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AMTAS
Advanced Materials in Transport Aircraft Structures

# AMTAS Educational Offerings

Presented to
AMTAS Spring 2006 Meeting

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April 11, 2006

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AMTAS Overall Mission:

- Perform ***research*** studies
- Provide ***educational*** opportunities
- Facilitate ***technology transfer***

pertinent to the use of advanced materials in transport aircraft

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# Center Mission: *Education*

- **Train new composites engineers**
  - Enhance existing undergraduate/graduate composite courses
  - Develop new courses as necessary
  - Increase number of distance-learning courses
- **Provide continuing education programs**
  - Develop short courses intended for practicing engineers
  - Develop short courses intended for composite technicians

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# Current UW Courses in Composite Materials

***Aeronautics and Astronautics***

- AA 432 “Composite Materials for Aerospace Structures”
- AA 532 “Mechanics of Composite Materials”*

***Chemical Engineering***

- ChE 571 “Polymer Physics and Engineering”
- ChE 572 “Advanced Polymeric Composites”

***Material Science and Engineering***

- MSE 475 “Introduction to Composite Materials”
- MSE/ME 562 “Introduction to Electronic Composites”*
- MSE/ME 563 “Advanced Composite: Design and Manufacturing”*

***Mechanical Engineering***

- ME 450 “Introduction to Composite Materials and Design”*
- ME 553 “Adhesion Mechanics”*
- ME/MSE 562 “Introduction to Electronic Composites”*
- ME/MSE 563 “Advanced Composite: Design and Manufacturing”*
- ME 599 “Advanced Mechanics of Composite Materials”*

** Typically offered online through UW EDGE*

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# Composites Courses from AMTAS Academic Members

## *Washington State University*

- MSE 404 “Engineering Composites”
- ME 534 “Mechanics of Composite Materials”

## *Oregon State University*

- ME 583 “Composite Materials”

## *Edmonds Community College*

- MTECH 200 “Introduction to Composites”
- MTECH 250 “Composites Engineering Design”
- MTECH 260 “Composites Manufacturing”

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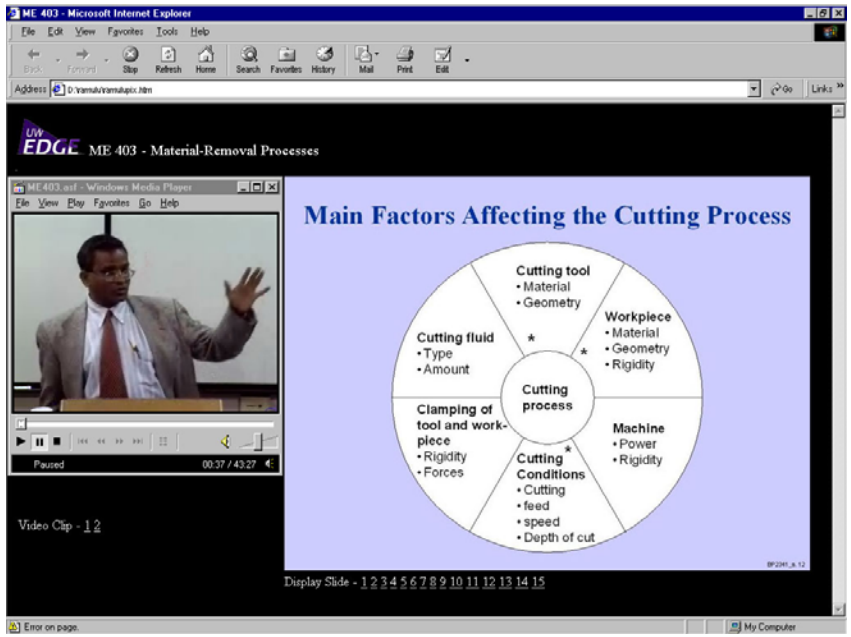
# UW EDGE Course Access

**http://www.engr.washington.edu/edge/**

## Video

- Live Web-Based Streaming Video
- Video-on-Demand
- CD-ROMs or Videotapes




## Course Web Pages

- Syllabus/Handouts/Assignments
- Online discussion boards
- Streaming Video

## Online Videoconferencing

- Quiz sections, office hours, etc.

**Contact: Michael Campion**
**campion@engr.washington.edu**

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# UW/Boeing LTD Aircraft Composites Certificate Programs

**http://www.engr.washington.edu/epp/cmc**

- Certificate Program in Aircraft Composite Structural Analysis and Design
  - Began Autumn 2004
  - Over 320 course registrations
  - 11,000 hours of instruction
- Certificate Program in Aircraft Composite Materials and Manufacturing
  - Began Autumn 2005
  - Over 80 course registrations
  - 2,600 hours of instruction
- Programs administered by UW Engineering Professional Programs and UW EDGE in collaboration with Boeing Learning, Training and Development

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# University of Washington

## New Composite Course Offering

**Course Title:** **"Aircraft Composites: Materials, Tooling, Manufacturing, Testing, Analysis, Design, Inspection, and Repair"**

**Course Hours:** 5 days (40 hours, 4 CEUs)

**Date:** September 18- 22, 2006

**Course Fees:** $2,500 (limit to 40 students)

**Prerequisite:** B.S. in Engineering or Equivalent

**Course Coordinators:**

Prof. K. Y. Lin, Aeronautics and Astronautics, University of Washington
Phone: 206 543-6334; Email: lin@aa.washington.edu
Michael Campion, UW EDGE Program
Phone: 206 616-4673; Email: campion@engr.washington.edu

**Industry Liaison:** Michael Richey (Boeing); michael.c.richey@boeing.com

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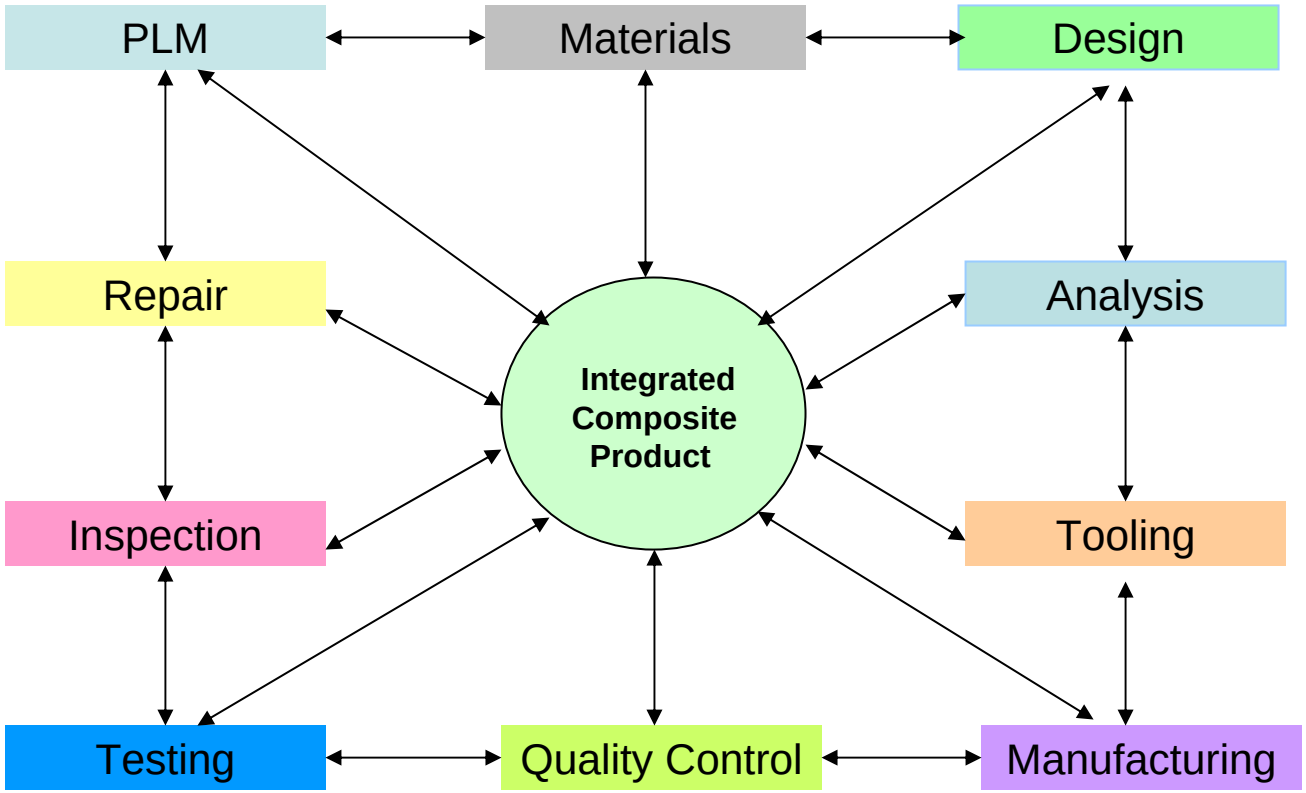
# "Aircraft Composites" Course Content



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# Course Outline

| | | |
|---|---|---|
| **9/18** | **Topic 1** | **Overview; New Developments (3 hours)** |
| | | Kuen Lin (UW)/Patrick Stickler (Boeing) |
| **9/18** | **Topic 2** | **Materials (5 hours)** |
| | | Bud Das/Brian Flinn (UW) |
| **9/19** | **Topic 3** | **Tooling (3 hours)** |
| | | David Dickson (Boeing)/M. Ramulu (UW) |
| **9/19** | **Topic 4** | **Manufacturing (including Lab) (5 hours)** |
| | | Brian Flinn(UW)/Moe Soleiman (Boeing) |
| **9/20** | **Topic 5** | **Analysis Methods (5 hours)** |
| | | Kuen Lin (UW) |
| **9/20** | **Topic 6** | **Design Methodology (3 hours)** |
| | | Chris Eastland (Boeing) |

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# Course Outline

| | | |
|---|---|---|
| **9/21** | **Topic 7** | **Advanced Manufacturing Processes (5 hours)** |
| | | Doug McCarville (Boeing) |
| **9/21** | **Topic 8** | **Testing Methods (3 hours)** |
| | | Mark Tuttle (UW)/Grant Pomering (Intec) |
| **9/22** | **Topic 9** | **Product Lifecycle Management (2 hours)** |
| | | Michael Richey/Barry McPherson (Boeing) |
| **9/22** | **Topic 10** | **Nondestructive Inspection (2 hours)** |
| | | Dave Swartz (FAA) |
| **9/22** | **Topic 11** | **Repair Techniques (4 hours)** |
| | | Dave Swartz (FAA)/ Howard Banasky (Heatcon) |

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# Course Highlights

- An intermediate level course that covers introductory and state-of-the-art technologies in 10 major areas of composites.
- Taught by top subject matter experts from academia, industry, and government.
- Taught by 15 exceptionally qualified instructors with over 300 years of R&D experience in composites.
- Over 50% of course content are derived from the public release version of UW/Boeing LTD Composite Certificate Programs.
- Course materials contain fundamental and practical knowledge necessary to built aerospace composite structural hardware.

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# Edmonds Community College

## New Composite Course Offering

**Course Title:** **"Critical Composite Maintenance and Repair Issues I"**

- Basics of Composite Materials Technology
- Basics of Composite Materials Maintenance and Repair
- Selection of Bonded or Bolted Repairs
- Electrical Requirements
- Protective Coatings and Surface Finishing
- Paint and Surface Layer Removal Techniques
- Emerging Advances in Repair Process Technologies
- Emerging Damage and Repair Inspection Technologies

**Offering Schedule:** Fall 2006 (Beta Test in May 2006)

**Course Coordinators:**


- Charlie Seaton, Charles.Seaton@edcc.edu, 425 640-1830 , Edmonds CC
- Cyndi Schaeffer, Cyndi.schaeffer@edcc.edu, 425 640-1183, Edmonds CC

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# Edmonds Community College

## New Composite Course Offering

**Course Title:** **"Critical Composite Maintenance and Repair Issues II"**

- Roles and Responsibilities
- Composite Damage Types and Sources
- Information Contained in Documentation
- Composite Laminate Fabrication and Bonded Repair Methods
- Bonded Composite Repair – Detail Discussion
- Composite Damage and Repair Inspection Procedures
- Composite Laminate Bolted Assembly and Repair Methods
- Case Team Studies

**Offering Schedule:** Fall 2006 (Beta Test in May 2006)

**Course Coordinators:**


- Charlie Seaton, Charles.Seaton@edcc.edu, 425 640-1830 , Edmonds CC
- Cyndi Schaeffer, Cyndi.schaeffer@edcc.edu, 425 640-1183, Edmonds CC

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# Summary

- The existing composite courses being offered at UW and other AMTAS institutions have been presented.
- A new professional development course on “Aircraft Composites” to be offered by UW in September 2006 has been introduced.
- New courses on “Critical Composite Maintenance and Repair Issues ”, being developed by Edmonds Community College have been shown.

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THANK YOU !

QUESTIONS?

COMMENTS?