



**SYLLABUS**  
**AFAB 4218, Spring 2017**  
**Composites Fabrication and Repair 2**

**COURSE DESCRIPTION**

Composites Fabrication and Repair is designed to give students the necessary skills to perform composite lay-up and fabrication, as well as composite repair procedures. The course consists of classroom lecture and hands-on practice in graphite, aramid, and fiberglass composite lay-up and repair using vacuum bagging techniques with room temperature and oven cures. Students will be required to interpret blueprints/engineering drawings.

**COURSE INFORMATION**

Class Time	T, Th: 2:00-5:30pm
Class Location	Aero Lab, TS-100
Credits	4 SCH
Requisites	There are no Prerequisites for this course.

**INSTRUCTOR**

Instructor	Mr. Al Bradbury
Phone	501-760-4396
E-mail	abradbury@np.edu
Office	TS-100
Office Hours	Outside of Class hours contact me by email.

**TEXT & MATERIALS**

- Advanced Composites by Cindy Foreman (ISBN-13: 978-0-88487-316-1, Publisher-Jeppesen)  
□ Pencil/pen, loose-leaf paper, and the textbook must be brought to every class period.
- Personal protective equipment (PPE) – safety glasses, steel toed shoes. Clothing should be worn that is appropriate for the production setting. No open toed shoes are allowed in the laboratory.

**ASSURANCE OF LEARNING**

*Instructional methods*

This course will incorporate a variety of teaching and learning methods - lectures, readings, lab exercises, lab work, video clips, group/field projects, peer teaching, etc

### *General Educational Outcomes*

Upon successful completion of any degree at National Park Community College, the student will

- Communicate effectively by demonstrating proficiency in the English language, utilizing appropriate communication technology, and presenting ideas and information orally and in writing.
- Reason scientifically and quantitatively by demonstrating knowledge of mathematical and scientific principles, applying these principles to solve problems, interpreting information presented in graphic form, and by applying scientific methods to the inquiry process.
- Think critically as demonstrated by the ability to read, understand, analyze complex ideas, locate, evaluate, and apply research information, draw inferences from facts and evaluate and present well-reasoned arguments.
- Develop a global perspective which empowers the student to recognize commonalities and differences among cultures, examine the significance of diversity in social interaction, interpret events and values within a given context.

### *Course Specific Outcomes*

Upon completion of the course, the student will:

- Observe and comply with shop safety procedures and environmental regulations related to composite fabrication.
- Recognize and safely use hand and power tools used in composite fabrication and repair.
- Explain the importance of proper storage for prepreg materials and adhesives to include regulatory compliance.
- Prepare a fiberglass lay-up vacuumed bagged room temperature cure project.
- Assemble a graphite composite project using vacuum bagging procedures with an oven cure.
- Compare and contrast hot bond and cold bond fabrication and repairs.
- Create the final project using lay-up and bagging procedures learned in class.
- Demonstrate effective teamwork skills through the successful completion of the group final project.
- Demonstrate good time management through timely completion of all written assignments and the final project.

Progress on achieving these objectives will be measured through the completion of assignments inside and outside the classroom, participation in discussions and lab work, and periodic quizzes and examinations.

## **COURSE REQUIREMENTS**

### *Assignments*

Problems and textbook problems will be assigned to provide additional practice on the concepts. These assignments may be collected and graded to provide feedback.

*Quizzes*

Announced or unannounced quizzes may be given. Makeup quizzes are at the discretion of the Instructor.

*Examinations*

There will be 3 to 5 examinations worth 100 points each. Students will be required to take the exams in class or in a proctored environment. Alternative testing sites are acceptable but **MUST BE APPROVED BY THE INSTRUCTOR PRIOR TO THE EXAM**. Exams will consist of problems, fill-in-the-blank, and short essay.

*Final Exam*

There will be a final comprehensive assessment of the course material worth approximately 200 points.

*Lab requirements (if appropriate)*

What has to be accomplished in lab? What sort of testing, participation, skills.

*Evaluation*

Your grade will be determined by your relative performance on the following:

Exams .....	30%	Grading Scale:	
Homework/Quizzes .....	25%	A .....	90% - 100%
Projects .....	25%	B .....	80% - 89%
Comprehensive Final .....	10%	C.....	70% - 79%
Attendance/Participation .....	10%	D .....	60% - 69%
Total .....	100%	F .....	59% or Below

*Daily Class Outline*

Time	Activities
2:00	Take Roll Quiz (if planned) Review and answer questions from previous day Turn in homework instruction and/or demonstration, Class/project work assignments
3:00	10 minute break
3:10	Continue instruction and Class/project work assignments
4:00	10 minute break
4:10	Continue instruction and Class/project work assignments

5:00	Stop instruction and class/project work Return tools, equipment, and materials to storage Clean up work area and classroom Conduct tool kit inventory
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*Topical Outline*

Week	Tuesday	Thursday
0		Orientation/ Introduction Shop Safety Lecture Ch. 6 & 10 Vocab #1 Read Ch. 1, 6 & 10
1	Vocab quiz #1 Safety Quiz Lecture Ch. 1 Vocab #2	
2	Project 1	
3		
4	Project 2	
5		
6	Project 3	
7		
8	Mid-Term Written	Mid-Term Practical
9	Project 4	
10		
11	Project 5	
12		
13	Project 6	
14		
15	Final Exam – Written/Practical	

**COURSE POLICIES**

*Student Responsibility*

Students are responsible for reading the textbook material and completing homework assignments on time, documenting their lab projects, writing assigned technical research reports, and keeping a

notebook to document their learning progress. Points will be deducted for work that is turned in late! A dedicated 3-ring binder is recommended for the Basic Electricity notebook.

### *Attendance policy*

The College assumes that regular class attendance is essential to its academic operations. Students not attending regularly scheduled classes are considered absent. Faculty members have the responsibility to deal with absences, to decide makeup work required, if any, and to drop students for absences that exceed the instructor's policy. Students are personally responsible for the academic consequences of a poor attendance record.

Students may be administratively dropped if they fail to do ALL of the following:

- 1) Attend at least 85% of class meetings to date
- 2) Satisfactorily complete at least 85% of all assignments, quizzes, exams, online discussions, etc.
- 3) Make satisfactory academic progress

### *Cell Phone Policy/Classroom Etiquette*

- Pagers, cell phones, iPods, MP3 players and other electronic devices shall be turned off or on mute during classroom and shop/lab hours.
- Sleeping is not allowed during class/lab hours.
- Eating of snacks and/or food is not allowed in class. Food and drink containers must remain closed at all times in the classroom.
- Proper interpersonal courtesy and decorum will be maintained at all times. Disruptions, personal outbursts, tantrums and abusive and/or foul language are not allowed at anytime in the classroom or any academic environment.
- Students who do not follow the above guidelines, or who are disruptive during class, will be asked to stop the disruptive behavior and given a warning. A third warning will result in the student being temporarily suspended from the class that day and the day following. (See temporary suspension guideline below.) The temporary suspension for the day and the day following will be counted as unexcused absences.

### *Laboratory Policy/ Shop Rules*

At all times, students are expected to comply with all Shop Rules. Clothing should be worn that is appropriate for Aerospace production environments. No short pants or open toed shoes are allowed in the laboratory.

### *Personal Safety*

1. Absolutely no horseplay of any kind.
2. Never place composite material or any hardware in your mouth.
3. All jewelry, rings, watches, earrings, and chains must be removed during the use of any machinery-tools. These items have a tendency to get into the machinery, ruining the machinery and possibly an appendage.
4. Never wear gloves during drilling, sanding, grinding, rolling operations or any time you use any type of machinery. Gloves have a habit of getting pulled into machinery and your fingerextremity with it.

5. Never-ever eat, drink or keep open food/drink in the laboratory/shop. The atmosphere within the laboratory/shop is filled with dust particles containing fiber/metallic debris which can and will cause cancer if ingested. Sealed food containers and closed bottles (water, coffee cups, soda cans, and bottles) may be kept in the classroom area.
6. If you have long hair, you must wear a ball cap, hairnet, or have your hair placed-pinned on top of your head to keep it from acquiring a resting place within machinery or mechanized hand tools.
7. Always use your eye-ear-facemask PPE (personal protective equipment). PPEs are a must, and they will be worn at all times when working on projects. Never work without PPEs or perform any type of manufacturing without them.
8. Keep in mind that during drilling operations the drill bit will acquire heat due to friction. So, during bit changing processes do not touch the drill bit immediately after use. Use a little common sense; let the bit cool down for a few seconds.
9. While in the shop/classroom and at work you will be working in an industrial setting. You must dress appropriately and for personal safety. Full length pants with tucked-in shirts are required for safety. Shoes must be closed-toed for the same reason. Loose fitting/baggy low rider pants or long shorts will not be allowed due to safety issues. You can't hold pants with one hand while operating machinery at the same time. Bare legs are vulnerable to cuts, scrapes, and shop liquids. You must protect yourself as much as possible at all times.
10. It is strongly advised that you pay attention at all times to what is happening within the laboratory/shop. You must remain 100% focused on what you are doing and what is going on around you. This is a very dangerous career field due to the operation of shop equipment, machinery, pneumatic tools, and cutting tools. There are harsh chemicals, resins, catalysts, and sealants in use. Noise decibel levels can be high due to equipment operation and nearby aircraft operations.
11. Use your PPE at all times when using resins, catalysts, and sealants, as they are known to cause cancer.

#### Equipment

1. Do not drill into the work tables-benches. Use the wooden blocks provided for all hand drilling and drill press operation.
2. Do not leave vises open or vise handles in a horizontal position. Always close the vise jaws with the handle placed in the down position.
3. Always detach drill guns from their air source during drill bit changes/counter sink changes.
4. Always place the micro stop-countersink cage within the drill gun during the change process of the countersink. Never-ever use vise grips or a vise to perform the countersinking change. This will destroy the countersink cage.
5. Always use the right tool for the job. Never use a drill gun as a hammer.
6. Drill press operation: Ensure the chuck key is removed from the drill chuck prior to operating. Ensure that the travel guide of the drill press is unlocked and free to travel. Ensure that the drill press table is locked into proper position with table locks secured. (If the table needs to be lowered or raised, release the locks and crank to appropriate/desired depth or height.)

## Housekeeping

1. Always clean your work table and immediate area as you go. Never-ever allow clutter to build within your area, as this is a sure method or formula for an accident.
2. If you use tape on your tools you must remove it at the end of class. Ensure that consideration for others is the rule, as another student will be using these tools. Also, ensure that you clean your tools at end of class.
3. The work benches will be papered for protection during certain processes. Once papered, keep them papered, thus adding paper to the old paper. Do not remove it. It will layer and protect better. The night class will remove the paper and dispose of it properly.
4. Everyone will perform clean up of the laboratory/shop areas. No one is excused. There is plenty to do. This includes sweeping, debris to pickup, scrap to put away, and special tools to put away. Toolkits must be inventoried. The work benches and class tables must be wiped down daily. The machinery must be vacuumed, cleaned, and oiled daily as are the pneumatic drill guns. The class tables and chairs must be in correct position. The special tool cart must be in an orderly condition with all tools in their correct locales. All trash and debris must be removed. Workbench area chairs must be put on top of workbenches. Air hoses and wood blocks must be placed neatly back into bins. Only when the instructor is satisfied with clean up, will the class be dismissed. Early leavers are warned: Roll call can and will be called prior to class dismissal. Absentees will be dealt with.

## General Rules

1. You may have water-bathroom calls at anytime during the class. Just leave and come back. Never-ever leave the laboratory/shop building without informing the instructor.
2. Always see the instructor or e-mail/call him with a problem or question prior to elevating it to the professor and/or dean.
3. Always obtain permission to enter the laboratory/shop's tool crib. Never-ever enter without permission. This is for your protection.
4. Cell phones must be on vibrate during class at all times. Special note: If you have to have it on ring tone for emergency purposes do so. Just inform the instructor. Do not text during class lectures-demonstrations. Do not play games. Do not play music (i-pods).
5. Always be mindful of the whereabouts and control of your tools. Tool control is a major concern of the aircraft companies.
6. Bring worn or broken tools to the instructor for replacement. Place broken drill bits into the drill bit bucket and obtain a new one from the cabinet.
7. Ensure that all scraps that are useable go into the usable bin. Unusable scraps go into unusable bin.

## *Lab Supplies and Materials (Consumables)*

All technical classes are expensive to operate. It is imperative that students do not waste material. Material expense is a major cost item in industry, and good habit patterns should be established in the classroom. Wasteful practices will be noted by the instructor, and students who are observed wasting material will be docked points from their project.

*Make-up Policy*

Make-ups on regular exams will be given at the instructor’s discretion. It is the student’s responsibility to work this out with the instructor. If an exam date is missed, the student must provide a written request for makeup work. Any supporting documentation may be attached. Any missed projects; quizzes, discussion board postings, papers, and any other class assignments may be made-up only at the discretion of the instructor.

*Academic Integrity*

Students are responsible for familiarizing themselves with the College policies on academic integrity. Any instance of academic dishonesty, especially cheating or plagiarism, will be dealt with harshly and may result in failure on the exam or assignment, failure in the course, or dismissal from the College.

*ADA statement*

Students with Disabilities: It is the policy of National Park Community College to create inclusive learning environments. If there are aspects of the instruction or design of this course that result in barriers to your inclusion or to accurate assessment of achievement—such as time-limited exams, inaccessible web content, or the use of non-captioned videos—please notify the instructor as soon as possible, preferably during the first or second week of class. Then, it is the student’s responsibility to contact the campus Disability Specialist, Audrey Annette Smelser, to verify disability and to request one or more accommodations. Students should contact the Disability Specialist by telephone at 501-760-4227 (v/tty) or via email at [asmelser@npcc.edu](mailto:asmelser@npcc.edu). For more information, visit the Disability Services website at [http://www.npcc.edu/Students/StudentServices/student\\_services\\_description.htm#Disability](http://www.npcc.edu/Students/StudentServices/student_services_description.htm#Disability)

*Legal Disclaimer*

The schedule, policies, and assignments in this course are subject to change in the event of extenuating circumstances or by mutual agreement between the instructor and the students. The instructor will always inform the students of any changes in a timely manner.

**Personal Contact Information & Program Interest Information Sheet**

(PLEASE PRINT)

NAME:		PHONE:
ADDRESS:		CITY:
STATE:	ZIP:	ALTERNATE PHONE:
EMERGENCY CONTACT:		
EMERGENCY PHONE:		
EMAIL:		



**What are your personal goals for this program?**

**What are your career goals in Aerospace?**

**How Did You Know About the AFAB Program?**

- Radio     Triumph Airborne Employee
- Newspaper     CMT Employee
- Former NPC Student     Air Tech Employee
- Parent     Cobalt Aero Employee
- High School     Other Aviation Employee
- NPC Website     Class Schedule
- Triumph Fabrications Employee     Other \_\_\_\_\_

**AFAB Program Classes:**

What other classes in the AFAB Program are you **currently** enrolled in?

What other classes in the AFAB program have you **completed** with a passing grade of "C" or better?

**CERTIFICATION OF UNDERSTANDING  
AFAB 120 SYLLABUS & LABORATORY SHOP RULES**

I have read the syllabus for AFAB 120 "Composite Fabrication and Repair" and the Laboratory/Shop Rules and Toolkit Inventory procedures found in Section V of the syllabus. I fully understand and I will comply with the information contained therein.

I, \_\_\_\_\_, have read and understand the above  
(Print Your Name)

syllabus and rules, and I agree to, and will abide by, their contents.

\_\_\_\_\_  
(Student Signature)

\_\_\_\_\_  
(Date)

\_\_\_\_\_  
(Witness Signature - classmate)

\_\_\_\_\_  
(Date)

\_\_\_\_\_  
(Instructor's Signature)

\_\_\_\_\_  
(Date)

\_\_\_\_\_  
Course Number

\_\_\_\_\_  
Semester Term

**CCBY License Statement**

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**DOL Attribute**

This course is part of a program at National Park College that is (wholly or partially) funded by a DOL TAACCCT grant, awarded to the SouthWest Arkansas Community College Consortium in 2013.