

FAA CSET, CMT, CMfgT and Adhesive Online Courses – Modifications and Implementation

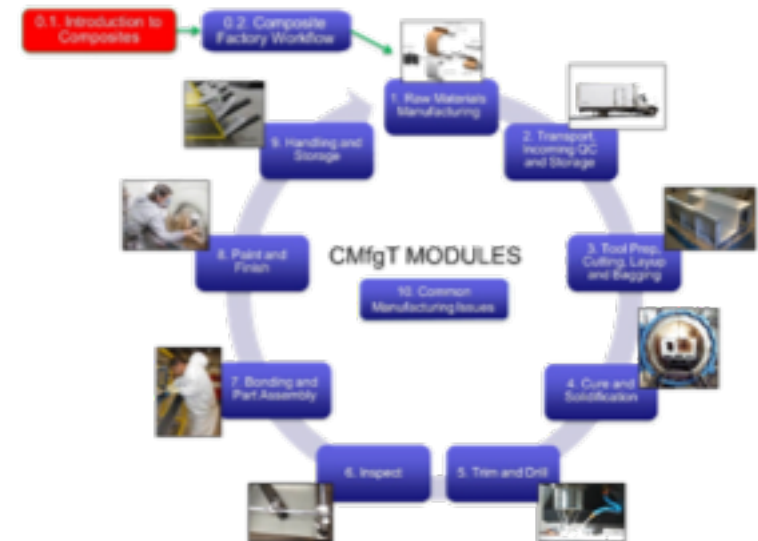
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Wichita State University

JAMS 2018 Technical Review
May 23-24, 2018

FAA CSET, CMT, CMfgT and Adhesive Online Courses –Modifications and Implementation

- Motivation and Key Issues

- Workforce Education
 - Safety Awareness courses
- Offered online
 - No fixed schedule
- Audience
 - Practicing engineers
 - Time commitment



- Objectives

- Convert existing CMfgT and CSET courses into WSU ‘Badge courses’ and ‘Graduate courses’.
- WSU Academic calendar

Team

- Wichita State University
 - Suresh Keshavanarayana (P.I., Aerospace Engg.)
 - Carolyn Speer (IDA*)
 - Torie Wynn (IDA)
 - Taylor Moore (IDA)
- FAA
 - Cindy Ashforth (Technical Monitor)
 - Larry Ilcewicz
 - C. Seaton, NSE Composites, C. Kassapoglou
 - Rusty Jones

*IDA : Instructional Design and Accessibility

CMfgT and CSET courses...Background

- CMfgT : Composites Manufacturing Technology Safety Awareness course

The course notes was developed by Convergent Manufacturing Technologies under FAA grant 8-C-AM-WISU

Course Description This course provides manufacturing professionals with a technical background of composites manufacturing to a level that allows them to better and more proactively identify deficiencies on the factory floor that have safety implications

4 weeks online course + 2 days hands-on lab

- CSET : Composites Structural Engineering Technology

The course notes was developed by FAA, Industry & Academia partnership.

Course Description This course will provide to students a background in the techniques, methodology and safety issues regarding the structural engineering and certification of composite materials utilized in commercial aerospace.

12 weeks online course + 2 days hands-on lab

WSU Badge Courses

Source : <http://badges.wichita.edu/node/87>, *Frequently Asked Questions for Faculty–
Badge Development and Instruction*

What is a Badge?

“Badges are short credit courses that appear on a transcript indicating that academic work was successfully completed in a short course. Badges are designed for working, non-degree seeking professionals. Badges may also be granted for successful completion of workforce related noncredit academic programs.”

Can badges be offered for academic credit?

“**Yes.** Badges can be awarded for approved undergraduate or graduate level academic work completed in workshops and short courses, in which there may be a need or it may be useful to award credit for less than a full credit hour. Badges for academic credit must meet the University’s definition and assignment of credit hours and have measureable learning outcomes.”

WSU Badge Courses...

Source : <http://badges.wichita.edu/node/87>, *Frequently Asked Questions for Faculty–
Badge Development and Instruction*

Do badges count toward a degree or certificate?

Badge credit hours may apply to a university degree, if the student has been or is admitted as a degree seeking student into a degree program (pursuant to all policies governing such admission, including qualified admissions requirements) and the academic unit accepts the credit hours as part of the degree program. Badges may be “stacked” to allow professionals to gain a certificate to document their learning. This would allow both the University and the employer to document the quality of the student learning in a manner that is much more rigorous than traditional noncredit continuing education offered by most universities. Because these courses would all meet HLC standards, faculty and departments may choose to allow these courses to count toward a university degree should the student later be admitted to a degree program.

Who is qualified to teach a badge course?

Instructors must meet Higher Learning Commission credentialing policies, which includes possessing an academic degree relevant to what they are teaching and at least one level above the level at which they teach, except in programs for terminal degrees or when equivalent experience is established.

Composite Manufacturing Technology (CMfgT)

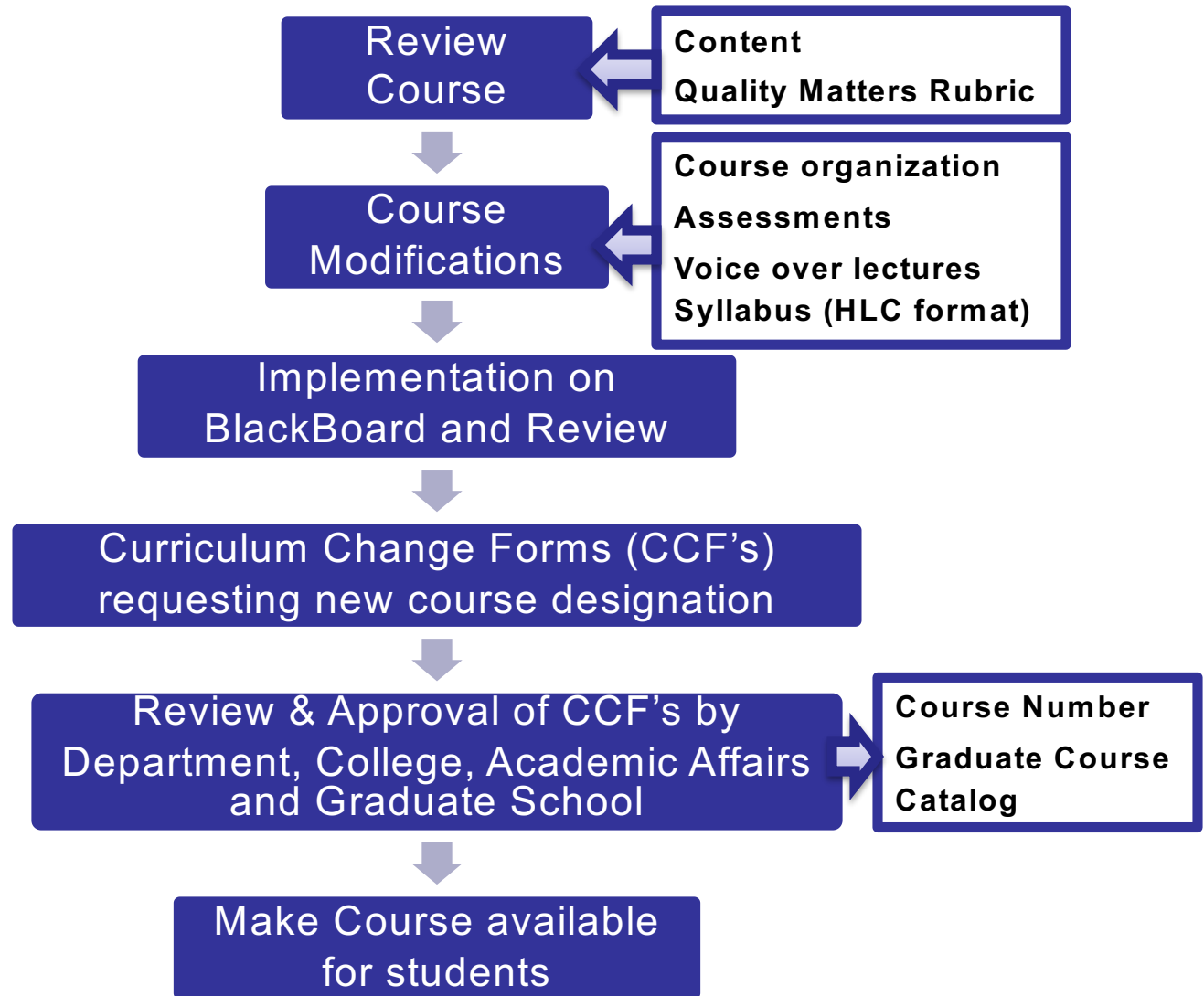
- **Previous version**

- Online
 - BlackBoard
- Offered as 4 weeks + 2 days “continuing education” course
- No regular schedule
- Course completion certificate
 - Not usable towards graduate credit
- Course notes (pdf)
- Limited quizzes & Discussion boards

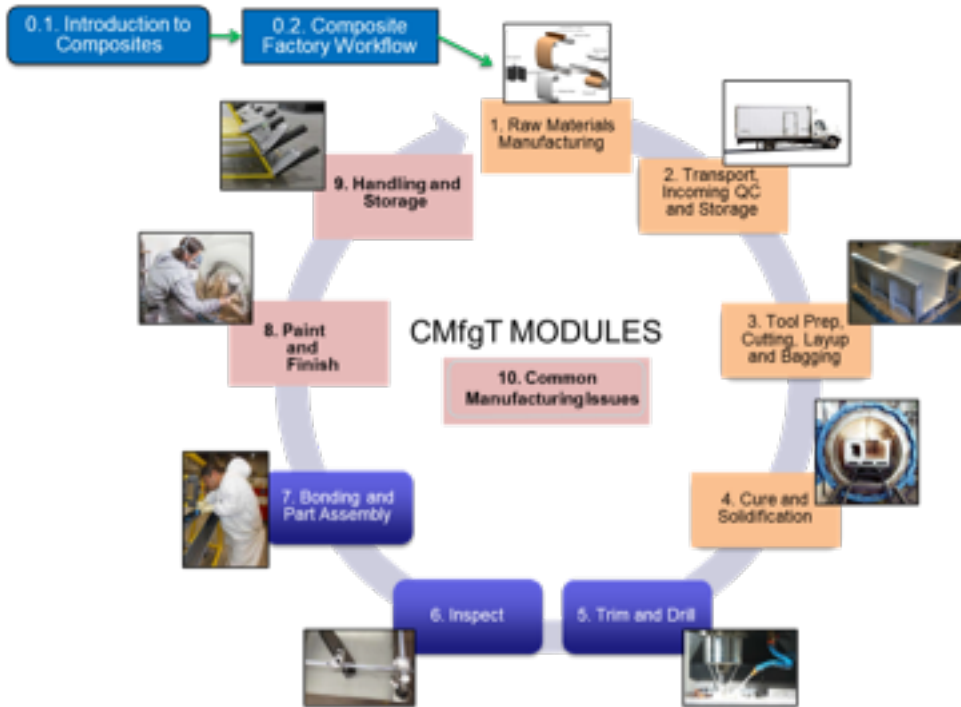
- **Current version**

- Online
 - BlackBoard
- “Badges”
 - AE 770 Bx (x ~ A,B,...,E)
- Graduate credits
 - AE 765 x (x ~ A,B,...,E)
- 0.5 credit hours each
- Offered every semester per WSU academic calendar
- Course notes + Voice over lectures with embedded quizzes
- Assessment using quizzes and consolidated discussion boards

Course Modification for Badges..Process

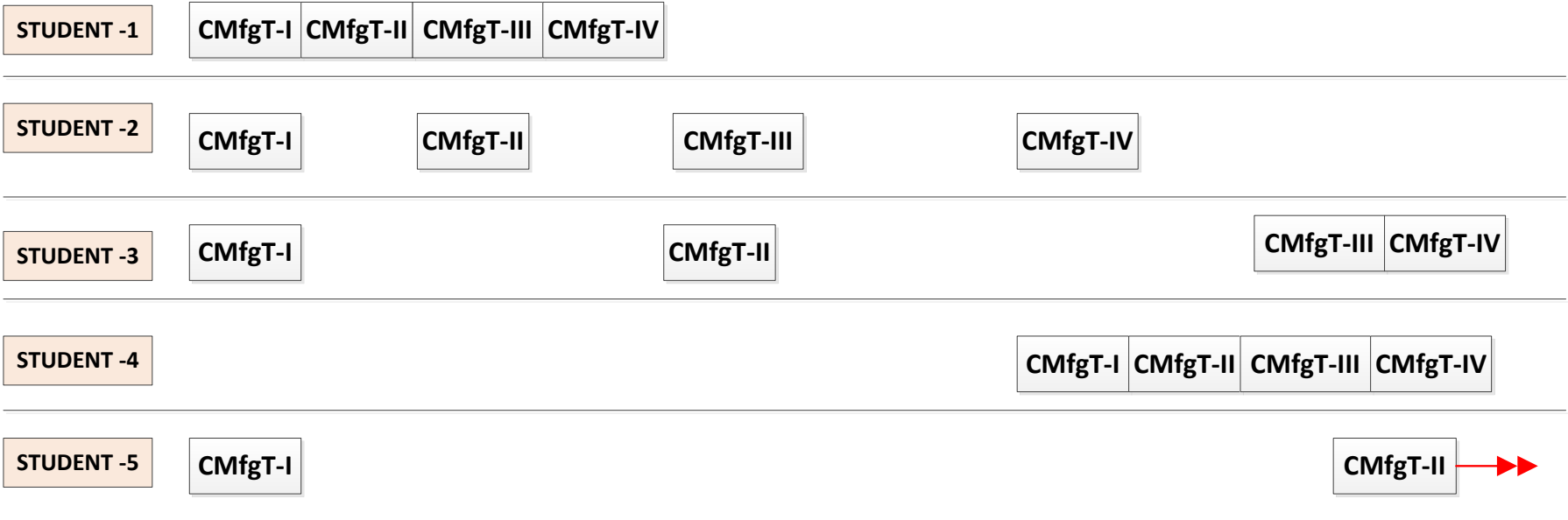


Composite Manufacturing Technology (CMfgT)



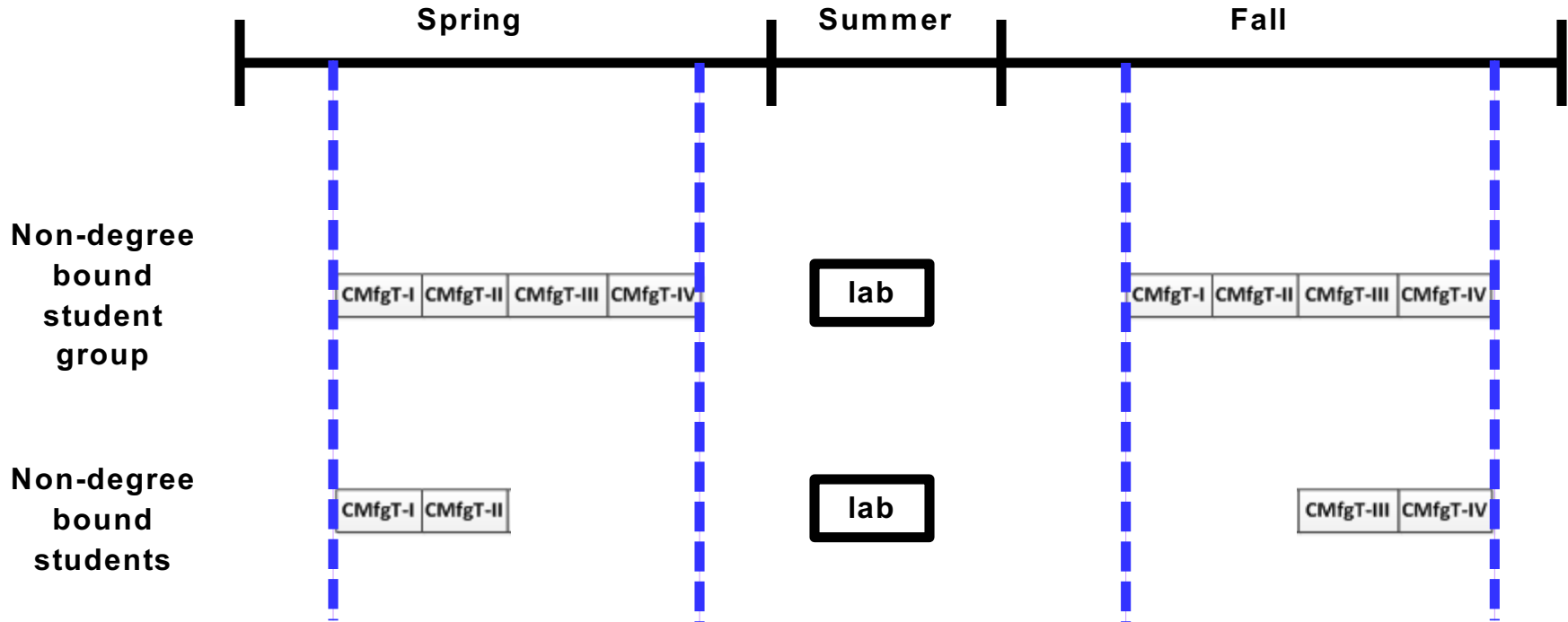
- CMfgT-I (AE 770BA/ AE 765A)
 - Introduction to Composites
 - Composites Factory Workflow
- CMfgT-II (AE 770BB/ AE 765B)
 - Raw Materials Manufacturing
 - Transport, Incoming QC and Storage
 - Tool Prep., Cutting, Layup and Bagging
 - Cure and Solidification
- CMfgT-III (AE 770BC/ AE 765C)
 - Trim and Drill
 - Inspect
 - Bonding and Part Assembly
- CMfgT-IV (AE 770BD/ AE 765D)
 - Paint and Finish
 - Handling and Storage
 - Common Manufacturing Issues
- CMfgT-V (AE 770BE/ AE 765E)
 - Hands-on Lab

Enrollment options..



Students registered in a particular semester will have access to messages/comments posted on course page for the duration of the semester

Enrollment options..



CMfgT.. BlackBoard Course page sample

ST: CMfgT II (AE-765B-26646-Spring 2018)

Announcements

Welcome! | START HERE

Lesson Modules

Discussion Boards

Student Progress

My Achievements

Student Support

About the Badge Series

Student Support Manual

Glossary

Blackboard Support

Your Instructor

Ask the Instructor

Email the Instructor

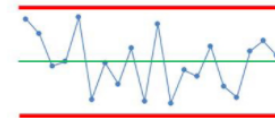
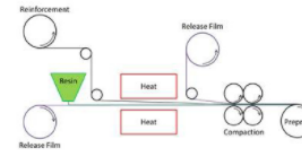
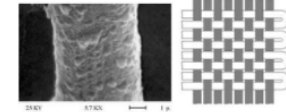
Materials Manufacturing

Click the title above to access materials

LESSON ONE

The following topics are covered in this lesson

- Key concepts in Composites Manufacturing
- Raw Materials (Fibers, resins, prepreg, cores, adhesives and consumables)
- Quality Inspection Techniques
- Implications for the Inspector



Transport, Incoming Quality Control and Storage

Enabled: Adaptive Release
Click the title above to access materials

LESSON TWO

The following topics are covered in this lesson

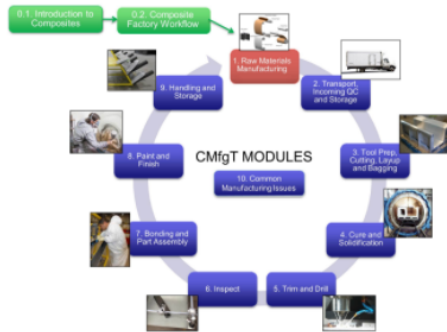
- Important Environmental Conditions
- Controlling Environmental Conditions
- Receiving Raw Materials



CMfgT.. BlackBoard Course page sample

Materials Manufacturing

Instructions



1. Download the course notes in pdf format (click on the link below) and have a printed copy handy.
2. View the video of the course notes with interactive quizzes.
3. After completing the embedded quizzes in the video lecture, you may review the course notes and attempt Quiz 01.
4. Successful completion of Quiz 01 will give you access to Lesson 02 of this course

The course notes was developed by Convergent Manufacturing Technologies under FAA grant 8-C-AM-WISU. The design of the online instruction was done by Instructional Design and Technology, Wichita State University.

Lesson Objectives

At the end of this course module, you should be able to:

- Describe the manufacturing processes of the individual constituents of composites as well as the composite forms
- Explain the characteristics, advantages and disadvantages of different fiber and resin classes of materials (thermoplastic vs. thermoset, glass vs. graphite, etc.)
- Explain the characteristics, advantages and disadvantages of different fiber forms (unidirectional, woven, chopped, etc.)
- Appreciate the relationship between the quality of raw materials on the quality of the resulting composite structure.

CMfgT.. BlackBoard Course page sample

- ST: CMfgT II (AE-765B-26646-Spring 2018)
- Announcements
- Welcome! | START HERE
- Lesson Modules
- Discussion Boards
- Student Progress
- My Achievements
- Student Support
- About the Badge Series
- Student Support Manual
- Glossary
- Blackboard Support
- Your Instructor
- Ask the Instructor
- Email the Instructor

Course Notes for "Materials Manufacturing"

Enabled: Statistics Tracking

Attached Files: [Module 1 Materials Manufacturing NOTES.pdf](#) (3.344 MB) [Optional Slides for Module 1.pdf](#) (420.796 KB)

Download and print a copy of the course notes and optional slides prior to watching lecture videos

Module 1: Raw Materials Manufacturing

Enabled: Review

Please note:

- (1) It is perfectly acceptable to pause the video, take a break, and resume it at a later time.
- (2) You must mark this activity as "reviewed" after completing it.



If you have difficulty viewing this slide presentation or would like to review the audio notes, please access the Alternative Lecture Format folder below. Reviewing the Alternative presentation just in alternative media forms. Please be sure to report viewing difficulty to OneStop Support so that the issue may be resolved.

Alternative Lecture Formats (Optional)

For alternative lecture formats, such as audio-only and audio/video with notes, please click on the title of the folder.

QUIZ-01

Enabled: Adaptive Release

Review the course notes and lecture videos prior to attempting the quiz. This quiz has 20 questions for a total of 31 points. You will have 60 minutes to complete the quiz and complete the quiz and gain access to the contents of the next lesson.

CMfgT Course Availability

- Courses available Spring, Summer & Fall semesters
- Hands-on Labs
 - 1st week of May & October every year
- Non-degree seeking students
 - Register through WSU Continuing Education Program (<http://badaes.wichita.edu>)
- Degree seeking students
 - Register through WSU graduate program

Engineering Badges



[Advanced MatLab](#)



[CMfgT/CSET: Hands-On Lab](#)



[Composite Manufacturing Technology Safety Awareness Badge 1](#)



[Composite Technology 2](#)



[Composite Manufacturing Technology Safety Awareness Badge 3](#)



[Composite Manufacturing Technology Safety Awareness Badge 4](#)



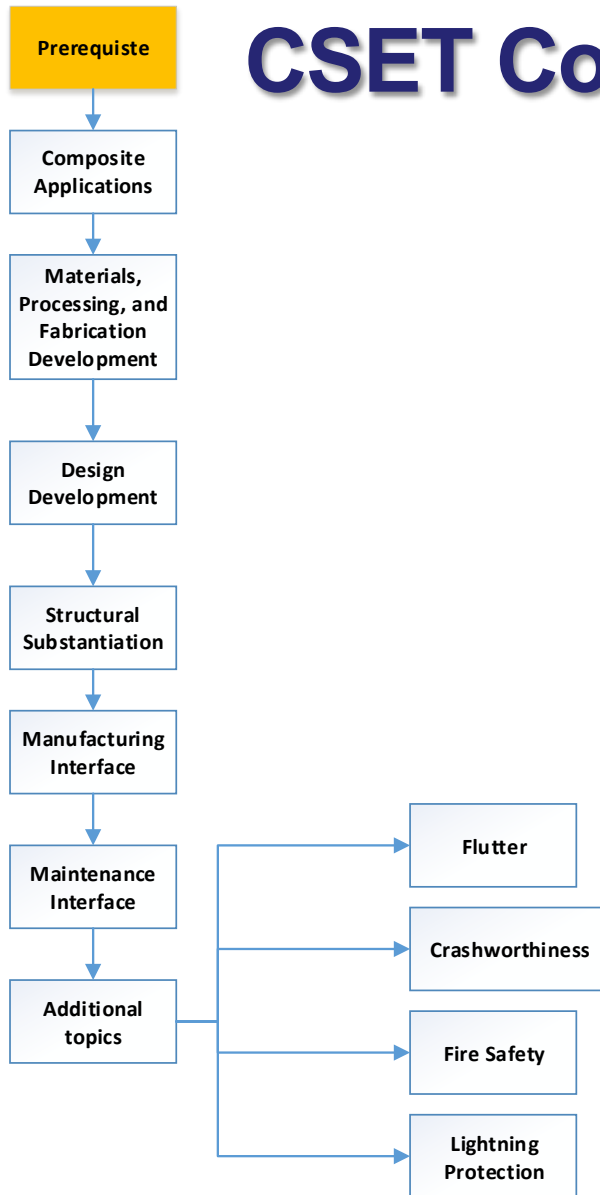
[Computer Programming: Computer Programming for Engineers](#)



[Computer Systems fr](#)



CSET Course Modules

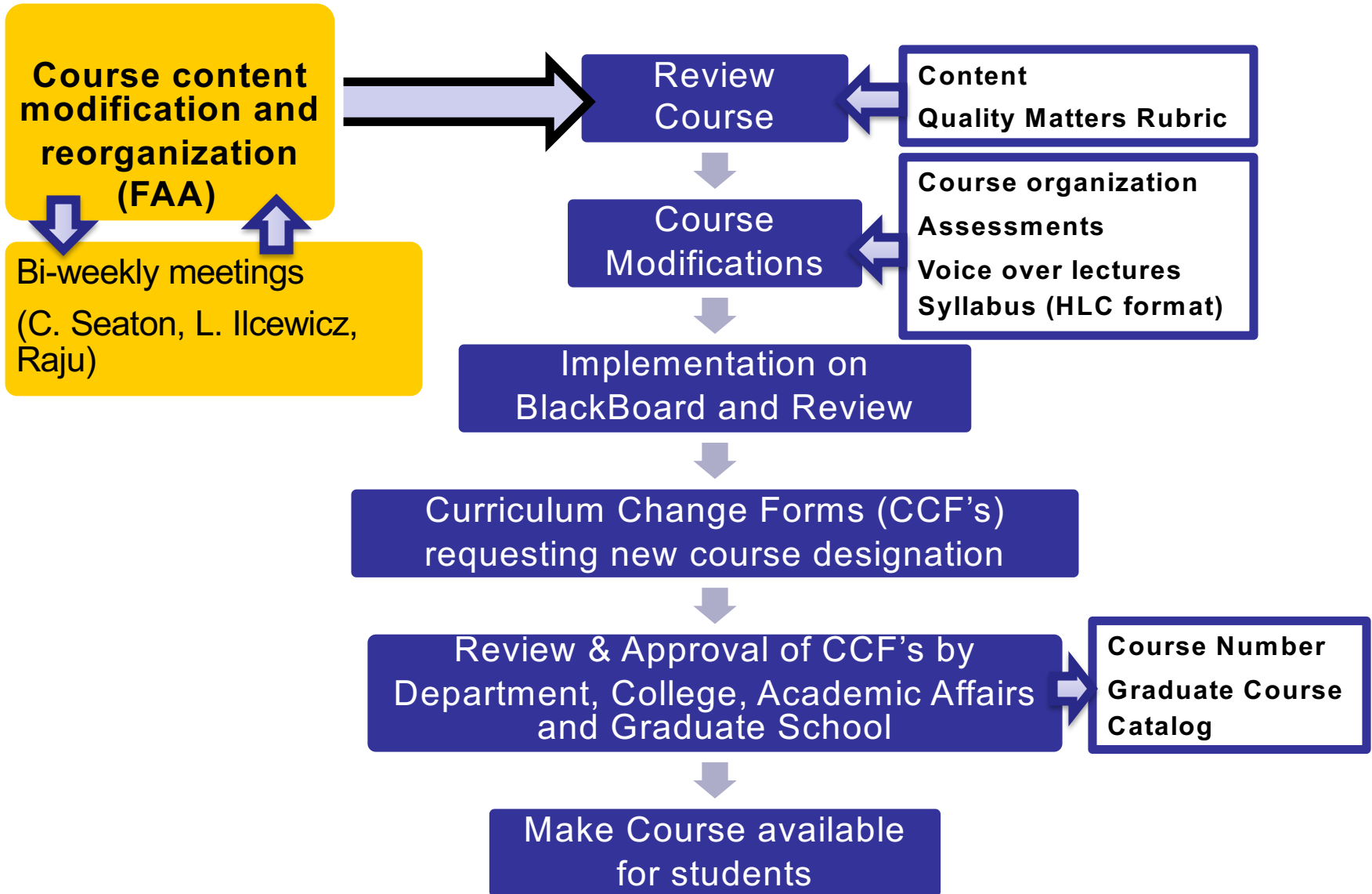


- Content organization
 - L. Ilcewicz, C. Seaton, C. Ashforth
- Present course offering
 - 12 weeks online course + 2 day lab
 - Continuing ed./non-credit course
 - FAA, Industry subject matter experts involvement
 - Course notes + discussion boards
 - Course schedule – dictated by minimum enrollment

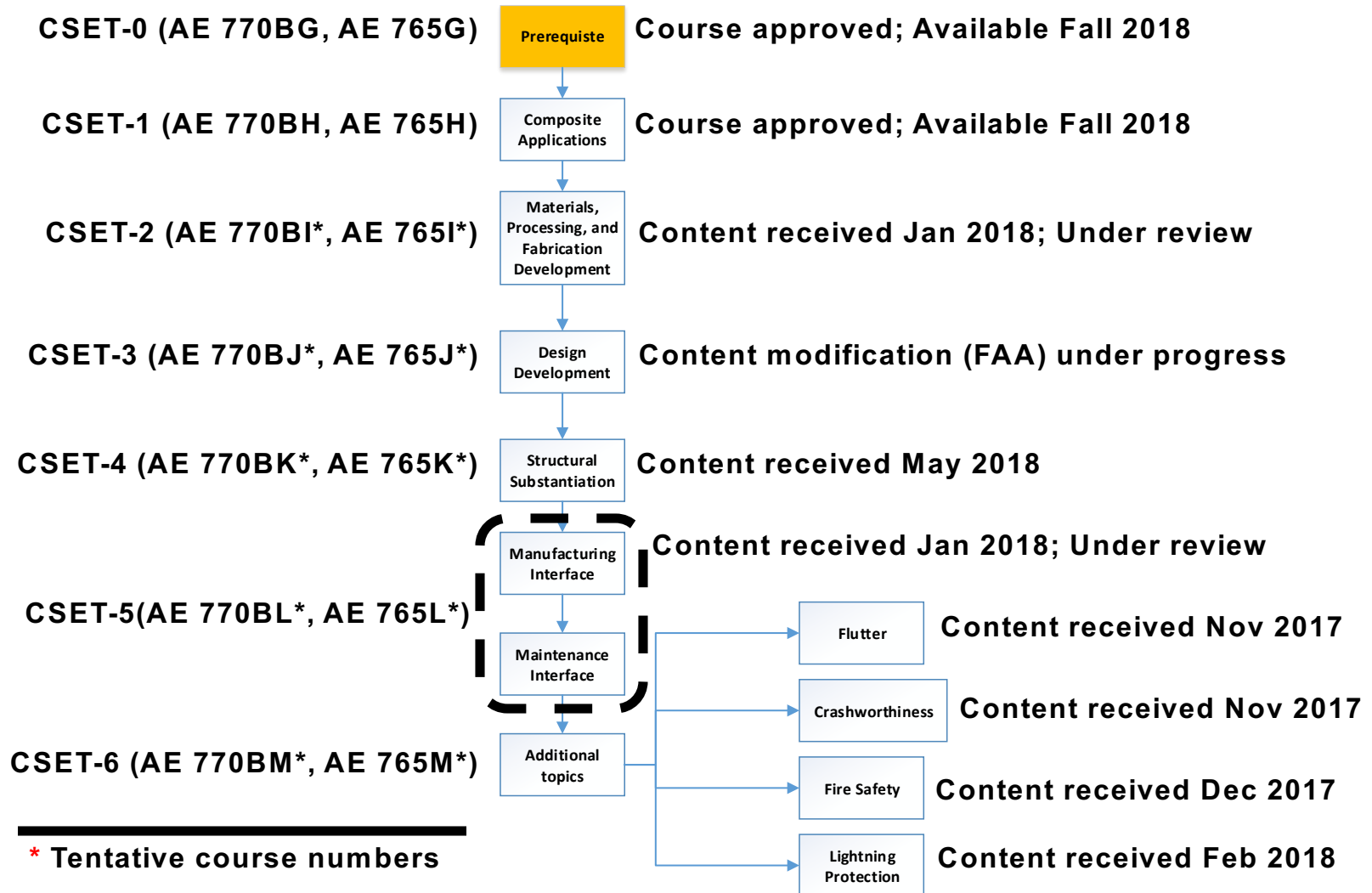
CSET course Modifications

- Modifications and reorganization of course content
 - C. Seaton, L. Ilcewicz, C. Ashforth
 - NSE Composites
- Delivery
 - WSU Aerospace Engg
 - WSU IDA
- Voice over lecture scripts
- Quizzes
- Discussion Boards
- Badge & Graduate course inclusion into WSU catalog

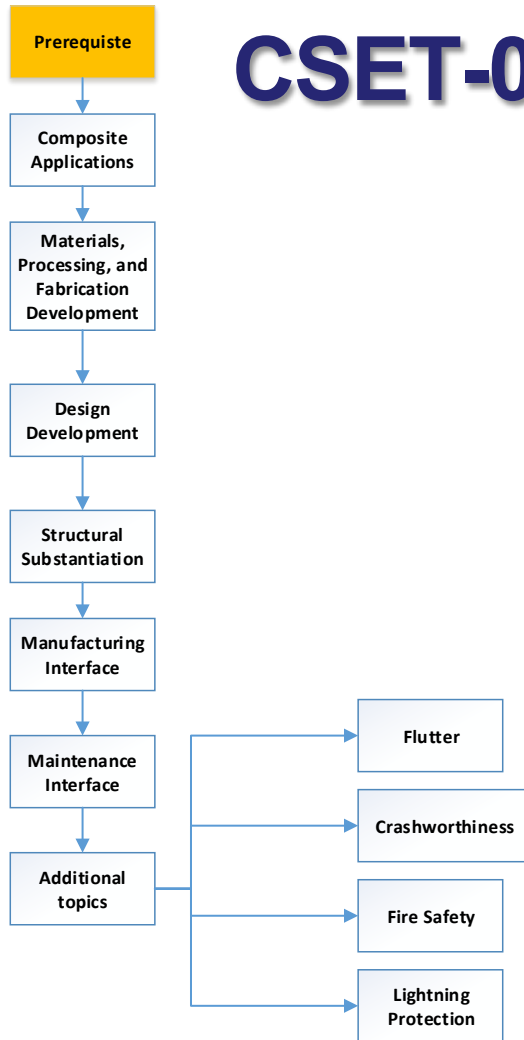
Course Modification for Badges..Process



CSET Course..status



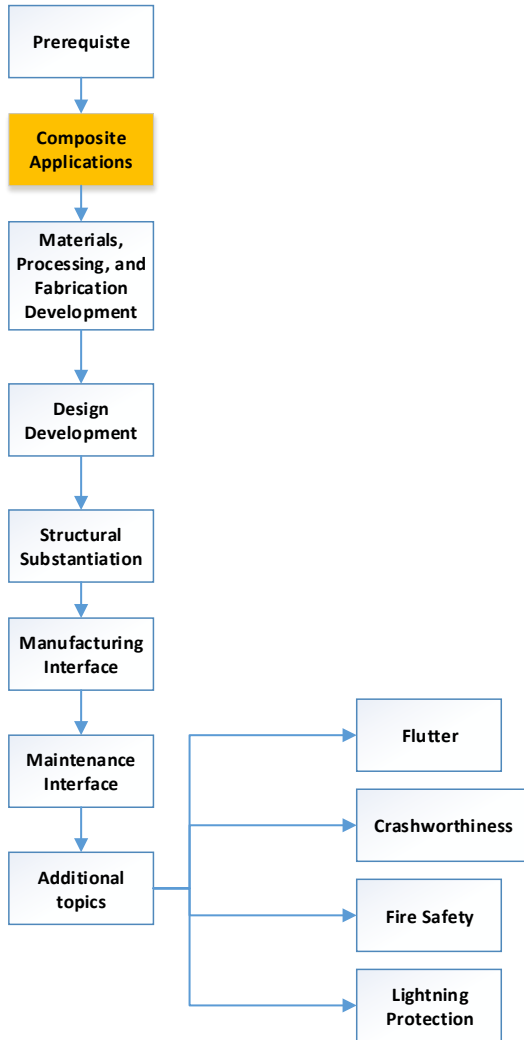
CSET-0 : Prerequisite course (0.5 Cr)



- 0.1 Introduction to Composite Materials as applied to aircraft structures
- 0.2 Materials, Processes, and Manufacturing
- 0.3 Structural Design
- 0.4 Proof of Structures
- 0.5 Maintenance
- 0.6 Considerations such as aeroelastic issues (e.g., flutter), crashworthiness, fire safety, and lightning protection

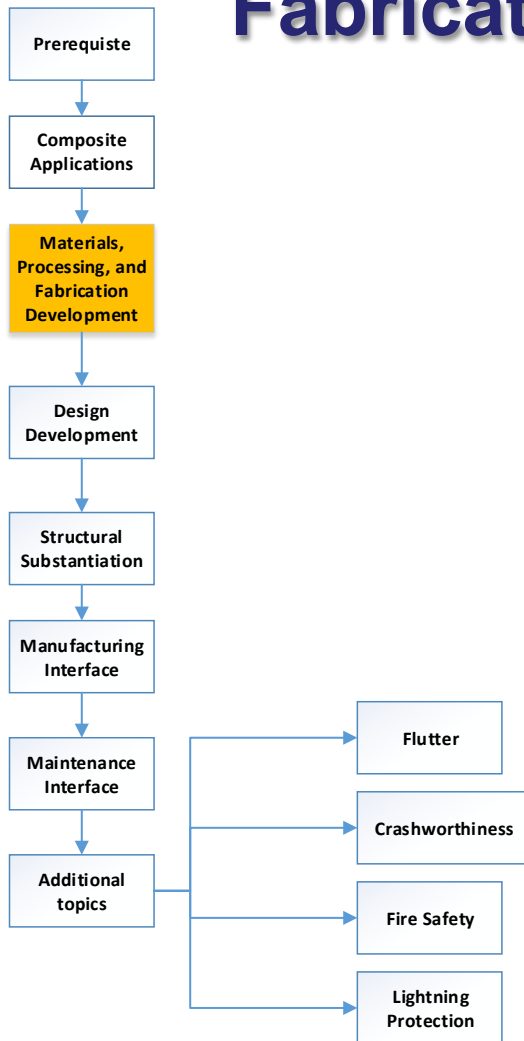
- Students review course materials
- Assessment using quizzes (x 6)

CSET-1 : Composite Applications (0.5 Cr)



- 1.1 Composites Overview (Voice over, 34 slides)
Quiz
 - 2.0 Challenges (Voice over, 56 slides)
Quiz
 - 3.0 Integrated Product Design Teams (Voice over, 32 slides)
Quiz
- Discussion Board activity

CSET-2 : Materials, Processing and Fabrication Development (0.75 Cr)



2.1.1 M & P : Regulations (Voice over, 14 slides)

2.1.2 M & P : Technical Challenges (Voice over, 16 slides)

2.1.3 M & P : Stable Materials (Voice over, 22 slides)

2.1.4 M & P : Material Specifications(Voice over, 30 slides)

2.1.5 M & P : Manufacturing Control(Voice over, 60 slides)

2.1.6 M & P : Qualification Testing(Voice over, 43 slides)

2.1.7 M & P : Roles and Responsibilities(Voice over, 13 slides)

2.2 Damage and Defects (Voice over, 13 slides)

2.3 Protection of Structure (Voice over, 16 slides)

2.4 Manufacturing Implementation (Voice over, 48 slides)

2.5 Maintenance Implementation (Voice over, 23 slides)

Assessments (Quizzes, Discussion Board activity)

Looking forward

- Course availability
 - CMfgT (current)
 - CSET (~ April 2019)
 - CSET-0,1 (Fall 2018)
 - Hands-on labs (1st week of May & October)
- Benefit to Aviation
 - Self-paced course modules for practicing engineers and graduate students
 - Courses offered per the university academic calendar
 - Courses credits for graduate degree

Questions and comments ?

Thank you.

