UNSW AUSTRALIA

Course Outline

Semester 2 2016

Never Stand Still | Engineering | Mechanical and Manufacturing Engineering

NAVL4120 AND NAVL4130

SHIP DESIGN PROJECT A AND B

Contents

1. Staff contact details

Contact details and consultation times for course convenor

Mr Phil Helmore
Office location: Ainsworth 208C
Tel: (02) 9385 5215
Email: p.helmore@unsw.edu.au

Consultation concerning this course is available on Tuesdays and Wednesdays 0930–1700 whenever I am not otherwise engaged. Direct consultation or phone contact is preferred. Email *may* be used at other times, but it uses your time and mine less efficiently.

Contact details and consultation times for additional lecturers/demonstrators/lab staff

Nil.

2. Course details

Credit points

NAVL4120 in Semester 1 and NAVL4130 in Semester 2 are each 6 unit-of-credit (UoC) courses, and each involves 3 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 each of these courses. The additional time should be spent in making sure that you understand the lecture material, completing the set assignments, and further reading.

There is no parallel teaching in either of these courses.

Contact hours

Lectures/Tutorials	Day	Time	Location
NAVL4120	Thursday	2 pm–5 pm	BUS130
NAVL4130	Wednesday	12 noon–3 pm	Pioneer Theatre

Summary of the course

NAVL4120 (S1) and NAVL4130 (S2) are two separate courses, run sequentially and focusing on the design of a vessel to meet the requirements of a design brief. However, they

are, in effect, one complete design project with the preliminary design being done in S1, and the resistance, powering and structure, and the final design being done in S2.

Aims of the course

These courses expose you to the reality of accepting a design brief (a set of requirements for a vessel) from a client, researching the requirements, coming up with the design of a vessel which will meet those requirements, and preparing the documentation (drawings, calculations and specification of outfit items) to describe the vessel so that it may be built.

These courses also provide you with a solid grounding in the overall ship design process. This includes data collection, deciding on the principal particulars, generating a suitable hullform, deciding on the general arrangement of the vessel, estimating the mass and the location of its centre of gravity, assessing the stability of the vessel against an appropriate set of criteria, providing structural details in accordance with classification society requirements, and analysing the resistance of the vessel to come up with the powering requirements and propeller(s) to suit.

In these courses you will use information and skills from *all* other NAVL courses:

NAVL3120 Ship Design and Propulsion	Design aspects and propeller
NAVL3410 Ship Structures 1	Structural arrangement
NAVL3610 Ship Hydrostatics and Practice	Hydrostatics and stability
NAVL3620 Ship Hydrodynamics	Resistance prediction
NAVL3710 Ship Practice and Marine Engineering	Engine-room layout and powering
NAVL4140 Design of Yachts and High Speed Craft	Yacht or HSC design
NAVL4410 Ship Structures 2	Structural details

This project is where the skills gained in each of these areas are integrated to produce a design which meets the requirements of the design brief.

Student learning outcomes

These courses are designed to address the learning outcomes below and the corresponding Engineers Australia Stage 1 Competency Standards for Professional Engineers as shown. The full list of Stage 1 Competency Standards may be found in Appendix A.

After successfully completing these courses, you should be able to:

Learning Outcome		**EA Stage 1 Competencies**
1.	Collect data on previous vessels from the literature, and analyse it to decide on a set of principal particulars to meet the requirements of the design brief.	1.2, 1.5, 2.1, 2.4, 3.2, 3.4
2.	Generate a hullform suitable for the operation in Maxsurf and translate to a lines plan and a general arrangement drawing in AutoCAD.	1.1, 1.3, 2.2, 2.3, 3.2, 3.3

3.	Estimate the mass of the vessel and the location of its centre of gravity, and assess the stability of the vessel.	1.3, 1.5, 2.1, 2.2, 3.2, 3.4
4.	Calculate the resistance of the vessel, specify the power required, select an engine and gearbox, and design a propeller to suit.	1.3, 1.5, 2.1, 2.2, 2.3, 3.2
5.	Calculate the scantlings of the principal structural elements of the vessel and prepare a structural drawing in AutoCAD.	1.3, 1.5, 2.2, 3.2

3. Teaching strategies

The material for these courses will be presented through a combination of lectures and tutorials.

You will be provided initially with several design briefs from which you may choose the type of vessel for your own project. This is not what happens in industry, as you are unlikely to have any choice about the type of vessel which you design next; it is done here so that you may design the type of vessel in which you have the greatest interest.

You will be provided with descriptive sheets for each assignment, and notes on some of the details; these will also be placed on the Moodle site in case you miss the class.

Lectures in the course are designed to cover the next phase of the assignment schedule, what to look for and how to go about it, and to alert you to pitfalls and traps which you may encounter. This introduces you to how the design process unfolds, and you then know what to expect in industry.

Tutorials are arranged in both group sessions, and on a one-to-one basis with the lecturer, to assist in the analysis at each stage of the design process. Designs are discussed as they evolve, and students who have selected the same type of vessel can benefit from the experiences of, and information found by, others. Where specific software is required for drawing or analysis, demonstrations of its use will be given in class.

4. Course schedule

All classes in these two courses are given by Mr Phil Helmore.

NAVL4120 Semester 1

Week	Date	Topic	Location
1	3/3/16	Introduction, design briefs and data collection	BUS130
2	10/3/16	Data analysis	BUS130
3	17/3/16	Design lanes and basic dimensions	BUS130
4	24/3/16	The lines plan and tutorial on Maxsurf Modeler	BUS130
Mid-semester break			

5	7/4/16	Tutorial on importing hullform into AutoCAD	BUS130
6	14/4/16	Student's own time on lines plan	
7	21/4/16	The general arrangement drawing	BUS130
8	28/4/16	General arrangement details	BUS130
9	5/5/16	Student's own time on general arrangement drawing	
10	12/5/16	Mass estimates and stability criteria	BUS130
11	19/5/16	Tutorial on stability assessment in Maxsurf Stability	BUS130
12	26/5/16	Submission of preliminary mass estimate and stability assessment	BUS130
13	2/6/16	Review of design projects	BUS130

NAVL4130 Semester 2

Week	Date	Topic	Location
1	27/7/16	Resistance prediction methods	PioneerTh
2	3/8/16	Tutorial on resistance prediction using Maxsurf Resistance	PioneerTh
3	10/8/16	Powering and engine selection	PioneerTh
4	17/8/16	Propeller design	PioneerTh
5	24/8/16	Structural rules and tutorial on Lloyd's SSC software	PioneerTh
6	31/8/16	Structural arrangement and details	PioneerTh
7	7/9/16	Student's own time on structure drawing	PioneerTh
8	14/9/16	Refining the lines plan and GA drawing	PioneerTh
9	21/9/16	Refining the mass estimate and stability analysis	PioneerTh
Mid-semester break			
10	5/10/16	Tutorial on heeling-lever stability assessment in Maxsurf Stability	PioneerTh
11	12/10/16	Student's own time on mass estimate and stability	PioneerTh
12	19/10/16	Submission of final mass estimate and stability book	PioneerTh
13	26/10/16	Review of design projects	PioneerTh

The schedule shown for each course may be subject to change at short notice to suit exigencies; you will be advised by email of any changes.

5. Assessment

Assessment overview

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

You will be assessed in each course entirely on the basis of assignments; there is no final examination. The assignments involve data collection, calculations, drawings, and reports, and contribute to the final grade as shown on the next page. The intention is that these assignments reflect the actions which you will be expected to undertake as a graduate naval architect in preparing the design documentation for a client

Assignments will be handed out in hard copy in class, and will also be posted on the Moodle site in case you miss the class.

NAVL4120 Semester 1

Assessment	Weight	Learning outcomes assessed	Assessment criteria	Due date and submission requirements	Marks returned
1	20%	1	Data collection, calculations and report	Thur 24/3/16, hard copy	One week after submission
2	20%	2	Drawing and report	Thur 21/4/16, hard copy	One week after submission
3	30%	2	Drawing and report	Thur 12/5/16, hard copy	One week after submission
4	30%	3	Calculations and report	Thur 2/6/16, hard copy	One week after submission
Total	100%				

NAVL4130 Semester 2

Assessment	Weight	Learning outcomes assessed	Assessment criteria	Due date and submission requirements	Marks returned
1	15%	4	Calculations and report	Wed 10/8/16, hard copy	One week after submission
2	20%	4	Calculations and report	Wed 24/8/16, hard copy	One week after submission
3	25%	5	Calculations, drawing and report	Wed 14/9/16, hard copy	One week after submission
4	20%	2	Calculations and report	Wed 5/10/16, hard copy	One week after submission
5	20%	3	Calculations and report	Wed 19/10/16, hard copy	One week after submission
Total	100%				

Assessment criteria

The following criteria will be used to grade assignments:

For data collection:

- Comprehensiveness of information.
- Clarity of presentation.
- Neatness.

For numerical calculations:

- Accuracy of numerical answers.

- All working shown.
- 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.

For drawings:

- Comprehensiveness of information.
- Compliance with drawing standards.
- Clarity of presentation.
- Labelling.
- Neatness.

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.

Assignments

Presentation

All submissions should have a standard School cover sheet which is available from this course's Moodle page.

All submissions are expected to be neat, and clearly set out. Your results are the pinnacle of all your hard work. Presenting them clearly gives the marker the best chance of understanding your method; even if the numerical results are incorrect.

Submission

Assignments are due on the scheduled day of the class as shown on the previous page. Assignments should be submitted direct to me in class, or in my office, or at the School Office by 1700 on the due date, and *not* via the assignment boxes.

Late submissions will be penalised 5% per calendar day (including weekends). 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 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.

Examinations

There is no final examination in either of these courses.

Special consideration and supplementary assessment

For details of applying for special consideration and conditions for the award of supplementary assessment, see the School intranet, and the information on UNSW's Special Consideration page.

6. Expected resources for students

Textbooks

There is no required textbook for either of these courses. Textbooks and lecture notes from *all* other NAVL courses are relevant and can be used for your design project.

Suggested additional readings

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

Larsson, L. and Eliasson, R.E. (2007), *Principles of Yacht Design*, 3rd Ed., Adlard Coles Nautical, London.

Claughton, R.E., Wellicome, J.F. and Shenoi, A. (Eds), *Sailing Yacht Design: Theory* (v.1) *and Practice* (v.2), Longman, London.

Skene, N.L. and Kinney, F.S. (1981), *Skene's Elements of Yacht Design*, 8th Ed., Dodd Mead & Co., New York.

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

Lamb (2003 and 2004) are textbooks for other naval architecture courses at UNSW and are also 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 convenor 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);
- copies of notes (as they are issued); 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

Internet sites relevant to particular topics will be advised in class.

The NSW Roads and Maritime Services website
www.maritime.nsw.gov.au/cv/vessel_compliance.html
has a number of spreadsheet applications which are useful for calculating the requirements for shafting diameters, shafting systems (bearing spacing, couplings, etc.), rudder and steering gear, bilge systems, fuel tanks, etc.

Also, on the National Standard for Commercial Vessels section of the Australian Maritime Safety Authority website there is a number of tools available for download to help make life easier for naval architects. Visit
www.amsa.gov.au/domestic/standards/national-standards
and, in the Assistance/Tools column of the table, you will find various spreadsheet application tools, including a fire-safety assistant, a propeller-shaft calculator, required equipment lists for various classes of vessel and areas of operation, a fast-craft calculator, etc.

Other resources

If you wish to explore any of the lecture topics in more depth, then many other resources are available, and assistance may be obtained from the UNSW Library:
http://info.library.unsw.edu.au/web/services/services.html

7. 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 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 resulting from student feedback include the provision of all printed notes on the Moodle site, and a change to drawing the lines plan before the general arrangement drawing (instead of in the reverse order).

Lloyd's Register's *Rules for Special Service Craft* is now the structural standard for the National Standard for Commercial Vessels. In 2011 the SSC software was obtained from Lloyd's Register and introduced for you to calculate the scantlings of the structure in your design project.

In 2012 the first two assignments (collection of data and estimation of preliminary dimensions) were combined into one assignment.

In 2013 the marks for Assignments 1 and 4 were re-arranged from 25/25 to 20/30 to better align with the effort required.

In 2014 the notes on exporting Maxsurf hullforms to AutoCAD were massively revised.

In 2015 the *SSC Calculation Procedures* and *SSC Design Details* guidance notes were obtained from Lloyd's Register and placed on the Moodle site.

8. Academic honesty and plagiarism

UNSW has an ongoing commitment to fostering a culture of learning informed by academic integrity. All UNSW students have a responsibility to adhere to this principle of academic integrity. Plagiarism undermines academic integrity and is not tolerated at UNSW. *Plagiarism at UNSW is defined as using the words or ideas of others and passing them off 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 website with a wealth of resources to support students to understand and avoid plagiarism: student.unsw.edu.au/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.

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 an honours thesis) even suspension from the university. The Student Misconduct Procedures are available here: www.gs.unsw.edu.au/policy/documents/studentmisconductprocedures.pdf

Further information on School policy and procedures in the event of plagiarism is available on the intranet.

9. Administrative matters

All students are expected to read and be familiar with School guidelines and polices, available on the intranet. In particular, students should be familiar with the following:

- Attendance, Participation and Class Etiquette
- UNSW Email Address
- Computing Facilities
- Assessment Matters (including guidelines for assignments, exams and special consideration)
- Academic Honesty and Plagiarism
- Student Equity and Disabilities Unit
- Health and Safety
- Student Support Services

P.J. Helmore
30 June 2016

Appendix A: Engineers Australia (EA) Professional Engineer Competency Standards

	Program Intended Learning Outcomes
PE1: Knowledge and Skill Base	PE1.1 Comprehensive, theory-based understanding of underpinning fundamentals
	PE1.2 Conceptual understanding of underpinning maths, analysis, statistics, computing
	PE1.3 In-depth understanding of specialist bodies of knowledge
	PE1.4 Discernment of knowledge development and research directions
	PE1.5 Knowledge of engineering design practice
	PE1.6 Understanding of scope, principles, norms, accountabilities of sustainable engineering practice
PE2: Engineering Application Ability	PE2.1 Application of established engineering methods to complex problem solving
	PE2.2 Fluent application of engineering techniques, tools and resources
	PE2.3 Application of systematic engineering synthesis and design processes
	PE2.4 Application of systematic approaches to the conduct and management of engineering projects
PE3: Professional and Personal Attributes	PE3.1 Ethical conduct and professional accountability
	PE3.2 Effective oral and written communication (professional and lay domains)
	PE3.3 Creative, innovative and pro-active demeanour
	PE3.4 Professional use and management of information
	PE3.5 Orderly management of self, and professional conduct
	PE3.6 Effective team membership and team leadership