

MSE 404: Engineering Composites

<i>Course description:</i>	Basic concepts in design and specifications of engineering composites.
<i>Number of credits:</i>	3
<i>Course Coordinator:</i>	W.H. Katie Zhong
<i>Prerequisites by course:</i>	MSE 201
<i>Prerequisites by topic:</i>	<ol style="list-style-type: none">1. Knowledge of stress/strain, fracture, and fatigue of materials.2. Understanding of polymer science.3. Basic understanding of thermodynamics and chemistry.
<i>Postrequisites:</i>	None
<i>Textbooks/other required materials:</i>	<ol style="list-style-type: none">1. Baker, A., Dutton, S., and Kelly, D. <i>Composite Materials for Aircraft Structures</i>. AIAA, 4th Ed.
<i>Course objectives:</i>	<ol style="list-style-type: none">1. Structures and properties of reinforcing fibers and matrix materials.2. Mechanics concepts of continuous and failure mechanisms of fiber composites.3. Composite manufacturing technologies
<i>Topics covered:</i>	<ol style="list-style-type: none">1. Structures and properties of reinforcing fibers and matrix materials.2. The concepts of interface issues.3. Characteristics of polymer matrix, metal matrix and ceramic matrix composites.4. Mechanics concepts of continuous and discontinuous fiber composites.5. Failure mechanisms of fiber composites.6. Relationships between composite architecture and mechanical properties.7. Concepts in nondestructive testing (NDT), joining and repairing.8. Composite manufacturing technologies.
<i>Expected student outcomes:</i>	<ol style="list-style-type: none">1. Know characteristics of primary reinforcement fibers.2. Know the advantages and disadvantages of design with the primary types of polymeric matrix.3. Understand basic concepts of interfacial adhesion.4. Understand advantages and disadvantages of designing with polymer matrix, ceramic matrix and metal matrix composite systems.5. Understand the rules of mixtures for uniaxial composites.6. Understand the relationship between composite performance and nature of reinforcing phase for continuous fiber and discontinuous fiber composite systems.7. Develop a basic understanding of the unique problems involved in joining composite structures.8. Understand basic concepts of NDT for composites.9. Basic manufacturing methods for industrial composites.10. An ability to design composite components and apply processing methods to meet desired needs.
<i>Class schedule:</i>	Three 50-minute lecture sessions per week, for one semester.
<i>Laboratory schedule:</i>	None
	Engineering Topics
<i>Relationship of course to program</i>	Meets:

objectives:

1. School of MME educational objectives: 1, 2
2. School of MME program outcomes: (a), (c), (l), (m)
3. ABET EC2000, Criterion 3 program outcomes: (a), (c), (l), (m)

Prepared by: W.H. Katie Zhong

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POLICIES

A. Reasonable Accommodation (the nature of the particular course determines which one applies):

- **Pullman Campus.** Reasonable accommodations are available for students with a documented disability. If you have a disability and need accommodations to fully participate in this class, please either visit or call the Access Center (Washington Building 217; 509-335-3417) to schedule an appointment with an Access Advisor. All accommodations MUST be approved through the Access Center.
- **WSU Online Course.** Reasonable accommodations are available in online classes for students with a documented disability. All accommodations must be approved through your WSU Disability Services office. If you have a disability and need accommodations, we recommend you begin the process as soon as possible. For more information contact a Disability Specialist on your home campus: Pullman or WSU Online (<http://accesscenter.wsu.edu>), Spokane (<http://spokane.wsu.edu/students/current/studentaffairs/disability/>), Tri-Cities (<http://www.tricity.wsu.edu/disability>), Vancouver (<http://studentaffairs.vancouver.wsu.edu/student-resource-center/disability-services>).

B. Academic Integrity

WSU expects all students to behave in a manner consistent with its high standards of scholarship and conduct. Students are expected to uphold these standards both on and off campus and acknowledge the university's authority to take disciplinary action. The Standards of Conduct for Students can be found at <http://conduct.wsu.edu>.

C. WSU Safety

WSU is committed to maintaining a safe environment for its faculty, staff, and students. Safety is the responsibility of every member of the campus community and individuals should know the appropriate actions to take when an emergency arises. In support of our commitment to the safety of the campus community the University has developed a Campus Safety Plan, <http://safetyplan.wsu.edu>. It is highly recommended that you visit this web site as well as the University emergency management web site at <http://oem.wsu.edu/> to become familiar with the information provided.