

Course Title: Maritime 1
Course Number: 8404110
Course Credit: 1

Course Description:

This course provides students with an understanding of the field of maritime studies and prepares for postsecondary programs, as well as the world of work, by developing an in-depth mastery of maritime industry related concepts and their relationship to the business of shipping. The course also includes various concepts of history, science, technology, engineering, and mathematics, as well as social and political implications of the maritime industry on the international scale.

CTE Standards and Benchmarks	
01.0	Demonstrate knowledge relating to the historical origins of the maritime industry from vessel development, cultural, and trade perspectives--The student will be able to:
01.01	Identify different types of ships and their origins.
01.02	Construct a three-dimensional model of a historical ship.
01.03	Create a timeline showing significant milestones in maritime history.
01.04	Describe the significance of the Phoenicians, Vikings, and Asians on maritime cultures and traditions.
01.05	Identify changes in sea going trade over the centuries.
01.06	Describe the effect of trade on colonialism and the developing world.
02.0	Demonstrate proficiency in understanding the various career paths in the maritime industry--The student will be able to:
02.01	Identify important factors to choosing a career.
02.02	Explain the importance of planning for a career.
02.03	Evaluate the impact of education on long term career success.
02.04	Describe the many career paths in the maritime industry.
02.05	Describe the skills and personal qualities needed for maritime careers.
02.06	Describe the everyday life of people working in maritime careers.
02.07	Describe the future growth trends of maritime careers.
02.08	Create a personal maritime career path based on interest.
02.09	Describe careers in the shipyard.

CTE Standards and Benchmarks

02.10	Explain the skills and education needed to work in various shipyard careers.
02.11	Describe careers located in ports.
02.12	Explain the skills and education needed to work in various port careers.
02.13	Describe careers working on at sea.
02.14	Explain the skills and education needed to work in various careers at sea.
03.0	Demonstrate an understanding of required skills sets by mariners including, safety training, regulations, and leadership--The student will be able to:
03.01	Create a timeline explaining the evolution of the U.S. Coast Guard.
03.02	Explain the main functions of the U.S. Coast Guard.
03.03	Describe the U.S. Coast Guard and its place in the U.S. military.
03.04	Describe the organization and leadership hierarchy on a vessel.
03.05	Explain Master's Level of Authority.
03.06	Describe the importance of leadership and chain-of-command on a vessel.
03.07	Use seamanship skills to tie knots, handle lines, identify equipment, and practice safe work methods.
03.08	Describe the process of watch keeping, navigation, boat handling, anchoring, and mooring.
03.09	Use seamanship terminology.
04.0	Demonstrate proficiency in using engineering methods for ship construction and design--The student will be able to:
04.01	Identify and describe two types of marine engines.
04.02	Explain the phenomenon of wind generation.
04.03	Explain how wind has been used to propel ships.
04.04	Describe the process and instrumentation for measuring and calculating wind power.
04.05	Describe the principles of buoyancy.
04.06	Explain the relationship between weight, volume, and density.
04.07	Explain Archimedes Principal.

CTE Standards and Benchmarks

04.08 Explain how a ship made of steel is able to float.

04.09 Construct a model vessel from material with a density greater than 1 and ensure it floats.

04.10 Use the engineering process to create solutions for a maritime related problem.

04.11 Work in teams to using the engineering process to create solutions for a maritime problem.

05.0 Demonstrate an understanding of common navigation systems used in the maritime industry--The student will be able to:

05.01 Describe the purpose and history of charts.

05.02 Describe the various features of charts.

05.03 Describe the history of navigation instruments and how they evolved over time.

05.04 Describe four common navigation instruments used in modern times.

05.05 Describe the purpose of a sextant.

05.06 Simulate the use of modern navigation equipment as it would be used in a voyage.

05.07 Explain the navigational strategy of dead reckoning and when it is appropriate.

05.08 Plot a course using various chart tools.

06.0 Identify and explain various vessels and their and their use--The student will be able to:

06.01 Identify various types of ships.

06.02 Explain specific reasons for different types of ships.

06.03 Describe different types of cargo vessels and cargo types.

06.04 Describe different types of passenger vessels and their purpose

07.0 Evaluate the environmental impact of the maritime industry--The student will be able to:

07.01 Explain the role of maritime in protection of the environment.

07.02 Describe the environmental regulations on the maritime industry.

08.0 Demonstrated an understanding of the business of maritime as related to shipping operations--The student will be able to:

08.01 Explain the process of booking cargo.

CTE Standards and Benchmarks

08.02	Describe crewing requirements for sailing at sea.
08.03	Describe the Stevedore process.
08.04	Chart a sample ship voyage with stops at multiple ports.
08.05	Define and explain Tidal Datum.
08.06	Describe the role of tides in worldwide shipping
08.07	Explain the process of chartering.
08.08	Identify the different types of charters.
08.09	Describe the most commonly used clauses in voyage or time chartering.
08.10	Describe the business model of ship owners, operators, brokers, and charters.
09.0	Demonstrate an understanding of the business of shipping as related to port operations--The student will be able to:
09.01	Describe the main functions of a port.
09.02	Explain the importance of infrastructure networks to ports.
09.03	Describe the importance of pipelines to ports.
09.04	Evaluate specific ports on their design and transport connections.
10.0	Demonstrate an understanding of various cargo and cargo management systems--The student will be able to:
10.01	Provide examples of liquid bulk cargo.
10.02	Provide examples of bulk cargo.
10.03	Explain the history on containerization.
11.0	Demonstrate an understanding of international trade and its impact on the world economy--The student will be able to:
11.01	Identify worldwide main shipping routes.
11.02	Identify main commodities that move through international shipping routes.
11.03	Explain how local resources impact the types of ports, vessels, terminals, and infrastructure in various countries and regions along the main shipping routes.
11.04	Define tariffs and explain their importance.

CTE Standards and Benchmarks

11.05 Explain the operation of the intermodal transportation system.

11.06 Explain the importance of canal systems on shipping routes.

11.07 Explain the difference between fronthaul and backhaul cargo.

12.0 Examine the legal aspects of the maritime industry--The student will be able to:

12.01 Explain the admiralty law specialization as related to legal application.

12.02 Describe the legal concept of admiralty jurisdiction.

12.03 Describe the purpose and operation of limitation of liability.

13.0 Explain the importance of vessel and ship security--The student will be able to:

13.01 Describe the function of the U.S. Coast Guard.

13.02 Explain the position of the U.S. Coast Guard within the U.S. military system.

13.03 Explain the regulatory operations of U.S. flag ships by the U.S. Coast Guard.

13.04 Explain how the U.S. Coast Guard protects U.S. coasts.

13.05 Explain port state control and how it is administered around the world.

14.0 Examine the potential and use of marine resources--The student will be able to:

14.01 Identify various energy sources related to the marine environment.

14.02 Explain how power could be harvested from offshore winds and identify locations for such opportunity around the world.

14.03 Describe the operations and advantages of coastal wind farms.

14.04 Provide examples of wind farms currently in operation.

14.05 Describe how solar energy can be used to provide power for ships.

14.06 Provide three examples of solar power use in the maritime industry.

14.07 Explain how power could be generated from currents.

14.08 Explain the concept of wave energy.

14.09 Describe how energy can be created from tidal movements and what technology is used to perform this function.

CTE Standards and Benchmarks

14.10 Identify areas of the ocean where thermal energy can be found.

15.0 Demonstrate an understanding of oceanography concepts--The student will be able to:

15.01 Explain oceanography's role as a marine science discipline and its areas of investigation.

15.02 Explain how ocean currents form and their role in distribution of heat.

15.03 Explain the causes of tides.

15.04 Describe the various types of tides and why they are monitored throughout the maritime industry.

15.05 Evaluate the difference between tides, currents, and waves.

15.06 Compare the El Niño and La Niña events and their impact on weather.

15.07 Identify various ways wave energy is created and how it moves through the ocean.

15.08 Identify areas under the ocean where plate tectonic activity is occurring.

15.09 Identify seafloor topographic features.

15.10 Apply mathematics to waves to solve for wave height and wave length.

15.11 Explain the Coriolis Effect.

15.12 Describe the theory of global warming and how humans have contributed to associated maritime events.

15.13 Describe how humans have impacted the world's oceans and steps used to limit these impacts.

16.0 Demonstrate an understanding of the fundamentals of marine biology--The student will be able to:

16.01 Describe how freshwater collects on the earth's surface and its relation to the oceans.

16.02 Explain underground water movements and their connection with the oceans.

16.03 Compare the chemical composition of freshwater, brackish water, and salt water.

16.04 Identify the seasonal beach profiles and organisms that accompany each season.

16.05 Identify the various types of currents that interact with the water and land at the beach.

16.06 Explain the ecological importance of mangroves in water filtration and runoff.

16.07 Describe the organisms that live in mangroves and adapt to tidal fluctuations.

CTE Standards and Benchmarks

16.08 Explain the role of mangroves in high energy events and environmental concerns for their removal.

16.09 Identify and explain the importance of estuaries.

16.10 Explain the importance of sea grass beds and their importance in raising juvenile organisms.

16.11 Describe various water quality parameters that are associated with sea grass productivity.

Course Title: Maritime 2
Course Number: 8404120
Course Credit: 1

Course Description:

This course provides students with opportunities to further their mastery on maritime related concepts in preparation for postsecondary education and the world of work. The course builds on material presented in Maritime 1 by increasing the depth and breadth of student knowledge.

CTE Standards and Benchmarks	
01.0	Demonstrate knowledge relating to the historical origins of the maritime industry from vessel development, cultural, and trade perspectives--The student will be able to:
01.07	Describe the impact of shipping on world demographics
01.08	Describe the Greek and Roman impact on sailing culture.
01.09	Describe important naval conflicts through the ages.
01.10	Describe the modern seagoing life.
01.11	Explain the role of trade on ancient empire development.
01.12	Explain the role of the spice trade in world economic development.
01.13	Explain the tea trade and its impact on world history.
02.0	Demonstrate proficiency in understanding the various career paths in the maritime industry--The student will be able to:
02.15	Explain the difference between charter boat and commercial boat fishing operations.
02.16	Describe the duties of a charter boat captain and mate.
02.17	Describe the duties of a commercial fishing vessel captain and mate.
02.18	Explain the licensing requirements for a charter vessel captain.
02.19	Explain the licensing requirements for a commercial fishing captain.
03.0	Demonstrate understanding of required skills sets by mariners including, safety training, regulations, and leadership--The student will be able to:
03.10	Explain the role of communications technology to the maritime industry.
03.11	List the electronic systems used aboard modern vessels.
03.12	Identify modern ship to shore communication systems.

CTE Standards and Benchmarks

03.13 Describe modern vessel tracking systems.

03.14 Describe the most common short range communications system found on modern vessels.

03.15 Describe the most common long range communications systems found on modern vessels

03.16 Explain the use of emergency communications systems such as SSAS, EPIRB, and flares.

03.17 Explain the process for sending and emergency distress signal.

03.18 Describe common first aid practices and equipment.

03.19 Explain the process for acquiring U.S. Coast Guard certification.

03.20 Explain the roles of the IMO, USCG, Ports State Control and Class societies in regulating safety management systems.

03.21 Explain the requirements for STCW, TOAR, Radar, Firefighting, and PIC licensing.

03.22 Describe the need and restrictions of different types of licenses.

03.23 Describe the types of service a mariner can perform based on held license.

04.0 Demonstrate proficiency in using engineering methods for ship construction and design--The student will be able to:

04.12 Identify and use two common measurement systems.

04.13 Identify units in linear, square, and cubic measurements.

04.14 List and describe Newton's Laws of Motion.

04.15 List materials commonly used in ship construction.

04.16 Describe properties of ship construction materials.

04.17 Identify parameters relevant to ship design.

04.18 Develop a set of parameters for a ship design.

04.19 Use the engineering method to solve problems.

04.20 Identify an engineering problem relevant to maritime studies.

04.21 Identify software used in ship design.

04.22 Describe the ship design process.

CTE Standards and Benchmarks

05.0 Demonstrate understanding of common navigation systems used in the maritime industry--The student will be able to:

05.09 Explain the marine rules of the road, their origin, and responsible entity.

05.10 Use maritime whistle signals to transmit messages.

05.11 Identify night conditions by following vessel light configurations.

05.12 Explain the procedure for passing another vessel.

05.13 Explain how to overtake a vessel when navigating a river.

05.14 Explain early communication processes using flags and lights.

05.15 Describe the contributions made by Samuel Morse.

05.16 Explain worldwide ship communication abilities and how they are used.

05.17 Explain the modern use of flags aboard merchant vessels.

05.18 Explain the need for AIS and LRIT systems on modern ships.

05.19 Create an electronic communications timeline.

05.20 Compare the use of e-nav and cel-nav.

05.21 Describe the function, history, and current use of LORAN.

05.22 Describe the history and function of RADAR.

05.23 Plot CPA on a RADAR output.

05.24 Explain the history and function of GPS.

05.25 Explain the history and function of the depth finder.

05.26 Explain the history and function of the RDF.

05.27 Describe the operation of the ECDIS.

05.28 Explain the various navigation systems as used for ship security.

06.0 Identify and explain various vessels and their and their use--The student will be able to:

06.05 Explain why there is a need for different types of ships.

CTE Standards and Benchmarks

06.06	Identify different types of ships based on their roles.
06.07	Provide examples of takers, dry bulk, container, and break bulk vessels.
06.08	Describe the need for a class of industrial vessels.
06.09	Explain five industrial vessels and explain the function of each.
06.10	Explain the principle of buoyancy.
06.11	Explain the principle of displacement.
06.12	Describe the concept of density.
06.13	Describe the relationship between density, displacement, and volume.
06.14	Explain Archimedes' Principle.
06.15	Calculate the displacement of a vessel.
07.0	Evaluate the environmental impact of the maritime industry--The student will be able to:
07.03	Explain the impact of the maritime industry on air pollution.
07.04	Describe the process for control of invasive species as related to shipping.
07.05	Evaluate current invasive species problems and formulate solutions.
07.06	Describe the occurrence of habitat loss due to the maritime industry needs.
07.07	Evaluate the impact of algae blooms on the maritime industry.
08.0	Demonstrated an understanding of the business of maritime as related to shipping operations--The student will be able to:
08.11	Describe the process of pricing and tariffs.
08.12	Explain the process of booking cargo on an ocean liner.
08.13	Explain the purpose of the letter of credit and its impact on shipping operations.
08.14	Explain the purpose of the bill of lading in a shipping transaction.
08.15	Describe the complete process of customer inquiry for a request to use a carrier, through goods delivery at destination.
09.0	Demonstrate an understanding of the business of shipping as related to port operations--The student will be able to:

CTE Standards and Benchmarks

09.05	Describe the main characteristics of the different types of terminals.
09.06	Compare private and public terminals.
09.07	Explain the need for terminal tariffs.
09.08	Describe the scheduling process for loading and unloading cargo at terminals.
09.09	Explain the operations of the stevedores and husbandry.
09.10	Evaluate the layouts of the three main terminal designs.
09.11	List all services terminal operators provide.
09.12	Explain the operation of a Foreign Trade Zone.
09.13	Describe the different types of marine surveys.
09.14	Explain the reasons for performing a cargo survey.
09.15	Explain the reasons for performing a vessel damage survey.
09.16	Describe a draft survey.
09.17	Explain the reasons for performing a deadweight survey.
09.18	Explain the reasons for performing an incline survey.
09.19	Explain an allusion and how marine surveys play a role in its investigation.
09.20	Provide examples of situations where multiple surveyors are needed for the same event.
10.0	Demonstrate an understanding of various cargo and cargo management systems--The student will be able to:
10.04	Explain different types of liquid bulk cargo.
10.05	Explain the process of measuring standard liquid bulk cargo.
10.06	Identify liquid bulk carriers and explain their special characteristics.
10.07	Identify liquid bulk trade routes and major global ports.
10.08	Explain different types of dry bulk cargo.
10.09	Explain the process of measuring dry bulk cargo.

CTE Standards and Benchmarks

10.10 Describe the characteristic of dry bulk carriers.

10.11 Identify dry bulk trade routes and major global ports.

11.0 Demonstrate an understanding of international trade and its impact on the world economy--The student will be able to:

11.08 Compare the practices of tramp shipping, liner shipping, and contracted shipping.

11.09 Describe the interaction of brokers with cargo interests and tramp vessel owners.

11.10 Explain the role of service contract in liner shipping.

11.11 Describe NVOCCs and their role in liner shipping.

11.12 Explain vessel sharing agreements, slot charter agreements, space agreements, and consortia.

11.13 Explain freight rates and their impact on markets as used in liner and tramp shipping.

11.14 Examine liner shipping and its importance to the container trade.

11.15 Describe the interaction between government policy and freight trading routes.

12.0 Examine the legal aspects of the maritime industry--The student will be able to:

12.04 Explain when admiralty law applies to cases.

12.05 Explain the concept of a Charter Party.

12.06 Describe the function of the time charter.

12.07 Describe the function of the bareboat charter.

13.0 Explain the importance of vessel and ship security--The student will be able to:

13.06 Describe the Maritime Transportation Security Act (MTSA).

13.07 Describe the roles of the U.S. Coast Guard and the Border Patrol in preventing terrorist acts on U.S. soil.

13.08 Explain the methods used by U.S agencies to prevent terrorist attacks.

13.09 Explain the purpose of the Transportation Worker's Identification Credential (TWIC).

14.0 Examine the potential and use of marine resources--The student will be able to:

14.11 Identify biological resources found in the ocean and explain how society benefits from their use.

CTE Standards and Benchmarks

14.12 Identify various types of energy that can be harvested at the surface of the ocean and at depth.

14.13 Explain the impact aquaculture has on world populations.

14.14 Describe the potential harm that is associated with aquaculture practices.

14.15 Describe the process of desalination and molecular activity that occurs during this process.

14.16 Compare and contrast the chemical properties of fresh and salt water.

14.17 Identify substances, such as medications and drugs that have been found in the marine environment.

15.0 Demonstrate an understanding of oceanography concepts--The student will be able to:

15.13 Explain the role of chemical oceanography as a marine science.

15.14 Explain the importance for water through research of its properties.

15.15 Conduct an experiment to yield freshwater from a saltwater solution.

15.16 Explain the molecular structure of fresh and salt water.

15.17 Measure salinity of water using various methods.

15.18 Research salinity levels of the world's oceans and identify areas with higher than average salt concentrations.

15.19 Investigate reasons for higher than average salt concentrations in various seas and oceans.

15.20 Investigate the interaction of fresh and salt water in estuary systems.

15.21 Explain the study of toxicology as it relates to the marine environment.

15.22 Explain the process of ocean acidification.

16.0 Demonstrate an understanding of the fundamentals of marine biology--The student will be able to:

16.12 Investigate organisms that live in coral reef systems.

16.13 Identify the ecological importance of coral reef systems.

16.14 Identify ocean zones from the surface to the deep and the organisms found in each zone.

16.15 Describe how water moves in the ocean.

16.16 Identify the causes of algae blooms and their ecological impact on ocean organisms and humans.

CTE Standards and Benchmarks

16.17 Identify various types of West Caribbean algae.

16.18 Describe the structure and function of algae.

Course Title: Maritime 3
Course Number: 8404130
Course Credit: 1

Course Description:

This course provides students with opportunities to further their mastery on maritime related concepts in preparation for postsecondary education and the world of work. The course builds on material presented in Maritime 2 by increasing the depth and breadth of student knowledge.

CTE Standards and Benchmarks	
01.0	Demonstrate knowledge relating to the historical origins of the maritime industry from vessel development, cultural, and trade perspectives--The student will be able to:
01.14	Describe the evolution of ship steering systems.
01.15	Provide a historical analysis of piracy through the ages.
01.16	Explain the change from break bulk cargo shipping to containerization.
01.17	Describe the effect of communications technology on trade through the ages.
02.0	Demonstrate proficiency in understanding the various career paths in the maritime industry--The student will be able to:
02.20	Explain the specialized training required for a career in admiralty law.
02.21	Compare careers in naval architecture, design engineering, and operating engineering.
02.22	Describe the main responsibilities of a chief engineer.
02.23	Explain the process for achieving a position of chief engineer.
02.24	Describe the main responsibilities of a design engineer.
02.25	Explain the licensing requirements to attaining a position of a practicing engineer.
02.26	List the careers associated with the offshore drilling industry.
02.27	Describe the main responsibilities of a tool pusher.
02.28	Describe the main responsibilities of a rig boss.
02.29	Describe the main responsibilities of a roustabout.
03.0	Demonstrate an understanding of required skills sets by mariners including, safety training, regulations, and leadership--The student will be able to:
03.24	Explain the reasons for proper knot tying and line handling.

CTE Standards and Benchmarks

03.25	Demonstrate splicing techniques.
03.26	Explain the use of a stopper.
03.27	Evaluate various materials used to construct mooring lines.
03.28	Explain the purpose and functionality of risk assessment as related to shipping.
03.29	Participate in personal risk assessment activities.
03.30	Participate in group risk assessment activities.
03.31	Explain the process of documentation and evaluation of non-conformance.
04.0	Demonstrate proficiency in using engineering methods for ship construction and design--The student will be able to:
04.23	Describe the use of model for ship hull design.
04.24	Explain the use of half breadth models.
04.25	Describe model basin method of proving hull designs.
04.26	Report on an active model basin facility.
04.27	Describe how shipbuilding methods have evolved over the centuries.
04.28	Explain the Laid Keel method of shipbuilding.
04.29	Explain the modular method of shipbuilding.
04.30	Research the construction of a present day vessel.
04.31	Explain the function of the screw as an invention and simple machine.
04.32	Describe the transition from paddle wheels to propellers.
04.33	Explain the effects of the pitch of a propeller.
04.34	Explain the two modes of propeller action.
04.35	Describe the concept of the Bollard Pull, its calculation and measurement techniques.
04.36	Explain the characteristics of the three types of rudders.
04.37	Describe modern methods of attaching and controlling rudders.

CTE Standards and Benchmarks

04.38 Describe modern methods of steering that do not use rudders.

04.39 Explain the Willy Beck rudder design.

04.40 Research the development of side thrusters in use on modern vessels.

05.0 Demonstrate an understanding of common navigation systems used in the maritime industry--The student will be able to:

05.29 Explain the importance of tides to ship navigation systems.

05.30 Explain the importance of currents to ship navigation.

05.31 Describe effect currents have on ships in open waters.

05.32 Describe the effect currents have on ships in restricted waters.

05.33 Evaluate the effect of currents and tides on dead reckoning navigation.

05.34 Describe the various types of buoys and where they are used.

05.35 Explain the purpose of a day mark and how it is used.

05.36 Explain the purpose of a range and how it is used.

05.37 Describe the purpose of lighthouses and their use.

05.38 Evaluate different port structures found on charts and their application in navigation.

05.39 Describe the importance of an air draft.

06.0 Identify and explain various vessels and their and their use--The student will be able to:

06.16 Describe the general class of service vessels.

06.17 Describe various types of service vessels.

06.18 Describe the general class of miscellaneous vessels.

06.19 Name two types of miscellaneous vessels.

06.20 Describe the function of specific miscellaneous vessels.

06.21 Describe various research vessels.

06.22 Describe various military vessels.

CTE Standards and Benchmarks

11.0 Demonstrated an understanding of the business of maritime as related to shipping operations--The student will be able to:

11.16 Explain the functions of insurance agencies.

11.17 Describe the steps in processing and insurance claim.

11.18 Explain the purpose of a P & I club.

12.0 Demonstrate an understanding of the business of shipping as related to port operations--The student will be able to:

09.22 Explain the development and personnel behind the change to containerization.

09.23 Describe the reasons for the success of worldwide containerization.

09.24 Research the impact of containerization on daily American lives.

09.25 Design a container terminal.

09.26 Describe the types of modern ship fuels.

09.27 Explain the evolution of ship fuels and their environmental impact.

09.28 Explain the ship refueling process.

10.0 Demonstrate an understanding of various cargo and cargo management systems--The student will be able to:

10.12 Describe the movement of a product from abroad to an American store through the intermodal transportation process.

10.13 Describe different container sizes.

10.14 Identify different container ports and global shipping routes.

10.15 Explain the stresses that are associated with cargo loading.

10.16 Define bending movements, free space, and vertical center of gravity.

10.17 Define hogging, sagging, and twisting as related to cargo loading.

10.18 Explain the use of stow plans and stability calculators.

10.19 Describe what makes a vessel tender or stiff in a seaway.

11.0 Demonstrate an understanding of international trade and its impact on the world economy--The student will be able to:

11.20 Explain the importance of ship registries.

CTE Standards and Benchmarks

11.21 Explain the concept of flags of convenience.

11.22 Describe how U.S. commercial vessel ownership has changed over the years.

12.0 Examine the legal aspects of the maritime industry--The student will be able to:

12.08 Describe three types of marine insurance coverage.

12.09 Explain the concept of duty of utmost faith.

12.10 Describe a warranty of seaworthiness.

12.11 Explain the five perils commonly covered by marine insurance.

13.0 Explain the importance of vessel and ship security--The student will be able to:

13.10 Explain the role of insurance underwriters in piracy.

13.11 Explain the concept of terrorism at sea.

13.12 Describe the protocol for preparing a commercial vessel for adverse weather conditions.

13.13 Explain the process used by the master to avoid storms.

13.14 Describe the tools used by mariners in traffic during conditions of restricted visibility.

14.0 Examine the potential and use of marine resources--The student will be able to:

14.16 Investigate how petroleum is found and harvested below the seafloor.

14.17 Explain gas hydrates and how they may be used as a source of energy.

14.18 Investigate particle size of gravel, sand, silt, and clay.

14.19 Explain the forces used to create different particle sizes.

14.20 Explain the marine phosphorus cycle.

14.21 Identify marine phosphorous deposits in the ocean.

14.22 Identify desired minerals that are harvested from marine nodules.

14.23 Explain marine mining methods.

16.0 Demonstrate an understanding of the fundamentals of marine biology--The student will be able to:

CTE Standards and Benchmarks

16.19 Explain the ocean food chain and how it supports healthy and clean ocean zones.

16.20 Identify the importance of upwelling and downwelling.

16.21 Describe how upwelling and downwelling supports ocean life.

16.22 Analyze various ocean profiles for salinity, density, temperature, sunlight, oxygen, and organism types.

Course Title: Maritime 4
Course Number: 8404140
Course Credit: 1

Course Description:

This course provides students with opportunities to further their mastery on maritime related concepts in preparation for postsecondary education and the world of work. The course builds on the material presented in Maritime 3 by increasing the depth and breadth of student knowledge.

CTE Standards and Benchmarks	
01.0	Demonstrate knowledge relating to the historical origins of the maritime industry from vessel development, cultural, and trade perspectives--The student will be able to:
01.18	Explain various reasons why people go to sea.
01.19	Describe the history of the whaling culture.
02.0	Demonstrate proficiency in understanding the various career paths in the maritime industry--The student will be able to:
02.30	Explain the training needed for careers in marine science.
02.31	Describe the main responsibilities of a stevedore.
02.32	Describe the main responsibilities of a salvage master.
02.33	Describe the licensing and training required to become a salvage master.
02.34	Explain the role of the International Salvage Union.
02.35	Describe the main responsibilities of a commercial diver.
02.36	Explain the training and licensing requirements for commercial divers.
02.37	Describe the duties of a diving superintendent.
02.38	Explain the focus on Hyperbaric Medicine.
03.0	Demonstrate an understanding of required skills sets by mariners including, safety training, regulations, and leadership--The student will be able to:
03.32	Describe the purpose, function, and scope of operations of the International Maritime Organization (IMO).
03.33	Explain how the U.S. became a member in the IMO.
03.34	Explain the relationship between U.S. agencies and their regulations and the IMO conventions and treaties.
03.35	Describe the Marine Pollution (MARPOL) Annexes and their main functions.

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03.36	Explain which MARPOL Annexes have been adopted by the U.S.
03.37	Describe the Safety of Life at Sea (SOLAS) requirements.
03.38	Explain the Standards for Training, Certification, and Watchstanding (STCW) and why they are needed.
03.39	Describe maritime aspects that are covered by the Federal Communications Commission (FCC).
03.40	Explain the FCC certifications that are required for mariners and vessels.
03.41	Describe the different types of emergencies that can occur aboard a vessel at sea or in port.
03.42	Explain the use of emergency plans aboard a vessel.
03.43	Explain the origination of the Incident Command Center.
03.44	Describe the involvement of the Incident Command Center at the vessel, company, state, and federal level.
03.45	Explain the effects of hyperthermia on the body as related to water temperature.
03.46	Describe the use of survival suits aboard ocean going vessels.
03.47	Explain fire prevention and safety precautions when dealing with fires.
03.48	Describe how to extinguish a fire.
03.49	Explain the different types of fires that can be found on ships.
03.50	Explain the processes for fighting each specific type of fire.
03.51	Explain the mariner training process for firefighting.
03.52	Describe the use of fire escape plans and posting regulations.
03.53	Explain the importance of lifeboats and the practice of performing drills.
03.54	Explain a no sail command issued by the U.S. Coast Guard.
03.55	Explain the concept of seaworthiness and its legal importance.
04.0	Demonstrate proficiency in using engineering methods for ship construction and design--The student will be able to:
04.41	Explain the responsibilities of a naval architect.
04.42	Describe and interpret drawings used in ship design and construction.

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04.43 Explain the process of lofting.

04.44 Identify software used in modern engineering design.

04.45 Demonstrate an understanding of a lines plan.

04.46 Demonstrate and understanding of weld symbols.

04.47 Research alternative methods of ship propulsion.

04.48 Explain the use of complex machines.

04.49 Describe the function of simple machines.

04.50 Provide examples of simple and complex machines as used on a ship.

04.51 Research various incidents of vessel damage.

04.52 Explain the engineering process as related to the repair of damaged vessels.

06.0 Identify and explain various vessels and their and their use--The student will be able to:

06.23 Describe the major global ports of call for each type of vessel.

06.24 Explain various reasons for specific vessel ports of call.

07.0 Evaluate the environmental impact of the maritime industry--The student will be able to:

07.08 Explain the process of shoreline erosion and its impact on the maritime industry.

07.09 Explain the impact and function of human structures and barriers on waterways.

07.10 Describe the changes in the chemical composition of salt water in heavy marine traffic areas.

07.11 Describe laws designed to limit human environmental impact on marine systems.

07.12 Describe the impact of ocean dumping on marine ecology.

07.13 Explain the relationship between ozone depletion and phytoplankton.

07.14 Evaluate the impact of coastal population increases on marine ecosystems.

07.15 Explain the process of dredging and its impact on marine ecosystems.

07.16 Evaluate the environmental impact of using long lines and netting as part of commercial fishing practice.

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08.0 Demonstrated an understanding of the business of maritime as related to shipping operations--The student will be able to:

08.19 Explain the role of the Marine Personnel Manager.

08.20 Explain the procurement process for materials and goods need on ships prior to voyage.

08.21 Describe the purpose of load lines as established by the IMO.

08.22 Calculate vessel dry cargo lift using stow factors and hold capacity.

08.23 Calculate consumption and voyage time.

08.24 Describe the vessel crewing process from major crew markets and training facilities.

08.25 Explain the communication process from shore support to vessel while at sea.

08.26 Describe the ISM/SPS codes.

08.27 Describe how spare technical maintenance systems relate to maritime codes.

09.0 Demonstrate an understanding of the business of shipping as related to port operations--The student will be able to:

09.29 Describe the organization of a typical port and major functions.

09.30 Explain the roles of engineering, real estate, operations, security, sales/marketing, finance, government relations, and executive entities in a typical port.

09.31 Describe the roles and impact of stevedores and longshoremen.

09.32 Explain the responsibilities of a shipping agent.

09.33 Describe the responsibilities of a terminal operator.

09.34 Compare a public and private terminal operator.

09.35 Explain shipping agent authority as related to the vessel owner.

09.36 Compare the difference between a full service shipping agent and a protective agent.

09.37 Explain the Statement of Facts.

09.38 Describe the disbursement account.

09.39 Explain the role of the labor union as related to stevedores.

09.40 Describe how the size and scope of stevedore operations impacts port operations.

CTE Standards and Benchmarks

09.41 Explain the organization and function of the port authority.

09.42 Compare operating ports and landlord ports.

09.43 Describe the port master plan and its purpose.

09.44 Explain the role of a port as an economic engine.

09.45 Explain how a port authority determines rates for services, berthing, etc.

09.46 Describe the role of real estate and its importance to the port authority.

09.47 Explain the social impact of the port authority on the local community.

09.48 Describe methods ports use to maintain positive customer relations with the local community.

11.0 Demonstrate an understanding of international trade and its impact on the world economy--The student will be able to:

11.23 Explain the factors that change the dynamic between the capacities to move goods vs. the demand for goods.

11.24 Explain elasticity of demand for different commodity groups and how it affects freight rates.

11.25 Describe the freight rate agreement.

11.26 Compare contract rates and spot rates.

11.27 Explain the role of freight brokers.

11.28 Define the contract of affreightment and explain the main terms.

11.29 Compare voyage and time charter agreements.

11.30 Explain how contracts of affreightment mitigate risks involved in trade.

11.31 Explain freight forward agreements.

11.32 Describe the role of freight forward agreements in managing risk.

11.33 Define the financial term of hedging as related to the maritime industry.

11.34 Explain the role of the Baltic Exchange and in determining daily indices.

11.35 Explain the origin, role, and purpose of the Bill of Lading.

11.36 Explain the process of a fuel surcharge.

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11.37 Describe how the world shipbuilding orderbook affects freight rates.

11.38 Describe three major factors that affect market conditions.

11.39 Explain the economic effect of congestion and its impact on supply and demand.

11.40 Explain several types of measurements for freight rates and link each to a particular cargo type.

11.41 Calculate freight rates from multiple key elements.

11.42 Describe the interaction between commodity prices and freight rates.

12.0 Examine the legal aspects of the maritime industry--The student will be able to:

12.12 Explain the Jones Act.

12.13 Explain the legal definition of unseaworthiness.

12.14 Explain the use of the legal term maintenance and cure.

12.15 Explain the Longshoremen and Harbor Workers Compensation Act.

12.16 Explain the role of the Department of Occupational Safety and Health Act.

12.17 Describe the use of maritime liens.

12.18 Explain how a maritime lien is enforced.

12.19 Describe the Carriage of Goods at Sea/Harter Act.

12.20 Explain how fault is established in a maritime casualty.

12.21 Explain appointment of liability and how it is established.

12.22 Defined the legal term of economic losses.

12.23 Define the legal term of cargo losses.

12.24 Describe the purpose and operation of maritime salvage.

12.25 List three laws governing pollution control.

12.26 Describe the liability and damages resultant from marine pollution.

13.0 Explain the importance of vessel and ship security--The student will be able to:

CTE Standards and Benchmarks

13.15	Describe the primary functions of the Customs and Border Patrol (CBP) and how the agency is structured within the U.S. government.
13.16	Explain how the CBP regulates mariners in both the U.S. and foreign flag ships.
13.17	Describe how the CBP regulates the flow of cargoes in the U.S.
13.18	Explain the Merchant Mariners' Document (MMD) and how it is obtained.
14.0	Examine the potential and use of marine resources--The student will be able to:
14.24	Describe how research studies onboard the <i>JOIDES Resolution</i> has contributed to what we know about the Earth and the oceans.
14.25	Explain how collecting and analyzing seafloor sediment samples has helped scientists learn about the Earth and oceans.
14.26	Compare the experiments onboard the <i>JOIDES Resolution</i> from a quantitative and qualitative perspective.
14.27	Describe how robotic exploration has helped scientists learn more about the ocean at greater depths.
14.28	Explain the life style onboard a research vessel.
14.29	Analyze the various land-based careers and sea-based careers that are needed to maintain research vessels.