

This course is available for student registration only after the approval process has been completed.

SUBJECT OCE COURSE NO. 4572 CREDIT HOURS 3 TERM TO BE ADDED TO THE FILE Spring 2010

CLASS HOURS 45 LECTURE HOURS LAB HOURS CONTACT HOURS (CEU ONLY)

DEPARTMENT Marine and Environmental Systems SCHEDULE TYPE Lecture (A)

- COLLEGE OF AERONAUTICS-23 COLLEGE OF PSYCHOLOGY AND LIBERAL ARTS-25
COLLEGE OF BUSINESS-24 COLLEGE OF SCIENCE-26
COLLEGE OF ENGINEERING-01 UNIVERSITY COLLEGE EXTENDED STUDIES-27

COMPUTER TITLE Restricted to 25 characters, including spaces Des of Mar Vehicles

CATALOG TITLE Structural Design of Marine Vehicles

CATALOG DESCRIPTION OF COURSE Limited to 350 characters, including spaces

Provides a working knowledge of ship hull girder, longitudinal bending in still water and waves, and simple bending theory as it applies to ship structure.

In addition, you may attach a course syllabus and/or more detailed description.

RESTRICTIONS Prerequisite OCE 4571 Corequisite
Prerequisite Corequisite
Prerequisite Corequisite

GRADES TO BE ISSUED
A, B, C, D, F
A, B, C, D, F, CEU
CEU
S, U
P, F
Other

ADDITIONAL RESTRICTION (e.g., Major, Class Level, Department Head Approval)

If this course replaces a course currently offered in BANNER, please indicate old course information

SUBJECT Alpha Prefix (e.g., CSE) OCE COURSE NO. (e.g., 1301) 4574

APPROVALS: Upon completion of appropriate department approvals, submit form to Chair, Graduate Council, or Chair, Undergraduate Curriculum Committee for approval below and forward to Catalog Director.

Signatures and dates for Originator, Department Head/Program Chair, and Dean or Associate Dean.

CATALOG DIRECTOR

These changes/additions have been made for the University/Extended Studies Catalog and entered into the BANNER term named above.

Catalog Director Date

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To: Prof. Mark Archambault
Chair, UGCC

CC Prof. Ed Kalajian
Associate Dean, COE

COURSE APPROVED BY COE COUNCIL.

CC Ms. Liz Fox
Director (Catalog and Graduate Information)

Ed Kalajian 10/14/09

From: Dr. Prasanta K Sahoo
DMES

Dated: October 13, 2009

Sub: New Course OCE 4572 "Structural Design of Marine Vehicles"

Dear Prof. Archambault,

This is to inform you that the new course for Ocean Engineering as mentioned above is intended to be introduced from Spring 2010.

This course was approved by the College Curriculum Committee on August 31, 2009. It is my understanding that this new course needs further approval from UGCC. This was on the agenda for the meeting on September 25, 2009. It was not approved due to concerns raised by Prof. Alan Rosiene. These concerns are now addressed in a separate page attached to this letter. Comments are in capitals and italics.

In view of this I am re-submitting the course for approval at the next meeting to be held on October 23. May I therefore request you to kindly put this on your agenda for approval.

Regards,



Dr. Prasanta K Sahoo, PhD, FRINA, MSNAME
Associate Professor (Ocean Engineering)
Department of Marine and Environmental Systems

Prasanta,

Thank you for your clarifications. Here's another round:

1. Is it the intention of Ocean Engineering to replace OCE 4574, Structural Mechanics of Marine Vehicles, with OCE 4572? If so, the intention to replace is not noted on the ANC form.

Structural Mechanics has not been taught for sometime. Moreover it was my understanding that there was no design component on Structural Mechanics.

Do you intend to teach Structural Mechanics in the future, or do you think Structural Design will cover the same material in addition to offering the design component? If the course is not likely to be taught, and Structural Design will take its place, the usual practice is to replace the old course. You can always "resurrect" the old course if it becomes necessary in the future.

STRUCTURAL MECHANICS.. IS BEING REPLACED BY STRUCTURAL DESIGN... AND THE ANC FORM HAS NOW BEEN AMENDED

2. If OCE 4572 is not intended to replace OCE 4574, why are the course descriptions nearly identical? Is inclusion of a design project in OCE 4572 the primary motivation for the new course?

Yes there is large structural design component in this course which motivated us to give a new course name.

Okay. Structural Design significantly differs from Structural Mechanics, such that you cannot simply modify Mechanics to include design. The first part of the next question is answered.

3. If OCE 4572 is intended to remedy a lack of preparation "to assess the structural strength of large vessels," why not require OCE 4574 as a prerequisite for OCE 4575? (I assume the intent is to require OCE 4572 as a prerequisite for OCE 4575, although the catalog currently states instructor approval for the latter.)

The reason for instructor approval for OCE 4575 results from the fact that a few topics are covered in this course which are not covered in any other topic before hand. Yes I would think that OCE 4572 will be a pre-requisite for OCE 4575.

Although it's not necessary, you may want to file a change of prerequisites form with the committee for OCE 4575 and take care of the housekeeping at the same time as you add the new course.

***CHANGE IN PRE-REQUISITE FOR OCE 4575 IS NOW ATTACHED.
INSTRUCTOR APPROVAL IN NOW REPLACED WITH "PRE-REQUISITE OCE 4572". CHANGE RESTRICTION FORM IS ATTACHED.***

In short, I'm asking about the relationship between OCE 4572 and OCE 4574. If the courses are intended to be distinct in scope and focus, I'm suggesting that the

course descriptions be adjusted to highlight the distinctions, especially since the two courses will appear near each other in the catalog.

Yes the course description will be adjusted to illustrate the distinctions.

In my opinion, this would not have to be done if you replace OCE 4574. But if you do choose to keep both classes in the catalog, Liz Fox should be able to help you make the distinctions. Liz is exceptionally helpful in this area.

THIS IS NOT NECESSARY NOW AS THIS COURSE IS REPLACING OCE 4574.

Thanks again for answering my questions. I'm sure this course will pass at the next meeting if you either replace OCE 4574 or offer a significantly different course description.

--Alan

To: The Undergraduate Curriculum Committee
Florida Institute of Technology
College of Engineering

From: Dr. Prasanta K Sahoo (Instructor)

Via: Prof. G. Maul (Head of the Department, DMES)

Dated: October 13, 2009

Subject: Addition of New Course; OCE 45XX "Structural Design of Marine Vehicles"

RATIONALE:

The instructor is presently engaged in teaching of the course "Design of High-Speed Small Craft". As a result of my interaction with the senior students, it was apparent that they had only basic understanding of Ship's Hull Girder which they have obtained from the course "Fundamentals of Naval Architecture I". While the basic knowledge was adequate, this however did not prepare them to undertake rigorous analysis and calculations in greater detail to assess the structural strength of large vessels. During several informal discussions with the students it was apparent that a course such as this would reinforce fundamental aspects they have already studied as well undertake exercises in determining bending moments an section modulus, design of mid-ship section as per class rules and hence evaluate the structural strength for various types of marine vessels including application of theories and principles for local strength calculations.

**OCE 4572 STRUCTURAL DESIGN OF MARINE VEHICLES
SPRING 2010**

2009-10 Catalog Data: OCE 4572 STRUCTURAL DESIGN OF MARINE VEHICLES (3 credits). Provides an understanding and working knowledge of ship hull girder, longitudinal bending moment in still water and waves, application of simple bending theory as applicable to ship's structures culminating in design of a mid-ship section as per classification society rules. Concepts to predict bending moment in irregular waves and local and transverse strength analysis.

Prerequisites by Topic: Fundamentals of Naval Architecture I, OCE 4571

Textbook (T) and References (R):

A comprehensive set of lecture notes will be provided by instructor.

(R) Visser, W., The Structural Design of Offshore Jackets, The Marine Technology Directorate Ltd, UK, 1993

(R) Muckle, W., Strength of Ship's Structures, Edward Aronald, London, 1967.

(R) Hughes, O., Ship Structural Design, SNAME pub.

(R) Rawson, K.J. and Tupper, E.C., Basic Ship Theory, Vol. 2, 3rd edition, Longman, 1986.

(R) Principles of Naval Architecture, SNAME pub., New York, 1980.

(R) Mather, A., Offshore Engineering, An Introduction, Witherby & Co. Ltd, UK, 1995

Course Learning Outcomes: The student will be able to:

- Specify why structural strength determination is necessary.
- Describe the various parameters of calm water and dynamic forces influencing the structural strength.
- Calculate the load on a ship's girder from buoyancy and weight along the length of the vessel.
- Classify and examine detail strength checks of tubular structures.
- Categorize the influence of CG of various weights and LCB position on trim of the vessel and estimate the bending moment at any position along the length of the vessel.
- Formulate procedures required to determine the effect of bending moment and moment of inertia on the stresses at deck and keel at any section.

- Evaluate the effects of stresses at different angles of heel or if the section is composite.
- Appraise the phenomenon of shear stress on bending stress and deflection of hull girder and learn the procedure to determine the shear stress distribution for a ship type section.
- Recommend various methods to solve local strength problems.

E- (electronic) resources

Library: It is recommended that students will avail themselves of the relevant books and journals and conference proceedings.

ANGEL: A set of lecture will be available to download from ANGEL. Also lecture slides may be available to download before the lecture takes place if students so desire.

Other

Equipment & materials

It is expected that at the minimum students should have an equivalent of CASIO-FX82 calculator, rulers and pencils.

Computer hardware & software

Unit-specific software

It may be necessary at some stage to make use of s/w available on the network in the CAD lab. Specifically any CAD package may be necessary to make structural drawings including MaxSurf suite of software already existing in DMES CAD Lab.

Tutorials

There is no time allocated separately for tutorials. Tutorials form part of lectures in this course.

Workshops/seminars

Information on workshops/seminars will be intimated to all students through appropriate channels during the course of the semester.

Online activities

None planned at this stage.

Field trips

Not envisaged at this stage.

Course schedule (Topics Covered and Associated Time) :

Week	Date Beginning	Topic	Readings/Resources	Further Information
1		Intro to Course and Handout on Assignments		None
2		Background Theory on Ship Structures	Chapter 1	

3		Weight and Buoyancy distribution	Chapter 1 contd.	Problems to solve
4		Analysis Procedure for weight and buoyancy distribution	Chapter 1 contd.	Problems to solve
5		Load, Shear and BM distribution in still water	Chapter 2	Problems to solve
6		Shear Force and BM due to waves	Chapter 2 contd.	Problems to solve
7		Changes to SF and BM due to change in loading	Chapter 2	Numerical problems
		CLASS TEST (MID TERM EXM)		20%
8		Calculation of section modulus	Chapter 3	
9		Effect of adding/removing material	Chapter 3	Numerical problems
10		Effect of Inclination on Stress	Chapter 4	Numerical problems
11		Bending and Shear deflection of hull girder	Chapter 5	Numerical problems
12		Deflection contd.	Chapter 5 contd.	Numerical problems
13		Local Strength calculations	Chapter 6	Numerical problems
14		Local Strength Contd.	Chapter 6 contd.	
14		Classification rules for Structural Design	Chapter 7	
15		Assignment submission	Design of mid-ship section	30%
15		END TERM EXAM		40%
		Home work		20%

Assessment Schedule:

The assessment for this course will comprise of mid-term and end-term exam, assignment and home work. The percentage of marks allocated is as shown in the table above. Home work will be given on a continuous basis.

Class/Laboratory Schedule: Spring 2010, Tuesday/Thursday,

Class	Day	Time	Locations
Lecture	Tuesdays	0930-1045	
	Thursdays	0930-1045	
Field Trip	None		

Contribution of Course to Meeting the Professional Component: Engineering Science: 2 credits or 67%. Engineering Design: 1 credit or 33%

Relationship of Course to Program Outcomes:

Course Outcomes															
Course Number - Course Name	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
OCE 4572 Structural Design of Marine Vehicles	X		X		X		X		X		X			X	X
Program Outcomes															
A. Ability to apply knowledge of mathematics, science and engineering															
B. Ability to design and conduct experiments, as well as to analyze and interpret data															
C. Ability to design a system, component or process to meet desired needs															
D. Ability to function on multi-disciplinary teams															
E. Ability to identify, formulate and solve engineering problems															
F. Understanding of professional and ethical responsibility															
G. Ability to communicate effectively															
H. Broad education to understand the impact of engineering solutions in global and societal context															
I. Recognition of the need for, and an ability to engage in life-long learning															
J. Knowledge of contemporary issues															
K. Ability to use the techniques, skills, and engineering tools necessary for engineering practice															
L. Knowledge and skills to apply principles of probability and statistics															
M. Knowledge and skills to apply the principles of oceanography, waves and acoustics to engineering problems															
N. An ability to integrate multiple technical areas															
O. An understanding of the necessity for design optimization															

Prepared By: P K Sahoo, Ph.D., Associate Professor of Ocean Engineering, 4/2009