**TERM 1 COURSE OVERVIEW**

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| **COMP&124** | **TOPIC**: **Composites Molding** | **CREDIT/HRS**: 3CR 10/40 | |
| **PURPOSE**: | **Survey course of the common methods used to shape, consolidate, and cure (mold) composite materials for use in multiple industries.** | | |
| **OUTCOMES**: | **Upon successful completion of this course students will reliably be able to**:   1. Compare at least three composite molding technologies commonly found in the industry by discussing benefits, drawbacks, and the proper applications of each. 2. Demonstrate the ability to perform a wet layup with a vacuum bag molding process according to industry standards. 3. Perform a Vacuum Infusion Process 4. Demonstrate the ability to calculate or determine key fabrication parameters (i.e. Resin Content, fiber weight, Mix Ratio, cure time, cure temperature, consolidation pressure, and debulking). | | |
| **TIMING:** | **TOPIC**: (Specific topics to achieve stated course outcomes.) | | **HOURS: LEC/LAB** |
| 1. Basic Mold Requirements 2. Open Mold Techniques    1. *Spray Up*    2. *Wet Layup*    3. *Filament Winding*    4. *Roll Wrapping/Shrink Tape* 3. Closed Mold    1. *( Vacuum Bag, Autoclave, Resin Infusion/CCBM, Light RTM, RTM, Pultrusion, Compression Molding, Trapped Rubber, Bladder, Expanding Foam Core, Automated Tape Laying (ATL, ATF, ATP)* 4. Cosmetics: Finishes, Gel Coats, Surface Coats, and Application methods | | 2/5  2/10  4/20  2/5 |
| **ASSESSMENT MEASURES** | 1. Comprehensive knowledge based exams and/or quizzes. 2. Vacuum Bag Test for a 2” x 4” x 6” block of wood with no bag bridging and insuring the system maintains a vacuum of 27.7inHg or greater for a minimum of 10 minutes. 3. Perform a vacuum infusion process using a minimum of three fiber stacks (e.g., chopped strand and continuous strand mats, double brase no crimp fabric, etc. and calculate each stacks permeability. 4. Assess the parameters of Darcy’s Law. 5. Wet layup, laminated flat panel fabrication using Vacuum Bag method demonstrating proper material handling, safe work practices, vacuum bag construction (i.e. vacuum bag material schedule and the proper placement of pleats), and cure cycle. Student is to produce a quality panel and calculate its pre and post cure resin content, fiber content, Resin Mix Ratio, and prepare a graphic representation of the cure cycle. 6. Perform and independent vacuum infusion process (VIP) of defined quality standards. | | |
| **KEY EXERCISES/**  **VIDEOS**: | **SME Composites Manufacturing Video Series** <http://www.sme.org/cmvs/> Including DVDs on Compression Molding, Manual Composite Layup and Spray Up, Automated Composite Layup and Spray-Up, Filament Winding, Pultrusion and Liquid Molding.  **Flat panel vacuum bagged project.** | | |
| **KEY REFERENCES**: | *Essentials of Advanced Composite Fabrication and Repair,* by Louis C Dorworth and Ginger L. Gardner  National STEM Consortium Open Source material. . . <http://www.nationalstem.org/home/composites/> | | |