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**MST 175 Intro Material Science**
Mechanical, chemical and thermal properties of engineering materials including metals, alloys, ceramics, polymers and composites. Includes materials microstructure, atomic bonding, atomic arrangement, crystal structure, co-existing phases, interfaces, defects and impurities.

The student will be able to demonstrate foundational knowledge and skills in materials science. In particular, the student will be able to...
- Explain the differences in properties of different materials, including metals, alloys, ceramics, polymers and composites
- Relate the properties of materials to microstructure (quantitative skills)
- Discuss new fields of micro-electro-mechanical-systems (MEMS) and nanotechnology
- Describe the basics of processing techniques for altering the microstructure and properties of different materials
- Apply the basic principles of material selection to specific applications (critical thinking, quantitative skills)

**MST 180 Polymer Technology**
Course provides an overview of thermoset and thermoplastic polymers. Topics include: chemical composition, physical properties, deformation, mechanical behavior, fabrication, processing and manufacturing of polymers.

The student will be able to demonstrate foundational knowledge and skills for processing and manufacturing polymer products. In particular, the student will be able to...
- Describe the basic properties and characteristics of polymers.
- Explain and apply the basics of deformation, elasticity and mechanical behavior in polymeric materials (quantitative skills).
- Explain the relationship between polymer structure and impact properties.
- Identify the different types of polymers, including elastomers, fibers, and plastic.
- Explain the various fabrication techniques of polymeric materials, and explain the advantages and disadvantages.
- Apply and explain the application of polymers to engineering and composite manufacturing (critical thinking, quantitative skills).
- Perform basic qualification and selection of polymer materials (critical thinking, quantitative skills).
- Follow procedures when using lab equipment, and follow EPA and OSHA regulations and safety procedures when working in the lab.

**MST 200 Intro to Composites**
General overview of composite materials and fabrication procedures. Covers composite constituents, material forms, mold design and development, ASTM standards, fabrication processes, composite applications, bonding, fastening, laminating, and finishing techniques.

The student will be able to demonstrate foundational knowledge and skills for the composites industry. In particular, the student will be able to:
- Explain the basic properties, characteristics and constituents of composite materials
- Explain the functions and elements of ASTM standards
- Present and apply the different fabrication processes for composite materials, including bonding, fastening, laminating, and finishing techniques
- Describe the primary usage of composite materials in today’s industry and potential for future applications (critical thinking, quantitative skills)
- Perform basic fabrication processes in making composite structures (critical thinking, group
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<th>Course Title</th>
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<td>MST 210 Applied Statics</td>
<td>Study of forces acting on structures at rest: free-body diagrams, trusses, friction and related material, which may include hydrostatic pressures and loads, cables and arches.</td>
<td>The student will be able to:</td>
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<tr>
<td>MST 220 Applied Strengths of Materials</td>
<td>Study of forces acting on structures at rest; free body diagrams, trusses, friction. Analysis of tension, compression, shear, deformation, and stress acting on members.</td>
<td>The student will be able to demonstrate foundational knowledge and skills for the composites industry. In particular, the student will be able to…</td>
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<tr>
<td>MST 250 Composites engineering Design</td>
<td>Overview of structural design utilizing composite materials including material and process selection, structural design, aesthetic qualities, assembly, and practical design information. This is a lab-based course focusing on product design.</td>
<td>The student will be able to demonstrate foundational knowledge and skills for composites product design. In particular, the student will be able to…</td>
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| MST 260  
Composites Manufacturing  
Overview of the processes involved in the development and production of composite products. Includes tooling, fabrication, machining, assembly, quality assurance, repair, lay-up, vacuum bagging, and cure processing of wet laminating techniques and pre-impregnated materials. | The student will be able to demonstrate foundational knowledge and skills for composite product manufacturing. In particular, the student will be able to…  
- Explain the processes involved in the development and production of composite products, present their applications, and compare the advantages and disadvantages of different processes (critical thinking).  
- Explain the basics of tooling, fabrication, machining, assembly, process specifications, facilities, quality assurance, and repairs (critical thinking).  
- Perform lay-up, vacuum bagging, and cure processing of wet laminating techniques and pre-impregnated materials (critical thinking).  
- Explain resin transfer molding, filament winding, pultrusion, bonding, and fabrication of composite structures with core materials (critical thinking).  
- Follow procedures when running lab equipment, and follow EPA and OSHA regulations and safety procedures when handling and disposing of materials. |
| MST 291  
Career Planning  
Designed to give students an overview of engineering technology careers. Includes field trips, resume building, interviewing skills and job searching skills. | The student will be able to demonstrate knowledge and skills career planning and job seeking. In particular, the student will be able to…  
- Search for information on specific careers and the skills needed to succeed in specific jobs (research).  
- Obtain company information and assess best fit with personal professional interests and goals (research).  
- Access local and regional resources to support job searching (research).  
- Write a formal letter of application and resume (written and oral communication).  
- Demonstrate good interviewing techniques (written and oral communication). |