




UNIVERSITY OF KENTUCKY

TRANSMITTAL

DATE: November 14, 2003

TO: Rebecca Scott  
Senate Council

FROM: Lissa Holland   
Graduate Council

**The Graduate School**  
351 Patterson Office Tower  
Lexington, KY 40506-0027  
(859) 257-4613  
Fax: (859) 323-1928  
[www.rgs.uky.edu/gsl](http://www.rgs.uky.edu/gsl)

The Graduate Council met on October 30, 2003 and approved the following:

COLLEGE OF ENGINEERING

*Manufacturing Systems Engineering*

**University Scholars Program – MS Manufacturing Systems Engineering**

The MS in Manufacturing Systems Engineering (MSMSE) is a multi-disciplinary program administered by the College of Engineering at the University of Kentucky. The program is taught by faculty from departments across the College, including Mechanical Engineering, Chemical and Materials Engineering, and Electrical and Computer Engineering. The MSMSE program is available as a thesis option (Plan A) requiring 24 hours of course work, or as a project option (Plan B) requiring 33 hours of course work. The Manufacturing Systems Engineering program is a MS-only program - The University of Kentucky does not offer a BS or PhD in Manufacturing Systems Engineering.

The University of Kentucky's College of Engineering offers 4-year, 132 credit-hour Bachelor of Science degrees in several engineering disciplines. The College of Engineering is accredited by the Accreditation Board of Engineering and Technology (ABET).

This document proposes the establishment of a University Scholars program for the Manufacturing Systems Engineering program. The program would be restricted to students who are pursuing a BS in one of the following engineering disciplines: Chemical Engineering, Civil Engineering, Electrical Engineering, Mechanical Engineering, Materials Engineering, and Mining Engineering. The program is intended to appeal to students who are studying engineering at UK as an undergraduate, but want to extend their education into the manufacturing area. The manufacturing systems engineering courses would be particularly relevant to mechanical engineers, electrical engineers, and chemical and materials engineers.



UNIVERSITY OF KENTUCKY

November 14, 2003

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351 Patterson Office Tower  
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Dr. Jeffrey B. Dembo, Chair  
Senate Council  
153 Bowman Hall  
CAMPUS 0059

Dear Dr. Dembo:

At its meeting on October 30, 2003, the Graduate Council approved, and recommends approval by the Senate Council, for the proposal from the College of Engineering to create a University Scholars Program in Manufacturing Systems Engineering.

Thank you for your attention to this request.

Sincerely yours,

A handwritten signature in blue ink that reads "Jeannine Blackwell". The signature is written in a cursive, flowing style.

Jeannine Blackwell, Dean  
The Graduate School

Enclosures

lh

cc: Rebecca Scott  
Jaque Hager

**GRADUATE COUNCIL  
INVESTIGATOR REPORT**

Course/Courses/Program: BS Engr/MSF USP

Category (check one):  New  Change  Drop

Date for Council Review: \_\_\_\_\_

Recommendation (circle one):  Approve  Approve with Reservation  Disapprove

Investigator's Signature: \_\_\_\_\_

**INSTRUCTIONS:**

The following questions are included as an outline only. Be as specific and as brief as possible. If the investigation was routine, please indicate this. Attach supplements as needed. Please return the form to Lissa Holland, 355 P.O.T., 0027, at least two days before the next Council meeting.

1. List any modifications made in the course proposal as submitted originally and reason(s) why.

2. If no modifications were made, review considerations which arose during the investigation and the resolutions.

The investigator believes that 400G-level courses should not be counted towards MS degree in MFS if they were offered by the student's undergraduate program or were counted towards the BS degree.

3. List contact(s) with program units and the considerations discussed therein.

This issue was discussed with Dr. Larry Halloway who said that if the Council agrees with this reservation, the MFS program will adopt a corresponding restriction.

4. Additional information as needed.

*400G courses should not be counted towards Master's if they were offered*

PO4



UNIVERSITY OF KENTUCKY

**Office of the Dean**

*College of Engineering  
351 Ralph G. Anderson Building  
Lexington, Kentucky 40506-0503  
(859) 257-1687 / 257-8827  
Fax: (859) 323-4922  
www.engr.uky.edu*

May 22, 2003

TO: Dr. Douglass Kalika, Dean, Graduate School

FROM: Dr. Eric Grulke, Associate Dean for Research and Graduate Studies

A handwritten signature in cursive script, appearing to read 'Eric Grulke'.

SUBJECT: BS Engr/MFS University Scholars Program

Attached is a proposal to create a University Scholars Program for a combined BS in an Engineering degree program and a MS in Manufacturing Systems Engineering. The proposal would allow undergraduate students in chemical, civil, electrical, materials, mechanical or mining engineering the opportunity to pursue a MS degree in Manufacturing Systems Engineering through the University Scholars Program.

The plan has been reviewed by the College of Engineering's Graduate Studies Team and was approved unanimously. I concur with their decision and ask that you approve this request.

cc: Dr. Larry Holloway

**MAY 30 2003**

## **PROPOSAL**

### **A University Scholars Program for a MS Manufacturing Systems Engineering combined with a BS in Chemical, Civil, Electrical, Mechanical, Material, or Mining Engineering**

#### **BACKGROUND**

The MS in Manufacturing Systems Engineering (MSMSE) is a multi-disciplinary program administered by the College of Engineering at the University of Kentucky. The program is taught by faculty from departments across the College, including Mechanical Engineering, Chemical and Materials Engineering, and Electrical and Computer Engineering. The MSMSE program is available as a thesis option (Plan A) requiring 24 hours of course work, or as a project option (Plan B) requiring 33 hours of course work. The Manufacturing Systems Engineering program is a MS-only program – The University of Kentucky does not offer a BS or PhD in Manufacturing Systems Engineering.

The University of Kentucky's College of Engineering offers 4-year, 132 credit-hour Bachelor of Science degrees in several engineering disciplines. The College of Engineering is accredited by the Accreditation Board of Engineering and Technology (ABET).

This document proposes the establishment of a University Scholars program for the Manufacturing Systems Engineering program. The program would be restricted to students who are pursuing a BS in one of the following engineering disciplines: Chemical Engineering, Civil Engineering, Electrical Engineering, Mechanical Engineering, Materials Engineering, and Mining Engineering. The program is intended to appeal to students who are studying engineering at UK as an undergraduate, but want to extend their education into the manufacturing area. The manufacturing systems engineering courses would be particularly relevant to mechanical engineers, electrical engineers, and chemical and materials engineers.

#### **PROGRAM STRUCTURE**

##### **Admissions**

A student desiring admission into the MSMSE University Scholars program is required to meet the following requirements for admission:

- 1). The applicant must have senior standing (completed at least 90 hours of course work) and have completed all University Studies requirements.
- 2). The applicant should apply at the end of their junior year.
- 3). The applicant must be an undergraduate pursuing a degree in Chemical Engineering, Civil Engineering, Electrical Engineering, Mechanical Engineering, Materials Engineering, or Mining Engineering.
- 4). The applicants must have an overall grade-point average of 3.2 or above on a 4.0 scale, and a grade-point average of 3.5 or above in the undergraduate major.
- 5). The applicant must follow the current application procedures for the Graduate School, and must meet the admission standards of the Graduate School and the MSMSE program.

### **PROGRAMS OF STUDY**

The MSMSE Director of Graduate Studies will advise students regarding their participation in the dual degree program and in the graduate coursework. The students' undergraduate departmental advisors will advise on undergraduate coursework.

#### **The Existing MSMSE and BS Engineering Programs**

The College of Engineering offers a 4-year curriculum leading to the Bachelor of Science in Engineering. University study and elective courses constitute some of the required hours for completion of an Engineering degree.

The MS in Manufacturing Systems Engineering (MSMSE) is a multi-disciplinary program administered by the College of Engineering at the University of Kentucky. The program is taught by faculty from departments across the College, including Mechanical Engineering, Chemical and Materials Engineering, and Electrical and Computer Engineering. The MSMSE program is available as a thesis option (Plan A) requiring 24 hours of course work, or as a project option (Plan B) requiring 30 hours of course work plus a project (MFS784). All students are expected to take a series of four core courses (MFS505, MFS605, MFS611, and MFS606). In addition, Plan A students must take two manufacturing electives and two other electives as well as write a thesis. Plan B students must take the four core courses with three manufacturing electives and three other electives, as well as present a written project at a final oral examination.

### **Dual degree with BS in an Engineering Discipline and MS in Mfg. Systems Engineering.**

Under the dual degree program, the total number of credit hours completed for the combined program may be twelve (12) fewer than the total required for both the bachelor's and master's degrees. (The requirements for the bachelor's degree are unchanged). However, for the MSMSE program, the student is still required to take each of the four core courses, and the required "manufacturing electives" must still be relevant to manufacturing as determined by the student's graduate advisor.

*Example:* A student who is pursuing a BS in Mechanical Engineering as part of the dual program could count the following courses towards both his or her BS and MS degree requirements:

- MFS505/ME505: Manufacturing Processes (a core course in the MSMSE program),
- MFS507/ME507: Design for Manufacturing (a "manufacturing elective" in the MSMSE program), and
- ME532: Advanced Strength of Materials (an "other elective" in the MSMSE program).

For Plan A students, 12 credit hours must be in the 600 level or above. For a Plan B student, 15 credit hours must be in the 600 level or above, in addition to the final project course MFS784. Courses that count toward the MSMSE program must be at the 400G-level or higher. All 400G- and 500-level courses will count toward the graduate grade point average.

A typical student in this program enrolls in the College of Engineering as a freshman. He or she takes required Engineering courses for three years and achieves Engineering Standing. In the third year, the student would apply to the Graduate School for admission to this University Scholars program. In the fourth year, the student begins to take courses that count for the MSMSE. In the fifth year, the student takes only MSMSE courses and completes his or her project or thesis. At the end of five years, the student has completed the requirements for the BS in an engineering discipline (Chemical, Civil, Electrical, Mechanical, and Materials, or Mining Engineering) and the Master of Science in Manufacturing Systems Engineering.

Attached are example undergraduate/graduate curricula for each of the programs of Chemical Engineering, Civil Engineering, Electrical Engineering, Mechanical Engineering, Materials Engineering, and Mining Engineering. Each example curriculum is based on sample undergraduate curriculum published in the *2002-2003 University Bulletin*.

# BS in Chemical Engineering

## MS in Manufacturing Systems Engineering

### Degree Requirements

The following curriculum meets requirements for the B.S. in Chemical Engineering and M.S. in Manufacturing Systems Engineering (Plan B), provided the student satisfies the graduation requirements listed in the University Bulletin.

#### Freshman Year

First Semester	Hours
CME 101 Introduction to Chemical Engineering.....	1
CHE 105 General College Chemistry I.....	3
ENG 101 Writing I.....	3
MA 113 Calculus I.....	4
University Studies.....	3
University Studies*	3

#### Second Semester

CHE 107 General College Chemistry II.....	3
CHE 115 General Chemistry Laboratory.....	3
ENG 102 Writing II.....	3
MA 114 Calculus II.....	4
CS 221 First Course in Computer Science for Engineers.....	2
COM 199 Presentational Communication Skills.....	1

#### Sophomore Year

##### First Semester

CME 200 Process Principles.....	3
CHE 230 Organic Chemistry.....	3
CHE 231.....	3
MA 213 Calculus III.....	4
PHY 231 General University Physics.....	4
PHY 241 General University Physics laboratory.....	1

##### Second Semester

CME 320.....	4
CHE 232 Organic Chemistry.....	3
MSE 201 Materials Science.....	3
MA 214 Calculus IV.....	3
PHY 232 General University Physics.....	4

#### Junior Year

##### First Semester

CME 415 Separation Processes.....	3
CME 471 Seminar.....	1
CHE 446G Physical Chemistry for Engineers.....	3
ME 330 Fluid Mechanics.....	3
University Studies*.....	3
Supportive Elective**.....	3

##### Second Semester

CME 006 The Engineering Profession (Junior and Senior).....	0
CME 420 Process Modeling In Chemical Engineering.....	3
CME 425 Heat and Mass Transfer.....	4
CHE 441G Physical Chemistry Laboratory.....	2
CHE Elective.....	3
University Studies*.....	3
Technical Elective**.....	3

#### Senior Year

##### First Semester

CME006 The Engineering Profession (Junior and Senior)...	0
CME 470 Professionalism, Ethics and Safety.....	1
CME 433 Chemical Engineering Laboratory.....	3
CME 455 Chemical Engineering Process Design I.....	3
CME 550 Chemical Reactor Design.....	3
Elective (CME) CME 404G (Mfg. Elect.).....	3
University Studies*.....	3

##### Second Semester

CME 006 The Engineering Profession (Junior and Senior).....	0
CME 456 Chemical Engineering Process Design II.....	4
CME 462 Process Control.....	3
EE 305 Electrical Circuits and Electronics.....	3
Elective (CME) CME 554 (Mfg elect).....	3
University Studies*.....	3

#### Fifth Year

##### First Semester

MFS 605 Mfg. Systems.....	3
MFS 611 Org. Behavior.....	3
MFS 505 Mfg. Processes.....	3
Manufacturing Elective (600 level or above).....	3

##### Second Semester

MFS 606 – MFS Proj/Seminar.....	3
Manufacturing Elective (600 level or above.).....	3
MFS784 Research Project (Plan B students).....	3

#### Example CME courses related to manufacturing

CME required:

CME 550 – Chemical Reactor Design

CME Elective:

CME 554 – Chemical & Physical Proc. Of Polymer Systems

CME 404G – Polymeric Materials

CME 650 – Advanced Chemical Reactor Design



# BS in Civil Engineering

## MS in Manufacturing Systems Engineering

### Degree Requirements

The following curriculum meets requirements for the B.S. in Civil Engineering and the M.S. in Manufacturing Systems Engineering (Plan B), provided the student satisfies the graduation requirements listed in the University Bulletin.

#### Freshman Year

First Semester	Hours
CE 120 Introduction to Civil Engineering.....	1
CHE 105 General College Chemistry I.....	3
Eng 101 Writing I.....	3
MA 113 Calculus I.....	4
HIS 106 Western Culture: Science and Technology I (Humanities)^*.....	3
GEO 130 Earth's Physical Environment (Cross-Disciplinary)^*.....	3

#### Second Semester

CE 106 Computer Graphics and Communication.....	3
CHE 107 General College Chemistry II.....	3
COM 199 Presentational Communication Skills.....	1
ENG 102 Writing II.....	3
MA 114 Calculus II.....	4
HIS 107 Western Culture: Science and Technology II (Humanities)^*.....	3

#### Sophomore Year

First Semester	
CE 211 Surveying.....	4
CS 221 First Course in Computer Science For Engineers.....	2
MA 213 Calculus III.....	4
PHY 231 General University Physics.....	4
PHY 241 General University Physics laboratory.....	1
ECO 201 Principles of Economics I (Social Science)^*.....	3

#### Second Semester

EM 221 Statics.....	3
MA 214 Calculus IV.....	3
ME 220 Engineering Thermodynamics I.....	3
PHY 232 General University Physics.....	4
PHY 242 General University Physics Laboratory.....	1
Social Science Elective*.....	3

#### Junior Year

##### First Semester

CE 331 Transportation Engineering.....	3
CE 341 Fluid Mechanics I.....	3
CE 351 Introduction Environmental Engineering.....	3
EM 302 Mechanics of Deformable solids.....	3
GLY 220 Principles of Physical Geology.....	4
MNG 303 Deformable Solids Laboratory.....	1

##### Second Semester

CE 303 Introduction to Construction Engineering.....	3
CE 381 Civil Engineering Materials I.....	3
CE 382 Structural Mechanics.....	3
CE 441 Fluid Mechanics II.....	3
CE 471G Soil Mechanics.....	3

#### Senior Year

##### First Semester

CE 401 Seminar.....	1
CE 421 Civil Engineering Systems Analysis.....	3
CE 461G Hydrology.....	3
EM 313 Dynamics.....	3
Structures Elective.....	3
Technical Elective**.....	3

##### Second Semester

System Design Elective.....	4
Technical Electives**.....	6
Supportive Elective (Mfg. Elective - 600 level or above).....	3
Cross-Cultural Elective.....	3

#### Fifth Year

##### First Semester

MFS 605 Mfg. Systems.....	3
MFS 611 Org. Behavior.....	3
MFS 505 Mfg. Process.....	3
Manufacturing Elective (600 level or above).....	3

##### Second Semester

MFS 606 MFS Proj/Seminar.....	3
Manufacturing Elective (600 level or above).....	3
MFS 784 research Project (plan B students).....	3

#### Example CE elective courses related to manufacturing

- CE 505 Project Planning and Management
- CE 521 Engineering Economy

# BS in Electrical Engineering

## MS in Manufacturing Systems Engineering

### Degree Requirements

The following curriculum meets requirements for the B.S. in Electrical Engineering and M.S. in Manufacturing Systems Engineering (Plan B), provided the student satisfies the graduation requirements listed in the University Bulletin.

#### Freshman Year

First Semester	Hours
EE 101 Electrical Engineering Professions Seminar.....	1
MA 113 Calculus I.....	4
CHE 105 General College Chemistry I.....	3
CS 115 Introduction to Computer Programming.....	3
ENG 101 Writing I.....	3
University Studies*.....	3

#### Second Semester

MA 114 Calculus II.....	4
CHE 107 General College Chemistry II.....	3
PHY 231 General University Physics.....	4
PHY 241 General University Physics Laboratory.....	1
ENG 102 Writing II.....	3

#### Sophomore Year

First Semester	Hours
MA 213 Calculus III.....	4
PHY 232 General University Physics.....	4
PHY 242 General University Physics Laboratory.....	1
EE 211 Circuits I.....	4
University Studies Oral Communication.....	3

#### Second Semester

MA 214 Calculus IV.....	3
EE 221 Circuits II.....	3
EE 222 Electrical Engineering Laboratory I.....	2
Engineering/Science Elective (A).....	3
EE 280 Design of Logic Circuits.....	3
University Studies*.....	3

#### Junior Year

First Semester	Hours
EE 415G Electromechanics.....	3
EE 416G Energy Conversion Laboratory or	
EE 481 Logical Design Laboratory.....	2
EE 421G Signals and Systems I.....	3
EE 461G Introduction to Electronics.....	3
EE 380 Computer Organization.....	3
Mathematics Selection.....	3

#### Second Semester

Engineering/Science Elective (B).....	3
EE 462G Electronic Circuits Laboratory.....	2
EE468G Introduction to Engineering Electromagnetics.....	4
Engineering/Science Elective (A/B).....	3
University Studies*.....	3
EE 422G Signals and Systems II.....	3

#### Senior Year

##### First Semester

Technical Elective.....	3
Engineering/Science Elective (A/B).....	3
Electrical Engineering Technical Electives.....	6
University Studies*.....	6

##### Second Semester

EE 499 Electrical Engineering Design.....	3
Electrical Engineering Technical Electives.....	3
Electrical Engineering Technical Electives.....	3
Supportive Elective (Mfg. Elective - 600 level or above).....	3
University Studies*.....	3

#### Fifth Year

##### First Semester

MFS 605 Mfg. Systems.....	3
MFS 611 Org. Behavior.....	3
MFS 505 Mfg. Processes.....	3
Manufacturing Elective(600 level or above).....	3

##### Second Semester

MFS 606 Mfg. Proj/Seminar.....	3
Manufacturing Elective (600 level or above).....	3
MFS784 Research Project (Plan B students).....	3

#### Example EE courses related to manufacturing

- EE 566 Hybrid Microelectronics
- EE 569 Electronic Packaging & Manufacturing

# BS in Materials Engineering

## MS in Manufacturing Systems Engineering

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### Degree Requirements

The following curriculum meets requirements for the B.S. in Materials Engineering and M.S. in Manufacturing Systems Engineering (Plan B), provided the student satisfies the graduation requirements listed in the University Bulletin.

### Freshman Year

First Semester	Hours
MSE 101 Materials Engineering.....	1
CHE 105 General College Chemistry I.....	3
ENG 101 Writing I.....	3
MA 113 Calculus I.....	4
CS 221 First Course in Computer Science for Engineers.....	2
University Studies*	3

### Second Semester

MSE 102 Metals Technology.....	1
CHE 107 General College Chemistry II.....	3
CHE 115 General Chemistry Laboratory.....	3
MA 114 Calculus II.....	4
ENG 102 Writing II.....	3
University Studies*	3

### Sophomore Year

#### First Semester

MSE 201 Materials Science.....	3
CME 200 Process Principles.....	3
MA 213 Calculus III.....	4
PHY 231 General University Physics.....	4
PHY 241 General University Physics Laboratory.....	1
COM 181 Basic Public Speaking.....	3

#### Second Semester

MSE 301 Materials Science II.....	3
MSE 351 Material thermodynamics.....	3
PHY 232 General University Physics.....	4
EM 221 Statics.....	3
MA 214 Calculus IV.....	3

### Junior Year

#### First Semester

MSE 401G Metal and Alloys.....	4
MSE 404G Polymeric Materials.....	3
MSE 450 Transport Phenomena for Materials Engineers.....	3
CHE 236 Survey of Organic Chemistry.....	3
EM 302 Mechanics of Deformable Solids.....	3

### Second Semester

MSE 403G Ceramic Engineering.....	4
MSE 402G Electronic Materials and Processing.....	3
PHY 361 Principles of Modern Physics.....	3
STA 381 Introduction to Engineering Statistics.....	3
University Studies*	3

### Senior Year

#### First Semester

MSE 436 Material Failure Analysis.....	3
MSE 581 Quality Control.....	3
EE 305 Electrical Circuits and Electronics.....	3
Materials Elective.....	3
University Studies*	6

#### Second Semester

MSE 480 Materials Design.....	3
MSE 538 Deformation Processing.....	4
Materials Elective***	3
Supportive Elective (Mfg. Elective – 600 level or above).....	3
University Studies*	3

### Fifth Year

#### First Semester

MFS 605 Mfg Systems.....	3
MFS 611 Org. Behavior.....	3
MFS 505 Mfg. Processes.....	3
Manufacturing Elective(600 level or above).....	3

#### Second Semester

MFS 606 MFS Proj/Seminar.....	3
Manufacturing Elective (600 level or above).....	3
MFS784 Research Project (Plan B students).....	3

### Example MSE courses related to manufacturing

MSE/CME 554 Chemical & Physics Process of Polymer Systems
MSE/CME 404G Polymeric Materials
MSE/CME 558 Polymer Chemical and Analysis
MSE/EE 569 Electronic Packaging & Manufacturing
MSE 581/MFS 581 Quality Control
MSE 535 Mechanical Properties of Materials
MSE 538 Deformation Processing
MSE 531 Powder Metallurgy

# BS in Mechanical Engineering

## MS in Manufacturing Systems Engineering

### Degree Requirements

The following curriculum meets requirements for the B.S. in Mechanical Engineering and M.S. in Manufacturing Systems Engineering (Plan B), provided the student satisfies the graduation requirements listed in the University Bulletin.

### Freshman Year

#### First Semester Hours

ME 101 Orientation to Mechanical Engineering (Freshman and Transfer Student).....	1
ME 105 Basic Engineering Graphics.....	2
CHE 105 General College Chemistry I.....	1
MA 113 Calculus I.....	4
Eng 101 Writing I.....	3
University Studies*.....	3

#### Second Semester

ME 151 Manufacturing Engineering.....	3
CHE 107 General College Chemistry II.....	3
University Studies*.....	3
MA 114 Calculus II.....	4
ENG 102 Writing II.....	3

### Sophomore Year

#### First Semester

PHY 231 General University Physics.....	4
PHY 241 General University Physics Laboratory.....	1
MA 213 Calculus III.....	4
CS 221 First Course in Computer Science for Engineers.....	2
University Studies*.....	3
COM 181 Basic Public Speaking.....	3

#### Second Semester

ME 220 Engineering Thermodynamics I.....	3
PHY 232 General University Physics.....	4
PHY 242 General University Physics Laboratory.....	1
MA 214 Calculus IV.....	3
EM 221 Statics.....	3
University Studies*.....	3

### Junior Year

#### First Semester

ME 321 Engineering Thermodynamics II.....	3
ME Fluid Mechanics.....	3
EM 302 Mechanics of Deformable Solids.....	3
EM 313 Dynamics.....	3
Mathematics Elective*.....	3
University Studies*.....	3

#### Second Semester

ME 310 Engineering Experimentation I.....	3
ME 344 Mechanical Design.....	3
ME 325 Elements of Heat Transfer.....	3
ME 340 Introduction to Mechanical Systems.....	3
ME 406 Computer-Aided Graphics and Design.....	3

### Senior Year

#### First Semester

ME 407 Engineering Ethics.....	1
ME 311 Engineering Experimentation II.....	3
ME 440 Design Design of Control Systems.....	3
ME 501 Mechanical Design with Finite Element Methods.....	3
Technical Electives**.....	6

#### Second Semester

ME 408 Safety Engineering.....	2
ME 412 Senior Design Project.....	3
EE 307 Circuit Analysis with Applications.....	4
Technical Electives**.....	3
Supportive Elective (600 level or above).....	3
University Studies*.....	3

### Fifth Year

#### First Semester

MFS 605 Mfg. Systems.....	3
MFS 611 Org. Behavior.....	3
MFS 505 Mfg. Process.....	3
Manufacturing Elective (600 level or above).....	3

#### Second Semester

MFS 606 MFS Proj/Seminar.....	3
Manufacturing Elective (600 level or above).....	3
MFS784 Research Project (Plan B students).....	3

### Example ME courses related to manufacturing

ME/MFS 503 Lean Mfg. Principles and Practices
ME/MFS 505 Modeling of Mfg. Processes and Machines
ME/MFS 507 Design for Manufacturing
ME 554 Chemical & Physical Processing of Polymer Systems
ME 607 Analysis of Metal Cutting Processes
ME 647 Systems Optimization I

# BS in Mining Engineering

## MS in Manufacturing Systems Engineering

### Degree Requirements

The following curriculum meets requirements for the B.S. in Mining Engineering and M.S. in Manufacturing Systems Engineering (Plan B), provided the student satisfies the graduation requirements listed in the University Bulletin.

#### Freshman Year

First Semester	Hours
CHE 105 General College Chemistry I.....	3
ENG 101 Writing I.....	3
MA 113 Calculus I.....	4
ME 105 Basic Engineering Graphics.....	2
MNG 101 Introduction to Mining Engineering.....	2
University Studies*.....	3

#### Second Semester

CS 221 First Course in Computer Science for Engineers.....	2
CHE 107 General College Chemistry II.....	3
ENG 102 Writing II.....	3
MA 114 Calculus II.....	4
PHY 231 General University Physics.....	4
PHY 241 General University Physics Laboratory.....	1

#### Sophomore Year

First Semester	Hours
MNG 211 Surveying.....	4
MNG 264 Underground Mining Operations.....	2
EM 221 Statics.....	3
MA 213 Calculus III.....	4
PHY 232 General University Physics.....	4
PHY 242 General University Physics Laboratory.....	1

#### Second Semester

Com 199 Presentational Communication Skills.....	1
ECO 201 Principles of Economics I.....	3
EM 302 Mechanics of Deformable Solids.....	3
MA 214 Calculus IV.....	3
ME 220 Engineering Thermodynamics I.....	3
MNG 303 Deformable Solids Laboratory.....	1
MNG 332 Mine Plant Machinery.....	3

#### Junior Year

First Semester	Hours
MNG 371 Professional Development of Mining Engineers.....	3
CE 341 Fluid Mechanics I.....	3
GLY 220 Principles of Physical Geology.....	3
MNG 301 Minerals Processing.....	3
MNG 302 Minerals Processing Laboratory.....	1
STA 381 Introduction to Engineering Statistics.....	3

#### Second Semester

EE 306 Electrical Circuits and Machinery.....	3
EM 313 Dynamics.....	3
GLY 230 Fundamentals of Geology I.....	3
MNG 341 Mine Ventilation.....	3
MNG 363 Surface Mining Operations.....	3
University Studies*.....	3

#### Senior Year

##### First Semester

MNG 374 Mine Valuation and Investment Analysis.....	3
MNG 591 Mine Design Project I.....	1
MNG 551 Rock Mechanics.....	4
MNG 431 Mine Systems Engineering.....	3
Technical Electives***.....	3
University Studies*.....	3

##### Second Semester

MNG 592 Mine Design Project II.....	3
Technical Electives***.....	6
University Studies*.....	6
Supportive Elective (Mfg. course - 600 level or above).....	3

#### Fifth Year

##### First Semester

MFS 605 Mfg. Systems.....	3
MFS 611 Org. Behavior.....	3
MFS 505 Mfg. Process.....	3
Manufacturing Elective (600 level or above).....	3

##### Second Semester

MFS 606 MFS proj/Seminar.....	3
Manufacturing Elective (600 level or above).....	3
MFS 784 research Project (plan B students).....	3

#### Example MNG "technical elective" courses related to manufacturing :

MNG 563 Simulation of Industrial Production Systems



UNIVERSITY OF KENTUCKY

**Department of Electrical  
and Computer Engineering**

*College of Engineering  
453 Anderson Hall  
Lexington, KY 40506-0046  
(859) 257-8042  
Fax: (859) 257-3092  
[www.engr.uky.edu](http://www.engr.uky.edu)*

March 29, 2002

Graduate Studies C.Q.I. Committee  
College of Engineering  
University of Kentucky  
Lexington, KY 40506-0108

To Whom It May Concern:

This letter represents my support for the proposed University Scholars Program for a BS in Electrical Engineering and a MS in Manufacturing Systems Engineering. This University Scholars program with Manufacturing Systems Engineering would provide an option for our undergraduates who may be interested in graduate study in the manufacturing systems area.

Sincerely,

A handwritten signature in black ink, appearing to read 'Vijay Singh', written over a large, stylized flourish.

Professor Vijay Singh  
Department Chair  
Electrical and Computer Engineering

March 29, 2002

Graduate Studies C.Q.I. Committee  
College of Engineering  
University of Kentucky  
Lexington, KY 40506-0108

To Whom It May Concern:

This letter represents my support for the proposed University Scholars Program for a BS in Mechanical Engineering and a MS in Manufacturing Systems Engineering. This University Scholars program with Manufacturing Systems Engineering would provide an option for our undergraduates who may be interested in graduate study in the manufacturing systems area.

Sincerely,

A handwritten signature in black ink, appearing to read "Keith C. Rouch". The signature is fluid and cursive, with the first name "Keith" being the most prominent.

Professor Keith Rouch  
Department Chair of Mechanical Engineering

March 29, 2002

Graduate Studies C.Q.I. Committee  
College of Engineering  
University of Kentucky  
Lexington, KY 40506-0108

To Whom It May Concern:

This letter represents my support for the proposed University Scholars Program for a BS in Civil Engineering and a MS in Manufacturing Systems Engineering. This University Scholars program with Manufacturing Systems Engineering would provide an option for our undergraduates who may be interested in graduate study in the manufacturing systems area.

Sincerely,



Professor Issam Harik  
Department Chair of Civil Engineering





UNIVERSITY OF KENTUCKY

**Department of Chemical and  
Materials Engineering**

177 Anderson Hall  
Lexington, KY 40506-0046  
(859) 257-8028  
Fax: (859) 323-1929  
[www.engr.uky.edu/cme](http://www.engr.uky.edu/cme)

April 12, 2002

Graduate Studies C.Q.I. Committee  
College of Engineering  
University of Kentucky  
Lexington, KY 40506-0108

To Whom It May Concern:

This letter represents my support for the proposed University Scholars Program for a BS in Chemical or Materials Engineering and a MS in Manufacturing Systems Engineering. This University Scholars program with Manufacturing Systems Engineering would provide an option for our undergraduates who may be interested in graduate study in the manufacturing systems area.

Sincerely,

A handwritten signature in black ink, appearing to read 'Donn Hancher'. The signature is fluid and cursive, with a large loop at the end.

Professor Donn Hancher  
Interim Chair of Chemical and Materials Engineering



UNIVERSITY OF KENTUCKY

**Department of Mining Engineering**  
*College of Engineering*  
*230 Mining and Mineral Resources Bldg.*  
*Lexington, KY 40506-0107*  
*(859) 257-8026*  
*Fax: (859) 323-1962*  
*[www.uky.edu/dept/mining](http://www.uky.edu/dept/mining)*

August 30, 2002

Graduate Studies C.Q.I. Committee  
College of Engineering  
University of Kentucky  
Lexington, KY 40506-0108

To Whom It May Concern:

This letter represents my support for the proposed University Scholars Program for a BS in Mining Engineering and a MS in Manufacturing Systems Engineering. This University Scholars program with Manufacturing Systems Engineering would provide an option for our undergraduates who may be interested in graduate study in the manufacturing systems area.

Sincerely,

A handwritten signature in cursive script, appearing to read 'Richard J. Sweigard'.

Richard J. Sweigard  
Professor and Chair  
Mining Engineering