

MTAG MODULARIZED CURRICULUM

Introduction to Composites

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Giving special recognition to Edmonds Community College

TECH PREP/MTAG CURRICULUM Introduction to Materials Science

Lesson Plan

Time Allotment:	8-hours
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	Community College

MODULE DESCRIPTION

This module will introduce fiber-reinforced composites. Through classroom and lab activities students will learn about the properties and processing of composites materials used in advanced manufacturing.

MODULE OBJECTIVE

After completing this module, students should be able to discuss composite materials and demonstrate basic fabrication techniques. In particular, students should be able to...

- Define fiber-reinforced composites
- Discuss properties of composites
- Recognize products made for fiber-reinforced composites
- Explain the differences between a polymer and composite
- Explain the key differences between composites properties to metal properties
- Make a fiber reinforced composite part
- Demonstrate safe fabrication practices

MTAG COMPETENCIES INTRODUCED

- C1.05 Comply with established safety practices
- C2.01 Wear protective safety clothing and equipment as required
- F2.05 Follow established safety procedures when around machinery and equipment
- F5.03 Prepare resources for production
- F10.03 List types of chemical and manufacturing processes
- F10.04 Differentiate between types of chemical and manufacturing processes

MANUFACTURING SKILLS STANDARDS INTRODUCED (MSSC)

- B5 Layout material to prepare it for fabrication
- C3 Chemically process product
- C6 Apply identification
- E2 Stamp/document work performance

PERFORMANCE CRITERIA

- Students will be able to demonstrate safe work practices
- Students will be able to discuss and identify composite materials and processes
- Students will be able to complete select labs
- Students will be able to complete a report documenting the fabrication process and final result

SEQUENCING

Lesson 1:	Introduction to CompositesAn Exploration of FRC
	Introduce lesson
	Introduce composites
	Discuss different products made from composites
	Compare fiber-reinforced composites to polymers
	Compare fiber-reinforced composites to metals
Lesson 2:	Introduction to Composites LabSelect Lab Option
	Review PPE-personal protective equipment and basic lab safety
	Introduce and demonstrate lab
	Have the students practice lab
	Discuss lab
	Assignment: Lab report
Lesson 3:	Introduction to CompositesComposites Materials
	Introduce fiber-reinforced composites
	Discuss products made from composites
Lesson 4:	Introduction to Composites LabSelect Lab Option
	Review PPE-personal protective equipment and basic lab safety
	Introduce and demonstrate lab
	Have the students practice lab
	Discuss lab
	Assignment: Lab report
Lesson 5:	Introduction to CompositesFabrication Processes
	Cover different composites fabrication processes:
	• RTM (resin transfer molding)
	• VARTM (vacuum assisted resin transfer molding)
	• Filament winding
	Tape fiber placement
	Compression
	Vacuum bag molding
	• Chopper gun
	• Infusion
	• Autoclave
	Pultrusion and extrusion
Lesson 6:	Introduction to Composites LabSelect Lab Option

Review PPE-personal protective equipment and basic lab safety