

New Course Request

Indiana University

Indianapolis Campus

Check Appropriate Boxes:

Undergraduate credit

Graduate credit

Professional credit

1. School/Division School of Engineering and Technology 2. Academic Subject Code MET
 3. Course Number 34800 (must be cleared with University Enrollment Services) 4. Instructor Rongrong Chen
 5. Course Title Engineering Materials

Recommended Abbreviation (Optional) MET
 (Limited to 32 Characters including spaces)

6. First time this course is to be offered (Semester/Year): Fall/2009

7. Credit Hours: Fixed at 4 or Variable from _____ to _____

8. Is this course to be graded S-F (only)? Yes _____ No

9. Is variable title approval being requested? Yes No

10. Course description (not to exceed 50 words) for Bulletin publication: MET 348 Engineering Materials (4) Class: 3. Lab: 1. P: Chem-C101 and Chem-C121 C: None.

An overview of structures, properties and applications of metals, polymers, ceramics, and composite materials is presented. Problem-solving skills are developed in material selection, evaluation, measurement, and testing. Laboratory activities include testing various properties of different materials, and selection of materials for engineering applications.

11. Lecture Contact Hours: Fixed at 3 or Variable from _____ to _____

12. Non-Lecture Contact Hours: Fixed at 2 or Variable from _____ to _____

13. Estimated enrollment: 25 of which 0 percent are expected to be graduate students.

14. Frequency of scheduling: yearly Will this course be required for majors? yes

15. Justification for new course: Combining current MET 141 and MET 344 to one course

16. Are the necessary reading materials currently available in the appropriate library? Yes

17. Please append a complete outline of the proposed course, and indicate instructor (if known), textbooks, and other materials.

18. If this course overlaps with existing courses, please explain with which courses it overlaps and whether this overlap is necessary, desirable, or unimportant.

19. A copy of every new course proposal must be submitted to departments, schools, or divisions in which there may be overlap of the new course with existing courses or areas of strong concern, with instructions that they send comments directly to the originating Curriculum Committee. Please append a list of departments, schools, or divisions thus consulted.

Submitted by:

[Signature]
 Department Chairman/Division Director

Date 9-29-09

Approved by:

[Signature]
 Dean Date 9-29-09

 Date _____
 Dean of Graduate School (when required)

 Date _____
 Chancellor/Vice-President

 Date _____
 University Enrollment Services

After School/Division approval, forward the last copy (without attachments) to University Enrollment Services for initial processing, and the remaining four copies and attachments to the Campus Chancellor or Vice-President.

MET 348 Engineering Materials

Syllabus Fall, 2009

1. Instructor:

Dr. Rongrong Chen

- Office: ET 209
- Telephone: 274-4280
- E-mail: rochen@iupui.edu
- Office Hours: Tuesday 9:30 – 11:30 am

2. Textbook:

- “Engineering Materials Properties and Selection,” 9th edition, Kenneth G. Budinski and Michael K. Budinski

Reference:

- “Introduction to Materials Science for Engineers,” 7th edition, James F. Shackelford,
- “Foundations of Materials Science and Engineering,” 4th Edition, William F. Smith and Javad Hashemi

3. Prerequisites: Chem-C 101 and Chem-C 121

4. Course Description:

MET 348 Engineering Materials (4) Class: 3. Lab: 1. P: Chem-C101 and Chem-C121 C: None. An overview of structures, properties and applications of metals, polymers, ceramics, and composite materials is presented. Problem-solving skills are developed in material selection, evaluation, measurement, and testing. Laboratory activities include testing various properties of different materials, and the selection of materials for engineering applications.

5. Course Objectives:

- Students will gain an understanding of how the elements are the building blocks for engineering materials and how engineering materials, such as metals, polymers, ceramics, and composites are related in origin and structural characteristics.
- Through hands-on experimental activities, students will explore and test different physical, chemical and mechanical properties of various types of engineering materials.
- Students will learn how polymerized organic materials form engineering materials, what the differences are between polymer families, how

thermoplastic and thermoset plastics and polymer composites are shaped into parts.

- Students will understand of how steels are made, how cold/heat treatment and alloy additions alter steel properties. Other metals, such as Cu, Al, Ni, Zn, Ti and their alloys will be studied to understand how alloy composition, metallurgy affect mechanical, physical/chemical properties, .
- Students will learn application of nano-materials for real-world technical and engineering applications and methods to fabricate nano-materials.
- Students will learn basic selection criteria used for engineering materials during the design/production stages of a product.

6. Course Meeting Time and Location:

Lecture: Mon. and Wed.	2:00 – 3:15 pm,	Room: ET 121
Lab: Mon. or Wed.	4:00 – 5:50 pm,	Room: ET 125

7. Teaching Assistant:

TBD

8. Attendance and Expectations:

Attendances in class and laboratory sessions are expected. Material covered in class will follow the book closely in some chapters, and will deviate from it in others. **Students who missed classes are responsible for the material covered and the homework assigned.**

Correct behavior in class is expected. Making noise, talking, sending or reading text message on your cell phone, having your cell phone make noises, leaving early or arriving late can be very distracting to everyone. Students who are disruptive to the class will be asked to leave the room. In the case that you will arrive late or leave early, please minimize class disruption.

9. Grading:

The course grade is based on numerical scores including homework, lab reports, quizzes, exams, group problems and a cumulative final according to the following point system:

Homework	20 points each
Quiz	10 points each
Exam I	100 points
Exam II	100 points
Exam III	100 points
Lab reports	20 points each
Final	200 points

Bonus points will be given for research reports related to each lectures or lab experiments. One report for one topic will be accepted every week. Each report

will be graded up to 10 bonus points. If a presentation of the research work is given, up to 10-extra points will be given.

10. Grading Scale:

Letter grade	Accumulated point
A	900-1000
B	800-899
C	700-799
D	600-699
F	599 and below

11. Make-up Exam Policy:

No make-up exams will be given without an excused absence supported by a written notice.

12. Assignments:

Homework assignments constitute a major part of this course. In addition to your performance in tests, you can demonstrate your technical abilities through the way you present solutions to homework problems. Therefore, it is important that your solutions be correct and your presentation of the solutions be complete. The following is a list of the minimum requirements:

- Late assignments will be accepted but there is a penalty of 5 % for each late date.
- An 8.5 by 11 in standard size paper must be used for all assignments, including the figures. Computer printouts must be cut to 8.5 by 11 in size.
- Assignment sheet(s) should be attached to the front.
- If graphs are required, an appropriate scale should be used for each graph, and an accurate plot of functions should be provided. Graphs should contain titles, axis labels, legends and units.

13. Honest Policy:

All students are expected to be honest in all work submitted and exams taken in this course and all others. You are reminded of the statements made regarding cheating in the IUPUI "Student Rights and Responsibilities" booklet. Such academic misconduct will be handled according to the guidelines in that booklet. Penalties for such misconduct include lowering of a student's grade as well as disenrollment from school. The following quote from the booklet is important to note: "It is the responsibility of the student not only abstain from cheating but, in addition, to guard against making it possible for others to cheat. Any student who helps another student to cheat is as guilty of cheating as the student he/she assists." All lab reports and HW assignments must reflect student's individual effort.

14. Draft of Course Outline: Topics are subject to change (see next page)

10 lab sections will be conducted. A draft of lecture sections is as following.

Lecture Schedule

Date	Topics	Homework Assignment
8/26	Introduction to the course - Objectives of the course - What are going to teach - Expectations for lab and lecture	
8/31	Chapter I- Engineering Materials (EMs)	
9/2	Chapter 2 – Nature and Formation of EMs	HW#1
9/9	Chapter 3 – Chemical and Physical Properties of EMs	
9/14	Chapter 4 – Mechanical Properties of EMs	HW#2
9/16	Chapter 5 – Tribology in EMs	
9/21	Chapter 6 –Corrosion in EMs	HW#3
9/23	Review Chap. 1-6	
9/28	Exam #1	
9/30	Chapter 7 –Principles of Polymeric Materials	HW#4
10/5	Chapter 8 – Polymer Families	
10/7	Chapter 9 – Polymer Fabrication Processes	HW#5
10/12	Chapter 10 – Selection of Polymeric Materails	
10/14	Review Chap. 7-10	
10/19	Exam #2	
10/21	Chapter 11 - Ceramics	HW#6
10/26	Chapter 12 - Steels	
10/28	Chapter 13 – Heat Treatment of Steels	HW#7
11/2	Chapter 14 &15 &16– Carbon and Alloy Steels	
11/4	Chapter 17 –Cast Iron	HW#8
11/9	Chapter 18 Copper and Its Alloys	
11/11	Review Chap. 11-18	
11/16	Exam #3	
11/18	Chapter 19- Aluminum and Its Alloys	
11/23	Chapter 20- Other Alloys	HW#9
11/30	Chapter 21 – Surface Engineering	
12/2	Chapter 22 -Nanomaterials	HW#10
12/7	Chapter 23 – Material Selection	
12/9	Review Chap. 19-23	
12/14	No class	
Final Exam	TBD	

PURDUE SCHOOL OF ENGINEERING & TECHNOLOGY COURSE OUTCOMES AND ASSESSMENT DATA SHEET

This is an internal document to identify and record expected outcomes and anticipated assessment strategies for all courses taught within the School of Engineering and Technology. Submission of this form, as noted below, is required and must accompany all new course and course change requests. Copies of this form should also be retained within the department and kept on file with the outline or syllabus for each course.

Course Number: MET 348 Course Title: Engineering Materials

Procedure:

1. First, identify all instructional outcomes expected for this course, and then select all ABET outcomes which are consistent with those anticipated objectives from TABLE 1 below.

TABLE 1 - ABET OUTCOMES

#		TECHNOLOGY - TAC Criteria #1 (Proposed)
1	a	Demonstrate an appropriate mastery of the knowledge, techniques, skills and modern tools of their discipline.
2	b	Apply current knowledge and adapt to emerging applications in mathematics, science, engineering and technology.
3	c	Conduct, analyze and interpret experiments and apply experimental results to improve processes.
4	d	Apply creativity in the design of systems, components or processes appropriate to program objectives.
5	e	Function effectively on teams.
6	f	Identify, analyze and solve technical problems.
7	g	Communicate effectively.
8	h	Recognize the need for and possess the ability to pursue lifelong learning.
9	i	Understand professional, ethical and societal responsibilities.
10	j	Recognize contemporary professional, societal and global issues and be aware of and respect diversity.
11	k	Have a commitment to quality, timeliness and continuous improvement.

2. Subsets for each of the six IUPUI Principles of Undergraduate Learning (PUL) are given on the reverse side in TABLE 2. Using a number corresponding to each ABET outcome identified from TABLE 1 above to select a column, place a "√" or "X" mark in the applicable TABLE 2 row(s) cell for each PUL. Courses will often address multiple ABET outcomes and ABET outcomes frequently will overlap more than one PUL subset. Thus, it is expected completed data sheets may contain marks in several cells thereby indicating the course simultaneously satisfies multiple Principles of Undergraduate Learning while fulfilling its intended ABET objective(s).

3. After completing TABLE 2, briefly define or explain how the course outcomes or objectives will be evaluated within the context of the departmental assessment program in the space below:

Students will gain understandings of structures, properties, processing and applications of different types of engineering materials, measured in individual work, team work, exams, and Lab reports.

Submitted by: Rongrong Chen Date: 2/18/09

TABLE 2 - MATRIX OF EXPECTED COURSE OUTCOMES

(Suggestion - while completing Table 2, place a copy of the ABET outcomes from Table 1 along side for easy cross referencing.)

PRINCIPLES OF UNDERGRADUATE LEARNING - "Require All Students to Demonstrate An Ability to:"	TECHNOLOGY OUTCOMES - TAC CRITERIA #1: items (a) to (k)										
	a	b	c	d	e	f	g	h	i	j	k
1(a) - Express ideas and facts effectively in written formats							X				
1(b) - Comprehend, interpret, and analyze texts			X								
1(c) - Communicate orally in one-on-one and group settings					X		X				
1(d) - Solve problems that are quantitative in nature	X					X					
1(e) - Make efficient use of information resources and technology for personal and professional needs	X										
2(a) - Analyze complex issues and make informed decisions			X			X					
2(b) - Synthesize information in order to arrive at reasoned conclusions			X			X					
2(c) - Evaluate the logic, validity, and relevance of data			X			X					
2(d) - Solve challenging problems		X									
2(e) - Use knowledge and understanding to generate and explore new questions		X									
3(a) - Apply knowledge to enhance personal lives											
3(b) - Apply knowledge to meet professional standards and competencies											
3(c) - Apply knowledge to further the goals of society											
4(a) - Demonstrate substantial knowledge and understanding of at least one field of study											
4(b) - Compare and contrast approaches to knowledge in different disciplines											
4(c) - Modify their approach to an issue or problem based on the contexts and requirements of particular situations											
5(a) - Compare and contrast the range of diversity and universality in human history, societies, and ways of life											
5(b) - Analyze and understand the interconnectedness of global and local concerns											
5(c) - Operate with civility in a complex social world											
6(a) - Make informed and principled choices regarding conflicting situations in their personal and public lives and to foresee the consequences of these choices											
6(b) - Recognize the importance of aesthetics in their personal lives and to society											

PURDUE UNIVERSITY
REQUEST FOR ADDITION, EXPIRATION,
OR REVISION OF AN UNDERGRADUATE COURSE
(100-400 LEVEL)

DEPARTMENT Engineering and Technology EFFECTIVE SESSION Fall 2009

INSTRUCTIONS: Please check the items below which describe the purpose of this request.

<input checked="" type="checkbox"/> 1. New course with supporting documents	<input type="checkbox"/> 7. Change in course attributes (department head signature only)
<input type="checkbox"/> 2. Add existing course offered at another campus	<input type="checkbox"/> 8. Change in instructional hours
<input type="checkbox"/> 3. Expiration of a course	<input type="checkbox"/> 9. Change in course description
<input type="checkbox"/> 4. Change in course number	<input type="checkbox"/> 10. Change in course requisites
<input type="checkbox"/> 5. Change in course title	<input type="checkbox"/> 11. Change in semesters offered (department head signature only)
<input type="checkbox"/> 6. Change in course credit/type	<input type="checkbox"/> 12. Transfer from one department to another

PROPOSED:		EXISTING:		TERMS OFFERED Check All That Apply:		
Subject Abbreviation	<u>MET</u>	Subject Abbreviation		<input type="checkbox"/> Summer	<input checked="" type="checkbox"/> Fall	<input checked="" type="checkbox"/> Spring
Course Number	<u>348</u>	Course Number		CAMPUS(ES) INVOLVED		
Long Title	<u>Engineering Materials</u>			<input type="checkbox"/> Calumet	<input type="checkbox"/> N. Central	
Short Title	<u>Engineering Materials</u>			<input type="checkbox"/> Cont Ed	<input type="checkbox"/> Tech Statewide	
Abbreviated title will be entered by the Office of the Registrar if omitted. (22 CHARACTERS ONLY)				<input type="checkbox"/> Ft. Wayne	<input type="checkbox"/> W. Lafayette	
				<input checked="" type="checkbox"/> Indianapolis		

CREDIT TYPE		COURSE ATTRIBUTES: Check All That Apply			
1. Fixed Credit: Cr. Hrs.	<u>4</u>	1. Pass/Not Pass Only	<input type="checkbox"/>	7. Registration Approval Type	
2. Variable Credit Range:		2. Satisfactory/Unsatisfactory Only	<input type="checkbox"/>	Department	<input checked="" type="checkbox"/>
Minimum Cr. Hrs		3. Repeatable	<input type="checkbox"/>	Instructor	<input type="checkbox"/>
(Check One) To <input type="checkbox"/>	Or <input type="checkbox"/>	Maximum Repeatable Credit:	<input type="checkbox"/>	8. Variable Title	<input type="checkbox"/>
Maximum Cr. Hrs		4. Credit by Examination	<input type="checkbox"/>	9. Remedial	<input type="checkbox"/>
3. Equivalent Credit: Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	5. Designator Required	<input type="checkbox"/>	10. Honors	<input type="checkbox"/>
4. Thesis Credit: Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	6. Special Fees	<input type="checkbox"/>	11. Full Time Privilege	<input type="checkbox"/>
				12. Off Campus Experience	<input type="checkbox"/>

Instructional Type	Minutes Per Mig	Meetings Per Week	Weeks Offered	% of Credit Allocated	Delivery Method (Asyn. Or Syn.)	Delivery Medium (Audio, Internet, Live, Text-Based, Video)	Cross-Listed Courses
Lecture	75	2	15	75			
Recitation							
Presentation							
Laboratory	110	1	15	25			
Lab Prep							
Studio							
Distance							
Clinic							
Experiential							
Research							
Ind. Study							
Pract/Observ							

COURSE DESCRIPTION (INCLUDE REQUISITES):
MET 348 Engineering Materials (4) Class: 3. Lab: 1. P: Chem-C101 and Chem-C121 C: None. An overview of structures, properties and applications of metals, polymers, ceramics, and composite materials is presented. Problem-solving skills are developed in material selection, evaluation, measurement, and testing. Laboratory activities include testing various properties of different materials, and the selection of materials for engineering applications.

Date	Calumet School Dean	Date	
Fort Wayne Department Head	Date	Fort Wayne School Dean	Date
<i>[Signature]</i>	9-29-09	<i>[Signature]</i>	9-28-09
Indianapolis Department Head	Date	Indianapolis School Dean	Date
North Central Department Head	Date	North Central Chancellor	Date
West Lafayette Department Head	Date	West Lafayette College/School Dean	Date
		West Lafayette Registrar	Date