DESL S102 Lubrication, Preventative Maintenance, and Inspections

Upon successful completion of this course, students will be able to:

1. Demonstrate the necessity of preventive maintenance as it pertains to different pieces of equipment including but not limited to: trucks, construction equipment, mine equipment and marine applications.
2. Determine the make-up of oils, greases and coolants and their importance.
3. Formulate proper maintenance criteria and procedures using both hard copy service manuals and online software.
4. Evaluate the safety factors and precautions needed when using lifting and jacking equipment, grinders (both bench and angle), hydraulic press work, torqueing, hammering, and prying.

DESL S106 Diesel Engines Simplified

Upon successful completion of this course, students will be able to:

1. Recognize the basic functions of a diesel engine.
2. Analyze the operation of various types of systems, such as cooling, lubrication, fuel and air.
3. Formulate proper repair criteria and procedures as stated in both hard copies of repair manuals and online software programs.
4. Evaluate the safety factors and precautions needed when using lifting and jacking equipment, grinders (both bench and angle), hydraulic press work, torqueing, hammering, and prying.
5. Evaluate what troubleshooting steps are necessary to isolate a problem.
6. Conclude and perform the most effective maintenance procedures for a specific system using service manuals and online software.

DESL S107 Diesel Fuel Systems

Upon successful completion of this course, students will be able to:

1. Perform diagnostic tests and repair of diesel fuel systems including the following: mechanical type fuel pumps, mechanical injectors, electronic unit injectors, hydraulically actuated electronic unit injectors (HEUI), and common rail high pressure fuel injection.
2. Use computer diagnostic software for troubleshooting of electronic fuel systems.
3. Use hard copy manuals for mechanical fuel system repair.
4. Diagnose and formulate repair procedures for diesel emission systems: including exhaust gas recirculation, selective catalyst reduction, and diesel particulate filters.

5. Troubleshoot air breathing systems for diesel engines including: variable geometry turbocharges, fixed geometry turbocharges and charge air cooling systems.

DESL S110 Diesel Engines

Upon successful completion of this course, students will be able to:

1. Identify all major types diesel engines and how they operate, including on highway, off highway, equipment, and marine.
2. Analyze the operation of various types of systems, such as cooling, lubrication, fuel and air.
3. Formulate proper repair criteria and procedures as stated in both hard copies of repair manuals and online software programs.
4. Evaluate the safety factors and precautions needed when using lifting and jacking equipment, grinders (both bench and angle), hydraulic press work, torqueing, hammering and prying.
5. Evaluate what troubleshooting steps are necessary to isolate a problem.
6. Conclude and perform the most effective maintenance procedures for a specific system using service manuals and online software.

DESL S121 Basic Electrical Systems

Upon successful completion of this course, students will be able to:

1. Identify and interpret electrical/electronic system concern; determine necessary action.
2. Research applicable vehicle and service information, such as electrical/electronic system operation, vehicle service history, service precautions, and technical service bulletins.
3. Locate and interpret vehicle and major component identification numbers.
4. Diagnose electrical/electronic integrity of series, parallel, and series-parallel circuits using principles of electricity (Ohm’s law).
5. Demonstrate the proper use of a digital multimeter (DMM) during diagnosis of electrical circuit problems, including: source voltage, voltage drop, current flow, and resistance.
6. Check electrical circuits with a test light; determine necessary action.
7. Measure and diagnose the cause(s) of excessive parasitic draw; determine necessary action.
8. Perform battery capacity test; confirm proper battery capacity for vehicle application, determine necessary action.
9. Perform starting and charging system tests, diagnose and repair.

DESL S125 Basic Hydraulics

Upon successful completion of this course, students will be able to:

1. Demonstrate the proper use of hydraulic schematics.
2. Discriminate between different components of a hydraulic system and identify vane, piston, gear pumps, pressure and flow control valves, both linear, rotary actuators, reservoirs and their applications.
3. Identify hydraulic fluids and their properties.
4. Use hydraulic formulas to design and interpret various hydraulic systems. Identify the different fittings and hose applications in order to make hydraulic hoses.
5. Evaluate the safety factors and precautions needed to work on systems with an emphasis on avoiding high pressure injection injuries.
6. Evaluate what troubleshooting steps are necessary to isolate a problem including flow checks and pressure checks.
7. Conclude and perform the most effective maintenance procedures for a specific system including open and closed loop systems.

DESL S130 Refrigeration and Air Conditioning

Upon successful completion of this course, students will be able to:

1. Recognize air-conditioning and refrigeration components and their functions.
2. Analyze the operation of various systems including: type I, type II, type III (stationary refrigeration systems) and automotive air conditioning systems.
3. Check, test, and adjust refrigeration and air conditioning systems.
4. Formulate proper repair criteria and procedures for most refrigeration and air conditioning systems.
5. Evaluate the safety factors and precautions needed when working on systems that have refrigerant in them including but not limited to R-12, R-22, R-123, R-134.
6. Evaluate what troubleshooting steps are necessary to isolate a problem in both stationary refrigeration systems and automotive air conditioning systems.
7. Conclude and perform the most effective maintenance procedures both stationary refrigeration systems and automotive air conditioning systems.
8. Handle and use refrigerants following EPA guidelines and laws.
9. Students will be provided (included in class fees) with the opportunity to take the EPA 608 Core, type I, type II, type lll or Universal test(s) and earn the certificate.

DESL S131 Electrical II

Upon successful completion of this course, students will be able to:

1. Use wiring diagrams during diagnosis of electrical circuit problems.
2. Locate shorts, grounds, opens, and resistance problems in electrical/electronic circuits; determine necessary action.
3. Inspect and test switches, connectors, relays, solenoids, solid state devices, and wires of electrical/electronic circuits; perform necessary action.
4. Remove and replace terminal end from connector; replace connectors and terminal ends.
5. Perform solder repair of electrical wiring.
6. Maintain or restore electronic memory functions.
7. Inspect and diagnose incorrect turn signal or hazard light operation; perform necessary action.
8. Diagnose body electronic system circuits using a scan tool; determine necessary action.
9. Test, diagnose, and service electronic brake control system speed sensors (digital and analog), toothed ring (tone wheel), and circuits using a graphing multimeter (GMM)/digital storage oscilloscope (DSO) (includes output signal, resistance, shorts to voltage/ground, and frequency data).
10. Perform active tests of actuators and sensors using a scan tool; determine necessary action.

DESL S140 Construction Drawing Interpretation

Upon successful completion of this course, students will be able to:

1. Differentiate between the individual sets of plans within a full set of construction drawings.
2. Read and interpret site and floor plans.
3. Read and interpret elevation drawings including sectional views.
4. Read and interpret electrical and mechanical drawings.
5. Read and interpret machine drawings and assembly drawings.
6. Interpret material specifications and how to check them.
7. Demonstrate a basic knowledge of pipe layout including piping symbols and schematics.
8. Demonstrate entry level knowledge of computer-aided drafting (CAD).

DESL S141 Precision Measuring Tools

Upon successful completion of this course, students will be able to:

1. Demonstrate the various uses of hand tools and demonstrate the safe use of drills, grinders and saws.

2. Demonstrate the use of precision measuring tools and understand the math involved in order to measure objects in one thousandths of an inch increments.
3. Demonstrate the use of testing equipment including but not limited to: tachometers, pyrometers and digital multimeters.
4. Recognize different mechanical systems and what testing equipment is needed to troubleshoot a particular failure.
5. Demonstrate the use of laser levels.
6. Demonstrate the use thermal imaging equipment.

DESL S142 Piping Systems

Upon successful completion of this course, students will be able to:

1. Identify different piping systems and their uses.
2. Work with and identify the different materials that pipe is made of such as: metal, copper and plastic and realize the advantages and disadvantages of each.
3. Demonstrate safe practices when working on and with piping systems.
4. Be able to identify the different types of pumps, seals, packings and gaskets.
5. Perform pump testing, installation and rebuilding.
6. Demonstrate the knowledge required to identify, remove and replace packings.
7. Perform seal installation and replacement.
8. Demonstrate practical pipe layout including: routing, placement and securing.

DESL S143 Industrial Rigging Principles

Upon successful completion of this course, students will be able to:

1. Perform safe rigging practices when lifting and or moving heavy objects.
2. Demonstrate the safe and efficient use of slings, chains, come-alongs, chain hoists, and tuggers.
3. Be able to use both verbal and non-verbal communication when working with a crane.
4. Demonstrate the safe use of fixed plant shop cranes.
5. Demonstrate safe working practices when working with and around a mobile crane.

DESL S144 Conveyor and Drive Systems

Upon successful completion of this course, students will be able to:

1. Demonstrate the mounting of base plates.
2. Demonstrate the mounting of equipment and machines to base plates, including the knowledge of prealignment.
3. Identify the different types of coupling systems and their uses.

4. Demonstrate the knowledge needed to install and adjust coupling systems and perform final alignment.
5. Demonstrate the ability to safely work on and around conveyor belts.
6. Identify the different types of conveyor systems and the uses for each.
7. Demonstrate the ability to install, adjust and maintain conveyor systems.
8. Demonstrate a working knowledge of drive chains and belts, with the ability to install and adjust.

DESL S161 Applied Marine Hydraulics

Upon successful completion of this course, students will be able to:

1. Demonstrate the proper use of hydraulic schematics.
2. Discriminate between different components of a hydraulic system and identify vane, piston, gear pumps, pressure and flow control valves, both linear, rotary actuators, reservoirs and their applications on a vessel.
3. Evaluate the safety factors and precautions needed to work on systems with an emphasis on avoiding high pressure injection injuries.
4. Evaluate what troubleshooting steps are necessary to isolate a hydraulic problem on a vessel.
5. Conclude and perform the most effective maintenance procedures for a marine hydraulic system.

DESL S180 AC Power Generation

Upon successful completion of this course, students will be able to:

1. Interpret, understand and use electrical schematics.
2. Know where to find technical publications and how to apply them to specific system designs including rotating armature and rotating field, brush and brushless systems and magnetic induction principals.
3. Interpret frequencies and the basic components to affect frequency including engine speeds and number of poles and the relationship to voltage.
4. Check and adjust generator engine speeds and system voltages and diagnose system problems including checking air gap, slip rings, brush gear, and governor use and adjustment.
5. Formulate proper repair criteria and procedures including flashing the field and using an insulation tester to test stators and rotors.
6. Evaluate the safety factors and precautions needed to work on generator systems, especially auto-start generator sets and the associated hazards.
7. Conclude and perform the most effective maintenance procedures for a specific system.

DESL S225 Advanced Hydraulics

Upon successful completion of this course, students will be able to:

1. Identify and use hydraulic schematics on complex hydraulic systems.
2. Master different components of a hydraulic system including pressure compensated pumps and actuators and their applications with an emphasis on design.
3. Determine the different viscosities of hydraulic fluids their applications and fluid conditioning.
4. Use hydraulic formulas and ISO symbols to design pressure compensated hydraulic systems.
5. Evaluate the safety factors and precautions needed to work on systems with an emphasis on avoiding high pressure injection injuries.
6. Evaluate what troubleshooting steps are necessary to isolate an electrical problem from flow and pressure failures.
7. Differentiate between proportional hydraulic and electro-hydraulic solenoids used for load sensing and valve operation.
8. Demonstrate the safety precautions and the proper use of hydraulic accumulators.

DESL S250 Heavy Duty Brakes and CDL Preparation

Upon successful completion of this course, students will be able to:

1. Demonstrate knowledge of the major types of braking systems including, air brakes, hydraulic brakes, air over hydraulic brakes in both trucks and off highway equipment.
2. Discriminate between and identify the different sub-systems that make up air brakes, the supply system, the control system, the foundation system.
3. Discriminate between and identify the different sub-systems that make up hydraulic brakes, the hydraulic system, and the mechanical system.
4. Check, test, and adjust air brake systems and hydraulic brake systems.
5. Formulate proper repair criteria and procedures using online information and manuals.
6. Evaluate the safety factors and precautions needed to work on all brake systems including: using lifting and jacking equipment, grinders (bench and angle), hydraulic press work, torqueing, hammering, and prying.
7. Evaluate what troubleshooting steps are necessary to isolate a problem in any system or sub-system.
8. Conclude and perform the most effective maintenance procedures for a specific brake system.
9. Prepare and study for the CDL (class B) written test.

DESL S255 Heavy Duty Suspension and Alignment

Upon successful completion of this course, students will be able to:

1. Identify the various types of suspension systems such as leaf spring, air-ride, and walking beam (both spring and biscuit)
2. Discriminate between and identify the relationship of the various front end suspension components and their functions including steering boxes, drag links, pitman arms, wheel bearing set up, and adjust camber and caster.
3. Check, test, and adjust suspension systems for proper alignment of truck axles and trailer tracking.
4. Formulate proper repair criteria and procedures using online resources and hard copy repair manuals.
5. Evaluate the safety factors and precautions needed to work on systems including jacking, blocking and cribbing and the use of pneumatic tools.
6. Evaluate what troubleshooting steps are necessary to isolate a problem.
7. Conclude and perform the most effective maintenance procedures for a specific system based on current resources.

DESL S260 Heavy Duty Power Trains

Upon successful completion of this course, students will be able to:

1. Identify the operation of clutches: wet and dry, steering and shifting. Demonstrate the operation of transmissions, automatic, manual, and electronic-manual.
2. Demonstrate the operation of planetary gearing in both transmissions and drive axles.
3. Troubleshoot and repair the gearing in transmissions and drive axles.
4. Troubleshoot and repair shifting systems including: air, electric over air, and electric over hydraulic in transmissions and drive axles.
5. Evaluate the safety factors and precautions needed to work on all drive train components including: using lifting and jacking equipment, grinders (bench and angle), hydraulic press work, torqueing, hammering and prying.
6. Evaluate what troubleshooting steps are necessary to isolate a problem in any system or sub-system.
7. Conclude and perform the most effective maintenance procedures for a specific system.

DESL S261 Marine Auxiliary Systems

Upon successful completion of this course, students will be able to:

1. Identify and interpret the different components of auxiliary systems and their relationship to each other.
2. Analyze and describe the layout and the purpose of a vessel's auxiliary systems.
3. Discriminate between and identify specific systems and their functions including positive and non-positive displacement pumps, valves, piping and through hull fittings.
4. Analyze and describe the operation of various types of systems including bilge systems, potable water, MSD systems, electrical, both AC and DC and electronics.
5. Properly size, specify, disassemble, check, install and adjust systems.
6. Formulate proper repair and installation criteria and describe the characteristics of various metals used in marine applications.
7. Evaluate and use the safety factors and precautions needed to work with systems including lockout-tag out procedures.

DESL S262 Marine Auxiliary Systems Lab

Upon successful completion of this course, students will be able to:

1. Identify and interpret the different components of auxiliary systems and their relationship to each other.
2. Analyze and describe the layout and the purpose of a vessel's auxiliary systems.
3. Discriminate between and identify specific systems and their functions including positive and non-positive displacement pumps, valves, piping and through hull fittings.
4. Analyze and describe the operation of various types of systems including bilge systems, potable water, MSD systems, electrical, both AC and DC and electronics.
5. Properly size, specify, disassemble, check, install, and adjust systems.
6. Formulate proper repair and installation criteria and describe the characteristics of various metals used in marine applications.
7. Evaluate and use the safety factors and precautions needed to work with systems including lockout-tag out procedures.

DESL S263 Marine Transmissions

Upon successful completion of this course, students will be able to:

1. Demonstrate the knowledge of the operation of marine transmissions and identify the various components that make up the marine propulsion system.
2. Know where to find technical publications and demonstrate how to use them.
3. Compare and analyze the relationship between the engine, hull design and marine gear.
4. Identify and determine the function of all the components of the marine drive train.
5. Properly disassemble, clean, inspect and reassemble and install a marine transmission.
6. Evaluate the condition of used parts with the aid of guidelines and measuring tools.

7. Evaluate the difference between cause and effect when troubleshooting.
8. Conclude most effective maintenance procedures for a specific system.