JAMES RUMSEY TECHNICAL INSTITUTE

DIESEL TECHNOLOGY

SECONDARY PROGRAM

SYLLABUS

2024-25

KEVIN PRICE
INSTRUCTOR

DIESEL TEGHNOLOGY

The Diesel Technology class provides students with the skills necessary to compete in the field of diesel mechanics. Today's technician is responsible for keeping the "life line of the country" the transport industry moving. Diesel Technology class is bases on the trucking industry, but the "workhorse of the industry" the diesel engine is also at the heart of the auto, marine, rail and construction industries, providing the James Rumsey Technical Institute trained student with vast opportunities.

Prerequisites:

1. Excellent attendance
2. Good basic math skills
3. Ability to read and comprehend to grade level
4. Excellent safety habits
5. Ability to work independently or in groups
6. Self-motivated

Instructional/Reading Materials:

1. Diesel Technology Textbook
2. Heavy Duty Truck Systems Textbook
3. CDX On-Line
4. NATEF Tasksheets
5. Kenworth Essentials

Instructional Procedures and Methods:

1. Instructor Lectures and Demonstrations
2. Illustrations
3. Lab/shop Work
4. Powerpoints
5. Videos

6. Field Trips

7. Guest Speakers

Criteria for Grading::

90-100% A
80-89% B
70-79% C
60-79% D
0-59% F

Diesel Technology
Simulated Workplace Grade Chart

Last	First	Mon.	Tues	Wed	Thurs	Fri	Total

CODES

P1 Greet people with professionally
P2 Follow all rules without reminders
P3 On time and prepared for class
P4 Give undivided attention to person speaking

C1Put all tools and equipment away
C2 Cleanup work area
C3 Use polite language no obscenities

A1 Stay on task
A2 Remain flexible (non-confrontational)
A3 Use constructive criticism no complaining
A4 Pride and ownership displayed
A5 Safety conscious without reminders

T2 Give assistance when needed
T2 Follow thru with assignments
T3 Help others

***Student begins each day with 10 points participation grade, if a code appears in the chart the student has not performed that task satisfactory. 5 points will be deducted for each code in chart. If a code is repeated the same day or a class/shop rule broken all points for that day will be lost. Points will be tallied up weekly.**

Make Up Work-Missing Assignments:

It is the **sole responsibility** of the student to obtain and complete any work assignments/tests missed due to his/her **excused absence.** Assignments/tests missed due to an **unexcused absence** will be recorded as a zero. The student will have the same number of days missed to make up the work provided they ask for their assignments their first day back**. Any incomplete assignments/tests will be recorded as a zero.**

Units and Areas of Instruction:

Units and areas of instruction to be taught are subject to change at the discretion of the instructor. The class schedule may change due to scheduled interruptions of class work or school activities. The amount and speed of work completed will set the pace of the class.

Sample of reported job titles upon completion of the concentration: Mechanic, Diesel Mechanic, Bus Mechanic, General Repair Mechanic, Diesel Technician, Truck Mechanic, Service Technician, Preventive Maintenance Technician.

Career Preparation Skills
Safety
Leadership Development
Customer and Personal Service
Engine Systems
Cab and Hood
Electrical/Electronics
Frame and Chassis
General Engine Diagnosis
Cylinder Head and Valve Train Diagnosis and Repair
Engine Block Diagnosis and Repair
Lubrication and Cooling Systems Diagnosis and Repair
Air Induction and Exhaust Systems Diagnosis and Repair
Fuel System Diagnosis and Repair
General Electrical/Electronic System Diagnosis
Battery and Starting System Diagnosis and Repair
Charging System Diagnosis and Repair
Lighting Systems Diagnosis and Repair

Skill set. Career Preparation Skills, Safety, Leadership Development and Customer and Personal Service should be integrated throughout the concentration as remaining skill sets are delivered.

Knowledge Objectives: Students will demonstrate knowledge of

- career paths.
- goal development and achievement.
- attitudes and work habits that support career retention and advancement.
- communication in varied contexts.

Performance Objectives: Students will

- relate skills and abilities to possible career pathways.
- explain methods of goal development.
- discuss methods of time management and task coordination.
- practice professionalism in punctuality, appropriate dress, task completion, etc.
- investigate methods of supervision such as giving and receiving feedback and instruction.
- develop and present a statement of their personal work ethic beliefs.
- prepare an application, cover letter, resume and thank you letter.
- create a personal portfolio for use when applying for employment.
  practice simulated job interviews.

Skill Set Safety

Knowledge Objectives Students will demonstrate knowledge of

- performing tasks in a safe manner.
- safety procedures required when using hazardous materials.
- proper use of tools associated with diesel equipment.
- proper use of shop equipment.

Performance Objectives Students will

- define personal and environmental safety on the job.
- anticipate and avoid or mitigate potential safety risks.
- demonstrate the proper use of shop equipment and tools used in diesel engine technology.
- demonstrate the proper use of hand and pneumatic tools.
- demonstrate how to properly handle hazardous waste materials

Skill Set Leadership Development

Knowledge Objectives Students will demonstrate knowledge of

- public speaking.
- parliamentary law.
- leadership concepts.
- characteristics of effective teams and organizations.

Performance Objectives Students will

- develop and deliver speeches.
- participate in meetings using parliamentary procedure.
- attend leadership conferences or training. (local, state, national)
- volunteer in community service opportunities.
- participate in career development events.

Skill Set Customer and Personal Service

Knowledge Objectives Students will demonstrate knowledge of

- customer needs assessment.
- quality standards of service.
- assessing customer satisfaction.

Performance Objectives Students will

- examine vehicles to determine extent of damage or malfunctions.
- follow checklists to ensure all important parts are examined, including belts, hoses, steering systems, brake and fuel systems, wheel bearings, and other potentially troublesome areas.
- examine vehicles, compile estimates of repair costs, and secure customers' approval to perform repairs.
- plan work procedures, using charts, technical manuals, and experience.
- test and adjust repaired systems to meet manufacturers performance specifications.
- maintain cleanliness of work area.

Fundamentals of Diesel Equipment Technology
Skill Set Engine Systems
Knowledge Objectives Students will demonstrate knowledge of
- performing a visual inspection of the engine and its systems.
- initiating a work order for servicing a vehicle.
- identifying worn and or out or specification components.

Performance Objectives Students will
- review past maintenance/repair documents, driver vehicle condition reports, and brake/tire wear report. check and record electronic diagnostic codes and trip/operational data. clear codes and data.
- check engine operation (including unusual noises, vibration, and excessive exhaust smoke); record idle rpm, governed rpm, and pto rpm (if applicable).
- inspect vibration damper.
- inspect condition of belt(s), tensioner(s), and pulley(s); check and adjust belt tension.
- check engine for oil, coolant, air, and fuel leaks (engine off and engine running).
- inspect engine mounts for looseness and deterioration.
- check engine oil level and condition; check dipstick seal and fill cap seal.
- check engine compartment wiring, harnesses, connectors, and seals for damage, mounting, and proper routing.
- check fuel tanks, vents, mountings, lines, caps, and seals; check anti-siphon device (if applicable).
- inspect water separator/fuel heater; drain water from separator; replace fuel filter(s); prime and bleed fuel system.
- inspect crankcase ventilation system.
- check exhaust system mountings for looseness and damage.
- check engine exhaust system for leaks, excessive noise, proper routing, and missing or damaged components (heat shields and guards).
- check air induction system piping, charge air cooler, hoses, clamps, mountings, proper routing, and indicators; check for air restrictions and leaks.

- inspect turbocharger(s) for noise, oil and exhaust leaks; check mountings and
- connections; check wastegate, variable geometry turbocharger (VGT), linkages, and hoses.
- service or replace air filter(s) as needed.
- inspect diesel emission control systems, including exhaust gas recirculation (egr).
- exhaust gas recirculation (egr) cooler, diesel particulate filter (dpf), and/or catalytic converter.
  - check fan clutch/hub operation, bearing condition and noise (including viscous/thermostatic, air, and electric fan types); inspect fan assembly and shroud for missing and damaged components.
- inspect radiator (including air flow restriction, missing/corroded fins, leaks, and damage) and mountings.
- inspect coolant hoses and clamps for leaks, damage, and proper routing.
- inspect coolant recovery system.
- identify coolant type; check coolant for contamination, supplemental coolant additives (scas), and protection level (freeze point).
- inspect water pump for leaks and bearing play.

Skill Set Cab and Hood

Knowledge Objectives Students will demonstrate knowledge of

- identifying worn and or out or specification components.
- electronic testing equipment for diagnostic and repair.
- initiating a work order for repairs.

Performance Objectives Students will

- inspect key condition and check operation of ignition switch.
- check operation of indicator lights, warning lights and/or alarms.
- check operation of instruments/gauges and panel lighting.
- check operation of electronic power take off (pto) and engine idle speed controls (if applicable).
- check operation of defroster, heater, ventilation, and a/c (hvac) controls.
- check operation of all accessories.
- use diagnostic tool or on-board diagnostic system to read current and historic diagnostic trouble codes from electronic modules (including engine, transmission, brake, supplemental restraint, traction control and body control systems).
- check operation of electric and air horns.
- check condition of safety equipment, including flares, spare fuses, reflective triangles, fire extinguisher, and all required decals.
- inspect seat belts, seat tethers, and sleeper restraints.
- check supplemental restraint system (srs) for proper warning light operation and diagnostic trouble codes (if applicable).
- inspect wiper blades and arms.
- check wiper and washer operation.
- check for all required vehicle permits, registration, decals, and inspection papers.
- inspect windshield glass for cracks, chips, clarity, discoloration/glazing, or other damage; check sun visor operation.
- check seat condition, operation, mounting, and suspension components.
- check door glass and window operation.

- inspect steps and grab handles.
- inspect mirror mountings, brackets, glass, heaters, and motors.
- inspect and record all observed physical damage.
- lubricate all cab and hood grease fittings.
- inspect and lubricate door and hood hinges, latches, strikers, lock cylinders, linkages, and cables.
- inspect cab mountings, hinges, latches, linkages; service as needed.
- inspect tilt cab hydraulic pump, lines, and cylinders for leakage; inspect tilt cab safety devices; service as needed.
- check accelerator, clutch, and brake pedal operation and condition.
- check cab ride height; inspect cab air suspension springs, mounts, hoses, valves, shock absorbers, and fittings for leaks and damage.
- inspect front bumper, fairings, and mounts.
- inspect a/c condenser and lines for condition and visible leaks; check mountings.
- inspect a/c compressor and lines for condition and visible leaks; check clutch; check mountings.
- check a/c system condition and operation.
- check HVAC air inlet filters and ducts; service as needed.
- check auxiliary power unit (APU) operation and mounting; inspect for damage, leaks, and belt tension.

Skill Set Electrical/Electronics

Knowledge Objectives Students will demonstrate knowledge of

- proper use of diagnostic equipment.
- measuring voltage with volt/Ohm meter.

Performance Objectives Students will

- inspect battery box(es), cover(s), and mountings.
- inspect battery hold downs, connections, cables, and cable routing; service as needed.
- check and record battery state of charge (open circuit voltage) and condition.
- perform battery test (load and capacitance).
- inspect starter, mounting, connections, cables, and cable routing.
- engage starter; check for unusual noises, starter drag, and starting difficulty.
- inspect alternator, mounting, wiring, and wiring routing.
- perform alternator current output test.
- perform alternator voltage output test.
- check operation of interior lights; service as needed.
- check all exterior lights, lenses, and reflectors; check headlight alignment; service as needed.
- inspect and test trailer power cord connector, cable, and holder; service as needed.

Skill Set Frame and Chassis

Knowledge Objectives Students will demonstrate knowledge of

- proper use of diagnostic equipment.
- initiating a work order to repair or replace worn or faulty equipment..

Performance Objectives Students will

BRAKES:

- check air parking brake operation.
- check and record air governor cut-in and cut-out settings (psi).
- service air drier as needed. check air drier purge valve operation and air drier heater, if equipped.
- check air system for leaks (brakes released).
- check air system for leaks (brakes applied).
- drain air tanks; test one-way and double-check valves.
- check low air pressure warning devices.
- check spring brake inversion/emergency (spring) brake control valve, if equipped.
- check tractor protection valve, if equipped.
- test air pressure build-up time.
- check condition and operation of hand brake (trailer) control valve, if equipped.
- perform antilock brake system (abs) operational system self-test. perform automatic traction control (atc) operational system self-test, if equipped.
- inspect coupling air lines, holders, and gladhands.
- check brake chambers and air lines for secure mountings, damage, and missing caging plugs.
- inspect and record front and rear brake lining/pad condition and thickness.
- inspect condition of front and rear brake drums/rotors.
- check operation and adjustment of front and rear brake automatic slack adjusters.
- check s-camshaft and bushing condition.
- check master cylinder for leaks and damage; check fluid level and condition.
- inspect hydraulic brake lines, fittings, flexible hoses, and valves for leaks and damage.
- check hydraulic parking brake operation; inspect parking brake application and holding devices.
- check operation of hydraulic system; pedal travel, pedal effort, and pedal feel (drift).
- inspect calipers and/or wheel cylinders for leaks and damage.
- inspect power brake booster(s), hoses, and control valves.
- check and/or adjust hydraulic drum brakes.
- check operation of hydraulic assist back-up system and warning devices.

DRIVETRAIN:

- check operation of release/throw out bearing and clutch brake.
- check clutch linkage/cable and levers for looseness or binding; lubricate release/throwout bearing as required.
- check clutch master cylinder fluid level; check clutch master cylinder, slave cylinder, lines, and hoses for leaks and damage.
- check and/or adjust clutch.
- check transmission and/or transfer case housing, fasteners, seals, filter, cooler, and cooler lines for cracks, leaks, and proper routing, if equipped.
- check transmission wiring, connectors, seals, and harnesses for damage and proper routing.
- inspect transmission breather, service as needed.

- inspect transmission mounts for looseness and deterioration.
- check transmission oil/fluid level and condition.
- inspect u-joints, yokes, driveshafts, and center bearings for looseness, damage, and proper phasing.
- inspect axle housing(s) for cracks and leaks.
- inspect axle breather(s); service as needed.
- check drive axle(s) oil level.

STEERING, TIRES. and WHEELS:

- check steering wheel and column operation for free play and binding.
- check power steering pump and hoses for leaks and mounting; check fluid level and condition.
- change power steering fluid and filter.
- inspect steering gear(s) or rack-and-pinion for leaks and mounting.
- inspect steering shafts and u-joints condition and for proper phasing; inspect pinch bolts, splines, pitman arm-to-steering sector shaft, drag link, tie rod ends, cross tube, and wheel stops.
- check kingpin and thrust bearing wear.
- check front and rear wheel bearings/hub assemblies for looseness and noise, including extended service (sealed, close tolerance, and unitized) assemblies. check oil level and condition in all non-drive axle hubs; check for leaks.
- adjust wheel bearings as needed (including one and two nut types) in accordance with manufacturer's specifications.
- inspect tires for irregular wear patterns and proper mounting of directional tires.
- inspect tires for cuts, cracks, bulges, and sidewall damage.
- inspect valve caps and stems.
- measure and record tire tread depth; probe for imbedded debris.
- check and record tire air pressure; adjust as needed.
- check for loose lugs and/or slipped wheels; check mounting hardware condition; service as needed.
- check tire matching (diameter and tread) on dual tire installations.

Suspension, Frame, and 5th Wheel:

- inspect front and rear suspension components (springs, hangers, shackles, spring u-bolts, insulators, radius rods, torque rods, load pads, walking beams, and equalizers); check u-bolt torque in accordance with manufacturers' specifications.
- inspect shock absorbers for leaks and mounting.
- inspect air suspension components (air springs/bags, mounts, arms, hoses, valves, linkage, and fittings) for leaks and damage; check suspension ride height.
- inspect operation of tag/pusher axle and components for mounting and damage.
- lubricate all suspension grease fittings.
- check tandem axle spacing.
- inspect fifth wheel mount, bolts, slider, air lines, locks, pivot pins, bushings, and stops.
- test operation of fifth wheel locking device; adjust as needed.
- check mud flaps, brackets, and reflective devices.

- check pintle hook assembly, mounting bolts, and locks.
- clean and inspect fifth wheel plate for cracks and damage; lubricate fifth wheel plate and all grease fittings.
- inspect frame and frame members for cracks and damage.
- inspect body attaching hardware.
- inspect cargo ramps. inspect lift gates, cylinders, controls, hoses, wiring, and warning decals; check fluid level, service as needed.
- inspect rear (icc/dot) impact guard.

Instructor Availability:

The instructor's office hours are from 10:15 – 11:00 AM and from 2:30 – 3:00 PM. Request for meetings other than these times must be made in writing at least five days prior to the requested date. Instructor's E-mail is kwprice@k12.wv.us