

# DEEP SEA NAVIGATION

## MT-2121 SPRING 2022

---

### COURSE

Deep Sea Navigation

### CREDITS

3: 2-50 min Lectures 1-1 hr & 50 min Lab per week

### COURSE INFORMATION

**Description:** This course reinforces and continues the learning of the navigational processes and knowledge acquired in Coastal Navigation that are used daily while at sea. In addition to applying knowledge already studied including position fixing techniques, sources of error and correction calculation, NAVAIDS, and navigational publications, the student will learn and understand the concepts of Tides and Currents and their calculation, The Navigational Sailings, and be introduced to voyage planning, use of navigation publications, and navigational record keeping. Classwork is supplemented by practical chart plot exercises in weekly labs including time in the Electronic and Navigation Lab (ENL) or Integrated Navigation Lab (INL) simulator with students working in teams of two at each student station.

**Prerequisite:** All students enrolled in Deep Sea Navigation MUST HAVE PASSED Coastal Navigation with a C- or better.

Deep Sea Navigation serves as a pre-requisite for Celestial Navigation (MT-2222). Therefore, CADETS MUST PASS DEEP SEA NAVIGATION with a 70% or better and PASS ALL FOUR PRACTICAL ASSESSMENTS to be eligible to enroll in Sea Term II, Celestial Navigation and/or Radar Observer.

### STCW Knowledge-Based Learning Objectives:

#### Demonstrate knowledge and understanding of the following STCW elements:

- OICNW-A1.03 Thorough knowledge of and ability to use nautical charts, and publications, such as sailing directions, tide tables, notices to mariners, radio navigational warnings and ships' routing information
- OICNW-A1.05 Ability to operate echo sounder equipment and apply the information correctly
- OICNW-A1.07 Ability to determine errors of the magnetic and gyro-compasses, using terrestrial means,
- OICNW-A1.07 Allow for errors in magnetic and gyro-compasses

To satisfy these requirements, the minimum passing grade for the course is 70%.

### STCW Practical Element Learning Objective:

#### Completion of this course will demonstrate proficiency in the following skills:

- OICNW-1-2D Plot the ship's DR position
- OICNW-1-2E Determine course to steer
- OICNW-1-5D Determine course to steer by magnetic compass
- OICNW-1-5E Position fix by magnetic compass bearings

A cadet will have two opportunities to pass these four assessments during the course. If they have earned a 70% or better for the course, they will be given **one** more opportunity to retake any previously-failed assessment at a later scheduled time.

Should a cadet not pass one or more of these practical assessments, they will receive a FAILING grade for the course.

**COURSE OUTCOMES and OBJECTIVES**

As a result of completing Deep Sea Navigation and successfully passing the associated examinations and assessments, Cadets will:

- Present a proficiency in the skill of using visual bearings and radar ranges to fix their position and stay clear of dangers
- Display knowledge of the meaning and information proved by various NAVAIDs
- Show an understanding of how to determine and apply gyro compass error as well as magnetic Compass Error, Variation, and Deviation
- Demonstrate knowledge of available Navigational Publications and the information they provide
- Exhibit the ability to calculate the essential parameters of terrestrial navigation through The Sailings
- Prove an ability to determine tides and currents and know how these affect safe navigation, and
- Reveal an understanding of voyage planning including proper record keeping

Grading of multiple assignments issued throughout the semester as well as the results of tests and examinations will be used to determine satisfaction of these outcomes.

After completing Deep Sea Navigation, Cadets should have:

- Confidence that they can keep their vessels out of danger when navigating in Coastal Waters by fixing their position through various techniques, planning passages, and making adjustments necessary to compensate for various sources of error
- Expanded their familiarity with and understanding of navigation terminology
- Furthered their ability to use the tools of navigation, and
- Appreciate how piloting skills are used in industry

Grading of tests and examinations will be used to determine satisfaction of these outcomes and objective.

**ATTENDANCE**

Since this is an STCW course, no allowance for unexcused absence can be made. Missing more than two meetings of lecture *OR* one lab meeting for ANY reason will result in at least one full letter reduction of your final grade, or an incomplete, or possibly a failing grade for the course.

It is your duty to keep up with the material, and to arrange to make up any quizzes, tests or material missed ***in advance***. Make your arrangements beforehand, or a zero will be recorded for that work. Lecture Assignments and Lab Exercises **will not be accepted for credit past their due date**.

The Academy offers, upon request, accommodations to students with documented learning disabilities. The ADA Coordinator, Asst. Dean Elaine Craghead, evaluates the documentation provided, determines appropriate services, and is available to discuss accommodations with students. The Disability Resources office is located in the Academic Resource Center, ABSIC 320. Students can drop in during normal business hours, M-F 0800-1600, or call x5120, or email [ADAcompliance@maritime.edu](mailto:ADAcompliance@maritime.edu).

Thereafter, you must make your instructors aware of any determined accommodations so that they may be implemented.

## COURSE CONDUCT

- Most lectures (and announced labs) will be taught in a “flipped” manner meaning students will be required to watch a video lecture BEFORE class and then will complete exercises in class based upon the lecture material. Video lectures will be posted on Blackboard. Student watching of video lectures will be tracked by the instructor. **A 2 point reduction off a student’s final average for the course will occur EACH time a lecture video is not watched in its entirety PRIOR to class.**
- Course conduct will be in accordance with the MMA regimental system. All students **shall** wear the appropriate uniform of the day to each class.
- The MMA honor code will be strictly followed during the course of the semester. Any submitted work be that examinations, tests, exercises, assignments, etc. is expected to be only your work. No outside sources may be used in the production of your work. No collaboration with any individual is permitted unless specifically authorized by the instructor for example during lecture breakout sessions. If the instructor has any concern about a possible violation of the MMA Honor Code, the submitted work will be given a grade of zero and the instance may be pursued with the Commandant of Cadets after referral to the Vice President of Academic Affairs. In serious cases, violations of the Honor Code may result in dismissal from the Academy.
- Cell phone texting or calls during class sessions is not permit, regardless of whether a student is participating in-person or on-line. **Cell phones *SHALL* be put away and remain away until the end of class, unless otherwise directed by the instructor. Use of your cell phone during lecture will result in immediate dismissal from class and a zero for that day’s class. Repeated violations of this classroom policy may result in a reduction of your overall grade by one letter grade and a report of the repeated violations to Dean of Undergraduate Studies and/or VP of Academic Affairs.**
- Laptop computer use for social media or Internet surfing during class time is strictly prohibited. **Repeated violations of this classroom policy may result in a reduction of your overall grade by one letter grade and a report of the repeated violations to Dean of Undergraduate Studies and/or VP of Academic Affairs**
- Only covered drinks will be permitted in the classroom. Absolutely no drinks will be permitted on desk tops during lab periods.

**GRADING POLICY**

- In accordance with the Mass Maritime Academy academic policy, the minimum passing grade for Deep Sea Navigation 60%. However, as this course satisfies a portion of your STCW requirements for licensing, in order to receive credit for the knowledge-based components of STCW for this subject, it is necessary to obtain a grade of 70% or better.
- Those who receive a grade below 70% **must retake** Deep Sea Navigation **and** all four practical STCW Assessments *regardless if any were previously passed* in order to satisfy their STCW requirements.
- Grades will not be scaled.
- The + - system will be used.
- Grades will be averaged based upon the following percentage values:

Lecture Tests	15%	Lab Tests	15%
Lecture Quizzes	10%	Graded Lab Exercise	10%
Lecture Final Examination	15%	Lab Mid-Term Chart Exam	10%
Assignments and Participation	10%	Lab Final Chart Exam	15%

- *Students may select one graded item from lecture and one from lab to drop not to include a final examination, the lab mid-term, or participation grade.*

**Final Course Grading:**

100 - 93%	A	76.9 - 73%	C
92.9 - 90%	A-	72.9 - 70%	C-
89.9 - 87%	B+	69.9 - 67%	D+
86.9 - 83%	B	66.9 - 63%	D
82.9 - 80%	B-	62.9 - 60%	D-
79.9 - 77%	C+	Below 60%	F

**Required Books & Accessories:**

- TEXT Books: DUTTONS 15th Edition, BOWDITCH - Recommend you purchase the book, but **BOOK IS AVAILABLE ONLINE**
- Bowditch 1981 - Available for semester loan from library
- Charts 12221-TR, 12354-TR, 13205-TR, 18465-TR
- Chart No.1 12th Edition
- Pad of universal plotting sheets
- Plotting Gear: Triangles, Parallel Ruler, and Dividers. I recommend two dividers, one with points, and one with a pencil lead
- Print out Tide & Tidal Current Table Supplements posted on Blackboard under "Resources"
- In addition to books and calculators, plotting tools, **all charts and plotting sheets** (unless specifically requested by the instructor not to) are to be brought to **every lab** throughout the semester.

## INSTRUCTORS

**Lecture Instructor: CDR John Belle**      Office # 317A      [jbelle@maritime.edu](mailto:jbelle@maritime.edu)  
Office Hours: Mon., Wed. & Thurs. 1400-1450 or **by appointment**

**Lab Instructor: LT Edward Vacha**      Office # 305B      [evacha@maritime.edu](mailto:evacha@maritime.edu)  
Office Hours: **by appointment**

### Our duty is to:

- guide you through the material,
- answer all your questions, e-mails, texts, etc.,
- be available should you need further explanation, and
- promptly return and comment on assignments, quizzes and tests.

### It is your responsibility to:

- Come to class prepared to discuss the reading and subject matter for that day,
- Actively participate in classroom discussions and labs,
- Stop me at any point that you don't understand as I will be glad to go over it again, and
- Learn the material.

Your comprehension of the material can only come from your active involvement in the lecture and lab exercises, completing all exercises, watching all posted videos, and outside classroom study as needed. Each student should make good use of all the available resources on campus to help with academic success including, but not limited to, instructor office hours, the Center for Student Success, tutors, and study groups.

Be certain you are able to do all the work in this course on our own because when you are standing in the Wheelhouse or on the Navigation Bridge looking out the windows, you and you alone must process the information and navigate the vessel safely and efficiently. Any indication of collaborative work (outside of advice) on graded exercises will be met with a zero.

It is our personal goal to see each and every one of you succeed with this material. It is our personal goal to see each and every one of you to succeed with this material. If you feel you are falling behind or are having trouble understanding some of the subject matter, and one of us has not detected this on our own, be sure to contact us or stop by our office for extra help. We will be available for as long as it takes to help you. **We can only help you if you come to us.**

### 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.

**LESSON PLAN CLASSROOMS – SPRING 2022-- ALL SECTIONS**

Class	LESSON	Duttons 15 <sup>th</sup> ed.	Bowditch 2002	Bowditch 2017
1	Course Intro – Proper Units & Coastal Deep Sea Review			
2	Current Sailings Introduction	<b>Chap 13</b>	Art. 906-908, 116-117	Art.117 & 118
3	Current Sailings			
4	Tides Intro	<b>Chap 10</b>	Art.3500-3501	Art. 1101
5	Tides Causes		Art. 3502-3513	
6	Tides Causes Part 2			
7	Tide Calculations		Art.3528-3531	Art. 1104-1106
8	Tide Calculations			
9	Tidal and Ocean Currents	<b>Art 1100-1115</b>	Art.3514-3518, 3600-3604	
10	Current Calculation		Art. 3532-3539	Art.1107-1111
11	Current Calculations	<b>Chap 14</b>		
12	Navigation Mathematics		Art. 1109,125- 127,136- 138,143	Art. 139, 503
13	The Sailings	<b>Chap 31</b>	Art. 1200	Art. 1001
14	The Sailings Terminology		Art. 1201, 1204	
15	Plane Sailing		Art 1215	Art. 1003
16	Parallel Sailing		Art.1217	Art. 1005
17	Mid-Latitude Sailing		Art 1218	Art. 1006
18	Mercator Sailing		Art 1219	Art. 1007
19	Great Circle Sailing		Art. 1202, 1206,1208-1211	Art. 1014-1016
20	Mercator & Great Circle Sailings			
21	Composite Sailings	<b>2306-2316</b>	Art. 1203, 1205, 1213	
22	Sailings Review/Wrap Up			
23	Time Zones		Art.1607, 1605	Art. 605-607
24	ETA's			
25	Voyage Planning		Art. 2707-2709	
26	Log Books & Records	<b>Chap 4</b>		
27	Voyage Planning			Art. 2707-2709
	<b>TEST DATES WILL BE DETERMINED BY CLASS PROGRESS AND WILL BE ANNOUNCED</b>		<b>"Art." Means article number in the text</b>	

## LESSON PLAN LABS – SPRING 2022 -- ALL SECTIONS

	Labs
1	<b>Coastal &amp; Deep Sea Navigation Review Plotting Chart Plot all-encompassing</b>
2	Chart Plot - Current Sailings <i>Chart 13205</i>
3	<b>Chart Plot - Current Sailings #2 <i>Chart 12221</i></b>
4	Chart and Publication Correction Exercise <i>Chart 13205</i>
5	Chart Plot Long Island Sound – Timed Plotting Exercise <i>Chart 12354</i>
6	<b>ENL Exercise – Strait of Juan de Fuca Traffic Lanes - ENL Lab <i>Chart 18465</i></b>
7	<b>Mid Term Chart Plot – Assessments First Attempt</b>
8	Additional Chart Plot Exercise - Chart TBD
9	<b>Tide and Current Tables Exercise</b>
10	Plotting Sheets and Exercise <i>Universal Plotting Sheets</i>
11	<b>Mercator Sailing Problems Exercise</b>
12	<b>Great Circle Sailing Problems and Plotting Exercise - <i>Supplied Charts - Gnomonic and Mercator Projections</i></b>
13	Chart Plot - Final Exam Practice
14	<b>CHART PLOT FINAL – Assessments Second Attempt</b>

**\*\*HIGHLIGHTED LABS WILL BE GRADED**