



Truck and Transport Mechanic

Guide to Course Content

Online: www.saskapprenticeship.ca

Recognition:

To promote transparency and consistency, this document has been adapted from the 2022 Truck and Transport Mechanic Red Seal Occupational Standard (RSOS) (Employment and Social Development Canada).

A complete version of the Occupational Standard can be found at www.red-seal.ca

STRUCTURE OF THE **GUIDE TO COURSE** **CONTENT**

To facilitate understanding of the occupation, this guide to course content contains the following sections:

Task Matrix: a chart which outlines graphically the major work activities, tasks and sub-tasks of this standard detailing the essential skills and the level of training where the content is covered. The Task Matrix is broken down into the following:

Major Work Activity: the largest division within the standard that is comprised of a distinct set of trade activities.

Task: distinct actions that describe the activities within a major work activity.

Sub-task: distinct actions that describe the activities within a task.

Training Profile Chart: a chart which outlines the model for Saskatchewan Apprenticeship and Trade Certification Commission (SATCC) technical training.

Technical Training Course Content for the Truck and Transport Mechanic trade: a chart which outlines the model for SATCC technical training sequencing. For the harmonized level of training, a cross reference to the Harmonized apprenticeship technical training sequencing, at the learning outcome level, is provided.

TRAINING REQUIREMENTS FOR THE TRUCK AND TRANSPORT MECHANIC TRADE

To graduate from each level of the apprenticeship program, an apprentice must successfully complete the required technical training and compile enough on-the-job experience to total at least 1800 hours each year. Total trade time required is 7200 hours and at least 4 years in the trade.

There are four levels of technical training delivered by Saskatchewan Polytechnic in Saskatoon.

Level One:	8 weeks
Level Two:	8 weeks
Level Three:	8 weeks
Level Four:	8 weeks

The information contained in this document details the technical training delivered for each level of apprenticeship. An apprentice spends approximately 15% of their apprenticeship term in a technical training institute learning the technical and theoretical aspects of the trade. The hours and percentages of technical and practical training may vary according to class needs and progress.

The content of the technical training components is subject to change without notice.

Entrance Requirements for Apprenticeship Training

Your grade twelve transcripts (with no modified classes) or GED 12 is your guarantee that you meet the educational entrance requirements for apprenticeship in Saskatchewan. In fact, employers prefer and recommend apprentices who have completed high school. This ensures the individual has all of the necessary skills required to successfully complete the apprenticeship program and receive journeyperson certification.

Individuals with “modified” or “general” classes in math or science do not meet our entry requirements. These individuals are required to take an entrance assessment prescribed by the SATCC.

English is the language of instruction in all apprenticeship programs and is the common language for business in Saskatchewan. Before admission, all apprentices and/or “upgraders” must be able to understand and communicate in the English language.

Designated Trade Name	Math Credit at the Indicated Grade Level ^❶	Science Credit at Grade Level
Truck and Transport Mechanic	Grade 11	Grade 10
❶ - (One of the following) WA – Workplace and Apprenticeship; or F – Foundations; or P – Precalculus, or a Math at the indicated grade level (Modified and General Math credits are not acceptable.). *Applicants who have graduated in advance of 2015-2016, or who do not have access to the revised Science curricula will require a Science at the minimum grade level indicated by trade. For information about high school curriculum, including Math and Science course names, please see: http://www.curriculum.gov.sk.ca/ Individuals not meeting the entrance requirements will be subject to an assessment and any required training.		

TRUCK AND TRANSPORT MECHANIC

TASK MATRIX CHART

This chart outlines the blocks, tasks and sub-tasks from the 2022 Truck and Transport Mechanic Red Seal Occupational Standard (RSOS). Each sub-task details the corresponding essential skill and level of training where the content is covered. *

* Sub-tasks with numbers in the boxes is where the content will be delivered in training.

A – Performs Common Occupational Skills

6%

A-1 Performs safety-related functions	1.01 Maintains safe work environment 1	1.02 Uses personal protective equipment (PPE) and safety equipment 1	1.03 Implements specific safety protocols for hybrid and electric vehicles (EV) 1		
A-2 Uses and maintains tools and equipment	2.01 Uses hand, power, measuring, testing, and diagnostic tools 1,2	2.02 Uses shop equipment 1	2.03 Uses hoisting, lifting and staging equipment 1	2.04 Uses welding and cutting equipment 1,2	2.05 Uses electronic devices and systems for diagnostics and programming 1
A-3 Performs routine work practices	3.01 Uses documentation and reference materials 1, In Context in 2,3,4	3.02 Maintains fluids and lubricants 1, In Context in 2,3,4	3.03 Services hoses, tubing, and fittings 1, 2 In Context in 3,4	3.04 Services filters 1, In Context in 2,3,4	3.05 Services bearings and seals 2, In Context in 3,4
	3.06 Uses fasteners and sealing devices 1, In Context in 2,3,4				
A-4 Uses communication and mentoring techniques	4.01 Uses communication techniques 1	4.02 Uses mentoring techniques 4			

B – Services, Diagnoses and Repairs Engines and Supporting Systems

15%

B-5 Services, diagnoses and repairs base engines	5.01 Services base engines 3,4	5.02 Diagnoses base engines 3,4	5.03 Repairs base engines 3,4
B-6 Services, diagnoses and repairs lubrication systems	6.01 Services lubrication systems 1,3,4	6.02 Diagnoses lubrication systems 3,4	6.03 Repairs lubrication systems 3,4
B-7 Services, diagnoses and repairs intake systems	7.01 Services intake systems 3,4	7.02 Diagnoses intake systems 3,4	7.03 Repairs intake systems 3,4
B-8 Services, diagnoses and repairs exhaust systems	8.01 Services exhaust systems 3,4	8.02 Diagnoses exhaust systems 3,4	8.03 Repairs exhaust systems 3,4
B-9 Services, diagnoses and repairs engine management systems	9.01 Services engine management systems 3,4	9.02 Diagnoses engine management systems 3,4	9.03 Repairs engine management systems 3,4
B-10 Services, diagnoses and repairs fuel delivery systems	10.01 Services fuel delivery systems 3,4	10.02 Diagnoses fuel delivery systems 3,4	10.03 Repairs fuel delivery systems 3,4

B-11 Services, diagnoses and repairs engine retarder systems

11.01 Services engine retarder systems

3

11.02 Diagnoses engine retarder systems

3

11.03 Repairs engine retarder systems

3

B-12 Services, diagnoses and repairs cooling systems

12.01 Services cooling systems

3

12.02 Diagnoses cooling systems

3

12.03 Repairs cooling systems

3

C – Services, Diagnoses and Repairs Air Systems and Brake Systems

13%

C-13 Services, diagnoses and repairs air systems

13.01 Services air systems

1,2

13.02 Diagnoses air systems

1,2

13.03 Repairs air systems

1,2

C-14 Services, diagnoses and repairs brake systems

14.01 Services brake systems

1,2

14.02 Diagnoses brake systems

1,2

14.03 Repairs brake systems

1,2

D – Services, Diagnoses and Repairs Electrical and Electronic Systems

16%

D-15 Services, diagnoses and repairs battery systems

15.01 Services battery systems

1

15.02 Diagnoses battery systems

1

15.03 Repairs battery Systems

1

D-16 Services, diagnoses and repairs charging systems	16.01 Services charging systems 1,2	16.02 Diagnoses charging systems 1,2	16.03 Repairs charging systems 1,2
D-17 Services, diagnoses and repairs spark ignition systems	17.01 Services spark ignition systems 3	17.02 Diagnoses spark ignition systems 3	17.03 Repairs spark ignition systems 3
D-18 Services, diagnoses and repairs starting systems	18.01 Services starting systems 1,2	18.02 Diagnoses starting systems 1,2	18.03 Repairs starting Systems 1,2
D-19 Services, diagnoses and repairs electrical components and accessories	19.01 Services electrical components and accessories 1,2,3,4	19.02 Diagnoses electrical components and accessories 1,2,3,4	19.03 Repairs electrical components and accessories 1,2,3,4
D-20 Services, diagnoses and repairs vehicle management systems and electronic components	20.01 Services vehicle management systems and electronic components 2,3,4	20.02 Diagnoses vehicle management systems and electronic components 2,3,4	20.03 Repairs vehicle management systems and electronic components 2,3,4

E – Services, Diagnoses and Repairs Drive Trains

12%

E-21 Services, diagnoses and repairs clutches	21.01 Services clutches 2,3	21.02 Diagnoses clutches 2,3	21.03 Repairs clutches 2,3
E-22 Services, diagnoses and repairs manual transmissions and transfer cases	22.01 Services manual transmissions and transfer cases 2,3	22.02 Diagnoses manual transmissions and transfer cases 2,3	22.03 Repairs manual transmissions and transfer cases 2,3

E-23 Services, diagnoses and repairs automatic transmissions	23.01 Services automatic transmissions 3	23.02 Diagnoses automatic transmissions 3	23.03 Repairs automatic transmissions 3
E-24 Services, diagnoses and repairs automated transmissions	24.01 Services automated transmissions 3	24.02 Diagnoses automated transmission 3	24.03 Repairs automated transmissions 3
E-25 Services, diagnoses and driveline systems	25.01 Services driveline system 2,3	25.02 Diagnoses driveline systems 2,3	25.03 Repairs driveline systems 2,3
E-26 Services, diagnoses and repairs drive axle assemblies	26.01 Services drive axle assemblies 2,3	26.02 Diagnoses drive axle assemblies 2,3	26.03 Repairs drive axle assemblies 2,3
E-27 Services, diagnoses and repairs drive train retarders	27.01 Services drive train retarders 3	27.02 Diagnoses drive train retarders 3	27.03 Repairs drive train retarders 3

F – Services, Diagnoses and Repairs Steering, Chassis/Frames, Suspensions, Tires, Wheels and Hubs

13%

F-28 Services, diagnose, and repairs steering systems	28.01 Services steering systems 1,2	28.02 Diagnoses steering systems 1,2	28.03 Repairs steering systems 1,2
F-29 Services, diagnoses, and repairs chassis/frames	29.01 Services chassis/frames 1,2	29.02 Diagnoses chassis/frames 1,2	29.03 Repairs chassis/frames 1,2
F-30 Services, diagnoses, and repairs suspensions	30.01 Services suspensions 1,2	30.02 Diagnoses suspensions 1,2	30.03 Repairs suspensions 1,2
F-31 Services, diagnoses, and repairs hitches and couplers	31.01 Services hitches and couplers 1,3	31.02 Diagnoses hitches and couplers 1,3	31.03 Repairs hitches and couplers 1,3
F-32 Services, diagnoses, and repairs tires, wheels and hubs	32.01 Services tires, wheels and hubs 1,2	32.02 Diagnoses tires, wheels and hubs 1,2	32.03 Repairs tires, wheels and hubs 1,2

G – Services, Diagnoses and Repairs Cabs

4%

G-33 Services, diagnoses, and repairs interior cab components	33.01 Services interior cab components 2	33.02 Diagnoses interior cab components 2	33.03 Repairs interior cab components 2
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G-34 Services, diagnoses and repairs exterior cab components

34.01 Services exterior cab components

1

34.02 Diagnoses exterior cab components

1

34.03 Repairs exterior cab components

1

H – Services, Diagnoses and Repairs Trailers

6%

H-35 Services, diagnoses and repairs trailer components and accessories

35.01 Services trailer components and accessories

2

35.02 Diagnoses trailer components and accessories

2

35.03 Repairs trailer components and accessories

2

H-36 Services, diagnoses and repairs heating and refrigeration systems

36.01 Services, heating and refrigeration systems

1,4

36.02 Diagnoses heating and refrigeration systems

1,4

36.03 Repairs heating and refrigeration systems

1,4

I – Services, Diagnoses and Repairs Climate Control Systems

6%

I-37 Services, diagnoses and repairs heating and ventilation systems

37.01 Services heating and ventilation systems

1,2,4

37.02 Diagnoses heating and ventilation systems

1,2,4

37.03 Repairs heating and ventilation systems

1,2,4

I-38 Services, diagnoses and repairs air conditioning systems

38.01 Services air conditioning systems

1,2,4

38.02 Diagnoses air conditioning systems

1,2,4

38.03 Repairs air conditioning systems

1,2,4

J – Services, Diagnoses and Repairs Hydraulic Systems

6%

J-39 Services, diagnoses and repairs hydraulic systems

39.01 Services hydraulic systems

1,2,3

39.02 Diagnoses hydraulic systems

1,2,3

39.03 Repairs hydraulic systems

1,2,3

K – Services, Diagnoses and Repairs Hybrid and Electric Vehicles (EV)

3%

K-40 Services, diagnoses and repairs hybrid vehicles

40.01 Services hybrid vehicles

4 In Context in
2,3

40.02 Diagnoses hybrid vehicles

4 In Context in
2,3

40.03 Repairs hybrid vehicles

4 In Context in
2,3

K-41 Services, diagnoses and repairs electric vehicles (EV)

41.01 Services electric vehicles (EV)

4 In Context in
2,3

41.02 Diagnoses electric vehicles (EV)

4 In Context in
2,3

41.03 Repairs electric vehicles (EV)

4 In Context in
2,3

TRAINING PROFILE CHART

This Training Profile Chart represents Saskatchewan Apprenticeship and Trade Certification Commission (SATCC) apprenticeship technical training at the topic level.

Level One	Transcript Code	Hours
Basic Tools	TOOL 145 – Theory	12
	TOOL 146 – Shop	12
Brake Systems	BRAK 111 – Theory	24
	BRAK 112 – Shop	36
Electrical	ELCT 100 – Theory	14
	ELCT 101 – Shop	16
Environmental Control Systems	HVAC 100	6
Hydraulics	HYDR 108 – Theory	12
	HYDR 109 – Shop	18
Steering Systems	STER 100 – Theory	12
	STER 101 – Shop	18
Structural Components	MAIN 102 – Theory	12
	MAIN 103 – Shop	18
Welding OFC/SMAW/GMAW	WELD 235 – Theory	6
	WELD 236 – Shop	24
		240

Level Two	Transcript Code	Hours
Braking Systems ABS	BRAK 211 – Theory	12
	BRAK 212 – Shop	18
Drivetrain Systems	DRTR 201 – Theory	24
	DRTR 202 – Shop	36
Electrical	ELCT 202 – Theory	12
	ELCT 203 – Shop	18
Hydraulics	HYDR 206 – Theory	12
	HYDR 207 – Shop	18
Steering and Directional Control Systems	STER 204 – Theory	12
	STER 205 – Shop	18
Welding OFC/SMAW/GMAW	WELD 235 – Theory	6
	WELD 236 – Shop	24
Truck and Trailer Systems	TRLR 200 – Theory	12
	TRLR 201 – Shop	18
		240

Level Three	Transcript Code	Hours
Alternate Fuels	FUEL 304 – Theory	10
	FUEL 305 – Shop	20
Electrical	ELCT 301 – Theory	14
	ELCT 302 – Shop	16
Engine and Engine Support Systems	ENGN 306 – Theory	55
	ENGN 307 – Shop	65
Powertrain Systems	TRNM 308 – Theory	24
	TRNM 309 – Shop	36
		240

Level Four	Transcript Code	Hours
Drivetrains	DRTR 400 – Theory	24
	DRTR 401 – Shop	36
Electrical	ELCT 400 – Theory	28
	ELCT 401 – Shop	32
Environmental Control Systems	HVAC 400 – Theory	12
	HVAC 401 – Shop	18
Fuel Systems	FUEL 404 – Theory	40
	FUEL 405 – Shop	50
		240

TECHNICAL TRAINING COURSE CONTENT

This chart outlines the model for Saskatchewan Apprenticeship and Trade Certification Commission (SATCC) technical training sequencing. For the harmonized level of training, a cross reference to the Red Seal Occupational Standard apprenticeship technical training sequencing, at the learning outcome level, is provided.

Sub-tasks listed are the minimum to be covered in a topic. Related sub-tasks not listed may be used as a reference and taught “in-context” in other topics.

Level One	8 weeks	240 hours
Basic Tools – Theory		12 hours
- describe safety rules and regulations - describe the purpose and care of shop and hand tools - describe various types of fasteners, adhesives and sealing devices		
Basic Tools – Shop		12 hours
- demonstrate safety - explain legislative regulations - demonstrate use and care of hand tools and shop equipment		
RSOS topics covered in this section of training:		
A-1 Performs safety-related functions		
1.01 Maintains safe work environment		
1.02 Uses personal protective equipment (PPE) and safety equipment		
A-2 Uses and maintains tools and equipment		
2.01 Uses hand, power, measuring, testing, and diagnostic tools		
2.02 Uses shop equipment		
2.03 Uses hoisting, lifting and staging equipment		
2.04 Uses welding and cutting equipment		
A-3 Performs routine work practices		
3.01 Uses documentation and reference materials		
3.03 Services hoses, tubing and fittings		
3.06 Uses fasteners and sealing devices		
A-4 Uses communication and mentoring techniques		
4.01 Uses communication techniques		
Brake Systems – Theory		24 hours
- describe hydraulic brake system operation - describe air brake system operation - describe various types of park brake systems		

Brake Systems – Shop

36 hours

- evaluate hydraulic brake system operation
- evaluate air brake system operation
- evaluate various park brake systems
- conduct final adjustments and performance tests
- repair faults

RSOS topics covered in this section of training:

C-13 Services, diagnoses and repairs air systems

13.01 Services air systems

13.02 Diagnoses air systems

13.03 Repairs air systems

C-14 Services, diagnoses and repairs brake systems

14.01 Services brake systems

14.02 Diagnoses brake systems

14.03 Repairs brake systems

Electrical – Theory

14 hours

- apply scientific principles to explain electrical theory and magnetism
- identify electrical circuit types and faults utilizing test equipment
- explain the function and operation of a lead acid battery

Electrical – Shop

16 hours

- measure electrical values and check circuit operation
- evaluate a lead acid battery
- repair faults

RSOS topics covered in this section of training:

A-2 Uses and maintains tools and equipment

2.05 Uses electronic devices and systems for diagnostics and programming

D-15 Services, diagnoses and repairs battery systems

15.01 Services battery systems

15.02 Diagnoses battery systems

15.03 Repairs battery Systems

D-16 Services, diagnoses and repairs charging systems

16.01 Services charging systems

16.02 Diagnoses charging systems

16.03 Repairs charging systems

D-18 Services, diagnoses and repairs starting systems

18.01 Services starting systems

18.02 Diagnoses starting systems

18.03 Repairs starting systems

D-19 Services, diagnoses and repairs electrical components and accessories

- 19.01 Services electrical components and accessories
- 19.02 Diagnoses electrical components and accessories
- 19.03 Repairs electrical components and accessories

Environmental Control Systems – Theory**6 hours**

- complete the Heating, Refrigeration and Air Conditioning Institute's course on ozone depleting substances

RSOS topics covered in this section of training:**H-36 Services, diagnoses and repairs heating and refrigeration systems**

- 36.01 Services heating and refrigeration systems
- 36.02 Diagnoses heating and refrigeration systems
- 36.03 Repairs heating and refrigeration systems

I-37 Services, diagnoses and repairs heating and ventilation systems

- 37.01 Services heating and ventilation systems
- 37.02 Diagnoses heating and ventilation systems
- 37.03 Repairs heating and ventilation systems

I-38 Services, diagnoses and repairs air conditioning systems

- 38.01 Services air conditioning systems
- 38.02 Diagnoses air conditioning systems
- 38.03 Repairs air conditioning systems

Hydraulics – Theory**12 hours**

- explain the fundamentals of a basic hydraulic system and related components
- interpret hydraulic symbols and diagrams
- describe hydraulic system maintenance and testing procedures

Hydraulics – Shop**18 hours**

- service hydraulic system and various components
- test hydraulic systems using correct tools and procedures
- evaluate basic hydraulic systems

RSOS topics covered in this section of training:**F-31 Services, diagnoses, and repairs hitches and couplers**

- 31.01 Services hitches and couplers
- 31.02 Diagnoses hitches and couplers
- 31.03 Repairs hitches and couplers

J-39 Services, diagnoses and repairs hydraulic systems

- 39.01 Services hydraulic systems
- 39.02 Diagnoses hydraulic systems
- 39.03 Repairs hydraulic systems

Steering Systems – Theory**12 hours**

- explain basic wheel and frame alignment angles
- explain manual and integral steering system operation
- describe mounting procedures for tires, rims and hubs

Steering Systems – Shop

18 hours

- perform a basic wheel alignment
- evaluate manual and integral power steering systems
- perform mounting procedures for tires, rims and hubs

RSOS topics covered in this section of training:

C-13 Services, diagnoses and repairs air systems

13.01 Services air systems

13.02 Diagnoses air systems

13.03 Repairs air systems

F-28 Services, diagnoses and repairs steering systems

28.01 Services steering systems

28.02 Diagnoses steering systems

28.03 Repairs steering systems

F-30 Services, diagnoses and repairs suspensions

30.01 Services suspensions

30.02 Diagnoses suspensions

30.03 Repairs suspensions

F-32 Services, diagnoses and repairs tires, wheels and hubs

32.01 Services tires, wheels and hubs

32.02 Diagnoses tires, wheels and hubs

32.03 Repairs tires, wheels and hubs

Structural Components and Accessories – Theory

12 hours

- describe preventative maintenance programs
- identify hoisting and rigging techniques
- describe tractor frame construction and suspension systems
- describe truck and trailer coupling and docking systems
- identify hybrid and EV systems and safe work procedures

Structural Components and Accessories – Shop

18 hours

- perform preventative maintenance checks
- perform hoisting and rigging techniques
- repair various hitching and docking systems
- inspect frame and suspension systems
- perform hybrid and EV system lockout or safe energy release

RSOS topics covered in this section of training:

A-1 Performs safety-related functions

1.01 Maintains safe work environment

1.03 Implements specific safety protocols for hybrid and electric vehicles

A-2 Uses and maintains tools and equipment

2.01 Uses hand, power, measuring, testing, and diagnostic tools

2.03 Uses hoisting, lifting and staging equipment

A-3 Performs routine work practices

3.02 Maintains fluids and lubricants

3.04 Services filters

B-6 Services, diagnoses and repairs lubrication systems

6.01 Services lubrication systems

F-29 Services, diagnoses and repairs chassis/frames

29.01 Services chassis/frames

29.02 Diagnoses chassis/frames

29.03 Repairs chassis/frames

F-30 Services, diagnoses and repairs suspensions

30.01 Services suspensions

30.02 Diagnoses suspensions

30.03 Repairs suspensions

F-31 Services, diagnoses, and repairs hitches and couplers

31.01 Services hitches and couplers

31.02 Diagnoses hitches and couplers

31.03 Repairs hitches and couplers

G-34 Services, diagnoses and repairs exterior cab components

34.01 Services exterior cab components

34.02 Diagnoses exterior cab components

34.03 Repairs exterior cab components

OFC/SMAW/GMAW Welding – Theory**6 hours**

- Identify safety considerations associated with oxy-fuel units, shielded metal arc welding and gas metal arc welding
- Describe the setup and operation of an oxy-fuel unit, shielded metal arc welding and gas metal arc welding equipment

OFC/SMAW/GMAW Welding – Shop**24 hours**

- Cut plate and gauge metal using oxy-fuel unit
- Weld ¼" material, T joint, horizontal fillet and surface build up using the SMAW process
- demonstrate use of GMAW in the horizontal and vertical down positions

RSOS topics covered in this section of training:**A-2 Uses and maintains tools and equipment**

2.04 Uses welding and cutting equipment

F-29 Services, diagnoses and repairs chassis/frames

29.01 Services chassis/frames

29.02 Diagnoses chassis/frames

29.03 Repairs chassis/frames

Level Two

8 weeks

240 hours

Brake Systems ABS – Theory

12 hours

- describe antilock braking system components
- describe electric braking system components
- describe traction and stability control system components
- describe SGI safety inspection procedures for truck and trailers

Brake Systems ABS – Shop

18 hours

- evaluate antilock braking systems
- evaluate electric braking systems
- evaluate traction and stability control systems
- repair system faults
- perform SGI safety inspection

RSOS topics covered in this section of training:

C-13 Services, diagnoses and repairs air systems

- 13.01 Services air systems
- 13.02 Diagnoses air systems
- 13.03 Repairs air systems

C-14 Services, diagnoses and repairs brake systems

- 14.01 Services brake systems
- 14.02 Diagnoses brake systems
- 14.03 Repairs brake systems

D-19 Services, diagnoses and repairs electrical components and accessories

- 19.01 Services electrical components and accessories
- 19.02 Diagnoses electrical components and accessories
- 19.03 Repairs electrical components and accessories

D-20 Services, diagnoses and repairs vehicle management systems and electronic components

- 20.01 Services vehicle management systems and electronic components
- 20.02 Diagnoses vehicle management systems and electronic components
- 20.03 Repairs vehicle management systems and electronic components

Drivetrain Systems – Theory

24 hours

- identify various seals and bearing types
- discuss various clutch types
- discuss manual transmission operation
- discuss differential operation
- discuss planetary and final drives
- discuss driveline operation

Drivetrain Systems – Shop

36 hours

- perform the removal and replacement of various seals and bearings
- evaluate various clutch types
- evaluate manual transmission operation
- evaluate differential operation
- evaluate planetary and final drive systems
- evaluate driveline systems
- repair faults

RSOS topics covered in this section of training:

E-21 Services, diagnoses and repairs clutches

- 21.01 Services clutches
- 21.02 Diagnoses clutches
- 21.03 Repairs clutches

E-22 Services, diagnoses and repairs manual transmissions and transfer cases

- 22.01 Services manual transmissions and transfer cases
- 22.02 Diagnoses manual transmissions and transfer cases
- 22.03 Repairs manual transmissions and transfer cases

E-25 Services, diagnoses and repairs driveline systems

- 25.01 Services driveline system
- 25.02 Diagnoses driveline systems
- 25.03 Repairs driveline systems

E-26 Services, diagnoses and repairs drive axle assemblies

- 26.01 Services drive axle assemblies
- 26.02 Diagnoses drive axle assemblies
- 26.03 Repairs drive axle assemblies

Electrical – Theory

12 hours

- explain the operation of a cranking system and related components
- explain the operation of an alternating current (AC) charging system and related components

Electrical – Shop

18 hours

- evaluate cranking and charging systems
- repair faults

RSOS topics covered in this section of training:

D-16 Services, diagnoses and repairs charging systems

- 16.01 Services charging systems
- 16.02 Diagnoses charging systems
- 16.03 Repairs charging systems

D-18 Services, diagnoses and repairs starting systems

- 18.01 Services starting systems
- 18.02 Diagnoses starting systems
- 18.03 Repairs starting systems

D-19 Services, diagnoses and repairs electrical components and accessories

19.01 Services electrical components and accessories

19.02 Diagnoses electrical components and accessories

19.03 Repairs electrical components and accessories

Hydraulics – Theory

12 hours

- describe the operation of the different types of flow control valves
- describe a power-beyond hydraulic systems
- describe open and closed loop hydrostatic systems

Hydraulics – Shop

18 hours

- evaluate various types of hydraulic systems and flow control valves
- evaluate open and closed loop hydraulic systems
- repair faults

RSOS topics covered in this section of training:

J-39 Services, diagnoses and repairs hydraulic systems

39.01 Services hydraulic systems

39.02 Diagnoses hydraulic systems

39.03 Repairs hydraulic systems

Steering and Directional Control Systems – Theory

12 hours

- explain the operating principles of tandem steering systems
- explain the operating principles of an auxiliary steering systems
- discuss pilot control and orbital steering systems

Steering and Directional Control Systems – Shop

18 hours

- evaluate a tandem steering system
- evaluate an auxiliary steering systems
- evaluate pilot control and orbital steering systems
- repair system faults

RSOS topics covered in this section of training:

C-13 Services, diagnoses and repairs air systems

13.01 Services air systems

13.02 Diagnoses air systems

13.03 Repairs air systems

F-28 Services, diagnoses and repairs steering systems

28.01 Services steering systems

28.02 Diagnoses steering systems

28.03 Repairs steering systems

F-32 Services, diagnoses and repairs tires, wheels and hubs

32.01 Services tires, wheels and hubs

32.02 Diagnoses tires, wheels and hubs

32.03 Repairs tires, wheels and hubs

Truck and Trailer Systems – Theory

12 hours

- describe trailer frame and suspension systems
- describe operational fundamentals of trailer heat, ventilation and air conditioning systems
- describe the operation of cab and engine heaters and auxiliary power generation units

Truck and Trailer Systems – Shop

18 hours

- evaluate trailer frame and suspension systems
- evaluate trailer heating, ventilation and air conditioning systems
- evaluate the engine and cab heating and auxiliary power generation units
- repair defects

RSOS topics covered in this section of training:

A-3 Performs routine work practices

3.03 Services hoses, tubing and fittings

C-13 Services, diagnoses and repairs air systems

13.01 Services air systems

13.02 Diagnoses air systems

13.03 Repairs air systems

F-29 Services, diagnoses and repairs chassis/frames

29.01 Services chassis/frames

29.02 Diagnoses chassis/frames

29.03 Repairs chassis/frames

F-30 Services, diagnoses and repairs suspensions

30.01 Services suspensions

30.02 Diagnoses suspensions

30.03 Repairs suspensions

G-33 Services, diagnoses and repairs interior cab components

33.01 Services interior cab components

33.02 Diagnoses interior cab components

33.03 Repairs interior cab components

H-35 Services, diagnoses and repairs trailer components and accessories

35.01 Services trailer components and accessories

35.02 Diagnoses trailer components and accessories

35.03 Repairs trailer components and accessories

I-37 Services, diagnoses and repairs heating and ventilation systems

37.01 Services heating and ventilation systems

37.02 Diagnoses heating and ventilation systems

37.03 Repairs heating and ventilation systems

I-38 Services, diagnoses and repairs air conditioning systems

38.01 Services air conditioning systems

38.02 Diagnoses air conditioning systems

38.03 Repairs air conditioning systems

OFC/SMAW/GMAW Welding – Theory**6 hours**

- Identify safety considerations associated with oxy-fuel units, shielded metal arc welding and gas metal arc welding
- Describe the setup and operation of an oxy-fuel unit, shielded metal arc welding and gas metal arc welding equipment

OFC/SMAW/GMAW Welding – Shop**24 hours**

- Cut plate and gauge metal using oxy-fuel unit
- Weld ¼" material, T joint, horizontal fillet and surface build up using the SMAW process
- demonstrate use of GMAW in the horizontal and vertical down positions

RSOS topics covered in this section of training:**A-2 Uses and maintains tools and equipment**

2.04 Uses welding and cutting equipment

F-29 Services, diagnoses and repairs chassis/frames

29.01 Services chassis/frames

29.02 Diagnoses chassis/frames

29.03 Repairs chassis/frames

Level Two topics from the RSOS that are taught in-context:*Routine Trade Activities**Hybrid Vehicles**Electric Vehicles (EV)**For details regarding the In-Context Topics, see page 32*

Level Three

8 weeks

240 hours

Alternative Fuels – Theory

10 hours

- describe the ignition process of a spark ignition engine
- describe the fuel delivery process for various fuel types

Alternative Fuels – Shop

20 hours

- perform servicing, diagnoses and replacement of spark ignition components
- perform servicing, diagnosing and replacement of components related to fuel delivery

RSOS topics covered in this section of training:

B-9 Services, diagnoses and repairs engine management systems

- 9.01 Services engine management systems
- 9.02 Diagnoses engine management systems
- 9.03 Repairs engine management systems

B-10 Services, diagnoses and repairs fuel delivery systems

- 10.01 Services fuel delivery systems
- 10.02 Diagnoses fuel delivery systems
- 10.03 Repairs fuel delivery systems

D-17 Services, diagnoses and repairs spark ignition systems

- 17.01 Services spark ignition systems
- 17.02 Diagnoses spark ignition systems
- 17.03 Repairs spark ignition systems

Electrical – Theory

14 hours

- explain common electrical components and their applications
- interpret wiring diagrams
- explain common electrical faults

Electrical – Shop

16 hours

- construct electrical circuits
- measure electrical values
- analyze circuit operation

RSOS topics covered in this section of training:

D-19 Services, diagnoses and repairs electrical components and accessories

- 19.01 Services electrical components and accessories
- 19.02 Diagnoses electrical components and accessories
- 19.03 Repairs electrical components and accessories

D-20 Services, diagnoses and repairs vehicle management systems and electronic components

- 20.01 Services vehicle management systems and electronic components
- 20.02 Diagnoses vehicle management systems and electronic components
- 20.03 Repairs vehicle management systems and electronic components

Engine and Engine Support Systems – Theory

55 hours

- describe the operational characteristics of a diesel engine
- describe metallurgy and fluid analysis as it pertains to diesel engines
- describe the operational characteristics of various diesel engine support systems
- describe the procedures involved in a diesel engine overhaul
- describe the processes involved in determining component serviceability.

Engine and Engine Support Systems – Shop

65 hours

- evaluate a diesel engine for potential faults prior to disassembly
- disassemble engine using correct procedures and shop practices
- evaluate engine components for serviceability
- assemble a diesel engine using proper procedures and serviceable components
- evaluate engines after assembly and inspect for potential faults
- evaluate operating engine for faults
- repair defects as required

RSOS topics covered in this section of training:

B-5 Services, diagnoses and repairs base engines

5.01 Services base engines

5.02 Diagnoses base engines

5.03 Repairs base engines

B-6 Services, diagnoses and repairs lubrication systems

6.01 Services lubrication systems

6.02 Diagnoses lubrication systems

6.03 Repairs lubrication systems

B-7 Services, diagnoses and repairs intake systems

7.01 Services intake systems

7.02 Diagnoses intake systems

7.03 Repairs intake systems

B-8 Services, diagnoses and repairs exhaust systems

8.01 Services exhaust systems

8.02 Diagnoses exhaust systems

8.03 Repairs exhaust systems

B-9 Services, diagnoses and repairs engine management systems

9.01 Services engine management systems

9.02 Diagnoses engine management systems

9.03 Repairs engine management systems

B-10 Services, diagnoses and repairs fuel delivery systems

10.01 Services fuel delivery systems

10.02 Diagnoses fuel delivery systems

10.03 Repairs fuel delivery systems

B-11 Services, diagnoses and repairs engine retarder systems

- 11.01 Services engine retarder systems
- 11.02 Diagnoses engine retarder systems
- 11.03 Repairs engine retarder systems

B-12 Services, diagnoses and repairs cooling system

- 12.01 Services cooling system
- 12.02 Diagnoses cooling system
- 12.03 Repairs cooling system

Powertrain Systems – Theory**24 hours**

- describe operating principles of a manual transmission
- describe operating principles of an automatic transmission

Powertrain Systems – Shop**36 hours**

- evaluate manual transmissions
- evaluate automatic transmissions
- repair defects

RSOS topics covered in this section of training:**B-10 Services, diagnoses and repairs fuel delivery systems**

- 10.01 Services fuel delivery systems
- 10.02 Diagnoses fuel delivery systems
- 10.03 Repairs fuel delivery systems

D-20 Services, diagnoses and repairs vehicle management systems and electronic components

- 20.01 Services vehicle management systems and electronic components
- 20.02 Diagnoses vehicle management systems and electronic components
- 20.03 Repairs vehicle management systems and electronic components

E-21 Services, diagnoses and repairs clutches

- 21.01 Services clutches
- 21.02 Diagnoses clutches
- 21.03 Repairs clutches

E-22 Services, diagnoses and repairs manual transmissions and transfer cases

- 22.01 Services manual transmissions and transfer cases
- 22.02 Diagnoses manual transmissions and transfer cases
- 22.03 Repairs manual transmissions and transfer cases

E-23 Services, diagnoses and repairs automatic transmissions

- 23.01 Services automatic transmissions
- 23.02 Diagnoses automatic transmissions
- 23.03 Repairs automatic transmissions

E-24 Services, diagnoses and repairs automated transmissions

- 24.01 Services automated transmissions
- 24.02 Diagnoses automated transmission
- 24.03 Repairs automated transmissions

E-25 Services, diagnoses and driveline systems

25.01 Services driveline system

25.02 Diagnoses driveline systems

25.03 Repairs driveline systems

E-26 Services, diagnoses and repairs drive axle assemblies

26.01 Services drive axle assemblies

26.02 Diagnoses drive axle assemblies

26.03 Repairs drive axle assemblies

E-27 Services, diagnoses and repairs drive train retarders

27.01 Services drive train retarders

27.02 Diagnoses drive train retarders

27.03 Repairs drive train retarders

F-31 Services, diagnoses, and repairs hitches and couplers

31.01 Services hitches and couplers

31.02 Diagnoses hitches and couplers

31.03 Repairs hitches and couplers

Level Three topics from the RSOS that are taught in-context:

Routine Trade Activities

Hybrid Vehicles

Electric Vehicles (EV)

For details regarding the In-Context Topics, see page 32

Level Four

8 weeks

240 hours

Drivetrains – Theory

24 hours

- explain the fundamentals of hybrid and EV drive systems
- describe the operation and components of a hybrid drive system
- describe the operation and components of an EV drive system
- identify tools and equipment for safe testing of hybrid and EV drive systems
- describe procedures to safely test and diagnose hybrid and EV drive systems

Drivetrains – Shop

36 hours

- examine hybrid drive system components
- examine EV drive system components
- evaluate hybrid and EV drive systems
- demonstrate repairs of hybrid and EV drive systems

RSOS topics covered in this section of training:

K-40 Services, diagnoses and repairs hybrid vehicles

- 40.01 Services hybrid vehicles
- 40.02 Diagnoses hybrid vehicles
- 40.03 Repairs hybrid vehicles

K-41 Services, diagnoses and repairs electric vehicles (EV)

- 41.01 Services electric vehicles (EV)
 - 41.02 Diagnoses electric vehicles (EV)
 - 41.03 Repairs electric vehicles (EV)
-

Electrical – Theory

28 hours

- demonstrate the theory, function and operation of electrical circuits and wiring diagrams
- compare common electrical and electronic components and their applications
- analyze the operation of electrical accessories and control circuits
- examine vehicle management systems, their components, characteristics, application and operation
- analyze the procedures involved diagnosing electronic vehicle management systems

Electrical – Shop

32 hours

- utilize wiring diagrams for fault diagnosis of electrical and electronic circuits
- evaluate electrical and electronic vehicle management systems
- select diagnostic equipment to evaluate vehicle management systems

RSOS topics covered in this section of training:

D-19 Services, diagnoses and repairs electrical components and accessories

- 19.01 Services electrical components and accessories
- 19.02 Diagnoses electrical components and accessories
- 19.03 Repairs electrical components and accessories

D-20 Services, diagnoses and repairs vehicle management systems and electronic components

- 20.01 Services vehicle management systems and electronic components
- 20.02 Diagnoses vehicle management systems and electronic components
- 20.03 Repairs vehicle management systems and electronic components

K-41 Services, diagnoses and repairs electric vehicles (EV)

- 41.01 Services electric vehicles (EV)
- 41.02 Diagnoses electric vehicles (EV)
- 41.03 Repairs electric vehicles (EV)

Environmental Control Systems – Theory**12 hours**

- describe the operation of heating, ventilation and air conditioning systems
- identify various heating and air conditioning components
- describe proper usage of test equipment

Environmental Control Systems – Shop**18 hours**

- demonstrate service procedures
- repair air conditioning and heating components
- repair air conditioning systems

RSOS topics covered in this section of training:**H-36 Services, diagnoses and repairs heating and refrigeration systems**

- 36.01 Services, heating and refrigeration systems
- 36.02 Diagnoses heating and refrigeration systems
- 36.03 Repairs heating and refrigeration systems

I-37 Services, diagnoses and repairs heating and ventilation systems

- 37.01 Services heating and ventilation systems
- 37.02 Diagnoses heating and ventilation systems
- 37.03 Repairs heating and ventilation systems

I-38 Services, diagnoses and repairs air conditioning systems

- 38.01 Services air conditioning systems
- 38.02 Diagnoses air conditioning systems
- 38.03 Repairs air conditioning systems

Fuel Systems – Theory**40 hours**

- describe preventive maintenance procedures for diesel fuel storage and delivery systems
- describe proper procedures to diagnose faults in fuel delivery and control systems
- describe proper procedures to inspect, adjust or repair fuel delivery and control systems
- describe the procedures involved in performance testing on diesel engines
- describe proper procedures to inspect, adjust or repair exhaust after-treatment devices

Fuel Systems – Shop

50 hours

- perform preventative maintenance
- evaluate diesel injection delivery and control components
- evaluate an operating diesel engine
- conduct performance testing
- repair faults
- evaluate exhaust after-treatment devices

RSOS topics covered in this section of training:

A-4 Uses communication and mentoring techniques

4.02 Uses mentoring techniques

B-5 Services, diagnoses and repairs base engines

5.01 Services base engines

5.02 Diagnoses base engines

5.03 Repairs base engines

B-6 Services, diagnoses and repairs lubrication systems

6.01 Services lubrication systems

6.02 Diagnoses lubrication systems

6.03 Repairs lubrication systems

B-7 Services, diagnoses and repairs intake systems

7.01 Services intake systems

7.02 Diagnoses intake systems

7.03 Repairs intake systems

B-8 Services, diagnoses and repairs exhaust systems

8.01 Services exhaust systems

8.02 Diagnoses exhaust systems

8.03 Repairs exhaust systems

B-9 Services, diagnoses and repairs engine management systems

9.01 Services engine management systems

9.02 Diagnoses engine management systems

9.03 Repairs engine management systems

B-10 Services, diagnoses and repairs fuel delivery systems

10.01 Services fuel delivery systems

10.02 Diagnoses fuel delivery systems

10.03 Repairs fuel delivery systems

Level Four topics from the RSOS that are taught in-context:

Routine Trade Activities

For details regarding the In-Context Topics, see page 32

IN-CONTEXT TOPICS

In-context means learning that has already taken place and is being applied to the applicable task. Learning outcomes for in-context topics are accomplished in other topics in that level.

A-4 Uses communication and mentoring techniques

4.01 Uses communication techniques

4.02 Uses mentoring techniques

A-3 Performs routine work practices

3.01 Uses documentation and reference materials

3.02 Maintains fluids and lubricants

3.03 Services hoses, tubing and fittings

3.04 Services filters

3.05 Services bearings and seals

3.06 Uses fasteners and sealing devices

K-40 Services, diagnoses and repairs hybrid vehicles

40.01 Services hybrid vehicles

40.02 Diagnoses hybrid vehicles

40.03 Repairs hybrid vehicles

K-41 Services, diagnoses and repairs electric vehicles (EV)

41.01 Services electric vehicles (EV)

41.02 Diagnoses electric vehicles (EV)

41.03 Repairs electric vehicles (EV)