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### Course Descriptions

| Course Title  | Type/<br>Hours | Description  |
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| <b>AASHTO LRFR Bridge Specifications</b>  | WS<br>8 hours  | This one-day bridge load rating seminar is sponsored by the Federal Highway Administration in cooperation with the Arizona Department of Transportation. The seminar will provide guidance on implementing the ASHTO Load and Resistance Factor Rating (LRFR) methodology for bridges designed with the AASHTO LRFD Specifications as well as bridges designed in accordance with previous versions of the AASHTO Standard Specifications.   |
| <b>Administration of FHWA Planning Grants</b>                                       | WS<br>16 hours | This training covers the responsibilities of and relationships among Federal, State, and local agencies involved in the administration of FHWA planning and research funds to States and State subgrants to metropolitan planning organizations (MPO) and local governments. It provides a forum for discussion of the Federal requirements associated with the administration of FHWA planning and research funds. In addition, the training touches on allowable costs, cost allocation plans, and audit requirements. |
| <b>Arc GIS Desktop II: Tools &amp; Functionality (formerly called ArcGIS I)</b>     | WS<br>24 hours | ArcGIS Desktop II will teach the range of functionality available in ArcGIS Desktop 9.3 and the essential tools for visualizing, creating, managing, and analyzing geographic data.  |
| <b>Arc GIS Desktop III; GIS Workflow &amp; Analysis (formerly called ArcGIS II)</b> | WS<br>16 hours | ArcGIS Desktop III will include how to apply ArcGIS tools in a workflow context with a focus on working with data stored in a geodatabase and performing geo processing and analysis. Exercises will include how to organize and edit data stored in a geodatabase, prepare data for analysis, create and edit geoprocessing models using ModelBuilder, and work through a challenging analysis project.   |

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| <p><b>Asphalt Pavement Maintenance</b></p>                                  | <p>WS<br/>8 hours</p>  | <p>TOPICS: The Case for Preventive Maintenance , Engineering a Preventive maintenance Program, Materials for Preventive Maintenance, Fog Seals and Rejuvenators, Chip Seal, Slurry Seal and Micro-Surfacing, Thin Hot-Mix Asphalt Overlays (Conventional, Asphalt Rubber, Novachip, etc.), Crack Treatments for Asphalt Pavements</p>  |
| <p><b>Basic Materials</b></p>   | <p>WS<br/>8 hours</p>  | <p>The course is designed to introduce public works employees and construction personnel to various types of asphalt and soils along with their use and application.</p> <p>The course generally includes content regarding: Soils types, Atterberg limits, moisture content, compaction, field measurement of moisture content, density and smoothness, Aggregates (sources, uses, important properties, compaction, handling), Asphalt and hot mix asphalt (asphalt types, paving applications, grades, hot mix asphalt, preparation of existing surface, HMA production, transportation, placement and compaction, additive, fabrics, recycling), Concrete (ingredients, mixing, placing, handling, workability, curing, compressive and flexure strength, admixtures).</p>   |
| <p><b>Basic Relocation Under the Uniform Act</b></p>                        | <p>WS<br/>24 hours</p> | <p>The course is designed for the beginning relocation agent or for those persons interested in a basic knowledge of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Uniform Act). The purpose is to answer questions, meet technical needs, and broaden the knowledge of those engaged in the relocation of persons displaced as a result of a Federal or Federally-funded project. The course covers all functional areas of the relocation assistance program, with emphasis on residential displacements.</p>  |
| <p><b>Basic Work Zone Traffic Control / Flagger</b></p>                     | <p>WS<br/>8 hours</p>  | <p>This course will give the participant an introduction to Part VI of the Manual on Uniform Traffic Control Devices with exposure to typical applications of various traffic control devices. The topics of discussion will include: Work Zone Safety, signs and signing applications, work zone set up, types of work zones, and Flagging procedures.</p>  |
| <p><b>Certified Payroll Workshop (Contractor Pay)</b></p>                   | <p>WS<br/>8 hours</p>  | <p>The Workshop covers the Davis-Bacon And Related Acts (DBRA) law, history and application on ADOT Federal Aid construction contracts. It details the conditions (work, location, etc.) for the application of prevailing wages. Both Certified Payrolls and Weekly Statements of Compliance are explained thoroughly. Additionally, related construction forms and processes are covered which include Apprenticeships, and Subcontractor Requests.</p> <p>The course is intended for Field Office staff and contractor employees responsible for submitting and reviewing certified payrolls. It is of benefit to construction staff that have responsibility for contractor compliance with respect to prevailing wages. Local agency and FHWA personnel can benefit from the background information provided.</p>   |
| <p><b>Construction Maintenance Safety</b></p>                               | <p>WS<br/>8 hours</p>  | <p>Training to help tackle some of the key areas of opportunity for preventing accidents in the road construction and maintenance environment should be a primary concern for any transportation official. Recognizing the high percentage of injuries happen to employees, safety orientation and continual education are primary components. This course is designed to address those concerns and enlighten the employee on safety practices and procedures.</p>  |
| <p><b>Countermeasure Design for Bridge Scour and Stream Instability</b></p> | <p>WS<br/>20 hours</p> | <p>This course provides an overview of countermeasures to highway related failures from the effects of stream instability, scour, erosion, and stream aggradation and degradation problems. Material for the 2.5 day course comes primarily from Hydraulic Engineering Circular (HEC) "Bridge Scour and Stream Instability Countermeasures-Experience, Selection, and Design Guidance" (HEC-23).</p> <p>Given a stream instability and scour problem, participants will select appropriate countermeasures to correct the problem. The course provides training in recommended strategies for developing a plan that includes appropriate countermeasures, including alternatives to conventional riprap and filter design.</p> <p>Participants will apply hydraulics analysis techniques to countermeasure design for seven design guideline workshops. The course provides an introduction to fixed and portable instrumentation for scour monitoring using slides and video demonstrations. Participants will receive training in designing a monitoring program to reduce the risk from scour.</p> |
| <p><b>Drilled Shafts NHI -132014</b></p>                                    | <p>WS<br/>24 hours</p> | <p>Drilled shafts are an alternate type of deep foundation that may be more cost effective and perform better than other types of deep foundations in bridge piers at river crossings and in retrofit operations, high-mast lighting, earth retaining structures, single-column piers, and similar applications. This course provides participants with specific technical guidance on all aspects of designing, installing, and monitoring the construction of drilled shafts. The lessons address the following topics: applications,</p>  |

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|   |                | <p>advantages, and disadvantages of drilled shafts for transportation structure foundations; general requirements for subsurface investigations; construction methods; construction case histories; construction specifications; principles of designing drilled shafts for axial and lateral loading; expansive soils, downdrag, and similar effects; load testing; inspection; integrity testing; repair and retrofit of defective shafts; and cost estimation. The participants will receive a comprehensive reference manual on drilled shaft construction and design used by engineers who perform detailed designs of drilled shafts, write construction specifications, and evaluate the performance of contractors through a comprehensive inspection program.</p> <p>The target audience for this course includes geotechnical engineers, bridge designers, and resident engineers. The course embraces both construction and design, and it is important that all participants attend all lessons, not just those in their immediate areas of interest. A key issue is how the details of construction affect the way in which a drilled shaft should be designed and how the intent of the design affects inspection. Participants are expected to have a degree in engineering for which they have passed an undergraduate course in soil mechanics and/or have successfully completed NHI course FHWA-NHI-132012 Soils and Foundations Workshop. This course is intended for field or laboratory personnel with a background in engineering.</p> |
| <b>Erosion Control Coordinator Training</b> | WS<br>16 hours | <p>This comprehensive 16-hour training class objective is to give the participant a knowledge base on storm water pollution, regulations and best management practices (BMPs). The course will include potential storm water pollution sources and effects associated with construction activity. The appropriate methods of erosion and sedimentation control will be presented as well as use of BMPs to control erosion and sedimentation pollutants discharged into waterways. Post construction BMPs, inspection techniques and a checklist for inspections will be reviewed. The class will conduct a mock inspection exercise and fill out the inspection forms using photo images to represent field conditions. Maintenance of the BMPs along with a section on storm water monitoring for construction sites within a ¼ mile of a unique / impaired waterway will also be presented.</p>  |
| <b>Federal Aid Highways 101</b>             | WS<br>16 hours | <p>During this time of economic expansion and growth, there are dramatic workforce changes taking place. Given the increasing demand by our partners and customers, it is critical to develop the knowledge of State DOT employees in the area of the Federal-aid highway development processes and regulations. Therefore, the overall course goal is to provide participants with an overview of the key elements of the Federal-Aid Highway Program. Specifically, this course focuses on general requirements and laws that govern the Federal-Aid Highway Program; processes and procedures followed in the entire project development process, including financing, planning, environment, right of way, highway and bridge design, construction, operations/ITS, maintenance, and technology; and identifying flexibility inherent in the Federal-Aid Program.</p>   |
| <b>FEMA Workshop-Floodplain Training</b>    | WS<br>8 hours  | <p>The Floodplain Training class provides information to the learner regarding: FEMA Regulations and Policies, State Regulations and Policies, FHWA Regulations on Coordination with FEMA, Terminology and The process of preparing a Letter of Map change.</p> <p>The training is conducted by a FEMA regional engineer, the state NFIP coordinator, and a FHWA Resource Center Hydraulic Engineer. The primary objective: Learner will know what must be done to coordinate with FEMA Regarding development in a floodplain.</p>  |
| <b>Flagger Recertification</b>              | WS<br>4 hours  | <p>Participants will be trained in fundamental concepts, usage, and procedures to ensure MUTCD compliance. They will receive comprehensive training from a qualified, experienced instructor. Knowledge of pertinent government regulations and knowledge of required equipment. Training in different types of traffic patterns. Training in approved flagging methods. In addition, the materials and information provided will include Part 1, 5, 6 of the Manual on Uniform Traffic Control Devices, Flagging Handbook and Certification Card.</p>  |
| <b>HEC-RAS River Analysis</b>               | WS<br>24 hours | <p>HEC-RAS is a computer program designed as the successor to the U.S. Army Corps of Engineerings' Hydraulic Engineering Circular HEC-2, Water Surface Profiles program (WSPRO). The program incorporates the Standard Step Method for Water Surface Profile computations, bridge hydraulics, including the method presented in WSPRO, culvert hydraulics, flood encroachments, design of open channel flow, analyzing split flow options and sub- and supercritical flow computations. The program can be used to compute bridge pier and abutment scour following the HEC-18 guidelines. The program is Windows-based and uses a graphical user interface user interface for file management, data entry and editing, program execution and output display. It provides easy conversion from English to metric units and vice versa.</p>  |

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| <p><b>InRoads XM Essentials</b></p>   | <p>WS<br/>40 hours</p>   | <p>InRoads XM Essentials training course consisting of 5 days of hands on training covering the essential functionality of InRoads, from introductory to intermediate material, together with instructor lead advanced topic discussion throughout the training session.</p> <p>This training is geared toward educating the student in such areas as vertical alignments, creating templates, superelevations, and plan and profile generator to name a few.</p> <p>The prerequisite for this training class should consist of the student having knowledge of civil transportation design concepts together with MicroStation essentials training. Previous InRoads training is a plus for students attending InRoads XM essentials.</p>  |
| <p><b>Internal Control &amp; Sub-Recipient Responsibilities</b></p>                   | <p>WS<br/>12 hours</p>   | <p>Internal Control (Half Day)<br/>* Defined, * Importance - Why Have Them?, * Internal Control Components, * Internal Control Elements associated with each Component, * Practical Examples and Application of Internal Controls</p> <p>Federal-Aid Grant Recipient and Sub-Recipient Responsibilities for State and Local Governments (One Day with concentration on FHWA Federal-aid)<br/>* Distinction between Recipient and Sub-Recipient, * Distinction between Sub-Recipient and Vendors, * Roles and Responsibilities, * Administrative, Programmatic, and Other Requirements, * Relationship of OMB Circulars, * Applicability of OMB Circulars, * Basic Guidelines, * Composition of Cost, * Direct and Indirect Cost</p>   |
| <p><b>Introduction to Geo Processing Scripts Using Python</b></p>                     | <p>WS<br/>16 hours</p>   | <p>The ArcGIS® geo processing framework includes a scripting environment, and Python is the scripting language included with ArcGIS. This course introduces the Python scripting language and shows how it can be used to access and automate geoprocessing functionality. Students learn Python scripting syntax, and then begin writing scripts to automate geoprocessing operations. Students also learn how to incorporate Python scripts as custom tools in ArcToolbox.</p> <p>This course is designed for experienced ArcGIS users who want to learn how to automate everyday processes or create complex analytical scripts. ARC Macro Language (AML™) and Avenue™ programmers who want to write scripts for ArcGIS will also find the course of interest</p> <p>Prerequisite: Students should have completed Introduction to ArcGIS I or Learning ArcGIS Desktop and Introduction to ArcGIS II or have equivalent knowledge. Basic programming skills, such as using loops and conditional statements, are also required.</p> |
| <p><b>Introduction to Survey and Grade Checking</b></p>                               | <p>RS I<br/>16 hours</p> | <p>This course introduces the student to the basic surveying tools, techniques, terminologies and mathematics necessary to perform the duties of a field inspector, transportation construction tradesmen or equipment operator. This course is 16 hours in length and includes actual field lab exercises where the student has an opportunity to practice topics covered in the classroom. This course includes practice problems with each section and a pre and post course test.</p>   |
| <p><b>Linking Freight to Planning &amp; Environment (NHI 139005)</b></p>              | <p>WS<br/>16 hours</p>   | <p>Linking Freight to Planning and the Environment is a two-day course designed to assist public and private sector transportation planners and engineers, environmental planners, and freight planners in the public and private sectors better address and more effectively integrate freight and environment considerations in the public sector planning and project development processes. The course will also emphasize applicable and recent case studies from all modes to demonstrate the range of practices that are available to small, medium and large MPOs and urban and rural state DOTs, as well as exercises on analysis techniques and tool application.</p>   |
| <p><b>Load and Resistance Factor Design (LRFD) Seismic Bridge Design Workshop</b></p> | <p>WS<br/>8 hours</p>    | <p>The American Association of State Highway and Transportation Officials (AASHTO) recently approved two major changes to the seismic design of highway bridges. The first updates seismic provisions in the AASHTO LRFD Bridge Design Specifications, and the second adopts a new Guide Specification for LRFD Seismic Bridge Design.</p>  |
| <p><b>Maintenance Math</b></p>  | <p>RS I<br/>8 hours</p>  | <p>A refresher and beginner course for public work employees. The course teaches the student in calculating areas, volumes, rates, costs, and solving common maintenance problems encountered in the field of public works.</p>   |
| <p><b>NEPA and Transportation Decision Making</b></p>                                 | <p>WS<br/>24 hours</p>   | <p>This course considers FHWA's policies and procedures for applying the National Environmental Policy Act (NEPA) to the project development and decision-making processes related to transportation facilities. The course examines the evolution of environmental policy and the integration of social, environmental, and economic factors into the framework of laws, regulations, policies, and guidance, which assist in</p>  |

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|   |                 | <p>achieving a decision on a transportation project that is in the best overall public interest.</p> <p>The course emphasizes using the Council on Environmental Quality and FHWA's regulations and guidance for implementing NEPA and Section 4(f) of the Department of Transportation Act, as well as initiatives for interagency coordination and streamlining the project development process. Also emphasized are public involvement, Title VI/Environmental Justice, FHWA's policy for mitigation and enhancement, and the role of transportation in achieving sustainable development.</p>  |
| <b>Pavement Subsurface Drainage Design</b>                          | WS<br>16 hours  | <p>Upon Completion of the training, participants will be able to:</p> <ul style="list-style-type: none"> <li>-Design subsurface drainage systems for new and existing portland cement concrete (PCC) and asphalt concrete (AC) pavements.</li> <li>-Assist in developing plans, specifications, and estimates for subsurface drainage system projects.</li> <li>-Develop monitoring and maintenance programs for pavements with subsurface drainage systems.</li> </ul>  |
| <b>River Engineering for Highway Encroachments</b>                  | WS<br>24 hours  | <p>The course provides training in the theory and application of alluvial channel flow, fluvial geomorphology, sediment transport, and river mechanics to the planning, location, design, construction, maintenance, and operations of highways. Materials for this course comes from "Hydraulic Design Series 6 (HDS-6): River Engineering for Highway Encroachments- Highways in the River Environment." The course includes detailed coverage on how to estimate rates of sediment transport by selecting appropriate equations for use in the computations. Additional topics include sediment properties and sediment measurement techniques. Case histories provide practical examples of problems that occur at highway crossings and encroachments of streams and rivers. A computer generated 360- degree virtual tour site visit is used for a comprehensive workshop. Example problems in sediment transport will be worked by the course participants.</p> |
| <b>Safety Inspection of In-Service Bridges</b>                      | WS<br>80 hours  | <p>This course is based on the "Bridge Inspector's Reference Manual" and provides training on the safety inspection of in-service highway bridges. Satisfactory completion of this course will fulfill the training requirements of the National Bridge Inspection Standards (NBIS) for a comprehensive training course.</p>   |
| <b>Safety in the Workplace</b>                                      | RS I<br>8 hours | <p>This is general safety training required by OSHA and MSHA. the segments covered apply to all work environments, from office to shop to field. Employees will learn how to work more safely and why they should. Areas covered are fire safety, housekeeping, proper lifting, bloodborne pathogens, and hazardous communications. Employees benefit by having a reduction in accidents and loss time injuries.</p>   |
| <b>Shallow Foundations NHI-132037)</b>                              | WS<br>16 hours  | <p>This course provides transportation earthwork professionals with the necessary skills to design shallow foundations for transportation applications and to consider the construction and inspection implications of the design.</p>   |
| <b>Signing and Striping</b>   | RS I<br>8 hours | <p>The course is designed to give the student a basic overview of signing and striping as per the Manual of Uniform Traffic Control Devices. Types of signs, pavement marking and their installation.</p>  |
| <b>Soil Slope Embankment Design &amp; Construction (NHI-132033)</b> | WS<br>24 hours  | <p>This course covers important aspects associated with the design and construction of soil slopes and embankments. It is intended to provide transportation earthwork professionals with knowledge to recognize potential problems with soil slope/embankment stability and deformation in transportation projects. Participants will develop the skills necessary to design and evaluate soil slopes and embankments and learn about the implications for construction and inspections. The course embraces both design and construction. It is important for all participants to attend all lessons, not just those in their immediate areas of interest.</p>   |
| <b>Stream Stability &amp; Scour at Highway Bridges</b>              | WS<br>24 hours  | <p>This course provides comprehensive training in the prevention of hydraulic- related failures of highway bridge. The effects of stream instability, scour, erosion, and stream aggradation and degradation are covered. Materials for the 3-day course comes primarily from two Hydraulic Engineering Circulars (HEC), "Evaluating Scour at Bridges" (HEC-18), and " Stream Stability at Highway Structures" (HEC-20).</p>   |

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| <b>Systems Engineering for ITS Workshop</b>      | WS<br>16 hours  | <p>This two day workshop includes two parts:</p> <p>Systems Engineering Training- Learn about systems engineering, moving from general concepts to the specifics of how systems engineering is being used for actual transportation projects.</p> <p>Process Improvement Review- The workshop participants apply what they learned about systems engineering to their own project delivery process. The existing project delivery process and sample project deliverables are reviewed and discussed. Facilitators and participants will work together to develop a set of process improvement recommendations. Workshop participants will meet on the morning of the last day to discuss and refine preliminary recommendations.</p>  |
| <b>Technical Math</b>                            | WS<br>16 hours  | Designed to give an applied introduction to solving technical math problems, both in and out of the field.   |
| <b>Tire Pavement Noise 101</b>                   | WS<br>8 hours   | <p>Workshop Objectives</p> <ul style="list-style-type: none"> <li>-To educate noise practitioners on the fundamentals of pavements.</li> <li>-To educate pavement practitioners on the fundamentals of noise.</li> <li>-To understand tire-pavement noise and how it fits into the bigger picture.</li> <li>-To understand the fundamentals of measuring and interpreting noise.</li> <li>-To examine current practices for designing and constructing quieter pavements.</li> <li>-To learn of research and policy directions related to tire-pavement noise.</li> </ul>  |
| <b>Two-Way Radio and Effective Communication</b> | RS I<br>8 hours | <p>The Two Way Radio course is designed to give transportation industry personnel the basic knowledge of proper 2-way radio procedures for their agency and the FCC. Topics covered are the general use of a two-way radio system, tower systems, 10 codes, phonetic codes, rules and regulations. Accident reporting and recommended procedures is briefly discussed.</p> <p>Effective Communications is intended to provide highway officials some basic guidelines for talking with and getting along effectively with the public, the media, their local governing boards, and each other. Topics include basic communication skills and tools for effective communications; how to use these tools to communicate successfully in specific situations; how to communicate with the media so that you control your news; how to control anger when dealing with irate citizens; how to develop and use good telephone habits to ensure effective communications with your public; and how a good boss communicates with employees.</p> |
| <b>Urban Drainage Design</b>                     | WS<br>32 hours  | This course provides a detailed introduction to urban roadway drainage design. Design guidance for solving basic problems encountered in urban roadway drainage design is provided. The topics are hydrology including rational equation, soil conservation method, regression equations, and synthetic hydrographs; and highway drainage including gutter flow, roadway inlet interception, storm drain systems, energy and hydraulic grade lines, detention ponds, and storm water management.   |
| <b>Work Zone Traffic Control II</b>              | WS<br>8 hours   | Those enrolled must complete Work Zone I prior to taking this class. Participants will receive instruction in Legal Liability, and Inspection and Maintenance. During the class there will be 2 breakout sessions where participants will plan and demonstrate traffic control set-ups.  |

WS= Workshop DL= Downlink RS I= Road Scholar Level I Course RS II= Road Scholar Level II Course

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