



Action Requested

- New Course
- Modification of Existing Course
- Deletion of Course

Complete the following sections:
 New Courses - B & C completely
 Modifications - A modified information, B & C completely
 Deletions - A & C completely

Date 2/23/2004

Effective Fall 2004

A. CURRENT LISTING

B. REQUESTED LISTING

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Approval

- Curriculum Comm. _____
- Faculty _____
- Rackham _____
- Cross listed Unit 1 _____
- Cross listed Unit 2 _____

Submitted By: Home Dept. Cross-listed Dept.
 Name, Signature & Department
 Home Dept. John W. Halloran, Dept. Chair
 Cross-listed Dept(s) _____

SUPPORTING STATEMENT

MSE requests that the prerequisites for this course be changed from "advised" to "enforced," as now allowed by the new policy from the Registrar's Office. Furthermore, the Undergraduate Committee of MSE recommends that the current prerequisite requirement be changed to "MSE 220 or 250, MSE 242, and MSE 360" to better reflect the background knowledge and skills required for this course.

Lined area for additional text or comments.

Are any special resources or facilities required for this course? Yes No

Detail the Special requirements

Lined area for detailing special requirements.

Action Requested

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Complete the following sections:
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Date 2/24/2004

Effective Fall 2004

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Approval

Curriculum Comm. _____

Faculty _____

Rackham _____

Cross listed Unit 1 _____

Cross listed Unit 2 _____

Submitted By: Home Dept. Cross-listed Dept.

Name, Signature & Department
 Home Dept. John W. Halloran, Dept. Chair
 Cross-listed Dept(s). John Kieffer on Staff of Dept. of

135

SUPPORTING STATEMENT

MSE requests that the prerequisites for this course be changed from "advised" to "enforced," as now allowed by the new policy from the Registrar's Office. Furthermore, the Undergraduate Committee of MSE recommends that the current prerequisite requirement be changed to "MSE 330 and MSE 335" to better reflect the background knowledge and skills required for this course.

Are any special resources or facilities required for this course? Yes No

Detail the Special requirements

The students will need extensive use of laboratory and computer design facilities, including both hardware and software. Most needs will be met by CAEN and department facilities. Students may have to seek off-campus resources to solve some of their problems.

Action Requested

- New Course
- Modification of Existing Course
- Deletion of Course

Complete the following sections:
 New Courses - B & C completely
 Modifications - A modified information, B & C completely
 Deletions - A & C completely

Date 2/24/2004

Effective Fall 2004

A. CURRENT LISTING

B. REQUESTED LISTING

<p><input type="checkbox"/> Home Department: Materials Science & Engineering Div #: 281 Course Number: 493</p> <p><input type="checkbox"/> Cross Listed Course Information</p> <p><input checked="" type="checkbox"/> Course Title: Special Topics in Materials Processing and Applications</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;">TITLE ABBREVIATION</td> <td style="width: 15%;">Time Sched Max = 19 Spaces</td> <td style="width: 70%;"></td> </tr> <tr> <td></td> <td>Transcript Max = 20 Spaces</td> <td></td> </tr> </table> <p><input type="checkbox"/> Course Description</p> <p>PROGRAM OUTCOMES: <input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input type="checkbox"/> g <input type="checkbox"/> h <input type="checkbox"/> i <input type="checkbox"/> j <input type="checkbox"/> k</p> <p>Degree Requirements <input type="radio"/> Degree Requirement <input type="radio"/> Tech Elective <input type="radio"/> Core Course <input type="radio"/> Other <input type="radio"/> Free Elective</p> <p><input checked="" type="checkbox"/> Prerequisites: MSE 350 <input type="radio"/> Enforced <input checked="" type="radio"/> Advised</p> <p><input type="checkbox"/> Credit Restrictions</p> <table border="1" style="width: 100%; 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C.

Repeatability (Indi Research, Dir. Study, Dissertation):
 Is this course repeatable? Yes No
 Maximum Hours? 3 Maximum Times? 1
 Can it be repeated in the same term? Yes No

Class Type(s)	Graded Section	Grading	Location
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Approval

Curriculum Comm. _____

Faculty _____

Rackham _____

Cross listed Unit 1 _____

Cross listed Unit 2 _____

Printing Information (Optional)
 Print the course in the Bulletin
 Print the course in the Time Schedule

Terms & Freq. of Offering: I II IIIa IIIb III
 Yearly Alter Years Even Years Odd Years
 Half term 1st 2nd

Cognizant Faculty Member: _____ Staff _____ Title _____

Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty

Submitted By: Home Dept. Cross-listed Dept.

Name, Signature & Department
 Home Dept. John W. Halloran, Dept. Chair
 Cross-listed Dept(s): _____

SUPPORTING STATEMENT

MSE requests that this course title be changed to better reflect it's relationship to Materials Science & Engineering in it's entirety. We also request that prerequisites for this course be changed from "advised" to "enforced," as now allowed by the new policy from the Registrar's Office.

(This section contains multiple horizontal lines for providing a supporting statement.)

Are any special resources or facilities required for this course?


Yes No

Detail the Special requirements

(This section contains horizontal lines for detailing special requirements.)

Department of Naval Architecture and Marine Engineering
University of Michigan
February 16, 2004

MEMORANDUM

From: 
Michael G. Parsons
Academic Affairs Committee Chair
Department of Naval Architecture and Marine Engineering
University of Michigan

To: Gregory M. Hulbert
Curriculum Committee Chair
College of Engineering
University of Michigan

Subject: Approval of Program Change

The Department of Naval Architecture and Marine Engineering requests College approval of a Program Change to implement the following:

1. introduce a new course in Marine Systems Manufacturing (NA280, 3 credits);
2. replace NA277 Introduction to Probability and Statistics with Marine Applications (2 credits) with IOE/Stat265 Probability and Statistics for Engineers (4 credits);
3. drop the Advanced Mathematics requirement;
4. drop NA276, NA277, and technical elective NA460;
5. add an Advanced Mathematics course as one of the allowed technical electives.

Change 2 is being made to strengthen the preparation of our students in the area of probability and statistics and to reduce the course duplication within the College. Change 3 is being made to provide the hours needed for the addition of IOE/Stat 265. Changes 1 and 4 are being made to reduce the dependence of the department on Adjunct teaching during this period of budget contraction. Change 5 is being made to partially offset Change 3, particularly for seniors who are preparing for graduate school.

The revised sample schedule for the new curriculum is attached. The associated course revision forms are also attached.

Encl. (1, plus course approval forms)

Sample Schedule

B.S.E. (NAVAL ARCHITECTURE & MARINE ENGINEERING)

	Credit Hours	Terms							
		1	2	3	4	5	6	7	8
Subjects required by all programs (55 hrs.)									
Mathematics 115, 116, 215, and 216	16	4	4	4	4	-	-	-	-
Engr 100, Intro to Engineering.	4	4	-	-	-	-	-	-	-
Engr 101, Intro to Computers	4	-	4	-	-	-	-	-	-
Chemistry 125/126 and 130 or Chemistry 210 and 211	5	5	-	-	-	-	-	-	-
Physics 140 with Lab 141; Physics 240 with Lab 241	10	-	5	5	-	-	-	-	-
Humanities and Social Sciences	16	4	4	-	-	-	-	4	4
Related Technical Core Subjects (15 hrs.)									
ME 211, Intro. to Solid Mechanics	4	-	-	4	-	-	-	-	-
ME 240, Intro. to Dynamics	4	-	-	-	4	-	-	-	-
ME 235, Thermodynamics I	3	-	-	-	3	-	-	-	-
IOE/Stat 265 Prob.& Stat. for Eng.	4	-	-	-	-	4	-	-	-
Program Subjects (41 hrs.)									
NA 270, Marine Design	4	-	-	4	-	-	-	-	-
NA 280, Marine Systems Manufacturing	3	-	-	-	3	-	-	-	-
NA 310, Marine Structures I	4	-	-	-	-	4	-	-	-
NA 320, Marine Hydrodynamics I	4	-	-	-	-	4	-	-	-
NA 321, Marine Hydrodynamics II	4	-	-	-	-	-	4	-	-
NA 331, Marine Engineering I	3	-	-	-	-	3	-	-	-
NA 332, Marine Electrical Engineering	3	-	-	-	-	-	3	-	-
NA 340, Marine Dynamics I	4	-	-	-	-	-	4	-	-
NA 470, Foundations of Ship Design	4	-	-	-	-	-	-	4	-
NA 475, Marine Design Team Project	4	-	-	-	-	-	-	-	4
NA 491, Marine Engr. Laboratory	4	-	-	-	-	-	-	4	-
Technical Electives (8)	8	-	-	-	-	-	-	4	4
Choose two from the following list. At least one must come from the 1 st four on the list:									
NA 410, Marine Structures II									
NA 420, Environmental Ocean Dynamics									
NA 431, Marine Engineering II									
NA 440, Marine Dynamics II									
NA 401, Small Craft Design									
NA 403, Sailing Craft Design Principles									
NA 562, Marine Systems Production Strategy and Operations Management									
Advanced Mathematics: Math/Stat425, Math450, Math454, or Math471									
Unrestricted Electives (9 hrs.)	9	-	-	-	2	-	4	-	3
Total	128	17	17	17	16	15	15	16	15

Action Requested

- New Course
- Modification of Existing Course
- Deletion of Course

Complete the following sections:
 New Courses - B & C completely
 Modifications - A modified information, B & C completely
 Deletions - A & C completely

Date 2/18/2004
 Effective Winter 2005

A. CURRENT LISTING

B. REQUESTED LISTING

<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Home Department</td> <td style="width: 10%;">Div #</td> <td style="width: 60%;">Course Number</td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td colspan="3">Cross Listed Course Information</td> </tr> <tr> <td colspan="3"> </td> </tr> <tr> <td colspan="3">Course Title</td> </tr> <tr> <td colspan="3"> </td> </tr> <tr> <td style="width: 15%;">TITLE ABBRE- VIATION</td> <td style="width: 15%;">Time Sched Max = 19 Spaces Transcript Max = 20 Spaces</td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td colspan="3">Course Description</td> </tr> <tr> <td colspan="3"> </td> </tr> <tr> <td colspan="3">PROGRAM OUTCOMES:</td> </tr> <tr> <td colspan="3"> <input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input type="checkbox"/> g <input type="checkbox"/> h <input type="checkbox"/> i <input type="checkbox"/> j <input type="checkbox"/> k </td> </tr> <tr> <td colspan="3"> Degree Requirements <input type="checkbox"/> Degree Requirement <input type="checkbox"/> Tech Elective <input type="checkbox"/> Core Course <input type="checkbox"/> Other <input type="checkbox"/> Free Elective </td> </tr> <tr> <td colspan="3">Prerequisites</td> </tr> <tr> <td colspan="3"> <input type="radio"/> Enforced <input type="radio"/> Advised </td> </tr> <tr> <td colspan="3">Credit Restrictions</td> </tr> <tr> <td style="width: 15%;">Level of Credit</td> <td style="width: 15%;">All Credit types</td> <td style="width: 15%;">Credit Hours</td> </tr> <tr> <td> <input type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad <input type="checkbox"/> Ugrad or Non-Rackham Grad </td> <td> <input type="checkbox"/> Rackham Grad w/add'l Work </td> <td> Min Max _____ </td> </tr> <tr> <td colspan="2">Contact Hrs/Wk</td> <td>Number of Wks</td> </tr> <tr> <td colspan="2"> </td> <td> </td> </tr> </table>	Home Department	Div #	Course Number				Cross Listed Course Information						Course Title						TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces Transcript Max = 20 Spaces					Course Description						PROGRAM OUTCOMES:			<input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input type="checkbox"/> g <input type="checkbox"/> h <input type="checkbox"/> i <input type="checkbox"/> j <input type="checkbox"/> k			Degree Requirements <input type="checkbox"/> Degree Requirement <input type="checkbox"/> Tech Elective <input type="checkbox"/> Core Course <input type="checkbox"/> Other <input type="checkbox"/> Free Elective			Prerequisites			<input type="radio"/> Enforced <input type="radio"/> Advised			Credit Restrictions			Level of Credit	All Credit types	Credit Hours	<input type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad <input type="checkbox"/> Ugrad or Non-Rackham Grad	<input type="checkbox"/> Rackham Grad w/add'l Work	Min Max _____	Contact Hrs/Wk		Number of Wks				<table border="1" style="width: 100%; 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<p>C.</p> <p>Repeatability (Indl: Research, Dir. Study, Dissertation):</p> <p>Is this course repeatable? <input type="radio"/> Yes <input checked="" type="radio"/> No</p> <p>Maximum Hours? Maximum Times? </p> <p>Can it be repeated in the same term? <input type="radio"/> Yes <input type="radio"/> No</p> <table border="0" style="width: 100%;"> <tr> <td style="width: 15%;">Class Type(s)</td> <td style="width: 15%;">Graded Section</td> <td style="width: 15%;">Grading</td> <td style="width: 15%;">Location</td> </tr> <tr> <td> <input checked="" type="checkbox"/> Lec <input type="checkbox"/> Rec <input type="checkbox"/> Sem <input type="checkbox"/> Lab <input type="checkbox"/> Dis <input type="checkbox"/> Ind <input type="checkbox"/> Other </td> <td> <input type="checkbox"/> Lec <input type="checkbox"/> Rec <input type="checkbox"/> Sem <input type="checkbox"/> Lab <input type="checkbox"/> Dis <input type="checkbox"/> Ind <input type="checkbox"/> Other </td> <td> <input checked="" type="checkbox"/> A-E <input type="checkbox"/> CR/NC <input type="checkbox"/> S/U <input type="checkbox"/> P/F <input type="checkbox"/> Y </td> <td> <input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension </td> </tr> </table>	Class Type(s)	Graded Section	Grading	Location	<input checked="" type="checkbox"/> Lec <input type="checkbox"/> Rec <input type="checkbox"/> Sem <input type="checkbox"/> Lab <input type="checkbox"/> Dis <input type="checkbox"/> Ind <input type="checkbox"/> Other	<input type="checkbox"/> Lec <input type="checkbox"/> Rec <input type="checkbox"/> Sem <input type="checkbox"/> Lab <input type="checkbox"/> Dis <input type="checkbox"/> Ind <input type="checkbox"/> Other	<input checked="" type="checkbox"/> A-E <input type="checkbox"/> CR/NC <input type="checkbox"/> S/U <input type="checkbox"/> P/F <input type="checkbox"/> Y	<input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension	<p>Printing Information (Optional)</p> <p><input checked="" type="checkbox"/> Print the course in the Bulletin <input type="checkbox"/> Print the course in the Time Schedule</p> <p>Terms & Freq. of Offering <input type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> IIIa <input type="checkbox"/> IIIb <input type="checkbox"/> III Half term <input type="checkbox"/> 1st <input type="checkbox"/> 2nd</p> <p><input checked="" type="checkbox"/> Yearly <input type="checkbox"/> Alter Years <input type="checkbox"/> Even Years <input type="checkbox"/> Odd Years</p> <p>Cognizant Faculty Member: Thomas Lamb Title Research Scientist</p> <p>Grad Course: Attachment nomination if Cognizant Faculty is not a regular graduate faculty</p>																																																																																																																			
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Approval

Curriculum Comm. _____

Faculty _____

Rackham _____

Cross listed Unit 1 _____

Cross listed Unit 2 _____

Submitted By: Home Dept. Cross-listed Dept.

Name, Signature & Department: Armin W. Troesch, NA&ME

Home Dept. _____

Cross-listed Dept(s). _____

SUPPORTING STATEMENT

In an attempt to meet anticipated budget cuts, and also the need to reduce current department deficits, the curriculum was examined and it was decided to eliminate one course and to merge its topics into two existing courses. This course (NA280) is developed by taking the 2 credit NA276 course and adding one credit's worth of content from the eliminated course.

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Are any special resources or facilities required for this course? Yes No

Detail the Special requirements

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UNIVERSITY OF MICHIGAN TL 2/20/04
DEPARTMENT OF NAVAL ARCHITECTURE AND MARINE ENGINEERING
NA280 - MARINE SYSTEMS MANUFACTURING
WINTER TERM

COURSE OBJECTIVE:

To present an overview of shipbuilding, boatbuilding, marine and offshore equipment building related aspects of all areas interfacing with naval architecture and marine engineering in order to enable students to continue their studies and/or enter industry with a basic knowledge of these areas.

CLASS SCHEDULE:

Two 1 1/2 hour sessions per week on Tuesdays and Thursdays from 7.30 to 7.00 PM.

INSTRUCTOR:

Thomas Lamb (Associate Professor)
Room 216 NA&ME (764-4509 with Voice Mail)
Room 222 UMTRI (763-7408 with Voice Mail)
Home 332-3491 Fax 3320624
E-mail - nalamb@umich.edu

NA&ME OFFICE HOURS:

I will be available to meet with students in my office at NA&ME, except during class times. Please schedule a meeting by dropping in the NA&ME office when I am there, or by calling me on my telephones or by E-mail. My schedule/availability is posted on my door.

TEXT:

Course Class outlines and other material are posted on the Web and can be accessed at <http://coursetools.ummi.umich.edu/200?Winter/navarch/2751>

If you have trouble getting into this site from your student personal webpage do the following:

Access <http://coursetools.ummu.umich.edu/>
Click on *Browse all IM Course Tools Sites*
Select Term: Winter 200?
Select School: College of Engineering
Click on *Display Sites*
Scroll down to *Naval Architecture/275*

The assigned texts for the course are:

SHIP DESIGN AND CONSTRUCTION, Vol. I, by T. Lamb (Editor). Available from SNAME with Student discount

SHIP KNOWLEDGE, by Klaas van Dokkum, Available from Professor Lamb. Fill out order form.

PREREQUISITES:

Preceded by or taken concurrently with NA270 - MARINE DESIGN

TEACHING METHOD:

I will primarily use lectures, utilizing videos and slides of appropriate material and case study assignments. The assignments will assist understanding of the topics covered and facilitate student participation. A 10 minute Q&A period will be held at the start of each class. **THIS IS NOT TIME TO LET LATECOMERS TURN UP, BUT FOR MEANINGFUL DIALOG. PLEASE BE THERE ON TIME.** If previous class prevents you being in this class by 3.4PM please let me know at

beginning of semester. If you must miss a class, I would appreciate the courtesy of you letting me know.

TYPE OF WORKLOAD:

Students are encouraged to engage in class discussion of the lecture material as well as review of the assignments. Anticipated effort is:

Class Attendance	42 hours (excluding exam time)
Reading Assignments	42 hours
Task Assignments	42 hours
Exam (Take home)	16 hours
TOTAL EFFORT	134 HOURS

EXAMS:

There will be two take home open book exams. In addition eight, **closed book**, multiple choice, Pop Tests will be given throughout the semester, on class dates selected by the instructor. The pop test will be given at start of class so do not be late.

GRADING:

Mid-term Examination	30%
Final Examination	30%
Pop Tests	10%
Assignments	30%

SCHEDULE, TOPICS AND READING ASSIGNMENTS:

CLASS NO.	DATE	TOPIC	READING ASSIGNMENT
1	1/ /	Introduction to Marine Industry	SD&C Chapter 3
2	1/ /	Ship and Boat Types and Components	SK Chapters 1 and 3
3	1/ /	Materials Overview	SD&C Chapter 22
4	1/ /	Material Joining	SD&C Chapter 22
5	1/ /	Material Joining	Class 5 Course Notes
6	1/ /	Composites	SD&C Chapter 21
7	1/ /	Materials Preservation	SD&C Chapter 13
8	1/ /	Introduction to Offshore Industry	SD&C Chapters 32 and 36
9	2/ /	Introduction to Pleasure Boat Industry	Class 9 Course Notes
10	2/ /	Markets, Demand and Supply	Class 10 Course Notes
11	2/ /	Productivity	Class 11 Course Notes
12	2/ /	Competition	Class 12 Course Notes
13	2/ /	Specifications and Contracts	SD&C Chapter 9
14	2/ /	Marine Cost Estimating	SD&C Chapter 10
WEEK OF 2/ /		MID-TERM EXAM - TAKE HOME	
	2/ /	SPRING BREAK	
	2/ /	SPRING BREAK	
15	3/ /	Modern Shipbuilding Practice	SK Chaps 3 & 7, SD&C Chap 25
16	3/ /	Offshore Equipment Construction Practice	Class 16 Course Notes
17	3/ /	Shipyard Layout & Equipment	SD&C Chapter 26
18	3/ /	Design for Production	SD&C Chapter 14
19	3/ /	Engineering for Ship Production	SD&C Chapter 14
20	3/ /	Shipyard Organization & Management	Class 20 Course Notes
21	3/ /	Group Technology & Work Breakdown Structures	Class 21 Course Notes
22	3/ /	Build Strategy	SD&C Chapter 14
23	4/ /	Planning and Scheduling	Class 23 Course Notes
24	4/ /	Production & Material Control	Class 24 Course Notes
25	4/ /	CAD/CAM Applications	Class 25 Course Notes
26	4/ /	Simulation Based Design	Class 26 Course Notes
WEEK OF 4/ /		FINAL EXAM - TAKE HOME DUE 4/ /	

ASSIGNMENTS:

Reading assignments should be completed prior to class so as to maximize understanding of class presentation.

The assignments will be based on course material. From assignment 5 onward, a sequential development of a new shipyard, boatyard or offshore equipment building site and the various methods and procedures necessary to make it operational. Each student, or groups of up to three students, will select either a ship, a small boat or an offshore platform/rig for which they will develop their assignments:

Task Assignments:

Number	Hand in Class	Requirements
1	5	A paper describing what industry segment you are interested in and why
2	9	Material Selection for Different marine Products
3	12	Welding Sizing and Symbols Exercise
4	16	Prepare a Cost Estimate
5	20	Prepare a description of your shipyard layout and work flow
6	23	Prepare a Work Breakdown Structure
7	25	Prepare a Build Strategy Outline
8	WE	Describe the CAD/CAM applications you would use in your company and why

Assignments shall consist of a 2 to 4 page report plus drawings, as appropriate, which will be graded based on:

- Understanding of topic
- Feasibility of approach
- Extent of effort and completeness
- Presentation (Format, tidiness)

It is preferred that text be typed, **single** spacing.

Calculations shall be as required.

STEP II: Develop Course Objectives and Outcomes

COURSE #: NA 280	COURSE TITLE: Marine Systems Manufacturing
TERMS OFFERED: Winter	PREREQUISITES: Corequisite NA 270
INSTRUCTOR(S): Lamb, Spicknall	SCIENCE/DESIGN: 1.0 / 0.0
CATALOG DESCRIPTION: Overview of the marine industry and its environment as it relates to all aspects of naval architecture and marine engineering, including industry characteristics; organization; product types and components; materials used, joining methods, shipbuilding, boatbuilding and offshore equipment manufacturing methods; design; production engineering; planning; contracts and specifications; cost estimating; production and material control.	COURSE TOPICS: 1. Industry Characteristics 2. Ship types and components 3. Materials 4. Joining methods 5. Marine markets, demand and supply 6. Productivity and competitiveness 7. Contracts and Specifications 8. Marine cost estimating 9. Shipyard layout and equipment 10. Modern shipbuilding practice 11. Design for production, group technology and work breakdown structures 12. Planning, scheduling and production & material control 12. Shipbuilding policy and build strategy 14. CAD/CAM/CIM & Simulation based design 15. Shipyard organization and management

Continued on next page

<p>COURSE OBJECTIVES</p>	<ol style="list-style-type: none"> 1. To give students a broad understanding of the industry in which they will practice after graduation. This in turn should help them decide in which sector of the industry to focus their future studies. 2. To provide a foundation and framework on which to develop their detailed understanding of the core courses that they will take throughout their remaining undergraduate education. 3. To teach students the different business segments in the marine industry. 4. To teach students the basic components of a ship and offshore product. 5. To teach students basic modern shipbuilding practices. 6. Provide experiences for students to practice written communications skills.
<p>COURSE OUTCOMES*</p>	<ol style="list-style-type: none"> 1. Know the basic business relationships of the marine industry. [Objectives 1,3] 2. Understand the basic types of ships and other equipment used in the marine industry. [3] 3. Be able to describe the components of a ship. [4,6] 4. Understand the market dynamics of the marine industry. [1,3,6] 5. Know the factors that influence competitiveness in the marine industry. [3,6] 6. Know the need and use of contracts and specifications. [3,6] 7. Develop cost estimates for ships [1,3,4] 8. Be able to analyze shipyard layouts and determine product material flow and processes used. [5] 9. Apply Design for Production in future design courses. [5] 10. Apply Group Technology to future process related tasks. [5] 11. Understand the need for and use of Work Breakdown Structures. [1,2,6] 12. Understand the planning, scheduling and control tools used in the marine industry. [1,5,6] 13. Use a shipyard's shipbuilding policy to develop a build strategy for a ship. [1,2,5,6] 14. Be able to find appropriate marine industry CAD/CAM/CIM and SBD tools. [5] 15. Understand the organization of shipyards and the way they are managed. [1,2,6] 16. Apply correct approach to written technical communication. [6]

ASSESSMENT TOOLS	
	<ol style="list-style-type: none"> 1. 8 quizzes test individual student's understanding and retention of course material covered since previous quiz. [Outcomes 1-15] 2. Mid-term and final examinations measure individual student's depth of understanding of the course subject. [Outcomes1-15]. 3. 8 assignments measure individual student's depth of understanding of specific topics and gives them an opportunity to be innovative and creative. [Outcomes 1-16] The technical communications assessment is conducted with the assistance of the College Of Engineering Tech Comm Department. 4. Course evaluation by each student at the end of the course, used for assessing all outcomes of the course.

*Numbers in brackets following each course outcome indicate corresponding course objective.

THE UNIVERSITY OF MICHIGAN - COLLEGE OF ENGINEERING
Course Approval Request
College Curriculum Committee, 1420 Lurie Engineering Center Building

Form Number
1336

Action Requested

- New Course
- Modification of Existing Course
- Deletion of Course

Complete the following sections:
New Courses - B & C completely
Modifications - A modified information, B & C completely
Deletions - A & C completely

Date 2/18/2004

Effective Fall 2004

A. CURRENT LISTING

B. REQUESTED LISTING

	Home Department	Div #	Course Number
<input type="checkbox"/>	Naval Architecture & Marine Engineering	284	552
<input type="checkbox"/>	Cross Listed Course Information Program in Manufacturing MFG	275	553
<input checked="" type="checkbox"/>	Course Title Concurrent Marine Design Management		
	TITLE ABBREVIATION CONC DES MGMT	Time Sched Max = 19 Spaces Transcript Max = 20 Spaces	Course Title Marine Sys Production Marine Sys Production
<input checked="" type="checkbox"/>	Course Description Combination capstone and management development course to provide students the opportunity to apply basic naval architectural and related engineering knowledge to a real life business situation and to apply newly gained management skills. Management and organization concepts, theories and processes will be presented in the context of the marine industry.	Course Description for Official Publication (Max = 50 words) Examination of business strategy development, operations management principals and methods, and design-production integration methods applied to the production of complex marine systems such as ships, offshore structures, and yachts. Addresses shipyard and boat yard business and product strategy definition, operations planning and scheduling, performance measurement, process control and improvement.	
	PROGRAM OUTCOMES: <input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input type="checkbox"/> g <input type="checkbox"/> h <input type="checkbox"/> i <input type="checkbox"/> j <input type="checkbox"/> k		
<input checked="" type="checkbox"/>	Prerequisites 6.6. In Engineering <input type="checkbox"/> Enforced <input checked="" type="checkbox"/> Advised	Degree Requirements <input type="checkbox"/> Degree Requirement <input type="checkbox"/> Core Course <input type="checkbox"/> Free Elective <input type="checkbox"/> Tech Elective <input type="checkbox"/> Other	
<input type="checkbox"/>	Credit Restrictions	Prerequisites NA280 (C-) or graduate standing <input checked="" type="checkbox"/> Enforced <input type="checkbox"/> Advised	
<input checked="" type="checkbox"/>	Level of Credit <input type="checkbox"/> Undergrad only <input checked="" type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad <input type="checkbox"/> Ugrad or Non-Rackham Grad	Credit Hours Min Max 3 3	Contact Hrs/Wk 3 Number of Wks 1
<input type="checkbox"/>	Repeatability (incl Research, Dir. Study, Dissertation) Is this course repeatable? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Maximum Hours? _____ Can it be repeated in the same term? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Level of Credit <input type="checkbox"/> Undergrad only <input checked="" type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad <input type="checkbox"/> Ugrad or Non-Rackham Grad	
<input type="checkbox"/>	Class Type(s) <input type="checkbox"/> Lec <input type="checkbox"/> Rec <input type="checkbox"/> Sem <input type="checkbox"/> Lab <input type="checkbox"/> Dis <input type="checkbox"/> Ind <input type="checkbox"/> Other	Graded Section <input type="checkbox"/> Lec <input type="checkbox"/> Rec <input type="checkbox"/> Sem <input type="checkbox"/> Lab <input type="checkbox"/> Dis <input type="checkbox"/> Ind <input type="checkbox"/> Other	Grading <input type="checkbox"/> A-E <input type="checkbox"/> CR/NC <input type="checkbox"/> S/U <input type="checkbox"/> P/F <input type="checkbox"/> Y
		Printing Information (Optional) <input type="checkbox"/> Print the course in the Bulletin <input checked="" type="checkbox"/> Print the course in the Time Schedule	
		Terms & Freq. of Offering <input type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> III <input type="checkbox"/> IV <input type="checkbox"/> V <input type="checkbox"/> VI <input type="checkbox"/> Yearly <input type="checkbox"/> After Years <input type="checkbox"/> Even Years <input type="checkbox"/> Odd Years	
		Cognizant Faculty Member: Marin Seccombe Title <u>Asst. Prof. Sc.</u>	
		Submitted By: <input checked="" type="checkbox"/> Home Dept. <input type="checkbox"/> Cross-listed Dept.	
		Name, Signature & Department Home Dept. <u>Armin W. Troesch, NA&ME</u> Cross-listed Dept. <u>Jack Hu, MFG</u>	

Curriculum Comm.

- Faculty
- Rackham
- Cross listed Unit 1
- Cross listed Unit 2

Form Number

1336

SUPPORTING STATEMENT

In an attempt to meet anticipated budget cuts, and also the need to reduce current department deficits by reducing dependence on Adjunct teaching, the curriculum was examined. It was decided to eliminate one course and to merge its topics into two existing courses. This course (NA460) is expanded by taking 1 credit from the eliminated NA460 course and adding it to the currently existing 3-credit NA562

[Lined area for supporting statement text]

Are any special resources or facilities required for this course? Yes No

Detail the Special requirements

[Lined area for special requirements text]

STEP II: Develop Course Objectives and Outcomes

<p>COURSE #: NA 562</p> <p>TERMS OFFERED: Fall</p>	<p>COURSE TITLE: Marine Production Engineering, Planning, and Control</p> <p>PREREQUISITES: NA 280 Marine Systems Manufacturing or graduate standing</p>
<p>INSTRUCTOR(S): Spicknall</p> <p>CATALOG DESCRIPTION: Examination of business strategy development, operations management principals and methods, and design-production integration methods applied to the production of complex marine systems such as ships, offshore structures, and yachts. Addresses shipyard and boat yard business and product strategy definition, operations planning and scheduling, performance measurement, process control and improvement.</p>	<p>SCIENCE/DESIGN:</p> <p>COURSE TOPICS:</p> <ol style="list-style-type: none"> 1. Fundamental Physics and Behavioral Characteristics of Production Systems 2. Production System Analysis for Applicability To Complex Marine System Production 3. Production Engineering for Complex Marine Systems 4. Long-range, or "Strategic," Operations Planning For Ship/Boat Yards 5. Medium-Range, or "Master," Planning For Ship/Boat Yards Detailed, or "Shop Floor," Planning For Ship/Boat Yards 6. Production Control and Performance Measurement For Ship/Boat Yards 7. Cost and Schedule Risk Assessment For Ship/Boat Yards Operations 8. Operations Improvement Strategies and Methods For Ship/Boat Yards

STEP II: Develop Course Objectives and Outcomes
NA 562 continued

<p>COURSE OBJECTIVES</p>	<ol style="list-style-type: none">1. To give students an understanding of the fundamental principals and terminology of production and operations management.2. To give students a thorough understanding of the group-technology-based production approach that is the most efficient for producing complex marine systems.3. To provide students with a background in the fundamentals of production engineering / design-for-production principals as applied to complex marine systems.4. To teach students planning and scheduling, production control, performance measurement, and cost and schedule risk assessment methods that are appropriate for ship and boat yards.5. To teach students methods of ship and boat yard operations improvement.6. To provide students with some basic experience with technologies that support production engineering for complex marine systems, and ship / boat yard operations planning and management.7. To provide an opportunity for students to develop a broad business perspective of ship / boat yard operations, and to help teach them the value of cross-functional collaboration and teamwork in design, planning, and operations management.
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STEP II: Develop Course Objectives and Outcomes
 NA 562 continued

<p>COURSE OUTCOMES*</p>	<p>The student:</p> <ol style="list-style-type: none"> 1. Understands the fundamental physics and behavioral characteristics of production systems. [Objective 1] 2. Understands the basic terminology associated with production, production engineering, and operations management. [1, 2, 3, 4, 5] 3. Can solve basic utilization / cycle time / capacity / inventory and production line balancing problems. [1] 4. Can define an appropriate production system for any given type of product based on that product's uniqueness, value, and demand. [1, 2, 7] 5. Can explain a group-technology-based production approach, and describe why it is typically most appropriate for the production of complex marine systems. [2, 7] 6. Can apply basic production engineering principals to the design of a complex marine system. [3, 7] 7. Can work effectively with others to identify for a ship a logical set of intermediate products, and create an associated product structure. [3, 4, 7] 8. Can explain the objectives and outputs of long-range planning. [4, 7] 9. Can develop and use mathematical models to assist with long-range planning and medium-range aggregate production planning in a ship / boat yard. [4, 6, 7] 10. Can work effectively with others to develop a work breakdown structure for a ship at the medium-range planning unit and critical resource level of detail. [4, 7] 11. Can work effectively with others to develop resource-loaded master production schedules for complex marine systems. [4, 6, 7] 12. Can develop schedule-driven medium-range cost estimates and derive associated cost and schedule risk. [4, 6, 7] 13. Can carry out basic statistical quality control activities, and use the resulting data for process control, process improvement, and production engineering. [3, 4, 5, 6, 7] 14. Understand the strengths and weaknesses of various operations philosophies, planning and scheduling methods, performance measurement and control methods, and technologies relative to their applicability in the complex marine system production domain. [2, 4, 5, 6, 7]
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*Numbers in brackets following each course outcome indicate corresponding course objective.

STEP II: Develop Course Objectives and Outcomes
NA 562 continued

ASSESSMENT TOOLS	<ol style="list-style-type: none">1. Six homework assignments help measure individual competency in outcomes 1, 2, 3, and 72. Two substantial case-study-based team projects, the second building on the first, help measure competency with outcomes 1, 2, 3, 4, and 7.4. A final exam that helps measure individual competency with outcomes 1-16.5. A class participation requirement helps measure individual competency with all outcomes, but primarily with objectives 4-6, 9-16.6. Course evaluation by each student at the end of the course used to assess the objectives and effectiveness of the course.
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Course Title: NA562 Marine systems Production Business Strategy and Operations Management

Course Function: B.S.E. Technical Elective; MEng required course

Cognizant Faculty: Mark Spicknall

Credit Hours: 4 credits

Schedule: Fall semester annually

Prerequisite: NA280

Short Description: Examination of business strategy development, operations management principals and methods, and design-production integration methods applied to the production of complex marine systems such as ships, offshore structures, and yachts. Addresses shipyard and boat yard business and product strategy definition, operations planning and scheduling, performance measurement, process control and improvement.

Text: Course pack

Outline

- Overview of ship, offshore, yacht, and pleasure boat industries –
 - Market information and competitive overview
 - Overall production approach -
 - impact of volume
 - impact of degree of product customization
 - type of product structure
 - Typical production processes -
 - overall production flow
 - specific work centers and process lanes together with their intermediate product types/groups/families
- Physics of production systems –
 - relationships between demand, capacity, utilization, and inventory
 - impact of variability on utilization and inventory
 - implications for marine systems production business strategy and operations management as compared to other types of products
- Typical shipyard and yacht yard operations management –
 - Strategic product and capacity planning
 - Medium-range “master” planning
 - Detailed “shop floor” planning
 - Process measurement & control (cost/productivity, schedule, quality)
 - Differences in operations management for producing offshore products
 - Differences in operations management for producing small series-production boats
- Operations process improvement methods & marine systems cases –
 - TQM
 - BPR

- Integrated approaches
- Integration of design and planning with production operations
 - Detail design / design-for-production approaches
 - Operational integration of design and planning with production