

## ME240A

### ADVANCED MARINE STRUCTURES I

Tuesdays and Thursdays 5:00 pm – 6:30pm, in 3107 Etcheverry Hall

#### INSTRUCTOR

Dr. Tao Xu

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#### COURSE GRADE

The grades for the course will be based on the following:

Homework:	40%
Midterms (2)	30%
Final (Oral) or Term Paper	30%

#### TERM PROJECT SCHEDULE

Tu. 09/17/13	Submit the Abstract
Tu. 10/29/13	Progress Report
Tu. 12/03/13	Final Report

#### USEFUL REFERENCES

There is no required text for this class. The book listed below will complement the material learned in this course and is highly recommended:

Alaa Mansour and Donald Liu, Strength of Ships and Ocean Structures, Principle of Naval Architecture (PNA), SNAME, 2008.

This book can be purchased from Amazon.com for \$46.95.

## COURSE SYLLABUS

LECTURE	DATE	SUBJECT	HWK	READINGS
#1	Th-08/29	Marine Structures and Their Characteristics		Section 1
#2	Tu-09/03	Marine Structures and Their Characteristics	HWK#1	
#3	Tu-09/05	Beam Theory		Sections 2.1-2.4, & 2-9-2.10
#4	Tu-09/10	Beam Theory	HWK#2	
#5	Th-09/12	Box Girder – 2D Stress Analysis		Sections 3.1-3.4
#6	Tu-09/17	Box Girder Analysis	HWK#3	
#7	Th-09/19	Girth Stress Analysis		
#8	Tu-09/24	Beam Theory Summary		
#9	Th-09/26	Ship Ultimate Strength		Sections 4.1-4.9
#10	Tu-10/01	Ship Ultimate Strength	HWK#4	
#11	Th-10/03	Shear Lag and Effective Breath		Sections 3.5
#12	Tu-10/08	Shear Lag and Effective Breath	HWK#5	
#13	Th-10/10	Midterm (1)		
#14	Tu-10/15	Theorem of Stationary Potential Energy		
#15	Th-10/17	Calculus of Variation		
#16	Tu-10/22	Hull Deckhouse Interaction	HWK#6	Sections 3.7
#17	Th-10/24	Hull Deckhouse Interaction		
#18	Tu-10/29	Isotropic Plate Theory		Sections 3.9
#19	Th-10/31	Isotropic Plate – Navier and Levy Solutions		
#20	Tu-11/05	Buckling of the Isotropic Plate	HWK#7	
#21	Th-11/07	Postbuckling of the Isotropic Plate		

#22	Tu-11/12	Midterm (2)	
#23	Th-11/14	Orthotropic Plate – Huber Equation	Sections 3.10
#24	Tu-11/19	Orthotropic Plate – Navier and Levy Solutions	HWK#8
#25	Th-11/21	Buckling of the Orthotropic Plate	
#26	Tu-11/26	Postbuckling of the Orthotropic Plate	
#27	Th-11/28	Morison Equation	
#28	Tu-12/03	Beam Column Theory	
#29	Th-12/05	Ultimate Strength of Offshore Platforms	

#### Reference Book

1. Alaa Mansour and Donald Liu, Strength of Ships and Ocean Structures, Principle of Naval Architecture (PNA), SNAME, 2008.

#### References

##### Beam Theory

1. Eatock Taylor and M. Ohkusu, “ Green functions for hydroelastic analysis of vibrating free–free beams and plates”, Journal of Applied Ocean Research 22 (2000) 295-314.

##### Linear Elasticity and Box Girder Theory

1. G. R. Irwin, “Analysis of stresses and strains near the end of a crack transversing a plate”, Journal of Applied Mechanics, 1957

##### Ultimate Strength

1. Alaa Mansour, J.M. Yang, and A. Thayamballi, “An Experimental Investigation of Ship Hull Ultimate Strength”, SNAME Transactions (1984)
2. Chen Y.K., Kutt, L.M., Piaszczyk, C.M., and Bieniek, M.P., “Ultimate Strength of Ship Structures”, Transactions, SNAME (1983)

##### Hull Deckhouse Interaction

1. J. R. Pauling and H.G. Payer, “Hull-Deck house Interaction by Finite-Element Calculation”, Transaction, SNAME, 1968

##### Isotropic Plate Theory

1. Douglas Faulkner, "A Review of Effective Plating for Use in the Analysis of Stiffened Plating in Bending and Compression", Journal of Ship Research, 1975

#### Orthotropic Plate Theory

1. Alaa Mansour, "Charts for the Buckling and Post-Buckling Analyses of Stiffened Plates under Combined Loading", Technical and Research Bulletin No. 2-22, SNAME (1976)

#### Offshore Structures

1. Yura J.A., Zettlemoyer, N., and Edward, I.F., "Ultimate Capacity Equations for Tubular Joints", Proceedings, Offshore Technology Conference, OTC 3690, 1980