

# DIESEL TECHNOLOGY

2009 – 2010

18 Months

Credits Required for Graduation:

Agricultural/Industrial Tractor Option: 72

Truck Option: 72

Associate of Applied Science (A.A.S.) Degree

## Diesel Powers the World

- Diesel-powered farm equipment is responsible for preparing the soil, fertilizing, planting, harvesting and the myriad of other tasks performed on the typical farm.
- Diesel-powered trucks, trains and ships carry the grain and livestock to market.
- Diesel-powered trucks carry manufactured or processed products to consumers.
- Diesel-powered construction equipment builds the bridges and roads that cross this country.
- Clean-burning, reliable diesel-powered generator sets provide emergency power for vital facilities such as hospitals and municipal utilities.

From the food you eat to the clothes you wear, diesel-powered equipment has played an integral part in the whole process. America runs on diesel!

## A Strategy for Success

Diesel Technology First-Year students receive training in the areas of basic diesel engines, basic engine overhaul, small engines, power trains, hydraulics, electrical systems, and welding. They also learn general shop practices include safety, AED, and hazardous waste management.

Diesel Technology second-year students pursuing the ag/industrial (tractor) option receive training in the areas of diesel engine overhaul, hydraulic system diagnostics, HVAC system diagnostics, tractor electrical system diagnostics, fuel injection systems, diesel engine tune up, and combine electrical/hydraulic system familiarization. Students diagnose and repair customer-owned equipment during general shop production.

Students pursuing the heavy truck option receive training in the areas of diesel engine overhaul, diesel fuel systems, diesel engine tune-up and troubleshooting, truck electrical systems, electronic diesel engine controls, truck drive trains, air brake systems, suspension and steering, and preventive maintenance. "Hands-on" training is emphasized and students spend much of their time learning by performing actual repair work on customer-owned trucks.

## Industry Connections

A cooperative training agreement between LATI and the Case New Holland Corporation provides diesel instructors and students with access to the latest equipment, technology, and diagnostic procedures. In addition, students participate in a week-long training program called "Failure Analysis," provided courtesy of Butler Machinery Company. The nationally-recognized program was developed by the Caterpillar Company to provide a systematic method of determining root causes of engine failures.

## Employment Opportunities

Graduates of the Diesel Technology agricultural/industrial option are employed by farm equipment dealers, independent equipment repair shops, construction firms, diesel injection equipment repair shops, large farm repair shops, and maintenance facilities for industry.

Graduates of the Diesel Technology truck option are employed by truck dealers, truck fleets, bus lines, heavy equipment shops, construction firms, and independent repair shops. A diesel technology career often leads to positions in equipment and part sales, as well as management positions at all levels.

## ASE Master Certified Program

The Board of the National Institute of Automotive Service Excellence (ASE) granted the Lake Area Technical Institute – Diesel Technology program "Master Certification" status after evaluating the program's curriculum, equipment, and facilities. All diesel instructors are ASE certified as well.

## Recommended Background Courses

Although not required, the following courses would be beneficial to this course of study prior to attending Lake Area Technical Institute: vocational agriculture and/or auto technology, math, communications, science, and basic Computer.

## Diesel Technology Courses

- AED 100 – Automated External Defibrillator (.5 credit)
- CIS 102 – Windows Applications for Technicians (3 credits)
- DT 107 – Welding Technologies (1 credit)
- DT 108 – Consumer Products Theory (.5 credit)
- DT 113 – Consumer Products Engines Shop (1 credit)
- DT 119 – Hydraulics Systems Theory (1.5 credits)
- DT 123 – Hydraulics Systems Shop (2.5 credits)
- DT 126 – Basic Engine Overhaul Theory (1 credit)
- DT 131 – Basic Engine Overhaul Shop (3 credits)
- DT 140 – Electrical Systems Theory (1 credit)
- DT 146 – Electrical Systems Shop (2.5 credits)
- DT 152 – Power Trains Theory (1.5 credits)
- DT 161 – Power Trains Shop (3 credits)
- DT 165 – Heating, Ventilation, and Air Conditioning Theory (HVAC) (1.5 credits)
- DT 167 – Heating, Ventilation, and Air Conditioning Shop (HVAC) (2 credits)
- DT 173 – Preventative Maintenance Theory (1 credit)
- DT 176 – Preventative Maintenance Shop (1.5 credits)
- DT 179 – Basic Diesel Engines Theory (.5 credit)
- DT 180 – Basic Diesel Engines Shop (1 credit)
- DT 200 – Diesel Fuel Systems Diagnostics Theory (1.5 credits)
- DT 201 – Diesel Fuel Systems Diagnostics Shop (2 credits)
- DT 202 – Diesel Engine Overhaul Shop (2 credits)
- DT 210 – Diesel Engine Overhaul Theory (1.5 credits)
- DT 219 – Diesel Engine Tune-Up Theory (1.5 credits)
- DT 223 – Diesel Engine Tune-Up Shop (2 credits)
- DT 265 – ASE Certification Testing (1 credit)
- HAZ 100 – Hazardous Materials Safety (.5 credit)
- Selected Communications Course (3 credits)
- Selected Math Course (3 credits)

## Additional Courses for Agricultural/Industrial Tractor Option

- DT 234 – Tractor Shop Production I (1.5 credits)
- DT 242 – Tractor Electrical System Diagnostics (.5 credit)
- DT 245 – Hydraulic System Diagnostics Theory (1.5 credits)
- DT 262 – Tractor HVAC System Diagnostics (1.5 credits)
- DT 267 – Shop Management (.5 credit)
- DT 278 – Combine Hydraulic and Electrical Familiarization (1 credit)
- DT 282 – Tractor Shop Production II (7 credits)
- DT 288 – Hydraulic System Diagnostics Shop (2.5 credit)
- DT 291 – Tractor Electronic Controls/Global Positioning Systems and Auto Steer (2.5 credit)
- Selected Behavioral Science Course (3 credits)
- Selected Social Science Course (3 credits)

## Additional Courses for Truck Option

- DT 220 – Truck Preventive Maintenance (1.5 credits)
- DT 231 – Truck Drive Trains (2 credits)
- DT 216 – Truck Suspension and Steering (4 credits)
- DT 217 – Truck Brake Systems (4 credits)
- DT 225 – Truck Electrical Testing (2 credits)
- DT 229 – Electronic Engine Controls (3 credits)
- DT 264 – Truck HVAC System Diagnostics (1.5 credits)
- Selected Behavioral Science Course (3 credits)
- Selected Social Science Course (3 credits)

## COURSE DESCRIPTIONS

### **AED 100 – Automated External Defibrillator (.5 credit)**

To prepare individuals in the workplace to provide care for breathing emergencies, perform cardiopulmonary resuscitation (CPR), and use an automated external defibrillator (AED) for victims of sudden cardiac arrest.

### **CIS 102 – Windows Applications for Technicians (3 credits)**

Using a Windows-based microcomputer and related software, you will gain an understanding and basic operational knowledge about the Windows XP operating system, Microsoft Office word processing, and spreadsheets, presentation software, and publishing software. You will demonstrate this knowledge by scoring at least 80% on assignments, related objective, and performance tests.

**DT 107 – Welding Technologies (1 credit)** Hands-on practice using gas and arc welding equipment.

**DT 108 – Consumer Products Theory (.5 credit)** An introduction to the maintenance of small engine-powered equipment.

**DT 113 – Consumer Products Shop (1 credit)** The practical application of repair and adjustment skills related to small engine-powered equipment.

**DT 119 – Hydraulic Systems Theory (1.5 credits)** Introduces hydraulic system theory of operation including component identification and function.

**DT 123 – Hydraulic Systems Shop (2.5 credits)** Provides hands-on experience in rebuilding hydraulic system components.

**DT 126 – Basic Engine Overhaul Theory (1 credit)** Examines operational theory of multi-cylinder gasoline engines and associated components.

**DT 131 – Basic Engine Overhaul Shop (3 credits)** Develops skills in multi-cylinder engine overhaul, tune-up, and troubleshooting.

**DT 140 – Electrical Systems Theory (1 credit)** Examines the principles of basic electricity as well as the theory of operation of batteries, starting, and charging systems.

**DT 146 – Electrical Systems Shop (2.5 credits)** Provides shop practice servicing storage batteries, starting, and charging systems.

**DT 152 – Power Trains Theory (1.5 credits)** Introduces power train components and the theory of system operation.

**DT 161 – Power Trains Shop (3 credits)** Reinforces power train theory with hands-on component rebuilding.

**DT 165 – Heating, Ventilation, and Air Conditioning Theory (HVAC) (1.5 credits)** An introduction to the principals of operation of basic heating ventilation and air conditioning systems.

**DT 167 – Heating, Ventilation, and Air Conditioning Shop (HVAC) (2 credits)** Develops the skills necessary to service HVAC systems including the identification, recovery, and recycling of refrigerants.

**DT 173 – Preventative Maintenance Theory (1 credit)** Outlines procedure for performing preventive maintenance on farm equipment, trucks, and construction equipment.

**DT 176 – Preventative Maintenance Shop (1.5 credits)** Actual performance of preventive maintenance on farm equipment, trucks, and construction equipment.

**DT 179 – Basic Diesel Engines Theory (.5 credit)** The study of the operational theory of diesel engines.

**DT 180 – Basic Diesel Engines Shop (1 credit)** An introduction to basic diesel engine servicing procedures.

**DT 200 – Diesel Fuel System Diagnostics Theory (1.5 credit)** An examination of the operation and troubleshooting of modern diesel engine fuel systems.

**DT 201 – Diesel Fuel System Diagnostics Shop (2 credits)** The hands-on diagnosis and repair of modern diesel engine fuel systems.

**DT 202 – Diesel Engine Overhaul Shop (2 credits)** Develops the skills necessary for heavy-duty diesel engine rebuilding.

**DT 210 – Diesel Engine Overhaul Theory (1.5 credits)** A study of the theory of diesel engine operation and the procedures used for reconditioning.

**DT 216 – Truck Suspension and Steering (4 credits)** A presentation of the information required to service heavy truck suspension and steering components including fifth wheels.

**DT 217 – Truck Brake Systems (4 credits)** The study and shop practice of servicing and troubleshooting heavy truck brake systems.

**DT 219 – Diesel Engine Tune-Up Theory (1.5 credits)** Examination of common diesel engine designs and tune-up methods.

**DT 220 – Truck Preventive Maintenance (1.5 credits)** The study and shop practice of medium/heavy truck preventive maintenance and inspection procedures including the annual Commercial Vehicle Safety Alliance inspection. Hands-on work to include truck and bus applications.

**DT 223 – Diesel Engine Tune-Up Shop (2 credits)** Hands-on application of diesel engine tune-up skills.

**DT 225 – Truck Electrical Testing Theory (2 credits)** A presentation of the information required to diagnose malfunctions and repair truck electrical systems.

**DT 229 – Electronic Engine Controls (3 credits)** Basic theory of operation, programming, and troubleshooting diesel engine electronic controls.

**DT 231 – Truck Drive Trains (2 credits)** The information needed to inspect and repair clutches, transmissions, drive shafts, and rear drive axles.

**DT 234 – Tractor General Shop Production I (.5 credit)** Assigned shop exercises diagnosing malfunctions and repairing ag tractor hydraulic and electrical systems.

**DT 242 – Tractor Electrical System Diagnostics (1.5 credits)** An introduction to the procedures and tools required to perform electrical testing and troubleshooting on a farm tractor.

**DT 245 – Hydraulic System Diagnostics Theory (1.5 credits)** A study of hydraulic system diagnosis and repair.

**DT 262 – Tractor HVAC System Diagnostics (1.5 credits)** The study and practical application of heating, ventilation, and air conditioning system diagnosis and repair.

**DT 264 – Truck HVAC System Diagnostics (2 credits)** The practical application of truck heating, ventilation, and air conditioning system diagnosis and repair.

**DT 265 – ASE Certification Testing (1 credit)** ASE Technician certification testing verifies that a technician's qualifications meet national standards. The LATI Diesel Technology program maintains ASE master certification status.

**DT 267 – Shop Management (.5 credit)** An introduction to the management techniques applicable to a typical dealership.

**DT 278 – Combine Hydraulic and Electrical Familiarization (1 credit)** A hands-on study of combine electro-hydraulic systems including component identification and testing procedures.

**DT 282 – Tractor General Shop Production II (7 credits)** The practical application of technical skills demonstrated by reconditioning production (customer-owned) equipment, including engine and power train rebuilding.

**DT 288 – Hydraulic System Diagnostics Shop (2.5 credits)** The hands-on development of hydraulic system troubleshooting skills.

**DT 291 – Tractor Electronic Control Systems/Global Positioning systems and auto Steer (2.5 credits)**

An introduction to ag tractor electronic control systems and diagnostic procedures, with an emphasis on engine controls.

**HAZ 100 – Hazardous Materials Safety (.5 credit)** Identifying types of hazardous material, demonstrating personal protective equipment, and identifying blood borne pathogens.

**To fulfill graduation requirements, students must select one course in each of the four areas listed. Courses marked with an asterisk can be transferred directly to the university system under the terms of articulation agreements.**

## **Behavioral Science**

PSYC 100 – Psychology of Human Relations

PSYC 101 – General Psychology \*

## **Communications**

SPCM 101 – Fundamentals of Speech \*

ENGL 101 – Composition \*

COMM 101 – Contemporary Communication

## **Mathematics**

MATH 100 – Applied General Math

MATH 101 – Intermediate algebra

MATH 102 – College Algebra \*

## **Social Science**

ECON 105 – Leadership in the Global Workplace

ECON 201 – Principles of Microeconomics I \*

ECON 202 – Principles of Macroeconomics II \*

SOC 100 – Introduction to Sociology \*