I. LEARNING OBJECTIVES
Operating a vessel safely and efficiently in all conditions of weather requires a seaman’s knowledge of the vessel’s fittings and equipment and the practical skill set necessary to operate and maintain the vessel. Through hands on experience under the supervision of experienced master mariners, this program of study provides the student the opportunity to build seamanship skills. Case studies based on marine, casualty investigations are employed to reinforce learning objectives and promote both critical thinking and problem solving. This cap stone course in advanced seamanship is designed to provide the new deck officer with a strong foundation in the fundamentals of traditional seamanship and an exposure to the “best practices” in the ever evolving shipboard technologies and operations necessary to compete globally in the marine industry.

II. LEARNING OUTCOMES
The student will be able to explain the function and limitations of each component of ground tackle. The student will be able to describe the different types of moorings and explain the correct application of each mooring technique. The student will be able to calculate optimal length of chain for the prevailing geographic and environmental conditions. The student will be able to compute the maximum radius of swing. The student will be able to explain the application of controllable forces in shiphandling including: propeller forces, rudder forces, thrusters, auxiliary propulsion units, lines, tugs and ground tackle. The student will be able to contrast the advantages and disadvantages of different types of marine propulsion systems. The student will be able to demonstrate fundamental shiphandling techniques through the operation of the academy’s small crafts and manned models. The student will be able to compute propeller slip and speed by revolution. The student will be able to discuss the effects of uncontrollable forces in shiphandling including: hydrodynamic interaction, current, and wind. The student will be able to describe the effects of speed, drift angle and pivot point on the maneuvering characteristics of a vessel in both deep and shallow water. The student will be able to calculate squat and the maximum transit speed to insure a minimum under keel clearance. The student will be able to describe the different attributes of mooring lines based on their respective material, construction, size and length. The student will be able to explain the application of different mooring patterns. The student will be able to calculate mooring line stress. Gaining hands on experience, the student will be able to
demonstrate the safe methods of handling mooring lines under heavy loads. The student will be able to explain the advantages and disadvantages of different modes of towing. Through hands on operations, the student will be able to demonstrate the advantages and disadvantages of maneuvering a tow made up alongside and maneuvering a tow pushed ahead. The student will be able to list the actions to be taken immediately after grounding and explain the different methods to refloat a vessel. The student will be able to execute basic stranding calculations critical to the early stages of a successful salvage. The student will be able to explain the fundamentals of ice seamanship including: types of ice, risks of ice passage, and operating with and without icebreaker assistance. The student will be able to identify the hazards inherent in marine helicopter operations and list controls to reduce the risk to personnel. The student will be able to list the phases of a search and rescue operation from awareness to mission conclusion. The student will be able to discuss the roll of a merchant ship in a coordinated SAR mission. Based on given parameters, the student will be able to identify the optimal type of search pattern to employ.

III. INSTRUCTOR
Mate Vacha

Lab Instructors:
Capt. Edward Bruce
Capt. Kirt DeCicco

IV. TEXTS
SEAMANSHIP NOTES, 8th. Edition
KNIGHT'S MODERN SEAMANSHIP, 18th Edition
AMERICAN MERCHANT SEAMAN'S MANUAL, 7th Edition
(available on line: http://www.nga.navy.mil)
INTERNATIONAL AERONAUTICAL AND MARITIME SEARCH AND RESCUE (IAMSAR) MANUAL, Vol. 3 (optional)
V. GRADING

"If something exists, it exists in some amount. If it exists in some amount, then it is capable of being measured." Rene Descartes, Principles of Philosophy, 1644

A. Tests, integral assessments, will be administered every other week during the semester. The purpose of the bi-weekly tests is:
   • to measure the student’s progress
   • to provide feedback
   • to provide motivation

   Approximately one third of each test will be based on material found solely in the assigned readings. In addition, the instructor reserves the right to administer short unannounced tests at his discretion.

B. A students who misses a test due to an authorized absence must personally notify the instructor prior to the test missed. A student who does not follow this procedure will be considered an unauthorized absentee and will receive a grade of zero for the test missed.

C. A comprehensive final examination will be given in the period designated by the Registrar during the final examination week at the end of the semester. The final examination for the lecture segment of the course will be approximately one third of the lecture segment final grade.

D. The final grade for the course will be computed based on the lecture segment being 85% and the lab segment being the remaining 15%.

VI. MISCELLANEOUS

A. Each student is responsible for assignments and work covered in the class and lab whether he/she is present or not.

B. Attendance is a course requirement and is mandatory. All unauthorized absences will be reported to the Commandant's Office. Further, more than four class and/or lab absences will result in a reduction of the final grade by one full letter grade.

C. Office hours are established to allow the student the opportunity to consult with the instructor. If you are having a problem, do not hesitate to see your instructor. The instructor will be pleased to schedule tutoring.
D. Massachusetts Maritime Academy is committed to providing reasonable accommodations to students with documented disabilities. Students who believe they may need accommodations in this class are required to contact Mrs. Fran Tishkevich, Director of Disability Compliance (Ext.2208).

E. Electronic communication devices, any telecommunication device that emits an audible signal, vibrates, displays a message, or otherwise summons or delivers a communication to the possessor including but not limited to: cell phones, Iphones and Blackberries, are prohibited from this class. In the event of a medical condition or personal circumstance necessitating the cadet to be in touch with a doctor or a parent, a reasonable accommodation will be made between the instructor and the cadet. Failure to comply with this directive will result in the following report offence, disobedience of a direct order.

F. You will be treated and expected to conduct yourselves as the professionals you are aspiring to be.
# MASSACHUSETTS MARITIME ACADEMY

## DEPARTMENT OF MARINE TRANSPORTATION

### ADVANCED SEAMANSHIP (MT4132)

## WEEK 1
### COURSE INTRODUCTION & GROUND TACKLE REVIEW
- Anchor Design And Use
- Anchor Kinematics
- Chain Design
- Anchor Machinery And Associated Fittings
- And Equipage

### Audio Visual Presentation
- VHS Film: *Ships of Shame*

### SEA NOTES
- pp.1-1 to 1-12
- K.M.S. 116-140
- A.M.S.M. Ch. 8

## WEEK 2 & 3
### ANCHORING AND MOORING
- Scope of Chain
- Holding Power
- Anchoring Procedure and Safety Considerations
- Riding to a Single Anchor
- Mooring (Riding to Two Anchors)
- Mediterranean Moor
- Mooring at Offshore Terminals
- Radius of Swing Calculations
- Scope and Length of Chain Calculations

### SEA NOTES
- pp.2-1 to 2-23
- K.M.S. 282-301
- A.M.S.M. Ch. 8
WEEK 4 & 5

SHIP MANEUVERING
CONTROLLABLE EFFECTS

Type Of Machinery
Horse Power To Displacement Ratio
Propellers: Number And Type
Propeller Forces
Rudders: Number And Type
Rudder Forces
Resultant Forces Of Rudder And Propeller
Maneuvering Devices: Thrusters And Auxiliary Propulsion Units
Dredging An Anchor
Displacement, Trim, List and Heel.
Speed by Revolution Calculations

Audio Visual Presentation:
  VHS Film: Shiphandling II
  Slides: Ship Rudder

SEA NOTES pp.3-1 to 3-33
K.M.S. pp. 95-115
A.M.S.M. pp. 241-254

WEEK 5 & 6

SHIP MANEUVERING
UNCONTROLLABLE EFFECTS

Hydrodynamic Forces And Interactions
Interaction Situations
Passing Ship Effects
Ship Squat And Its Calculation
Bank Effects
Current
Aerodynamic Interactions - Wind

Audio Visual Presentation:
  VHS Film: Shiphandling III

SEA NOTES pp.3-34 to 3-43
K.M.S. pp. 255-261
A.M.S.M. pp. 9-7 to 12
WEEK 7

SHIP MANEUVERING
Drift Angle
Pivot Point
Maneuvering Characteristics
Speed
Turning
Requirements For And Limitations Of
Displayed Maneuvering Information
Man Overboard Techniques
Deceleration And Stopping Maneuvers
Instruments to Assist in Judging Motion

Audio Visual Presentation:
VHS Film: Shiphandling I

WEEK 8 & 9

DOCKING AND UNDOCKING
PROCEDURES
Mooring Line Pattern
Relative Characteristics Of Mooring Line:
   Material, Construction, Size And Elasticity
Attributes Of A Mooring Line
Bights And Three Part Leads
Communication And Line Handling Commands
Deck Winch Machinery
Lead Angles
Safety And Operational Considerations
Mooring Line Inspection
Mooring Line Calculations

Audio Visual Presentation
VHS Film:
Snap Back
Steutgard Field Test
The Theory of Mooring and Its Application
Spectra 12

SEA NOTES pp.3-43 to 3-58
K.M.S. pp. 261-264

SEA NOTES pp. 4-1 to 4-15
K.M.S. pp.271-282
A.M.S.M. pp. 4-8 to 17
## Week 10 & 11

**Tugs and Towing**

- Tug Function
- Tug Design Characteristics
- Ship Assist Practice
- Sheltered Water Towing
- Open Ocean Towing
- Emergency Towing
- Tug and Towing Safety

### Audio Visual Presentation

- **VHS Films:**
  - *Tractor Tugs in Panama Canal*
  - *Voith Schneider Training Film*
  - *MSC Passing a Emergency Tow Line*

### SEA NOTES
- pp. 5-1 to 5-44
- K.M.S. pp. 306-318

## Week 12

**Stranding and Salvage Operations**

- Actions Taken Immediately After Stranding
- Precautions Against Broaching, Pounding and Further Grounding
- Methods of Refloating
- Stranding Calculations

### Audio Visual Presentation

- Slides: *Stranding and Salvage Operations*

### SEA NOTES
- pp. 6-1 to 6-11
- K.M.S. pp. 306-318

## Week 13

**Ice Seamanship**

- Types Of Floating Ice
- Ice Identification
- Risks Of Ice Passage
- Anchoring & Towing In Ice
- Ice Accretion And Vessel Stability
- Freeing A Beset Vessel While Operating Independently
- Freeing A Beset Vessel With Icebreaker Escort

### Audio Visual Presentation

- Slides: *USS EDISTO Arctic Transit*

### SEA NOTES
- pp. 7-1 to 7-21
- K.M.S. pp. 382-402
- A.P.N. pp. 453-479
WEEK 14
HELICOPTER OPERATIONS
Vessel Responsibilities And Preparations
Dangers And Personnel Safety
Personnel Approaching The Helicopter
Helicopter Operating Conditions
Maneuvering Vessel
Shipboard Hoisting And Landing

SEARCH AND RESCUE OPERATIONS
Sources of SAR Information Including AMVER Reporting
SAR Planning
On-Scene Coordination
Search Patterns
Terminating the Search

SEA NOTES pp. 8-1 to 8-12
K.M.S. pp. 372-381
IAMSAR Vol. III

WEEK 15
SEA NOTES pp. 9-1 to 9-15
IAMSAR Vol. III (optional)