DIESEL EQUIPMENT TECHNOLOGY

ASSOCIATE OF APPLIED SCIENCE (AAS) – 79 CREDITS

About this program

The diesel equipment technician works in an exciting and rapidly changing industry. This program prepares individuals to diagnose and repair diesel engines, clutches and transmissions, starting and suspension systems, wheel alignment, air-conditioning and refrigeration systems, drive lines, differentials, hydraulic and air brake systems, electrical systems, electronically controlled fuel systems and transmissions, and involves instruction in the use of a wide variety of tools and diagnostic testing equipment. Students are prepared for careers in the maintenance of trucks and trailers, farm equipment, construction equipment, stationary diesel engines in electrical generators and other related equipment. About two-thirds of the instruction time is spent in the diesel lab working on live work and training models. Students learn to diagnose problems and disassemble, recondition and replace faulty parts, and get hands-on training in all program areas. This program is an Association of Diesel Specialists TechSmart program participant.

Program outcomes

1. Demonstrate professionalism and related soft skills.
2. Apply theory of vehicle operating systems.
3. Diagnose vehicle operating systems.
4. Repair vehicle operating systems.
5. Interpret service information.
6. Exhibit safety practices and procedures.

Curriculum overview

Crds	Requirement type
76	Required courses
3	Restricted electives in courses
79	**Total**

Developmental courses note: A student may be required to enroll in developmental courses in reading, writing and math. A student's scores on the Accuplacer assessment will determine enrollment in developmental courses. The purpose of developmental courses is to prepare students for the demands of a college-level curriculum. *Credits may vary.*

Accreditation: Minnesota State Community and Technical College is accredited by the Higher Learning Commission, a regional accreditation agency recognized by the U.S. Department of Education. The Higher Learning Commission 230 South LaSalle Street, Suite 7-500 Chicago, IL 60604-1411 http://www.ncahigherlearningcommission.org Phone: 312.263.0456 / 800.621.7440

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Curriculum requirement details

Required courses

Course	Crds
DSET1100 - Diesel Equipment Fundamentals	2
DSET1101 - Software Systems in Transportation	2
DSET1106 - Fuel Systems	2
DSET1110 - Power Train I	3
DSET1112 - Hydraulics I	4
DSET1114 - Vehicle Brakes	3
DSET1124 - Diesel Shop Management	1
DSET1130 - Trans Elec/Start/Charge	4
DSET1132 - Introduction to Engine Theory	2
DSET1136 - Introduction to Diesel Engines	2
DSET1144 - Electrical Troubleshooting	3
DSET2200 - Introduction to Electronic Controls	3
DSET2204 - Advanced Electrical and Emission Systems	3
DSET2206 - Electronic Controls	3
DTRK1140 - Supervised Occupational Experience 1	7
DTRK2214 - Suspension and Alignment	3
DTRK2238 - Transmissions and Drive Systems	4
DTRK2240 - Supervised Occupational Experience II	4
DTRK2242 - Advanced Engines and Fuel Systems	6
ECON1150 - Essentials of Economics	3
ENGL1101 - College Writing	3
ENGL1215 - Writing for the Workplace	3
SOC1111 - Introduction to Sociology	3
TRNS1112 - Heating Ventilation A/C	3

Other requirements or restricted electives

3 credits from one or more of these Courses:

Course title	Credits
COMM1120 - Introduction to Public Speaking	3
COMM1130 - Small Group Communication	3
COMM1140 - Interpersonal Communication	3

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Course summaries

DSET1100 - Diesel Equipment Fundamentals ..... ***(2 credits)***
This course is designed to give the student an understanding of a diesel shop environment. Personal and shop safety will be emphasized. Hand tool, pneumatic tool, precision measuring tool and hardware identification, usage and safety will also be areas of study.

DSET1101 - Software Systems in Transportation ..... ***(2 credits)***
This course introduces students to proprietary software used in the diesel technology industry. Students will become familiar with various software from industry-leading manufacturers.

DSET1106 - Fuel Systems ..... ***(2 credits)***
This course covers the fundamentals of diesel engine fuel systems identification, minor repair, testing and troubleshooting. Mechanical governor operation, fuel system operation, fuel system/governor adjustments and related engine operation are studied.

DSET1110 - Power Train I ..... ***(3 credits)***
This course covers the operating principles, diagnosis and repair of drive train components. Components included will be clutches, mechanical transmissions, drive lines and drive axles.

Prerequisites:

- TRNS1102

OR

- DSET1100

DSET1112 - Hydraulics I ..... ***(4 credits)***
This course covers the fundamentals of hydraulic systems. It is an introduction to hydraulic component operation, maintenance, repair and testing. These systems may be used in agricultural, industrial heavy equipment and trucks.

DSET1114 - Vehicle Brakes ..... ***(3 credits)***
This course covers hydraulic and air brake system operation, service and diagnosis. Anti-lock braking systems will also be covered.

DSET1124 - Diesel Shop Management ..... ***(1 credits)***
This course provides students an opportunity to visit John Deere, Case New Holland or general shops and work with on-site instructors as it relates to management procedures including parts, ordering inventory, repair order writing, payroll, employee-employer relations, customer relations and communication skills.

DSET1130 - Trans Elec/Start/Charge ..... ***(4 credits)***
This course is an introduction to electrical systems. Students will learn how to use DVOMs and their applications. Students will study electrical theory including Ohm's law and its application to electrical systems. The course also introduces service procedures necessary to repair charging and starting system components. Electrical principles are applied to test and troubleshoot complete circuits as well as components of each. Fundamental rebuilding principles and system analysis are emphasized. Safe battery testing and service are performed.

DSET1132 - Introduction to Engine Theory ..... ***(2 credits)***
This course introduces the theory of today's diesel engines, including operation, repair and maintenance. Students will learn the proper industry procedures for removing, replacing, diagnosing, troubleshooting, rebuilding and assembling diesel engines.

DSET1136 - Introduction to Diesel Engines ..... ***(2 credits)***
This course introduces students to the four-cycle diesel engine. Coursework includes disassembly, inspection, measurement, assembly and adjustment of diesel engines and their components.

DSET1144 - Electrical Troubleshooting ..... ***(3 credits)***
This course is a hands-on troubleshooting course that allows students to apply knowledge of DSET 1130. Students will be required to troubleshoot and repair a variety of equipment and vehicles.

Prerequisites:

- DSET1130

DSET2200 - Introduction to Electronic Controls ..... ***(3 credits)***
Students in this course are exposed to various original equipment manufacturer (OEM) software used to diagnose computer control systems in the transportation, construction and agricultural industries. Coursework includes the operation, diagnosis and repair of sensors and actuators used on engines, transmissions, brakes and hydraulic systems.

Prerequisites:

- DSET2204

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DSET2204 - Advanced Electrical and Emission Systems ..... ***(3 credits)***
This course covers failure analysis of electrical systems, the recognition of causes of failures and how to interpret a wiring diagram. Lab activities include the troubleshooting of heavy-duty electrical and emission components, testing, inspecting and repair. Electrical meters will be used to diagnose, locate and repair failures. Lab work may include diagnosis, disassembly, inspection, repair, assembly and testing of program and customer-owned equipment.

Prerequisites:

- DSET1100
- DSET1130

DSET2206 - Electronic Controls ..... ***(3 credits)***
This course covers electronic components used to control engines, transmissions, brakes and hydraulics used in modern equipment. The coursework will include system analysis, testing, troubleshooting and replacement of components used in electronic control systems.

Prerequisites:

- DSET1130
- TRNS1102

OR

- DSET1100
- DSET1130

DTRK1140 - Supervised Occupational Experience 1 ..... ***(7 credits)***
Students will apply skill sets previously learned related to medium- and heavy-duty trucks at a sponsoring dealer or fleet shop. Students may be introduced to curriculum skill sets to be delivered in future semesters. Skill sets will be identified in a training plan developed by industry and instructor.

DTRK2214 - Suspension and Alignment ..... ***(3 credits)***
This course will cover the procedures used in repair, inspection, rebuilding and alignment of steering and suspension systems. Vehicle Department of Transportation inspections will also be covered.

Prerequisites:

- DSET1100

OR

- TRNS1102

DTRK2238 - Transmissions and Drive Systems ..... ***(4 credits)***
This course is designed to give the student an understanding of the theory, operation, troubleshooting and repair of modern medium- and heavy-duty truck transmission, differential and driveline components. Areas of study include the operation, inspection, disassembly and assembly of various manufacturers including but not limited to Allison, Eaton, Meritor, Rockwell and Mack.

Prerequisites:

- DSET1110

DTRK2240 - Supervised Occupational Experience II ..... ***(4 credits)***
Students will apply skill sets previously learned related to medium- and heavy-duty trucks at a sponsoring dealer or fleet shop. Skill sets will be identified in a training plan developed by industry and instructor.

DTRK2242 - Advanced Engines and Fuel Systems ..... ***(6 credits)***
This course is designed to give students an understanding of the theory, operation, troubleshooting and repair of modern medium- and heavy-duty truck diesel engines. Areas of study include base engine components, intake and exhaust systems, emission control devices, lubrication systems, cooling systems and fuel systems on but not limited to truck diesel engines manufactured by Caterpillar, Cummins, Detroit, Navistar, Mack and Volvo.

Prerequisites:

- DSET1132
- DSET1136

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ECON1150 - Essentials of Economics ..... ***(3 credits)***
Meets MnTC Goal Areas 2 and 5. This course is an introductory study of economics and exposes the student to a variety of economic concepts. In order to enjoy a successful career, people need to understand how economics impacts the environment in which they live and work. This course helps satisfy those needs by exploring the principles of microeconomics, macroeconomics and international economics. At the microeconomic level, students will learn how the choices they make affect particular markets. They will examine resource allocation and pricing structure by analyzing demand and supply applications. Students will survey the competitive environment by exploring the market structures of perfect competition, monopolistic competition, monopoly and oligopoly. At the macroeconomic level, students will learn about the business cycle by analyzing the gross domestic product (GDP), the inflation rate, the unemployment rate, deficit spending, the national debt and other economic indicators. They will also investigate the debate over activism and non-activism in monetary and fiscal policies. Finally, the student will examine international issues including tariffs/quotas, foreign exchange, the concept of comparative advantage and trends in globalization. This course is not intended for business or economics majors.

ENGL1101 - College Writing ..... ***(3 credits)***
Meets MnTC Goal Area 1. This is an introductory course designed to prepare students for later college and career writing through a process approach with particular emphasis on revision. Students consider purpose and audience as they read, discuss and refine their work to develop confidence in their writing and communication skills.

Prerequisites:

- ELL1085
- ENGL0097
- or placement in College Level English.

ENGL1215 - Writing for the Workplace ..... ***(3 credits)***
Meets MnTC Goal Area 1. This composition course focuses on writing and designing professional and technical documents, including print and non-print correspondence, descriptions, instructions, reports and proposals, along with promotional material. Analysis, critical thinking and synthesis of sources will be covered, along with the development of presentation skills. Coursework also includes a formally documented, multi-source professional project. This course builds on the foundations of College Writing and provides students with additional opportunities to develop and refine their writing through a process approach.

Prerequisites:

- ENGL1101

SOC1111 - Introduction to Sociology ..... ***(3 credits)***
Meets MnTC Goal Areas 2, 5 and 7. This course is an introduction to the study of societies and the social factors that influence individual and group behavior. The course incorporates sociological and other critical thinking models for the investigation of various components of social life: culture, socialization, social organization, social stratification, social institutions, populations dynamics and social change.

TRNS1112 - Heating Ventilation A/C ..... ***(3 credits)***
This course teaches the principles of air conditioning and its relationship to the heating system. The various types and the diagnosis of malfunctions, testing and repair are studied in the classroom. Practical experience is performed on live systems: recovering, evacuating, component replacement, charging and performance testing of the systems.

Prerequisites:

- DSET1100

OR

- TRNS1102

COMM1120 - Introduction to Public Speaking ..... ***(3 credits)***
Meets MnTC Goal Area 1. This course clarifies the process of oral communication, clarifies the basic principles of public speaking and allows the student to increase the application of these principles while both speaking and listening.

COMM1130 - Small Group Communication ..... ***(3 credits)***
Meets MnTC Goal Areas 1 and 2. This course focuses on communication issues in small groups and the importance of small group work in business today. An emphasis will be placed on improving communication skills for successful teamwork, group cohesiveness and the responsibility to group goals and tasks. Students will be provided with opportunities to build their group communication skills through practice.

COMM1140 - Interpersonal Communication ..... ***(3 credits)***
Meets MnTC Goal Area 1. This course will focus on improving students' abilities to communicate effectively in one-to-one dyadic encounters by providing experience-based instruction. Extensive in-class and out-of-class analyses allow the student to examine his/her own and others' informal social interactions. The long-term goal is for the student to apply interpersonal communication theories to daily interactions and draw his/her own conclusions about the effectiveness of interpersonal communication.

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Program Plan — "Primary"

Locations: Moorhead

1st Fall Term (18 credits)

Courses

Course	Crds
DSET1100 - Diesel Equipment Fundamentals	2
DSET1101 - Software Systems in Transportation	2
DSET1106 - Fuel Systems	2
DSET1112 - Hydraulics I	4
DSET1114 - Vehicle Brakes	3
DSET1124 - Diesel Shop Management	1
DSET1130 - Trans Elec/Start/Charge	4

1st Spring Term (19 credits)

Courses

Course	Crds
DSET1110 - Power Train I	3
DSET1132 - Introduction to Engine Theory	2
DSET1136 - Introduction to Diesel Engines	2
DSET1144 - Electrical Troubleshooting	3
ECON1150 - Essentials of Economics	3
ENGL1101 - College Writing	3
TRNS1112 - Heating Ventilation A/C	3

2nd Fall Term (18 credits)

Courses

Course	Crds
DSET2200 - Introduction to Electronic Controls	3
DSET2204 - Advanced Electrical and Emission Systems	3
DTRK2214 - Suspension and Alignment	3
DTRK2242 - Advanced Engines and Fuel Systems	6
ENGL1215 - Writing for the Workplace	3

2nd Spring Term (17 credits)

Courses

Course	Crds
DSET2206 - Electronic Controls	3
DTRK2238 - Transmissions and Drive Systems	4
DTRK2240 - Supervised Occupational Experience II	4
SOC1111 - Introduction to Sociology	3

3 credits in one or more of the following:

COMM1120 - Introduction to Public Speaking	3
COMM1130 - Small Group Communication	3
COMM1140 - Interpersonal Communication	3

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2nd Summer Term (7 credits)

Courses

Course	Crds
DTRK1140 - Supervised Occupational Experience 1	7

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