LEADERSHIP TRAINING FOR AEROSPACE PROFESSIONALS

Learn the crucial skills you need to become an effective leader in your organization with KU Professional & Continuing Education's Professional Leadership training. Visit the website for a complete list of our leadership training, and voice your interest in bringing this training to KU Aerospace Short Course locations.

LEADERSHIP LINK & LEARN FREE LIVE WEBINARS

Take advantage of these free, one-hour webinars on such topics as business presentation skills, organizational culture, and inspired leadership. Visit the website for the complete webinar schedule.

Visit our website for more information about all of our leadership training options: aeroshortcourses.ku.edu/skills

AEROSPACE SHORT COURSES

The professional training choice of the global aerospace community.
Forty years ago... our history began.

In 1976, Dr. Jan Roskam, the first Ackers Distinguished Professor of Aerospace Engineering at the University of Kansas School of Engineering, was asked to teach a short course in Wichita, Kansas, sponsored by the NASA-Dryden Flight Research Center. The course, General Aviation Feedback Control Technology, attracted 21 engineers from Cessna, Beech, Boeing and Gates-Learjet.

The resulting publicity led to requests from around the country for short courses. In 1977, Dr. Roskam taught the first official short course—Dynamic Stability, Control and Synthesis of Automatic Flight Control Systems—for the newly established Aerospace Short Course Program within the KU Division of Continuing Education. Additional short courses were soon developed in the areas of stability, control, automatic flight controls, airplane design and performance.

Forty years later... our legacy continues.

Over the past forty years, the KU Aerospace Short Course Program has become the professional training choice of the global aerospace community by offering premier courses taught by industry experts. The program now offers more than 50 short courses, with Certificates of Specialization in nine topic areas.

We continue to evolve and innovate, recruiting top instructional talent and developing new course topics designed to address the issues aerospace professionals encounter in the workplace every day.

And, Dr. Roskam still lends his expertise to the program, teaching and providing new generations of engineers with invaluable insight with his History of Airplane Design webinar presentations.

In 2017

- Three new short courses
- New webinars
- New training location—Denver, Colorado
- New Early Registration Discount
- New U.S. Federal Government Employee Discount

785-864-5823 or toll-free in the U.S. 877-404-5823
FOUR WAYS TO LEARN

PUBLIC (OPEN ENROLLMENT) COURSES

Each year, the KU Aerospace Short Course Program offers groups of short courses at specific locations in the U.S. Individual courses range from 1–5 days in length, and are delivered in a traditional classroom setting. Participants learn face-to-face from industry expert instructors. Group discussions and networking opportunities enhance the learning experience.

2017 Aerospace Short Course Locations:

- Seattle, Washington (April)
- Denver, Colorado (June)
- San Diego, California (September)
- Orlando, Florida (November)

See the complete course schedule by locations on pages 4–5 of this catalog.

ON-SITE COURSES

Your company can realize substantial savings by bringing an aerospace short course to your workplace. On-site delivery is ideal for organizations that need to train 10 or more employees on a specific topic.

- Train more people for less—on-site courses cost less per participant and eliminate employee travel expenses.
- Reduce the time employees are away from work—training on site allows employees to remain in close contact with their offices.
- Train when it fits your company’s schedule, and maintain company confidentiality.
- Train on the topics you need most—course content, length and mode of delivery can be tailored to meet your specific training needs.

For a no-cost, no-obligation proposal, email us at ProfessionalPrograms@ku.edu.

WEBINARS

Throughout the year, the KU Aerospace Short Course Program offers free live webinars, presented by our industry expert instructors. Topics vary, and the recorded webinars are typically made available on our website following each presentation. Registration is required. Visit our website to register, and to access our archive of recorded webinar topics.

We also offer specialized webinars, for which a fee is charged. See pages 8–9 for a listing of these webinars, scheduled in 2017.

ONLINE COURSES

You can get the training you need to be successful through KU’s aerospace online short courses. Online courses feature a live discussion format, with live sessions scheduled on one or more designated days each week (at specific times). See page 21 and page 54 for more information.

For the most current information on our courses, please visit our website.

aeroshortcourses.ku.edu
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*Save $: Combine Software Safety, Certification and DO-178C (M–TH) with Integrated Modular Avionics (IMA) and DO-297 (F) and save $595 on course registration fees.

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DoubleTree by Hilton at the Entrance to Universal Orlando

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  - Airplane Aerodynamic Design and Subsonic Wind Tunnel Testing (retired)
  - Digital Flight Control Systems: Analysis and Design (retired)
  - Helicopter Performance, Stability and Control (retired)
- Choose one of these courses to satisfy the certificate requirements.

**AVIONICS AND AVIONIC COMPONENTS**
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- Choose one of these courses to satisfy the certificate requirements.

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- Choose one of these courses to satisfy the certificate requirements.

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- p. 42 Introduction to 25.981—Fuel Tank Safety and Ignition Prevention

• Retired courses are no longer offered, but still count toward a Certificate of Specialization in a given track.

*Enhance Your Knowledge—Advance Your Career*
The Certificate of Specialization is for those who desire concentrated study in a specific area of interest. Achieving a Certificate of Specialization demonstrates to employers, coworkers and the aerospace industry that you are qualified, competent and current in your field. It distinguishes you as a professional who is committed to your career and cares to be the best.

**Completion Requirements**
You can earn a Certificate of Specialization by completing **four courses** within any one track. Please visit our website to learn more about each track and how you can apply for a Certificate of Specialization. If you have questions about Certificates of Specialization, please contact us by phone at 913-897-8772 or 877-404-5823 (toll-free within the U.S.), or by email at ProfessionalPrograms@ku.edu.
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HISTORY OF AIRPLANE DESIGN WEBINAR SERIES
with Dr. Jan Roskam

The History of Airplane Design webinar series includes four individual webinars, each focusing on specific companies and their contributions to the commercial, military and transport aircraft industries. Learn from a legend in aircraft design how some of today’s best known companies got started, persevered or went bankrupt, merged or made it on their own.

Dr. Jan Roskam is the Ackers Distinguished Professor Emeritus of Aerospace Engineering, University of Kansas, and founder of the KU Aerospace Short Course Program.

Each webinar is presented live, and will not be available for viewing following the live presentation. Registration for each live webinar is $50 per person.

Vultee, Consolidated, Convair, General Dynamics and Chance-Vought
Wednesday, March 8, 2017 • 11:00 a.m.–Noon CT

In this webinar, Dr. Jan Roskam will provide an overview of five of the industry’s pioneering companies: Vultee, Consolidated, Convair, General Dynamics and Chance-Vought. He will discuss each company’s contributions to the development of both military and commercial airplanes, from Vultee’s trainers and fighters to Consolidated flying boats and bombers, Convair’s bombers and commercial airliners, General Dynamics fighters and bombers and Chance-Vought’s fighters.

Attend this webinar to learn more about:
- Vultee trainers and fighters including the Swoose Goose and innovative XP-81.
- Consolidated-Vultee flying boats (starting with the PBY-3 Catalina), bombers (starting with the B-24 Liberator) and the unique double deck XC-99.
- Convair airliners, fighters and bombers including the B-58 Hustler.
- General Dynamics F-111 and F-16.
- Chance-Vought’s famous F4U Corsair, the innovative V-173 and Flapjack, the infamous F7U Cutlass and the very successful F-8 Crusader and A-7 Corsair II.

Cessna, Beech and Piper
Wednesday, May 10, 2017 • 11:00 a.m.–Noon CT

Attend this webinar to learn how Clyde Cessna, Walter Beech and William Piper built up their companies to dominate general aviation manufacturing.

Attend this webinar to learn more about:
- Cessna successes, including the immensely popular training, personal transportation and business airplanes, the pioneering T-37 military jet trainer and its attack derivative, the Citation jet series of business airplanes and the Caravan passenger and cargo turboprops.
- Cessna failures, including the Model 405 personal jet, the four-engine Model 620 and the LSA Model 162 Skycatcher.
- The innovative 336 Skymaster and its retractable gear derivative, and the 337 Skymaster.
- The novel but unsuccessful Model 34 Twin Quad passenger airplane.
- The famous Bonanza, Queen-Air, Barron and King-Air business airplanes.
- The remarkable but unsuccessful Starship.
- Various business jets, and the T-6 Texan II military turboprop trainer that flies like a jet.
- Piper’s widely popular J-3 Cub and multiple derivatives.
- The Apache and Comanche line of airplanes, the Pawnee agricultural airplane, the Navajo and Cheyenne turboprop business airplanes and the single engine turboprop Meridian.
Messerschmitt, Heinkel, Focke-Wulf, Junkers and Dornier
Wednesday, August 23, 2017 • 11:00 a.m.—Noon CT

This webinar will provide an overview of the contributions of five of Germany’s major airplane companies to military and civil aviation before, during and after WWII.

Attend this webinar to learn more about:
• Messerschmitt’s pioneering Taifun personal travel airplane and the famous Bf-109 fighter which followed it, along with Messerschmitt’s Amerika bomber and its Gigant transport airplane.
• Heinkel’s 111 bomber, its 111z Zwilling derivative tow-plane, the He 177 Greif bomber. Also, Heinkel’s pioneering jet-powered airplane, the He 178 of 1938 as well as its He 162 Salamander WWII jet fighter.
• Focke-Wulf’s innovative Fw 19 “Ente” canard airplane and the Fw 189 Uhu twin-boom reconnaissance airplane.
• Junkers first all-metal airplane, the F-13 of 1919.
• The forward swept wing, four engine jet bomber, the Ju 287.
• The Dornier Do 18 and 24 military flying boats.
• Dornier Do 217 bomber and the formidable Do-335 Pfeil fighter.
• The VTOL Do 31 military jet transport.
• The 228 commercial turboprop, and its larger brother, the 328 and the 328Jet.

Grumman, Northrop, Republic and Fairchild
Wednesday, October 11, 2017 • 11:00 a.m.—Noon CT

This webinar will discuss how today’s Northrop-Grumman arose and how Republic and Fairchild met their demise.

Attend this webinar to learn more about:
• How Grumman became the prominent carrier airplane provider with their famous “cats”: Wildcat, Hellcat, Tigercat and Bearcat of WWII and the Panther, Cougar, Tiger and Tomcat.
• Why the world’s first variable swept wing airplane, the Grumman XF10F Jaguar failed.
• How the experimental, forward swept wing X-29 was developed.
• The failure of the XP-56 Black Bullet.
• Various flying wings culminating in the post WWII Northrop B-35 and later the B-2 flying wing bombers.
• The very successful line of fighters and trainers: F-89 Scorpion, F-5 Freedom Fighter, T-38 Talon and YF-17 Cobra which became the basis of the McDonnell-Douglas (now Boeing) F-18.
• The twin-boom freighters: C-82 Packet, C-119 Flying Boxcar and innovative but unsuccessful XC-120 Pack Plane.
• Fairchild’s attempt to enter the commercial airliner market with the FH227.
• The famous tank-buster: A-10 and the infamous T-46 trainer which led to Fairchild’s demise.

How to Register
To register for a webinar, please visit our webinars page at aeroshortcourses.ku.edu.
Advanced Avionics  NEW
Instructor: Albert Helfrick

SAN DIEGO, CALIFORNIA
September 19–22, 2017
Tuesday–Friday,
8:00 a.m.–4:00 p.m.
Course Number AA181040

CEUS
28 classroom hours
2.8 CEUs

COST
Early registration fee
$2,195 if registered and paid by August 4
Regular registration fee
$2,395 if registered and paid after August 4

The course registration fee includes instruction, course materials, refreshments and lunches.

U.S. Federal Employee Discount: This course is available to federal employees at 10% off the registration fee. To receive the federal employee discount, you must enter a code, which can be found on the course page on our website. Please note that you must validate your eligibility to receive this discount by entering your U.S. government email address ending with .gov or .mil.

EARN A CERTIFICATE
This course is part of the Certificate of Specialization in Avionics and Avionic Components.

Visit our website, aeroshortcourses.ku.edu, for more information about this course, including a day-by-day outline, instructor bio(s) and a downloadable PDF with course details.

Description
Advanced Avionics covers systems that will be the mainstay of CNS (communications, navigation and surveillance) in the future. Course material reviews the basic theory of navigation, and provides a thorough introduction and survey of global navigation satellite systems (GNSS), with emphasis on GPS. Modern surveillance systems based on Mode-S and ADS-B are also covered, as are both wired and wireless communications systems. This course includes in-class exercises that involve college-level mathematics.

This course provides some redundancy of topics covered in the Fundamental Avionics short course (taught by the same instructor), but covers those topics in much greater detail. Fundamental Avionics is not a prerequisite for this course. Advanced Avionics will also provide a good review for those who may have studied these subjects previously.

Highlights
• the art and mathematics of navigation
• electronic systems used for navigation
• the use of space-based navigation
• electronically-guided approaches and landings
• the operation of the surveillance systems needed for safe aircraft separation
• the need for communications in modern aviation navigation and safety
• some widely-used wired and wireless communications systems
• exercises in problem-solving

Who should attend?
This course is intended for engineers involved in the design and development of avionics components and systems.
Advanced Flight Tests
Instructors: Donald T. Ward, Thomas William Strganac

DENVER, COLORADO
June 5–9, 2017
Monday–Thursday,
8:00 a.m.–4:00 p.m. and
Friday, 8:00 a.m.–2:00 p.m.
Course Number AA171410

CEUS
33 classroom hours
3.3 CEUs

COST
Early registration fee
$2,495 if registered and paid
by April 21
Regular registration fee
$2,695 if registered and paid
after April 21

The course registration fee
includes instruction, course
materials, refreshments and
lunches.

EARN A CERTIFICATE
This course is part of the
Certificate of Specialization
in Flight Tests and Aircraft
Performance. See pages
6–7 for more information.

Visit our website,
aeroshortcourses.ku.edu
for more information about
this course, including a
day-by-day outline, instructor
bio(s) and a downloadable
PDF with course details.

Description
This course provides the practical knowledge needed to plan a safe and
comprehensive series of flutter envelope expansion tests. It includes suggestions
and recommendations for flutter and post-stall certification and demonstration
of new or significantly modified airplane designs to meet civil or military
requirements.

Highlights
• Why advanced flight testing is necessary
• Fundamental principles of aeroelasticity
• Experimental and analytical tools used in preflight preparations
• Instrumentation for flutter envelope expansion
• Subcritical response techniques and interpretation of supporting analyses
• Interpreting test results
• Expanding the envelope
• Discussions of limit cycle oscillations
• Foundations of post-stall flight testing
• Aerodynamic conditions for dynamic equilibrium
• Experimental tools for preflight preparations
• Instrumentation for post-stall flight tests
• Emergency recovery devices
• Subsystem modifications for post-stall testing
• Recommended recovery techniques
• Guidelines and discipline for conducting advanced flight tests
• Planning for efficiency in data collection and data management
• Contingency planning

Who should attend?
Designed for practicing and entry-level flight test engineers and managers,
aircraft engineers and aircraft designers.

“I enjoyed this class. I liked both the professors and the different perspectives they had to offer. Dr. Ward offered his view, knowledge and first-hand experiences, and Dr. Strganac presented the “nuts and bolts” and scientific theoretical perspective that helped me understand aeronautical theory.”

—Glenn Johnson, Northrop Grumman Corporation
Aerodynamic Design Improvements: High-Lift and Cruise
Instructors: C.P. (Case) van Dam, Paul Vijgen (This course may be taught by one or both instructors.)

Description
This course covers recent advances in high-lift systems and aerodynamics, as well as cruise drag prediction and reduction. It includes discussion of numerical methods and experimental techniques for performance analysis of wings and bodies and boundary-layer transition prediction/detection.

Highlights
- Aircraft design and the importance of lift and drag on fuel efficiency
- Reynolds number and Mach number effects on aerodynamic lift and drag
- CFD-based drag prediction and decomposition
- Boundary-layer transition prediction and instrumentation/visualization techniques
- Impact of operational, environmental and manufacturing effects on laminar flow
- Drag reduction techniques including viscous, wave, and induced drag
- High-lift physics of multi-element systems
- High-lift wind tunnel and flight testing examples
- Flow separation control and active flow control techniques (cruise and high-lift conditions)

Who should attend?
Designed for engineers and managers involved in the aerodynamic design and analysis of airplanes, rotorcraft and other vehicles.

“This course was very interesting, with useful information for both the design and the evaluation of aerodynamic devices in the aeronautical industry environment. Professor van Dam’s lectures have given me insights for solving actual problems I face continuously at work.”
— Rafael Garcia Leal, Embraer S.A.
Aerodynamic Design of Transport Aircraft
Instructor: Roelof Vos

Description
In this course participants learn how aerodynamics drive the detailed exterior design of transport aircraft. What aerodynamic phenomena play a role in the exterior design of a wing, a cockpit, or an engine intake? What is the effect of aerodynamic add-ons such as vortex generators, fairings, or winglets? What are the advantages and penalties of wing sweep and how can the penalties be mitigated by the aerodynamic design of the wing? Those are the types of questions that are being addressed in this course. Participants learn to understand how the various aircraft components should be shaped in order to fulfill aerodynamic requirements in all corners of the flight envelope. The strong ties between aircraft performance, aircraft aerodynamics, and aircraft exterior design are demonstrated through numerous historical and contemporary examples. Although the main focus is on jet aircraft, the course also covers the effects of propeller installation on the aerodynamic design of the empennage.

Highlights
- Causes for interference drag in high-subsonic conditions
- Effect of Reynolds number on shock-boundary-layer interaction
- Design characteristics of supercritical airfoils
- Mach number effects on flow over multi-element airfoils
- Design of root and tip airfoils of swept-wing aircraft
- Stability and control beyond the maximum operating Mach number
- Propeller slipstream effects on empennage design
- Design constraints resulting from transonic buffet
- Stalling characteristics of wings with high-lift devices

Who should attend?
Designed for aeronautical engineers, pilots with some engineering background, government research laboratory personnel, engineering managers and educators.

“Well thought-out course, well presented. Good presentation materials, up-to-date information with a historical basis.”
—Jeffrey C. Anderson, Guidance, Navigation and Control Engineer, Boeing Commercial Airplanes

ON-SITE
This course is only available as an on-site course in 2017 (it may return to our open enrollment schedule in subsequent years). The course can be brought to your company and tailored to fit your individual training needs. On-site courses are delivered throughout the United States and around the world. To obtain a no-cost, no-obligation proposal, please contact the On-site Program Manager at 913-897-8782 or email ProfessionalPrograms@ku.edu.

CEUS
35 classroom hours
3.5 CEUs

EARN A CERTIFICATE
This course is part of the Certificate of Specialization in Aircraft Design. See pages 6–7 for more information.

Visit our website, aeroshortcourses.ku.edu for more information about this course, including a day-by-day outline, instructor bio(s) and a downloadable PDF with course details.
Aerospace Applications of Systems Engineering
Instructors: Donald T. Ward, Mark K. Wilson, D. Mike Phillips

Description
An introduction to systems engineering fundamentals as applied to aerospace systems with emphasis on manned aircraft, both commercial and military. The course is based on evolving systems engineering standards, the current version of the INCOSE Systems Engineering Handbook (the Systems Engineering Book of Knowledge), and the underlying EIA/IS 632, IEEE P1220 and INCOSE papers. The material provides a working knowledge of all elements, technical and managerial, involved in systems engineering as applied to aerospace systems of varying complexity. It concentrates on the most troublesome areas in systems development: requirements definition and derivation, integration, allocation of requirements, risk management, verification and validation. Hardware and software systems case studies, primarily from the aircraft sector of the aerospace industry are used as examples. Techniques have been used on many commercial aircraft (from large airliners to military fighters to small personal aircraft), DoD and NASA programs.

Highlights
- Comprehensive exposure of systems engineering practices including comprehensive synopsis of all processes and terminology suggested by the INCOSE SE Handbook, definition of terms and methods
- Summary of system life cycles as currently utilized by the U. S. Department of Defense, industry and NASA, with discussion of potential changes in the development and sustainment approaches along with the potential impacts [for example, model-based systems engineering (MBSE), product line management (PLM), and other innovations]
- Introduction to standard practices and activities including requirements generation, trade studies, architectural practices, functional allocation and decomposition, and verification/validation methodologies
- Scope a systems engineering plan for specific purposes—example from large military programs and from a tightly focused research program
- Practical exercises in requirements identification and definition, risk and opportunity management, and in tailoring a systems engineering process to a specific project
- Assessment of specialty engineering contributions to systems engineering effort—value of integrated product and process teams and interaction between project management and systems engineering
- Emphasis on software-intensive systems and innovations in software engineering
- Use of multiple case studies from military, commercial and research implementations of systems engineering to illustrate principles and to illuminate good practices

Who should attend?
The lectures and practice are designed for systems engineers at all levels and program managers developing large or small systems. It is especially well-suited for engineers moving into systems engineering from other disciplines.

“Outstanding course! Taught by industry professionals who fully conveyed the value of systems engineering principles in a dynamic, participative and fun way! Highly effective.”
—Steven Kirbach, Systems Engineer
**Aircraft Icing: Meteorology, Protective Systems, Instrumentation and Certification**

Instructors: Wayne R. Sand, Steven L. Morris

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**SEATTLE, WASHINGTON**
April 25–28, 2017  
Tuesday–Friday, 8:00 a.m.–4:00 p.m.  
Course Number AA171360

**CEUs**  
28 classroom hours  
2.8 CEUs

**COST**  
Early registration fee  
$2,195 if registered and paid by March 10  
Regular registration fee  
$2,395 if registered and paid after March 10

The course registration fee includes instruction, course materials, refreshments and lunches.

**EARN A CERTIFICATE**  
This course is part of the Certificate of Specialization in Aerospace Compliance and the Certificate of Specialization in Aircraft Maintenance and Safety. See pages 6–7 for more information.

Visit our website, aeroshortcourses.ku.edu for more information about this course, including a day-by-day outline, instructor bio(s) and a downloadable PDF with course details.

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**Description**  
This course covers meteorology and physics of aircraft icing; forecasting, finding and avoiding icing conditions; designing and evaluating ice protection systems and certification of aircraft for flight into known icing conditions.

**Highlights**
- Description of aircraft icing
- Atmospheric aerosols
- Cloud physics of icing and conceptual cloud modes
- Ground icing
- Skew-T, Log P adiabatic diagrams
- Assessment of icing potential
- Critical icing parameters, theory and measurements
- Finding and avoiding icing conditions
- New and current icing research
- Ice accretion characteristics
- Effects of ice on aircraft performance
- Anti-ice and de-ice systems
- Icing instrumentation and detection
- Effect of SLD on aircraft
- Engine icing considerations
- Ice-testing methods
- Certification and regulations
- Conceptual methods

**Who should attend?**
Designed for aerospace engineers, flight test and design engineers, test pilots, line pilots, meteorologists, FAA engineers, Designated Engineering Representatives (DERs) and program managers.

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“This course gave me basic knowledge in in-flight icing and associated meteorology, which is important in facilitating exchanges with my colleagues engaged in in-flight icing research.”  
—Warren Underwood, Ground Icing Research Lead, FAA
Aircraft Lightning: Requirements, Component Testing, Aircraft Testing and Certification

Instructors: C. Bruce Stephens, Kenneth C. Darbonne (This course may be taught by one or both instructors.)

Description
This course provides details for direct and indirect effects of aircraft lightning testing and certification. Requirements for both composite and metallic aircraft, including proper RTCA/DO-160 classifications, are examined. The course will also include a high-level overview of Electromagnetic Compatibility (EMC), High-Intensity Radiated Fields (HIRF), Precipitation Static (P-Static) and Electrical Bonding requirements. The new requirements of Electrical Wiring and Installation System (EWIS) and Fuel Tank Safety (14 CFR 25.981 Amd. 102) will also be addressed.

Highlights
• The electromagnetic environment of the aircraft
• Metallic and composite aircraft requirements
• The history of lightning requirements for aircraft certification
• Direct and indirect effects of lightning testing
• FAA compliance for lightning effects

Who should attend?
This course is designed for all design engineering disciplines, project managers, project engineers and laboratory personnel whose aircraft system may require protection from the effects of lightning.
Aircraft Structural Loads: Requirements, Analysis, Testing and Certification
Instructor: Wally Johnson

Description
This course provides an overview of aircraft structural external loads analysis including: criteria, design, analysis, fatigue, certification, validation and testing. It covers FAR 23 and FAR 25 airplane loads requirements. However, the concepts may be applicable for military structural requirements. Loads calculations examples using BASICLOADS software will be demonstrated throughout the course week. A copy of BASICLOADS software will be provided to attendees.

Highlights
• Overview of data requirements—aerodynamics, mass properties, stiffness, control systems and propulsion
• Certification requirements—methods of compliance and FAR 23 and FAR 25 loads requirements
• Structural design airspeeds derivations—construct flight envelope
• V-n diagrams—calculation of maneuvering load factors, gust load factors, construct V-n diagrams
• Maneuver loads—balanced maneuvers, abrupt pitch maneuvers, roll maneuvers, yaw maneuvers and engine-out maneuvers
• Gust loads—gust formula, discrete tuned 1-cos gust, PSD gust, vertical, lateral and head-on gust
• Ground loads—landing, taxi, ground handling, static and dynamic loads and landing gear drop test
• Airframe loads—wing, horizontal tail, vertical tail, fuselage, control surfaces and flaps
• Fatigue loads—certification requirements, mission requirement, exceedance curve, gust and maneuver fatigue loads
• Loads testing—flight loads validation, ground calibration, static limit and ultimate test and fatigue loads test
• Loads calculations using BASICLOADS software throughout the course

Who should attend?
Designed for practicing engineers and engineering managers whose responsibilities include aircraft structures.

“...The course was interactive, comprehensive and the trainer had a dynamic approach which kept the momentum going. Ideal for those who would like to better understand how structural loads are analyzed for design certification.”
—Emilio Isilas, MRB Engineer, Fokker Mexico
Aircraft Structures Design and Analysis
Instructors: Mark S. Ewing, Michael Mohaghegh

Description
An introduction to analysis and design of aircraft structures, including design criteria, structural design concepts, loads and load paths, metallic and composite materials; static strength, buckling and crippling, durability and damage tolerance; practical design considerations and certification and repairs. Analysis exercises and a design project are included to involve students in the learning process.

Highlights
- Structural design overview
- Aircraft loads
- Metals
- Fiber-reinforced composites
- Material selection
- Design to static strength
- Mechanical joints
- Mechanics of thin-walled and built-up structure
- Design to buckling and stiffness
- Component design
- Design for damage tolerance
- Design for durability
- Certification
- Continued airworthiness of the aging fleet

Who should attend?
Designed for engineers, educators and engineering managers whose responsibilities include aircraft structures.

“This is a course all aircraft design engineers should take in order to familiarize themselves with important concepts in structural design and analysis.”
—Daniel Wallace, Senior Stress Analyst, PPG Aerospace
Airplane Flight Dynamics
Instructor: Willem A.J. Anemaat

Description
An overview of airplane static and dynamic stability and control theory and applications, classical control theory and applications to airplane control systems. Overview of flying qualities and regulations.

Highlights
- General airplane equations of motion
- Review of basic aerodynamic concepts
- Longitudinal aerodynamic forces and moments
- Lateral-directional aerodynamic forces and moments
- Thrust forces and moments
- The concept of static stability
- Applications of the steady state airplane equations of motion
- Effects of the flight control system; control forces
- Applications of the perturbed state equations of motion
- Dynamic stability: short period, phugoid, Dutch Roll, spiral and roll mode
- Review of flying qualities criteria
- Videos of flying qualities, cross-wind landings, take-off rotation, roll-rate coupling etc.

Who should attend?
Aeronautical engineers, mechanical engineers, electrical engineers needing to learn more about flight dynamics, along with pilots with some engineering background, government research laboratory personnel, engineering managers and educators.

“I felt the course will be immediately applicable to my current position. The instructor was excellent and had a great command of the course material from both a theoretical and practical point of view.”
—Karl Parsons, Aerospace Engineer, Sierra Nevada Corporation

Visit our website, aeroshortcourses.ku.edu for more information about this course, including a day-by-day outline, instructor bio(s) and a downloadable PDF with course details.
Airplane Preliminary Design
Instructor: Willem A.J. Anemaat

Description
This course provides an overview of the fixed-wing airplane design decision-making process and the relation of design to manufacturing, maintainability and cost-effectiveness. It is applicable to jet transport, turboprop commuter transport, military (trainers, fighter bomber, UAV) and general aviation aircraft. The design process covers sizing (weight, wing area, thrust/power), aerodynamics, weight and balance, stability and control and cost. Numerous examples are shown. Lessons learned and “what to watch out for” are discussed.

Highlights
- Review of drag polar breakdown for subsonic and supersonic airplanes
- Preliminary sizing of airplane take off, empty and fuel weights for a given mission specification
- Performance constraint analyses
- Preliminary configuration selection
- Fundamentals of fuselage and wing layout design
- High-lift and lateral control design considerations
- Fundamentals of power plant integration
- Fundamentals of landing gear layout design
- Class I weight and balance prediction
- Class II weight, balance and moment of inertia prediction
- Fundamentals of static longitudinal stability
- Deep stall and how to design for recoverability
- Take-off rotation and the effect of landing gear location
- Review of dynamic stability concepts and prediction methods
- Unusual configurations
- Design optimization
- Cost

Who should attend?
Aeronautical engineers, mechanical engineers and electrical engineers needing to learn more about design. Pilots with some engineering background, government research laboratory personnel, engineering managers and educators.

“It’s the course is very rich in history and details. It should be taken by every preliminary design engineer.”

—Rodrigo F. Souza, Embraer, S.A.
Description

This course provides an overview of the fixed-wing airplane sizing process. It is applicable to jet transport, turboprop commuter transport, military (trainers, fighter bomber, UAV) and general aviation aircraft. The design process covers sizing (weight, wing area, thrust/power), drag, high lift device sizing, weight and balance, stability and control and geometry. Numerous examples are shown, and lessons learned and “what to watch out for” are discussed.

Highlights

- Introduction to airplane design: flowchart of the design process
- Review of drag polar breakdown for subsonic and supersonic airplanes, rapid method for drag polar prediction, check of drag polar realism
- Two airplanes: same mission, different design: comparison of the Boeing B-47 with the B2 Vulcan
- Preliminary sizing of airplane take-off weight, empty weight and fuel weight for a given mission specification: applications; sensitivity of take-off weight to changes in payload, empty weight, range, endurance, lift-to-drag ratio and specific fuel consumption; role of sensitivity analyses in directing program-oriented research and development: applications
- Performance constraint analyses: relation between wing loading and thrust-to-weight ratio (or wing loading and weight-to-power ratio) for the following cases: stall speed, take-off field length and landing field length, statistical method for estimating preliminary drag polars, review and effect of airworthiness regulations; relation between wing loading and thrust-to-weight ratio (or wing loading and weight-to-power ratio) for the following cases: climb and climb rate (AEO and OEI), cruise speed and maneuvering; the matching of all performance constraints and preliminary selection of wing area and thrust required: applications
- Preliminary configuration selection; what drives unique (advanced) configurations? Discussion of conventional, canard and three-surface configurations; fundamentals of configuration design
- Preliminary Design Sequence:
  - Fuselage/cockpit
  - Type of propulsion
  - Wing planform
  - Type, size and disposition of high-lift devices
  - Layout of empennage (horizontal tail, canard, V-tail, vertical tail sizing)
- Example airplane sizing exercise using Advanced Aircraft Analysis (AAA)

Who should attend?

Aeronautical engineers, mechanical engineers, electrical engineers needing to learn more about design. This course could also be beneficial for pilots with some engineering background, government research laboratory personnel, engineering managers and educators.
Application of Human Factors Engineering to the Life Cycle Management of Aeronautical Products and Systems NEW

(course debuts in April 2017)

Instructor: Andrew Appleton

SEATTLE, WASHINGTON
April 25–28, 2017
Tuesday–Friday, 8:00 a.m.–4:00 p.m.
Course Number AA171365

CEUS
28 classroom hours
2.8 CEUs

COST
Early registration fee $2,195 if registered and paid by March 10
Regular registration fee $2,395 if registered and paid after March 10

The course registration fee includes instruction, course materials, refreshments and lunches.

EARN A CERTIFICATE
This course is part of the Certificate of Specialization in Aircraft Maintenance and Safety.

Visit our website, aeroshortcourses.ku.edu, for more information about this course, including a day-by-day outline, instructor bio(s) and a downloadable PDF with course details.

Description
This introductory course will provide attendees with a solid foundation of knowledge and skills necessary to successfully apply Human Factors Engineering (HFE) and Human System Integration (HSI) to their daily work. Attendees will attain familiarity with and trust in HFE/HSI principles and practices to consider and implement at their workplace. This understanding will provide attendees with the knowledge and skills to inject HFE/HSI at an early stage in the lifecycle of their aeronautical products and systems. Doing so will produce a safer, user-centered product that can lower the cost of the product over the entire course of its lifecycle.

Highlights
- Characteristics and capabilities of aircrew and how they are affected by the technical aircraft systems with which they work
- How the application of HFE and HSI considerations to aeronautical product and system design and modification contributes to safe operation
- How to consider and apply HFE and HSI principles and practices in aviation design, modification or maintenance duties
- How to consider and apply HFE in a systems integration approach to aeronautical product and system design and modification
- How to apply Human Factors requirements traceability to aeronautical product and system design and modifications
- The cost-savings to aeronautical product and system or airworthiness projects through the early injection of HFE and HSI

Who should attend?
Aeronautical product designers, aeronautical system specialist engineers, aviation system safety specialists, aircraft occupant safety specialists, aircraft maintenance personnel, aircrew and aircraft maintenance trainers and airworthiness program managers.
Cabin Electronics: Management, Entertainment and Connectivity Systems
Instructor: Kenneth C. Darbonne

Description
This course will provide an introduction to cabin electronics, including cabin management, entertainment and connectivity systems. Fundamental elements of these systems will be presented along with common installation concerns. Certification aspects including FAA regulations and guidance for showing compliance to the regulations will be discussed. Instruction, practical examples, and in-class activities are used to enhance the learning experience.

Highlights
- Cabin management system designs
- Electrical interface fundamentals
- Cabin entertainment elements
- Passenger interfaces
- Common cabin internet connectivity options
- Certification requirements & guidance
- Installation considerations
- Environmental qualification
- Electrical load analyses
- Electromagnetic compatibility

Who should attend?
This course is aimed at designers, engineers, integrators, and project/program managers involved in aircraft completions. Individuals tasked with the design and certification of cabin electronics will benefit from the information presented.

Visit our website, aeroshortcourses.ku.edu for more information about this course, including a day-by-day outline, instructor bio(s) and a downloadable PDF with course details.
Cabin Safety and Crashworthiness of Aircraft Cabin Interiors
Instructor: Jose Mora-Vargas

Description
This course provides a fundamental review of transport airplane regulatory requirements and compliance-finding methodologies associated with cabin safety and crashworthiness regulations on aircraft cabin interior configurations. The course also reviews FAA/EASA criteria to determine the certification bases of Type Certification and Supplemental Type Certification projects.

Highlights
- Review FAA requirements and advisory material associated with cabin safety/crashworthiness
- Practical insight into industry practices to evaluate transport airplane cabin interiors
- Establishing certification basis applicable to TC/STC projects
- Review seats qualification requirements and impact on cabin safety/crashworthiness compliance

Who should attend?
This course is designed for FAA designees, FAA organizational designees/authorized representatives and certification engineers associated with TC/STC cabin interior projects.

SAN DIEGO, CALIFORNIA
September 18–22, 2017
Monday–Thursday, 8:00 a.m.–4:00 p.m. and Friday, 8:00 a.m.–11:30 a.m.
Course Number AA181055

CEUs
31.5 classroom hours
3.15 CEUs

COST
Early registration fee $2,495 if registered and paid by August 4
Regular registration fee $2,695 if registered and paid after August 4

The course registration fee includes instruction, course materials, refreshments and lunches.

EARN A CERTIFICATE
This course is part of the Certificate of Specialization in Aircraft Maintenance and Safety and the Certificate of Specialization in Aircraft Structures. See pages 6–7 for more information.

Visit our website, aeroshortcourses.ku.edu for more information about this course, including a day-by-day outline, instructor bio(s) and a downloadable PDF with course details.
Civil and Military Certification of Propulsion Systems to Support Aircraft and Helicopter Operations
Instructors: Luc Deniger, Derek Ferguson (This course may be taught by one or both instructors.)

Description
This course provides fundamental design considerations for certification of propulsion systems. It discusses design requirements, methods of compliance, tests and analyses to demonstrate compliance to civil and military certification requirements. Using practical examples, the participants will gain knowledge to support their role as propulsion engineers.

Highlights
- Propeller certification
- Engine certification
- Integration of propulsion systems on aircraft/helicopters
- System safety and safety assessments for propulsion systems
- Propulsion systems flight testing
- Electronic control aspects, including FADECs
- Helicopter gear boxes
- Environmental aspects (rain, ice/hail, snow, sand, volcanic ash, etc.)
- Fuel system considerations
- ETOPS considerations
- Thrust reversers
- Critical components lives
- In-service monitoring and engine structural integrity programs
- Continuing airworthiness of propulsion systems

Who should attend?
This course is designed for entry-level and practicing propulsion engineers and managers, aircraft engineers and aircraft designers.

SAN DIEGO, CALIFORNIA
September 18–22, 2017
Monday–Thursday,
8:00 a.m.–4:00 p.m. and
Friday, 8:00 a.m.–11:30 a.m.
Course Number AA181060

CEUS
31.5 classroom hours
3.15 CEUs

COST
Early registration fee
$2,495 if registered and paid
by August 4
Regular registration fee
$2,695 if registered and paid
after August 4

The course registration fee
includes instruction, course
materials, refreshments and
lunches.

EARN A CERTIFICATE
This course is part of the
Certificate of Specialization
in Aerospace Compliance.
See pages 6–7 for more
information.

Visit our website,
aeroshortcourses.ku.edu
for more information about
this course, including a
day-by-day outline, instructor
bio(s) and a downloadable
PDF with course details.
Commercial Aircraft Safety Assessment and 1309 Design Analysis
Instructor: Marge Jones

2017 COURSES

DENVER, COLORADO
June 5–9, 2017
Monday–Thursday,
8:00 a.m.–4:00 p.m. and
Friday, 8:00 a.m.–11:30 a.m.
Course Number AA171420

Description
This course provides the practical knowledge of system safety requirements of 14 CFR 2X.1309 regulation, from fundamental philosophies and criteria to the analysis techniques to accomplish safety requirement identification, validation and verification. It includes detailed review of SAE ARP 4761 and system safety aspects of ARP 4754A, including allocation of safety requirements and assigning development assurance levels. Principles apply to all types of commercial aircraft certification and may also be adapted for any system safety activity.

Highlights
- Detailed review of the 14 CFR2X.1309 regulation and what it requires
- Overview of the SAE ARP 4761 Safety Assessment process for commercial aviation
- Overview of the SAE ARP 4754A Development Process focused to system safety aspects
- Aircraft and system functional hazard assessments
- Preliminary system safety assessments
- Failure rate prediction techniques
- Failure mode and effects analysis (FMEA) and summary (FMES)
- Fault tree analysis concepts
- Common cause analysis
- System safety assessments
- Tailoring the safety process for modifications
- Safety analysis and information required to support development of certification plans
- Guidelines for preparing 1309 safety related compliance statements

Who should attend?
This course is designed for Parts 23, 25, 27 and 29 system certification engineers, system designers, FAA Designated Engineering Representatives (DERs), aircraft certification personnel, system safety specialists who are new to the commercial certification safety process and military personnel who are responsible for procuring civil equipment.

ORLANDO, FLORIDA
November 13–17, 2017
Monday–Thursday,
8:00 a.m.–4:00 p.m. and
Friday, 8:00 a.m.–11:30 a.m.
Course Number AA181095

CEUS
31.5 classroom hours
3.15 CEUs

COST
Denver:
Early registration fee
$2,495 if registered and paid by
April 21
Regular registration fee
$2,695 if registered and paid after
April 21

Orlando:
Early registration fee
$2,495 if registered and paid by
September 29
Regular registration fee
$2,695 if registered and paid after
September 29

The course registration fee includes instruction, course materials, refreshments and lunches.

U.S. Federal Employee Discount:
This course is available to federal employees at 10% off the registration fee. To receive the federal employee discount, you must enter a code, which can be found on the course page on our website. Please note that you must validate your eligibility to receive this discount by entering your U.S. government email address ending with .gov or .mil.

EARN A CERTIFICATE
This course is part of the Certificate of Specialization in Aerospace Compliance, the Certificate of Specialization in Aircraft Maintenance and Safety, the Certificate of Specialization in Avionics and Avionic Components, and the Certificate of Specialization in Electrical Wiring Interconnection System (EWIS).
See pages 6–7 for more information.

Visit our website, aeroshortcourses.ku.edu for more information about this course, including a day-by-day outline, instructor bio(s) and a downloadable PDF with course details.

“This course was presented in an excellent, interesting and systematic order. It brought additional meaning and insight to my everyday work. The reference material will be my constant companion going forward.”

—Travis Bond, Safety & Reliability Engineer, 2015 Orlando attendee
Complex Electronic Hardware Development and DO-254
Instructor: Jeff Knickerbocker

Description
This course provides the fundamentals of developing and assessing electronic components to the standard RTCA/DO-254 Design Assurance Guidance for Airborne Electronic Hardware. It is designed for developers, avionics engineers, systems integrators, aircraft designers and others involved in the development or implementation of complex electronic hardware (application-specific integrated circuits, field-programmable gate arrays, etc.). The course also provides insight into the FAA’s review process and guidance and provides practical keys for successful development and certification. Practical exercises and in-class activities will be used to enhance the learning process.

Highlights
- The course addresses RTCA/DO-254 as applied via FAA Advisory Circular AC20-152
- FAA Order 8110.105 is addressed as are current standard EASA certification review items and FAA issue papers
- Potential deficiencies in current regulatory guidance material is addressed versus the current state of practice verification techniques
- Best practices for requirements capture and subsequent verification methodologies are discussed
- White papers will be provided—some out-of-class reading will enhance the participant’s experience

Who should attend?
Designed for developers, avionics engineers, systems integrators, aircraft designers and others involved in development or implementation of complex electronic hardware and programmable devices (application-specific integrated circuits, field-programmable gate arrays, etcetera.)

“After completing the class, I feel that I now have a much better understanding of the requirements and expectations of this guidance, as well as how it is applied in the industry. Overall, I enjoyed the class, took a lot of notes and plan to share the knowledge that I have gained with my department as well as others within my organization. Thank you for a quality job.”
—Frank D’Onofrio, Senior Software Quality Engineer
Conceptual Design of Unmanned Aircraft Systems
Instructor: Bill Donovan

Description
This conceptual approach to overall design of Unmanned Aircraft Systems (UAS) includes concepts of operations, communications, payloads, control stations, air vehicles and support. It includes requirements and architecture development, initial sizing and conceptual level parametric and spreadsheet assessment of major system elements.

Highlights
• Introduction to Unmanned Aircraft Systems (UAS), including conceptual design issues and operating environments
• Control station, communication and payload considerations and sizing
• Life cycle cost estimation
• Air vehicle parametric design and propulsion
• Conceptual level aerodynamics
• Standard atmosphere models
• Conceptual level mass estimation
• Parametric geometry
• Air vehicle performance
• Mission assessment
• Methodology and correlation
• Overall system optimization
• Reliability, maintainability and support

Who should attend?
Designed primarily for practicing conceptual-level design engineers, systems engineers, technologists, researchers, educators and engineering managers. Students should have some knowledge of basic aerodynamics and conceptual design, although it is not mandatory. Basic knowledge of spreadsheet analysis methods is assumed.

“I would consider Mr. Donovan as one of the premiere and up-and-coming authorities in aviation. The course material was presented at the proper level for the introductory level aerospace professional. I now see the conceptual design of unmanned aircraft in a whole new light.”
—Glenn Johnson, Northrop Grumman
Dynamics for Aerospace Structures
Instructor: Dennis Philpot

SAN DIEGO, CALIFORNIA
September 19–22, 2017
Tuesday–Friday,
8:00 a.m.–4:00 p.m.
Course Number AA181065

CEUS
28 classroom hours
2.8 CEUs

COST
Early registration fee
$2,195 if registered and paid by August 4
Regular registration fee
$2,395 if registered and paid after August 4

The course registration fee includes instruction, course materials, refreshments and lunches.

EARN A CERTIFICATE
This course is part of the Certificate of Specialization in Aircraft Design and Certificate of Specialization in Aircraft Structures. See pages 6–7 for more information.

Visit our website, aeroshortcourses.ku.edu for more information about this course, including a day-by-day outline, instructor bio(s) and a downloadable PDF with course details.

Description
This course is designed to provide participants with strong theoretical, as well as practical, knowledge of the methodologies for performing rigid body and modal-based dynamics analysis on a wide range of structural and mechanical systems. The course builds upon the theoretical foundation with practical applications that can be immediately put into practice in the workplace. In this manner, both the theory and practice of classical “hand” analysis techniques are presented, along with the more modern (numerical/computational) methods used in the industry. The subject matter difficulty level is intermediate.

Highlights
- Solid mechanics: the big picture
- Dynamics for structural verification
- Time-domain vs. frequency-domain analysis
- The structural dynamics analysis process
- Kinetic energy and momentum
- Strain energy in structural elements
- d’Alembert’s Principle
- Mode shapes, boundary conditions and natural frequencies
- The nature of dynamic response
- Newtonian dynamics: first- and second-order systems
- Response of first-order systems to various load conditions
- Second-order systems
- Dynamic response of second-order systems
- Introduction to random vibration
- Probability density functions
- Power spectral density functions
- Multiple-degree-of-freedom (MDOF) Systems
- Computation of eigenvectors and eigenvalues
- Dynamic response of MDOF Systems
- Common failure modes for dynamically-loaded structures
- Practical examples for the aerospace industry
- Shock and vibration testing
- Introduction to MIL-STD-810G
- Deriving environments from flight test data
- Computing RMS values of acceleration, velocity and displacement

Who should attend?
Design engineers who would like to become more familiar with the techniques and modern practices of dynamics analysis to help them be more knowledgeable and bring more capability to the work place; mechanical engineers who need to become more proficient in the area of structural dynamics due to a particular job assignment or new career opportunity that requires expertise in the dynamic analysis of structures; and department managers whose staff are involved in loads and dynamics work.

“This is an excellent course. Dennis is a wonderful teacher. I learned a lot. I really appreciate the applied problems used in this course.”
—2015 Seattle Participant
Electrical Wiring Interconnection System (EWIS) and FAA Requirements

Instructors: C. Bruce Stephens, Franklin L. Cummins, Thomas N. Taylor

(This course may be taught by any of these instructors.)

Description
This course will discuss the FAA Code of Federal Regulations (CFRs) and design concepts required to ensure all aspects of aircraft electrical wiring and installation are safe. It will examine aircraft wiring as a system and review all Part 25 CFRs related to EWIS FAA Certification. A review of FAA Advisory Circulars and practical applications of the information will be conducted as teams will be selected to simulate the EWIS certification process. EWIS requirements for aircraft maintenance and inspection will also be discussed.

Highlights
- EWIS best practices
- Team EWIS workshops
- DER/UM EWIS requirements
- EWIS examples and practical applications
- Review of advisory circulars

Who should attend?
The course is designed for all aircraft design areas including electrical, avionics, and HIRF/lightning engineers and aircraft technicians. Aircraft managers and project engineers working in electrical/avionics related areas should also attend.

SEATTLE, WASHINGTON
April 24–28, 2017
Monday–Thursday, 8:00 a.m.–4:00 p.m. and Friday, 8:00 a.m.–11:30 a.m.
Course Number AA171370

CEUs
31.5 classroom hours
3.15 CEUs

COST
Early registration fee
$2,495 if registered and paid by March 10
Regular registration fee
$2,695 if registered and paid after March 10

The course registration fee includes instruction, course materials, refreshments and lunches.

EARN A CERTIFICATE
This course is part of the Certificate of Specialization in Aerospace Compliance, Certificate of Specialization in Aircraft Maintenance and Safety, Certificate of Specialization in Avionics and Avionic Components, Certificate of Specialization in Electrical Wiring Interconnection System (EWIS), and Certificate of Specialization in Electromagnetic Effects. See pages 6–7 for more information.

Visit our website, aeroshortcourses.ku.edu for more information about this course, including a day-by-day outline, instructor bio(s) and a downloadable PDF with course details.

“This is an excellent course on an important EWIS subject that can affect airplane design, system integration and aircraft safety. Highly recommend! The instructors are extremely knowledgeable and provide lots of practical design lessons learned, as well as making the course an interesting learning experience.”

—Phil Dang, Power Plant ODA/EUM/Certification Leader, Honeywell
Electrical Wiring Interconnection System (EWIS) Safety Assessment—25.1709

Instructor: Thomas N. Taylor, C. Bruce Stephens (This course may be taught by one or both instructors.)

Description
This course will focus on the requirements and methods that can be used to demonstrate compliance to 14 CFR 25.1709 (EWIS Safety Analysis). The discussion will examine the use of FAA AC 25.1701-1 to prepare a Functional and Physical Analysis. The course will also include an overview of the EWIS requirements in 14 CFR Part 25, subpart H.

Highlights
- A detailed review of FAA AC 25.1701-1C and 25.1709 Flow Diagram
- Practical EWIS example for new and modified aircraft
- 25.1709 Functional and Physical Analysis Development through Team Workshops

Who should attend?
The course is designed for engineers, technicians and managers involved in the design and certification of Transport Category Aircraft. The course is intended for both Original Equipment Manufacturers (OEM) and aircraft modifiers.

““This course brought awareness to all facets of airplane safety affected by electrical wiring, and approaches to mitigate the dangers.”
—Kelly Bajaj, Electrical Engineer, Northrop Grumman

“The course has significantly contributed to my knowledge on the subject matter. It was very well-presented and enjoyable due to the outstanding attributes of the instructors.”
—Sau Pascal, System Engineering Manager, CAAI
Electromagnetic Effects Aircraft Level Testing and FAA Requirements
Instructors: C. Bruce Stephens, Darren L. Stout (This course may be taught by one or both instructors.)

Description
This course will discuss the concepts of aircraft ground and flight testing that may be required to ensure that aircraft level systems are safe for operation when exposed to Electromagnetic Effects (EME), High Intensity Radiated Fields (HIRF), Lightning, Precipitation Static (P-Static), and Transmitting Personal Electronic Devices (TPEDs). This course will discuss the fundamentals of coordinating and performing aircraft testing from a very practical, step-by-step perspective, and examine the process used by aircraft OEMs to show compliance to regulations relating to EME, HIRF, lightning, p-static, and TPEDs. The course will also include a high-level overview for electromagnetic effects areas. Topics discussed include Electromagnetic Compatibility (EMC), High Intensity Radiated Fields (HIRF), Lightning Transit Analysis, Precipitation Static (P-Static) and Transmitting Personal Electronic Devices (TPEDs) requirements.

Highlights
- Aircraft testing fundamentals
- Coordination of aircraft testing activities
- Documentation of test procedures and results
- FAA aircraft-level certification requirements
- Problem and solution discussions
- EME testing team workshops

Who should attend?
The course is designed for all aircraft design and testing areas including electrical, avionics, communications, engineers and technicians. Aircraft Managers and Project Engineers who coordinate airplane testing and/or certification related areas are also recommended to attend.
FAA Certification Procedures and Airworthiness Requirements as Applied to Military Procurement of Commercial Derivative Aircraft/Systems

Instructors: Gilbert L. Thompson, Robert D. Adamson (This course may be taught by one or both instructors.)

DENVER, COLORADO
June 6–8, 2017
Tuesday–Thursday,
8:00 a.m.–4:00 p.m.
Course Number AA171425

CEUS
21 classroom hours
2.1 CEUs

COST
Early registration fee $1,895 if registered and paid by April 21
Regular registration fee $1,995 if registered and paid after April 21

The course registration fee includes instruction, course materials, refreshments and lunches.

U.S. Federal Employee Discount: This course is available to federal employees at 10% off the registration fee. To receive the federal employee discount, you must enter a code, which can be found on the course page on our website. Please note that you must validate your eligibility to receive this discount by entering your U.S. government email address ending with .gov or .mil.

EARN A CERTIFICATE
This course is part of the Certificate of Specialization in Aerospace Compliance. See pages 6–7 for more information.

Visit our website, aeroshortcourses.ku.edu for more information about this course, including a day-by-day outline, instructor bio(s) and a downloadable PDF with course details.

Description
This course provides an overview of FAA functions and requirements applicable to Type Design Approval, Production Approval, Airworthiness Approval and Continued Airworthiness associated with military procured commercial derivative aircraft and products. The course will focus on the unique military needs in procurement (customer versus contractor) of products meeting civil airworthiness requirements which are aligned with military-specific mission/airworthiness goals. Prior certification experience is beneficial, but not required.

Highlights
- Overview of FAA Aircraft Certification (AIR) and Flight Standards (AFS) service organizations
- Applicability of FAA advisory circulars, notices and orders
- Parts Manufacturer Approval (PMA) process
- FAA “baseline” and “Program Specific Service Agreement” (PSSA) services following Title 14, Code of Federal Regulations (CFRs), Parts 1, 11, 21
- Eligibility of Department of Defense contractor installations and modification centers as FAA Part 145 Repair Stations
- Part 39 Airworthiness Directives
- Flight Standards Aircraft Evaluation Group’s (AEG) role in aircraft certification
- Type Certification (TC) and Supplemental Type Certification (STC) process (FAA Handbook 8110.4)
- Project Specific Certification Plan (PSCP) principles in the RFP process
- FAA Form 337/Field Approval process
- Role of FAA Military Certification Office (MCO) as defined in FAA Order 8110.101
- Federal Reimbursable Agreement AVS-OA-ACE-12-3035 between DOT/FAA and armed services of the United States
- USAF Policy Directive 62-6, NAV AIR Instruction 13100.15, Army Regulation 70-62, application of Mil-HDBK-516C, TACC/MACC

Who should attend?
This course is designed and focused specifically for U.S. Department of Defense (DoD), Department of Homeland Security, U.S. Coast Guard and non-U.S. military procurement and airworthiness personnel, and associated military/supplier engineers, consultants and project directors involved in procurement of commercial derivative aircraft (CDA) or equipment developed for use on CDA.

“Extremely relevant to my current role and career. Bob Adamson’s in-depth knowledge and high experience in the subject area made it a very enjoyable course.”
—Benjamin Graham, Systems Engineer–Aviation Certification, Royal Australian Air Force
FAA Functions and Requirements Leading to Airworthiness Approval
Instructors: Gilbert L. Thompson, Robert D. Adamson (This course may be taught by one or both instructors.)

SEATTLE, WASHINGTON
April 25–27, 2017
Tuesday–Thursday,
8:00 a.m.–4:00 p.m.
Course Number AA171375

SAN DIEGO, CALIFORNIA
September 19–21, 2017
Tuesday–Thursday,
8:00 a.m.–4:00 p.m.
Course Number AA181070

CEUS
21 classroom hours
2.1 CEUs

COST
Seattle:
Early registration fee
$1,895 if registered and paid by March 10

Regular registration fee
$1,995 if registered and paid after March 10

San Diego:
Early registration fee
$1,895 if registered and paid by August 4

Regular registration fee
$1,995 if registered and paid after August 4

The course registration fee includes instruction, course materials, refreshments and lunches.

EARN A CERTIFICATE
This course is part of the Certificate of Specialization in Aerospace Compliance. See pages 6–7 for more information.

Visit our website, aeroshortcourses.ku.edu for more information about this course, including a day-by-day outline, instructor bio(s) and a downloadable PDF with course details.

Description
This course provides an overview of the FAA organizational structure and its function in aircraft certification, the rule-making and advisory process, production rules applicable to aircraft and aircraft components, and the subsequent certification process and continued airworthiness. The course is specifically tailored toward civil airworthiness certification. The course is FAA-approved for Inspection Authorization (IA) renewal. Prior certification activity is beneficial, but not required.

Highlights
- Overview of FAA Aircraft Certification (AIR) and Flight Standards (AFS) service organization and functions
- Advisory circular, notice and order process and issuance
- Federal Aviation Regulations (FAR) Parts 1, 11, 21, 23, 25, 26, 27, 29, 33, 36, 39, 43, 45 and 183
- Parts Manufacturer Approval (PMA)
- Type Certification (TC) and Supplemental Type Certification (STC) process
- Certification process improvement
- FAA/Industry guide to product certification
- Documentation of typical TC/STC products
- Safety management concepts
- FAA Form 337/Field Approval
- Flight Standards Information Management System (FSMIS) notices and orders
- Bilateral Aviation Safety Agreements

Who should attend?
Designed for industry (airframe and vendor) engineers, design engineers, civil airworthiness engineers, consultants, project directors, aircraft modifiers, FAA Designated Engineering Representatives (DERs) and coordinators, FAA organizational designees/authorized representatives (ARs), industry and governmental quality assurance inspectors and managers.

“I found the course to be most insightful. The information that I learned can be applied immediately to my daily tasks and activities.”
—Howard Anderson, Final Phase Certification Engineer, Gulfstream Aerospace
Flight Control and Hydraulic Systems
Instructor: Wayne Stout

SAN DIEGO, CALIFORNIA
September 18–22, 2017
Monday–Thursday,
8:00 a.m.–4:00 p.m. and
Friday, 8:00 a.m.–11:30 a.m.
Course Number AA181075

CEUs
31.5 classroom hours
3.15 CEUs

COST
Early registration fee
$2,495 if registered and paid
by August 4
Regular registration fee
$2,695 if registered and paid
after August 4

The course registration fee
includes instruction, course
materials, refreshments and
lunches.

U.S. Federal Employee
Discount: This course
is available to federal
employees at 10% off the
registration fee. To receive
the federal employee
discount, you must enter a
code, which can be found
on the course page on our
website. Please note that you
must validate your eligibility
to receive this discount
by entering your U.S.
government email address
ending with .gov or .mil.

EARN A CERTIFICATE
This course is part of the
Certificate of Specialization
in Aircraft Design.

Visit our website,
aeroshortcourses.ku.edu
for more information about
this course, including a
day-by-day outline, instructor
bio(s) and a downloadable
PDF with course details.

Description
This course covers fundamental design issues, along with analysis and design
methodologies, for aerospace hydraulic and flight control systems. It includes
design requirements, component description and operation, component and
system math modeling, component sizing, system layout rationale, system
sizing and airframe integration. The course emphasizes the fundamentals
and necessary engineering tools (both analytical and otherwise) needed to
understand and design aerospace hydraulic and flight control systems. Practical
examples and actual systems are presented and discussed throughout the class.

Highlights
- Hydraulic flow fundamentals
- Hydraulic components operation and sizing (actuators, valves, regulators,
pumps, motors, accumulators, etc.)
- Servo valve operation and sizing
- Power Control Units (PCUs) function and operation
- Hydraulic system design and airframe integration
- Mechanism fundamentals
- Flight control system design and airframe integration
- Flight control system failure modes and design considerations

Who should attend?
Designed for system- and component-level engineers and managers—including
airframe, vendor, industry and government—and educators involved with
aerospace mechanical systems.

“...This course covers all major topics, design aspects and components pertinent to any practicing
flight controls engineer. Highly recommend!”
—Daniel Alberici, Gulfstream Aerospace
Flight Test Principles and Practices
Instructors: Donald T. Ward, George Cusimano

Description
An introduction to and definition of the basic flight test process, application of engineering principles to flight test and description of common flight test practices: a survey of the flight test discipline embellished with a variety of examples from completed flight test programs.

Highlights
- Flight test introduction/overview and brief history
- The atmosphere
- Mass, center of gravity and moment of inertia determination
- Time/space position measurements
- Air data calibration methods
- Instrumentation system principles
- Data recording and processing methods
- Proper use of digital bus data
- In-flight measurement of thrust and power
- Stall tests
- Flight test planning and interaction with program planning
- Preliminary preparation: modeling and simulation preparation, and value of ground testing
- Takeoff and landing and cruise performance
- Climb performance
- Advanced performance methods
- Static stability and control
- Structural flight tests
- Spin testing
- Systems testing and evaluation

Who should attend?
The course is designed for all levels of engineers and managers in industry working on flight test projects, military and civil project engineers, test pilots and flight test engineers, government research laboratory personnel and FAA and other regulatory agency engineers. It is ideally suited for engineers and managers from other disciplines who are moving into the flight test discipline for the first time or who must interact with flight test engineers regularly on a given project.
Flight Testing Unmanned Aircraft Systems—Unique Challenges
Instructor: George Cusimano

Description
Unmanned Aircraft Systems (UAS) are comprised of an unmanned vehicle (UAV), manned control element(s), and various data and control links. Although unmanned, the vehicle is still an aircraft and must be tested with the same rigor and precision as manned systems. However, being “unmanned”, and being part of an integrated system, UAVs demand unique flight test approaches that present corresponding challenges. If these challenges go unmet, the UAS Development Test and Evaluation (DT&E) program often experiences unacceptable cost and schedule overruns, which in turn could lead to program termination. This course introduces the primary challenges associated with flight-testing remotely piloted and command-directed (a.k.a. autonomous) vehicles with primary emphasis on Tactical, MALE and HALE class systems. The course also recommends solutions to these challenges that are meant to either mitigate or eliminate potential problems before they become unmanageable.

Highlights
• Review of the purpose of the flight test and evaluation process as it applies to UAS testing.
• Review of both typical user and certifying airworthiness requirements.
• Review of current regulations for conducting UAV flight operations within both the National Airspace System and on national test ranges.
• Review of the system concept and why knowledge of typical UAS architectures is necessary to assure a successful flight test program.
• Examine the level and complexity of UAS software testing and the need for systems-level flight test.
• The basis for UAV designs, with emphasis on those features that create development and test challenges.
• Review of the most problematic areas of UAV ground and flight test.
• Review of the risk-management process and how it applies to UAV testing.
• Introduction of a new methodology designed to help mitigate UAV flight test problems.
• Discussion of the application of human factors principles to UAS command and control design and test.
• Discussion of the unique aspects of UAV first flight(s).
• UAV lessons learned.
• Review the top 20 flight test challenges presented in the course.

Who should attend?
The course is designed for practicing flight test engineers, test pilots, test managers, aircraft engineers, aircraft designers and educators who already possess a fundamental understanding of flight test principles and practices. The course content is appropriate for civilian, military and academic researchers.

“Flight Testing Unmanned Aircraft—Unique Challenges was an amazing course refresher that reinforced my understanding of UAS. I highly recommend this course to beginners and experienced engineers, or anyone interested in UAS systems.”
—Monty Corbett, Senior Systems Tests & Qualification Engineer, General Atomics Aeronautical Systems
Fundamental Avionics
Instructors: Albert Helfrick, Brian Butka (This course may be taught one or both instructors.)

Description
This course provides a very broad overview of avionics. It covers the evolution of the avionics industry and usage to provide the student with an understanding of WHY avionics is what it is today, in addition to understanding how it works. The course covers legacy systems still in use and the latest state-of-the-art systems currently being installed. The avionics environment is an important part of this course. In the context of this course, “environment” refers not only to the physical environment of pressure, temperature, vibration, etc., but the regulatory environment. Systems are an important part of this course, and system communications and assessment are covered. This course introduces the student to the unique language of avionics (abbreviations, terms and acronyms) and connects these terms to the systems they represent.

Highlights
• Provides a comprehensive overview of avionics, from the early years to the present
• Covers the fundamentals of navigation, communications and surveillance
• Explains the roles of world-wide regulatory and advisory groups
• Introduces future systems currently under development and equipage
• Emphasizes satellite-based navigation—the backbone of future navigation and surveillance
• Covers safety assessment and human factors as associated with avionics systems

Who should attend?
This course is for engineers and technicians who are involved with avionics, but may not have attended formal courses in avionics. It would also be beneficial for those who work in a specific area of avionics, and would like to brush up on the basics and learn more about the latest developments in areas outside of their discipline.
Fundamentals of Project Management for Aerospace Professionals
Instructor: Herbert Tuttle

Description
This course is designed to familiarize aerospace professionals with current project management techniques. It includes: selecting the project team; identifying the functions of a project team and management team; the integration of project management; work breakdown structures, interfaces, communications and transfers; estimating, planning, risk and challenges of the project manager; alternative organizational structures; control and planning of time, money and technical resources. Course attendees are asked to bring a current project management problem from your team or organization. During class you will work on developing a reasonable solution and a project plan to accomplish it.

Highlights
- Understanding the five phases of project management
- Project definition and distinguishing characteristics and how they are related
- Strategic issues to include how this project is significant for the organization
- Internal project planning or how to wear many hats simultaneously
- Work breakdown structure taken to the appropriate level and not just the lowest level
- Time estimating, as well as “guesstimating” and scheduling techniques
- Network diagrams and how to determine the most efficient and expedient options
- Cost estimating for the top down and bottom up perspective
- Contingency and risk for every phase of the project
- Project team selection, training, mentoring, team building and dealing with special people
- Project cost reporting during the course of each phase and calculating the end cost

Who should attend?
Designed for engineers and other technical professionals at all levels, and new project managers responsible for small as well as large and long duration projects. This course is best suited to people who are new to project management and current project managers who want to hone their management skills.

“Herb Tuttle was very inspirational and did an excellent job getting his knowledge and experience across. One of the greatest courses I’ve attended. I will definitely be putting into practice all that I have learned.”

—Amanda Martins, Contracts Administrator and Supply Chain Management, Embraer S/A
Instructions for Continued Airworthiness Using Enhanced Zonal Analysis Procedure (EZAP)  NEW  (course debuts in September 2017)
Instructors: C. Bruce Stephens, Thomas N. Taylor  (This course may be taught one or both instructors.)

SAN DIEGO, CALIFORNIA
September 13–15, 2017
Wednesday–Friday,
8:00 a.m.–4:00 p.m.
Course Number AA181020

CEUS
21 classroom hours
2.1 CEUs

COST
Early registration fee
$1,895  if registered and paid by July 28
Regular registration fee
$1,995  if registered and paid after July 28

The course registration fee includes instruction, course materials, refreshments and lunches.

EARN A CERTIFICATE
This course is part of the Certificate of Specialization in Electrical Wiring Interconnection System (EWIS).

Description
This course will discuss the Enhanced Airworthiness Program for Airplane Systems/Fuel Tank Safety (EAPAS/FTS) rule. This rule requires design approval holders (DAH) and applicants to develop instructions for continued airworthiness (ICA), consisting of maintenance and inspection tasks, intervals, and procedures for the representative airplane’s electrical wiring interconnection systems (EWIS) for each affected type design.

Participants will gain an understanding of the guidance material used for developing the maintenance and inspection instructions for EWIS using EZAP, and how the information developed using EZAP can be used by operators to improve EWIS maintenance practices. Additional information to be provided includes an overview of Certification of Electrical Wiring Interconnection Systems on Transport Category Airplanes, how to use the EZAP flowchart to determine EWIS change requirements, design requirements related to EZAP, how EZAP impacts engineering requirements and compliance for EZAP.

Highlights
• EZAP Best practices
• Team EZAP workshops
• DER/UM EZAP requirements
• EZAP examples and practical applications
• Review of Advisory Circulars

Who should attend?
The course is designed for all aircraft design areas including Electrical, Avionics, EWIS and HIRF/Lightning Engineers and aircraft technicians. Maintenance and Inspection Managers and Operators Aircraft Managers should also attend.

Visit our website, aeroshortcourses.ku.edu for more information about this course, including a day-by-day outline, instructor bio(s) and a downloadable PDF with course details.
Integrated Modular Avionics (IMA) and DO-297
Instructor: Jeff Knickerbocker

Description
This course provides the fundamentals for developing and integrating IMA systems, using TSO-C153 (Integrated Modular Avionics Hardware Elements), FAA Advisory Circular 20-170 (Integrated Modular Avionics Development, Verification, Integration and Approval Using RTCA/DO-297 and Technical Standard Order C153) and DO-297 [Integrated Modular Avionics (IMA) Development Guidance and Certification Considerations]. Discussions and in-class activities will be used to enhance the learning process.

Highlights
- What is IMA?
- What are the benefits of IMA?
- History of IMA
- Overview of IMA guidance material
- TSO-C153 (Integrated Modular Avionics Hardware Elements)
- Purpose of the advisory circular (AC)
- Technical highlights from the AC
- Roles and responsibilities
- DO-297 (Integrated Modular Avionics (IMA) Development Guidance and Certification Considerations)
- ARINC 653 Usage in IMA Systems
- SAE ARP 4754A aspects in IMA Systems
- Using TSO-C153, AC 20-170, DO-297 and ARINC 653 together
- Common challenges in IMA development and certification
- Practical tips for IMA development and certification

Who should attend?
Designed for developers and integrators of integrated modular avionics systems. The focus will be on identifying challenges with IMA and satisfying the regulatory guidance.

Visit our website, aeroshortcourses.ku.edu for more information about this course, including a day-by-day outline, instructor bio(s) and a downloadable PDF with course details.
Introduction to 25.981—Fuel Tank Safety and Ignition Prevention
Instructors: Franklin L. Cummins, C. Bruce Stephens (This course may be taught one or both instructors.)

Description
(Note: This course was previously titled: Fuel Tank Explosion Prevention Certification Requirements—Airworthiness Standard 14 CFR 25.981 [25-125].)

This course provides details for all elements of fuel tank design needed for compliance with the regulation, with specific emphasis on the electrical design aspects. Some review of regulatory history and 25.981 [25-125] is included for reference and TCA, STC work. Specific design implementations are examined and evaluated.

The course will also include a high level overview of Electromagnetic Effects and Compatibility (EME / EMC), Lightning Effects (direct and indirect), High Intensity Radiated Fields (HIRF), Precipitation Static (P-Static), Electrical Bonding requirements, and requirements for Electrical Wiring and Installation System (EWIS).

Highlights
• The electromagnetic environment: considerations for 25.981
• Metallic and composite aircraft structures: considerations for 25.981
• The history of fuel tank protection requirements for aircraft certification
• Direct and indirect effects of lightning and HIRF testing for 25.981 compliance
• Requirements for in-tank mounted equipment (including FQIS)
• Requirements for out-of-tank mounted FQIS
• Requirements for fuel control equipment mounted out-of-tank
• Fuel tank bonding and continued Safety
• 25.981 ICA; Critical design configuration control limitations

Who should attend?
This course is intended for all design engineering disciplines, project managers, project engineers and laboratory personnel whose aircraft system may require protection of the airplane's fuel system from ignition / explosion.

“I left the course with a greater understanding of the impact of bonding and EWIS and lightning in regard to fuel tank ignition sources. As a side note, I have a much better understanding of what the FAA/DERs are looking for to show compliance.”
—Hugh Copeland, Senior Staff Engineer
Introduction to Electromagnetic Effects (EME)
Instructors: C. Bruce Stephens, Darren L. Stout (This course may be taught one or both instructors.)

Description
This course will provide students with an understanding of Electromagnetic Effects related to aircraft engineering, testing requirements for both DO-160 Bench Testing and an introduction to Aircraft Level Testing, and FAA Certification requirements related to Electrical Bonding/ESD/P-Static/Aircraft Wiring/EWIS/TPED’s/EMC/HIRF/Lightning/Lightning Fuel Prevention and FAA Certification Requirements.

Highlights
- EME best practices
- Team EME compliance workshops
- DER/UM EME requirements
- EME examples and practical applications
- Review of the Advisory Circulars related to EME.
- Daily real examples of problems and solutions related to EME certification

Who should attend?
The course is designed for all aircraft design areas including certification engineers and managers, electrical, avionics, HIRF & lightning engineers, DO-160 laboratory and aircraft technicians. Aircraft managers, project engineers, and all other system engineers working in electrical/avionics/HIRF/lightning/EWIS-related areas should also attend. The course is also appropriate for recently graduated students or employees who wish to get a head-start in understanding the exciting career opportunities related to electromagnetic effects engineering.
Introduction to Helicopter Performance, Stability and Control
Instructor: Shawn Coyle

Description
This course covers the information anyone working with helicopters needs to know to understand or analyze an existing design or participate in the development of a new one. It covers hover, vertical and forward flight, flight controls and unique helicopter aspects. Emphasis is on relating helicopter aerodynamics to airplane aerodynamics for those making the transition.

Highlights
- Practical examples to demonstrate theory and practice of performance and stability and control
- Difference between density altitude and pressure altitude and temperature for performance
- Turbine engine controls and governors
- Tandem and other configuration control issues
- Experience in certification of helicopters
- The course includes detailed discussion on helicopter automatic flight control systems and autopilots

Who should attend?
Engineers, engineering managers, pilots and educators who are involved in rotary wing engineering, design, testing, operational evaluation, certification or other technical aspects. The course is suitable for entry through advanced-level students, engineers and pilots.
Introduction to High Intensity Radiated Fields (HIRF)
Instructors: C. Bruce Stephens, Franklin L. Cummins (This course may be taught one or both instructors.)

Description
This course will discuss the design concepts required to ensure that all aspects of aircraft HIRF electrical wiring, installations, and aircraft-level systems are safe for operation. This course will discuss the typical certification process for HIRF from a very practical, step-by-step perspective and examine all steps used by aircraft OEMs to show compliance to HIRF regulations. 14 CFR 25.1317 for transport category airplanes will be used as the baseline regulation. A review of FAA Advisory Circulars and practical applications of the information will be conducted, as teams will be selected to simulate the HIRF certification process. HIRF requirements for aircraft maintenance and inspection will also be discussed. The course will also include a high-level overview for electromagnetic effects areas. Topics discussed include Electromagnetic Compatibility (EMC), Precipitation Static (P-Static), lightning, ESD, and electrical bonding requirements. An overview of the new requirements for Electrical Wiring and Installation System (EWIS) will also be addressed.

Highlights
• HIRF best practices
• Team HIRF workshops
• DER/UM HIRF requirements
• HIRF examples and practical applications
• Review of the HIRF Advisory Circulars

Who should attend?
The course is intended for all aircraft design areas including electrical, avionics, HIRF engineers, laboratory and aircraft technicians. Aircraft managers and project engineers working in electrical/avionics related areas should also attend.
MIL-STD Qualification: Purpose, Testing and Design Considerations
Instructor: Tom Cash

Description
This class is designed to educate program managers, system engineers, design engineers and test engineers/technicians in the aspects of the United States military standard-oriented environmental, electromagnetic interference and power quality testing, with the intention of obtaining an airworthiness certification. The intention of this course is to acquaint personnel involved in new military aircraft efforts or the modifications of existing military aircraft to add enhanced capabilities with the knowledge of the testing that will be required so that system and design engineers may develop equipment designs that are robust enough to pass the Military Standard testing, test engineers may properly design test plans for their equipment, and program managers are aware of the time necessary to accomplish this testing.

Highlights
- Top-level overview of the U.S. military airworthiness process
- Comparison of the military versus civilian airworthiness process
- Introduction and overview of the documents defining military testing
- An introduction to the environmental tests, their purpose, and a typical setup for performing each test
- An introduction to the electromagnetic interference tests, their purpose, and a typical setup for performing each test
- An introduction to the power quality tests, their purpose, and a typical setup for performing each test

Who should attend?
Any program manager, systems engineer, design engineer and/or test personnel who are or may become involved in the design and manufacturing of any items for which an airworthiness certification is desired.

ORLANDO, FLORIDA
November 14–16, 2017
Tuesday–Thursday,
8:00 a.m.–4:00 p.m.
Course Number AA181125

CEUS
21 classroom hours
2.1 CEUs

COST
Early registration fee $1,895 if registered and paid by September 29
Regular registration fee $1,995 if registered and paid after September 29

The course registration fee includes instruction, course materials, refreshments and lunches.

EARN A CERTIFICATE
This course is part of the Certificate of Specialization in Avionics and Avionic Components and the Certificate of Specialization in Aerospace Compliance. See pages 6–7 for more information.

Visit our website, aeroshortcourses.ku.edu for more information about this course, including a day-by-day outline, instructor bio(s) and a downloadable PDF with course details.

“The course is a great overview of MIL-STD 810 and 461. It is great for how to set up a plan for yourself and your organization. Well thought-out and well-organized.” —Matthew J. Berry, Senior Operations Engineer, NASA Armstrong Flight Research Center
Operational Aircraft Performance and Flight Test Practices
Instructor: Mario Asselin

Description
This course provides an overview of airplane performance theory and prediction, certification standards and basic flight test practices. The course will focus on turbojet/turbofan-powered aircraft certified under EASA/TCCA/FAA CS/CAR/14 CFR Part 25. This standard will briefly be compared to military and Part 23 standards to show different approaches to safety, certification, operational and design differences. This course is supported by the use of flight test examples and videos.

Highlights
- Basic airplane performance theory
- Determining what to test to build performance models
- Required instrumentation to best measure airplane performance
- Minimizing scatter during flight testing
- Performance model development to match flight test results
- Certification requirements
- How to demonstrate certification compliance
- Presentation of airplane performance information to the flight crew
- Setting operational limits to ensure continued operational safety
- Maneuvering and the flight envelope
- Estimating wing area, take-off thrust, take-off power and maximum lift for clean takeoff and landing
- Preliminary configuration design and integration of the propulsion system
- Flight test principles and practices
- Airplane life cycle program costs

Who should attend?
Designed for aeronautical engineers in the design or flight test departments, educators, aircrews with engineering background and military personnel involved in managing fleets of 14 CFR Part 25 (FAR 25)-certified aircraft.

“Mario Asselin has the breadth of knowledge and experience that is becoming sorely lacking in an ever more specialized world. Not only this, but he is able to convey this knowledge in a fresh and enthusiastic manner.”
—Stuart Morris, Aerodynamicist, Airbus Operations Ltd.
**Principles of Aeroelasticity**

**Instructor:** Thomas William Strganac

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**Description**

The course is designed to provide a qualitative understanding of aeroelastic behavior for aerospace vehicles. The level of class instruction is appropriate for engineers and managers with an undergraduate degree in engineering. The class will explore different forms of aeroelastic phenomena and associated issues in structural dynamics and aerodynamic-structure interaction. Topics include solution methodologies, computational methods for aeroelastic analysis, development of the operational flight boundary, aeroservoelasticity, and contemporary topics such as limit cycle oscillations and related nonlinear pathologies in aeroelastic systems. The course material will require selected study of the essential equations. The class addresses practical issues such as ground and flight tests.

**Highlights**

- A brief overview of history, definitions and fundamentals
- Description of static aeroelastic phenomena, including divergence and reversal
- Review basic mechanical vibration theory leading to modal methods
- An introduction to unsteady aerodynamics
- An introduction to dynamic aeroelasticity
- The development of the governing equations for the aeroelastic system
- Frequency domain versus time domain methods—Pros & Cons
- Flutter identification and review of flutter models
- Development of the flutter boundary, federal regulations and application to the flight envelope
- Example problems used to elucidate concepts
- Ground tests, GVTs and wind tunnel tests
- Aeroservoelasticity for response mitigation and flutter alleviation
- Flight test program examples
- Nonlinear aeroelasticity

**Who should attend?**

Designed for engineers and technical managers involved in aerospace vehicle design, analysis and testing related to aeroelastic response and stability issues.

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“*This course provided me with a good technical and high-level balance of knowledge of aeroelasticity. I will be able to grow with the core knowledge obtained here.*”

—San Diego attendee
Principles of Aerospace Engineering
Instructor: Wally Johnson

ON-SITE
This course is only available as an on-site course in 2017 (it may return to our open enrollment schedule in subsequent years). The course can be brought to your company and tailored to fit your individual training needs. On-site courses are delivered throughout the United States and around the world. To obtain a no-cost, no-obligation proposal, please contact the On-site Program Manager at 913-897-8782 or email ProfessionalPrograms@ku.edu.

CEUs
31.5 classroom hours
3.15 CEUs

EARN A CERTIFICATE
This course is part of the Certificate of Specialization in Aircraft Design. See pages 6–7 for more information.

Visit our website, aeroshortcourses.ku.edu for more information about this course, including a day-by-day outline, instructor bio(s) and a downloadable PDF with course details.

Description
The objective of this course is to provide an overview and integrated exposure to airplane aerodynamics, performance, propulsion, flight mechanics, mass properties, structural dynamics, aeroelasticity, structural loads, structures, ground testing, flight testing and certification. Lecture notes are supported by showing examples using Basic Aerospace Engineering software. This course shows the relationship between aircraft certification requirements, engineering analysis and testing.

Highlights
• Atmospheric models and airspeed measurements
• Introduction to certification requirements
• Introduction to aerodynamics
• Weight and balance
• Introduction to propulsion
• Airplane performance
• Flight mechanics
• Mechanical vibrations and structural dynamics
• Aeroelasticity
• Structural design envelopes
• Structural analysis
• Ground testing and flight testing

Who should attend?
This course is intended as an overview for non-aerospace degreed engineering professionals, managers, military and government personnel who are involved in aircraft design and certification.

“This course not only covered relevant topics, but also provided the experience of an industry participant engineer, which is priceless.”

—2014 Las Vegas Attendee
Process-Based Management in Aerospace: Defining, Improving and Sustaining Processes
Instructor: Michael Wallace

Description
This course covers foundational principles and the tools and techniques of Process Based Management (PBM) and delineates the strategies for successful implementation of PBM in an aerospace organization. Content focuses on how to depict an enterprise process view, develop process measures, define key components and identify critical success factors to maintain the focus on priority requirements for managing processes to achieve sustainable performance improvements. It includes how this fits with and supports Lean Six Sigma, Total Quality Management and Toyota Production System. Several aerospace organizational case studies are used to augment the theoretical components.

Highlights
- Overview of the aerospace design and manufacturing processes
- Foundational principles of process management
- Data gathering methods and analysis
- Identifying, reducing and controlling variation
- Increasing efficiencies and effectiveness of the designer and production
- Setting, achieving and holding performance goals
- Achieving a culture of continuous improvement

Who should attend?
Managers, engineers, quality, IT and planning professionals in the aerospace industry who are responsible for the identification, implementation and improvement of existing organizational processes and the development of new processes necessary to compete in the future.

“This course opened my eyes about things that I never thought about. It was very good and will help me to help people from my company.”
—Las Vegas Course Participant
Propulsion Systems for UAVs and General Aviation Aircraft
Instructor: Ray Taghavi

Description
This course provides an in-depth understanding of the state-of-the-art propulsion issues for UAVs and general aviation aircraft, including propulsion options, cycle analysis, principles of operation, systems, components, performance and efficiencies.

Highlights
- Fundamentals of aircraft propulsion systems, engine types and aircraft engine selection
- Aircraft spark-ignition, diesel and Wankel engines
- Two-stroke and four-stroke cycle engines
- Aircraft engine classification by cylinder arrangement, cooling, cycle, etc.
- Carburetion, ignition and lubrication systems
- Aviation fuels
- Propellers
- Engine testing and simulations
- Electric propulsion
- Overview of turbo-propeller and turboshaft engines
- Engines for special applications, UAVs, RPVs, blimps, etc.

Who should attend?
Designed for propulsion engineers, aircraft designers, aerospace industry managers, educators, research and development engineers from NASA, FAA and other government agencies.

"Dr. Taghavi is a knowledgeable, thorough and effective instructor. He brings things/topics down to the practical level. Love his attitude, personality and his sense of humor."
—San Diego Course Participant
Rotorcraft Vibration: Analysis and Practical Reduction Methods
Instructor: Richard L. Bielawa

Description
Material is presented for acquiring familiarity with both the underlying physics and the analytical tools needed for addressing rotorcraft vibration phenomena. Topics include a review of appropriate mathematical techniques, gyroscopic theory, blade natural frequency characteristics, drive system dynamics, vibration alleviation devices, rotorcraft instability phenomena and testing procedures. While some new analysis techniques are introduced, the course will address familiarization with the physics using traditional methodology.

Highlights
• Overview of rotorcraft structural dynamic problems and solutions
• Mathematical tools
• Rotational dynamics and gyroscopics
• Dynamics of rotating slender beams
• Transverse vibration characteristics
• Basic balancing techniques
• Torsional natural frequencies of shafting systems
• Fuselage vibrations basic issues
• Full-scale vibration testing of real systems
• Linear stability analysis methods
• Blade aeromechanical instabilities
• Linear unsteady aerodynamics
• Bending-torsion flutter
• Nonlinear aeroelastic stability analyses
• Rotor-fuselage coupled instabilities
• Software for ground and air resonance calculations
• Testing for dynamics at model and full scales
• Methods for quantifying stability
• Future trends

Who should attend?
Designed for those engineers and educators involved in rotorcraft research, design, development and/or testing who seek an understanding of and solutions to rotorcraft vibration issues in contemporary rotorcraft.

“Mr. Bielawa achieved a very good compilation of all structural dynamics chapters related to any rotorcraft. Very good exercises can be applied to real design parameters. I’m really satisfied with this course.”
—Alper Uzunoglu, TIA, Tusas Aerospace Ind. Inc.
RTCA DO-160 Qualification: Purpose, Testing and Design Considerations

Instructors: C. Bruce Stephens, Franklin L. Cummins (This course may be taught by one or both instructors.)

Description
This class is designed to educate engineers of all disciplines—hardware design engineers, test engineers, certification engineers, program managers, project engineers and laboratory employees—in DO-160 as it pertains to the equipment qualification in support of aircraft certification. For system and hardware engineers, the intent is to educate and empower them to develop equipment designs that are compliant with DO-160 by design and avoid expensive redesigns to correct issues found late in the development cycle during test. For test engineers, it is intended to assist them to properly develop test plans for their products. Certification engineers, program managers and project engineers will gain knowledge in the process and requirements of conducting the testing. Laboratory employees will learn the details of each DO-160 section and the requirements for certification. For each test section of DO-160, we provide purpose, adverse effects, categories, and a high-level, step-by-step guide through the test procedure and design considerations for passing the test. A high-level review of related FAA advisory material and certification requirements will be discussed.

Highlights
- The aircraft environment
- Overview of RTCA and DO-160
- Advisory circular AC 21-16G
- Requirements, development and management
- FAA test requirements
- Pass/fail requirements

Who should attend?
This class is designed for all engineering disciplines, program and project management employees, certification employees, and test lab personnel responsible for developing qualification requirements for airborne electronic equipment.

Additional Course Format
An online version of this course is also available. See page 54 for details.

“Listening to real DO-160 training experiences by the instructors was what I enjoyed the most.”
—Aida Urrutia, Electrical Engineer, Jamco America Inc.
RTCA DO-160 Qualification: Purpose, Testing and Design Considerations  ONLINE
Instructor: C. Bruce Stephens

Description
This class is designed to educate engineers of all disciplines—hardware design engineers, test engineers, certification engineers, program managers, project engineers and laboratory employees—in DO-160 as it pertains to the equipment qualification in support of aircraft certification. For system and hardware engineers, the intent is to educate and empower them to develop equipment designs that are compliant with DO-160 by design and avoid expensive redesigns to correct issues found late in the development cycle during test. For test engineers, it is intended to assist them to properly develop test plans for their products. Certification engineers, program managers and project engineers will gain knowledge in the process and requirements of conducting the testing. Laboratory employees will learn the details of each DO-160 section and the requirements for certification. For each test section of DO-160, we provide purpose, adverse effects, categories, and a high-level, step-by-step guide through the test procedure and design considerations for passing the test. A high-level review of related FAA advisory material and certification requirements will be discussed.

Highlights
- The aircraft environment
- Overview of RTCA and DO-160
- Advisory circular AC 21-16G
- Requirements, development and management
- FAA test requirements
- Pass/fail requirements

Who should attend?
This class is designed for all engineering disciplines, program and project management employees, certification employees, and test lab personnel responsible for developing qualification requirements for airborne electronic equipment.

Additional Course Format
If you prefer a classroom-based learning environment, this course will be offered in San Diego, California, in September, 2017 (see page 53).
Software Safety, Certification and DO-178C
Instructor: Jeff Knickerbocker

Description
This course provides the fundamentals of developing and assessing software to the standard RTCA/DO-178B and RTCA-DO-178C Software Considerations in Airborne Systems and Equipment Certification as well as associated RTCA/DO-178C supplements in DO-330, DO-331, DO-332 and DO-333. Similarities and differences to RTCA/DO-278A for CNS/ATM equipment will also be addressed. The course also provides insight into the FAA’s software review process; the FAA’s software policy; practical keys for successful software development and certification; common pitfalls of software development; and software challenges facing the aviation community. Practical exercises and in-class activities will be used to enhance the learning process.

Highlights
• Differences between DO-178B and DO-178C
• DO-178C supplemental documents and where they fit
• Overview of existing standards related to software safety
• Configuration management
• Development and integration/test processes
• Verification processes
• Quality assurance objectives
• Supplements
• Assessing compliance—the Software Job-Aid
• Planning process
• Common pitfalls
• Software challenges facing the aviation industry

Who should attend?
Designed for software developers, avionics engineers, systems integrators, aircraft designers and others involved in development or implementation of safety-critical software. The focus is on civil aviation, certification and use of RTCA/DO-178C; however, the concepts may be applicable for other safety domains, such as military, medical, nuclear and automotive.
Stress Analysis for Aerospace Structures
Instructor: Dennis Philpot

Description
This course is designed for the practicing engineer who has an interest in the various aspects of stress analysis in aerospace structural-mechanical design and would like to enhance his or her expertise in this important field. The approach taken in this course is to start with a strong theoretical foundation and then build upon that foundation with practical applications that can be immediately put into practice in the workplace. In this manner, both the theory and practice of classical “hand” analysis techniques are presented as well as the more modern (numerical/computational) methods used in the industry. The subject matter difficulty-level is intermediate.

Highlights
• Why structures fail
• Analysis in the design environment
• Vectorial and analytical mechanics
• Two-dimensional theory of elasticity
• The airy stress function
• Energy methods in mechanical analysis
• The principle of stationary potential energy
• Finite element method discussion
• Failure prevention of engineering materials
• Deterministic stress analysis
• Generalized Hook’s Law
• Stress concentration factors in mechanical design
• Linear elastic fracture mechanics (LEFM) approach
• Analysis of bolted joints
• The bolted joint diagram
• Calculation of critical external load
• Interaction equation for combined loading
• Fatigue analysis in mechanical design
• Modified Goodman approach
• Gerber and ASME-elliptic relations
• Fatigue crack propagation and Paris’ Law
• Damage tolerance and fracture control
• Numerical optimization
• Unconstrained and constrained design problems
• Multidiscipline design optimization

Who should attend?
Design engineers who would like to become more familiar with the techniques and modern practices of stress analysis to help them be more efficient and productive in their work; mechanical engineers who have been out of college for a while and need to become more knowledgeable in the area of stress analysis due to a particular job assignment or new career opportunity that requires expertise in analyzing structures; and department managers whose staff are involved in stress analysis work.

“Dennis is very knowledgeable about this subject and articulates it to the class. He is very passionate in teaching this subject, and keeps it interesting.”
—Ron Grose, Falcon Program Manager & Technical Specialist, Duncan Aviation

ORLANDO, FLORIDA
November 13–17, 2017
Monday–Thursday, 8:00 a.m.–4:00 p.m. and Friday, 8:00 a.m.–11:30 a.m.
Course Number AA181135

CEUs
31.5 classroom hours
3.15 CEUs

COST
Early registration fee $2,495 if registered and paid by September 29
Regular registration fee $2,695 if registered and paid after September 29

The course registration fee includes instruction, course materials, refreshments and lunches.

EARN A CERTIFICATE
This course is part of the Certificate of Specialization in Aircraft Design and the Certificate of Specialization in Aircraft Structures. See pages 6–7 for more information.

Visit our website, aeroshortcourses.ku.edu for more information about this course, including a day-by-day outline, instructor bio(s) and a downloadable PDF with course details.
Structural Composites
Instructors: Max Kismarton, Mark S. Ewing (This course may be taught by one or both instructors.)

Description
An introduction to high-performance composite materials, covering both engineering and manufacturing of composite parts and assemblies; basic material properties of the constituents (fiber and matrix); how they combine to form plies, or lamina; how to obtain lamina properties; how laminae are combined to form laminates and how to obtain the laminate properties. Other engineering topics include stress analysis, failure criteria and testing methods. Case studies and lessons learned will be discussed. Design using composites will include material selection; lamination rules of thumb; weight analysis; fabrication process description; tool design; and preliminary cost and production rate analysis.

Highlights
- Historical review of laminated composite usage
- Constituent materials and properties
- Formulas and analysis tools to predict mechanical properties of laminates
- Introduction to manufacturing composites
- Failure theories and their limitations
- Coupon level testing methods
- Introduction to tooling design
- Design of simple structures, lamination rules of thumb
- Inspection methods
- Bonded and bolted joints
- Hygro-thermal effects
- Interlaminar and free-edge effects
- Durability and environmental issues
- Design problems

Who should attend?
The course has proven very helpful to those wanting a broad overview and/or a crash course in composites; experienced engineers looking for a refresher course; stress engineers wanting to understand how composites really work or fail and what to look out for when analyzing parts, data and margins; practicing engineers and managers with metal experience wishing to expand their skill set; anyone wanting to jump into the field but does not know how to go about it; and engineering teams embarking on new projects involving composites.

“I have attended two other structural short courses before Structural Composites. This course was by far the one that takes my attention most. I’m looking forward to seeing additional courses from our instructor, Max Kismarton.”
—2015 Orlando attendee
Unmanned Aircraft System Software Airworthiness
Instructor: Willie J. Fitzpatrick, Jr.

Description
This course covers the software airworthiness requirements for unmanned aircraft systems (UAS). It will address the development and airworthiness evaluation of complex integrated software intensive unmanned aircraft systems, as well as the relationship between the acquisition/development processes for these systems and the key software airworthiness assessment processes. The course also identifies the deliverables, artifact requirements and approaches for documenting the software airworthiness assurance case, which is required to ultimately provide the certification/qualification basis for approval of the airworthiness of the unmanned aircraft system. The course offers key lessons learned in the application of the airworthiness assessment processes in software intensive unmanned aircraft systems.

Highlights
- Overview of UAS software requirements
- Software acquisition and development
- Software airworthiness products and assessment process during the system life cycle
- Assessments of: planning and requirements analysis; preliminary and architectural design; detailed design, coding and unit test; software integration and formal qualification test and system integration test; and aircraft integration, ground test and flight test
- Developing recommendations for formal flight and airworthiness releases to approval authority
- Documenting the UAS software airworthiness assurance case
- Keys to successful software airworthiness process implementation for UAS
- Problem areas, concerns and lessons learned
- Future trends

Who should attend?
This course is intended for managers, systems engineers, software system safety engineers and software engineers who design, develop or integrate software in unmanned aircraft systems or evaluate these systems to provide the qualification/certification basis for their software airworthiness.

“Very good course putting together the best practices in software certification, combining DO 178 B/C and MIL-STD 498 experiences and providing guidance through the complicated and often long airworthiness certification process.”
—Prodrag Vucetic, 2015 Orlando attendee
OUR CLIENTS INCLUDE

| Airbus Group                              | L-3 Communications            |
| Aeronautical Radio, Incorporated (ARINC)  | Lockheed Martin                |
| ASELSAN A.Ş.                              | Lufthansa Technik AG           |
| BAE Systems, plc                          | Lycoming Engines               |
| B/E Aerospace, Inc.                       | NASA                           |
| Beechcraft Corporation                     | National Aerospace Laboratory (NLR) |
| Bell Helicopter Textron, Inc.             | National Transportation Safety Board (NTSB) |
| The Boeing Company                        | New Zealand Defence Force (NZDF) |
| Bombardier Aerospace                      | Northrop Grumman Corporation   |
| Brazilian Organization for the Development of Aircraft Certification (DCA-BR) | Parker Hannifin Corporation   |
| Cessna Aircraft Company                    | Pilatus Aircraft Ltd.          |
| Cirrus Aircraft                            | Pratt & Whitney                |
| Civil Aviation Administration of China (CAAC) | QinetiQ Group plc            |
| Commercial Aircraft Corporation of China (COMAC) | Raytheon Company              |
| Dassault Aviation                          | Rockwell Collins, Inc.        |
| Defense Acquisition Program Administration (DAPA) | Rolls-Royce                   |
| Department of National Defence and the Canadian Armed Forces | Samsung Techwin              |
| Embraer S.A.                               | Saab Group                     |
| European Aviation Safety Agency (EASA)     | Savunma Teknolojileri Muhendislik (STM) |
| Federal Aviation Administration (FAA)      | Sierra Nevada Corporation (SNC) |
| Garmin International, Inc.                 | Sikorsky Aircraft Corporation |
| General Atomics Aeronautical Systems, Inc. | Singapore Technologies Aerospace (ST Aerospace) |
| General Electric Aviation                  | Spirit AeroSystems, Inc.      |
| The Goodrich Corporation                   | SR Technics                    |
| Gulfstream Aerospace Corporation           | Taikoo (Xiamen) Aircraft Engineering Co., Ltd. |
| Honeywell Aerospace                        | Transport Canada               |
|                                           | U.S. Department of Defense (Air Force, Army, Navy and Coast Guard) |
**LODGING AND TRAVEL INFORMATION**

- **Lodging and transportation costs are NOT included in course fees.** Attendees are responsible for making their own lodging and travel arrangements.
- The following lodging and transportation suggestions are provided for your convenience and do not represent an endorsement.
- For additional travel information, including convenient weblinks to assist you in making your travel plans, please visit our website: www.aeroshortcourses.ku.edu.

**International Travelers**
Are you planning to attend one of our courses in the United States but are not a U.S. citizen? Please visit www.travel.state.gov for visa and travel information.

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**Denver, Colorado**
June 5–9, 2017

**Crowne Plaza Denver Downtown**
1450 Glenarm Place
Denver, Colorado 80202

**Hotel Information:**
- A limited number of rooms has been reserved for course attendees.
- The standard single/double room rate is $159, plus applicable taxes.
- Free in-room internet and discounted parking ($5 each day) are included in the group rate.
- The room block will only be held until May 14, 2017.
- Make a reservation by calling 1-720-269-3257 and state that you are with KU Aerospace Short Courses.
- A dedicated reservation link can be accessed from our website.

**From the airport:**
- The Denver International Airport (DEN) is 26 miles (41 km) from the Crowne Plaza Denver Downtown.
- SuperShuttle provides ground transportation for approximately $19 each way. Provide group code UPBP7 to receive the discounted rate.
- To reserve the SuperShuttle, call 1-800-258-3826 (toll free in the U.S.) or visit www.supershuttle.com
- The NEW light rail from the airport to Downtown Union Station costs $9 each way. Visit www.rtd-denver.com/a-line.shtml. From Union Station take the MallRide bus at 16th Street Mall & Wynkoop Street to 16th Street Mall and Glenarm Place. Then walk to 1450 Glenarm Place.

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**Seattle, Washington**
April 24–28, 2017

**DoubleTree Suites by Hilton Hotel Seattle Airport Southcenter**
16500 Southcenter Parkway
Seattle, Washington 98188

**Hotel Information:**
- A limited number of rooms has been reserved for course attendees.
- The standard single/double room rate is $129, plus applicable taxes.
- Free in-room internet and parking are included in the group rate.
- The room block will only be held until April 6, 2017.
- Make a reservation by calling 1-800-222-8733 and provide the group code UOK.
- A dedicated reservation link can be accessed from our website.

**From the airport:**
- The Seattle-Tacoma International Airport (SEA) is 3.5 miles (5.6 km) from the hotel.
- Complimentary shuttle service is provided by the hotel (no reservation is required).
- Hotel shuttle courtesy phones are located on the baggage claim level, in the shuttle pickup area at Islands #1 and #3.
San Diego, California
September 11–15, 2017
September 18–22, 2017
San Diego Marriott Mission Valley
8757 Rio San Diego Drive
San Diego, California 92108

Hotel Information:
• A limited number of rooms has been reserved for course attendees.
• The standard single/double room rate is $149, the U.S. Federal Government per diem rate for San Diego at the time of the event, plus applicable taxes. Free in-room internet and discounted parking ($6/day) are included in the group rate.
• The room block will only be held until August 22, 2017.
• Make a reservation by calling 1-877-622-3056 (toll free worldwide) and state that you are with KU Aerospace Short Courses.
• A dedicated reservation link can be accessed from our website.

From the airport:
• The San Diego International Airport (SAN) is 8.1 miles (13km) from the hotel.
• SuperShuttle provides ground transportation for approximately $12 each way.
• Provide group code UPBP7 to receive the discounted rate.
• To reserve the SuperShuttle, call 1-800-258-3826 (toll free in the U.S.) or visit www.supershuttle.com.

Orlando Florida
November 13–17, 2017
Doubletree by Hilton at the Entrance to Universal Orlando
5780 Major Boulevard
Orlando, Florida 32819

Hotel Information:
• A limited number of rooms has been reserved for course attendees.
• The standard single/double room rate will be the prevailing U.S. Federal Government per diem rate for Orlando at the time of the event plus applicable taxes. (The FY2017 U.S. Federal Government per diem rate is $133.)
• Free in-room internet and discounted parking are included in the group rate.
• The room block will only be held until October 31, 2017.
• Make a hotel reservation by calling 1-800-222-8733 and provide the group code. (The group code will be listed on the website when it becomes available.)
• A dedicated reservation link can be accessed from our website.

From the airport:
• The Orlando International Airport (MCO) is 18 miles (29 km) from the hotel.
• Mears Transportation provides 24 hours shuttle service for approximately $19 one-way ($30 round trip).
• Mears reservations can be made online at www.mearstransportation.com or by phone at 407-423-5566.
**HOW TO REGISTER**

- **Online** aeroshortcourses.ku.edu
- **Phone** 785-864-5823
  877-404-5823 toll-free in the U.S.
- **Fax** 785-864-4871
- **Mail** KU Professional & Continuing Education
  1515 Saint Andrews Drive
  Lawrence, KS 66047-1619

Please copy the registration form on page 63 of this catalog to register by fax or mail.

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**Registration**
2017 course registration opens December 1, 2016.

Course registration is limited and will be accepted in the order received. Payment is due upon registration. A confirmation letter and receipt will be emailed to each paid registrant. If you do not receive a confirmation, please contact us.

**NEW Early Registration Discount**
Register early and save. Register and pay by the early registration deadline and save up to $200 on the course regular registration fee. Early registration deadlines are listed on each course description page. If you register after the early registration date, you will pay the regular registration fee.

**NEW US Federal Government Employee Discount**
Under the new Federal Executive Board partnership with the University of Kansas, US federal government employees qualify for a 10% discount off the registration fee on select courses. If a course qualifies, it will be noted on the course description page. For more information, and to register using the Federal Executive Board partnership, visit http://kupce.ku.edu/federal-partnership. Please note that you must validate your eligibility to receive this discount by entering your U.S. government email address ending with .gov or .mil.

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**Payment**
All fees are payable in U.S. dollars and due upon registration.

**Payment by Credit Card**
Online registrations must be paid by credit or debit card. KU accepts MasterCard, VISA, Discover and American Express. When you register online you will be prompted for your credit card information. To register by fax or mail include your credit card information on the registration form. Please do not provide the CVV code. Please note for your security, KU cannot accept credit card information via email.

**Payment by Check (personal or company check)**
Please mail your registration form and a check in U.S. dollars to the address listed above. Make your check payable to “The University of Kansas”. Please reference “KU Professional & Continuing Education” on the check. A $30 fee will be charged for returned checks.

**Payment by Purchase Order or Wire Transfer**
The University of Kansas requires payment upon registration. If your organization requires use of a purchase order before payment is issued or must pay by wire transfer, please contact the Registration Center at kupce@ku.edu prior to registering online. Please note that to receive the Early Registration Discount, full payment will be required before the early registration deadline as listed on each course page. After the deadline, your registration will automatically be canceled and you can enroll again at the regular course fee.
Please print. If your mailing address requires a different format than indicated here, please use that format and ignore the printed guidelines.

Full name (first, middle initial, last name or surname, suffix)  
Male ☐ Female ☐

Email address (Your confirmation letter and receipt will be sent to this email address.)

Company or organization

Position/job title

Mail stop, building or room number (if needed)

Street address or post office box  ☐ Home ☐Work

City, state or province  Zip+four or postal code  Country

Daytime phone  Alternate/evening phone

If you will need special accommodation, please call 785-864-5823, or email ProfessionalPrograms@ku.edu.

Please register me for the following course:

Course Name  Course #

Dates  Location

FEES (Registration fees are listed on each course page. Please check the course page online at aeroshortcourses.ku.edu or in the 2017 Course Catalog.)

☐ Early registration fee (must be paid before the published early registration deadline)

☐ Regular registration fee

☐ I am a U.S. federal employee requesting the federal discount (10% off the registration fee). Enter discount code (required): ________________

(Note: Not all courses are eligible for this discount. Please check the course page online or in the 2017 Course Catalog.)

PAYMENT

Amount due $_____________

☐ Check enclosed, payable in U.S. dollars, to The University of Kansas.

☐ Credit card: ☐ Visa ☐ MasterCard ☐ Discover ☐ American Express

Card number _______________ Expiration (MM/YR) _________ / _________

Name on card (please print) _______________________________ Cardholder's phone number __________________

Payment by Purchase Order or Wire Transfer

The University of Kansas requires payment upon registration. If your organization requires the use of a purchase order before payment is issued, or if you must pay by wire transfer, please contact the Registration Center at kupce@ku.edu prior to registering online. Please note that to receive the Early Registration Discount, full payment will be required before the early registration deadline as listed on each course page. After the deadline, your registration will automatically be canceled and you can enroll again at the regular course fee.

How did you hear about this KU Aerospace Short Course?

☐ Referral ☐ Course catalog ☐ Website ☐ Email ☐ LinkedIn group ☐ Print ad ☐ Tradeshow ☐ Other ________________

aeroshortcourses.ku.edu  785-864-5823 or toll-free in the U.S. 877-404-5823
POLICIES

Audio or Video Recording
Audio or video recording is not permitted in the classroom.

Cancellation Policy
KU Professional & Continuing Education reserves the right to cancel a course and return all the registration fees in the event of insufficient registrations, inclement weather or other unforeseen circumstances. The liability of the University of Kansas is limited to the registration fee. The University of Kansas will not be responsible for any losses incurred by a registrant including, but not limited to, airline cancellation charges or hotel deposits.

If you are unable to attend a course, you have the following options:

- **Send a qualified substitute.** Please contact the Registration Center at kupce@ku.edu to inform them you will not be attending and provide your substitute’s name. Ask your substitute to also contact the registration department to provide his/her complete registration information.

- **Transfer or Request a Refund.**
  - **For Public Short Courses:** Contact the Registration Center at kupce@ku.edu at least two weeks prior to the course start date to receive a full refund. Cancellations made after the two-week deadline, but before the course start date, are eligible to receive a refund less a $250 administrative fee or transfer to another course. If transferring, you have one year from the original course date to complete a short course of equal value.
  - **For Live (Synchronous) Online Courses:** No refunds or transfers will be granted for the class once the published start date has passed and/or the student has accessed the Blackboard class site. A full refund of registration fees, less a $30 administrative fee, will be approved if requested in writing prior to the published start date and/or accessing the course. The cost of any text or course materials that have already shipped will also be withheld from your refund.

Please note that if you fail to cancel and do not participate, you are still responsible for payment.

Certificate of Attendance
A certificate of attendance will be awarded to each participant who is present for 100 percent of the course.

CEUs
Continuing Education Units (CEUs) are assigned to each course and are listed on each course page. CEUs may not be used for college credit.

Course Materials
The course materials (course notes) are for participants only and are not for sale.

Course Schedule
The University of Kansas Professional & Continuing Education and/or its instructors reserve the right to adjust course outlines, schedules and/or materials. Course times and total hours are approximate and may be adjusted by the instructor(s) as the situation warrants.

Instructor Substitution
The University of Kansas Professional & Continuing Education reserves the right to substitute an equally qualified instructor in the event of faculty illness or other circumstances beyond its control.

Nondiscrimination Policy
The University of Kansas prohibits discrimination on the basis of race, color, ethnicity, religion, sex, national origin, age, ancestry, disability, status as a veteran, sexual orientation, marital status, parental status, gender identity, gender expression and genetic information in the University’s programs and activities. Retaliation is also prohibited by university policy. The following person has been designated to handle inquiries regarding the non-discrimination policies: Executive Director of the Office of Institutional Opportunity and Access, IOA@ku.edu, 1246 W. Campus Road, Room 153A, Lawrence, KS, 66045, (785)864-6414, 711 TTY. For the most current information on this subject, visit http://policy.ku.edu/IOA/nondiscrimination.

Privacy Policy
The University of Kansas Professional & Continuing Education does not share, sell or rent its mailing lists. You have our assurance that any information you provide will be held in confidence by the University of Kansas Professional & Continuing Education. We occasionally use mailing lists that we have leased. If you receive unwanted communication from KUPCE, it may be because your name appears on a list we have acquired from another source. In this case, please accept our apology.

Program Accessibility
We accommodate persons with disabilities. Please call (785) 864-5823, or email ProfessionalPrograms@ku.edu to discuss your needs. To ensure accommodation, please contact us at least four weeks before the start of the course. See the nondiscrimination policy above.

Returned Check
A $30 fee will be charged for returned checks.
LEADERSHIP TRAINING FOR AEROSPACE PROFESSIONALS

Learn the crucial skills you need to become an effective leader in your organization with KU Professional & Continuing Education’s Professional Leadership training. Visit the website for a complete list of our leadership training, and voice your interest in bringing this training to KU Aerospace Short Course locations.

LEADERSHIP LINK & LEARN FREE LIVE WEBINARS

Take advantage of these free, one-hour webinars on such topics as business presentation skills, organizational culture, and inspired leadership. Visit the website for the complete webinar schedule.

Visit our website for more information about all of our leadership training options:
aeroshortcourses.ku.edu/skills
YOUR WORLD.
OUR TRAINING.
NEW HEIGHTS.