UNSW AUSTRALIA

Course Outline

Semester 1, 2015

Never Stand Still | Faculty of Engineering | School of Mechanical and Manufacturing Engineering

NAVL3610

Ship Hydrostatics and Practice

Contents

1.	Course Staff	1
2.	Course Details	1
3.	Rationale for Inclusion of Content and Teaching Approach	3
4.	Teaching Strategies	4
5.	Assessment	4
6.	Academic Honesty and Plagiarism	7
7.	Course Schedule	8
8.	Resources for Students	9
9.	Course Evaluation and Development	12
10.	Administrative Matters	12

Course Outline

NAVL3610 Ship Hydrostatics and Practice

1. COURSE STAFF

Contact details and consultation times for course convener

Mr David Lyons
Room 464F, Building G17
Email david.lyons@unsw.edu.au
Tel (02) 9385 6120 or (0418) 208 370 (send SMS or leave voicemail if unattended)

Consultation concerning this course is available by email, by phone or in person. For an in-person appointment, please contact me by email first or see me in class.

Contact details and consultation times for additional lecturers and tutorial/laboratory teaching staff

Nil.

2. COURSE DETAILS

Units of credit

This is a 6 unit-of-credit (UoC) course, and involves 6 hours per week (h/w) of face-to-face contact.

The UNSW website states “The normal workload expectations of a student are approximately 25 hours per semester for each UoC, including class contact hours, other learning activities, preparation and time spent on all assessable work.”

For a standard 24 UoC in the semester, this means 600 hours, spread over an effective 15 weeks of the semester (thirteen weeks plus stuvac plus one effective exam week), or 40 hours per week, for an average student aiming for a credit grade. Various factors, such as your own ability, your target grade, etc., will influence the time needed in your case.

Some students spend much more than 40 h/w, but you should aim for not less than 40 h/w on coursework for 24 UoC.

This means that you should aim to spend not less than about 10 h/w on this course, i.e. an additional 4 h/w of your own time. This should be spent in making sure that you understand the lecture material, completing the set assignments, further reading about the course material, and revising and learning for the examination.
There is no parallel teaching in this course.

Summary of the course

This course focusses on ship terminology, the ship design office, construction and repair facilities, and ship operations, and the hydrostatic calculations required for design and analysis purposes.

Aims of the course

This course enables you to explore the terminology unique to ships and then to use this as a stepping stone into how design consultancies, ship repair yards, naval and commercial vessels, and ship classification societies operate.

The course also provides you with a solid grounding in the ship hullform and numerical integration methods required to produce the hydrostatic particulars and stability characteristics of a vessel, practical insight into how stability criteria are applied to a range of vessels types, and the details of trim, flooding, subdivision and launching.

This course introduces ship terminology which will be used in all subsequent NAVL courses, and complements the overall view of the design process given in NAVL3120. It builds on the report-writing skills which you commenced in ENGG1000, and provides an introduction to the technical meetings of your professional society, the Royal Institution of Naval Architects.

Student learning outcomes

At the conclusion of this course, it is expected that you will be able to:

- Visit a ship or site and write a coherent technical report on what you have seen and learned.
- Conduct an inclining experiment, work the results up to the lightship condition, and assess the stability of a vessel against a specified set of criteria.
- Use principles of fluid statics, masses and centres of gravity, and numerical integration methods.
- Use numerical integration methods to calculate a ship's hydrostatic and stability characteristics.
- Perform launching and subdivision calculations to ensure the safety of the ship during launching or flooding.

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 ✓
   - (b) capable of independent and collaborative enquiry
   - (c) rigorous in their analysis, critique, and reflection
   - (d) able to apply their knowledge and skills to solving problems ✓
   - (e) ethical practitioners
   - (f) capable of effective communication ✓
   - (g) information literate ✓
   - (h) digitally literate

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

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

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

   ✓ = Developed in this course

In this course, you will be encouraged to develop graduate attributes 1(b), 1(d), 1(f), 1(g), 3(a), 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 6.

You will be supported in developing the above attributes through:
(i) the design of academic programs;
(ii) course planning and documentation;
(iii) learning and teaching strategies; and
(iv) assessment strategies.

3. RATIONALE FOR INCLUSION OF CONTENT AND TEACHING APPROACH

This course is included to give you an understanding of how ships are designed, constructed and operated by showing you some examples of each, and to give you the tools necessary to analyse the hydrostatic properties so that the vessel will fulfil the contractual requirements.

The content reflects the experience of the lecturer in drawing offices, in shipyards, and at sea on various vessels, and practical examples drawn from that experience are used throughout the lectures and tutorials.

Effective learning is supported when you are actively engaged in the learning process and by a climate of enquiry, and these are both an integral part of the lectures and tutorials.

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 drawn from industry.

Dialogue is encouraged between you, others in the class and the lecturer. Diversity of experiences is acknowledged, as some students in each class have prior marine experience. Your experiences are drawn on to illustrate various aspects, and this helps to increase motivation and engagement.

It is expected that assignments will be marked and handed back in the week following submission. You will have feedback and discussion while fresh in your mind to improve the learning experience.

4. TEACHING STRATEGIES

Lectures in the course are designed to cover the terminology and core concepts and theories in the design, construction and operation of ships, and in the terminology and calculations relating to the hydrostatic properties of ships. They do not simply reiterate the texts, but build on the lecture topics using examples taken directly from industry to show how the theory is applied in practice and the details of when, where and how it should be applied.

Tutorials are designed to provide you with feedback and discussion on the assignments, and to investigate problem areas in greater depth to ensure that you understand the application and can avoid making the same mistake again.

5. ASSESSMENT

General

You will be assessed by way of short assignments and an examination, both of which involve calculations and descriptive material.

The parts of the course contribute towards the overall grade as follows:

	Part A Practice	**Part B Hydrostatics**
h/w	3	3
Assignments	40%	40%
Examination	60%	60%

Total	100%	100%
Scaled	50%	50%
Overall	100%	

In order to pass the course, you must achieve an overall mark of at least 50%.

Assignments

The set assignments during the semester are shown on the following page. Assignments will be handed out in hard copy in class, and will be available on the Moodle website in case you miss the hand-out in class.

Presentation

All submissions should have a standard School cover sheet, which is available for download on the school website:
https://www.engineering.unsw.edu.au/mechanical-engineering/forms-and-guidelines

All submissions are expected to be neat and clearly set out. All calculations should be shown as, in the event of incorrect answers, marks are awarded for method and understanding.

The preferred set-out of any numerical calculation is similar to the following:

$\Delta = \rho\nabla$	(Equation in symbols)
$= 1.025 \times 200$	(Numbers substituted)
$= 205$ t	(Answer with units)

Submission

Assignments are due on the scheduled day of the class in the week nominated below. Assignments should be submitted direct to the lecturer in class or at the lecturer's office by 1700 on the date due, rather than via the assignment boxes.

Late submission of assignments attracts a penalty of ten percent per *day*, unless prior dispensation has been given; i.e. see me before the due date to avoid penalty. An extension may only be granted in exceptional circumstances. Where an assessment task is worth less than 20% of the total course mark and you have a compelling reason for being unable to submit your work on time, you must seek approval for an extension from the course convenor ***before the due date***. Special consideration for assessment tasks of 20% or greater must be processed through https://student.unsw.edu.au/special-consideration.

It is always worth submitting late assessment tasks when possible. Completion of the work, even late, may be taken into account in cases of special consideration.

Part A Practice

No.	Assignment	Mark	Learning outcomes assessed	Graduate attributes assessed				Due Wed
1	Report on ship visit	10	Visit and write coherent report	1(a)		1(f)	1(g)	Week 3
2	Report on technical presentation	10	Visit and write coherent report	1(a)		1(f)	1(g)	Week 6
3	Inclining experiment	10	Inclining and assess stability	1(a)	1(d)		1(g)	Week 10
4	Stability criteria	10	Inclining and assess stability	1(a)	1(d)		1(g)	Week 12
	Total	40						

Part B Hydrostatics

No.	Assignment	Mark	Learning outcomes assessed	Graduate attributes assessed			Due Thu
1	Pressure, density, etc.	10	Principles, CG and integration	1(a)	1(d)	1(g)	Week 3
2	Centres of gravity	10	Principles, CG and integration	1(a)	1(d)	1(g)	Week 4
3	Integration methods	10	Principles, CG and integration	1(a)	1(d)	1(g)	Week 5
4	Hydrostatics	20	Hydrostatics and stability	1(a)	1(d)		Week 7
5	Transverse stability	20	Hydrostatics and stability	1(a)	1(d)		Week 9
6	Longitudinal stability	10	Trim, launching and subdivision	1(a)	1(d)		Week 11
	Total	80					

Criteria

The following criteria will be used to grade assignments:

For reports:

- Identification of key facts and the integration of those facts in a logical development.
- Clarity of communication—this includes development of a clear and orderly structure and the highlighting of core arguments.
- Sentences in clear and plain English—this includes correct grammar, spelling and punctuation.
- Correct referencing in accordance with the prescribed citation and style guide.

For numerical calculations:

- Accuracy of numerical answers.
- All working shown (see *Presentation* above).
- Use of diagrams, where appropriate, to support or illustrate the calculations.
- Use of graphs, were appropriate, to support or illustrate the calculations.
- Use of tables, where appropriate, to support or shorten the calculations.
- Neatness.

Examination

There will one three-hour examination at the end of the semester, covering all material in both Parts A and B for the whole semester.

You will need to provide your own calculator, of a make and model approved by UNSW, for the examination. The list of approved calculators is shown at https://student.unsw.edu.au/exam-approved-calculators-and-computers

It is your responsibility to ensure that your calculator is of an approved make and model, and to obtain an “Approved” sticker for it from the School Office or the Engineering Student Centre prior to the examination. Calculators not bearing an “Approved” sticker will not be allowed into the examination room.

Special Consideration and Supplementary Assessment

For details of applying for special consideration and conditions for the award of supplementary assessment, see *Administrative Matters for All Courses*, available from the School website.

6. ACADEMIC HONESTY AND PLAGIARISM

Plagiarism is using the words or ideas of others and presenting them as your own. Plagiarism is a type of intellectual theft. It can take many forms, from deliberate cheating to accidentally copying from a source without acknowledgement. UNSW has produced a booklet which provides essential information for avoiding plagiarism: https://my.unsw.edu.au/student/academiclife/Plagiarism.pdf

There is a range of resources to support students to avoid plagiarism. The Learning Centre assists students with understanding academic integrity and how not to plagiarise. They also hold workshops and can help students one-on-one. Information is available on the dedicated website Plagiarism and Academic Integrity website: 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 in this course are given by Mr David Lyons.

Tuesday	0900–1200	QuadG48
Wednesday	0900–1200	EE218 or industry visit location TBA

Week	Day	Part A	Part B
1	Tue		Ship geometry and hydrostatic concepts
	Wed	Ship terminology and report-writing lecture	
2	Tue		Integration methods
	Wed	Naval ship visit	
3	Tue		Coefficients of form
	Wed	Ship building and repair yards	
4	Tue		Hydrostatics (1)
	Wed	Ship repair yard visit	
5	Tue		Hydrostatics (2)

	Wed	Consultancies and survey authorities lecture	
6	Tue		Transverse stability (1)
	Wed	Commercial tug visit	
7	Tue		Transverse stability (2)
	Wed	Small consultancy visit	
8	Tue		Longitudinal stability
	Wed	Inclining experiment lecture	
9	Tue		Launching calculations (1)
	Wed	Inclining experiment on a vessel	
10	Tue		Launching calculations (2)
	Wed	Stability criteria lecture	
11	Tue		Watertight subdivision
	Wed	Large consultancy visit	
12	Tue		Damaged stability
	Wed	Classification society visit	
13	Tue	Revision and exam details tutorial	
	Wed		

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

8. RESOURCES FOR STUDENTS

Textbooks

Letcher, J.S. (2009), *Principles of Naval Architecture Series: The Geometry of Ships*, Society of Naval Architects and Marine Engineers, Jersey City.

Moore, C.S. (2010), *Principles of Naval Architecture Series: Intact Stability*, Society of Naval Architects and Marine Engineers, Jersey City.

These books are available in the UNSW Library. They are also available for purchase from the Society of Naval Architects and Marine Engineers, Jersey City, USA. However, the price to non-members exceeds the member price plus the cost of student membership, so it is advisable to join the Society and order the books at the same time. Please see the course convener for an application form if you wish to do this.

Printed notes will be handed out for the applied stability (inclining experiment and stability criteria) component.

Suggested additional readings

Lamb, T.C. (Ed.) (2003 and 2004), *Ship Design and Construction*, v.1 and 2, Society of Naval Architects and Marine Engineers, Jersey City.

Rawson, K.J. and Tupper, E.C. (2001), *Basic Ship Theory*, Butterworth Heinemann, London.

These are all available in the UNSW Library and are useful as additional reading material.

Lamb (2003 and 2004) are also text books for other naval architecture courses at UNSW and are available for purchase from the Society of Naval Architects and Marine Engineers, Jersey City, USA. However, the price to non-members (of any one book) exceeds the member price plus the cost of student membership, so it is advisable to join the Society and order the books at the same time. Please see the course convener for an application form if you wish to do this.

Additional materials provided in Moodle

This course has a website on Moodle which includes:

- copies of assignments (as they are issued, in case you miss the hand-out in class);
- previous examination papers in this course from 2009 onwards;
- answers to the numerical questions in examination papers from 2010 onwards; and
- a discussion forum.

The discussion forum is intended for you to use with other students enrolled in this course. The course convenor will occasionally look at the forum, monitor the language used and take note of any frequently-asked questions, but will not respond to questions on the forum. If you want help from the convenor then direct contact is preferred.

Recommended Internet sites

There are many websites giving lectures, papers and data on ship terminology, hydrostatics, stability, and naval architecture in general. Try searching for “ship terminology”, hydrostatics, stability, or “naval architecture” (including the quote marks where there is more than one word), for example, with your favourite search engine (or, better, a meta-search engine such as Dogpile at www.dogpile .com).

Information about some of the topics in Hydrostatics may be found at:

Free Marine	www.free-marine.com/i8transtab.htm
Ultramarine	www.ultramarine.com/hdesk/runs/samples/hystat/doc.htm

Information about some of the sites and ships we visit in the Practice component may be found at:

Incat Crowther Design	www.incatcrowther.com
Lloyd’s Register	www.lr.org
Navy ships	http://www.navy.gov.au/fleet/ships-boats-craft
One2three Naval Architects	www.one2three.com.au
Svitzer Australia	www.svitzer.com
Thales Australia	www.thalesgroup.com/countries/australia/home

Many videos of launchings and side-launchings of vessels may be found on YouTube by searching for “launching ships” or “side launching ships”.

Other Resources

If you wish to explore any of the lecture topics in more depth, then other resources are available and assistance may be obtained from the UNSW Library.

One starting point for assistance is www.library.unsw.edu.au/servicesfor/index.html

9. COURSE EVALUATION AND DEVELOPMENT

Feedback on the course is gathered periodically using various means, including the Course and Teaching Evaluation and Improvement (CATEI) process, informal discussion in the final tutorial class for the course, and the School’s Student/Staff meetings. Your feedback is taken seriously, and continual improvements are made to the course based, in part, on such feedback.

In this course, recent improvements include the provision of a contents page for the Hydrostatics lecture notes, and visits to two consultancies designing high-speed craft (in view of the course NAVL4110 Design of Yachts and High-speed Craft).

10. ADMINISTRATIVE MATTERS

You are expected to have read and be familiar with *Administrative Matters*, available on the School website.

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

D. Lyons
20 February 2015