

## METALLURGY AND MATERIALS SCIENCE

### Credentials

Metallurgy: Applied Physical certificate .....	30 cr.
Metallurgy and Materials AAS degree .....	63–64 cr.
Materials Science post-associate certificate .....	16 cr.

### Major Description

In an era of increased emphasis on sustainability and quality assurance, knowledge about metals and other materials used in products, manufacturing processes and construction is invaluable.

Established in 1966, our metallurgy and materials science department is one of the longest continually running programs at Schoolcraft and is the only two-year program of its type offered in Michigan.

Schoolcraft College can help prepare you for positions ranging from technician to plant manager.

- You'll learn on an array of testing equipment including computers, microscopes and a state-of-the-art Scanning Electron Microscope (SEM) used for compositional and image analysis of materials.
- You'll have the opportunity to publish and present a technical paper to a panel of experts at a technical seminar.
- If you already work in the profession, build your knowledge of the newest materials and technologies with our post-associate certificate.

### Job Titles & Median Salaries or Hourly Rates

- Metallurgical Engineering Technician: \$47,632 (Michigan)

### Metallurgy and Materials Science AAS Degree

The metallurgy and materials science program has been specifically designed to accommodate most areas of industry associated with research, development, manufacturing and materials control. Carefully selecting electives will prepare students for specialization. Students interested in the laboratory control of processing may wish to select electives in welding, fabrication, manufacturing processes or quality control. Likewise, students interested in development or industrial research may wish to complete electives in materials or physical science, design or computer technology.

Metallurgy and materials science graduates have knowledge of the philosophy of metallic and nonmetallic materials used in industry and can apply principles basic to scientific laboratory investigation, research, product development and process control.

All courses are not offered each semester. Students should work with an academic advisor or counselor to develop a schedule that will work for them. Students who satisfactorily complete all college and program requirements qualify for an associate in applied science degree.

Students seeking transfer to a baccalaureate program should request transfer guides provided by the department.

### SAMPLE SCHEDULE OF COURSES

#### First Year—Fall Semester

MET 102	Introduction to Materials Science .....	3
MET 120*	Hazardous Materials Management .....	2
ENGR 100	Introduction to Engineering and Technology .....	3
MET 152	Structure and Properties Laboratory .....	3
MATH 113	Intermediate Algebra for College Students .....	4
HUM 106	Introduction to Art and Music .....	1

**Total Credits 16**

#### First Year—Winter Semester

English	Select 1 .....	3
ENG 100	Communication Skills .....	
ENG 101	English Composition 1 .....	
CAD 103	Engineering Graphics .....	3
MET 114	Engineering Materials .....	3
BIOL 140	Scanning Electron Microscopy .....	4
MET 211*	Physical Metallurgy Structures .....	3

**Total Credits 16**

#### First Year—Spring/Summer Session

Social Science	Select 1 .....	3
POLS 105	Survey of American Government .....	
PSYCH 153	Human Relations .....	
SOC 201	Principles of Sociology .....	
English	Select 1 .....	3
ENG 102	English Composition 2 .....	
ENG 106	Business English .....	
ENG 116	Technical Writing .....	

**Total Credits 6**

#### Second Year—Fall Semester

MET 215*	Mechanical Properties of Metals .....	3
MET 217*	Computer Applications in Materials Science .....	3
MFG 102	Basic Machining Processes .....	3
WELD 113	Shielded Metallic Arc Welding (S.M.A.W.) .....	3

**Total Credits 12**

#### Second Year—Winter Semester

MET 248*	Electron Microscopy and Image Analysis .....	3
MET 280*	Special Problems in Materials Science .....	4
WELD 262	Welding Metallurgy .....	3
Elective	Select from the list below .....	3–4

**Total Credits 13–14**

### PROGRAM TOTAL 63–64 CREDITS

\* These classes are offered on a rotational basis. Contact Metallurgy faculty for current and projected offerings.

Students planning to transfer should check the transfer institution's requirements/guides or discuss their options with a counselor or advisor. Number of credits may vary depending on the course selection.

### Electives

BUS 103	Organizing a Small Business .....	3
MET 160*	Composite Materials .....	3
MET 271*	Corrosion and Corrosion Analysis .....	4
MFG 105	Manufacturing Processes .....	4

### ***Metallurgy: Applied Physical Certificate***

The applied physical metallurgy certificate program is designed to provide people currently employed in the field with an opportunity to reinforce skills and acquire the academic foundations necessary for advancement in the laboratory and related process situations. The program is oriented to property, process and structure areas of study and is designed and scheduled with consideration for part-time students.

All courses are not offered each semester. Students should work with an academic advisor or counselor to develop a schedule that will work for them. Students who satisfactorily complete the program requirements qualify for a certificate of program completion.

#### **SAMPLE SCHEDULE OF COURSES**

##### **First Year—Fall Semester**

MET 102	Introduction to Materials Science .....	3
MFG 102	Basic Machining Processes .....	3
MET 120*	Hazardous Materials Management .....	2
MET 152	Structure and Properties Laboratory .....	3

**Total Credits 11**

##### **First Year—Winter Semester**

MET 114	Engineering Materials .....	3
WELD 113	Shielded Metallic Arc Welding (S.M.A.W.) .....	3
Elective**	MET .....	3

**Total Credits 9**

##### **Second Year—Fall Semester**

MET 211*	Physical Metallurgy Structures .....	3
MET 215*	Mechanical Properties of Metals .....	3

**Total Credits 6**

##### **Second Year—Winter Semester**

MET 280*	Special Problems in Materials Science .....	4
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**Total Credits 4**

**PROGRAM TOTAL 30 CREDITS**

\* These classes are offered on a rotational basis. Contact Metallurgy faculty for current and projected offerings.

\*\* Any Metallurgy course not previously taken.

### ***Materials Science Post-Associate Certificate***

This post-associate certificate in materials science is designed for working professionals who have industrial experience and/or training in the materials science field and who wish to study current technologies applied to laboratory practice and other materials-related endeavors.

Completion of this program will enhance students' abilities to meet the needs of current and changing industrial technologies in metallurgical and materials science applications, processing, and control environments. It will also provide support background for managerial and technical personnel who have direct responsibilities in industrial materials operations and planning. These courses are also intended to meet requirements for current and future professional certification.

Prior to admission students must have earned a minimum of an accredited associate degree in applied science.

All courses are not offered each semester. Students should work with an academic advisor or counselor to set up a schedule that will work for them. The post-associate certificate is awarded upon successful completion of 16 credit hours (exact number may vary slightly due to credit value or content of courses).

#### **SAMPLE SCHEDULE OF COURSES**

##### **First Year—Fall Semester**

MET 211*	Physical Metallurgy Structures .....	3
MET 215*	Mechanical Properties of Metals .....	3
Elective	Select any applicable MET 200-level course .....	3–4

**Total Credits 9–10**

##### **First Year—Winter Semester**

MET 280*	Special Problems in Materials Science .....	4
Elective	Select any applicable MET 200-level course .....	3–4

**Total Credits 7–8**

Completion of a minimum of 16 credit hours is required.

Courses can be taken through independent study.

\* These classes are offered on a rotational basis. Contact Metallurgy faculty for current and projected offerings.