EFD 47-07

Print Form

Office of the Registrar
FORM 40 REV. 7/08

PURDUE UNIVERSITY

REQUEST FOR ADDITION, EXPIRATION,
OR REVISION OF AN UNDERGRADUATE COURSE
(10000-40000 LEVEL)

DEPARTMENT Materials Engineering

EFFECTIVE SESSION Spring 2009

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

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

PROPOSED:		EXISTING:	
Subject Abbreviation	MSE	Subject Abbreviation	
Course Number	445	Course Number	
Long Title	Materials Engineering Systems Analysis and Design		
Short Title	~~Mat Eng Sys ana & desg~~ Matls Engr Sys Anlys & Design		

Abbreviated title will be entered by the Office of the Registrar if omitted. (30 CHARACTERS ONLY)

TERMS OFFERED
Check All That Apply:
[ ] Summer [X] Fall [ ] Spring

CAMPUS(ES) INVOLVED
[ ] Calumet [ ] N. Central
[ ] Cont Ed [ ] Tech Statewide
[ ] Ft. Wayne [X] W. Lafayette
[ ] Indianapolis

CREDIT TYPE
1. Fixed Credit: Cr. Hrs. 3
2. Variable Credit Range: Minimum Cr. Hrs ____ (Check One) To [ ] Or [ ] Maximum Cr. Hrs. ____
3. Equivalent Credit: Yes [ ] No [ ]

COURSE ATTRIBUTES: Check All That Apply
1. Pass/Not Pass Only [ ]
2. Satisfactory/Unsatisfactory Only [ ]
3. Repeatable [ ] Maximum Repeatable Credit: [ ]
4. Credit by Examination [ ]
5. Special Fees [ ]
6. Registration Approval Type Department [ ] Instructor [ ]
7. Variable Title [ ]
8. Honors [ ]
9. Full Time Privilege [ ]
10. Off Campus Experience [ ]

ScheduleType	Minutes Per Mtg	Meetings Per Week	Weeks Offered	% of Credit Allocated
Lecture	50	3	16	100
Recitation				
Presentation				
Laboratory				
Lab Prep				
Studio				
Distance				
Clinic				
Experiential				
Research				
Ind. Study				
Pract/Observ				

Cross-Listed Courses

COURSE DESCRIPTION (INCLUDE REQUISITES/RESTRICTIONS):

Integration of materials engineering core coursework with statistical, economic and environmental considerations for analysis and design of systems. Analysis of primary materials processing operations using mathematical and statistical models for predicting interactive effects and process optimization. Specification of materials and processes for mechanical designs, incorporating properties assessment and tradeoffs, cost analysis, and performance optimization with multiple constraints.

Calumet Department Head	Date	Calumet School Dean	Date
Fort Wayne Department Head	Date	Fort Wayne School Dean	Date
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 12/19/08 Date

OFFICE OF THE REGISTRAR

12/19/08

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(Check One) To [ ] Or [ ]
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COURSE ATTRIBUTES: Check All That Apply

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3. Repeatable [ ]
Maximum Repeatable Credit: [ ]
4. Credit by Examination [ ]
5. Special Fees [ ]
6. Registration Approval Type
Department [ ] Instructor [ ]
7. Variable Title [ ]
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Calumet Department Head — Date — Calumet School Dean — Date

Fort Wayne Department Head — Date — Fort Wayne School Dean — Date

Indianapolis Department Head — Date — Indianapolis School Dean — Date

Central Department Head — Date — North Central Chancellor — Date

West Lafayette Department Head — Date — West Lafayette College/School Dean — Date — West Lafayette Registrar — Date

OFFICE OF THE REGISTRAR

Engineering Faculty Document No. 47-07
April 17, 2008

TO: The Engineering Faculty

FROM: The Faculty of the School of Materials Engineering

DATE: March 1, 2008

RE: New Undergraduate Course, MSE 445

The faculty of the School of Materials Engineering have approved the following new course. This action is now submitted to the Engineering Faculty with a recommendation for approval.

MSE 445 **Materials Engineering Systems Analysis and Design**
Sem. 1. Class 3, Cr. 3.
Prerequisites: MSE 330 and MSE 340; Co-requisites: MSE 430 or consent of instructor.

Description: Integration of materials engineering core coursework with statistical, economic and environmental considerations for analysis and design of systems. Analysis of primary materials processing operations using mathematical and statistical models for predicting interactive effects and process optimization. Specification of materials and processes for mechanical designs, incorporating properties assessment and tradeoffs, cost analysis, and performance optimization with multiple constraints.

Reason: This class is currently (Spring 2008) offered as MSE 497C with an enrollment of 17 students. The updated School of Materials Engineering curriculum (EFD 50-07) will make this a required course for students entering MSE. The course content is new and reflects an emphasis on integrating topics from several core courses simultaneously in a systems approach.

Keith J. Bowman, Professor and Head
School of Materials Engineering

APPROVED FOR THE FACULTY
OF THE SCHOOLS OF ENGINEERING
BY THE ENGINEERING
CURRICULUM COMMITTEE

ECC Minutes #6

Date 10-8-08

Chairman ECC RJCipra

MSE 445
Materials Engineering Systems Analysis and Design
Instructor: Professors M. J.M. Krane, krane@purdue.edu, ARMS 2231, 494-4107
K. Trumble, driscol@ecn.purdue.edu, ARMS 2333, 494-4114

Course Description: Integration of Materials Engineering core coursework with statistical, economic and environmental considerations for analysis and design of systems. Analysis of primary materials processing operations using mathematical and statistical models for predicting interactive effects and process optimization. Specification of materials and processes for mechanical designs, incorporating properties assessment and tradeoffs, cost analysis, and performance optimization with multiple constraints.

Prerequisites: MSE 330 and MSE 340; Co-requisites: MSE 430 or consent of instructor.

Goals: Most of the core MSE courses focus on individual aspects of materials structure, properties, or processing. The goal of this course is to integrate these elements of the field, together with other constraints of practice (economic, environmental, etc.), to quantitatively analyze and design engineering systems.

Objectives:
After completing the course, students will be able to:

- Use models based on core Materials Engineering topics to describe and simulate industrial processes.
- Apply concepts of engineering cost analysis to process models to minimize cost and evaluate impact of process changes.
- Describe the behavior of commercial processes using statistical process control charts.
- Assess material properties data and the impact of uncertainty in performance predictions.
- Select materials for specific applications involving multiple property constraints and trade-offs.
- Specify the materials and processing to optimize engineering components and systems for cost and performance.

Text(s):
Materials Selection in Mechanical Design, 3rd Edition, M. F. Ashby, Elsevier (2005).

The Iron Blast Furnace: Theory and Practice, J. G. Peacey and W. G. Davenport, Pergamon (1979). (This text reflects the choice of the blast furnace as the current example process. In different years, other processes will be featured and appropriate reading material will be selected.)

Assessment: Design Projects (50%), Homework (30%), Two Exams (20%)

Weekly syllabus:

Week 1:	Introduction
Week 2-3:	Materials production process modeling
Weeks 4-5:	Statistical process control
Week 6-7:	Introduction to engineering economics
Week 8-10:	Materials properties in design
Week 11-13:	Materials and processing specifications
Week 14-15:	Optimization