

0662

# Curriculum Proposal

Please type or select the requested information. Print completed forms, add appropriate paper attachments, and route through MSU's curricular process for recommendations and decisions.

		(Check all that apply):		Proposal # <u>215</u>
College:	<u>Science, Engineering and Technology</u>	<input checked="" type="checkbox"/> Undergraduate	Effective Date of Change:	
Department:	<u>Mechanical Engineering</u>	<input checked="" type="checkbox"/> Graduate	Academic Year <u>05-06</u>	
Program:	<u>Mechanical Engineering</u>	CIP # _____	(For Office Use Only)	
Type of Change	<u>COURSE PROPOSALS</u>			Course Designator    Number of and Number                    Credits
Proposed:	<u>New Course</u>			
Title Current:	_____			_____
Title Proposed:	<u>Mechanics of Composite Materials</u>			<u>ME 422/522</u> <u>3</u>
24-Char. Abbrev:	<u>Mech. composites mat'ls</u>			(if applicable)

Include a course or program description for the Bulletin (30-40 words maximum for courses, 100 for programs):

Introduce anisotropic mechanics theories, engineering application of various composite materials, mechanical behaviors and fabrication of composites, experimental and theoretical approach for composite designs, contemporary issues such as nano/microcomposites. Prerequisite: ME 223

Rationale or Justification for change:

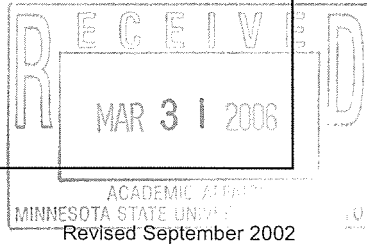
It will be an important senior elective/graduate course that adds the breadth in solid mechanics area for mechanical engineering electives. It will provide knowledge and experience of advanced materials. ME 491/591 is currently offered as in-service course and a total of 25 senior/graduate students are taking it.

**\*\*\*For General Education or Cultural Diversity Courses Only\*\*\***

<b>General Education Course:</b>		<b>Cultural Diversity Course:</b> (Please check one.) <input type="checkbox"/> Core (At least 75% devoted to topics of race, gender, sexual orientation, age, class, and disabilities as they occur in United States Society.) <input type="checkbox"/> Related (At least 25% devoted to the above topics or to a global perspective on topics related to African American, Asian, Hispanic, and Native American inhabitants of the United States.)
GE Category #	GE Category Name (Maximum of 3 Categories)	
<u>N/A</u>	_____	
<u>N/A</u>	_____	
<u>N/A</u>	_____	
? For Writing Intensive Courses, attach a description of the kind and quantity of writing. ? For Upper Division Courses, include a description of the respects in which it is broad and general rather than narrow and specific, and so suitable as GE.		
Attach paper copies of the following:		
a. Syllabus or course outline.		
b. Course's student learning outcomes associated with each GE competency or CD designation.		
c. List of strategies to be used to assess students' achievement of each GE competency or CD designation.		

**\*\*\*For New Courses\*\*\***

(Check all that apply):	Instructional Type: <u>Lecture/Lab</u>	Course will be offered:
<input checked="" type="checkbox"/> Course is an elective.	Grading Format: <input checked="" type="checkbox"/> Grade <input type="checkbox"/> P/N	<input type="checkbox"/> Fall Semester
<input type="checkbox"/> Course is required for program	_____	<input type="checkbox"/> Spring Semester
<input checked="" type="checkbox"/> Pre- or Co-requisites:	Prerequisite: <u>ME 223</u>	<input type="checkbox"/> Summer Session
<input type="checkbox"/> Other courses are being changed or eliminated. (Explain.) _____		
<input type="checkbox"/> Course content or title is similar to courses in other departments. (Attach copy of letter of agreement with other program(s) contacted. Indicate the nature of the discussions and/or resolution of differences or potential conflicts.)		
Attach paper copies of the following:		
a. Syllabus or course outline.		
b. Course's student learning outcomes.		
c. A list of resources required to offer and support this course.		
d. A description of how teaching this course will affect department staffing.		
e. If 400/500 level course, an explanation of added expectations of graduate students.		





Minnesota State University, Mankato  
Curriculum Proposal

\*\*\*Signature Page\*\*\*

**Department**

Recommended (Category/ies \_\_\_\_\_)  
 Not Recommended (Category/ies \_\_\_\_\_)

Saeed Moora 3/20/06  
Department Chair Date

Comments:

**College Curriculum Committee**

Recommended (Category/ies \_\_\_\_\_)  
 Not Recommended (Category/ies \_\_\_\_\_)

Alan Mahoney 3-28-06  
Committee Chair Date

Comments:

**College Dean**

Recommended (Category/ies \_\_\_\_\_)  
 Not Recommended (Category/ies \_\_\_\_\_)

[Signature] 3/28/06  
Dean Date

Comments:

**General Education Subcommittee**

Recommended (Category/ies \_\_\_\_\_)  
 Not Recommended (Category/ies \_\_\_\_\_)

\_\_\_\_\_  
General Education Subcommittee Chair Date

Comments:

**Undergraduate Curriculum and Academic Policy Committee**

Recommended (Category/ies \_\_\_\_\_)  
 Not Recommended (Category/ies \_\_\_\_\_)

Mark Tomije 4/28/06  
UCAP Faculty Chair Date

Comments:

**Faculty Association Graduate Committee**

Recommended  
 Not Recommended

\_\_\_\_\_  
Faculty Association Graduate Chair Date

Comments:

**Graduate Dean**

Recommended  
 Not Recommended

\_\_\_\_\_  
Graduate Dean Date

Comments:

**Academic Affairs Council**

Recommended (Category/ies \_\_\_\_\_)  
 Not Recommended (Category/ies \_\_\_\_\_)

[Signature] 5/4/06  
Assistant Vice President Date

Comments:

**Senior Vice President and Vice President for Academic Affairs**

Approved (Category/ies \_\_\_\_\_)  
 Not Approved (Category/ies \_\_\_\_\_)

[Signature] 5/4/06  
Sr. Vice President / Vice Pres. Academic Affairs Date

Comments:

## ME 422/522 MECHANICS OF COMPOSITE MATERIALS

### a. SYLLABUS

**Textbook:** Fiber Reinforced Composites Materials, Manufacturing and Design, 2<sup>nd</sup> edition, Revised and Expanded, Mallick, ISBN: 0824790316, Marcel Dekker, New York

**Prerequisites:** ME 223

**Course Objectives:** The course objectives include:

- To introduce the various composites and their applications
- To introduce modern composites (micro/nanocomposites)
- To practice the theories, experiments and fabrication of composite materials
- To increase ability to design and analyze structures and elements by using composites

**Course Coverage:** This course will cover four major parts of composites:

1. Introduction and application of composite materials 20%
2. Theoretical study 40%
3. Experiments 20%
4. Fabrication 20%

### Course Contents:

This course consists of three 1 hour lectures per week. Lab. sessions will be added for experimental testing, fabrication and team design/research projects. The lecture topics are listed in the table below.

Week	Topics
1	Course introduction Introduction of composites
2	Various composite materials
3	Applications of composite materials
4	Composite constituents I
5	Composite constituents II
6	Mechanics of composite laminas
7	Mechanics of composite laminates
8	Composite structures
9	Composites design, Failure criteria
10	Product design using composites
11	Mechanical testing I
12	Mechanical testing II
13	Fabrication of nano/microcomposites I
14	Fabrication of nano/microcomposites II
15	Introduction to MMC and CMC

**Description:** To prepare the students for a career in engineering with the following emphasis in mechanical; introduce anisotropic mechanics theories, engineering application of various composite materials, mechanical behaviors and fabrication of composites; experimental and theoretical approach for composite designs; contemporary issues such as nano/microcomposites.

**Grading:**

Mid-term	20%
Final exam	20%
Homework	30%
Lab. report	10%
Team project	20%

**b. PROGRAM OUTCOMES**

This course addresses the following ABET learning outcomes.

1. an ability to communicate effectively
2. an ability to apply knowledge of mathematics, science, and engineering
3. an ability to design a system, component, or process to meet desired needs
4. an ability to identify, formulate, and solve engineering problems
5. an ability to use the techniques, skills and modern engineering tools necessary for engineering practice
6. a knowledge of contemporary issue
7. a knowledge of time budgeting and management

**c. RESOURCES REQUIRED TO OFFER AND SUPPORT THIS COURSE**

No new resources are required to offer and support this course.

**d. IMPACT ON STAFFING IN THE DEPARTMENT**

There's no impact on the department staffing.

**e. DIFFERENT ASPECT IN 500 LEVEL**

For graduate students in the course, the following aspect will be added.

- more depth in theories
- more problems in exams and homework
- more analytical and experimental projects
- additional problems in the design project

Department of Mechanical & Civil Engineering  
Minutes of Meeting  
March 9, 2006

The meeting began at 10:00 a.m. Present were: J. Wilde, V. Nikolic, S. Moaveni, T. Hause, V. Browne, J. Park, C. Johnson, A. Budge, K. Chou, P. Tebbe. The meeting covered agenda items from an announcement earlier by S. Moaveni.

0. The minutes of February 2, 2006 were approved for issue.
1. Advising Sheets: The advising schedule sheets were distributed to department faculty by S. Moaveni. They begin March 22.
2. Updates were given on the ASME Student Conference and the ASCE Steel Bridge Competition. J. Park reported that 11 students went to Missouri-Rolla for the ASME Competition. Among other awards, the MSU Student Chapter got the Ingersoll-Rand Award, which covers a number of activities. They placed 3<sup>rd</sup> out of 40 teams in this category. K. Chou reported that 13 students and faculty attended the ASCE Steel Bridge Competition. MSU placed 6<sup>th</sup> overall out of nine schools.
3. Dr. Frey went over the plans for an upper-level above the Structures Lab and existing computer room. He requested feedback on the plan the week after spring break. A committee was formed, including K. Chou, J. Wilde, A. Budge, V. Browne, and C. Johnson to look over the plan and give feedback. J. Wilde will head the committee.
- \* 4. Civil Engineering Program Re-design and Composite Materials Course Proposals: K. Chou gave a handout regarding the proposal to drop the EE 230 as a required course and change it to an elective and to add CIVE 380, Environmental Engineering as a required course. The department approved.

J. Park handed out information regarding a proposed ME 422/522, Mechanics of Composite Materials course. This included course content, program outcomes, catalog description, etc. The department approved this course.

5. Faculty Search Update: P. Tebbe reported that he has 38 applications so far for the fixed-term position. The applications will be reviewed starting March 20.
6. Graduate Brochure: P. Tebbe had provided to department members via email the brochure. He asked that each department member double-check the information regarding themselves and, make corrections if needed.
7. Department Chair Nomination Procedure: V. Browne handed out a proposed procedure for the department to follow in electing a new department chair. This procedure included target dates for nominations and election this spring. The department approved the procedure for this election as well as for a standing department procedure.
8. Repeat Course Policy and Academic Advising: K. Chou recommended that the department accept the new university repeat course policy if it is approved. It will go into affect August 2007 and allows three repeats of any course. The department agreed to this.

K. Chou also raised the issue of academic advising for students who have been accepted in to the program, but are then placed on academic probation. S. Moaveni requested K. Chou prepare a statement on this item based on her proposal.

9. Other: There were no other items.

The meeting was adjourned at 10:50 a.m.

Respectfully submitted,

Vance Browne