Welcome to Schoolcraft.

CREDENTIAL YEAR 2020–2021

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: Applied Physical 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.

• 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.

• 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.

Not all courses are offered each semester. Students should work with an academic advisor 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. Number of credits may vary depending on the course selection.

SAMPLE SCHEDULE OF COURSES

First Year - Fall Semester

Course #	Course Title	Credits
MET 103	**Introduction to Materials Science**	3
CHEM 104	**Fundamentals of Chemistry**	4
MATH 102	**Technical Mathematics**	4
ENG 116	**Technical Writing**	3
	Total Credits: 14	

First Year - Winter Semester

Course #	Course Title	Credits
MET 116	**Introduction to Physical Metallurgy**	3
MFG 102	**Basic Machining Processes**	3
CIS 120	**Software Applications**	3
MET 153	**Metallography**	3
CAD 120	**Mechanical Blueprint Reading with Sketching**	3
	Total Credits: 15	

PROGRAM TOTAL 29 CREDITS

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.

Not all courses are offered each semester. Students should work with an academic advisor 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. Number of credits may vary depending on the course selection.

SAMPLE SCHEDULE OF COURSES

First Year - Fall Semester

Course #	Course Title	Credits
MET 103	**Introduction to Materials Science**	3
CHEM 104	**Fundamentals of Chemistry**	4
MATH 102	**Technical Mathematics**	4
English	**Select one:**	3
ENG 100	**Communication Skills**	
ENG 101	**English Composition 1**	
	Total Credits: 14	

First Year - Winter Semester

Course #	Course Title	Credits
ENG 116	**Technical Writing**	3
CAD 120	**Mechanical Blueprint Reading with Sketching**	3
MET 116	**Introduction to Physical Metallurgy**	3
CIS 120	**Software Applications**	3
MET 153	**Metallography**	3
	Total Credits: 15	

Metallurgy and Materials Science AAS Degree (continued)

First Year - Spring Session

Course #	Course Title	Credits
MFG 102	**Basic Machining Processes**	3
WELD 110	**Introduction to Welding Basics for Fabrication**	3
	Total Credits: 6	

Second Year - Fall Semester

Course #	Course Title	Credits
MET 212*	**Heat Treatment**	3
MET 216*	**Mechanical Testing**	3
MET 248*	**Scanning Electron Microscopy and X-Ray Microanalysis**	3
ENGR 100	**Introduction to Engineering and Technology**	3
Elective	**Select from list below**	2-4
	Total Credits: 14-16	

Second Year - Winter Semester

Course #	Course Title	Credits
Elective	**Select from list below**	3-4
MET 281*	**Special Problems in Materials Science**	3
Social Science	**Select General Education Social Science course**	3-4
Recommended:	**PSYCH 153 Human Relations**	
Humanities	**Select General Education Humanities course**	3-4
Recommended:	**COMA 103 Fundamentals of Speech**	
	Total Credits: 12-15	

Metallurgy and Materials Science AAS Degree (continued)

Electives

Course #	Course Title	Credits
BIOL 140	**Scanning Electron Microscopy**	4
BUS 103	**Organizing a Small Business**	3
CAD 130	**Geometric Dimensioning and Tolerance**	3
ELECT 131	**Basic Measurement and Reporting Skills**	3
MET 160*	**Composite Materials**	3
MET 272*	**Corrosion Testing**	3
MET 291	**Metallurgy Internship**	3
MFG 103	**Basic Computer Numerical Control (CNC)**	3
MFG 105	**Manufacturing Processes**	4
MFG 106	**Basic Mastercam**	3
OSH 111	**Occupational Safety and Health for 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 and Team Building**	3
WELD 262	**Welding Metallurgy**	3

PROGRAM TOTAL 61-66 CREDITS

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

Materials 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).

Not all courses are offered each semester. Students should work with an academic advisor 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.

Program Courses

Completion of a minimum of 16 credit hours is required. Courses can be taken through independent study.

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

Course #	Course Title	Credits
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:

Course #	Course Title	Credits
MET 160*	**Composite Materials**	3
MET 248	**Scanning Electron Microscopy and X-ray Microanalysis**	3
MET 272*	**Corrosion Testing**	3
MET 291	**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

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