

Course Outline

Semester I 2015

UNSW
Sydney Australia

NAVL3410

Ship Structures 1

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Parallel teaching

There is no parallel teaching in this course.

Summary of the course

The contents of this course may be divided into three parts. The process of structural design and construction of commercial vessels are summarised during the first two weeks. Major portion of the course deals with the calculations of loading and response of the ship hull girder and major components. These calculations are based on the so-called first principles. The method of Rule based ship structural designs are also introduced. The last three weeks are devoted to fatigue and fracture of ship joints using both S-N curve and Fracture mechanics approaches and a brief outline of hull girder vibrations.

How the course relates to other co course offerings and overall program(s) in the discipline

This is first of the two ship structural analyses and design courses. This first course is developed on the methods you have learnt in Engineering Mechanics and

Graduate attributes

UNSW's graduate attributes are shown at

<https://my.unsw.edu.au/student/atoz/GraduateAttributes.html>

UNSW aspires to develop graduates who are rigorous scholars, capable of leadership and professional practice in a global community. The university has, thus, articulated the following Graduate Attributes as desired learning outcomes for ALL UNSW students.

UNSW graduates will be

1. Scholars who are:
 - (a) understanding of their discipline in its interdisciplinary context 9
 - (b) capable of independent and collaborative enquiry 9
 - (c) rigorous in their analysis, critique, and reflection 9
 - (d) able to apply their knowledge and skills to solving problems 9
 - (e) ethical practitioners
 - (f) capable of effective communication
 - (g) information literate 9
 - (h) digitally literate 9

2. Leaders who are:
 - (a) enterprising, innovative and creative
 - (b) capable of initiating as well as embracing change
 - (c) collaborative team workers 9

3. Professionals who are:
 - (a) capable of independent, self-directed practice 9
 - (b) capable of lifelong learning
 - (c) capable of operating within an agreed Code of Practice 9

4. Global Citizens who are:
 - (a) capable of applying their discipline in local, national and international contexts 9
 - (b) culturally aware and capable of respecting diversity and acting in socially just/responsible ways
 - (c) capable of environmental responsibility

9 = Developed in this course

A statement of broad graduate attributes has meaning when expressed in the context of the discipline. The graduate attributes contextualised for engineering are shown at

<http://teaching.unsw.edu.au/sites/default/files/upload-files/GradAttrEng.pdf>

In this course, you will be encouraged to develop graduate attributes 1(a)-(d), 1(g), 1(h), 2(c), 3(a), 3(c) and 4(a) by undertaking the selected activities and knowledge content. These attributes will be assessed within the prescribed assessment tasks, as shown in the assessment table on Page 5.

3. RATIONALE FOR INCLUSION OF CONTENT AND TEACHING APPROACH

This first course in Ship Structures will provide the students with a clear picture of the physical structure of various types of commercial vessels and then train them to analyse the ship hull girder and major components using first principles. They will also gain adequate knowledge about wave-induced loading on a floating structure.

Effective learning is supported if you are actively engaged in the learning process and by a climate of enquiry. You become more engaged in the learning process if you can see the relevance of your studies to professional, disciplinary and/or personal contexts, and the relevance is shown in the lectures and assignments by way of examples.

The assignments will be usually handed back within a week with feedback and discussion.

For reports:

- x Identification of key facts

<http://www.lc.unsw.edu.au/plagiarism/index.html>

You are also reminded that careful time management is an important part of study and one of the identified causes of plagiarism is poor time management. Students should allow sufficient time for research, drafting and the proper referencing of sources in preparing all assessment tasks.

If plagiarism is found in your work when you are in first year, your lecturer will offer you assistance to improve your academic skills. They may ask you to look at some online resources, attend the Learning Centre, or sometimes resubmit your work with the problem fixed. However more serious instances in first year, such as stealing another student's work or paying someone to do your work, may be investigated under the Student Misconduct Procedures.

Repeated plagiarism (even in first year), plagiarism after first year, or serious instances, may also be investigated under the Student Misconduct Procedures. The penalties under the procedures can include a reduction in marks, failing a course or for the most serious matters (like plagiarism in a honours thesis) even suspension from the university. The Student Misconduct Procedures are available here:

<http://www.gs.unsw.edu.au/policy/documents/studentmisconductprocedures.pdf>

Further information on School policy and procedures in the event of plagiarism is presented in a School handout, Administrative Matters for All Courses, available on the School website.

7. COURSE SCHEDULE

All lectures of the course, including tutorials, are given by Dr Mac Chowdhury.

Tuesday 15 00–1800 EEE221 and
Thursday 1500–1800 Mathews307

| Week | Topic |
|------|--|
| 1 | Ship construction – materials, welding and cutting methods |
| 2 | Shipyards practice, Classification society rules |
| 3 | Introduction to rationally-based design and optimization |
| 4 | Loading and responses in ships and offshore structures |
| 5 | Hull girder longitudinal bending – linear deterministic approach |
| 6,7 | Statistical predictions of wave induced loads |
| 8 | Application of extended beam theory to the analysis of open deck vessels |
| 9 | Fundamentals of fatigue and fracture, fatigue of welded structures |

The schedule shown above may be subject to change at short notice to suit exigencies.

8. RESOURCES FOR STUDENTS

Textbooks

Printed notes will be handed out whenever needed. The following are the two main sources of course contents but you need not purchase these texts; relevant portions will be handed over to you as hard copies.

Hughes, O. F. (1988) Ship Structural Design : A rationally-based Computer-aided Optimization Approach, Society of Naval Architects and Marine Engineers, Jersey City, USA

Eyres, D. J. (2003) Ship Construction, 5th

10. ADMINISTRATIVE MATTERS

You are expected to have read and be familiar with Administrative Matters for All Courses, available on the School website:

https://www.engineering.unsw.edu.au/mechanical-engineering/sites/mech/files/u41/S1-2015_Admin-Matters.pdf

This document contains important information on student responsibilities and support, including special consideration, assessment, health and safety, and student equity and diversity.

Dr Mac Chowdhury
20 February 2015