

**University of Wisconsin – Milwaukee**  
**College of Engineering and Applied Science**  
**MATERIALS ENGINEERING CURRICULUM**

The minimum number of credits required to complete the Bachelor of Science in Engineering with a major in Materials Engineering is 124 credits. Students who need background preparation courses may need additional credits. See information below regarding placement examinations.

<b>Engineering Core Courses (24 credits)</b>		<b>Credits</b>	<b>Prerequisite</b>
Civ Eng 201	Statics	3	Math 232
Civ Eng 202	Dynamics	3	Civ Eng 201, Math 233(C)
Civ Eng 303	Strength of Materials	4	Civ Eng 201, Math 233(C)
CompSci 240	Introduction to Engineering Programming	3	Math 116
EAS 200	Professional Seminar	1	None
ElecEng 301	Electrical Circuits I	3	Physics 210(C)
Ind Eng 467	Introductory Statistics for Physical Sciences & Engineering Students	3	Jr St, Math 233
MatlEng 201	Engineering Materials	4	Chem 102 or 105

<b>^Materials Engineering Major (28 credits)</b>			
MatlEng 330	Materials & Processes in Manufacturing	3	MatlEng 201
MatlEng 402	Physical Metallurgy	3	Jr St, MatlEng 201
MatlEng 410	Mechanical Behavior of Materials	3	Jr St, MatlEng 201
MatlEng 411	Materials Laboratory	3	Sr St, MatlEng 201
MatlEng 442	Thermodynamics of Materials	3	Jr St, MatlEng 201
MatlEng 443	Transport Phenomena in Materials Processing	3	Jr St, ElecEng 234, MatlEng 442
MatlEng 452	Ceramic Materials	3	Jr St, MatlEng 201
MatlEng 453	Polymeric Materials	3	Jr St, MatlEng 201
MatlEng 490	Senior Design Projects I	1	Sr St, MatlEng 411(C)
MatlEng 491	Senior Design Projects II	3	MatlEng 490

<b>^^Mathematics (14-16 credits)</b>		(16 credits typical: Math 231, 232, 233, ElecEng 234)	
One of the following <b>Calculus</b> sequences must be completed:			
Math 231-232-233		12	Math placement score, or previous course with at least "C" grade
Or Math 221- 222 (Honors)		10	
And ElecEng 234 Analytical Methods in Engineering		4	Math 232*

<b>^^Chemistry (5-10 credits)</b>	
One of the following sequences must be completed:	
Chem 105 (Suggested) or Chem 102 -104	5 Chem 100* or Chemistry Placement; Math 105* or 108*

<b>Physics (10 credits)</b>	
Physics 219 -220	Physics 219: Math 232 (C)
or	Physics 220: Math 233 (C), C or better in Physics 219
Physics 209 & 214 – 210 & 215	Physics 209: Math 232(C)
	Physics 210: Math 233(C), C- or better in Physics 209 )

<b>General Education Requirements</b>			
<i>Distribution Requirements (15 credits)</i>			
<b>Art</b>		3	
<b>Humanities</b>		3	
<b>Social Science</b>		6	
<b>English 310</b>	Writing, Speaking & Technoscience in the 21 <sup>st</sup> Century	3	English Competency
<b>Cultural Diversity</b> - One of the arts, humanities, or social science courses selected must also meet the UWM cultural diversity requirement.			
<b>Free Elective</b>		2	
<i>Competency Requirements</i>			
<b>^^English Composition (0-6 credits)</b>			
The English Composition requirement is satisfied by:			
1. Earning a satisfactory score on the English placement test, or			
2. Earning a grade of C or higher in English 102			
3. Transferring a grade of C or better in a course (3 credits or more) equivalent to English 102 or higher level expository writing course			
<b>Foreign Language (0-8 credits)</b> (for new freshman starting fall 1999)			
The foreign language requirement can be completed with one of these options:			
1. Two years of a single foreign language in high school			
2. Two semesters of a single foreign language in college			
3. Demonstrate ability by examination			

**\*C or better in prerequisite** (C) Concurrent Enrollment in Designated Course

**^Advancement to Major:** 1. Complete a minimum of 24 credits required for major. (Excludes: general education, prerequisite and orientation courses). 2. Complete Math 232 (or 222) with "C" or better grade. 3. Complete EAS 200 Professional Seminar. 4. Complete the English composition requirement. 5. Obtain a 2.0 GPA in all courses in item 1. **The program may impose major status as a prerequisite for courses numbered 300 or above.**

**^^Placement Examinations:** Students without previous college level credits in Math, Chemistry or English may be required to take placement exams. The results of these tests determine the appropriate course in which to register. Background prerequisite courses may be required in addition to the courses listed above.

## Technical Electives – Materials Engineering Major

The Materials Engineering program requires a total of 24 credits of technical elective, chosen as follows.  
At least 18 of the credits must be from Group A1 and A2 as outlined below

### Group A1 Technical Electives (Structure): Select at least 2 courses.

		<u>Credits</u>	<u>Prerequisite</u>
MatlEng 380	Engineering Basis for Materials Selection	3	MatlEng 201
MatlEng 461	Environmental Degradation of Materials	3	Jr St, MatlEng 201
MatlEng 465	Friction & Wear	3	Jr St, MatlEng 201
MatlEng 481	Electronic Materials	3	Jr St, MatlEng 201
MatlEng 483	Materials for Energy Systems	3	Jr St, MatlEng 201
MatlEng 485	Introduction to Biomaterials	3	Jr St, MatlEng 201
MatlEng 511	Advanced Materials Characterization	3	Jr St, MatlEng 201

### Group A2 Technical Electives (Processing): Select at least 2 courses

MatlEng 431	Welding Engineering	3	Jr St, MatlEng 201
MatlEng 456	Metal Casting Engineering	3	Jr St, MatlEng 201
MatlEng 457	Engineering Composites	3	Jr St, MatlEng 201
MatlEng 460	Nanomaterials & Nanomanufacturing	3	Jr St, MatlEng 201
MatlEng 471	Heat Treatment of Materials	3	Jr St, MatlEng 201

### Group B Technical Electives: Select no more than 6 credits

Chem 104	General Chemistry & Qualitative Analysis	3	Chem 102*
Chem 223	Elementary Quantitative Analysis	4	Chem 104 or 118
Chem 341	Introductory Survey of Organic Chemistry	3	Chem 104*, 342(C)
Civ Eng 401	Intermediate Strength of Materials	3	Jr St, Civ Eng 303
Civ Eng 431	Materials for Construction	3	Jr St, Civ Eng 303
Civ Eng 466	Mechanics of Composite Materials	3	Jr St, Civ Eng 303
Civ Eng 502	Experimental Stress Analysis	3	Jr St, Civ Eng 303
EAS 001	Co-op Work Period	3 <sup>1</sup>	Prior Cons Co-Op Dir
English 206	Technical Writing	3	Completion of Eng Comp
Ind Eng 111	Introduction to Engineering	3	Math 116(C), Admission to CEAS
Ind Eng 112	Engineering Drawing & Computer Aided Design/Drafting	3	Math 116, Admission to CEAS
Ind Eng 360	Engineering Economic Analysis	3	Jr St
MatlEng 699	Independent Study	3	Jr St, Cons Instr
Math 413	Introduction to Numerical Analysis	3	Jr St, ElecEng 234(C) or Math 233(C), 234(C)
MechEng 110	Engineering Fundamentals I	4	Math 231(C) or 225(C), Admission to CEAS
MechEng 111	Engineering Fundamentals II	4	MechEng 110, Admission to CEAS
MechEng 301	Basic Engineering Thermodynamics	3	Math 233, Physics 209
MechEng 320	Introduction to Fluid Mechanics	3	Civ Eng 202, ElecEng 234, MechEng 301(C)

Other appropriate courses by permission of the department chair.

<sup>1</sup>Students who earn 3 or more credits of Co-Op may use 3 of those credits as approved technical electives.

\*C or better in prerequisite

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