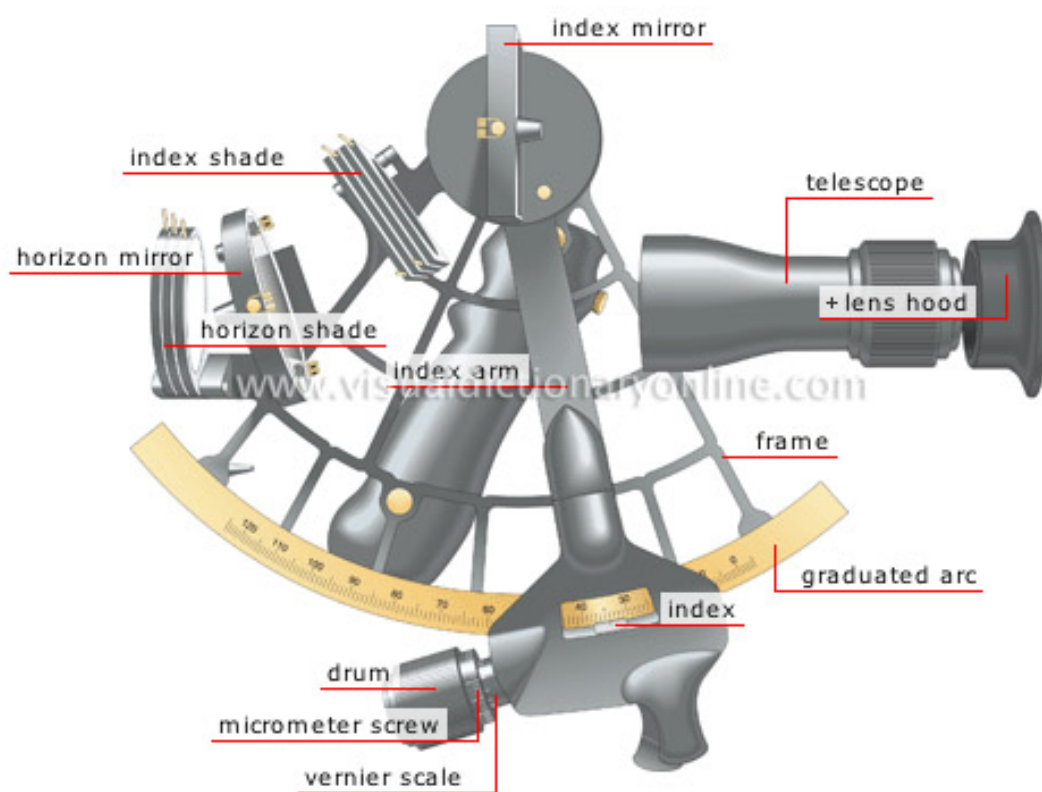


## MT 2222 - CELESTIAL NAVIGATION



Merriam Webster ©

**CELESTIAL NAVIGATION**  
***SPRING SEMESTER ACADEMIC YEAR 2022***

***Instructors:***

CDR Colleen McRae (Lecture) [cmcrae@maritime.edu](mailto:cmcrae@maritime.edu) OFFICE: 307A Harrington  
Office hours: Monday, Wednesday, Friday 1100-1150  
Tutoring – TBA

Mate Lisa Burke (Lab) [lburke@maritime.edu](mailto:lburke@maritime.edu) OFFICE: 318A Harrington  
Office hours: By appointment

**PRE- REQUISITE**

Deep Sea Navigation (MT 2121)

If you did not pass this course, you are unable to take this class.

**LEARNING OBJECTIVE**

The objective of this course is to introduce and familiarize the student with the necessary knowledge of celestial navigation so as to satisfy the STCW Code Table A-II/1 in the following areas: Ability

- to use celestial bodies to determine the ship's position
- to determine errors of the magnetic and gyro-compasses, using celestial means, and to allow for such errors
- to use celestial navigation in times of need, as second check and as a backup navigational system.

**LEARNING OUTCOME**

At the completion of the Celestial Navigation Course, the student will have:

- demonstrated advanced understanding and knowledge of the principles of celestial navigation
- demonstrated ability to utilize observations of celestial bodies to fix the vessel's position.
- demonstrated an ability to utilize observations of celestial bodies to determine error of the compasses
- demonstrated ability to obtain detailed information from appropriate navigational publications

## WEEKLY LEARNING OBJECTIVES

The expected learning outcome is that the student learns and understands the following\*:

1. Marine Sextant - Hs to HO
2. The coordinate systems ( Celestial, Horizon & Nav Triangle)
3. Nautical Astronomy
4. Time
5. Time at Local Apparent Noon ( LAN)
6. Latitude at Local Apparent Noon ( LAN )
7. Sunrise- Sunset -Star time
8. Compass Error - Triple interpolation Azimuth of the sun, planet and star
9. Compass Error – Az by Polaris – Latitude by Polaris
10. Compass Error – Amplitude of the Sun on celestial and visible horizon
11. Altitude Intercept (Hc, Zn, a)
12. Running Fix of the sun
13. Running Fix of any body ( stars, sun and planet )
14. Star Identification – star selection

**\* Order of topic are subject to change as per order of the instructor to fit the students learning objective\***

### REQUIRED TEXT:

1. Duttons Nautical Navigation
2. The American Practical Navigator, Bowditch
3. The American Practical Navigator, Bowditch, Vol. II 1995. You may check this out from the library.

### REQUIRED PUBLICATIONS:

1. Nautical Almanac, 2021 – we will be doing current sunset, sunrise, LAN problems PDF will be uploaded in to Blackboard.
2. Sight Reduction Tables for Marine Navigation Volumes I (LAT 0°-15°), II (LAT 15°-30°), Volume III(LAT 30°-45°), (Library)
2. Nautical Almanac, 1981. Check out from library or buy the reprint from ship's store
3. Universal Plotting Sheets (Ships Store)
4. RUDE Star finder ( Library or ships store )

### ATTENDANCE POLICY:

**ATTENDANCE AT ALL CLASSES AND LABORATORIES IS MANDATORY.**

**Unauthorized absence will not be tolerated. Disciplinary action and grade point reduction will be administered to offenders. You will receive a class III tap sheet.**

**As per STCW regulations - More than four (4) hours combined from Classrooms Lectures and/or Labs will result in a failure of the course.** (Note: 1 lab counts as 2 hours)

If absences occur due to illness, the student must notify the instructor as soon as possible for make-up work. *If you are sick, go to binnacle. Take a photo of your binnacle note, and email to me.*

The instructor must be informed of all special liberty requests well in advance of the respective date. I will not sign your special lib, but I still want to be notified prior.

Authorized absences must be reported to the instructor prior to the missed class. Plan ahead, and email me as soon as you know that you will need to miss a class. Make-up examinations for authorized absences will be scheduled for a mutually agreed upon time.

**All quizzes and examinations missed as a result of an unauthorized absence, will result in a ZERO.**

Cadets repeating this class must retake all sections and the laboratory. Dismissal from class will be considered as absence from that class.

\*Students not prepared for class (pencils, calculators, course books, plotting sheets) will be dismissed from class and marked absent from that class

\* Students who choose to sleep in class will be dismissed and be marked absent from that class.

#### **CLASSROOM AND LABORATORY POLICIES:**

- Course conduct will be in accordance with MMA regimental system. The MMA honor code will be strictly followed.
- Eating, drinking, or the use of tobacco products are prohibited during all classes and labs.
- Cell phone texting or calls are not permitted during class. **Phones shall remain on “silent” and “put away in either pocket or bag” in case of the emergency notification system activation. If I see or hear your phone, I will dismiss you from class and you will be sent to the dean’s office with your phone.**

**GRADING:**

**EXAMS:**

1. 5 Quizzes will be administered throughout the semester in the lecture period.
2. A Mid-Term will be given (TBD) and a comprehensive final exam will be held during finals week during the schedule exam period.
3. If you must be absent during a scheduled exam due to illness or an “Academy authorized” event or some other “Pre-approved” reason, a make-up exam will be scheduled. To qualify for a make-up exam it is the student’s responsibility to arrange for his/her make-up exam **PRIOR** to the date of the scheduled exam. Examinations missed as a result of an unauthorized absence will incur a zero.

Below is the grading policy. The minimum passing grade is 70% for STCW Certification.

**Those that receive a grade below C- (70%), will have to retake the course**

<b>FINAL GRADE:</b>	Quizzes	25%
	Mid Term Exam	20%
	Final Exam	25%
	Lab work Assignments	20%
	Lecture Assignments	10%

The following is a breakdown of the final course grading:

<b>A</b>	93.0-100
<b>A-</b>	90.0-92.9
<b>B+</b>	87.0-89.9
<b>B</b>	83.0-86.9
<b>B-</b>	80.0-82.9
<b>C+</b>	77.0-79.9
<b>C</b>	73.0-76.9
<b>C-</b>	70.0-72.9
<b>D+</b>	67.0-69.9

<b>D</b>	63-66.9
<b>D-</b>	60.0-62.9
<b>F</b>	Below 60.0

### **ACADEMIC ACCOMMODATIONS:**

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 the Academic Accessibility Services Coordinator, Assistant Dean Elaine Craghead ([ecraghead@maritime.edu](mailto:ecraghead@maritime.edu), or x5350), with any questions regarding academic accommodations. Please remember that accommodations are not retroactive, so submit your paperwork in a timely manner.

**SYLLABUS CHANGES:** The syllabus, course, and testing schedule may be adjusted as required to meet the goals and objectives of the course. Notice of changes will be made to students as soon as possible.

**If our current in person classroom situation changes due to COVID 19, a revised syllabus will be sent out and we will adhere to the revised syllabus.**

## LABORATORY

Lab	Subject
1	Intro to Sextants / Altitude Corrections
2	Coordinate System
3	Nautical Astronomy, Navigation Triangle
4	Time – Arc to time – Getting Fluid with Time.
5	Time of LAN
6	Latitude of LAN
7	Sunrise, Sunset, Twilight
8	Azimuth Compass Error
9	Latitude by Polaris & Azimuth of Polaris
10	Amplitude for Compass Error
11	Sight Reduction - Full Sight Reduction SUN
12	Altitude Intercept Plotting – Running Fix of the Sun and LAN
13	Altitude Intercept Plotting - Running Fix of Any Body

**LAB POLICY: All lab assignments are due one (1) week after they are assigned. Labs handed in after the due date WILL NOT be accepted and a grade of zero (0) will be assigned.**

**Lecture Homework handed in after the due date WILL NOT be accepted and a grade of zero (0) will be assigned.**

**If you are sick this day, make sure your shipmate brings in your assignment, and you are put on the binnacle list, or scan your work in using phone app HP smart, and email it to me**