

# Course Outline

Semester 1 2016

NAVL3610

Ship Hydrostatics and Practice

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# Course Outline

## NAVL3610 Ship Hydrostatics and Practice

### 1. Staff Contact Details

Contact details and consultation times for Course Convener

Mr David Lyons FRINA  
Naval Architecture Stream Coordinator  
Room 208D, Ainsworth Building J17  
Email [david.lyons@unsw.edu.au](mailto:david.lyons@unsw.edu.au)  
Tel (02) 9385 6120 or 0418 208370 (send SMS or leave voicemail on mobile if unattended)

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

Contact details and consultation times for additional lecturers/demonstrators

Mr Phillip Helmore will accompany us on (some) excursions, providing his great expertise.

### 2. Course details

Credit Points:

This is a 6 unit-of-credit (UoC) course, and involves up to 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. Thus, for a full-time enrolled student, the normal workload, averaged across the 16 weeks of teaching, study and examination periods, is about 37.5 hours per week.”

This means that you should aim to spend about 9 h/w on this Course. The additional time should be spent in making sure that you understand the lecture material, completing the set assignments, further reading, and revising for any examinations.

There is no parallel teaching in this Course.

## Contact Hours

	Day	Time	Location
Lectures	Wednesday	9am – 12noon	Weeks 1-5: Mathews Bldg (F23) Room 227 Weeks 6-12: UNSW Business School (E12) Room 130
			<i>when not on excursion (see 4. Course schedule)</i>
	Thursday	9am-12noon	UNSW Business School (E12) 205 or ME204

## Summary of the course

This course focuses on ship terminology, the ship design office, construction and repair facilities, and ship operations, and the hydrostatic calculations required for design and analysis purposes. You have hands-on use of the Maxsurf software suite.

## 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.

In summary:

Learning Outcome		EA Stage 1 Competencies (PE)
1.	Be familiar with ship yards and/or design/regulatory offices.	1.1, 1.5, 2.3, 3.4
2.	Perform an inclining test and analysis.	1.3, 2.2, 3.4
3.	Become conversant with hydrostatics and software.	1.1, 1.2, 1.3, 2.2, 3.4
4.	Perform launching and subdivision calculations.	1.1, 1.2, 2.1, 2.3, 3.4

### 3. 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. Extensive use is made of the Maxsurf software suite available on the School's computers.

### 4. Course schedule

All lectures in this course are given by Mr David Lyons.

Wednesday (Part A Practice) 0900–1200 Weeks 1-5: Mathews (F23) 227 or Weeks 6-12:  
UNSW Business School (E12) 130 or excursion

Thursday (Part B Hydrostatics) 0900–1200 UNSW Business School (E12) 205 or ME204

Week	Day	Part A – Practice: lectures/excursions	Part B – Hydrostatics: lectures/labs
1	Wed 2Mar	Lecture: Ship terminology and report-writing (F23) 227	
	Thu 3Mar		Ship geometry and hydrostatic concepts (E12) 205
2	Wed 9Mar	Lecture: Consultancies and survey authorities (F23) 227	
	Thu 10Mar		Integration methods; intro to Maxsurf suite (E12) 205
3	Wed 16Mar	Excursion: Consultancy	
	Thu 17Mar		Coefficients of form; more Maxsurf (ME204)
4	Wed 23Mar	Excursion: Consultancy	
	Thu 24Mar		Hydrostatics (1), Maxsurf (ME204)
MSB	28Mar-	Mid-semester break: Easter	

	4Apr		
5	Wed 6Apr	Excursion: Graving dock at Thales, Garden Island	
	Thu 7Apr		Hydrostatics (2), Maxsurf (ME204)
6	Wed 13Apr	Excursion: Commercial tug visit	
	Thu 14Apr		Transverse stability (1), Maxsurf (ME204)
7	Wed 20Apr	Excursion: Naval ship visit at Garden Island	
	Thu 21Apr		Transverse stability (2), Maxsurf (ME204)
8	Wed 27Apr	Lecture: Inclining experiment (E12) 130	
	Thu 28Apr		Longitudinal stability, Maxsurf (ME204)
9	Wed 4May	Excursion: Inclining experiment on a vessel at Rozelle Bay	
	Thu 5May		Launching calculations (E12) 205
10	Wed 11May	Lecture: Stability criteria (E12) 130	
	Thu 12May		Watertight subdivision (E12) 205
11	Wed 18May	Excursion: Classification society Lloyd's Register	
	Thu 19May		Damaged stability (E12) 205
12	Wed 25May	Revision and exam details tutorial (E12) 130	
	Thu 26May		Revision and exam details tutorial (E12) 205
13	Wed 1Jun		
	Thu 2Jun		

**The schedule shown may be subject to change at short notice to suit exigencies (check with David or the Course Moodle site).**

## 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 Assignments	3 40%	3 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>

09 9 scn shTD .0013 .5c(/cla)5. be neat and clearly set out. A9 9calculations should be shown as, in the event of incorr(/c an)5.2(swers, mark.0013 awardla)for method and understanding.

Part A Practice

No.	Assignment	Mark	Learning outcomes assessed (see p.4)	Due Wed
1	Report on ship visit	10	1- Be familiar with ship yards and/or design/regulatory offices.	Week 3
2	Report on technical presentation	10	1- Be familiar with ship yards and/or design/regulatory offices	Week 6
3	Inclining experiment	10	2- Perform an inclining test and analysis.	Week 10
4	Stability criteria	10	2- Perform an inclining test and analysis.	Week 12
	Total	40		

Part B Hydrostatics

No.	Assignment	Mark	Learning outcomes assessed (see p.4)	Due Thu
1	Pressure, density, etc.	10	3- Become conversant with hydrostatics and software	Week 3
2	Centres of gravity	10	3- Become conversant with hydrostatics and software	Week 4
3	Integration methods	10	3- Become conversant with hydrostatics and software	Week 5
4	Hydrostatics	20	3- Become conversant with hydrostatics and software	Week 7
5	Transverse stability	20	3- Become conversant with hydrostatics and software	Week 9
6	Longitudinal stability	10	4- Perform launching and subdivision calculations	Week 11
	Total	80		



## Submission

Assignments in Parts A and B are due on the scheduled day of the class in the week nominated above. Assignments *must* be

Provisional Examination timetables are generally published on myUNSW in May for Semester 1 and September for Semester 2

For further information on exams, please see the [Exams](#) section on the intranet.

### Calculators

You will need to provide your own calculator, of a make and model approved by UNSW, for

## 6. Expected resources for students

### Textbooks and Course notes

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.

Course notes are being (re-)typed as of Feb 2016 and beta copies will be posted to Moodle as they are finalised. An archive of hand-written notes will remain available on the Course Moodle. The Course Convenor will confirm which material is examinable.

### 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 regarding the application process.

### Additional materials provided in Moodle

This course has a website on Moodle which includes:

- The assignments;
- previous examination papers in this course from 2011 onwards;
- answers to the numerical questions in examination papers from 2011 onwards; and
- a discussion forum.

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





