the development of skill sets. Class work consists of one hour of lecture and two hours of laboratory each week.*

#### **IV. STUDENTS**

##### **A. Potential Students**

1. With the strong demand for workers in the maritime industry, a potential source for students are those who already have college degrees and would like to take courses and earn a certificate that will enable them to gain employment in the field.
2. There are some individuals who, due to financial obligations, are unable to attend college for more than a year. These individuals are willing to enroll in a short-term, vocationally-specific certificate program to gain employment or advance in current positions, and may, upon completion of the certificate program, reconsider education and enrollment in the degree program.

##### **B. Recruitment Methods:**

1. The office of Maritime Technology has contacts with numerous employers in the industry who will refer job applicants to Kingsborough Community College for education and training in the field. These employers and organizations include the National Marine Manufacturers Association, the Empire State Marine Trades Association and the New York Marine Trades Association as well as New York Water Taxi, and the majority of the owners of the various tugboats and dinner boat companies in the New York waters.
2. In addition to the above organizations, the Kingsborough Community College Admissions Information Center will disseminate information to the general New York City community.



## **V. ENROLLMENT REQUIREMENTS**

To be accepted into the Marine Mechanic Certificate Program students need to have a high school diploma or have earned their General Equivalency Degree (GED), and must take the CUNY Assessment Test if they do not have a two-year CUNY degree or a four-year degree from any accredited college in the United States.

## **VI. COST**

There will be no additional cost for the college for the implementation of the Marine Mechanic Certificate Program. The Director of the Office of Maritime Technology will also direct the certificate program, assuring the successful implementation and coordination of the program in a cost-effective setting.

## **VII. FACULTY**

Certificate students will be placed within classes that are already offered to degree students. The two new proposed courses will also be offered to degree students as electives, so they also will be covered by existing faculty. With the inclusion of the certificate program, another two to four students can be added without additional faculty or expense. Should enrollment in the certificate program significantly increase overall enrollment, additional faculty will be hired.

## **VIII. FACILITIES AND EQUIPMENT**

The certificate program will use the existing facilities and equipment utilized for the academic program, including books currently housed in the college library, labs and boats located on the campus, and hardware and related software packages. All courses of the certificate program require special facilities which are currently in place. However, additional instructional equipment would be required and it is anticipated that the associated costs will be met through grants and donations.

## **IX. EVALUATION AND OUTCOMES ASSESSMENT**

It will be the responsibility of the Director of the Marine Mechanic Certificate Program to evaluate the efficiency of the program, especially during its initial implementation. Student achievement will be monitored through successful completion of each course's requirements. These include "paper and pencil" examinations, hands-on laboratory work and course-specific exercises and projects.

The Maritime Technology Office will maintain a database of employers where students have gained employment as well as providing related employment web sites. In

addition, the Director plans to survey employers and former students annually to ascertain the extent to which the program adequately prepared them for their job responsibilities. Suggestions for improvement will be incorporated into the program.