Massachusetts Maritime Academy

STABILITY & TRIM

COURSE: MT-4241 (CREDITS: 3)

SPRING SEMESTER ACADEMIC YEAR 2022

COURSE LEVEL: UNDERGRADUATE

Assistant Professor	Lieutenant Albion Cassius Llewellyn
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Class Location & Time

SECTION	LOCATION	DAYS	TIME
MT-4241-11	Bresnahan Building, 301	Mon, Wed & Fri	0800-0850
MT-4241-16	Harrington Building, 205	Mon, Wed & Fri	1300-1350

Office Hours:
Tuesday 0900 -0950, Wednesday & Friday 1000-1050

Required Text

Stability & Trim For The Ship Officers
4th Edition
Author: William George

Ships Knowledge Ships Design, Construction and Operation
9th Edition
Author: Klaas Van Dokkum

Course Description
This course is designed to meet all stability knowledge requirements for Officer in Charge of a Navigation Watch defined by STCW Regulation II/1. Building on the principles of stability, the student will use tables and diagrams of stability and trim data to calculate initial stability, drafts and trim for any given configuration of loading. The student will compute both longitudinal and transverse stability for any condition during the load-out or discharge using both the traditional stability booklet and stability software. The student will interpret stability information and identify factors adversely affecting stability. Finally, the student will become familiar with damage stability assessment and fundamental actions to be taken in the event of partial loss of intact buoyancy.

Course requirement & prerequisites
MT-2141, SM 1214, SM-2121, comprehensive understanding of trigonometry and algebra

Teaching Facilities and Equipment
Stability & Trim (MT-42141) course will be presented in the Massachusetts Maritime Academy's academic facilities BR 301 and HA205. The lecture will be presented via audiovisual classroom setting, and course material will be posted on Blackboard.

Case Study Presentation
Inductive reasoning has proven to be a very effective method of learning. Most students learn better through real-life scenarios. Each student will be assigned to a group, each group member will collectively analyze an incident/ accident and present the findings to the class. This exercise is designed to help build upon each student's problem-solving and analytical skills.
During the presentation, each group should ascertain

1) The issue/ problem
2) Events leading up to the problem
3) Key factors and event
4) Lessons learned
5) Make recommendations

Note: Each group presentation format and content will be graded collectively. However, each presenter's body language, subject knowledge, and presentation skills will be graded individually.

Classroom Policies

- On-campus
  - Cadets will wear the appropriate uniform of the day in lecture classrooms. Commuter students should wear appropriate clothing.
  - Eating, drinking, or the use of tobacco products is prohibited from all classes.
  - The use of cell phones are disallowed; however, personal computers or tablets are permitted ONLY for course material.
  - If students are caught using their cell phones, browsing social media, or inappropriate websites, they will either be placed on the report and or evicted from class.
  - If students are justifiably evicted, they will not receive credit for that day.

- **Online Lecture Policies (only if classes revert to online)**
  - Please keep the computer microphone muted, to avoid disruption from sound feedback, interference, and background noise.
  - Avoid being disruptive and do speak over the instructor.
  - Cadets will wear the appropriate clothing.
  - Eating and the use of tobacco products are prohibited from all lectures.
  - The use of cell phones are disallowed; however, personal computers or tablets are permitted
  - During lectures, students should avoid browsing the internet content not related to the subject of discussion.
  - For your convenience, lectures will be recorded. Students can reference recorded lecture(s) at a time convenient to maximize their learning outcome. If students do not wish to be recorded, please contact the instructor.

Topics:

Basic Stability and Hydrostatic Tables

Deadweight scale
Hydrostatic scale
Cross Curve

Understanding and Calculating

Vertical & Longitudinal Center of Gravity
Location of the Metacenter
List
Displacement
Metacentric height
Metacentric Radius
Shift in Center of Gravity
Free Surface effects
Rolling Period
Waterplane Area
Incline Experiment
Righting arm

Calculating the stability condition of the S.S. American Mariner

GM after loading or discharging cargo
Draft after loading or discharging cargo
Required GM
Free surface

Longitudinal Stability

Trim
Trimming moment
Change in draft after loading or discharging cargo
Obtaining the desired trim
Calculating MT1 and TPI

Damage Stability

Hogging and sagging
Reserve buoyancy
Effects of flooding on the ship's stability

Learning Disabilities

Massachusetts Maritime Academy, 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, ABS 320. Students can drop in during normal business hours, M-F 0800-1600, or call x5120, or email ADAcompliance@maritime.edu.

Sexual Harassment and Misconduct

Our school is committed to fostering a safe, productive learning environment. Title IX and our school policy prohibit discrimination based on sex. Sexual misconduct including harassment, domestic and dating violence, sexual assault, and stalking are also prohibited at our school.
Our school encourages anyone experiencing sexual misconduct to talk to someone about what happened, so they can get the support they need and our school can respond appropriately. If you wish to speak confidentially about an incident of sexual misconduct, want more information about filing a report, or have questions about school policies and procedures, please contact our Title IX Coordinator, which can be found on our school's website.

Examinations Grading and Attendance

Stability & Trim (MT-4241) is an STCW knowledge-based course requiring a minimum passing grade of 70%. If students are unable to achieve the mentioned passing grade, they may fail the course.

Regular tests on lecture material, reading assignments, PowerPoint® presentation notes, and classroom handouts will be administered. You are expected to complete all assigned reading and are accountable for any information found in the lecture material, reading assignments, PowerPoint® presentation notes, and classroom handouts.

The instructor reserves the right to administer unannounced short quizzes and exams.

Absence for medical court, legal obligation, and varsity is permitted however students are responsible for the course material. Disciplinary action may be taken for unauthorized absences **and** ***anyone who has more than four class-long, unexcused absences will receive an "F" grade for the COURSE.***

Final Grade Computation

Homework Quizzes and Assignments	25%
Exams	60%
Case Study	15%
Total	100%

The following is a breakdown of the final course grading:

93.0 100	**A**
90.0 – 92.9	**A-**
87.0 – 89.9	**B+**
83.0 – 86.9	**B**
80.0 – 82.9	**B-**
77.0 – 79.9	**C+**
73.0 – 76.9	**C**
70.0 – 72.9	**C-**
67.0 – 69.9	**D+**
63.0 – 66.9	**D**
60.0 – 62.9	**D-**
Below 60.0	**F**
Incomplete	**I**

Syllabus Changes
The syllabus and course schedule is tentative and 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.

Cited Literature (B)

B1 Murphy, J II Deck Safety Stability & Trim Course Study Guide (MT 4241-06)

B2 Civilla. L *Stability and Trim for Upper-Level Deck License*. Houston Marine Training services, First Edition 1993

B3 Tupper, E. Introduction to Naval Architecture. 3rd ed. Jersey City, NJ: Society of Naval Architects and Marine Engineers, April 1, 1996. ISBN: 9780939773213.

B4 Lewis, E. V., ed. Principles of Naval Architecture. Jersey City, NJ: Society of Naval Architects and Marine Engineers, 1988. ISBN: 9789991181417.

B5 Murphy, II, J.S., *Deck Officer Study Guide, Volume 1&2, Deck General, Deck Safety 2011 ed*., (Buzzards Bay, MA: Academy Publishing Company, 2011)

B5 Dokkum Klaas Ship Knowledge Ship Design Construction and Operation 9th ED Dokmar Maritime Publishers BV, 2016