

**Department of**  
**MECHANICAL ENGINEERING**

**Guidebook for B.S.M.P.E. Students**

[Revised: Fall 2008]



**THE UNIVERSITY OF AKRON**



Welcome to the College of Engineering and the Department of Mechanical Engineering. Your eligibility for transfer to this College indicates that you have already enjoyed some success in your academic endeavors. The academic program that lies ahead of you is quite challenging; however, nothing of true value is obtained without effort. The academic degree that is your immediate goal, the Bachelor of Science in Mechanical Polymer Engineering, will represent an achievement worthy of your best efforts.

The curriculum in Mechanical Polymer Engineering has been designed to produce the most competent Mechanical Polymer Engineer in the time available. The BSMPE curriculum offers students a large array of representative engineering science and design courses which, combined with polymer science courses, provides a fundamental education in Mechanical Engineering principles as well as an understanding of Polymer Engineering principles.

We have prepared this Guidebook to consolidate certain information about the department and curriculum and to provide you with a copy of several relevant department and college rules and procedures. You will wish to keep this booklet and probably use the grade checksheet provided to keep your own record of your progress. Of course, your formal file will be maintained in the department office.

I will serve as your academic advisor as long as you remain in the BSMPE program. Please feel free to contact me if you have any questions.

Sincerely,

\_\_\_\_\_

Office \_\_\_\_\_

Telephone \_\_\_\_\_

**GRADE CHECKSHEET - BSMPE**

11/08/06-BSMPE

Student: \_\_\_\_\_

Advisor: \_\_\_\_\_

Date: \_\_\_\_\_

COURSE	CR	GR	Term/ Year Taken	COURSE	CR	GR	Term/ Year Taken
GENERAL EDUCATION				REQUIRED ENGINEERING			
5540:___ Physical Education	0.5			4300:201 Statics	3		
5540:___ Physical Education	0.5			4300:202 Intro: Mechanics of Solids	3		
7600:105 Intro to Public Speaking – or – 7600:106 Effective Oral Communication	3			4400:320 Basic Electrical Engineering	4		
3300:111 English Composition I	4						
3300:112 English Composition II	3			4600:165 Tools for Mechanical Engineering	3		
____:___ Social Science Elective*	3			4600:203 Dynamics	3		
3400:210 Humanites in Western Trad. I	4			4600:260 Engineering Analysis I	2		
____:___ Humanities Elective I**	3			4600:300 Thermodynamics I	3		
____:___ Humanities Elective II**	3			4600:310 Fluid Mechanics I	2		
3250:244 Intro. to Economic Anal.	3			4600:315 Heat Transfer	3		
____:___ Area Studies & Cultural Diversity	2			4600:336 Anal. of Mechanical Components	3		
<b>Total General Education</b>	<b>29</b>			4600:337 Design of Mechanical Components	3		
* From Social Sci. Sets 2 to 7 (see bulletin)				4600:340 System Dynamics and Response	3		
** From Humanities Sets 1 to 4 (see bulletin)				4600:360 Engineering Analysis II	2		
*** Engineering students select 1 course				4600:380 Mechanical Metallurgy	2		
				4600:400 Thermal Systems Components	3		
MATH AND NATURAL SCIENCE				4600:402 Senior Seminar	1		
3150:151 Principles of Chemistry I	3			4600:431 Fund. of Mechanical Vibrations	3		
3150:152 Principles of Chemistry Lab	1			4600:441 Control System Design	3		
3150:153 Principles of Chemistry II	3			4600:460 Concepts of Design (Polymer)	3		
3450:221 Analytical Geom. & Calculus I	4			4600:483 Measurements Lab	2		
3450:222 Analytical Geom. & Calculus II	4			4700:321 Intro to Polymer Fluids	3		
3450:223 Analytical Geom. & Calculus III	4			4700:422 Polymer Processing	3		
3450:335 Differential Equations	3			4700:425 Intro to Blending & Compounding	3		
3470:401 Prob. & Stat. for Engineers	2			4700:427 Mold Design	3		
3650:291 Elemental Classical Physics I	4			4700:450 Engineering Properties of Polymers	3		
3650:292 Elemental Classical Physics II	4			4700:451 Polymer Engineering Lab	2		
4700:281 Polymer Science for Engineers	2			4700:499 Mech. Polymer Design Project	2		
4700:381 Polymer Morphology for Eng.	3						
<b>Total Math/Nat. Sci.</b>	<b>37</b>			<b>Total Required Engineering</b>	<b>73</b>		

**TOTAL: 139**

## MECHANICAL-POLYMER ENGINEERING (Co-Op Students Entering University, Fall 2006)

1st Year (32) 2005-2006					
<u>FALL</u>			<u>SPRING</u>		
4600:165	Tools for Mechanical Eng.	3	7600:	Speech (105 or 106)	3
5540:	Physical Education	1	3300:112	English Comp. II	3
3150:151	Princ. of Chem. I	3	3150:153	Principles of Chem. II	3
3150:152	Princ. of Chem. I Lab.	1	3450:222	Calculus II	4
3300:111	English Composition I	4	----	Social Science Elective	<u>3</u>
3450:221	Calculus I	<u>4</u>			16
		16			
2 <sup>nd</sup> Year (67) 2006-2007					
<u>FALL</u>		<u>SPRING</u>		<u>SUMMER</u>	
3650:291	Physics I	4	<b>4600:260</b>	<b>Eng. Analysis I</b>	2
4300:201	Statics	3	3650:292	Physics II	4
3450:223	Calculus III	4	3450:335	Differential Equations	3
3400:210	Humanities-West. Trad. I	4	4600:203	Dynamics	3
3250:244	Intro.to Economic Anal.	<u>3</u>	4300:202	Mechanics of Solids	3
		18	4700:281	Polymer Science for Eng.	<u>2</u>
					17
					OPTIONAL Co-op
3rd Year (90) 2007-2008					
<u>FALL</u>		<u>SPRING</u>		<u>SUMMER</u>	
4600:300	Thermodynamics I	3		<b>4600:380</b>	<b>Mechanical Metallurgy</b> 2
<b>4600:310</b>	<b>Fluid Mechanics I</b>	2		4700:321	Polymer Fluids 3
4700:381	Polymer Morph for Eng	3		4600:340	Sys Dyn. & Response <u>3</u>
4600:336	Anal. Mech. Comp.	3	Co-op		8
<b>3470:401</b>	<b>Prob. &amp; Stat. for Eng.</b>	2			
<b>4600:360</b>	<b>Eng. Analysis II</b>	<u>2</u>			
		15			
4th Year (107) 2008-2009					
<u>FALL</u>		<u>SPRING</u>		<u>SUMMER</u>	
	Co-op	4600:431	Fund: Mech. Vibrations	3	
		4600:315	Heat Transfer	3	
		4600:337	Design of Mech. Comp.	3	Co-op
		4700:425	Blending & Compound	3	
		4700:450	Engr. Prop. of Polymer	3	
		4600:483	ME Measurements Lab	<u>2</u>	
				17	
5th Year (139) 2009-2010					
<u>FALL</u>			<u>SPRING</u>		
4600:400	Thermal Systems Components	3	----	Humanities Elective I	3
4600:441	Control Systems Design	3	----	Humanities Elective II	3
4600:460	Concepts of Design – Polymer Sect.	3	4700:427	Mold Design	3
4700:451	PE Lab	2	4400:320	Basic EE	4
4600:402	Senior Seminar	1	4700:499	PE Design Project	2
4700:422	Polymer Processing	<u>3</u>	----	Area Studies & Cultural Diversity	<u>2</u>
		15			17

This course schedule is in effect for those students entering The University of Akron in the Fall, 2005 or later, who are co-op students who expect to graduate in May, 2010 or later. It may also be in effect for students who have entered The University prior to Fall, 2005 but have fallen behind in their course schedule. The appropriate course schedule will be handled on an individual basis.

## MECHANICAL-POLYMER ENGINEERING (Non Co-Op Students Entering University, Fall 2006)

1st Year (32) 2005-2006																																						
<p style="text-align: center;"><b><u>FALL</u></b></p> <table style="width: 100%; border-collapse: collapse;"> <tr><td>4600:165 Tools for Mechanical Eng.</td><td style="text-align: right;">3</td></tr> <tr><td>5540: Physical Education</td><td style="text-align: right;">1</td></tr> <tr><td>3150:151 Princ. of Chem. I</td><td style="text-align: right;">3</td></tr> <tr><td>3150:152 Princ. of Chem. I Lab.</td><td style="text-align: right;">1</td></tr> <tr><td>3300:111 English Composition I</td><td style="text-align: right;">4</td></tr> <tr><td>3450:221 Calculus I</td><td style="text-align: right;"><u>4</u></td></tr> <tr><td style="text-align: right;">16</td><td></td></tr> </table>	4600:165 Tools for Mechanical Eng.	3	5540: Physical Education	1	3150:151 Princ. of Chem. I	3	3150:152 Princ. of Chem. I Lab.	1	3300:111 English Composition I	4	3450:221 Calculus I	<u>4</u>	16		<p style="text-align: center;"><b><u>SPRING</u></b></p> <table style="width: 100%; border-collapse: collapse;"> <tr><td>7600: Speech (105 or 106)</td><td style="text-align: right;">3</td></tr> <tr><td>3300:112 English Comp. II</td><td style="text-align: right;">3</td></tr> <tr><td>3150:153 Principles of Chem. II</td><td style="text-align: right;">3</td></tr> <tr><td>3450:222 Calculus II</td><td style="text-align: right;">4</td></tr> <tr><td>---- Social Science Elective</td><td style="text-align: right;"><u>3</u></td></tr> <tr><td style="text-align: right;">16</td><td></td></tr> </table>	7600: Speech (105 or 106)	3	3300:112 English Comp. II	3	3150:153 Principles of Chem. II	3	3450:222 Calculus II	4	---- Social Science Elective	<u>3</u>	16												
4600:165 Tools for Mechanical Eng.	3																																					
5540: Physical Education	1																																					
3150:151 Princ. of Chem. I	3																																					
3150:152 Princ. of Chem. I Lab.	1																																					
3300:111 English Composition I	4																																					
3450:221 Calculus I	<u>4</u>																																					
16																																						
7600: Speech (105 or 106)	3																																					
3300:112 English Comp. II	3																																					
3150:153 Principles of Chem. II	3																																					
3450:222 Calculus II	4																																					
---- Social Science Elective	<u>3</u>																																					
16																																						
2nd Year (67) 2006-2007																																						
<p style="text-align: center;"><b><u>FALL</u></b></p> <table style="width: 100%; border-collapse: collapse;"> <tr><td>3650:291 Physics I</td><td style="text-align: right;">4</td></tr> <tr><td>4300:201 Statics</td><td style="text-align: right;">3</td></tr> <tr><td>3450:223 Calculus III</td><td style="text-align: right;">4</td></tr> <tr><td>3400:210 Humanities-West. Trad. I</td><td style="text-align: right;">4</td></tr> <tr><td>3250:244 Intro.to Economic Anal.</td><td style="text-align: right;"><u>3</u></td></tr> <tr><td style="text-align: right;">18</td><td></td></tr> </table>	3650:291 Physics I	4	4300:201 Statics	3	3450:223 Calculus III	4	3400:210 Humanities-West. Trad. I	4	3250:244 Intro.to Economic Anal.	<u>3</u>	18		<p style="text-align: center;"><b><u>SPRING</u></b></p> <table style="width: 100%; border-collapse: collapse;"> <tr><td><b>4600:260 Eng. Analysis I</b></td><td style="text-align: right;"><b>2</b></td></tr> <tr><td>3650:292 Physics II</td><td style="text-align: right;">4</td></tr> <tr><td>3450:335 Differential Equations</td><td style="text-align: right;">3</td></tr> <tr><td>4600:203 Dynamics</td><td style="text-align: right;">3</td></tr> <tr><td>4300:202 Mechanics of Solids</td><td style="text-align: right;">3</td></tr> <tr><td>4700:281 Polymer Science for Eng.</td><td style="text-align: right;"><u>2</u></td></tr> <tr><td style="text-align: right;">17</td><td></td></tr> </table>	<b>4600:260 Eng. Analysis I</b>	<b>2</b>	3650:292 Physics II	4	3450:335 Differential Equations	3	4600:203 Dynamics	3	4300:202 Mechanics of Solids	3	4700:281 Polymer Science for Eng.	<u>2</u>	17												
3650:291 Physics I	4																																					
4300:201 Statics	3																																					
3450:223 Calculus III	4																																					
3400:210 Humanities-West. Trad. I	4																																					
3250:244 Intro.to Economic Anal.	<u>3</u>																																					
18																																						
<b>4600:260 Eng. Analysis I</b>	<b>2</b>																																					
3650:292 Physics II	4																																					
3450:335 Differential Equations	3																																					
4600:203 Dynamics	3																																					
4300:202 Mechanics of Solids	3																																					
4700:281 Polymer Science for Eng.	<u>2</u>																																					
17																																						
3rd Year (107) 2007-2008																																						
<p style="text-align: center;"><b><u>FALL</u></b></p> <table style="width: 100%; border-collapse: collapse;"> <tr><td>4600:300 Thermodynamics I</td><td style="text-align: right;">3</td></tr> <tr><td><b>4600:310 Fluid Mechanics I</b></td><td style="text-align: right;"><b>2</b></td></tr> <tr><td>4700:381 Polymer Morph for Eng.</td><td style="text-align: right;">3</td></tr> <tr><td>4600:336 Anal. Mech. Comp.</td><td style="text-align: right;">3</td></tr> <tr><td><b>3470:401 Prob. &amp; Stat. for Eng.</b></td><td style="text-align: right;"><b>2</b></td></tr> <tr><td><b>4600:360 Eng. Analysis II</b></td><td style="text-align: right;"><b><u>2</u></b></td></tr> <tr><td style="text-align: right;">15</td><td></td></tr> </table>	4600:300 Thermodynamics I	3	<b>4600:310 Fluid Mechanics I</b>	<b>2</b>	4700:381 Polymer Morph for Eng.	3	4600:336 Anal. Mech. Comp.	3	<b>3470:401 Prob. &amp; Stat. for Eng.</b>	<b>2</b>	<b>4600:360 Eng. Analysis II</b>	<b><u>2</u></b>	15		<p style="text-align: center;"><b><u>SPRING</u></b></p> <table style="width: 100%; border-collapse: collapse;"> <tr><td>4600:340 Sys, Dyn. &amp; Response</td><td style="text-align: right;">3</td></tr> <tr><td>4600:315 Heat Transfer</td><td style="text-align: right;">3</td></tr> <tr><td>4600:337 Design of Mech. Comp.</td><td style="text-align: right;">3</td></tr> <tr><td>4600:483 ME Measurements Lab</td><td style="text-align: right;">2</td></tr> <tr><td>4700:450 Engr. Prop. of Polymer</td><td style="text-align: right;">3</td></tr> <tr><td>4700:425 Blending &amp; Comp.</td><td style="text-align: right;"><u>3</u></td></tr> <tr><td style="text-align: right;">17</td><td></td></tr> </table>	4600:340 Sys, Dyn. & Response	3	4600:315 Heat Transfer	3	4600:337 Design of Mech. Comp.	3	4600:483 ME Measurements Lab	2	4700:450 Engr. Prop. of Polymer	3	4700:425 Blending & Comp.	<u>3</u>	17		<p style="text-align: center;"><b><u>SUMMER</u></b></p> <table style="width: 100%; border-collapse: collapse;"> <tr><td><b>4600:380 Mechanical Metallurgy</b></td><td style="text-align: right;"><b>2</b></td></tr> <tr><td>4700:321 Polymer Fluids</td><td style="text-align: right;">3</td></tr> <tr><td>4600:431 Fund: Mech. Vibrations</td><td style="text-align: right;"><u>3</u></td></tr> <tr><td style="text-align: right;">8</td><td></td></tr> </table>	<b>4600:380 Mechanical Metallurgy</b>	<b>2</b>	4700:321 Polymer Fluids	3	4600:431 Fund: Mech. Vibrations	<u>3</u>	8	
4600:300 Thermodynamics I	3																																					
<b>4600:310 Fluid Mechanics I</b>	<b>2</b>																																					
4700:381 Polymer Morph for Eng.	3																																					
4600:336 Anal. Mech. Comp.	3																																					
<b>3470:401 Prob. &amp; Stat. for Eng.</b>	<b>2</b>																																					
<b>4600:360 Eng. Analysis II</b>	<b><u>2</u></b>																																					
15																																						
4600:340 Sys, Dyn. & Response	3																																					
4600:315 Heat Transfer	3																																					
4600:337 Design of Mech. Comp.	3																																					
4600:483 ME Measurements Lab	2																																					
4700:450 Engr. Prop. of Polymer	3																																					
4700:425 Blending & Comp.	<u>3</u>																																					
17																																						
<b>4600:380 Mechanical Metallurgy</b>	<b>2</b>																																					
4700:321 Polymer Fluids	3																																					
4600:431 Fund: Mech. Vibrations	<u>3</u>																																					
8																																						
4th Year (139) 2008-2009																																						
<p style="text-align: center;"><b><u>FALL</u></b></p> <table style="width: 100%; border-collapse: collapse;"> <tr><td>4600:400 Thermal Systems Components</td><td style="text-align: right;">3</td></tr> <tr><td>4600:441 Control Systems Design</td><td style="text-align: right;">3</td></tr> <tr><td>4600:460 Concepts of Design – Polymer Sect.</td><td style="text-align: right;">3</td></tr> <tr><td>4600:402 Senior Seminar</td><td style="text-align: right;">1</td></tr> <tr><td>4700:451 PE Lab</td><td style="text-align: right;">2</td></tr> <tr><td>4700:422 Polymer Processing</td><td style="text-align: right;"><u>3</u></td></tr> <tr><td style="text-align: right;">15</td><td></td></tr> </table>	4600:400 Thermal Systems Components	3	4600:441 Control Systems Design	3	4600:460 Concepts of Design – Polymer Sect.	3	4600:402 Senior Seminar	1	4700:451 PE Lab	2	4700:422 Polymer Processing	<u>3</u>	15		<p style="text-align: center;"><b><u>SPRING</u></b></p> <table style="width: 100%; border-collapse: collapse;"> <tr><td>---- Humanities Elective I</td><td style="text-align: right;">3</td></tr> <tr><td>---- Humanities Elective II</td><td style="text-align: right;">3</td></tr> <tr><td>4400:320 Basic EE</td><td style="text-align: right;">4</td></tr> <tr><td>4700:427 Mold Design</td><td style="text-align: right;">3</td></tr> <tr><td>4700:499 PE Design Project</td><td style="text-align: right;">2</td></tr> <tr><td>---- Area Studies &amp; Cultural Diversity</td><td style="text-align: right;"><u>2</u></td></tr> <tr><td style="text-align: right;">17</td><td></td></tr> </table>	---- Humanities Elective I	3	---- Humanities Elective II	3	4400:320 Basic EE	4	4700:427 Mold Design	3	4700:499 PE Design Project	2	---- Area Studies & Cultural Diversity	<u>2</u>	17										
4600:400 Thermal Systems Components	3																																					
4600:441 Control Systems Design	3																																					
4600:460 Concepts of Design – Polymer Sect.	3																																					
4600:402 Senior Seminar	1																																					
4700:451 PE Lab	2																																					
4700:422 Polymer Processing	<u>3</u>																																					
15																																						
---- Humanities Elective I	3																																					
---- Humanities Elective II	3																																					
4400:320 Basic EE	4																																					
4700:427 Mold Design	3																																					
4700:499 PE Design Project	2																																					
---- Area Studies & Cultural Diversity	<u>2</u>																																					
17																																						

This course schedule is in effect for those students entering The University of Akron in the Fall, 2005 or later, who are non-co-op students who expect to graduate in May, 2009 or later. It may also be in effect for students who have entered The University prior to Fall, 2005 but have fallen behind in their course schedule. The appropriate course schedule will be handled on an individual basis.

## TECHNICAL ELECTIVES

The available credits of electives are divided as follows:

- At least three credits must be mechanical engineering “design” elective (available choices are marked by <sup>1</sup> in the list of mechanical engineering electives).
- At least three credits must be technical electives, selected from the listed mechanical engineering electives, other engineering electives, basic science electives, construction technology electives, polymer science electives, mechanical engineering technology electives, math/statistics electives, computer science electives, professional development, or polymer engineering electives, or mechanical engineering graduate course, unless specifically excluded.
- The remaining three credits are mechanical engineering technical electives, selected from the listed mechanical engineering electives.

Students with a specific profession objective (e.g., management, bioengineering, computer applications, graduate study, military service) will be permitted, upon petition to and approval of their advisor, to use their technical elective and their mechanical engineering technical elective to take courses in management/business administration, computer science, military science, polymer specialization, or graduate courses if these courses are all in a single area and total at least six (6) credits.

The College of Engineering and the College of Polymer Science and Polymer Engineering allow for a specialization for the mechanical engineering students. Students completing this specialization will be awarded a certificate of "Polymer Engineering Specialization." The certificate is awarded to those students that take one of the following three Polymer courses:

9871:401 Introduction to Elastomers  
 9871:402 Introduction to Plastics  
 9871:407 Polymer Science

and the following two courses:

4700:425 Introduction to Blending and Compounding of Polymers  
 4700:427 Mold Design

A mechanical engineering student may elect to choose a Polymer Engineering Design Project in lieu of one of the above two previous courses. If this is done, the student will still have to take a mechanical engineering technical elective.

## ELECTIVES

### Mechanical Engineering

4600:410	Heating & Air Conditioning <sup>1</sup>	(3)
4600:411	Compressible Fluid Mechanics	(3)
4600:412	Fundamentals of Flight <sup>1</sup>	(3)
4600:413	Intro to Aerodynamics	(3)
4600:414	Intro to Aerospace propulsion	(3)
4600:415	Energy Conversion <sup>1</sup>	(3)
4600:416	Heat Transfer Processes	(3)
4600:420	Intro to Finite Elem Meth <sup>1</sup>	(3)
4600:422	Experimental Stress Analysis	(3)
4600:430	Machine Dynamics <sup>1</sup>	(3)
4600:432	Vehicle Dynamics <sup>1</sup>	(3)
4600:442	Industrial Auto Control <sup>1</sup>	(3)
4600:443	Optimization Meth in Mech Engr <sup>1</sup>	(3)
4600:444	Robot Design, Control & Application <sup>1</sup>	(3)
4600:450	Intro Computat Fluid Flow & Conv	(3)
4600:462	Pressure Vessel Design <sup>1</sup>	(3)
4600:463	Computer Aided Design & Manuf <sup>1</sup>	(3)
4600:486	Special Topics	(1-3)
4700:427	Mold Design <sup>1</sup>	(3)

### Other Engineering

4200:463	Pollution Control	(3)
4300:306	Theory of Structures	(3)
4300:313	Soil Mechanics	(3)
4300:321	Intro. to Environmental Eng.	(3)
4300:323	Water Supply & Pollution Control	(3)
4300:341	Hydraulic Engineering	(4)
4300:361	Transportation Engineering	(3)
4300:380	Engineering Materials Lab	(3)
4300:401	Steel Design	(3)
4300:403	Reinf Concrete Design	(3)
4300:423	Chemistry for Environmental Engrs	(3)
4300:450	Urban Planning	(3)
4300:451	Computer Methods of Struct Analys	(3)
4300:471	Constr Admin	(3)
4450:410	Computer Methods	(3)
4450:432	System Simulation	(3)
4450:441	Expert Systems Design & Develop	(3)

### Basic Science

3100:111	Principles of Biology I <sup>2</sup>	(4)
3100:112	Principles of Biology II <sup>2</sup>	(4)
3100:130	Principles of Microbiology	(3)
3100:200, 201	Human Anatomy & Physiology &lab	(4)

### Basic Science-cont'd.

3100:265	Intro to Human Physiology	(4)
3150:154	Qualitative Analysis <sup>2</sup>	(2)
3150:263	Organic Chemistry Lecture I	(3)
3150:264	Organic Chemistry Lecture II	(3)

3150:265	Organic Chemistry Lab I	(2)
3150:266	Organic Chemistry Lab II	(2)
3370:101	Introductory Physical Geology	(4)
3370:441	Fundamentals of Geophysics	(3)
3370:446	Exploration Geophysics	(3)
3650:301	Elementary Modern Physics	(3)
3650:320	Waves	(3)
3650:331	Intermediate Astronomy	(3)
3650:340	Thermal Physics	(3)
3650:350	Modeling and Simulation	(3)
3650:406	Optics	(3)
3650:432	Mechanics II	(3)
3650:436	Electromagnetism I	(3)
3650:437	Electromagnetism II	(3)
3650:481	Methods of Mathematical Physics I	(3)
3650:482	Methods of Mathematical Physics II	(3)

### Polymer Science

9871:401	Introduction to Elastomers	(3)
9871:402	Introduction to Plastics	(3)
9871:407	Polymer Science	(4)
9871:411	Mole Struct & Phy Prop Polymer I	(2)
9871:412	Mole Struct & Phy Prop Polymer II	(2)
9871:413	Mole Struct & Phy Prop Polymer III	(2)

### Mechanical Engineering Technology

2870:348	CNC Programming I	(3)
2870:348	CNC Programming II	(3)
2920:247	Technology of Machine Tools	(3)
2920:347	Production Machinery and Processes	(3)

### Math/Statistics

3450:312	Linear Algebra	(3)
3450:414	Vector Analysis	(3)
3450:415	Combinatorics & Graph Theory	(3)
3450:421	Advanced Calculus I	(3)
3450:422	Advanced Calculus II	(3)
3450:425	Complex Variables	(3)
3450:427	Applied Numerical Methods 1	(3)
3450:428	Applied Numerical Methods 2	(3)
3450:430	Numerical Solutions for Partial Differential Equations	(3)
3450:432	Partial Differential Equations	(4)
3450:430	Numerical Solutions for Partial Differential Equations	(3)

### Math/Statistics – cont'd.

3450:435	Systems of Ordinary Differential Equations	(3)
3450:436	Math Models	(3)
3450:438	Advanced Engineering Math I	(3)
3450:439	Advanced Engineering Math II	(3)
3450:441	Concepts of Geometry	(4)
3470:450	Probability	(3)
3470:451	Theoretical Statistics I	(3)
3470:452	Theoretical Statistics II	(3)

3470:460 Statistical Methods (4)  
 3470:461 Applied Statistics I (4)  
 3470:462 Applied Statistics II (4)

Computer Science

3460:210 Data Structures&Algorithms I (4)  
 3460:306 Assy Language Programming (3)  
 3460:307 Applied System Programming (3)  
 3460:316 Data Structures&Algorithms II (3)  
 3460:440 Compiler Design (3)

Management/Business Administration<sup>3</sup>

6140:331 Personal Finance (3)  
 6140:300 Intro to Finance (3)  
 6200:201 Accounting (3)  
 6200:202 Managerial Accounting (4)  
 6200:301 Cost Management and Enterprise Resource Planning (3)  
 6400:220 The Legal & Social Env. In Bus. (3)  
 6400:371 Business Finance (3)  
 6400:432 Personal Finance Planning (3)  
 6400:473 Financial Statement Analysis (3)  
 6500:221 Quantitative Business Analysis I (3)  
 6500:222 Quantitative Business Analysis II (3)  
 6500:324 Data Management for Info. Systems (3)  
 6600:475 Business Negotiations (3)

Management/Business Administration<sup>3</sup> – cont'd.

6600:300 Marketing Principles (3)  
 6600:490 Marketing Strategy (3)  
 6500:301 Mgmt: Principles & Concepts (3)

Military Science

1500:303,304 Third Year Aero Studies (3,3)  
 1500:453,454 Fourth Year Aero Studies (3,3)  
 1600:300,301 Advanced Leadership I, II (3,3)  
 1600:400,401 Military Management I, II (3,3)

Professional Development

2020:222 Tech Report Writing (3)  
 3300:489 Seminar in English: Science Writing (3)

Polymer Engineering

4700:321 Polymer Fluid Mechanics (3)  
 4700:422 Polymer Processing (3)  
 4700:425 Intro to Blend & Compounding of Polymers (3)  
 4700:427 Mold Design (3)  
 4700:450 Engr Properties & Processes of Polymers (3)  
 4700:499 Polymer Engineering Proj. (1-3)

Polymer Science & Polymer Engineering

4700:281 Polymer Science for Engineers (2)  
 4700:381 Polymer Morphology for Eng. (3)

---

<sup>1</sup> M.E. Design Elective

<sup>2</sup> May NOT be used for Technical Elective credit

<sup>3</sup> Some courses provide "bridge-up" for MBA degree. Check with the College of Business Administration for an updated and complete list of "bridge-up" courses.

## HUMANITIES AND SOCIAL SCIENCE ELECTIVES

Studies in the humanities and social sciences meet the objectives of a broad education as well as those of the engineering profession. These courses, which are important to the general education of an engineer, are intended to make engineers fully aware of their social responsibilities and have the objective of improving your ability to consider related factors in decision-making processes. Humanities are the branches of knowledge concerned with the arts, literature and culture; while social sciences comprise studies of relationships in society. These electives are part of the General Education requirements of the University College as listed in the Undergraduate Bulletin of the University. In your freshman year, you are to select one of the listed courses for your social science elective. In your sophomore and senior year you are to select two courses, each from a different set (1-4) for your humanities electives. In your senior year, you are to select a single course in Area Studies and Cultural Diversity.

### **Social Science Electives**

3350:100	Introduction to Geography	3 cr.
3400:250	U.S. History to 1877	4 cr.
3400:251	U.S. History since 1877	4 cr.
3600:125	Theory and Evidence	3 cr.
3700:100	Government and Politics in the U.S.	4 cr.
3700:150	World Politics and Governments	3 cr.
3750:100	Introduction to Psychology	3 cr.
3850:100	Introduction to Sociology	4 cr.
3870:150	Cultural Anthropology	4 cr.
5100:150	Democracy and Education	3 cr.

Humanities ElectivesPrerequisites

## Set 1 - Fine Arts

7100:210	Visual Arts Awareness	3 cr.	3400:210
7500:201	Exploring Music	3 cr.	3400:210
7800:301	Introduction to Theatre and Film	3 cr.	3400:210
7900:200	Viewing Dance	3 cr.	3400:210

## Set 2 - Philosophy/Classics

3200:220	Introduction to the Ancient World	3 cr	3400:210
3200:289	Mythology of Ancient Greece	3 cr.	3400:210
3200:230	Sports & Society in Ancient Greece & Rome	3 cr,	none
3600:101	Introduction to Philosophy	3 cr.	none
3600:120	Introduction to Ethics	3 cr.	none
3600:170	Introduction to Logic	3 cr.	none

## Set 3 - Literature

3200:361	Literature of Greece	3 cr.	3400:210
3300:250	Classic and Contemporary Literature	3 cr.	3300:111, 112
3300:251	Topics in World Literature	3 cr.	3300:111, 112 & 3400:210
3300:252	Shakespeare and His World	3 cr.	3300:111, 112
3300:281	Fiction Appreciation	3 cr.	3300:111, 112 & 3400:210
3520:350	Themes in French Literature in Trans.	3 cr.	3400:210
3580:350	Literature of Spanish-American in Trans	3 cr.	3400:210

## Set 4 - Western Culture

3400:211	Humanities in the Western Tradition II	4 cr.	3400:210
----------	--	-------	----------

Area Studies and Cultural Diversity

2040:254	The Black Experience I	2 cr.	2020:121 or 3300:112
3001:300	Intro to Women's Studies	3 cr.	none
3005:300	Canadian Studies: An Interdis. Approach	3cr.	none
3350:375	Geography of Cultural Diversity	2 cr.	none
3400:385	World Civilization: China	2 cr.	64 credits
3400:386	World Civilization: Japan	2 cr.	64 credits
3400:387	World Civilization: S.E. Asia	2 cr.	64 credits
3400:388	World Civilization: India	2 cr.	64 credits
3400:389	World Civilization: Near Ea	2 cr.	64 credits
3400:390	World Civilization: Africa	2 cr.	64 credits
3400:391	World Civilization: Latin America	2 cr.	64 credits
3870:251	Human Diversity	3 cr.	none

## UNIVERSITY POLICY

A student may withdraw from a course up to the midpoint of the course with the signature of the student's advisor.

After the midpoint of a course, a student must have the written approval of both instructor and advisor to withdraw. Such approval must be dated and processed through the offices of the Registrar and the Cashier prior to the final examination period. Should the instructor or advisor refuse to sign the withdrawal form, the student may appeal to the dean of the student's college, who shall make the final decision after consultation with those who declined to approve the withdrawal.

## COLLEGE OF ENGINEERING

Instructors and advisors from the College of Engineering will observe the following:

There are only three valid reasons for withdrawal after the midpoint of a course:

1. Instructor responsibility: To permit better evaluation a student may be advised to remain in a course until the "next" exam (after the midpoint). If a withdrawal is in order it must be accomplished within one week after exam results are returned.
2. Unavoidable interruption: If a properly documented illness, accident, or other unavoidable event interrupts a student's academic routine, a withdrawal could be considered for load reduction. For a part-time student a documented forced change of work schedule could be a valid reason for withdrawal.
3. Change of objective: If an engineering student is transferring out of a department in the College of Engineering and the appropriate transfer is completed, consideration will be given for a withdrawal. This is not automatic. If a student is failing and has not done the required work, a grade of F is appropriate.

Withdrawing from a course after midterm to avoid a low grade is not permitted. Any withdrawal during the last week of class requires the approval of the Dean of the College.

Note to students on probation: If you withdraw from a course listed on your Approved Group of Courses, the agreement cannot be met and you are subject to "dismissal action".

An approved withdrawal will be indicated on the University official academic record by a WD. A student who leaves a course without going through the withdrawal procedure will receive an F in the course.

Although the laboratory portion of a combined lecture-laboratory course may constitute a minority of the total credit of that course, a student cannot pass the course without having satisfactorily completed the laboratory. This includes attendance at and participation in all laboratory experiments, and submission of required laboratory reports by designated deadlines. Students failing to meet these and related requirements (as set forth by their various laboratory instructors) will be subject to a grade of F without regard to their performance in the lecture portion of the course.

A student may be dropped from a course by the Dean if absences are repeated and the instructor recommends this action. A dismissed student may gain readmission only with the permission of the instructor and the Dean. A student dropped from a course receives an F which counts as work attempted whenever grade-point ratio calculations are made. (Passed May 5, 1983; Revised February 1988; Revised March 1991)

## **POLICY**

### **COLLEGIATE PROBATION**

#### **College of Engineering The University of Akron**

EFFECTIVE Spring Semester, 1982, i.e., students who fall under this definition during the Spring Semester, 1982, will be on probation during the next term when enrolled.

1. A student is placed on Collegiate Probation when any one of the following events occur:
  - a. Half or more of the credit hours or courses for any semester result in grades of D+, D, D-, F, I and/or W. Students taking one course are exempted from this rule. W grades may be excluded by action originated by the student's department head.
  - b. The overall or engineering grade point average for the semester is less than 1.50. Students taking one course are exempted from this rule.
  - c. The overall or engineering grade point average for two successive semesters is less than 2.000.
  - d. The cumulative grade point average for all engineering courses taken is less than 2.000.
2. A student on Collegiate Probation must file an "Approved Group of Courses" developed through the auspices of the appropriate department head or BSE advisor before commencing the next semester or summer session.
3. A student on Collegiate Probation is subject to immediate administrative withdrawal from any course(s) not listed on that individual's "Approved Group of Courses".
4. At the end of a semester on Collegiate Probation, a student is returned to good standing if a grade point average  $\geq 2.2500$  is received for a fully completed "Approved Group of Courses".
5. A student is continued on Collegiate Probation only when recommended by the department head, usually when the grade point average is  $> 2.000$  but  $< 2.2500$  and the student has completed all of the "Approved Group of Courses", or the student has a grade point average  $\geq 2.2500$  but has failed to complete all of the "Approved Group of Courses".
6. Students not removed from probation or recommended for continued Collegiate Probation by the department head will be suspended from the College of Engineering or dismissed from the University.

**POLICY  
SUSPENSION FROM THE COLLEGE OF ENGINEERING  
AND  
DISMISSAL FROM THE UNIVERSITY**

**College of Engineering  
The University of Akron**

EFFECTIVE January 1983, i.e., a student can be suspended from the College only after completion of the Fall Semester, 1982.

1. A student who has been on Collegiate Probation for at least one semester, and who is not removed from probation or continued on probation on recommendation of the Department Head, will be suspended from the College of Engineering for a period of two consecutive semesters or a consecutive semester and summer session only if the student's cumulative grade point average is <2.000. If the student's grade point average is <2.000, the student will be dismissed from the University unless accepted by another College of The University of Akron.
2. A student who attempts any course for a third time (by reason of previous D+, D, D-, F, W and/or I grades) and obtains a grade below C- will be suspended from the College of Engineering for two consecutive semesters or a consecutive semester and summer session.
3. When a student is placed on suspension, that student's records will be transferred to the Office of the Dean. Advisement for students suspended from the College of Engineering will also be performed by the Dean's Office.
4. While a student is suspended from the College of Engineering, no engineering courses can be audited or taken for credit.
5. At the end of two consecutive semesters or a consecutive semester and summer session on suspension from the College of Engineering, a student with an overall grade point average >2.000 may be reinstated with Collegiate Probation upon submission and approval of a petition.
6. A student reinstated from Collegiate Suspension must remove himself/herself from Probation at the end of that semester or be subject to dismissal.
7. A student who has been dismissed from the University may petition for readmission after one year. Readmitted students are placed on Collegiate Probation.

**ANTI-CHEATING RESOLUTION**

- WHEREAS, the Faculty of the College of Engineering recognizes cheating in any form is unethical and is contrary to all Codes of Ethics of our profession and is not to be condoned and
- WHEREAS, students as prospective and graduate engineers are often ill-informed in ethical matters and are frequently tempted to cheat and
- WHEREAS, the Faculty of the College of Engineering has endorsed the report "Handling the Cheater" during its deliberations
- BE IT RESOLVED that we, the Faculty of the College of Engineering, immediately make a concentrated effort to guide students in proper ethical behavior and to identify and discipline students who cheat.

**TRANSFER TO THE COLLEGE OF ENGINEERING**

1. Complete 30 hours
2. Complete Calculus II
3. Have 2.3 GPA in three of four categories:
  - (a) All course work
  - (b) Engineering course work (4x00:xxx)
  - (c) Required Mathematics
  - (d) Required Physics and Chemistry
4. No more than three grades in one course unless illness, etc.\*
5. All mathematics grades  $\geq$  C-. Only the highest grade is counted for each repeated course. B required in any course taken a third time.
6. Only six repeats for change-of-grade is permitted in the entire phase of study before transfer.

\* Different from The University policy.

**MECHANICAL POLYMER ENGINEERING PROGRAM EDUCATIONAL OBJECTIVES**

**(Expected attributes of graduates during the first few years after graduation)**

Practice the mechanical or mechanical-polymer engineering disciplines successfully within community accepted standards.

Acquire teamwork and communications skills to develop a successful career in mechanical or mechanical-polymer engineering.

Fulfill professional and ethical responsibilities in the practice of mechanical or mechanical-polymer engineering, including social, environmental and economical considerations.

Engage in professional service, such as participation in professional society and community service.

Engage in life-long learning activities, such as graduate studies or professional workshops.

Develop a professional career in the prevailing market that meets personal goals, objectives and desires.

# The University of Akron

## Department of Mechanical Engineering Faculty

		<b><u>Research Interests</u></b>
Dr. Celal Batur Department Chair <a href="mailto:batur@uakron.edu">batur@uakron.edu</a>	Ph.D. University of Leicester, 1975	Neural network, and fuzzy logic based process control. System identification, Nonlinear control.
Dr. M.J. Braun Professor <a href="mailto:mbraun@uakron.edu">mbraun@uakron.edu</a>	Ph.D. Carnegie-Mellon University, 1978	Energy conversion, Fluid dynamics, Lubrication, Heat transfer.
Dr. Abhilash Chandy Assistant Professor <a href="mailto:Ac76@uakron.edu">Ac76@uakron.edu</a>	Ph.D. Purdue University, 2007	Fluid dynamics, Combustion, Numerical methods and high-performance computing.
Dr. Fred Choy Professor <a href="mailto:fchoy@uakron.edu">fchoy@uakron.edu</a>	Ph.D. University of Virginia, 1977	Dynamics of rotating machinery, Lubrication, Vibrations, Experimental signal analysis.
Dr. B.T.F. Chung F. Theodore Harrington Professor Emeritus <a href="mailto:bchung@uakron.edu">bchung@uakron.edu</a>	Ph.D. Kansas State University, 1968	Heat and mass transfer, Fluid mechanics, Numerical methods.
Dr. Jerry E. Drummond Associate Professor <a href="mailto:drummon@uakron.edu">drummon@uakron.edu</a>	Ph.D. Ohio State University, 1981	Computational fluid mechanics heat transfer, Natural convection, Laminar flow stability.
Dr. Erik Engeberg Assistant Professor <a href="mailto:Ee9@uakron.edu">Ee9@uakron.edu</a>	Ph.D. University of Utah, 2008	Control of autonomous mobile robots, Biological signal processing, Bio-inspired control algorithms and sensor, Hybrid forms of robotic locomotion, Intelligent grasp force control of robotic manipulators.
Dr. Xiaosheng Gao Assistant Professor <a href="mailto:xgao@uakron.edu">xgao@uakron.edu</a>	Ph.D. Brown University, 1997	Solid Mechanics, Crack growth models.
Dr. Jon Gerhardt Adjunct Professor <a href="mailto:jgerhar@uakron.edu">jgerhar@uakron.edu</a>	Ph.D. University of Cincinnati, 1971	Design and Manufacturing.
Dr. Richard Gross Associate Professor Emeritus <a href="mailto:rgross@uakron.edu">rgross@uakron.edu</a>	Ph.D. (Mechanical Engineering), Carnegie-Mellon University, 1967	Heat transfer, Fluid flow, Thermodynamics.
Dr. Michelle S. Hoo Fatt Professor <a href="mailto:hoofatt@uakron.edu">hoofatt@uakron.edu</a>	Ph.D. Massachusetts Institute of Technology, 1992	Dynamic plasticity, Impact mechanics, Composite structures, Structural crashworthiness.
Dr. S. Graham Kelly Associate Professor <a href="mailto:sgraham@uakron.edu">sgraham@uakron.edu</a>	Ph.D. Virginia Polytechnic Inst. & State Univ., 1979	Nonlinear mechanics, Acoustics, Open cavity flows, Boundary layer stability.

Dr. Frank Loth F. Theodore Harrington Endowed Associate Professor <a href="mailto:Loth@uakron.edu">Loth@uakron.edu</a>	Ph.D. Georgia Institute of Technology, 1993	Fluid dynamics, Biofluids, Biological flows, Unsteady flows, Fluid structure interaction, Transitional flows, Laser Doppler anemometry, Doppler ultrasound, Computational fluid dynamics.
Dr. Gaurav Mittal Assistant Professor <a href="mailto:Gm29@uakron.edu">Gm29@uakron.edu</a>	Ph.D. Case Western Reserve University, 2001	Design of novel and well-characterized experimental facilities for combustion studies, Combustion at elevated pressures relevant to practical combustors and engines, Chemical kinetics of hydrocarbon fuels, Flame phenomena, Laser diagnostics, Development of reduced mechanisms, Alternative fuels.
Dr. Gregory Morscher Assistant Professor <a href="mailto:Gm33@uakron.edu">Gm33@uakron.edu</a>	Case Western Reserve University, 2000	Microstructure/property relationships of ceramic matrix composites and Nondestructive evaluations.
Dr. Alex Povitsky Associate Professor <a href="mailto:povitsky@uakron.edu">povitsky@uakron.edu</a>	Moscow Institute for Steel and Alloys, 1988	Heat transfer and Computational fluids.
Dr. D.Dane Quinn Assistant Professor <a href="mailto:quinn@uakron.edu">quinn@uakron.edu</a>	Cornell University, 1995	Applied dynamical systems, Mechanics, Combustion instability modeling.
Dr. Scott Sawyer Associate Professor <a href="mailto:ssawyer@uakron.edu">ssawyer@uakron.edu</a>	Purdue University, 1997	Fluid Mechanics, Turbo machinery, Active noise control, Computational fluid dynamics.
Dr. Tirumalai Srivatsan Professor <a href="mailto:tsrivatsan@uakron.edu">tsrivatsan@uakron.edu</a>	Georgia Institute of Technology, 1984	Mechanical behavior of materials, Materials science, Metallurgy, Fatigue analysis, Fracture mechanics, Electron microscopy, Composite materials.
Dr. Guo-Xiang Wang Assistant professor <a href="mailto:gwang@uakron.edu">gwang@uakron.edu</a>	University of California at Santa Barbara, 1995	Heat and mass transfer, Materials processing, Solidification theory and applications.
Dr. Shengyong Wang Assistant Professor <a href="mailto:wangs@uakron.edu">wangs@uakron.edu</a>	Purdue University, 2006	Systems engineering, Healthcare delivery systems modeling and optimization, Supervisory control for flexible manufacturing systems, Supply chain management.
Dr. Josh Wong Assistant Professor <a href="mailto:swong@uakron.edu">swong@uakron.edu</a>	University of Sydney, 1999	Nanomaterials, Polymer-Matrix Composites, Functional Materials, Fracture Behavior of Polymers and Biomaterials, Processing- Structure-Property Relationships.
Dr. Zhenhai Xia Associate Professor <a href="mailto:zxia@uakron.edu">zxia@uakron.edu</a>	Northwestern Polytechnic University, 1990	Mechanics of micro- and nano-composites; Multiscale computational methods; Multifunctional and bio-/biomimetic materials; Characterization of nano-materials and thin films.
Dr. John Zhe Assistant Professor <a href="mailto:jzhe@uakron.edu">jzhe@uakron.edu</a>	Columbia University, 2002	MEMS.

