**ETME 311 Joining Lab**

This Capstone project group is to develop experimental apparatus and procedures for an adhesive bonding lab in the ETME 311 course.

A large number of adhesive types exist for various applications. Adhesives are classified in a variety of ways depending on their chemistry (e.g. epoxies, polyurethanes, polyimides), their form (e.g. paste, liquid, film, pellets, tape), their type (e.g. hot melt, reactive hot melt, thermosetting, pressure sensitive, contact, etc.), or their load carrying capability (structural, semi-structural, or non-structural).

The design team is charged to investigate ETME311 facility capability and capacity, evaluate class educational needs, and perform research into various options for implementing a hands-on laboratory which provides students with an experience in structural adhesive application and bond testing. The lab experiment developed must consider safety (flammability, exotherm, off-gassing vapors, etc.), cost of implementation and expendables, test protocols such as cure times which may influence scheduling and capacity, material storage, cleanup, and any other lab-related items.

Tasks include choosing appropriate adhesive or adhesives, and substrate for use in a lab environment. Comparison of at least two unique adhesives with different characteristics may be a valuable methodology. The group must specify or design test equipment such as load-cells, fixtures, and grips suitable for testing the resulting bond strengths, according to published standards. [Example test protocols are available through ASTM for tension, shear, peel tests, etc.] Also required are complete classroom instructions, including procedures and protocols for all laboratory steps.