EDUCATION PLAN

The Maritime Academy of Toledo

Career-Technical Education Program

This document represents The Maritime Academy of Toledo's education plan to secure approval for and begin implementation of a Maritime career-technical program. The education plan fully fully describes the Maritime Academy Career-Technical Program (MACTEP) and situates it in relation to the mission and goals of the The Maritime Academy of Toledo. Signatures of the school's lead administrator and the sponsor are included in letters of support and on the appropriate Ohio Department of Education forms.

Significance and Alignment

Maritime Academy Career Technical Education workforce development program provides the following information that is:

1. Reflective of local/regional/state labor market information

The Toledo Metropolitan Area is a metropolitan area centered in the American city of Toledo, Ohio with 656,696 residents and four counties within Northwest Ohio. According to the U.S. Census Bureau, the metropolitan area includes the counties of Fulton, Lucas, Ottawa and Wood. The separate urban area of Fremont, Ohio, which has strong commuter interchange with the Toledo metropolitan area, is included in a wider labor market area called the Toledo-Fremont Combined Statistical Area. A wider definition may add the Sandusky Metropolitan Area.. Other extended additions may include the micropolitan areas of Findlay and Tiffin, and as well as Henry County in Ohio. The Toledo area is also the nation's third busiest rail hub, 15th-busiest air cargo hub (Toledo Express Airport), and one of the busiest ports on the Great Lakes. This area is fairly large and is maintaining its population. Toledo is also a popular hub location for transportation companies such as UPS and BAX Global.

There is no market data available describing local, regional, or state labor market. However, since Toledo is a significant port on the Great Lakes, the Bureau of Labor Statistics can easily be applied to our economy. As noted in the following narratives, the Port Authority of Toledo has ambitious plans to expand its ports and its cargo handling capacity over the next twenty years.

In April 2008. the Ship Operators Cooperative Program, a government-industry collaborative, strongly supported by the United States Department of Transportation, Maritime Administration, called together the then sixteen primary/secondary maritime education schools from across the country to enable us to network with industry leaders from the private and government sectors. During that gathering, Representative Cummings of Maryland encouraged attendees to continue to develop maritime education programs for primary and secondary students, preparing students for careers in the maritime industry. He also pledged to seek federal dollars in the coming years to support our work. As a result of the SOPC conference. As one of only eighteen K-12 schools across the country and as one of only three middle schools, Toledo, Northwest Ohio, and the entire State of Ohio has much to offer the field of education as well as maritime training institutions. In fact, The Maritime Academy of Toledo is on the cutting edge of primary/secondary maritime education with its Superintendent, Renee Marazon and faculty member Rick Brown, members of the recently

formed US Department of Transportation Primary/Secondary Education Coalition (www.mpsecoalition.com).

Maritime Primary/Secondary Education Coalition

The coalition has a chairman and a steering committee; this group sets specific goals and objectives to meet the needs and requirements of primary and secondary maritime schools based on their educational requirements. The members of the coalition will be made up of maritime associations, private and federal maritime industry employers, institutions of higher maritime education, maritime museums primary and secondary schools and is open to any individual or group that shares in the belief of the value of a maritime education.

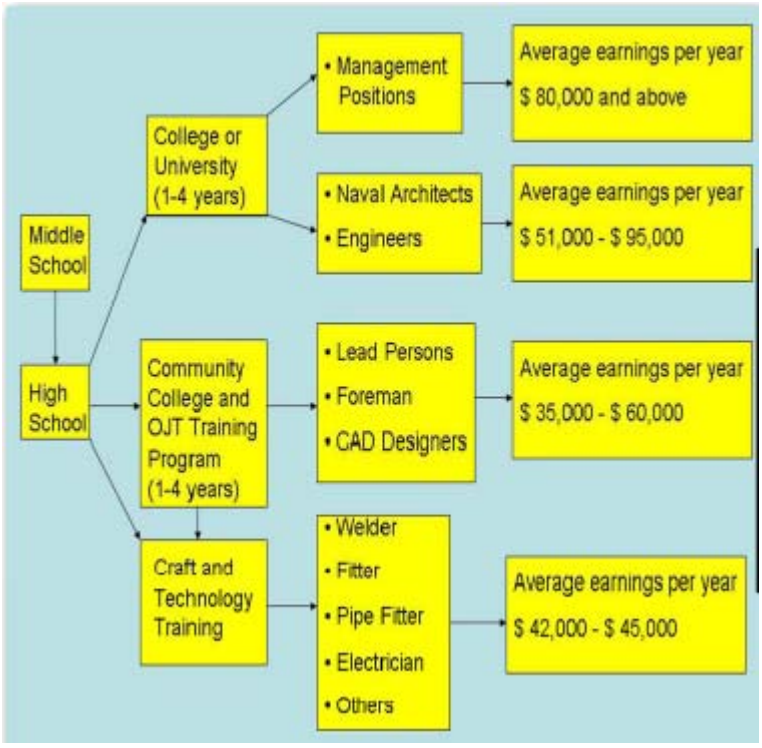
- Chairman: Congressman Elijah E. Cummings, Maryland 7th Congressional District, Chairman of the Subcommittee on Coast Guard and Maritime Transportation
- Advisory Board: Ms.Katharine M. Oliver, Assistant State Superintendent" Career Technology and Adult Education", Maryland State Department of Education
- Advisory Board: Captain Richard D. Stewart PhD, Associate Professor, Director Transportation and Logistics Research Center, University of Wisconsin Superior
- Advisory Board: Captain Arthur H. Sulzer USN-Ret., Maritime Education and Training Committee, Ship Operations Cooperative Program (SOCP)
- Advisory Board: TBD, Maritime Administration, United States Department of Transportation
- Goals

Goals of the Coalition

- Advise with development of new schools and programs
- Unite industry, government and educators on a regional basis
- Foster conferences and meeting to promote maritime education
- Develop specific course material for primary and secondary school programs
- Develop outreach programs for primary schools
- Collect and disseminate existing materials to schools
- Develop an electronic database of maritime educational material
- Establish a web site to connect members and share information

Maritime education and careers offer a unique educational opportunity to underserved students in America's urban cities to explore our Nations rich maritime heritage and to follow a path to high school graduation and a career in the marine/maritime community. The coalition will foster the development of Maritime Education in our nation's primary and secondary schools. This will be accomplished thru a net work of local, state and federal agencies, private employers, maritime associations, maritime institutions of higher education and other interested partners. The Maritime Primary and Secondary Education Coalition (MPSEC) will work with its coalition partners to develop outreach programs for primary education and specific courses for secondary schools.

The following table illustrates maritime education and career paths and potential earnings that lead to maritime careers:



The Port of Toledo

The Port of Toledo is comprised of shipyards, ports, and shipping companies. The Port is one of the most diverse and productive ports on the Great Lakes/St. Lawrence Seaway system. Our mile-long docking facility is serviced by both Big Lucas and Little Lucas – two of the largest cranes on any port in America. The seaport complex includes specialized docking areas for coal and ore as well as docking berths for tug boats. Heavy-lift gantry cranes are run by seasoned professionals to provide the lift capacity to meet shipping industry needs. The Port of Toledo's strategic combination of lift capacity, location and warehouse and open storage capacity is designed to more effectively meet local, state, national, and international shipping needs.

Cargo

Corn, wheat, beans, oats, distillers dried grains, fertilizers soybeans and wheat are the major grains shipped from The Andersons, ADM/Countrymark Cooperative Inc., and Cargill Incorporated (operated by The Andersons) terminals. Our riverfront grain terminals have easy access to ship, rail, and road. The port's three terminals have a 22 million bushel storage capacity.

Toledo is one of the largest capacity coal and iron ports in the world. Modern facilities are located at the confluence of the Maumee River and Lake Erie. Taconite is shipped to Toledo's TORCO dock from the St. Lawrence River by self-unloading vessels and can accommodate 1,000 feet long lake vessels. Coal shipping is conducted through the CSX Rail Transportation Docks. Petroleum (jet fuel, biofuels, liquid asphalt and more) is shipped by barge throughout the Great Lakes. Other than pipeline, barge is the most economical way to ship petroleum products.

Toledo is a major intermodal transportation hub serving the U.S. Midwest with efficient, effective connections to marine, rail, pipeline, truck and airborne transportation. The 150-acre

overseas cargo center is located along nearly one mile of straight line wharf at the mouth of the Maumee River on Lake Erie.

The cargo center includes companies such as, Midwest Terminals of Toledo International - as the overseas cargo operators and their link, Kuhlman Corporation - aggregate handling, Toledo Ship repair Yard, Cemex and Lafarge Cement, Westway Terminal Company - liquid storage, MidWest Terminals - stone unloading and 19 cargo handling terminals at the Port of Toledo including two shipyards. Ample warehouse and open storage space is readily available with gantry cranes serving the entire wharf.

The following companies serve the Great Lakes Maritime Industry through the Port of Toledo

ADM/Countrymark Cooperative, Inc
American Maritime Officers (AMO)
Army Corps of Engineers
Boat Nerd
Canfornav
Cargill
Department of Commerce
Fednav
Great Lakes Cruising Coalition
Great Lakes St. Law Seaway System
Great Lakes Towing
Kuhlman Corporation
LaFarge Corporation
Lake Carrier's Association
Lake Pilots Association
Longshoremen's
Midwest Terminals
National Oceanic & Atmospheric Assoc.
Ohio Blenders
Port of Toledo Seaport
St. Lawrence Seaway Development Corp.
St. Marys Cement
Streamline Foods Inc.
United States Coast Guard
US Customs & Homeland Security
Wagenborg Shipping
Westway Terminal

The Port of Toledo is a designated Foreign Trade Zone area and is customized to meet unique needs and objectives. The following table illustrates types of cargo and terminal operators.

Alfalfa	Midwest Terminals of Toledo International of Toledo International
Aluminum	Midwest Terminals of Toledo International
Amoco	Middleport Terminal
Asphalt Cement	Middleport Terminal
Bituminous	Middleport Terminal
Canola	Hansen Mueller
Cement	St. Marys, Lafarge, Kuhlman
Coal	CSX, Midwest Terminals of Toledo International
Containers	Midwest Terminals of Toledo International
Corn	ADM, The Andersons, Midwest Terminals of Toledo International
Copper	Midwest Terminals of Toledo International
Distiller Dry Grains	Midwest Terminals of Toledo International
Fertilizer	The Andersons, Kuhlman, Midwest Terminals of Toledo International
Flexi Coke	Midwest Terminals of Toledo International
Forest Products	Midwest Terminals of Toledo International
General Cargo	Kuhlman,Midwest Terminals of Toledo International
Granite	Midwest Terminals of Toledo International
Hot Briquetted Iron	Midwest Terminals of Toledo International
Heavy Lifts	Midwest Terminals of Toledo International
Iron Ore	CSX, Midwest Terminals of Toledo International
Iron Ore/ Slag	Midwest Terminals of Toledo International

Limestone	Midwest Terminals of Toledo International
Lumber	Midwest Terminals of Toledo International
Magnesite-Bag	Midwest Terminals of Toledo International
Magnesite-Bulk	Midwest Terminals of Toledo International
Misc. Machinery	Midwest Terminals of Toledo International
Oats	The Andersons, Hansen Mueller, Kuhlman, Midwest Terminals of Toledo International
OSB & Particle Board	Midwest Terminals of Toledo International
Pet Coke	Kuhlman, Midwest Terminals of Toledo International
Petroleum	BP-Husky Refining LLC, Arc Terminal Holdings, Seneca Petroleum, Sunoco MidAmerica M&R
Pig Iron	Midwest Terminals of Toledo International
Pipeline	Midwest Terminals of Toledo International
Potash	The Andersons, Kuhlman
Project Cargo	Midwest Terminals of Toledo International
Pumice	Kuhlman
Salt	Arms Dock, City of Toledo Dock, Kuhlman, Midwest Terminals of Toledo International
Sand	Kuhlman, Midwest Terminals of Toledo International
Scrap Steel	Midwest Terminals of Toledo International
Soybeans	ADM, The Andersons, Midwest Terminals of Toledo International
Steel Bar	Midwest Terminals of Toledo International
Steel Coil	Midwest Terminals of Toledo International
Steel Rod	Midwest Terminals of Toledo International
Steel Sheet	Midwest Terminals of Toledo International
Stone	Kuhlman
Stone Rail Ballast	Midwest Terminals of Toledo International
Sugar- Bag & Bulk	Midwest Terminals of Toledo International
Wind Turbine Parts	Midwest Terminals of Toledo International
Wheat	ADM, The Andersons, Hansen Mueller, Midwest Terminals of Toledo International
Zinc	Midwest Terminals of Toledo International

Toledo Seaport's Terminals

Toledo Ohio's Seaport, located on the Great Lakes, has an experienced work force with the skills to move all types of bulk, break bulk, project cargo and containers. The workforce is fast, flexible and reliable providing competitively priced quality handling and service to forwarders, manufacturers, suppliers, end users, transportation companies and all others in the supply chain. Being the most cargo diverse inland port on the Great Lakes, the Port of Toledo has a terminal to match that meets the needs of every cargo's handling requirements and intermodal logistics needs.

Toledo's general cargo facilities handle a diverse mix of commodities. Equipped with on dock rail, truck scales, shore cranes, ship loading conveyor systems and ample indoor and outdoor warehouse storage all within Foreign Trade Zone #8, these shipping terminals serve lake trading vessels, salt water vessels and lake trading barges.

Toledo's international seaport's intermodal grain handling facilities include some of the largest in the Great Lakes region which is centrally located in the USA. The seaport terminals import and export cargo on barges, lakers, tankers, and ocean vessels. Toledo's aggregate, salt, coal, iron ore, petroleum and cement terminals along with our ship yard provide the area with a full service seaport serving many industries in the United States and around the world.

Coal & Iron Ore: (taconite and various coal blends); Cement: (many mixes); Aggregates: (salt, sand, rail ballast, stone, and others); Ship Maintenance: (Toledo Shipyard with dry dock and high bay machine/fabrication shop for maintenance, repair, inspection and construction)

The Labor Market: Local, Regional, and State Intermodal Freight Connections:

Businesses located in northwest Ohio have convenient access to an extensive interstate highway system, one of the most active railroad centers in the country, a regional airport that serves as a major air freight transportation and distribution center, and one of the largest seaports on the Great Lakes. Along with distribution warehouse operations, Toledo is also home to several third party logistics operators. Local, regional, and state Ohio businesses and industries are supported through partnerships with the Toledo Port and related shippers, enabling businesses to move product and paper-work from the producer's door to the customer's door efficiently and economically.

By land, sea, or air Northwest Ohio has immediate intermodal links with rail and trucking lines, plus an international air cargo hub. These resources cut transportation costs and reduce transit time by shipping via Toledo. Toledo is at a National Crossroads of four railroads and major north-south (I-75) and east-west (Ohio Turnpike I80/90) Interstate highways. Toledo has designated "super-weight truck routes" from its Seaport into Michigan so trucking companies can take advantage of "Michigan Doubles" interstate weight limits. Toledo does not have the congestion issues of other ports. Toledo terminals have the ability to handle product efficiently and the intermodal accessibility to keep product moving on to its final destination.

The Port of Toledo is at the heart of North American markets. Its proximity to major U.S. and Canadian cities puts Toledo just a day's drive away from 50% of all North American industrial markets. Toledo does not have congestion issues typically experienced at other ports. Toledo has the capacity to grow with its customers and, because of its centralized location, transit time to the end user via truck, rail, or air is reduced.

Rail Connections

Five rail carriers, Norfolk Southern (NS), CSX, Canadian National (CN), Ann Arbor (AA) and Wheeling and Lake Erie (WLE), serve Toledo. NS, CSX, and CN are considered Class 1 carriers, while AA and WLE are regional or short-line carriers. Reciprocal switching agreements exist between NS, CSX, CN and AA.

Trucking Hub

Toledo is served by all national less-than-truckload (LTL) motor carriers. Toledo is also served by many truckload (TL) carriers. Motor carriers specializing in all types of equipment, vans, flat-beds, tanks, refrigerated, bulk, dump, and more are represented in Toledo. Expedited, small package and specialized carriers also serve the Toledo area. While **a**
Nearly 100 truck lines give shippers single-line truck service to every metropolitan area in the United States and most of Canada. Common, contract, refrigerated, and liquid-bulk carriers are all available in ample supply in the area.

Air Hub
Toledo Express is the international air cargo hub for BAX Global, Inc. Through its extensive global network, BAX offers overnight and second-day freight service worldwide. There are many public warehouse operators as well as private warehouse operations that serve their owners.

Distribution Hub: Toledo enjoys a large amount of distribution warehouse capability there are many motor carriers domiciled in Toledo, there are many more that maintain offices here.

Northwest Ohio is indeed at the center of an efficient, intermodal transportation network that connects local businesses to world markets.

Port of Toledo Cranes/Heavy Lift Capacity

The General Cargo Facility is fitted with five gantry cranes, one mobile crane, and heavy material handling equipment. The gantry cranes run along 4100 feet of rail and span two apron railroad tracks. “Big and Little Lucas” are two of the best known gantry cranes on the Great Lakes. These productive cranes can be fitted with clam buckets, spreader bars, grapples and other attachments to unload your cargo quickly and efficiently.

Coast Guard, TSA Announce Transportation Worker Identification Credential Compliance Dates

Compliance will be phased in by Captain of the Port Zones between Oct. 15, 2008 and April 15, 2009, after which all ports must be in compliance and all credentialed mariners must be in possession of a TWIC. TWIC was established in the Maritime Transportation Security Act and the Security and Accountability for Every Port Act to serve as an identification program for all Coast Guard credentialed mariners and personnel requiring unescorted access to secure areas within a port.

It is important to note that was has been written about the Port of Toledo is written of every other port city in Ohio. The needs are the same for the international, national, and local maritime shipping industry.

2. Aligns With Current Needs Of Business/Industry And Community Development Efforts

A Maritime Career-Technical Program is directly aligned with the current needs of business, industry, and community development efforts in the following ways:

a. There is a significant worker shortage in the maritime industry for captains, mates, able bodies seaman, dredge operators, pilots, communications, and engineers on the Great Lakes.
b. In light of the current shortage of merchant mariners, there arises a strong rationale for the development of maritime school-to-work initiatives for high school graduates. Adequate preparation and appropriate credentialing of high school students will provide the maritime industry with qualified interns as well as skilled workers for maritime land and sea-related careers. Related maritime industries include shipbuilding, Longshoreman Employment, Ship Agents, Marine Surveyor Jobs, Federal Maritime Jobs, Maritime Law, Vessel Engineering and Design, Port Manager, Fleet Superintendent, Marine Surveying, Shipbuilding, Marine Biology, Oceanography, Maintenance, Communications, Technology, cartology, fishers, mechanics, electricians, food service, medical,
c. Advanced maritime credentialing (TWIC) of high school graduates will give graduates a clear advantage over other individuals seeking maritime careers.
d. The newly legislated "Marine Highway Program" ensures the growth of the shipping industry and related employment opportunities in science, technology, engineering, and mathematics.
e. The United States increased container trade by 52% from 2000-2006. The average size of containers increased by 25%.
f. Passenger ferries and cruise vessels depart from Northwest Ohio port cities throughout the spring and summer months needing vessel crewmen and maintenance/shore side workers.
g. Over the last five years, the largest growth in the United States maritime industry has been for offshore supply vessels.
h. Thousands of new positions are being created in water transportation and port services industries.
i. Water transportation is now the most energy efficient way to travel and most importantly, ship cargo.

3. Addresses Current And Future Career Needs

At a time when jobs across the country are being eliminated, maritime careers are being opened up to the workforce. As reported by the Bureau of Labor Statistics, Occupational Outlook Handbook, 2008-09 Edition, faster-than-average growth and good job opportunities are expected for the future in the maritime industry. The movement of huge amounts of cargo, as well as passengers, between nations and within our Nation depends upon workers in water transportation occupations, also known on commercial ships as merchant mariners. They operate and maintain deep-sea merchant ships, tugboats, towboats, ferries, dredges, offshore supply vessels, excursion vessels, and other waterborne craft on the oceans, the Great Lakes, rivers, canals, and other waterways, as well as in harbors.

The following table illustrates the Bureau of Labor Statistics, Occupational Outlook Handbook for 2008-2009:

Occupational title	Employment, 2006	Projected jobs by 2016	Change through 2016	Percent Increase through 2016
Vessel Surveyors	60,000	74,000	14,000	24
Cartographers and photogrammetrists	12,000	15,000	2,500	19
Total	354,000	418,300	65,400	17
Water transportation occupations	84,000	98,000	14,000	16
Sailors and marine oilers	33,000	38,000	5,200	16
Ship and boat captains and operators	37,000	43,000	6,300	17
Captains, mates, and pilots of water vessels	34,000	40,000	6,000	18
Motorboat operators	3,000	3,300	300	11
Ship engineers	15,000	17,000	2,100	14
Surveying and mapping technicians	76,000	90,000	15,000	20

There is sufficient data describing the maritime industry's worker shortages for both sea and land careers throughout the Great Lakes region, in which Ohio has always been and continues to be, a significant player.

The US Department of Transportation, Maritime Administration, reported that as the maritime workforce ages and as veteran mariners retire, there are fewer and fewer young people getting aboard vessels. That fact coupled with the development of the new Department of Transportation, Maritime Highway System, water has become the most cost effective means of transporting goods at a local, state, national, and international level.
As reported in a recent Chicago Tribune article, February 2, 2009, "Long a symbol of romance and adventure, the seafaring life is attracting fewer young adults these days, creating a worsening personnel shortage for those hauling cargo across oceans and the Great Lakes. Some shipping companies have told the U.S. Maritime Administration that the problem has forced them to dock or even sell vessels. Others said it has kept them from expanding fleets, or caused delayed voyages and lost contracts. A cross-section of the maritime industry has been affected to varying degrees, from oil tankers and bulk cargo haulers to tugs, barges and ferries. "It's not limited to any region or any nation. It is a global challenge," Maritime Administrator Sean Connaughton said.

That being said, the Great Lakes, where ships carry iron ore, coal and limestone to factories and pick up Midwestern grain for transport overseas is not even able to hire officers, let alone able bodied seaman. While Great Lakes shippers prefer officers trained especially for the Great Lakes, some Great Lakes maritime industries have even had to fly in people at the last minute from Florida or Seattle to get them to crew a ship so the ship can leave port or hire saltwater vessel operators on a short-term basis.

Worker shortages in the maritime industries have been developing for years and have many causes. Some point to licensing and training requirements that have gotten tougher, along with beefed-up safety standards and greater use of computers and other technology.
"The days of people just being able to jump on a ship and get a job are long gone," said Glen Nekvasil, spokesman for the Lake Carriers Association, a trade group representing Great Lakes shippers. With international commerce picking up, more goods are being transported by water, so there are more job openings. Northwest Ohio port cities are key players in the international shipping industry.

A seafaring career still has plenty to offer. For one thing, as the unemployment rate climbs, the maritime industry is hiring. The maritime administration says about 10,000 replacements are needed in the graying officer corps, and a U.S. Coast Guard study predicts shipping trade will double or triple by 2020. Pay and benefits can be generous. The Great Lakes Maritime Academy in Traverse City, which trains prospective officers for civilian and commercial vessels, says it has a 100-percent placement rate for graduates in positions with starting salaries averaging $10,000 per month. Great Lakes mariners typically are on the water only six to eight months a year, so they can spend the rest of their time at home - or working elsewhere. Tom Orzechowski, a vice president of the Seafarers International Union based in Algonac, Mich., said the industry and government should do better at recruiting youths.

Recruitment and apprenticeship initiatives are currently under way. The Seafarers union started a 20-week program several years ago to help unlicensed seamen earn promotions to mate.

Room to Grow in Ohio

There is indeed room to grow maritime business in Northwest Ohio. Both facilities and land exist for future development and Port Authority economic development professionals are ready to help with a variety of financing assistance programs. Redevelopment plans are underway for a former refinery site along the Maumee River in East Toledo received a $5 million boost yesterday from the state - money that will be supplemented by $2.4 million from the private sector. The Ohio Department of Development grant to Lucas County will provide improved rail, truck, and ship access to a 181-acre property straddling Front Street that the Toledo-Lucas County Port Authority bought in May. The grant will be essential to Toledo's participation in a "short-sea shipping" proposal intended to move containerized freight through a planned deepwater ocean port in Nova Scotia.

There is also room to grow the maritime industries or all the following port cities in Ohio and to create a dynamic, educated, and prepared workforce through maritime education programs throughout Ohio as the following map illustrates the water port cities of Ohio.

Port Clinton	Ashtabula
Sandusky	Conneaut
Put-In-Bay	Columbiana
Huron	Steubenville
Vermillion	Belmont
Lorain	Southeastern Ohio
Cleveland	Ironton City
Fairport	Lawrence Economic Development Corporation
Eastlake	Southern Ohio
Mentor	Cincinnati

To further emphasize the importance of the Great Lakes in local, regional, and state economies, it is important to understand the workings of the entire Great Lakes systems: Lakes Superior, Michigan, Huron, Erie and Ontario, and their connecting channels form the largest fresh surface water system on earth. If one you stood on the moon, one could see the lakes and recognize the familiar wolf head shape of Lake Superior, or the mitten bounded by lakes Michigan, Huron and Erie. Covering more than 94,000 square miles and draining more than twice as much land, these Freshwater Seas hold an estimated 6 quadrillion gallons of water, about one-fifth of the world's fresh surface water supply and nine-tenths of the U.S. supply. Spread evenly across the contiguous 48 states, the lakes' water would be about 9.5 feet deep.

The channels that connect the Great Lakes are an important part of the system. The St. Marys River is the northernmost of these, a 60-mile waterway flowing from Lake Superior down to Lake Huron. At the St. Marys rapids, the Soo Locks bypass the rough waters, providing safe transport for ships. The St. Clair and Detroit rivers, and Lake St. Clair between them, form an 89-mile long channel connecting Lake Huron with Lake Erie. The 35-mile Niagara River links lakes Erie and Ontario, and sends approximately 50,000 to 100,000 cubic feet of water per second over Niagara Falls; the manmade Welland Canal also links the two lakes, providing a detour around the falls. From Lake Ontario, the water from the Great Lakes flows through the St. Lawrence River all the way to the Atlantic Ocean, about 1,000 miles away.

This system greatly affects not only Ohioans' way of life, but also, all aspects of the natural environment, from weather and climate, to wildlife and habitat. Yet for all their size and power, the Great Lakes are fragile. In the past, this fragile nature wasn't recognized, and the lakes were mistreated for economic gain, placing the ecosystem under tremendous stress from our activities. Today, we understand that our health and our children's inheritance depend on our collective efforts to wisely manage our complex ecosystem.

To this end, along with preparing students for maritime careers, the Maritime Academy teaches and promotes students' understanding of and respect for the powerful Great Lakes System. Students learn not only about the maritime aspects of the Great Lakes, but also the marine, nautical, economic, ecological, biological, botanical, political, lifestyle, and weather aspects of the Great Lakes.

Program Design

The Maritime Career-Technical Education Program (MACTEP) design incorporates the vision, goals, educational process, and outcomes for the program as illustrated in the following narrative:

1. Vision and Mission

MACTEP is a career preparation program which enables high school graduates to secure entry level positions and/or higher education degrees leading to a merchant marine career. Upon graduation from MACTEP graduates are able to begin a career on a commercial vessel, be recommended for congressional appointment to the US Merchant Marine Academy, Kings Point, New York; combine merchant marine experience with an officer training program, or attend two/four year colleges, or attend one of five federally funded state maritime academies for graduate and undergraduate programs leading to licensed mariners careers and/or shore side occupations.

The mission of MACTEP is to provide a safe, secure, and stimulating nautical/maritime focused educational environment and experience for students in grades 9-12 that enables students to achieve academic success through hands-on, interactive, life-based experiences that support State of Ohio's Academic Content Standards, uses a nautical/maritime-themed curriculum design, enables students to earn a diploma in preparation for college and/or the world of work in sea and shore side maritime-related careers. In addition to classroom and field training, students participate in two summer interships at sea prior to start of tenth and eleventh grade in order to gain practical experience in seamanship, navigation, and engineering operations. MACTEP will meet international and federal standards including U.S. Coast Guard and International Maritime Organization (IMO). Upon graduation, MACTEP students will be qualified for employment in the exciting field of marine transportation and/or will be prepared for college studies.

2. Goals

Throughout the MACTEP students will engage in paid internships with a maritime-related business

Upon graduation from MACTEP students will realize the following:

1. Earn Federal and National Certifications and documentations from the US Coastguard and IMO.
2. Congressional recommendation to the United States Merchant Marine Academy.
3. Employment on commercial vessels as ordinary seaman leading to non-traditional officer training programs that incorporate maritime experience and on-going coursework.
4. Two-year or four-year maritime college/university degree
5. Gainful employment in a shore-side and/or maritime related occupations.

MACTEP will give its graduates a significant advantage over all other Ohio high school graduates with regards to maritime-related careers.

3. Educational Process

The teaching learning process for MACTEP will incorporate classroom instruction through large group lectures, demonstrations, observations, small group learning experiences, and individualized/differentiated instruction. Seminar topics, workshop experiences, independent research/projects, team and individual research/projects, hands on experiences, field trips, maritime expert lecturers/teachers, and actual on-site small vessel construction and/or repair support the

educational process. Advanced nautical mathematics and technology skills include but are not limited to navigation simulators, mechanical simulators, global positioning systems, geographical information systems, and emerging technologies will be used extensively.

4. Outcomes

The following outcomes illustrate what teachers will know and be able to do as well as what students should know and be able to do upon completion of MACTEP. The competencies are organized according to the following categories:

1. **General Knowledge and Understanding**
2. **General Maritime Knowledge and Understanding**
3. **General Maritime Cognitive Skills**
4. **General Maritime/Navigation Knowledge**
5. **General Maritime Business/Multimodal Transport Knowledge**
6. **General Ship And Cargo Knowledge Skills Related To**
   a. **Basic Deck Knowledge And/Or Skills Related To**
   b. **Basic Engineering Knowledge And/Or Skills Related To**
   c. **Basic Steward (galley department) Knowledge And/Or Skills Related To**

Acquisition of these outcomes will enable students to secure gainful employment in the maritime industry both on ships and shore side and in other related careers:

1. General Knowledge and Understanding

Upon completion of the program students will be able to:

1.1. Personal development including intellectual and ethical judgment
1.2. Character formation.
1.3. Civic responsibility
1.4. Professional competencies: Prepare students for involvement in a global society
1.5. A learning environment that stimulates intellectual growth, scholarship, and creativity
1.6. A structured community which emphasizes responsible citizenship and self-discipline and which maximizes opportunities for exercising leadership
1.7. Ability To Communicate Effectively, Verbally And In Writing
1.8. Capability To Think Critically By Analyzing And Solving Complex Problems
1.9. Ability To Work Cooperatively In Groups
1.10. Application of Learned Content To Real-Life Work Situations
1.11. Development Of Skills Of Life-Long Learning.
1.12. To equip students having diverse backgrounds with knowledge skills and understanding in their chosen program.
1.13. To ensure students receive the core material recommended by the accrediting professional societies.
1.14. To enable students to enhance their projects by accessing the Academy's human and materials resources.
1.15. To equip students with appropriate transferable practical skills in computing and information technology, data collection and analysis, problem formulation and solving and communication skills, both oral and written.
1.16. To encourage students to develop awareness and responsible attitudes towards the needs of society and the environment in the application of their Marine Deck, Engineering, and Steward (galley department) Education and Training knowledge, including a regard for safety appropriate to their profession.
1.17. To have a repertoire of skills to enable the acquisition, evaluation and interpretation of information
1.18. To have the ability to communicate effectively, make presentations, work as a member of a team, manage their time, prioritize and manage their work effectively
1.19. To instill in students an awareness of their professional responsibilities and the need for their own continuing professional development.

1.20. To contribute to the working environment within the Academy such that students enjoy their learning experience and make the most of their opportunities for personal, career and educational growth, development, and learning.

2. General Marine Knowledge and Understanding

Upon completion of the program students will be able to:

2.1 Mathematics and Physics that are relevant to Marine Deck, Engineering, and Steward (galley department) Education and Training.
2.2 The fundamental concepts, principles and theories of Marine Deck, Engineering, and Steward (galley department) Education and Training.
2.3 Business and management techniques that are relevant to Marine Deck, Engineering, and Steward (galley department) Education and Training.
2.4 Detailed knowledge and understanding of the essential facts, concepts, principles and theories relevant to the student's chosen area of specialization of either Marine Deck, Engineering, and Steward (galley department) Education and Training.
2.5 The role of marine technologists in society and the constraints within which their engineering judgment will be exercised.
2.6 The professional and ethical responsibilities of marine technologists.
2.7 The environmental issues that affect Marine Technology and the issues associated with sustainable engineering solutions. Conceptual and detailed design of artifacts appropriate to their area of specialization.
2.8 Production practice including codes of practice, design, the assessment of safety risks, and the legislative framework for safety.

3. General Maritime Cognitive Skills

Upon completion of the program students will be able to:

3.1 Plan, conduct and report a program of investigative work related to Marine Deck, Engineering, or Steward (galley department) Education curriculum content.
3.2 Analyze and solve problems n related to Marine Deck, Engineering, or Steward (galley department) Education curriculum content.
3.3 Be creative in the solution of problems related to Marine Deck, Engineering, or Steward (galley department) Education curriculum content.
3.4 Evaluate Marine Deck, Engineering, or Steward (galley department) Education curriculum content.
3.5 Integrate and evaluate information and data from a variety of sources related to Marine Deck, Engineering, or Steward (galley department) Education curriculum content.
3.6 Take a holistic approach to solving problems and applying professional judgments to balance risks, costs, benefits, safety, reliability, aesthetics and environmental impact of Marine Deck, Engineering, or Steward (galley department) Education curriculum content.
3.7 Competencies

4. General Maritime/Navigation Knowledge

Upon completion of the program students will be able to:

4.4 Maritime Safety
4.5 Prevention Of Marine Pollution From Ships.
4.6 Cargo Handling And Stowage
4.7 Seamanship
4.8 Ship knowledge
4.9 Ship Structure And Stability
4.10 Ship Management
4.11 Occupational health and safety at sea
4.12 Environment

4.13 CPR/ First Aid
4.14 Qualifying for an STCW (Standards Training Certification Watchstanding) "ratings forming part of a navigational watch" endorsement

5. General Maritime Business/Multimodal Transport Knowledge

5.1 Ship And Fleet Management
5.2 Third Party Warehousing And Inventory Management
5.3 Cargo Transportation Management
5.4 Passenger Transportation

6. Basic Ship And Cargo Knowledge And/Or Skills Related To

6.1 The Integration Of Mathematics Skills With Knowledge About Ships And Cargo
6.2 Earth Geography
6.3 Remaining Current With And Interpret Sources Of Knowledge Related To World Trade
6.4 Maritime Law Concepts
6.5 General Mathematics

7. Basic Deck Knowledge And/Or Skills Related To

7.1 Practical shipboard experience
7.2 Nautical science with additional courses in computation
7.3 Communication
7.4 Theory, design, operation and maintenance of deck equipment
7.5 Applied navigation skills
7.6 Navigation, vessel operation and safety skills
7.7 Rules of the Road
7.8 Written and practical examination requirements

8. Basic Engineering Knowledge And/Or Skills Related To

8.1 Marine engine driving maintenance
8.2 Hand and power tools
8.3 Prepare a small vessel's machinery for sea within the limits of responsibility of a Marine Engine
8.4 Contribute to effective communications and teamwork on a coastal vessel
8.5 Survive at sea in the event of vessel abandonment
8.6 Maintain running log within the limits of responsibility of a Marine Engine
8.7 Observe safety and emergency procedures on a coastal vessel
8.8 Fight and extinguish fires on board a coastal vessel
8.9 Operate deck machinery installed on a small vessel of less than 750 kW propulsion power
8.10 Safely handle and stow explosive and flammable materials
8.11 Operate and carry out basic service checks on small vessel marine propulsion
8.12 Operate and carry out basic servicing on auxiliary systems
8.13 Operate and carry out basic routine servicing of marine extra low and low voltage electrical systems
8.14 Carry out refueling and fuel transfer operations
8.15 Use and care for hand and power tools on a small vessel
8.16 Ensure compliance with environmental considerations in a small domestic vessel

9. Basic Steward (galley department) Knowledge And/Or Skills Related To

9.1 Steward (galley department) Operations Overview
9.2 Nutrition and Portion Control
9.3 Supervision Of The Galley

9.4 Baking
9.5 Soups and Sauces,
9.6 Meats, Poultry, And Seafood
9.7 Hygiene and Sanitation.
9.8 Supplies and Inventory Control
9.9 Menu Planning

Proposed Student Schedule

MACTEP students will meet Monday through Friday in block scheduling which combines following calss periods depending upon course design and content. This is designed for maximum and best use of time, enabling students to acquire the requisite knowledge, skills, and dispositions for their marine area of specialization course of study.

Breakfast	**8:00**	**–**	**8:15**
Period I	**8:15**	**–**	**9:30**
Period II	**9:30**	**–**	**10:45**
Period III	**10:45**	**–**	**12:00**
Lunch	**12:00**	**–**	**12:30**
Period IV	**12:30**	**–**	**1:45**
Period V	**1:45**	**–**	**3:00**
Dismissal	**3:00**		

Course of Study

Maritime Academy Career-Technical Education Program Content Standards

The MACTEP content standards address grades 9-14 technical and related academic competencies. The Career Field Technical Content Standards are complete for Transportation Pathway

The MACTEP course of study which follows the following criteria:

- Alignment with the district mission, philosophy, educational goals, and strategic plan
- Identified program design – foundation, core, pathway
- Program philosophy and description
- Population to be served
- Learning objectives and performance expectations/standards
- Student assessment plan and identification of intervention needs and strategies
- Incorporation of MACTEP content standards
- Scope and sequence of knowledge to be taught
- Identified learning goals/outcomes
- Industry standards if applicable
- State/national skill licensing standards if applicable

The Maritime Academy of Toledo Career-Technical Education Program plan articlulates the following course of study which defines the key components of curriculum and instruction and is required under the Operating Standards for Ohio Schools, ORC 3301-35-04. The Maritime Academy of Toledo Career-Technical Program has been reviewed and approved by The Maritime Academy of Toledo School Board. The course of study will be reviewed and updated as needed.

The MACTEP content standards are illustrated in detail for the Deck and Engineering Courses of Study. The Steward (galley department) course of study will be developed at a later time. All three areas are built upon the Introduction to Maritime Industries Content Standards. The content standards are illustrated in the following tables:

MARITIME INDUSTRY PATHWAY **Introduction to Maritime Industries Content Standards** The first two columns to the right illustrate competency levels expected for each of the following outcomes at the end of grade 12 (12) maritime career-tech program and at the end of an advanced degree (AD) in maritime studies. The third column illustrates the Maritime Industry's expectations for each outcome in terms of essential (E) and required (R).	**Grade 12**	**Advanced Degree**	**Industry Requirements**
Competency Codes	**12**	**AD**	**IR**
Unit 1: Orientation to the Maritime Industry			
1.1 Complete an overview of the scope, trends and issues in the maritime industry, both worldwide and domestic	I	P	E
1.2 Complete an overview of the various types of specialty industries involved in the maritime industry.	I	P	R
1.3 Complete an overview of the various types of vessels involved in the maritime industry	I	P	E
1.4 Assess the career opportunities present in the domestic maritime industry	I	P	E
1.5 Assess the various working conditions on vessels in the maritime industry			
Unit 2: Maritime Industry Economic Impact	I	P	E
2.1 Complete an overview of the economic impact of the various maritime industries regionally and across the U.S.	I	P	E
2.2 Compare and contrast the average wages for mariners, shipyard workers and other maritime occupations with average employment	I	P	E
2.3 Compare and contrast the benefits and lifestyle of working aboard a ship vs. shore side occupations	I	P	E
Unit 3: Governing Bodies	I	P	E
3.1 Examine the roles and responsibilities of the US Coast Guard	P	R	E
3.2 Examine the roles and responsibilities of various federal agencies	I	P	E
3.3 Examine the roles and responsibilities of the IMO	I	P	E
3.4 Examine the roles and responsibilities of state and local agencies	I	P	E
3.5 Examine the roles and responsibilities of Classification Societies	I	P	E
Unit 4: Introduction to Ship and Maritime Terminology			
4.1 Explain Ship Nomenclature	I	P	E
4.2 Explain directions on a vessel	I	P	E
4.3 Explain marine definitions	I	P	E
Unit 5: Education Pathways to Maritime Careers	I	P	E
5.1 Introduction			
5.2 Maritime/Service Academy's and admissions			
5.3 Community Colleges 2 year programs			
5.4 Professional Institutions			
5.5 Registered Apprentice Program			
5.6 Military Service (Coast Guard/Navy/Army)			
5.7 Company/Labor Programs (SIU,IBU etc)			
Unit 6: Maritime Career Progression	I	P	E
6.1 Introduction			
6.2 Unlicensed advancement for deck and engineering			
6.3 Licensed advancement for deck and engineering			
6.4 Government Service			
6.5 Shore side careers/support (brief –see next unit)			
Unit 7: Maritime Support Operations Careers (shore side)	I	P	E
7.1 Introduction			

7.2 Ship Agencies (import/export/freight forwarders)			
7.3 Environmental Agencies/Services			
7.4 Marine Insurance			
7.5 Ship Chandlery			
7.6 Maritime Law			
7.7 Marine Survey & Classification (ABS, Lloyds, DMV)			
7.8 Salvage			
7.9 Docking Assistance			
7.10 Pilotage Services			
Unit 8: Port Operation Careers	I	P	E
8.1 Understanding Role of Port Operations			
8.2 Waterfront Operations (Loading/ Unloading Vessels)			
8.3 Distribution of Cargo (Arrival and Departure from Port)			
8.4 Homeland/Maritime Security			
8.5 Marine Logistics (Cargo Distribution)			
Unit 9: Specifics of Shipping Careers			
9.1 Introduction to various area's			
9.2 Deep Sea			
9.3 Offshore Supply			
9.4 Brown Water (Tug/Barge)			
9.5 Great Lakes			
9.6 Inter coastal			
9.7 Recreational (Yachts/Cruise Ships)			
9.8 Energy Platforms			
9.10 Government Service (NOAA/MSC/USACE)			
Unit 10: Education Pathways to Maritime Careers	I	P	E
10.1 Introduction			
10.2 Maritime/Service Academy's			
10.3 Community Colleges			
10.4 Professional Institutions			
10.5 Registered Apprentice Program			
10.6 Military Service (Coast Guard/Navy/Army)			
10.7 Company/Labor Programs			

MARITIME INDUSTRY PATHWAY **Deck Content Standards**	**Grade 12**	**Advanced Degree**	**Industry Requirements**
The first two columns to the right illustrate competency levels expected for each of the following outcomes at the end of grade 12 (12) maritime career-tech program and at the end of an advanced degree (AD) in maritime studies. The third column illustrates the Maritime Industry's expectations for each outcome in terms of essential (E) and required (R).			
Competency Codes	**12**	**AD**	**IR**
Unit 1: Seamanship	I	P	R
1.1 Ship and Maritime Terminology	I	P	E
1.2 Define Ship/ Deck Nomenclature	I	P	E
1.3 Define/show directions on a vessel			
1.4 Define marine deck definitions/ terms	I	P	E
1.5 Discuss various responsibilities of crew members	I	P	E
1.6 Show/ discuss various lines on a vessel	I	P	E
1.7 Show/ teach proper method for tying up a vessel	I	P	E
1.8 Show/ teach proper method for readying (laying out) line for use	I	P	E
1.9 Show/ teach proper method for heaving line	P	R	E
1.10 Show/ teach proper method for working the line	I	P	E
1.11 Show/ teach proper method for finishing the line handling task	I	P	E
1.12 Show/ teach proper method for bringing line in	I	P	E
1.13 Show/ teach proper method for stowing line	I	P	E
1.14 Show/ teach proper method for using all line handling stations			
1.15 Show/ teach proper methods of line handling communications	I	P	E
1.16 Show/ teach various splices and uses	I	P	E
1.17 Show/ teach various knots and uses	I	P	E
1.18 Show/ discuss anchoring a vessel	I	P	E
1.19 Define all anchoring! equipment definitions			
1.20 Discuss different types of anchor & rode systems			
1.21 Show/ teach proper methods of anchoring			
1.22 Show/ discuss various blocks & tackle			
1.23 Show/ teach various parts of blocks, tackle			
1.24 Show/ teach proper usage of blocks & tackle			
1.25 Show/ teach mechanical advantage of different blocks & tackle			
1.26 Discuss maritime (vessel) security			
1.27 Discuss difference in underway vs dockside security			
1.28 Discuss Maritime Transportation Security Act of 2003			
1.29 Discuss TWIC (Transportation Worker Identification Credential)			
1.30 Discuss interaction between port and vessel security			
1.31 Show/teach security responsibilities			
1.32 Show/discuss Ships Station Bill			
1.33 Discuss crew responsibilities on Station Bill			
1.34 Discuss Man Over Board I Best practices			
1.35 Discuss Abandon ship/ Best practices			
1.36 Discuss Fire & Fire Prevention! Best practices field trip to a freighter in port			

Unit 2: Ship & Vessel Systems			
2.1 Introduction to various vessels systems			
2.2 Main power plant overview			
2.3 Steerage system overview			
2.4 Propeller/ shafts/ Cutlass overview			
2.5 Reverse Gear overview			
2.6 Thrusters overview			
2.7 Generators/ 11 0 V overview			
2.8 Batteries / 12V,24V,32V overview			
2.9 Bilge System overview			
2.10 Fire Fighting System overview			
2.11 Life Saving Equipment Overview			
2.12 Hydraulics overview			
2.13 Water system overview (gray water/ fresh water/sanitary/pump out			
2.14 discharge)			
2.15 EPA oversight! overview			
2.16 Fuel System overview			
2.17 HV AC overview			
2.18 Communication systems overview			
2.19 Navigation systems overview			
2.20 Personal safety/ vessel overview			
2.21 Ground tackle (anchor) system overview			
2.22 Mooring system overview			
2.23 Damage Control Overview			
2.24 Field trip to a freighter in port			
Unit 3: Introduction to Boat Building (1)			
3.1 Overview of various ship designs			
3.2 Discuss various functions of ships			
3.3 Discus/ describe various hull designs			
3.4 Define various hull designs			
3.5 Discus/ describe design layout			
3.6 Discus/ describe hull blueprints			

MARITIME INDUSTRY PATHWAY **Engineering Content Standards**			
The first two columns to the right illustrate competency levels expected for each of the following outcomes at the end of grade 12 (12) maritime career-tech program and at the end of an advanced degree (AD) in maritime studies. The third column illustrates the Maritime Industry's expectations for each outcome in terms of essential (E) and required (R).	**Grade 12**	**Advanced Degree**	**Industry Requirements**
Competency Codes	**12**	**AD**	**IR**
Unit 1: Ship & Vessel Systems			
2.1. Introduction to various vessels systems	I	P	E
2.2. Main power plant overview	I	P	R
2.3. Reverse Gear overview	I	P	E
2.4. Thrusters overview	I	P	E
2.5. Propulsion gear overview (propellers, struts, bearings)			
2.6. Generators/ 110 V overview	I	P	E
2.7. Batteries / 12V,24V,32V overview	I	P	E
2.8. Bilge System overview	I	P	E
2.9. Hydraulics overview	I	P	E
2.10. Water system overview	I	P	E
2.11. Fuel System overview	P	R	E
2.12. HVAC overview	I	P	E
2.13. Fire Fighting System overview	I	P	E
2.14. Life Saving Equipment Overview	I	P	E
2.15. Evaluate and repair hydraulic and pneumatic power systems.	I	P	E
2.16. Evaluate and service cabin atmosphere control systems.	I	P	E
2.17. Troubleshoot and repair vessel instrument systems.	I	P	E
2.18. Evaluate and repair communication and navigation systems.	I	P	E
2.19. Evaluate and service vessel fuel systems.	I	P	E
2.20. Evaluate and service vessel electrical systems.	I	P	E
2.21. Evaluate and service position and warning systems.	I	P	E
2.22. Evaluate and service ice and rain control systems.	I	P	E
2.23. Evaluate and service fire protection systems.	I	P	E
2.24. Describe vessel navigation systems.	I	P	E
Unit 2: Powerplant Theory and Maintenance			
2.1. Evaluate and service reciprocating engines.	I	P	E
2.2. Evaluate and service turbine engines.	I	P	E
2.3. Complete engine inspection.	I	P	E
Unit 3: Powerplant Systems and Components			
3.1 Evaluate and service engine instrument systems.	I	P	E
3.2 Evaluate and service engine fire protection systems.	I	P	E
3.3 Evaluate and service engine electrical systems.	I	P	E
3.4 Evaluate and service lubrication systems.	I	P	E
3.5 Evaluate and service ignition and starting systems.	I	P	E
3.6 Evaluate and service fuel metering systems.	I	P	E
3.7 Evaluate and service engine fuel systems.	I	P	E
3.8 Evaluate and service induction and engine airflow systems.	I	P	E
3.9 Evaluate and service engine cooling systems.	I	P	E
3.10 Evaluate and service engine exhaust and reverser systems.	I	P	E
3.11 Evaluate and service propellers.	I	P	E

3.12 Inspect and troubleshoot unducted fan systems and components.	I	P	E
3.13 Assess auxiliary power unit.	I	P	E
Unit 4: Maritime Transportation Overview			
4.1. Explain the historical evolution of maritime transportation.	I	R	R
4.2. Explain the structure of the maritime transportation industry.	I	P	E
4.3. Explain the numerous careers and respective training for the maritime transportation industry.	I	P	E
4.4. Identify the various maritime organizations.	I	P	E
4.5. Examine the regulatory framework of navigation.	I	R	R
Unit 5: Types of Vessels			
5.1. Examine the aspects of recreational and general navigation.	I	P	R
5.2. Identify the aspects of commercial vessels.	I	P	R
5.3. Examine the aspects of military vessels.	I	P	R
5.4. Identify ports of authority and their role in general maritime transportation.	I	P	R
5.5. Explain business and commercial shipping.	I	P	R
5.6. Explain the use of support vessels.	I	P	R
5.7. Explain the evolution of vessel transportation.	I	P	R
Unit 6: Maritime Systems and Technology			
6.1. Describe the marine and shipyard powerplant and related systems.	I	P	E
6.2. Examine the marine instruments.	I	P	E
Unit 7: Marine Environment			
7.1. Examine the brown and blue water systems..	I	P	E
7.2. Explain shipyard design.	I	P	E
Unit 8: Maritime Traffic Services and Communication			
8.1. Explore sources for vessel traffic services (VTS) information.	I	P	E
8.2. Analyze radar and VTS services.	I	P	E
8.3. Explain marine radio procedures.	I	P	E
Unit 9: Meteorology			
9.1 Discuss the atmosphere and atmospheric elements.	I	P	E
9.2 Explain basic weather theory.	I	P	E
9.3 Interpret weather patterns.	I	P	E
9.4 Discuss weather hazards.	I	P	E
9.5 Interpret weather data.	I	P	E
9.6 Describe the printed weather reports and forecasts.	I	P	E
9.7 Describe graphic weather products.	I	P	E
9.8 Identify sources of weather information.	I	P	E
Unit 10: Marine Environment			
11.1 Identify and define the rules of the road (navigation).	I	P	E
11.2 Explain traffic control systems used in marine navigation.	I	P	E
11.3 Explain the pilotage and dead-reckoning methods of marine navigation.	I	P	E
Unit 11: Safety			
12.1 Analyze the importance of safety compliance management in accident prevention.	I	P	E
12.2 Distinguish between security and safety.	I	P	E
12.3 Analyze the impact of safety data analysis on marine safety.	I	P	E
12.4 Explain the nature of the human factor on accidents.	I	P	E
12.5 Explain strategies to manage human error.	I	P	E
12.6 Describe the impact of marine traffic systems on safety.	I	P	E
12.7 Explain the role of MARAD in accident investigations.	I	P	E
12.8 Describe navigation standards and rulemaking policies.	I	P	E
Unit 12: Management			
12.1 Summarize the structure and function of maritime-based businesses and services.	I	P	R

12.2 Describe management concepts.	I	P	E
12.3 Manage human resources.	I	P	R
12.4 Perform personnel staffing functions.	I	P	R
12.5 Conduct orientation and training sessions.	I	P	R
12.6 Discuss leadership principles in maritime-based businesses and services.	I	P	E
12.7 Explain how planning and budgeting are used to accomplish organizational goals and objectives.	I	P	R
12.8 Explore budgeting skills to determine staffing levels.	I	P	R
12.9 Explain the nature and scope of finance and controlling functions.	I	P	R
12.10 Explain basic accounting concepts and principles.	I	P	R
12.11 Establish criteria for purchasing products and services.	I	I	R
12.12 Explain material control and product inventories necessary to meet customer and business requirements.	I	I	R
12.13 Manage customer relationships.	I	P	E
12.14 Examine risk management.	I	P	R
12.15 Describe business risks.	I	P	R
12.16 Complete a business plan.	I	P	E
Unit 13: Marketing Functions			
13.1 Examine marketing and its role in a maritime-based businesses and services.	I	P	E
13.2 Complete a marketing plan.	I	P	E
13.3 Describe the promotion function.	I	P	E
13.4 Identify targeted markets.	I	P	E
13.5 Explain the sales cycle.	I	P	R
13.6 Explain the role of customer service as a component of marketing relationships.	I	P	E
13.7 Describe selling processes and techniques.	I	P	E
13.8 Describe sales support activities.	I	P	R
13.9 Manage selling activities.	I	P	R
13.10 Evaluate pricing fundamentals.	I	P	E
13.11 Evaluate pricing strategies.	I	P	E

MARITIME INDUSTRY PATHWAY **Steward (galley department) Content Standards** The first two columns to the right illustrate competency levels expected for each of the following outcomes at the end of grade 12 (12) maritime career-tech program and at the end of an advanced degree (AD) in maritime studies. The third column illustrates the Maritime Industry's expectations for each outcome in terms of essential (E) and required (R).	**Grade 12**	**Advanced Degree**	**Industry Requirements**
Competency Codes	**12**	**AD**	**IR**
Unit 1: Steward (galley department) Operations Overview			
Unit 2: Nutrition and Portion Con			
Unit 3: Baking Knowledge And Skills			
Unit 4: Soups and Sauces, Meats, Poultry, And Seafood			
Unit 5: CPR/ First Aid			
Unit 6: Supervision Of The Galley			
Unit 7: Hygiene and Sanitation			
Unit 8: Supplies and Inventory Control			

Unit 9: Menu Planning			
Unit 10: Internship			
Unit 11: Internship			

Scope and Sequence

Students may apply for admission to The Maritime Academy of Toledo Career-Technical Program in Grades 9 or 10. Students must fulfill all course requirements as listed in the following tables.

DIPLOMA COURSE OF STUDY REQUIREMENTS MARITIME INDUSTRY EMPLOYMENT	TOTAL CREDITS
Language Arts	**4.0**
Math (Must Include Alegbra,Geometry)	**3.0**
Social Studies (Must include Government, Am/Maritime History)	**3.0**
Science (Must include Biology, Physical Science)	**3.0**
Fine Arts	**0.5**
Physical Education	**0.5**
Introduction to Maritime Studies	**1.0**
Sub-Total	**15.0**
Maritime Deck or Engineering Course of Study	**9.0**
Total for Graduation	**25**

DIPLOMA COURSE OF STUDY REQUIREMENTS FOR 4 – YEAR COLLEGE PREPARATORY	TOTAL CREDITS
Language Arts	**4.0**
Math (Must Include Alegbra,Geometry)	**3.0**
Social Studies (Must include Government, Am/Maritime History)	**3.0**
Science (Must include Biology, Physical Science)	**3.0**
Fine Arts	**0.5**
Physical Education	**0.5**
Introduction to Maritime Studies	**1.0**
Foreign Language	**2.0**
Sub-Total	**17.0**
Electives	**6.0**
Minimum Total Credits Required	**23.0**

College Prep and Career Technical Education Courses of Study

YEAR 1 MARITIME EMPLOYMENT (ME) OR 2-YEAR COLLEGE PREPARATORY (2-YR) 4-YEAR COLLEGE PREPARATORY (4-YR)			
GENERAL EDUCATION CORE	**CREDITS**	**Maritime Technology Path**	**CREDITS**
English 9	1.0	Introduction To Maritime Studies (170350)	**1.0**
Math: Pre-Algebra or Algebra I	1.0		
Science: Marine Bio or Physical / Earth Sci	1.0		
Social Studies: Maritime World Studies	1.0		
Performing Arts / Fine Arts	0.5		
PE (Swimming)	0.5		
TOTAL REQUIRED College /Career Tech	**5.0**	**TOTAL REQUIRED College /Career Tech**	**1.0**

YEAR 2 Marine Technology MARITIME EMPLOYMENT (ME) OR 2-YEAR COLLEGE PREPARATORY (2-YR) 4-YEAR COLLEGE PREPARATORY (4-YR)			
GENERAL EDUCATION CORE	**CREDITS**	**Maritime Technology Path**	**CREDITS**
English 10	1.0	Marine Technology 1	2.0
Math: Algebra or Geometry	1.0	**Seamanship**	
Science: Physical / Earth Sci or Marine Bio	1.0	**Vessel Systems**	
Social Studies: American / Maritime History	1.0	**Boat Building**	
TOTAL REQUIRED Career Tech	**4**	**TOTAL REQUIRED Career Tech**	**2**
Fine Arts / Performing Arts / PE Elective	.05		
Health	.05		
TOTAL REQUIRED College Prep	**5**		

YEAR 3 Marine Technology MARITIME EMPLOYMENT (ME) OR 2-YEAR COLLEGE PREPARATORY (2-YR) 4-YEAR COLLEGE PREPARATORY (4-YR)			
GENERAL EDUCATION CORE	**CREDITS**	**Maritime Technology Path**	**CREDITS**
English 11	1.0	Marine Technology 2	2.5 / 2.5
Math: Geometry or Algebra 2	1.0	Vessel Operations	2.5
Science: Environmental Sci or Elective	1.0	Marine Engineering	2.5
Soc. Studies: American Government/Finance	1.0	Maritime Field Experience (Elective)	0.5
		PE: Advanced Swimming (Elective)	0.5
TOTAL REQUIRED Career Tech	**4.0**	**TOTAL REQUIRED Career Tech**	**3.0**
Electives	2.0		
TOTAL REQUIRED College Prep	**6.0**		

YEAR 4 Marine Technology MARITIME EMPLOYMENT (ME) OR 2-YEAR COLLEGE PREPARATORY (2-YR) 4-YEAR COLLEGE PREPARATORY (4-YR)			
GENERAL EDUCATION CORE	**CREDITS**	**Maritime Technology Path**	**CREDITS**
English 12	1.0	Marine Technology 3	3 / 3
Math: Algebra 2 if not yet taken	1.0	Vessel Operations	2.5
Elective	1.0	Marine Engineering	2.5
		Summer Internship 1 and / or 2 (elective)	0.5/0.5
TOTAL REQUIRED Career Tech	**3.0**	**TOTAL REQUIRED Career Tech**	**3.0**
Electives	3.0		
TOTAL REQUIRED College Prep	**6.0**		

Total Required for Career Tech	**25**
Total Required for College Prep	**23**

Student Assessment

All MACTEP students will be assessed using authentic assessment practices which include the following formative and summative evaluations of core academic content standards and maritime career-technical content standards. .

Formative Evaluations Of Core Areas And Maritime Skills And Technology Competence.

Formative evaluations of core academic areas and maritime skills and technology competence include but are not limited to unit and chapter exams and quizzes; classroom, lab, and field site observations; written and/or computer coursework, reports, and projects; oral reports, classroom participation, attendance; drug/alcohol-free screenings, and character development.

Summative Evaluations Of Core Academic Areas

Summative evaluations of core academic areas include but are not limited to semester exams, Scantron, OGT, PLAN, ACT, PSAT, and SAT exams and the Senior Project which is presented and evaluated in four distict phases: Product, Research, Portfolio, and Presentation as noted here:

Senior Project includes four elements: product, research paper, portfolio, and presentation.

1. **Product Phase** is the "hands-on" experience, or product related to some aspect of the student's Marine Deck, Engineering, or Steward (galley department) Education and Training Program. The Product must be a "learning stretch" in that, it is a student generated idea, outside of the regularly taught curriculum. The product is due at the end of Senior Year Semester I and will be coached and graded by the student's marine pathway instructor. Students choosing to utilize an industry-related mentor will earn extra credit on the project.

2. **Research Phase** requires students to write a paper that requires the student to use specific skills such as research, organization, interviews and time management to produce a five to eight page paper on a topic related to their project. This paper is due the end of senior year, Semester I and will be taught and graded by the student's Language Arts teacher with technical content graded by shop instructor.

3. **Portfolio Phase** follows the process and progress of each senior's project and will be monitored and graded by the teacher Senior Project Teacher. The purpose of the portfolio is the documentation, record keeping and organization of all phases of the project. Portfolios will be May 1st.

4. **Presentation Phase** is an oral presentation given by the student before a panel of judges from our school and the community. During the presentation, the student will explain, in a ten minute speech, the learning that occurred in completion of the product and research paper. Learning activities and lessons related to speech and presentation skills will be supported by the student's social studies instructor.

A successful senior project involves parent and teacher support as well as the student's initiative and self-discipline. If we all work together, this will be one of the most rewarding experiences the students will have in high school.

Summative Evaluations Of Maritime Skills And Technology Competence

Summative evaluations of maritime skills and techwill be assessed using the United States Coast Guard/International Maritime Organization exams. Upon successful completion of these exams students will be granted Federal and National Certifications and documentations by the US Coastguard and International Maritime Organization. These certifications and documentations will award students with gainful employment in the maritime industry upon graduation from the MACTEP—shipboard and shipyard careers. The MACTEP will design and offer end-of-program and modular type tests for maritime pathway students within the first five years of program approval. These tests may be taken online through Webxam, a Web-

based administration interface where students will be able to be scheduled to take tests, and student test results can be viewed. All tests will be aligned to the maritime technical content standards.

Advisory Committee

The Maritime Academy Career-Technical Education Program has assembled a Maritime Career-Tech Advisory Committee that represents the maritime industry and the community at-large. This committee has expressed a keen interest in the preparation of high school students for school-to-work maritime careers and higher education in maritime studies. The committee has been in place for the past six months and most recently has provided The Maritime Academy of Toledo with support, information, and consultation in the development of the proposed Maritime Academy Career-Technical Education Program. The Advisory Committee is currently conducting an intense review of the marine pathway areas of specialization, the content of each area, and needs assessments related to facilities, resources, and other work-based learning opportunities including internships and hands-on experiences. Once MACTE is firmly established it is expected that the Advisory Committee will continue to make recommendations on program design and program improvements on a quarterly basis.

The Maritime Academy Career-Technical Program Advisory Committee members are as follows:

1. Mr. Rick Brown, Director of Nautical Traditions for The Maritime Academy of Toledo;
2. Mr. Trent Clark, Operations Manager for Hannah Marine Corporation;
3. Jim Hartung, former director Toledo-Lucas County Port Authority;
4. Ms. Barbara Pinter, former Director of STAR Center, Toledo, currently Trainer/Toledo Coordinator STAR Academy, Ft. Lauderdale, Florida,
5. William Market, President of Miller Ferry Line;
6. Captain Steve Toth, President MDS Enterprises (Marine Surveying and Operations);
7. Paul LaMarre, Toledo-Lucas County Port Authority, Manager of Maritime Affairs and Director of the Willis B. Boyer Ship Museum (formerly a Great Lakes freighter).

Several others have been invited to participate on the Advisory Panel. These individuals are currently employed with Great Lakes shipping, towing, and shipyard companies. We are awaiting their response.

Postsecondary Partners

The MACTE program design supports maritime career pathways for students into postsecondary education—most especially, into maritime college and university programs and maritime tech prep community and junior college programs. Most attractive to these postsecondary partners is the fact that the MACTEP offers instituions of higher education a steady flow of both racial minorities and women into maritime career preparation programs—ensuring their greater representation in the maritime industry—one of the primary goals of the U.S. Department of Transportation, Maritime Administration both today and in the future.

Partnerships With Postsecondary Institutions And/Or Apprenticeship Programs

The MACTE marine pathways begin in high school with coursework, field experiences, and internships, and continue through to postsecondary education. MACTE graduates have a variety of options for continuing their education beyond high school, including 2-year colleges, 4-year colleges, and maritime industry-related adult education programs, including but not limited to interships, apprenticeships, proprietary schools, web-based courses, workshops, and seminars. Higher education opportunities for students will be provided through state-wide, regional, Tech-Prep and individual school articulation agreements between MACTE and postsecondary institutions/entities whenever possible. Articulation agreements will specify maritime pathways into further education, high school courses/competencies for postsecondary credits, and postsecondary credits earned while attending MACTE (post-secondary enrollment options, ORC, Chapter 3365).

More specifically, the Maritime Academy Career-Technical Education Program anticipates dynamic partnerships with Owens Community College, The University of Toledo, the only two higher education institutions focused on maritime/marine education and Great Lakes Maritime Academy, Traverse City, Michigan, with congressional appointments to Kings Point Merchant Marine Academy, Kings Point, NY. These college programs will prepare students for officer status with very lucrative benefits and advanced maritime careers.

School To Work Programs

School to work programs will also be a critical component of MACTE program. Maritime Industry employers have already contacted MACTE with one to two years of shipboard employment upon graduation followed by employer-paid college degree programs with the graduate making commitments for future employment, once graduated from college. With the expansion of Lake Ports and Maritime industries graduates will have a variety of opportunities on ships and shoreside.

Program Accreditation and Student Credentialing

There is currently no industry accreditation guiding maritime vocational education programs. For this reason, The Maritime Academy of Toledo Career-Technical Program will serve as a leader in preparing high school students for maritime careers through school to work programs and preparation for higher education.

Maritime Academy of Toledo Career-Technical Program students will be given the opportunity to earn valuable portable Federal and National Certifications and documentations, credentials that are supported and accepted by the US Coastguard and International Maritime Organization, the maritime industry's licensing and credentialing organizations.

Teacher Credentials and Teacher Information

All Maritime Academy of Toledo core academic courses currently have highly qualified teachers and MACTE students will be taught by these highly qualified teachers. The primary staff person who will be teaching in MACTE program will be Mr. Rick Brown (See Appendix A). Mr. Brown is highly qualified in social studies and is working with the University of Toledo to fulfill the requirments for a CTE license. Mr. Brown is currently an "Unlimited tonnage salt water license captain" which all of the training and teaching experience anyone in Northwest Ohio could imagine. Another staff member is Ms. Barbara Pinter, currently a trainer for the STAR Center, Ft. Lauderdale and formerly Director/Trainer for STAR Center, Toledo (recently merged with the Ft. Lauderdale STAR Center). Ms. Barbara Pinter has years of experience training mariners and is extremely knowledgeable in maritime deck, engineering, and steward curriculum content and teaching methods. Other maritime experts have been contacted to teach in the MACTE program. TMA will insure that every instructor attains HQT status as soon as program approval is given. The planned MACTE program will utilize professionals who are expert maritime trainers.

A MACTE career-technical teacher will have the current and appropriate credentials for teaching the course to be funded. The program will rely on teachers with industry credentials who will also be required to secure a State of Ohio career-technical certification/license as soon as such a license is developed by the University of Toledo and approved by the Ohio Department of Education.

Currently, a Maritime Career-Technical teacher credentialing program is not available anywhere in Ohio. However, in conversations with Dr. Paul Hubaker, University of Toledo Career and Technical Education, he is prepared to work with Mr. Rick Brown to develop and implement a credentialing program for maritime teachers; those who come to the University with industry work experience and those who are pursuing a teaching degree and desire a maritime career technical license. Mr. Rick Brown, Maritime Studies Program Director, currently holds a teaching license in History, Political Science, and Physical Education (Expiration 2013). Although a career technical licensing program is currently not available, it is anticipated that Mr. Brown will be recommended to ODE by the University of Toledo for licensure by the beginning of Fall Semester, 2009. This license is also dependent upon ODE developing the maritime career technical license as a legitimate credential. Such a maritime credential will greatly impact the Ohio's local, regional, and

statewide economies with the growth and development of skilled maritime workers on the water or shore side on Lake Erie (blue water) or the Ohio River (brown water).

On a state and national level, the development of a new career technical teacher license will enhance teacher credentialing not only across the State of Ohio but also throughout the United State as The University of Toledo and the State of Ohio assume a leading role in credentialing a future workforce that is facing a tremendous shortage of maritime skilled employees over the next twenty years. Ohio stands to be leaders in the solution.

Maritime industries and related businesses as well as secondary schools, community colleges and technical colleges around the world are searching for individuals with the necessary skills to train and teach their employees and students. A Maritime career technical license will provide students this professional development needed to meet the demand for maritime career development at the secondary level.