

**PROGRAM:** Department of Mechanical Engineering  
**COURSE:** NAME 522 (3) Ship Production and Industrial Engineering

***Instructors:***

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## **1. Course Structure, Context and Operation**

***Course Structure.*** This is a 3-credit course with the vector 3-0-0 (i.e. equivalent to 6 hours of lectures per week, no laboratory and no tutorials over one term). The course is to be taught as two 1.5-hour classes twice each day, weekly for 13 days.

***Context.*** The course is a required course of the Naval Architecture and Marine Engineering (NAME) focus area of the Master of Engineering in Mechanical Engineering. The course also serves as an elective course for MASc and PhD students in Mechanical Engineering.

***Operation.*** This course will operate through the delivery of lectures, videos, question/discussion periods, worked examples, five Pop Tests, two take home open book examinations, and coverage of assignment solutions. All students should have access to a laptop computer, and are required to submit all assignments electronically. UBC Vista or Connect will be used to provide students with lecture notes, worked examples, assignment solutions, additional materials, and their performance.

***Prerequisites:*** This course has the following prerequisite: One of MECH 392, MTRL 340 or equivalent.

## **2. Learning Objectives**

Upon completion of the course, it is expected that students will be able to:

- Describe the shipbuilding industry and its sectors
- Ensure that ship designs are production friendly and suited to each shipyards capabilities
- Describe the ship building process including various building approaches
- Understand shipyard layouts and assembly strategies to optimize material and work flow
- Understand the materials used for shipbuilding including ferrous and non-ferrous materials and their application in the marine environment
- Understand the requirements for Work Breakdown Structures
- Appreciate to cost drivers and cost estimating approaches
- Have a thorough understanding of the various fabrication and assembly techniques used in shipbuilding

## **3. Detailed Course Outline**

<b>CLASS NO.</b>	<b>TOPIC</b>	<b>READING ASSIGNMENT</b>
1	Introduction to Marine Industry	SD&C Chapter 3
2	Ship and Types and Components	SK Chapters 1 and 3
3	Shipbuilding Industry	SD&C Chapter 3
4	Markets, Demand and Supply	Course Notes
5	Productivity	Course Notes
6	Competition	Course Notes
7	Specifications and Contracts	SD&C Chapter 9
8	Marine Cost Estimating	SD&C Chapter 10
9	Modern Shipbuilding Practice	SK Chaps 3 & 7, SD&C Chap 25
10	Lean Shipbuilding	Course Notes
<b>MIDTERM EXAM 1</b>		
11	Structural Joining Design	SD&C Chapter 22
12	Shipyards Layout & Overall Design	SD&C Chapter 26
13	Shipyards Equipment	SD&C Chapter 26
14	Design for Production I	SD&C Chapter 14
15	Engineering for Ship Production	SD&C Chapter 14
16	Shipyards Management & Organization	Course Notes
17	Group Technology & Work Breakdown Structures	Course Notes
18	Build Strategy	SD&C Chapter 14
19	Production & Material Control	Course Notes
20	CAD/CAM Applications	Course Notes
<b>MIDTERM EXAM 2</b>		
21	Introduction to Materials for Ship Building	Course Notes
22	Material Behaviour and Analysis I	Course Notes
23	Material Behaviour and Analysis I	Course Notes
24	Material Joining	Course Notes
25	Composites	Course Notes
26	Materials Preservation	Course Notes
<b>FINAL EXAMINATION</b>		

#### **4. Type of workload:**

Students are encouraged to engage in discussion of the lecture material as well as review of the assignments on the Vista communication network.

Anticipated effort is:

Class Review	39 hours (excluding exam time)
Reading Assignments	39 hours
Task Assignments	32 hours
Exam	12 hours
TOTAL EFFORT	122 HOURS

## 5. Exams:

There will be two mid-term and one final exam.

## 6. Assignments:

***In-class Pop tests.*** There will be 5 Pop Tests in Section 1. These will check student understanding of class lectures and reading assignments as well as the performance of the lecturer.

***Task Assignments.*** Six (6) Task Assignments will be required throughout the course to allow application of the subject matter.

***Mid-term Exam 1.*** The mid-term exam will cover topics through Class 1-10

***Mid-term Exam 1.*** The mid-term exam will cover topics through Class 11-20

***Final Examination.*** The final exam will cover topics from Class 20 through 26.

Reading assignments should be completed along with class review so as to maximize understanding of class presentation.

The Task Assignments will be based on course material.

Number	Hand in Class	Requirements
1	10	Prepare a Cost Estimate
2	13	Welding Sizing and Symbols Exercise
3	15	Prepare a description of your shipyard layout and work flow
4	21	Prepare a Build Strategy Outline
5	24	Material Selection for Different Marine Products
6	26	Design of a Corrosion Protection System

Assignments shall consist of a 2 to 4 page report plus calculations and drawings, as appropriate, which will be graded based on:

- Understanding of topic
- Feasibility of approach
- Extent of effort and completeness
- Presentation (Format, tidiness)

It is preferred that text be typed, **single** spacing.

Calculations shall be as required to support task.

## 7. Study Guidance:

Read the Class Notes  
Review Class PPTs  
Read Reading Assignments  
Read Handouts  
Reread Class Notes and PPTs  
Start each Task Assignment as soon as possible after the completion of the applicable Class

## 8. Texts and Bibliography:

Lecture notes and additional materials will be provided to students through Vista.

The prescribed textbooks for this course are:

*Ship Design and Construction, Volume 1*, edited by T. Lamb, 2003, published by the Society of Naval Architects and Marine Engineers (SNAME).

*Ship Knowledge*, by Klaas van Dokkum, Available from - <http://www.dokmar.com/en/dokmar-books/details/1/1/books/ship-knowledge>

## 9. Assessment Strategies

Student performance will be assessed through five components as follows:

Numeric (percentage)	
In-class Pop Tests	15%
Mid-term Examination 1	20%
Mid-term Examination 2	20%
Final Examination	20%
Assignments	25%
TOTAL	100%

## 10. Academic Integrity

The academic enterprise is founded on honesty, civility, and integrity. As members of this enterprise, all students are expected to know, understand, and follow the codes of conduct regarding academic integrity. At the most basic level, this means submitting only original work done by you and acknowledging all sources of information or ideas and attributing them to others as required. This also means you should not cheat, copy, or mislead others about what is your work. Violations of academic integrity (i.e., misconduct) lead to the breakdown of the academic enterprise, and therefore serious consequences arise and harsh sanctions are imposed. For example, incidences of plagiarism or cheating may result in a mark of zero on the assignment or exam and more serious consequences may apply if the matter is referred to the President's Advisory Committee on Student Discipline. Careful records are kept in order to monitor and prevent recurrences. A more detailed description of academic integrity, including the University's policies and procedures, may be found in the Academic Calendar at:

<http://calendar.ubc.ca/vancouver/index.cfm?tree=3,54,111,0> .