The University of Michigan
College of Engineering
Curriculum Committee

Agenda
January 10, 2012
1:30-3:00 p.m.
Room 265 Chrysler Center

1. Approval of Minutes From 11-22-2011
2. Course Approval Forms

University of Michigan
College of Engineering
Curriculum Committee Meeting
Tuesday November 22, 2011
1:30-3:00 p.m.
Room 265 Chrysler Center
Minutes

Fred Terry called the meeting to order at 1:40 p.m.

Members Present: F. Terry, L. Bernal, Y. Bozer, E. Durfee, J. Holloway, A. Hunt, D. Kieras, E. Larsen, S. Montgomery,
T. Olson, T. Perakis, R. Robertson, F Ward

Members Absent: A. Gallimore, M. Moldwin, J. Pan, S. Vozar,

Guest: Kathleen Vargo

The minutes of the last meeting (November 8 2011) were approved

Course Approval Forms

These Courses Were Approved:

BME 503	New Course
BME 574	New Course
BME 594	New Course
NERS 531	Modification—Adding X-Listing with EARTH 529
NERS 621	Modification—Adding X-Listing with EARTH 620
NERS 490	Modification—Allowing course to be repeatable
NERS 583	Modification—Changing Credit Hours and Contact Hours from: 4 ***to: 3***
NERS 590	Modification—Changing Credit Hours and Contact Hours from 1-3 ***to 1-4***
RAV 503	New Course

These Courses Were Tabled:

AOSS 474 (X-Listed with EARTH 474	***New Course***
ENGR 290	***New Course (will be revised and re-submitted)***
ENGR 390	***Modification—Allowing course to be repeatable(will be revised and re-submitted)***
SI 650	Modification—Asking for Cross Listing with EECS 549

Proposed Changes to the CS Engineering Program—David Kieras

Information regarding this was included in the meeting packets.
David Kieras presented this and there was some discussion regarding this.
Vote—Moved and Seconded Approved with requested changes. This will go to the Faculty Meeting on December 6.

Adjournment: Motion to adjourn was made and seconded
Motion carried (approved)

Next Meeting: January 10, 2012 Room 265 Chrysler Center

COURSE APPROVAL FORMS

AOSS 474 (X-Listed with EARTH 474) New Course

NAME 580(X-Listed with MFG) Modification—Changing Title from: Optimization, Market Forecasts and Management of Marine Systems ***to: Optimization and Management of Marine Systems***; Changing Description; Removing Pre-req; Changing Contact hours from: 4 ***to: 3***

SI 650 Modification—Asking for Cross Listing with EECS 549

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

Form Number: 2261
Date: 10/26/2011
Effective Term: Winter 2012
Course Offer Freq: ☒ Indefinitely ☐ One term only

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

A. CURRENT LISTING	B. REQUESTED LISTING
Home Department / Course Number	Home Department: AOSS Atmos, Oceanic & Space Sci / Course Number: 474
☐ Cross Listed Course Information	Cross Listed Course Information: Earth and Environmental Sciences EARTH 474
☐ Course Title	Course Title: Ice Sheets, Glaciers and Climate Change
TITLE ABBREVIATION — Time Sched Max = 19 Spaces:	TITLE ABBREVIATION — Time Sched Max = 19 Spaces: Ice and Climate
TITLE ABBREVIATION — Transcript Max = 20 Spaces:	TITLE ABBREVIATION — Transcript Max = 20 Spaces: Ice and Climate
☐ Course Description	Course Description for Official Publication (Max = 50 words): The dynamics and mass balance of ice sheets and glaciers introduced along with mathematical theories describing how ice sheets and glaciers flow and current methods of observation. The course integrates lectures, assignments and discussion of journal articles.
PROGRAM OUTCOMES: ☐ a ☐ b ☐ c ☐ d ☐ e ☐ f ☐ g ☐ h ☐ i ☐ j ☐ k	PROGRAM OUTCOMES: ☒ a ☒ b ☐ c ☒ d ☐ e ☐ f ☒ g ☐ h ☒ i ☐ j ☒ k
Degree Requirements: ○ Degree Requirement ○ Free Elective ○ Other ○ Core Course ○ Tech Elective	Degree Requirements: ○ Degree Requirement ◉ Free Elective ○ Other ○ Core Course ○ Tech Elective
Prereq: ○ Enforced ○ Advised	Prereq: Math 115 and 116 ○ Enforced ◉ Advised
☐ Credit Restrictions	Credit Restrictions
☐ Level of Credit: ☐ Undergrad only ☐ Rackham Grad ☐ Non-Rckhm Grad ☐ Ugrad or Rckhm Grad ☐ Ugrad or Non-Rckhm Grad ☐ All Credit types ☐ Rckhm Grad w/add'l Work; Credit Hours Min Max; Contact Hrs/Wk; Number of Wks	Level of Credit: ☐ Undergrad only ☐ Rackham Grad ☐ Non-Rckhm Grad ☐ Ugrad or Rckhm Grad ☐ Ugrad or Non-Rckhm Grad ☒ All Credit types ☐ Rckhm Grad w/add'l Work; Credit Hours Min 3 Max 3; Contact Hrs/Wk 13; Number of Wks 13

C.

Repeatability (Indi Research, Dir. Study, Dissertation): Is this course repeatable? ○ Yes ◉ No; Max Hours? ____ Max Times? ____; Can it be repeated in the same term? ○ Yes ○ No

☐ Class Type(s): ☒ Lec ☐ Sem ☐ Dis ☐ Other ☐ Rec ☐ Lab ☐ Ind
Graded Section: ☒ Lec ☐ Sem ☐ Dis ☐ Other ☐ Rec ☐ Lab ☐ Ind
Grading: ☒ A-E ☐ CR/NC ☐ P/F ☐ S/U
Course Is Y Graded ☐
Location: ☒ Ann Arbor ☐ Biological Station ☐ Camp Davis ☐ Extension

Cognizant Faculty Member: Jeremy N. Bassis — Title: Assistant Professor

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

Approval Info — Approved by Name — Approved Date
- ☐ Curriculum Comm.
- ☐ Faculty
- ☐ Cross listed Unit 1
- ☐ Cross listed Unit 2

Submitted By: ☒ Home Dept. ☐ Cross-listed Dept.

	Department Chair Name	Chair Signature
Home Dept.	Atmos, Oceanic & Space Sci	
Cross-listed Dept(s).	Earth & Environmental Sci	Peter Huybers

Form Number

2261

SUPPORTING STATEMENT

The department of Atmospheric, Oceanic and Space Sciences offers students the opportunity to specialize in climate science as part of our Earth System Science and Engineering undergraduate degree that is offered jointly with the department of Earth and Environmental Sciences. This class is offered as a technical elective that undergraduate students enrolled in this program to can take to broaden their background in climate science beyond atmospheric science to include the cryosphere and the impact the changing glaciers and ice sheets have on the climate and water resources. The course serves a similar purpose in our graduate curriculum as one of the few climate courses our department offers that exposes graduate students to an important part of climate science outside of atmospheric science. We anticipate attracting PhD graduate students from Atmospheric, Oceanic and Space Sciences (AOSS), Earth and Environmental Sciences (EES) and the School of Natural Resources and the Environment (SNRE) well as Masters of Engineering students from our Applied Climate program and undergraduates from AOSS and EES.

This course was well received as indicated by Q1 & Q2: Winter 2010 Q1= 4.67, Q2= 5; Winter 2011 Q1= 4.08, Q2= 4.2

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

Detail the Special requirements

AOSS 605: Ice sheets, glaciers and climate
Syllabus, Winter 2011

Instructor: Dr. Jeremy Bassis
Office location: 2529 SRB
Office hours: TBD
Class Times: MWF 8:30-9:30AM

Primary textbook:
Principles of Glacier Mechanics, Hooke, 2nd Ed., 2005

Additional resources:
The Physics of Glaciers, Cuffey and Paterson, 4th Ed., 2010
Fundamentals of Glacier Dynamics (C.J. van der Veen, 1999)
Ice Sheets and Climate (Oerlemans and van der Veen, 1984)

Course Overview: Ice sheets and glaciers form an active component of the climate and hydrological systems that not only respond to climate, but also help shape the Earth's climate system. In this class students will be introduced to techniques used to observe and understand the dynamics and mass balance of ice sheets and glaciers. Course content includes an introduction to continuum mechanics, the equations of glacier and ice sheet deformation, boundary conditions, ice sheet and glacier mass and energy balance (both theory and observations). In addition, we shall discuss both current topics of interest to the glaciological and climate community and how these topics are relevant to efforts to better predict future sea level rise.

Prerequisites: Familiarity with linear algebra and partial differential equations. Homework assignments will involve pencil and paper exercises and some programming/data analysis with MATLAB or alternative language of preference.

Grading Rubric:		
	Problem sets:	40%
	Mid-term exam:	20%
	Oral presentation:	10%
	Final student report:	20%
	Participation/in class projects:	10%

Homework Assignments: We will have approximately 10 homework assignments during the semester. No late homework will be accepted without prior consent. If you are unable to turn in an assignment on time contact me before it is due.

Oral presentation(s): Each student will choose a topic not covered in class and explain this topic to the class. Students should aim for about 15-20 minute presentations. Fellow students will evaluate the presentations.

Final Project: The final project will consist of a research proposal (less than 10 pages). The topic of the research proposal is up each student, but should involve ice sheets/glaciers or the cryosphere. The proposal will involve (*i*) an outline of a problem of interest containing appropriate motivation and background information; (*ii*) a description of a research plan specifically designed to address the problem, including relevant equations; (*iii*) a list of expected obstacles and difficulties. The proposal will be evaluated based on its intellectual merit using NSF criteria (see http://www.nsf.gov/pubs/1998/nsf9891/nsf9891.pdf for a definition and examples). NB: The research proposal is aspirational -- you don't need to do the research described in the proposal, just describe the research you propose to do.

Tentative timeline for final project:
Friday, January 28th: One paragraph proposal topic due.
Friday, February 25th: Progress report
Friday, April 1st: Rough drafts due, in class peer review
Friday, April 15th: Final paper due

Participation: Participation grades will be determined by your contributions to discussions.

Mid-term exam: A single exam is tentatively scheduled during week 10 (the exact date will depend on our final class times.)

Outline

	Topic	**Reading**
Week 1	Ice sheets, glaciers and the climate system	IPCC, Chapter 4 (p. 341-342 and p. 356-367) Hook, Chapter 1
Week 2	Ice sheet mass balance (theory)	Hook, Chapter 3
Week 3	Ice sheet mass balance (observations)	Velicogna, GRL paper Pritchard, Nature paper
Week 4	Ice streams and surging glaciers	*Paper TBD*
Week 5	Flow and fracture of a crystalline material	Hook, Chapter 4
Week 6	The velocity field in a glacier (the shallow ice approximation)	Hook, Chapter 5
Week 7	Catchup	*Paper TBD*
Week 8	Basal sliding (theory)	Hook, Chapter 7
Week 9	Basal sliding (observations)	Iverson, Science Paper Weertman Paper

Week 10	Subglacial hydrology (theory and observations) Exam	Hook, Chapter 8 Stearns, Nature Paper
Week 11	Temperature in ice sheets and glaciers	Hook, Chapter 6
Week 12	Ice shelves, tidewater glaciers and ice ocean interaction	Scambos, Antarctic Research Paper Holland, Nature Paper
Week 13	Wrap-up/Presentations	

COURSE PROFILE

Degree Program: Earth System Science and Engineering **Date:Oct 19, 2011**
Prepared by: Jeremy N. Bassis

COURSE #: 474	**COURSE TITLE: ICE SHEETS, GLACIERS AND CLIMATE**
TERMS OFFERED: Winter	**For each prerequisite below, "E" denotes Enforced and "A" denotes Advised.**
TEXTBOOKS/REQUIRED MATERIAL: N/A	**PREREQUISITES: MATH 115 & 116 (A)**
INSTRUCTOR(S): Jeremy N. Bassis	**COGNIZANT FACULTY: Jeremy N. Bassis**
CoE BULLETIN DESCRIPTION: **The dynamics and mass balance of ice sheets and glaciers introduced along with mathematical theories describing how ice sheets and glaciers flow and current methods of observation. The course integrates lectures, assignments and discussion of journal articles.**	**COURSE TOPICS:** • Introduction to the role of ice sheets in climate change, sea level rise and water resources • Introduction to continuum mechanics • Theory and observations of glacier and ice sheet deformation • Ice sheet and glacier mass and energy balance (theory and observations) • Ice-ocean interaction • Projections of future sea-level rise • Impacts of melting glaciers and decreased snowpack on water resources • Topics of current topics of interest
COURSE STRUCTURE/SCHEDULE Lecture: 2 per week @ 75 minutes per lecture	

COURSE OBJECTIVES	(1) To provide understanding of the role ice sheets and glaciers play in sea level rise, past present and future climate change and fresh water budgets and; (2) to introduce students to the observational and mathematical techniques used to observe and understand the dynamics, thermodynamics and mass balance of ice sheets and glaciers.
COURSE OUTCOMES For each course outcome, links to the Program Outcomes are identified.	A. Students will apply math and science skills to derive solutions for homework assignments and complete programming exercises B. Students will download, analyze and interpret data and compare data to the predictions of numerical models D. Students will collaborate on homework problems and form in-class discussion groups with Engineering students paired with LSA students G. Students will prepare and present in-class oral presentations and write a proposal on a topic of their choice I. Students will recognize the need for life long learning by reading historic and current topic papers to see how knowledge has evolved J. Students will read current papers introducing them to contemporary topics in glaciology and climate change
ASSESSMENT TOOLS For each assessment tool, links to the course outcomes are identified.	Student evaluations will be based on homework, in-class discussions, oral presentations and performance on the final project. Homework assignments will require a combination of the application of mathematical and physical reasoning and programming in MATLAB. Some problems will require that the students compare observations with theory to determine and determine which assumptions of the theory are violated by the data. Ability to communicate orally will be assessed through in-class oral presentations. Technical writing skills will be evaluated through the final project, which consists of identifying a problem and then identifying a method of solving the problem in the format of a research proposal.

Revised 11 11 04

Course Approval Request Form

Office of the Registrar, University of Michigan

1210 LSA Building
500 S. State Street
Ann Arbor, MI 48109-1382
Phone: 734.763.2113
Fax: 734.936.3148
ro.curriculum@umich.edu
ro.umich.edu

CHECK APPROPRIATE BOXES FOR ALL CHANGES

Action Requested
- ☐ New Course
- ☒ Modification of Existing Course
- ☐ Deletion of Existing Course

Date of Submission:
Effective Term: Winter 2012

☐	Course Offered ☐ Indefinitely ☐ One term only	**RO USE ONLY** Date Received: Date Completed: Completed By:

	CURRENT LISTING			REQUESTED LISTING		
☐	Dept (Home): Information Subject: SI Catalog: 650			Dept (Home): Subject: Catalog:		
☒	☐ Course is Cross-Listed with Other Departments			☒ Course is Cross-Listed with Other Departments		
	Department	Subject	Catalog Number	Department CSE	Subject EECS	Catalog Number 549
☐	Course Title (full title) Information Retrieval			Course Title (full title)		
☐	Abbreviated Title (20 char)			Abbreviated Title (20 char)		
☐	Course Description (Please limit to 50 words and attach separate sheet if necessary)					
☐	Full Term Credit Hours Undergraduate Min: Undergraduate Max:	Graduate Min: 3.00 Graduate Max: 3.00		Half Term Credit Hours Undergraduate Min: Undergraduate Max:	Graduate Min: Graduate Max:	
☐	Course Credit Type select one					
☐	Repeatability ☐ Course is Repeatable for Credit Maximum number of repeatable credits:			☐ Course is Y graded ☐ Can be taken more than once in the same term		

Subject: SI Catalog: 650			
☐	Grading Basis ☐ Graded (A – E) ☐ Credit/No Credit ☐ Satisfactory/Unsatisfactory ☐ Pass/Fail ☐ Business Administration Grading ☐ Not for Credit ☐ Not for Degree Credit ☐ Degree Credit Only	Add Consent ☐ Department Consent ☐ Instructor Consent ☐ No Consent	Drop Consent ☐ Department Consent ☐ Instructor Consent ☐ No Consent

	CURRENT LISTING	REQUESTED LISTING
☐	Advisory Prerequisite (254 char)	Advisory Prerequisite (254 char)
☐	Enforced Prerequisite (254 char) Minimum grade requirement:	Enforced Prerequisite (254 char) Minimum grade requirement:
☐	Credit Exclusions	Credit Exclusions
☐	Course Components ☐ Lecture ☐ Seminar ☐ Recitation ☐ Lab ☐ Discussion ☐ Independent Study Graded Component ☐ ☐ ☐ ☐ ☐ ☐	Terms Typically Offered (Please select only one) [blank] or [blank]
Instructor Name:		Instructor Title:

SIGNATURES ARE REQUIRED FROM ALL DEPARTMENTS INVOLVED

Contact Person: Marsha Antal Email: mwhitish Phone: 615.8247

Curriculum Committee: _____ Date: _____

Dept Chair(s):
Home Department: _____ Date: 11/9/11

Cross-Listed Department: _____ Date: 11/11/11

Cross-Listed Department: _____ Date: _____

Cross-Listed Department: _____ Date: _____

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

Form Number 2095
Date 11/17/2011
Effective Term FALL 2012

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

Course Offer Freq ☒ Indefinitely ☐ One term only

A. CURRENT LISTING		B. REQUESTED LISTING	
Home Department	Course Number	Home Department	Course Number
NAVARCH Naval Arch & Marine Engin	580	NAVARCH Naval Arch & Marine Engin	580
Cross Listed Course Information		Cross Listed Course Information	
		Manufacturing	580
Course Title		Course Title	
Optimization, Market Forecasts and Management of Marine		Optimization and Management of Marine Systems	
TITLE ABBREVIATION — Time Sched Max = 19 Spaces	Opt, Mgmt Mar Sys	TITLE ABBREVIATION — Time Sched Max = 19 Spaces	Opt Mgmt Mar Sys
TITLE ABBREVIATION — Transcript Max = 20 Spaces	Opt, Mgmt MS	TITLE ABBREVIATION — Transcript Max = 20 Spaces	OptMgmtMarSys
Course Description		Course Description for Official Publication (Max = 50 words)	
Optimization methods (linear, integer, nonlinear, sequential) concepts and applications in the operations of marine systems. Forecasting methods (ARMA, Fuzzy sets, Neural Nets) concepts and applications to shipping and shipbuilding decisions. Economics of merchant shipbuilding and ship scrapping. Elements of maritime management: risk and utility theory. Deployment opt.		Optimization methods (linear, integer, nonlinear, deterministic and stochastic sequential optimization) concepts and applications in the operations of marine systems. Elements of maritime management. Risk analysis and utility theory. Fleet deployment optimization for major ocean shipping segments. Forecasting concepts and applications to shipping and shipbuilding decisions.	
PROGRAM OUTCOMES: ☐ a ☐ b ☐ c ☐ d ☐ e ☐ f ☐ g ☐ h ☐ i ☐ j ☐ k		PROGRAM OUTCOMES: ☐ a ☐ b ☐ c ☐ d ☐ e ☐ f ☐ g ☐ h ☐ i ☐ j ☐ k	
Degree Requirements: ○ Degree Requirement ○ Core Course ○ Free Elective ○ Tech Elective ○ Other		Degree Requirements: ○ Degree Requirement ○ Core Course ○ Free Elective ○ Tech Elective ○ Other	
Prereq NA 500 ◉ Enforced ○ Advised		Prereq ○ Enforced ○ Advised	
Credit Restrictions		Credit Restrictions	
Level of Credit: ☐ Undergrad only ☐ Rackham Grad ☐ Non-Rckhm Grad ☐ Ugrad or Rckhm Grad ☐ Ugrad or Non-Rckhm Grad ☐ All Credit types ☐ Rckhm Grad w/add'l Work	Credit Hours Min ___ Max ___ Contact Hrs/Wk 4 Number of Wks 14	Level of Credit: ☐ Undergrad only ☒ Rackham Grad ☒ Non-Rckhm Grad ☐ Ugrad or Rckhm Grad ☐ Ugrad or Non-Rckhm Grad ☐ All Credit types ☐ Rckhm Grad w/add'l Work	Credit Hours Min ___ Max ___ Contact Hrs/Wk 3 Number of Wks 14

Repeatability (Indi Research, Dir. Study, Dissertation: Is this course repeatable? ○ Yes ○ No Max Hours? ___ Max Times? ___ Can it be repeated in the same term? ○ Yes ○ No

C.

Class Type(s)
☒ Lec ☐ Sem ☐ Dis ☐ Other ___
☐ Rec ☐ Lab ☐ Ind

Graded Section
☐ Lec ☐ Sem ☐ Dis ☐ Other ___
☐ Rec ☐ Lab ☐ Ind

Grading
☒ A-E
☐ CR/NC
☐ P/F
☐ S/U
Course Is Y Graded ☐

Location
☒ Ann Arbor
☐ Biological Station
☐ Camp Davis
☐ Extension

Cognizant Faculty Member: A.N. Perakis
Title: Assoc. Proffesor

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

Approval Info | **Approved by Name** | **Approved Date**

- ☐ Curriculum Comm. ___ ___
- ☐ Faculty ___ ___
- ☐ Cross listed Unit 1 ___ ___
- ☐ Cross listed Unit 2 ___ ___

Submitted By: ☒ Home Dept. ☐ Cross-listed Dept.

	Department Chair Name	Chair Signature
Home Dept.	NA&ME	
Cross-listed Dept(s).	PIM Panos Papalambros	

Form Number

2095

SUPPORTING STATEMENT

This course was changed from a 4 credit to a 3 credit course due to several hours of material now being covered in the new course NA 585 (3). We also drop the prerequisite NA 500 which was discontinued, and most of whose content was not needed for NA580 specifically anyway.

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

Detail the Special requirements

NA 580(3))/MFG 578 (3), Winter 2012
Optimization and Management of Marine Systems

Objectives: Primarily offered to NA&ME Masters and Ph.D. students in Marine Systems Management. Also offered to students of the Program in Manufacturing. Also appropriate for, and has been taken in the past by, graduate students in I.O.E., Mech. Eng., Civil Eng., Automotive Engineering, and other departments and programs. The course aims to acquaint the student with the principles and the application of several optimization methods, decision analysis theory under uncertainty, international trade and barriers to trade, maritime logistics, economics and forecasting, in formulating and solving relevant problems.

Brief Description: Optimization methods (linear, nonlinear, sequential, probabilistic) concepts and application in the operations of marine and intermodal systems. Risk analysis, utility theory. Fleet operations optimization and fleet deployment for various major segments of ocean shipping, using linear, nonlinear, and sequential optimization techniques. Dynamic programming, applications in transportation and optimal replacement analysis. Maritime forecasting, applications to shipping and shipbuilding decisions, and its shortcomings.

Course Syllabus , No. of 1 hour Lectures

1.	Introduction, mechanics, the marine industry (overview)	3
2.	Formulation of optim. Problems, marine examples	4
3.	Calculus-based solution of optimization problems, marine applications	5
4.	Bulker and tanker fleet deployment optimization	4
5.	Management attitudes toward risk, utility theory, marine applications	7
6.	Linear programming and applications; optimal liner fleet deployment	5
7.	Dynamic programming, theory and several marine applications	8
8.	A rational, 8-step Marine forecasting procedure; problems, case studies	4
	Midterm Exam	2
	Final Exam	2
	Total	44

Recommended Textbooks:

1. "Maritime Economics", by Martin Stopford, Third Edition, Routeledge, publisher, excellent for reference purposes also.
2. "The Handbook of maritime Economics and Business", edited by C. Th. Grammenos, Lloyd's List, publisher, 2010

Additional Material will be posted at the NA580 ctools site or will be distributed in class, free of charge.

Office Hours: TBA

Homeworks: Six problem-solving homeworks planned. Several reading assignments as well. Additionally, case studies with applications will be discussed.

Exams: (tentative) Two exams planned, one two-hour midterm and one final.

Grades:		
	Homeworks	20%
	Exam 1	30%
	Exam 2 (Final)	40%
	Class Discussion Participation	10%

For more information: Contact Professor A.N. Perakis, Rm. 213, NA&ME; Phone: 764-3723; Or e-mail: tassos@engin.umich.edu .