

METALLURGY AND MATERIALS SCIENCE

Credentials

Metallurgy: Applied Physical certificate	29 cr.
Metallurgy and Materials AAS degree	61-66 cr.
Materials Science post-associate certificate	16 cr.

Major Description

The relationships among composition, processing, structure, properties, and performance of industrial materials are the focus of the Schoolcraft College Metallurgy and Materials Science department. Since 1966, the department has been providing students with knowledge of metals and other materials used in processes and industries including automotive, aerospace, appliance, building construction, energy production and distribution, and consumer products. Measurement, a critical precursor to control, is emphasized in the academic curriculum that features significant hands-on laboratory activity. Lectures expound on the qualitative aspects of underlying physical principle.

The department offers students the opportunity to learn on an impressive assemblage of material testing and characterization equipment, including a state-of-the-art scanning electron microscope used for high-magnification inspection and compositional analysis. Program options include:

- Metallurgy and Materials Science Associate of Applied Science (AAS) degree: This is the only two-year program of its kind in the state of Michigan. It gives students broad knowledge of materials testing, manufacturing, and research and development needed to contribute to high performance in positions ranging from laboratory technician to plant manager.
- Applied Physical Metallurgy Certificate: This program allows those who are currently employed in the field with an opportunity to develop or reinforce skills needed to advance in the laboratory or supporting organizations.
- Materials Science Post-Associate Certificate: This program allows professionals who are currently employed in the field with an opportunity to expand their knowledge of current technologies applied to laboratory practice and other materials-related careers.

Metallurgy: Applied Physical Certificate

Schoolcraft program code # 1YC.00124

The Applied Physical Metallurgy Certificate program provides current metallurgical practitioners with an opportunity to reinforce technical skills and acquire the academic foundation needed for professional advancement. The program is geared toward part-time students and applies the materials science construct "Composition plus processing leads to structure, properties, and performance as defined by the customer."

Students who satisfactorily complete the program requirements qualify for a certificate of program completion.

SAMPLE SCHEDULE OF COURSES

First Year—Fall Semester

First Year—Winter Semester

MET 103	Introduction to Materials Science	3	MET 116	Introduction to Physical Metallurgy	3
CHEM 104	Fundamentals of Chemistry	4	MFG 102	Basic Machining Processes	3
MATH 102	Technical Mathematics	4	CIS 120	Software Applications	3
ENG 116	Technical Writing	3	MET 153	Metallography	3
	Total Credits	14	CAD 103	Engineering Graphics	3
				Total Credits	15

PROGRAM TOTAL 29 CREDITS

Not all courses are offered each semester. Students should work with an academic advisor or counselor to develop a schedule that will work for them.

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

Metallurgy and Materials Science AAS Degree

Schoolcraft program code # AAS.00184

The desired outcome of the Metallurgy and Materials Science AAS Degree program is to prepare students to knowledgeably, safely, and responsibly contribute to metallurgical and material laboratory functions in engineering, manufacturing, and research and development organizations in a variety of industries. In addition, the knowledge gained could be applied in sales, purchasing, marketing, management, quality or other materials-related activities. The emphasis is on the basic theory and tools of metallurgical analysis and characterization techniques. Electives may be selected to nurture burgeoning interests in a specific area of materials science, business, basic sciences, manufacturing, or welding in preparation for further academic work or imminent employment.

Metallurgy and Materials Science graduates can apply fundamental knowledge to the processing, testing, and characterization of industrial materials by a variety of techniques.

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.

Metallurgy and Materials Science AAS Degree (continued)

SAMPLE SCHEDULE OF COURSES

First Year—Fall Semester

MET 103	Introduction to Materials Science	3
CHEM 104	Fundamentals of Chemistry	4
MATH 102	Technical Mathematics	4
English	<i>Select one</i>	3
ENG 100	Communication Skills	
ENG 101	English Composition 1	
	Total Credits	14

First Year—Winter Semester

ENG 116	Technical Writing	3
CAD 103	Engineering Graphics	3
MET 116	Introduction to Physical Metallurgy	3
CIS 120	Software Applications	3
MET 153	Metallography	3
	Total Credits	15

First Year—Spring Session

MFG 102	Basic Machining Processes	3
WELD 110	Introduction to Welding Basics for Fabrication	3
	Total Credits	6

Second Year—Fall Semester

MET 212*	Heat Treatment	3
MET 216*	Mechanical Testing	3
MET 248*	Scanning Electron Microscopy & X-Ray Microanalysis	3
ENGR 100	Introduction to Engineering & Technology	3
Elective	<i>Select from list below</i>	2-4
	Total Credits	14-16

Second Year—Winter Semester

Elective	<i>Select from list below</i>	3-4
MET 281*	Special Problems in Materials Science	3
Social Science	<i>Select General Education Social Science course PSYCH 153 Human Relations (recommended)</i>	3-4
Humanities	<i>Select General Education Humanities course COMA 103 Fundamentals of Speech (recommended)</i>	3-4
	Total Credits	12-15

PROGRAM TOTAL 61-66 CREDITS

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

Electives

BIOL 140	Scanning Electron Microscopy	4
BUS 103	Organizing a Small Business	3
ELECT 131	Basic Measurement & Reporting Skills	3
ELECT 133	Introduction to Battery Technology	3
MET 160*	Composite Materials	3
MET 272*	Corrosion Testing	3
MET 290	Metallurgy Internship	3
MFG 103	Basic Computer Numerical Control	3
MFG 105	Manufacturing Processes	4
MFG 106	Basic Mastercam	3
MFG 110	Geometric Measurement & Reporting Skills	3
OSH 111	OSH General Industry	2
PLAST 130	Introduction to Plastic Materials	3
PLAST 131	Introduction to Plastic Processing	3
QM 106	Introduction to Quality Improvement Tools	3
QM 107	Quality Planning & Team Building	3
WELD 262	Welding Metallurgy	3

Not all courses are offered each semester. Students should work with an academic advisor or counselor to develop a schedule that will work for them.

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

Material Science Post-Associate Certificate

Schoolcraft program code # PAC.00179

The Materials Science Post-Associate Certificate is designed for working technical professionals who need specific training in metallurgical technologies or laboratory practices.

This program is geared toward part-time students and will enhance the student's ability to contribute in metallurgical technology and laboratory settings. In addition, the program will benefit certain personnel in management, supervision, sales, quality, purchasing, or other materials-related technical support functions.

Prior to admission, students must have earned a minimum of an accredited associate degree in applied science. Prerequisite and co-requisite requirements must be honored or evidence of prior learning proficiency must be demonstrated. Please contact the appropriate administrator to discuss options.

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).

Material Science Post-Associate Certificate (continued)

Program Courses

Completion of a minimum of 16 credit hours is required.

A student is required to take the three courses listed below:

MET 212*	Heat Treatment	3
MET 216*	Mechanical Testing	3
MET 281*	Special Problems in Materials Science	3

A student may choose from any of the courses listed below:

MET 160*	Composite Materials	3
MET 248	Scanning Electron Microscopy & X-ray Microanalysis	3
MET 272*	Corrosion Testing	3
MET 290	Metallurgy Internship	3
MFG 105	Manufacturing Processes	4
PLAST 130	Introduction to Plastic Materials	3
PLAST 131	Introduction to Plastic Processing	3
WELD 262	Welding Metallurgy	3

Courses can be taken through independent study.

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

Not all courses are offered each semester. Students should work with an academic advisor or counselor to develop a schedule that will work for them.

Students planning to transfer should check the transfer institution's requirements/guides or discuss their options with an academic advisor or counselor.

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It is the policy of Schoolcraft college that no person shall, on the basis of race, religion, color, gender, age, marital status, disability, sexual orientation, and/or national origin, be subjected to discrimination during or be excluded from participating in or be denied the benefits of any program or activity or in employment.

