

The logo for the Joint Advanced Materials and Structures Center of Excellence (JAMS) features the letters 'JAMS' in a bold, blue, textured font. The letters are set against a background of two curved, overlapping bands: a bright yellow band on top and a dark blue band on the bottom, both tapering towards the right side of the image.

JAMS

Course Development Maintenance of Composite Aircraft Structures



Course Development: Maintenance of Composite Aircraft Structures

- Motivation and Key Issues
 - Practical, introductory-level awareness course for engineers, technicians and inspectors and any person involved with composite maintenance and repair
- Objective
 - Develop a balanced framework, with content and assessment criteria as a basis for curriculum training
 - Online course, with ‘hands-on’ laboratory, which will increase awareness of critical safety issues in composites’ maintenance
- Approach
 - Series of workshops and ‘beta’ class with experienced practitioners
 - Industry, regulatory and academic collaboration

JAMS FAA Sponsored Project Information



- Principal Investigators & Researchers
 - Charles Seaton, Principal Investigator, EdCC
 - Cyndi Schaeffer, Executive Director, EdCC
- FAA Personnel
 - Larry Ilcewicz, Curt Davies
- Industry Participation
 - Boeing, Airbus, EASA, Hexcel, Heatcon, Abaris and others

Motivation and Key Issues Overview

- Practical, introductory-level awareness course for engineers, technicians and inspectors FAA/EdCC Cooperative Agreement (2004-2006)
- Safety implications of maintenance and repair of composite materials accessible to a broad audience
 - Web-based, distance learning + regional labs
 - FAA guidelines on training needs (precursor to policy)
- Course is not intended to train qualified practitioners

Motivation and Key Issues Implementation

- Web-based course (4 credit hours)
 - Edmonds Community College
 - Industry partners for regional labs
- FAA Technical Center Report
 - Public domain
 - Course objectives, safety messages, testimonials, teaching points and instructor's guide
 - 300 – 400 pages
 - Coordinated release with SAE CACRC (industry)
- Teaching points
 - Specific instructional topics organized by TCO
- Assessments by users on effectiveness of training
 - Course assessments & success in integration of course content into workplace

Edmonds Community College

- Series of workshops to bring regulators and industry together on technical issues
 - 2004 Kickoff for FAA research to evaluate training needs
 - 2005 and 2006 FAA Workshops to review progress in establishing training needs
- Industry and government experts recruited to support the development of training *standards*
 - 2004 Seattle workshop defined terminal course objectives (TCO)
 - 2005 Chicago workshop used to review draft modules that will be released with the TCO as *industry standards*
 - Other feedback
 - Boeing/Airbus/EASA review – recommend updates
 - Web-based conferencing
 - Beta course conducted at EdCC

Elements (public domain)	Road Map	Learning organization provides unique curriculum
TCOs & Content (Overview, Instructors' guide)		Learning techniques
Flight safety messages	Story Board	Modified mix of elements
Testimonials		Teaching format
Videos		Target audience characteristics

- Base knowledge
 - Understand basics of composite materials technology
 - Understand basics of composite materials maintenance and repair
 - Consider other critical elements of composite maintenance and repair
 - Be aware of developments in composite maintenance research

TCOs Organized by Key Subjects

- Teamwork and disposition
 - Understand roles and responsibilities
 - Identify and describe information contained in source documentation
 - Participate in case team studies

- Damage detection and characterization
 - Recognize composite damage types and sources
 - Describe composite damage and repair inspection procedures

- Repair processes
 - Describe composite laminate fabrication and bonded repair methods
 - Perform bonded composite repair
 - Describe composite laminate bolted assembly and repair methods and perform/inspect bolted repair

- Course objectives guide course and provide balance (TCOs, or terminal course objectives)
- Contains course materials for distance learning ('blackboard' baseline)
 - TCOs
 - Content and weekly assignments
 - PowerPoint slides/videos/etc.
- Discussion of case studies to provide meaning & enhance learning

- Edmonds community college (<http://online.edcc.edu/>): experienced provider of online courses (~2,000 students per quarter)
 - Associate degrees (bus mgt, liberal arts, others)
 - Bachelor degree partnerships (WSU, UW)
 - Certificate programs (office skills, project mgt, others)
- Facilitator provided by EdCC, experienced in composites' technology
 - Assists in coordinating elements of course (grading, assessments, assignments)
- Involve experts (under discussion)
 - Facilitate topical discussion (typically 1 or more weeks per class)

Edmonds Community College

- **Benefit to Aviation**
 - Relates to a FAA goal for outlining **what** needs to be considered for aircraft safety.
 - Provides a **balanced** approach to training, based on industry collaboration
 - Provides a **perspective** to practitioners and students: *Knowing what you don't know, and when to go for help.*
- **Future needs**
 - Identify additional training development needs
 - Provide directions for future research and development