



PROFESSIONAL DEVELOPMENT SEMINARS

HELD IN CONJUNCTION WITH WCX™:
SAE WORLD CONGRESS EXPERIENCE

April 9-13, 2018 | Cobo Center, Detroit, Michigan, USA



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PROFESSIONAL DEVELOPMENT SEMINARS AT WCX™: SAE WORLD CONGRESS EXPERIENCE

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SCHEDULED SEMINARS EXPLORE THE FOLLOWING TOPICS

- Power & Propulsion including transmissions and emissions
- Vehicle Connectivity and vehicle autonomy
- Management & Leadership including team building and project management
- Chassis & Vehicle Dynamics including vehicle suspension design and ADAS
- Engineering Tools & Methods including GD&T

NEW SEMINAR TITLES

- Fundamentals of Vehicle Suspension Design - page 5
- ADAS Application: Automatic Emergency Braking - page 6
- Introduction to Radar for Automotive Applications - page 11

WHY SAE? WHAT OUR CUSTOMERS ARE SAYING

"The Instructor and seminar content were excellent! He kept it interesting and encouraged class participation. Well worth three days of my time!"

(In reference to Vehicle Dynamics for Passenger Cars and Light Trucks - page 7)

Angela Amerson, Global Product Validation Manager, General Motors

"You leave with the satisfaction of learning/reinforcing new tasks and methods that can be used at the office immediately."

(In reference to Engineering Project Management - page 17)

Richard Fanco, Engineering Program Manager, AM General Corporation

"Excellent course. Mark is an awesome teacher with experience in the subject."

(In reference to Fundamentals of Gear Design and Application - page 21)

Angel Alvarez, D&R Engineer, Ford Motor Company

SAE CUSTOMER SERVICE

Contact SAE Customer Service for any questions concerning schedules, fees, locations, or registration.

+1.877.606.7323 (US and Canada) or

+1.724.776.4970 or

CustomerService@sae.org

A LEARNING FORMAT TO FIT EVERY NEED

As the world's leader in offering access to the most extensive, multi-sector source of knowledge and expertise, SAE International provides the mobility engineering training and education needed to turn your challenges into solutions.

What is your learning need?

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Many courses are offered in multiple formats to fit your exact need. Be sure to watch for the icons that identify the format available for each course.

Seminars or workshops available as similar live, online web seminars or on demand courses, will feature icons and information about the schedule and fees for all platforms.

CATALOG KEY

Look for the icons below with the course descriptions. The icons indicate delivery formats for the course and whether the course is part of an SAE Certificate program.

Many courses are available in multiple formats. In addition to finding courses that fit your technology need, look for courses with icons that fit the way you want to learn.



CLASSROOM

indicates that course is an instructor-led seminar or workshop offered in a classroom setting



LIVE, ONLINE

indicates this course is an instructor-led Web Seminar offered live and online via telephone and internet connection



ON DEMAND

These offerings are available online anytime the participant would like to access the course through the internet



CERTIFICATE

This icon indicates that this course is part of an SAE International curriculum-based, multi-course certificate



ACTAR LOGO

This icon indicates the course is an ACTAR approved course. For more information on ACTAR and ACTAR accredited courses, visit training.sae.org/seminarsinfo/actar

As an IACET Accredited Provider, SAE International offers CEUs for its programs that qualify under the ANSI/IACET Standard.

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27 2018 LIVE LEARNING SCHEDULE

*Held at the SAE International Office in Troy, Michigan - only 30-minutes from Cobo Center.

BRAKE FRICTION MATERIALS: TESTING, QUALITY AND SELECTION



The choice of brake friction materials varies per application, but each must have the appropriate coefficient of friction and be able to disperse large amounts of heat without adversely effecting braking performance. This seminar provides an introduction to brake lining raw materials and formulation, manufacturing, quality control and testing; and covers the critical elements that must be reviewed before arriving at a lining selection decision. Different classes of friction material and their use will be defined.

LEARNING OBJECTIVES

By attending this seminar, you will be able to:

- Describe the principles of friction
- Define the basic elements of friction material formulations
- Identify the difference between OE and after-market friction materials
- Identify appropriate tests to distinguish the differences between friction materials
- Interpret friction material test results

WHO SHOULD ATTEND

Engineers and technicians working for friction material manufacturers and suppliers to friction material industries. Brake system designers, quality control auditors, product development engineers, application engineers, lab/bench/vehicle test technicians, managers/friction material sales and marketing will all gain valuable insight into this highly guarded industry.

CONTENT HIGHLIGHTS

- Principles of Friction Materials
- Lining Coefficient of Friction
- Formulation/Compounding Friction Material
- Manufacturing Friction Material
- General Asbestos/Non-asbestos Friction Material Characteristics
- Friction Material Testing
- Edge Code
- Bench & Vehicle Tests; Wheel Dust Test
- Government Regulations
- OE and After-market Friction Material Lining Selection
- Issues Facing Friction Material Industries

INSTRUCTORS

Mohammad Vakili
Industry Consultant

Brake system designers, quality control auditors, product development engineers, application engineers, lab/bench/vehicle test technicians, managers/friction material sales and marketing will all gain valuable insight into this highly guarded industry.

I.D.# C1020

SCHEDULE

April 9, 2018
Cobo Center
Detroit, Michigan

FEES

List:	\$810
Members	
Classic:	\$729
Premium:	\$689
Elite:	\$648

ONE-DAY/.7 CEUS

Get the complete course description and register:

sae.org/learn/content/c1020/

INTRODUCTION TO BRAKE CONTROL SYSTEMS: ABS, TCS, AND ESC



This course introduces you to the system-level design considerations, vehicle interface requirements, and inevitable performance compromises that must be addressed when implementing brake control systems technologies. This course defines the tire-road interface and analyzes fundamental vehicle dynamics and includes an in-depth study of system electronics, hydraulic hardware, and sensor requirements. Learn about the control strategies employed by anti-lock brakes (ABS), dynamic rear proportioning (DRP), traction control (TCS), and electronic stability control (ESC) with emphasis placed on the resulting vehicle dynamics.

LEARNING OBJECTIVES INCLUDE

By attending this seminar, you will be able to:

- Analyze brake system design parameters and their vehicle performance effects
- Evaluate the compromises between stability, steerability, and stopping distance
- Identify the discrete mechanical components required for ABS and fundamental performance attributes
- Calculate dynamic brake balance and explain the benefits of DRP
- Reconcile TCS performance expectations vs. method of implementation
- Define ESC performance metrics and physical limitations and interpret federal requirements for performance
- Assess features such as adaptive cruise control and brake assist

WHO SHOULD ATTEND

Engineers involved in design or development of vehicle dynamics and braking, powertrain, chassis, or suspension systems; and those with component design responsibilities in brake, chassis, suspension, or tire disciplines.

CONTENT HIGHLIGHTS

- Tire-Road Interface
- Hydraulic Brake System Overview
- Stability, Steerability, Stopping Distance
- ABS - mechanization, sensor overview, performance
- DRP - performance
- TCS - performance and mechanization
- ESC - performance, mechanization, sensors
- Features and Functionality
- Federal Motor Vehicle Safety Standard 126

INSTRUCTOR

James Walker, Jr.

Principal Engineer, Carr Engineering

“Forget any general idea you may have about brakes; this class introduces the complexity of the brake control systems and the engineering design that goes into it.”

Tim Lowe

Quality Engineering Powertrain
Toyota Motor Manufacturing of
Kentucky

I.D.# C0315

SCHEDULE

April 9-10, 2018
Cobo Center
Detroit, Michigan

FEES

List: \$1,355

Members

Classic: \$1,220

Premium: \$1,152

Elite: \$1,084

TWO-DAYS/1.3 CEUS

Get the complete course description and register:

sae.org/learn/content/c0315/

NEW! FUNDAMENTALS OF VEHICLE SUSPENSION DESIGN



Suspension component design continues to move toward mass and cost efficient designs with high levels of stiffness being essential to achieving design requirements. Mass, cost and stiffness are expected to become increasingly important with higher fuel economy requirements, alternative energy sources and the move to autonomous vehicles. This course emphasizes the basic tenets of suspension design enabling strategically important product trends.

LEARNING OBJECTIVES

By attending this seminar, you will be able to:

- Discuss the basic attributes of suspension design
- Evaluate various suspension types, identifying advantages and tradeoffs
- Convey an understanding of vehicle level boundary conditions for suspension geometry
- Analyze suspension designs and how they affect vehicle performance
- Assess the basics of ground lines and tire envelopes on vehicle design

WHO SHOULD ATTEND

Automotive engineers with a need to understand the basics of suspension design as well as suspension integration into the vehicle environment. The course is intended for both OEM and Supplier Engineers working in applications, materials, product design, development, testing, simulation and/or research.

CONTENT HIGHLIGHTS

- Suspension's role in the vehicle
 - definition of upper and lower suspension planes
 - dependent v. independent v. semi-independent suspensions
- Front and Rear Suspension Types
- Vehicle Packaging
- Suspension Geometry & Alignment
- Tire Envelopes and Ground Lines
- Vehicle Dynamics and NVH

INSTRUCTOR

William Pinch

Independent Industry Consultant

The design and development of vehicle suspensions significantly influences vehicle handling and ride comfort. Suspension system design excellence follows the basic laws of physics using design synthesis techniques, a methodical process for suspension geometry development. Suspension geometry is the foundation of vehicle performance from which high-confidence suspension components and tunings can be developed.

I.D.# C1618

SCHEDULE

April 9-10, 2018
Cobo Center
Detroit, Michigan

FEES

List: \$1,370

Members

Classic: \$1,233

Premium: \$1,165

Elite: \$1,096

TWO-DAYS/1.3 CEUS

Get the complete course description and register:
sae.org/learn/content/c1618/

NEW! ADAS APPLICATION: AUTOMATIC EMERGENCY BRAKING



This course provides an overview of the typical ADAS AEB system from multiple perspectives and a technical overview of the development cycle processes specific to AEB (including system level requirements and design architecture); as well as design considerations for AEB from an ISO-26262 perspective. A general overview of algorithm concepts for the various AEB subsystems will be demonstrated followed by a review of AEB system test and validation methods. Discussion is facilitated toward understanding customer perception and acceptance of AEB at present. You will gain a fundamental understanding of design principles and functional composition for a typical AEB system.

LEARNING OBJECTIVES INCLUDE

By attending this seminar, you will be able to:

- Describe AEB features / functionality including capabilities and limitations of typical systems
- Identify key principles of vehicle dynamics and system engineering disciplines integral to AEB system development
- Describe general activities required for driving and braking tasks and comment on how these form the bases for AEB system requirements
- Identify AEB system architectures and subsystem composition and describe the function and purpose of each subcomponent
- Identify functional safety (ISO 26262) implications including review of basic hazard and risk analysis examples
- Explain algorithm concepts and functions for each of the AEB subsystems
- Critically examine various methods and levels of testing specific to AEB.

WHO SHOULD ATTEND

Engineers and managers who are looking for an in-depth technical overview of AEB systems.

CONTENT HIGHLIGHTS

- Automatic Emergency Braking Overview
- Basic Engineering Fundamentals - vehicle dynamics; AEB features and marketed benefits
- AEB System Requirements
- AEB System Architecture and Decomposition
- AEB System Design: Safety; Performance Objectives
- AEB System Test and Validation
- Future Direction - market penetration; customer acceptance; steps towards full autonomy

INSTRUCTOR

Eldon Leaphart

Principal Engineer, Carr Engineering

Active Safety, Advanced Driver Assistance Systems (ADAS) are now being introduced to the marketplace as they serve as key enablers for anticipated autonomous driving systems. Automatic Emergency Braking (AEB) is one ADAS application which is either in the marketplace presently or under development as nearly all automakers have pledged to offer this technology by the year 2022.

I.D.# C1704

SCHEDULE

April 11, 2018
Cobo Center
Detroit, Michigan

FEES

List: \$810

Members

Classic: \$729
Premium: \$689
Elite: \$648

ONE-DAY/.7 CEUS

Get the complete course description and register:
sae.org/learn/content/c1704/

VEHICLE DYNAMICS FOR PASSENGER CARS AND LIGHT TRUCKS



This course presents an introduction to Vehicle Dynamics from a vehicle system perspective including theory and applications associated with the interaction and performance balance between key interrelated systems. The role that vehicle dynamics can and should play in effective automotive chassis development and the information and technology flow from vehicle system to subsystem to piece-part is included. Vehicle system dynamic performance in the areas of drive-off, braking, directional control and rollover is emphasized. The dynamics of the subsystems and their interactions are examined along with the important role of structure and structural parameters related to vehicle dynamics. Physical experiments, applicable to vehicle dynamics are also introduced.

LEARNING OBJECTIVES INCLUDE

By attending this seminar, you will be able to:

- Identify important vehicle system parameters useful for effective application of vehicle dynamics to chassis development
- List and explain parameters that effect vehicle performance relative to drive-off, braking, directional control and rollover
- Identify physical measurements needed to effectively apply vehicle dynamics to passenger cars and light trucks
- Define the value of vehicle dynamics simulation in the development and evaluation of vehicles
- Explain the balance required between ride, directional control and rollover and the essential process for this balance to be obtained for marketplace vehicles

WHO SHOULD ATTEND

Automotive engineers and quality professionals who work in product design, testing, quality, process or development will benefit from attending.

CONTENT HIGHLIGHTS

- Role of Vehicle Dynamics in Product Development
- Effective Metrics for Vehicle Dynamics
- Tire Fundamentals; Elementary Tire Patch Forces and Moments
- Acceleration (Drive-Off) Performance
- Braking Performance
- Ride Fundamentals; Cornering Fundamentals
- Suspension & Steering Systems
- Rollover Fundamentals
- Introduction to CAE Applications for Vehicle Dynamics

INSTRUCTOR

Richard Lundstrom

Independent Research and Project Engineer

“The Instructor and seminar content were excellent! He kept it interesting and encouraged class participation. Well worth three days of my time!”

Angela Amerson

Global Product Validation Manager
General Motors

I.D.# 99020

SCHEDULE

April 11-13, 2018
Cobo Center
Detroit, Michigan

FEES

List:	\$1,975
Members	
Classic:	\$1,778
Premium:	\$1,679
Elite:	\$1,580

THREE-DAYS/2.0 CEUS

Get the complete course description and register:

sae.org/learn/content/99020/

AUTOMOTIVE LIGHTING: DESIGN AND TECHNOLOGY



This seminar provides broad information about automotive lighting systems with emphasis on lighting functions, effectiveness, and technologies. The intent is to assist attendees to gain sufficient knowledge about automotive lighting and its importance in overall vehicle design and development. Since only the exterior lighting devices on the ground vehicles are regulated by the federal and local governments, and standardized by the SAE Lighting Committee and the international communities, this course will only address automotive exterior lighting.

LEARNING OBJECTIVES

By attending this seminar, you will be able to:

- Describe various automotive lighting technologies
- Articulate the legal aspects and implications related to automotive lighting
- Examine safety measurements used with lighting functions and human factors costs
- Discuss the latest advancements in lighting technologies and trends in lighting styling

WHO SHOULD ATTEND

Automotive body engineers responsible for lighting and vehicle interface and integration; vehicle stylists who are interested in lighting effects on vehicle cosmetics; regulatory personnel involved with the legal specifications of automotive lighting; marketing specialists who are interested in customers' preferences based on the relationship of human vision and lighting; and newcomers in the automotive industry who need to obtain a general overview of lighting.

CONTENT HIGHLIGHTS

- Fundamentals of Automotive Lighting
- Light Sources Used in Automotive Lighting
- Automotive Lamp Photometry Design
- Optical Design for Automotive Lamps
- Automotive Lamp System Configuration
- New Automotive Lighting Technologies
- Improved Projector Modules

INSTRUCTOR

Jianzhong Jiao

Independent Industry Consultant

“This course is a must for newcomers to automotive lighting or for designers and engineers coming from non-optics background.”

Michael Piscitelli

Electronics Systems Engineer
Sapphire Technical Solutions, LLC

I.D.# C0202

SCHEDULE

April 9-10, 2018
Cobo Center
Detroit, Michigan

FEES

List: \$1,370

Members

Classic: \$1,233

Premium: \$1,165

Elite: \$1,096

TWO-DAYS/1.3 CEUS

Get the complete course description and register:

sae.org/learn/content/c0202/

AUTOMOTIVE LIGHTING: LED APPLICATIONS



Today, LED technologies are being used for night vision, occupancy detection, and many other automotive application areas. This seminar is designed to provide the attendee with an overview of LEDs and their applications in automotive lighting and illumination.

LEARNING OBJECTIVES

By attending this seminar, you will be able to:

- Describe the basic LED configurations, characteristics, and classifications
- Assess LED and SSL technologies used in automotive applications
- Identify technical challenges and limitations of LEDs
- Select appropriate equipment for measurement of various conditions
- Evaluate LEDs for conformance to SAE standards
- Establish a basic design strategy for specific applications including forward lighting devices
- Manage a design activity to deal with thermal management

WHO SHOULD ATTEND

LED automotive body and system engineers responsible for lighting and vehicle interface and integration; vehicle stylists who are interested in lighting effects on vehicle cosmetics and lighting developers and manufacturers; marketing specialists who are interested in customers' preferences based on the relationship of human vision and lighting; and newcomers in the automotive industry who need to obtain a general overview of lighting.

CONTENT HIGHLIGHTS

- LED - Definitions and Classifications: Types; Characteristics; LED Efficiency
- LED Measurements & Standardization: Photometric Measurements; Thermal Measurements; LED Component & Lighting Standards
- LED Automotive Exterior Lighting Applications: Lamp Design Basics; LED Lighting System - Thermal & Electronic Design; Headlamp Design - Concepts & Examples

INSTRUCTOR

Jianzhong Jiao

Independent Industry Consultant

Lighting Emitting Diode (LED), a new generation semiconductor light source often referred to as Solid-State Lighting (SSL), has been broadly adopted in illumination, display, visualization, and other areas due to its higher efficacy and longer life. LEDs, first introduced for automotive interior applications such as indicators, expanded to exterior applications including center high mounted stop lamps and other automotive signal lighting devices.

I.D.# C0727

SCHEDULE

April 13, 2018
Cobo Center
Detroit, Michigan

FEES

List:	\$810
Members	
Classic:	\$729
Premium:	\$689
Elite:	\$648

ONE-DAY/.7 CEUS

Get the complete course description and register:
sae.org/learn/content/c0727/

AUTOMOTIVE LIGHTING: TESTING AND REQUIREMENTS



The SAE Lighting Standards Committee has been actively working with the automotive industry OEMs, suppliers, and human factor experts to develop automotive lighting standards. These standards have been widely used or referenced to establish and enforce lighting regulations. This seminar emphasizes the safety importance of automotive lighting devices and provides important information on lighting functions, standards or regulations, testing and evaluations.

LEARNING OBJECTIVES

By attending this seminar, you will be able to:

- Describe the legal aspects and implications related to automotive lighting
- Search for and use the lighting related standards for all exterior lighting devices
- Establish or assist with lighting tests and evaluations

WHO SHOULD ATTEND

Automotive engineers and product development personnel who are responsible for lighting design, manufacturing, quality assurance, installation, vehicle interface and integration. Regulatory personnel who are involved with the legal specifications of automotive lighting and law enforcement agencies or individuals responsible for lighting regulations; testing engineers or technicians who are responsible for evaluating and verifying the compliance of lighting standards and regulations.

CONTENT HIGHLIGHTS

- SAE Lighting Standards Committee: Introduction; Current Organization; Duties & Responsibilities
- Definitions and Terminologies Used in Automotive Lighting: Illumination Devices; Classification
- Testing and Evaluations: What needs tested; On-vehicle Testing; Material Testing; Human Factor Testing
- Automotive Lighting Requirements: Industry Standards & Government Regulation; SAE Requirements vrs. U.S. Federal Gov. Requirements; International Requirements

INSTRUCTOR

Jianzhong Jiao

Independent Industry Consultant

It has not been commonly known that automotive exterior lights are safety devices and must comply with governmental regulations. Since the 1930s, the SAE Lighting Standards Committee has been actively working with the automotive industry OEMs, lamp makers, tier-two suppliers, and human factor experts to develop automotive lighting standards.

I.D.# C0618

SCHEDULE

April 12, 2018
Cobo Center
Detroit, Michigan

FEES

List: \$810

Members

Classic: \$729

Premium: \$689

Elite: \$648

ONE-DAY/.7 CEUS

Get the complete course description and register:

sae.org/learn/content/c0618/

NEW! INTRODUCTION TO RADAR FOR AUTOMOTIVE APPLICATIONS



This course covers radar fundamentals, emphasizing the understanding of physical principles and limitations of radar systems from the perspective of radar returns from objects of interest (vehicles, pedestrians, and infrastructure) to automotive radar. Get exposed to all aspects of radar design at a level detailed enough to understand system engineering estimates for the major functions by examining the basic functions of radars: from the waveform generation in the transmitter, all the way to matched filter detection in the receiver.

LEARNING OBJECTIVES

By attending this seminar, you will be able to:

- Define basic radar operation from the perspective of waveform generation, RF carrier insertions, transmitter, channel effects, receiver mixing, and matched filtering
- Define basic radar design parameters including wavelength, bandwidth, antenna size, beam-schedule, and transmitter power
- Compute basic radar design parameters using signal to noise ratio, range resolution, unambiguous range, Doppler resolution, and unambiguous Doppler
- Discuss the concept of a radar cross section and use statistical models for realistic performance estimates for radar cross-section, scattering from canonical objects, scattering from extended targets, and statistical models
- Characterize system performance using design parameters and quantities for Receiver Operating Characteristic (ROC) curves, and Detector Error Trade (DET) curves

WHO SHOULD ATTEND

Assisted driving advanced system engineers, active safety technology, radar, and safety test engineers.

CONTENT HIGHLIGHTS

- Basic Radar Architecture
- Radar Range Equation with exercises
- Radio Frequency Mixing
- Waveform Design
- Matched Filter
- Automotive Radar Types
- Radio Propagation Channel
- Character of Radar Targets
- Estimating Performance

INSTRUCTOR

William Buller

Principal Investigator

Michigan Tech Research Institute

This course is taught from the perspective of a system level that can be used to evaluate design choices and understand their impact on the radar system as a whole.

I.D.# C1627

SCHEDULE

April 12-13, 2018

Cobo Center

Detroit, Michigan

FEES

List: \$1,370

Members

Classic: \$1,233

Premium: \$1,165

Elite: \$1,096

TWO-DAYS/1.3 CEUS

Get the complete course description and register:

sae.org/learn/content/c1627/

INTRODUCTION TO HIGHLY AUTOMATED VEHICLES



This course familiarizes you with the technologies enabling advanced driver assistance systems (ADAS) and how they integrate with existing passive occupant crash protection systems. Learn how ADAS functions perceive the world, make decisions, and warn drivers or actively intervene to avoid or mitigate crashes. Examples of current and future ADAS functions, sensors utilized in ADAS, and sample algorithms, will be discussed and demonstrated. The course utilizes a combination of hands-on activities, including computer simulations, discussion and lecture.

LEARNING OBJECTIVES INCLUDE

By attending this seminar, you will be able to:

- Explain the ADAS functions and articulate their limitations
- Identify sensors used in ADAS systems, how they operate, and their limitations
- Describe the current and future methodologies used in developing ADAS algorithms
- Articulate how ROC curves, DOE and Monte Carlo techniques can be used to measure and improve algorithm performance
- Analyze how active safety systems may affect performance of passive occupant safety systems and their integration
- Describe liability and policy considerations for OEM's and Tier suppliers

WHO SHOULD ATTEND

All professionals involved with vehicle safety performance; professionals in legal, regulatory, or compliance areas concerned with proposed NHTSA rulemaking.

CONTENT HIGHLIGHTS

- The Role of Vehicle Automation in Reducing Traffic Fatalities
- Three Main Functions Provided by HAVs
- Levels of Automation
- Operation/Functionality of HAV Capabilities
- SAE Level of Automation Corresponding to Each Application
- Advantages and Limitations
- Technology Spread
- Sensors: Active and Passive
- Testing: approaches and requirements
- Attack Surfaces and Vulnerabilities
- Federal Regulations and Application to Active Safety Technologies; Ongoing Rulemaking - NHTSA; IIHS

INSTRUCTOR

Jeffery Blackburn

North American Sales Manager
Tass International

Advanced driver assistance systems (ADAS) now offer the potential to significantly reduce or eliminate most vehicle crashes by perceiving a dangerous situation before the crash has occurred and taking action to avoid or mitigate the crash.

I.D.# C1603

SCHEDULE

April 9-10, 2018
Cobo Center
Detroit, Michigan

FEES

List: \$1,370

Members

Classic: \$1,233

Premium: \$1,165

Elite: \$1,096

TWO-DAYS/1.3 CEUS

Get the complete course description and register:

sae.org/learn/content/c1603/

FUNDAMENTALS OF GD&T 2009



Providing you have a basic understanding of mechanical drawings, this course teaches the terms, rules, symbols, and concepts of GD&T as prescribed in the ASME Y14.5-2009 Standard. Utilizing the expertise of world-renowned GD&T expert Alex Krulikowski, this course offers an in-depth explanation of geometric tolerancing symbols, their tolerance zones, applicable modifiers, common applications, and limitations. The class includes a comparison of GD&T to coordinate tolerancing; Rules #1 and #2; form and orientation controls; tolerance of position; runout and profile controls. It is up to date with the new 2009 standard and explains all the new rules and symbols.

LEARNING OBJECTIVES INCLUDE

By attending this seminar, you will be able to:

- Explain the importance of standards on engineering drawings
- Describe the types of dimensions, tolerances, and notes
- Explain why geometric tolerancing is superior to coordinate tolerancing
- Interpret the general dimensioning symbols
- Define key terms and explain the rules used in GD&T
- Recognize the symbols and modifiers used in GD&T
- Describe the concepts of worst-case boundary, virtual condition, and bonus tolerance
- Interpret the various types of tolerance
- Describe the datum system
- Interpret applications of datum targets, size datum features (RMB), and size datum features (MMB)

WHO SHOULD ATTEND

Individuals who create or interpret engineering drawings, product and gage designers; process, product, and manufacturing engineers; supplier quality engineers/professionals; CMM operators; buyers/purchasers; checkers; inspectors; technicians; and sales engineers/professionals.

CONTENT HIGHLIGHTS

- Fundamentals
- Form
- Datum System
- Orientation
- Position
- Runout, Concentricity, Symmetry
- Profile

INSTRUCTOR

See the course web page for instructor information.

Each attendee receives a robust collection of learning resources including:

The Fundamentals of GD&T Using Critical Thinking Skills (ASME Y14.5-2009) textbook by Alex Krulikowski

A GD&T Ultimate Pocket Guide (2009)

30-day access to Fundamentals of GD&T 2009 web training course to practice and reinforce what was learned in the classroom

I.D.# ET1151

SCHEDULE

April 10-12, 2018
Cobo Center
Detroit, Michigan

FEES

List:	\$1,635
Members	
Classic:	\$1,472
Premium:	\$1,390
Elite:	\$1,308

THREE-DAYS/2.0 CEUS

Get the complete course description and register:
sae.org/learn/content/et1151/

DESIGN OF EXPERIMENTS - BASIC SIMPLIFIED TAGUCHI



This seminar covers the fundamentals required in planning, conducting, and analyzing orthogonal experiments, which are the major steps in the Design of Experiments (DOE) process. Emphasis is placed on the DOE process, which, if diligently followed will yield an effectively completed experiment. An introduction to parameter design is included. A short video introduces the experimental approach; the end of the session allows practice with the new methods in a hands-on workshop.

LEARNING OBJECTIVES

By attending this seminar, you will be able to:

- Choose appropriate factors and factor levels to effectively plan DOEs
- Define an appropriate set of tests to evaluate the chosen factors and levels
- Utilize appropriate randomization strategies and choose appropriate sample sizes for conducting tests for DOE
- Utilize basic analytical methods to identify influential & non-influential factors in analyzing and interpreting DOE results
- Set specification limits for all factors for effective performance and low cost

WHO SHOULD ATTEND

Product and process design engineers, manufacturing engineers, quality engineers, testing and development engineers. Although it would be helpful, no statistical education or background is required for this course; only fundamental mathematical skills are necessary. It is strongly recommended that you attend a basic Design of Experiments course prior to attending this advanced course.

CONTENT HIGHLIGHTS

- Design of Experiments Background - DOE definition; DOE and Taguchi history
- Design of Experiments Process - flowcharts; case study
- Planning Phase
- Conducting the Experiment - trial data sheets; testing logistics; results
- Analyzing and Interpreting Results - observation method; column effects method; ranking, plotting, interpreting experimental results
- Experimental Workshop

INSTRUCTOR

Phillip J. Ross

President, Quality Services Inc.

With Design of Experiments, products and processes can be designed and developed in shorter times to reduce costs and become more competitive in the marketplace from a delivery and profit standpoint.

I.D.# C0231

SCHEDULE

April 12-13, 2018

Cobo Center

Detroit, Michigan

FEES

List: \$1,370

Members

Classic: \$1,233

Premium: \$1,165

Elite: \$1,096

TWO-DAYS/1.3 CEUS

Get the complete course description and register:

sae.org/learn/content/c0231/

INTRODUCTION TO FAILURE MODE AND EFFECTS ANALYSIS FOR PRODUCT AND PROCESS



This course assists FMEA team members to apply severity, occurrence and detection rankings consistently and efficiently and explores, in detail, the linkage of the Design and the Process FMEA through special characteristics development and product and process design collaboration. The course also reviews the relationships between FMEA and other popular tools. Expect dynamic “hands-on” activities with in-class Design and Process FMEA creation, facilitation skill development and risk analysis best practices. Instruction and clarification is provided for relevant portions of the SAE J1739 standard; a copy is included with the course materials.

LEARNING OBJECTIVES INCLUDE

By attending this seminar, you will be able to:

- List the benefits, requirements, and objectives of an FMEA
- Demonstrate the steps used in developing an FMEA
- Follow methodology to efficiently create an FMEA
- Identify corrective actions resulting from proper FMEA development
- Identify and classify the levels of risk requiring corrective action
- Show the links between Design and Process FMEA
- Demonstrate the FMEA’s role in developing Special Characteristics and Design and Process Controls
- Summarize the objectives of the SAE standard J1739

WHO SHOULD ATTEND

Engineers involved with manufacturing, product design, reliability, testing, quality, development, logistics/support, product assurance/design assurance, materials, or anyone responsible for the design and development of manufacturing, assembly or service processes in the completion of a Design or Process FMEA.

CONTENT HIGHLIGHTS

- FMEA Development Methodology
- Links Between Design and Process FMEA
- Practical Application of Design FMEA
- Methodology and Hands-on Experience
- Fault Tree Analysis
- Process FMEA
- Keys to Success and Efficient FMEA Development
- Statistical Process Control
- Reliability and Maintainability
- Workshops incl: Path exercises and FMEA Development

INSTRUCTOR

Lee D. Dawson

President & CEO, Quality-One International

“Lee is a master of the material and a superb communicator. I had no idea that 2 days of FMEA could be so much fun!”

Zac Chambers, PhD

Associate Professor

Rose-Hulman University

I.D.# C1201

SCHEDULE

April 12-13, 2018

Cobo Center

Detroit, Michigan

FEES

List: \$1,445

Members

Classic: \$1,301

Premium: \$1,228

Elite: \$1,156

TWO-DAYS/1.3 CEUS

Get the complete course description and register:

sae.org/learn/content/c1201/

SUCCESS STRATEGIES FOR WOMEN IN INDUSTRY AND BUSINESS



This seminar will provide detailed guidance, based on real life examples, on how female professionals can become proactive in creating career opportunities via self-assessment, self-motivation, an objective view of one's own abilities, and continuous steps in self-improvement. The program will take participants beyond theory to case studies and real life examples exemplifying potential for immediate use.

LEARNING OBJECTIVES

By attending this seminar, you will be able to:

- Identify obstacles and common challenges that hold you back in your career
- Develop and utilize critical communication skills
- Develop focused and well defined criteria for professional progress
- Define your professional relationships with clear boundaries and respect
- Create a flexible career plan
- Handle criticism and difficult situations with composure

WHO SHOULD ATTEND

This seminar will benefit professional women in engineering and non-engineering disciplines, who want to positively impact their careers. Current engineering students, will also benefit from this unique perspective.

CONTENT HIGHLIGHTS

- Course Motivation: Why are you here?
- Historical Perspective - Women in Engineering and Scientific Professions
- Common Challenges
- Definition of Professional Success
- Refining Critical Written Communication Skills
- Networking
- Behaviors and Relationships
- Work-Life Balance
- Reflections and Final Thoughts
- Case Studies incl.: What holds you back in your career? How can you successfully negotiate? What will I do next?

INSTRUCTOR

Ewa Bardasz

Technical Fellow, The Lubrizol Corporation

Many women appear to encounter a series of challenges at early or midcareer stages that contribute to them leaving their careers prematurely due to feelings of isolation, an unsupportive work environment, extreme work schedules, and unclear rules about advancement and success.

I.D.# C1202

SCHEDULE

April 9, 2018
Cobo Center
Detroit, Michigan

FEES

List: \$610

Members

Classic: \$549

Premium: \$519

Elite: \$488

ONE-DAY/.7 CEUS

Get the complete course description and register:

sae.org/learn/content/c1202/

ENGINEERING PROJECT MANAGEMENT



Project Management and Advanced Product Quality Planning (APQP) are two critical techniques used in product development in the mobility industry today. This seminar brings these techniques together in an easy to understand format that goes beyond the typical concept of constructing timelines and project planning, by exploring not only the AIAG APQP process, but also specific aspects of PM processes. Gain a solid foundation in the essential principles of Project Management and APQP with this course.

LEARNING OBJECTIVES

By attending this seminar, you will be able to:

- Define the importance of the ten (10) Bodies of Project Management Knowledge and the essential components of APQP by Phase
- Recognize the essential elements of a Robust Project Plan
- Apply the different timeline methodologies: Milestone, Gantt, Network (PERT) and Critical Path
- Utilize different types of meeting and conflict resolution strategies, formulate an effective meeting summary and action list, and conduct an actual Design Review
- Recognize the pitfalls common to most mobility projects due to Voice of the Customer (VOC) collection, current legislation and directives, improper application of limited resources, and others
- Advanced techniques for Risk Management

WHO SHOULD ATTEND

Project managers, design engineers, or others desiring knowledge on properly applying apply more advanced project management techniques or those needing a refresher.

CONTENT HIGHLIGHTS

- The Project Management Process
- Project Plan Life Cycle
- Project Management Techniques
- Resource Planning
- Sequence Planning
- Project Costing and Tracking
- Project Risk Management
- Procurement Management

INSTRUCTORS

Angelo E. Mago

Senior Consultant/Owner, ATM Consulting, Inc.

“Great seminar to attend! Helps engineers understand and work well with the program management office.”

Shirley Mayen

Engineering Project Lead
B/E Aerospace

I.D.# 99003

SCHEDULE

April 9-10, 2018
Cobo Center
Detroit, Michigan

FEES

List: \$1,530

Members

Classic: \$1,377

Premium: \$1,301

Elite: \$1,224

TWO-DAYS/1.3 CEUS

Get the complete course description and register:

sae.org/learn/content/99003/

PRINCIPALS OF COST AND FINANCE FOR ENGINEERS



This seminar introduces you to cost, finance and economic concepts and their applications to products and services. This provides practical information normally obtained through university level economics and business management courses and will help you to maximize efficiencies from both an engineering and business perspective.

LEARNING OBJECTIVES INCLUDE

By attending this seminar, you will be able to:

- Understand the hierarchy of economics, finance and cost in making financial decisions
- Select the best decision-making criteria in making project decisions and allocating capital
- Implement a benchmarking plan to establish a competitive market position
- Determine the enterprise costs of raising capital through debt and equity offerings
- Analyze make-buy and buy-lease options and other alternative decisions based on the best financial strategies
- Understand the financial sensitivity of project decisions and the use of decision tools for integrating business requirements
- Determine and optimize all costs in the production process
- Select cost control alternatives from marketing, engineering, commercial & geographic options

WHO SHOULD ATTEND

Engineers having responsibilities in manufacturing, maintenance, research, design, product and process development, program and project management, troubleshooting, and materials management. Individuals in non-engineering disciplines will benefit from an introduction to the engineering perspective.

CONTENT HIGHLIGHTS

- Process & Responsibility for Determining Cost
- Economics, Finance & Cost Principles
- Time Value of Money & Decision Making
- Benchmarking
- Cost Impact on the Enterprise
- Alternative Financial Decisions Using Case Analysis
- Sensitivity & Scenario Analysis
- Matrix Priority Rating Systems
- Production Cost Relationships
- Elements of Production Process
- Managerial and Cost Accounting
- Inventory Management
- Cost Estimating & Cost Control Alternatives

INSTRUCTOR

James Masiak

Independent Industry Consultant

“The instructor’s in-depth knowledge pertaining to financial topics and course material combined with [his] industry experience created a very informative and engaging class.”

Kevin Olesky

Senior Engineer

Mercedes-Benz USA

I.D.# C0828

SCHEDULE

April 11-13, 2018

SAE International Office

Troy, Michigan

FEES

List: \$1,745

Members

Classic: \$1,571

Premium: \$1,483

Elite: \$1,396

THREE-DAYS/2.0 CEUS

Get the complete course description and register:

sae.org/learn/content/c0828/

LEADING HIGH PERFORMANCE TEAMS



Product development is organizationally a complex undertaking that requires effective coordination within a company and between companies. During product development, teams are confronted with a number of ongoing organizational challenges and there is a high potential for conflict between participants in the process.

This course addresses teamwork and other “soft-side” factors that largely determine whether product development programs are successfully completed on schedule. The content is relevant for both OEMs and suppliers.

LEARNING OBJECTIVES

By attending this seminar, you will be able to:

- Explain the importance of effectively managing ‘soft-side’ issues that cause problems and delays during product development programs
- Employ successful practices of chartering and launching teams
- Implement techniques to successfully lead and facilitate effective teams
- Effectively troubleshoot problems on a team and employ techniques to remain productive
- Implement proven tips for conducting effective team meetings

WHO SHOULD ATTEND

Engineers and business people involved in various product development team activities will find the subject matter practical and useful. The content is of particular value to professionals from engineering, manufacturing, purchasing, quality, marketing, and finance functions in ground vehicle OEMs and suppliers.

CONTENT HIGHLIGHTS

- Designing High Performance Team
- Leadership and Group Dynamics
- Launching the Team
- Making Sound Decisions
- Flawless Facilitation

INSTRUCTOR

Joseph Doyle

Principal
Strategic Insights, Inc.

“Absolutely fantastic instructor and course! This is the most informative course I’ve ever taken, technical based or not.”

Michael Klos

Group Leader, Design Engineer
Honda R&D

I.D.# C0410

SCHEDULE

April 12-13, 2018
SAE International Office
Troy, Michigan

FEES

List:	\$1,370
Members	
Classic:	\$1,233
Premium:	\$1,165
Elite:	\$1,096

TWO-DAYS/1.3 CEUS

Get the complete course description and register:
sae.org/learn/content/c0410/

INTRODUCTION TO ADVANCED HIGH STRENGTH STEEL APPLICATIONS AND MANUFACTURING



Advanced High Strength Steels (AHSS) are now commonly used in automotive body structural applications. The high strength of this grade classification is attractive to help reduce mass in the automotive body through reduction in thickness. Strength also supports improvements in safety requirements so that mass increases are minimized. In some specific grades of AHSS, energy absorption is possible in addition to the high strength. This course reviews the definition and properties of AHSS and covers several common applications in automotive body structures. In addition, key manufacturing areas including stamping and welding are addressed to demonstrate the increased challenges as compared to lower strength steel grades. Troubleshooting of typical engineering and production problems rounds out the discussion leaving you with tools to help design more robust engineering solutions to AHSS applications.

LEARNING OBJECTIVES

By attending this seminar, you will be able to

- Define AHSS grades and describe general properties of AHSS
- Identify potential applications for AHSS
- Describe key manufacturing processing issues
- Assimilate tools for trouble shooting part issues

WHO SHOULD ATTEND

Automotive Body Engineers, Die Engineers, Designers, Manufacturing Plant Personnel, New Hires in the Steel Industry, Supervisors, Planners, and others who would like to decrease vehicle weight through the use of AHSS.

CONTENT HIGHLIGHTS

- Definition / Overview of AHSS
- Production Applications and Design Considerations
- Stamping Tooling
- Die Try-Out
- Hot Stamping
- Roll Forming
- Welding / Joining
- Types of Welding
- Case Studies

INSTRUCTOR

Jody N. Hall

Vice President, Automotive Market
Steel Market Development Institute

The high strength of this grade classification is attractive to help reduce mass in the automotive body through reduction in thickness. Strength also supports improvements in safety requirements so that mass increases are minimized.

I.D.# C1416

SCHEDULE

April 9-10, 2018
Cobo Center
Detroit, Michigan

FEES

List: \$1,370

Members

Classic: \$1,233

Premium: \$1,165

Elite: \$1,096

TWO-DAYS/1.3 CEUS

Get the complete course description and register:

sae.org/learn/content/c1416/

FUNDAMENTALS OF GEAR DESIGN AND APPLICATION



This course offers a solid and fundamental understanding of gear geometry, types and arrangements, and design principles. Starting with the basic definitions of gears, conjugate motion, and the Laws of Gearing, you receive the tools needed to understand the inter-relation and coordinated motion operating within gear pairs and multi-gear trains. Basic gear system design process and gear measurement and inspection techniques are explained. In addition, the fundamentals of understanding the step-wise process of working through the iterative design process required to generate a gear pair is reviewed, and you will discuss the steps and issues involved in design refinement and some manufacturing considerations. An explanation of basic gear measurement techniques, how measurement equipment and test machines implement these techniques, and how to interpret the results from these basic measurements is covered.

LEARNING OBJECTIVES INCLUDE

By attending this seminar, you will be able to:

- Describe the “Law of Gearing,” conjugate action and specifically, involute profiles
- Identify the function and operation of all gear arrangements
- Appraise preliminary design considerations and the gear system design process
- Explain practical gear measurement and inspection techniques, tools and equipment
- Recognize “Best Practices” in regards to gear system design
- Discuss some of the new and automated gear design systems

WHO SHOULD ATTEND

Powertrain engineers, engineering directors and managers, component suppliers, vehicle platform powertrain development specialists, and those involved in the design and application of geared systems and assemblies.

CONTENT HIGHLIGHTS

- Principles of Gears
- Gear Tooth Action
- Gear Geometry and Nomenclature
- Gear Arrangements
- Preliminary Design Considerations
- Gear System Design Process and Best Practices
- Gear Design Process
- Gear Measurement and Inspection

INSTRUCTOR

W. Mark McVea

President, Principal Engineer
KBE+, Inc.

“Highly recommended; being new to the gear measuring field, the instructor was able to easily make me understand what I previously believed to be a cryptic science.”

Jason D. Cron

Instrumentation Specialist
Toyota Motor Manufacturing NA,
Inc.

I.D.# C0223

SCHEDULE

April 9-10, 2018
Cobo Center
Detroit, Michigan

FEES

List: \$1,405

Members

Classic: \$1,265

Premium: \$1,194

Elite: \$1,124

TWO-DAYS/1.3 CEUS

Get the complete course description and register:

sae.org/learn/content/c0223/

ADVANCED DIESEL PARTICULATE FILTRATION SYSTEMS



As diesel emissions regulations have become more and more stringent, diesel particulate filters (DPF) have become possibly the most important and complex diesel aftertreatment device. This seminar covers many DPF-related topics using fundamentals from various branches of applied sciences such as porous media, filtration and materials sciences; and will provide both a theoretical and applications-oriented approach to enhance the design and reliability of aftertreatment platforms. Structure, geometry, composition, performance, applications and optimizations of DPFs are some of the main topics covered in this advanced level seminar.

LEARNING OBJECTIVES INCLUDE

By attending this seminar, you will be able to:

- Discuss fundamental, moderate and advanced topics on DPF structure, geometry, composition, performance, applications and optimizations
- Formulate porosity, permeability, inertial loss coefficient, flow resistance descriptors, different particulate transport modes to develop models for predicting backpressure of DPF
- Select, design, utilize and optimize DPF for various light duty and heavy duty aftertreatment applications
- Predict, via modeling and simulations, various important DPF performance features to analyze their failure modes and enhance reliability of diesel exhaust aftertreatment platform designs

WHO SHOULD ATTEND

This seminar is designed for engineers and other professionals involved in researching, developing, applications, designing or optimizing diesel exhaust aftertreatment components and systems.

CONTENT HIGHLIGHTS

- Porous Media Basics for Diesel Particulate Filters
- Filtration Concepts for Diesel Particulate Filters
- Diesel Filter Types: Materials and Configurations in Practice
- Applications, Performance Optimization and Modeling of Diesel Particulate Filters

INSTRUCTORS

Athanasios G. Konstandopoulos

Founder, Aerosol and Particle Technology Laboratory

Mansour Masoudi

Founder, Emissol LLC

“Excellent coverage of an emerging technology by a real expert in the area.”

Henry Gysling

Technology Director

Air Flow Catalyst Systems

I.D.# C0502

SCHEDULE

April 12-13, 2018

Cobo Center

Detroit, Michigan

FEES

List: \$1,370

Members

Classic: \$1,233

Premium: \$1,165

Elite: \$1,096

TWO-DAYS/1.3 CEUS

Get the complete course description and register:

sae.org/learn/content/c0502/

EVAPORATIVE AND REFUELING EMISSION CONTROL



This comprehensive seminar introduces you to the principles of gasoline evaporative fuel vapor generation (diurnal, hot soak, running loss, and refueling) from the vehicle fuel tank, fuel vapor storage in activated carbon canisters, and fuel vapor desorption and consumption in engine combustion. You will have the opportunity to apply the knowledge gained by designing a sample evaporative and refueling emissions control system in class.

LEARNING OBJECTIVES

By attending this seminar, you will be able to:

- Identify sources of evaporative fuel vapor emissions
- Predict the effects of ethanol on evaporative emissions
- Estimate diurnal and refueling vapor generation
- Analyze the differences in the test procedures: U.S., Europe, and Asia
- Explain activated carbon canister operation
- Identify potential solutions to induction hydrocarbon emissions
- Estimate the effect of altitude on evaporative emissions

WHO SHOULD ATTEND

Engineers in all fields related to the design and development of evaporative and refueling emission control systems. Air induction system design engineers; design engineers responsible for canister purge vapors; powertrain calibration engineers; and environmental engineers will all find the seminar valuable.

CONTENT HIGHLIGHTS

- Why and How to Control Fuel Vapor Emissions
- Fuel and Fuel Vapor Pressure
- Fuel Vapor Generation
- Carbon Canisters
- Evaporative and Refueling Emission Control System Design
- Hybrid & Plug-In Hybrid Evaporative Emission Control
- EVAP OBD II Leak Detection
- Permeation losses - effects on materials, temperature, fuel composition?

INSTRUCTOR

Sam Reddy

Independent Industry Consultant

“This course has greatly enhanced my understanding, and answered most questions I always had in my mind since I recently started working as an entry level automotive carbon engineer.”

Ken Onubogu

Applications Engineer
Mead West Vaco

I.D.# C0928

SCHEDULE

April 9-10, 2018
Cobo Center
Detroit, Michigan

FEES

List: \$1,370

Members

Classic: \$1,233

Premium: \$1,165

Elite: \$1,096

TWO-DAYS/1.3 CEUS

Get the complete course description and register:

sae.org/learn/content/c0928/

EMISSIONS-RELATED OBD SYSTEMS: A DESIGN OVERVIEW



On-board diagnostics, required by governmental regulations, provide a means for reducing harmful pollutants into the environment. Since being mandated, the regulations have continued to evolve and require engineers to design systems that meet strict guidelines. This course is designed to provide an overview of the fundamental design objectives and the features needed to achieve the objectives for generic on-board diagnostics. The basic structure of an on-board diagnostic will be described along with the system definitions needed for successful implementation. Due to proprietary considerations, this class does not provide details of algorithm design, performance, or application. The class will cover general OBD algorithm designs and the features required to promote sound OBD system design.

LEARNING OBJECTIVES INCLUDE

By attending this seminar, you will be able to:

- Articulate the underlying design objectives of on-board diagnostic systems
- Apply the design features that all diagnostics need for successful implementation
- Apply basic design techniques to deal with variation
- Use a diagnostic design template in the development of an on-board diagnostic

WHO SHOULD ATTEND

Engineers involved in either the design or control of on-board diagnostic systems for engines or transmissions or those involved in engine and transmission hardware. Engineers new to the area of OBD system design and engineers involved in the design of control systems wishing to obtain a better understanding of OBD requirements.

CONTENT HIGHLIGHTS

- Fundamental Design Objectives for OBD Systems
- Basic Design Features for OBD Systems
- Defining “Good” vs. “Bad” Systems
- Exercise: Defining Good vs. Defective Systems
- Anatomy of an On-Board Diagnostic
- Diagnostic Modeling
- Understanding and Dealing with Variation

INSTRUCTOR

John Van Gilder

Technical Fellow, OBD II Development,
Powertrain Group
General Motors

“Very informative. Great instructor. Highly recommend this course to anyone who deals with OBD.”

Vinay Premnath

Research Engineer
Southwest Research Institute

I.D.# C0708

SCHEDULE

April 13, 2018
Cobo Center
Detroit, Michigan

FEES

List: \$885

Members

Classic: \$797

Premium: \$752

Elite: \$708

ONE-DAY/.7 CEUS

Get the complete course description and register:

sae.org/learn/content/c0708/

RECONSTRUCTION AND ANALYSIS OF ROLLOVER CRASHES OF LIGHT VEHICLES



This seminar takes you beyond the basics of accident reconstruction to physical models and analysis techniques unique to the reconstruction of single-vehicle rollover crashes. The seminar begins by discussing the common characteristics and phases of single-vehicle rollover crashes and giving an overview of the test procedures and data available for developing analysis techniques. The seminar introduces you to common types of physical evidence deposited on the roadway and the vehicle during a rollover crash and how to use this physical evidence to reconstruct the motion the vehicle experienced during the crash. The course introduces the techniques and methods available for analyzing each phase of a single-vehicle rollover crash.

LEARNING OBJECTIVES INCLUDE

By attending this seminar, you will be able to

- Name common characteristics and phases of rollover crashes
- Describe common rollover test procedures and the data they offer for reconstruction
- Identify and document common types of physical evidence from rollover crashes
- Use physical evidence to reconstruct the motion of a vehicle involved in a rollover crash
- Estimate the rate at which a vehicle will decelerate during each phase of a rollover crash
- Determine what steering and braking inputs a driver utilized before a rollover
- Quantify the forces applied to a vehicle when it impacts the ground during a rollover
- Analyze the trajectory of an occupant that was ejected during a rollover
- Quantify the rate of error of common reconstruction techniques for rollovers

WHO SHOULD ATTEND

Accident reconstructionists and engineers. Individuals with a strong background in crash reconstruction, but new to or inexperienced in the specialized area of rollover crash reconstruction, will benefit the most from the course material.

CONTENT HIGHLIGHTS

- Types of Rollover Crashes and Rollover Statistics
- General Characteristics of Rollover Crashes
- Physical Evidence
- Analysis Methods - Rollover Phase, Trip Phase, Pre-trip Phase (Loss-of-Control)

INSTRUCTOR

Gray Beauchamp

Principal Engineer, Kineticcorp, LLC

For automotive engineers involved in crash reconstruction and analysis, a knowledge of basic accident reconstruction principles and techniques is essential, but often insufficient to answer all of the questions posed by design engineers, regulators, and lawyers.

I.D.# C1502

SCHEDULE

April 9, 2018
Cobo Center
Detroit, Michigan

FEES

List: \$810

Members

Classic: \$729

Premium: \$689

Elite: \$648

ONE-DAY/.7 CEUS

Get the complete course description and register:

sae.org/learn/content/c1502/

RECONSTRUCTION AND ANALYSIS OF MOTORCYCLE CRASHES



This seminar takes you beyond the basics of crash reconstruction to physical models and analysis techniques that are unique to the reconstruction of motorcycle crashes, providing you with a comprehensive summary of applicable reconstruction techniques. In addition, case studies will be utilized throughout the course to further explore crash causation, configuration, kinematics, dynamics, and handling characteristics, focusing on pre-crash, impact and post impact analysis.

LEARNING OBJECTIVES INCLUDE

By attending this seminar, you will be able to:

- Identify motorcycle crash causation from field studies
- Identify pertinent engineering design parameters affecting motorcycle dynamics
- Describe common characteristics and phases of motorcycle crashes
- Use physical evidence to reconstruct the motion of a motorcycle involved in a crash
- Calculate the speed a motorcycle travels during each phase of a crash sequence
- Evaluate the steering and braking inputs a rider used before a crash
- Identify factors leading to a single vehicle motorcycle crash

WHO SHOULD ATTEND

This course is designed for engineers or other professionals with a strong background in crash reconstruction, but new to or inexperienced in the specialized area of motorcycle crash reconstruction.

CONTENT HIGHLIGHTS

- Motorcycle Crash Characteristics
- Motorcycle Performance and Design
- Motorcycle Inspection
- Scene Information
- Analysis Methodology - Motorcycle Single-Vehicle Crashes
- Analysis Methodology - Motorcycle Pre-Crash, Crash, and Post-Crash Phase

INSTRUCTOR

Stein Husher

Principal Scientist, Crash Reconstruction
KEVA Engineering, LLC

The reconstruction and analysis of motorcycle crashes requires a specialized set of skills and knowledge beyond those required for typical four wheel vehicles.

I.D.# C1506

SCHEDULE

April 13, 2018
Cobo Center
Detroit, Michigan

FEES

List: \$810

Members

Classic: \$729

Premium: \$689

Elite: \$648

ONE-DAY/.7 CEUS

Get the complete course description and register:

sae.org/learn/content/c1506/

2018 LIVE LEARNING SCHEDULE

for the most up-to-date and complete schedule, visit
training.sae.org/calendar/

February 2018

Troy, MI, USA - SAE International Troy Office

- Feb 21-22 New! Fundamentals of Vehicle Suspension Design - I.D.# C1618
- Feb 28-Mar 1 A Familiarization of Drivetrain Components - I.D.# 98024

Live Online

- Feb 19-28 Root Cause Problem Solving: Methods and Tools - I.D.# WB0931
- Feb 19-Mar 7 Fundamentals of Geometric Dimensioning & Tolerancing (GD&T)
- Feb 20-22 Turbocharging for Fuel Economy and Emissions - I.D.# WB1018
- Feb 26-Mar 2 New! Performing a Cybersecurity Threat Analysis and Risk Assessment - I.D.# WB1742

Livonia, MI, USA - Effective Training Inc. (ETI)

- Feb 12-13 The Role of the Expert Witness in Product Liability Litigation - I.D.# 92054
- Feb 14-16 Fundamentals of GD&T 2009 3-day - I.D.# ET1151

March 2018

Troy, MI, USA - SAE International Troy Office

- Mar 2 Fundamentals of Automotive All-Wheel Drive Systems - I.D.# C0305
- Mar 12-13 Practical NVH Signal Processing Methods - I.D.# C0431
- Mar 14-16 Fundamentals of Steering Systems - I.D.# C0716
- Mar 19-21 Gasoline Direct Injection (GDI) Engines - I.D.# C1009
- Mar 19-21 Advanced Vehicle Dynamics for Passenger Cars and Light Trucks - I.D.# C0415
- Mar 22 Introduction to Brake Noise, Vibration, and Harshness - I.D.# C1337
- Mar 22-23 Modern Fluids for Internal Combustion Engines: An Overview - I.D.# C0704
- Mar 23 Brake Noise Problem Resolution - I.D.# C0831
- Mar 26-27 Engine Failure Investigation and Analysis - I.D.# C1344
- Mar 27-28 Diesel Engine Technology - I.D.# 93014

Live Online

- Mar 5-16 New! Risk Management Throughout the Automotive Development Process - I.D.# WB1629
- Mar 5-16 Design of Experiments (DOE) for Engineers - I.D.# WB0932
- Mar 6-13 Acoustic Fundamentals for Solving Noise and Vibration Problems - I.D.# WB1309
- Mar 20-22 Introduction to Powertrain Calibration Engineering - I.D.# WB1346

Lombard, IL, USA - MicroTek - Chicago Metro

- Mar 6-7 Introduction to Commercial and Off-Road Vehicle Cooling Airflow Systems - I.D.# C0738

Troy, MI, USA - SAE International Troy Office

- Mar 19-23 New! Transmission Engineering Academy - I.D.# ACAD11

Livonia, MI, USA - Effective Training Inc. (ETI)

- Mar 13-15 Fundamentals of GD&T 1994 3-Day - I.D.# ET2001
- Mar 20-21 Advanced Concepts of GD&T 1994 2-day - I.D.# ET2411
- Mar 26 Fundamentals of Shielding Design for EMC Compliance - I.D.#C0835

Herndon, VA, USA - MicroTek - Herndon (Dulles)

- Mar 19-21 Injuries, Anatomy, Biomechanics & Federal Regulation - I.D.# 85049

In Conjunction with the On-Board Diagnostic Symposium - Europe

- Mar 8 Emissions-Related OBD Systems: A Design Overview - I.D.# C0708

April 2018

Troy, MI, USA - SAE International Troy Office

- Apr 3 Principled Negotiation - I.D.# C1602
- Apr 4-6 Managing Engineering & Technical Professionals - I.D.# C0608
- Apr 16 Basic Tire Mechanics and Inspection - I.D.# C1423
- Apr 17-18 Tire Forensic Analysis - I.D.# C1424
- Apr 23-25 Hydraulic Brake Systems for Passenger Cars and Light Trucks - I.D.# C0509
- Apr 30-May 2 Commercial Vehicle Braking Systems - I.D.# C0233
- Apr 30-May 2 Strategic Leadership - I.D.# C0620

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- Apr 3-5 Driver Distraction from Electronic Devices: Insights and Implications – I.D.# WB1140
- Apr 4-6 Patent Litigation in the U.S.: What You Need to Know – I.D.# WB0940
- Apr 17-24 Catalytic NOx Control Technologies for Diesel and GDI Engines – I.D.# WB1237
- Apr 17-May 1 New! Materials Degradation in Mechanical Design: Wear, Corrosion, Fatigue and their Interactions – I.D.# WB1722
- Apr 18-27 Root Cause Problem Solving: Methods and Tools – I.D.# WB0931
- Apr 25-27 New! Patent Litigation Risk Management Toolkit – I.D.# WB1525
- Apr 30-May 11 FMEA for Robust Design: What, Why, When and How – I.D.# WB1422

Livonia, MI, USA - Effective Training Inc. (ETI)

- Apr 10-11 Product Liability and The Engineer – I.D.# 82001
- Apr 16-17 Fundamentals of GD&T for Inspectors 2-day – I.D.# ET2053
- Apr 24-25 New! Critical Concepts of Tolerance Stacks – I.D.# ET1701

Appleton, WI, USA - FVTC Public Safety Training Center

- Apr 30-May 3 Accessing and Interpreting Heavy Vehicle Event Data Recorders – I.D.# C1022

Pontiac, MI, USA - LHPU Campus

- Apr 2-6 New! Gasoline Engine Calibration Engineering Academy – I.D.# ACAD10

El Segundo, CA, USA - MicroTek - El Segundo

- Apr 23-25 New! Vehicle Crash Reconstruction: Principles and Technology – I.D.# C1728

May 2018

Troy, MI, USA - SAE International Troy Office

- May 1 Surface Texture: Specification and Control – I.D.# C1110
- May 2-3 Introduction to Hybrid and Electric Vehicle Battery Systems – I.D.# 0626
- May 3-4 Improving Fuel Efficiency with Engine Oils – I.D.# C0914
- May 4 Safe Handling of High Voltage Battery Systems – I.D.# C1019
- May 7-8 Automotive Heat Transfer – I.D.# C1230
- May 9 Exhaust Flow Performance and Pressure Drop of Exhaust Components and Systems – I.D.# C0235
- May 10 New! High Voltage Vehicle Safety Systems and PPE – I.D.# C1732
- May 10-11 Sound Package Materials for Vehicle Noise Control – I.D.# 92032
- May 10-11 Material Selection and Testing for Plastics – I.D.# C0134
- May 14-16 Combustion and Emissions for Engineers – I.D.# 97011
- May 22-23 Powertrain Selection for Fuel Economy and Acceleration Performance – I.D.# C0243
- May 24-25 Controller Area Network (CAN) for Vehicle Applications – I.D.# C0120
- May 24-25 Side Impact Occupant Safety and CAE – I.D.# C0717

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- May 8-15 Brake System Balance for Passenger Cars and Light Trucks – I.D.# WB1413
- May 14-25 Finite Element Analysis (FEA) for Design Engineers – I.D.# WB1241
- May 29-Jun 1 New! FEA Beyond Basics: Nonlinear Analysis – I.D.# WB1725

Greer, SC, USA - BMW Performance Center

- May 21-23 Applied Vehicle Dynamics – I.D.# C0414

Durham, NC, USA - MicroTek - Raleigh/Durham

- May 14-16 Fundamentals of Modern Vehicle Transmissions – I.D.# 99018

Livonia, MI, USA - Effective Training Inc. (ETI)

- May 1-2 New! ISO Geometric Tolerancing 2-day – I.D.# ET7103
- May 15-17 Fundamentals of GD&T 2009 3-day – I.D.# ET1151
- May 22-23 Functional Gaging and Measurement 2-day – I.D.# ET8200

Pontiac, MI, USA - LHPU Campus

- May 14-18 New! Gasoline Engine Calibration Engineering Academy – I.D.# ACAD10

Troy, MI, USA - SAE International Troy Office

- May 14-18 Engineering Management Academy – I.D.# ACAD09

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