



Truck and Transport Mechanic

Guide to Course Content

2024

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Recognition:

To promote transparency and consistency, this document has been adapted from the 2015 Truck and Transport Mechanic National Occupational Analysis (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.

Major Work Activity (MWA): 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 OF 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 guide to course content 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 journeyman 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. Applicants whose first language is not English must have a minimum Canadian Language Benchmark Assessment of six (CLB6).

Note: A CLB assessment is valid for a one-year period from date of issue.

Designated Trade Name	Math Credit at the Indicated Grade Level❶	Science Credit at Grade Level
Truck and Transport Mechanic	Grade 11	Grade 10
<p>❶ - (One of the following) WA – Workplace and Apprenticeship; or F – Foundations; or P – Pre-calculus, or a Math at the indicated grade level (Modified and General Math credits are not acceptable.).</p> <p>*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.</p> <p>For information about high school curriculum, including Math and Science course names, please see: http://www.curriculum.gov.sk.ca/#</p> <p>Individuals not meeting the entrance requirements will be subject to an assessment and any required training.</p>		

TRUCK AND TRANSPORT MECHANIC

TASK MATRIX

This chart outlines the blocks, tasks and sub-tasks from the 2015 Truck and Transport Mechanic National Occupational Analysis (NOA)*. Each sub-task details the corresponding essential skill and level of training (apprenticeship year) where the content is delivered 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			
A-2 Uses and maintains tools and equipment	2.01 Maintains hand, power, measuring, testing, and diagnostic tools 1	2.02 Maintains shop equipment 1	2.03 Uses hoisting and lifting equipment 1	2.04 Uses welding and cutting equipment 1, 2	
A-3 Performs routine trade activities	3.01 Uses documentation and reference materials 1 (2, 3, 4 in-context)	3.02 Maintains fluids, lubricants, and coolants 1 (2, 3, 4 in-context)	3.03 Services hoses, tubing, and fittings 1 (2, 3, 4 in-context)	3.04 Services filters 1 (2, 3, 4 in-context)	3.05 Services bearings, bushing and seals 1 (2, 3, 4 in-context)
	3.06 Uses fasteners, sealing devices, adhesives and gaskets 1 (2, 3, 4 in-context)				

B – Engines and Supporting Systems

17%

<p>B-4 Services, diagnoses and repairs base engine</p>	<p>4.01 Services base engine</p> <p>3</p>	<p>4.02 Diagnoses base engine</p> <p>3</p>	<p>4.03 Repairs base engine</p> <p>3</p>
<p>B-5 Services, diagnoses and repairs lubrication system</p>	<p>5.01 Services lubrication systems</p> <p>3</p>	<p>5.02 Diagnoses lubrication systems</p> <p>3</p>	<p>5.03 Repairs lubrication systems</p> <p>3</p>
<p>B-6 Services, diagnoses and repairs Intake and exhaust systems</p>	<p>6.01 Services Intake and exhaust systems</p> <p>3</p>	<p>6.02 Diagnoses Intake and exhaust systems</p> <p>3</p>	<p>6.03 Repairs Intake and exhaust systems</p> <p>3</p>
<p>B-7 Services, diagnoses and repairs engine management system</p>	<p>7.01 Services engine management system</p> <p>3</p>	<p>7.02 Diagnoses engine management system</p> <p>3</p>	<p>7.03 Repairs engine management system</p> <p>3</p>
<p>B-8 Services, diagnoses and repairs fuel delivery system</p>	<p>8.01 Services fuel delivery system</p> <p>3, 4</p>	<p>8.02 Diagnoses fuel delivery system</p> <p>3, 4</p>	<p>8.03 Repairs fuel delivery system</p> <p>3, 4</p>
<p>B-9 Services, diagnoses and repairs emission systems for diesel engines</p>	<p>9.01 Services emission systems for diesel engines</p> <p>3, 4</p>	<p>9.02 Diagnoses emission systems for diesel engines</p> <p>3, 4</p>	<p>9.03 Repairs emission systems for diesel engines</p> <p>3, 4</p>

B-10 Services, diagnoses and engine retarder systems

10.01 Services and repairs engine retarder systems

3

10.02 Diagnoses engine retarder systems

3

B-11 Services, diagnoses and repairs cooling system

11.01 Services cooling system

3

11.02 Diagnoses cooling system

3

11.03 Repairs cooling system

3

C – Air Systems and Brakes

14%

C-12 Services, diagnoses and repairs air systems

12.01 Services air systems

1, 2

12.02 Diagnoses air systems

1, 2

12.03 Repairs air systems

1, 2

C-13 Services, diagnoses and repairs brake systems

13.01 Services brake systems

1, 2

13.02 Diagnoses brake system

1, 2

13.03 Repairs brake systems

1, 2

D – Electrical and Electronic Systems

17%

<p>D-14 Services, diagnoses and repairs batteries</p>	<p>14.01 Performs servicing and repair of batteries</p> <p>1</p>	<p>14.02 Diagnoses batteries</p> <p>1</p>	
<p>D-15 Services, diagnoses and repairs charging systems</p>	<p>15.01 Services charging systems</p> <p>1, 2</p>	<p>15.02 Diagnoses charging systems</p> <p>1, 2</p>	<p>15.03 Repairs charging systems</p> <p>1, 2</p>
<p>D-16 Services, diagnoses and repairs spark ignition systems</p>	<p>16.01 Performs servicing and repair of spark ignition systems</p> <p>1</p>	<p>16.02 Diagnoses spark ignition systems</p> <p>1</p>	
<p>D-17 Services, diagnoses and repairs starting systems</p>	<p>17.01 Performs servicing and repairs of starting systems</p> <p>1, 2</p>	<p>17.02 Diagnoses starting systems</p> <p>1, 2</p>	
<p>D-18 Services, diagnoses and repairs electrical components and accessories</p>	<p>18.01 Performs servicing and repairs of electrical components and accessories</p> <p>3, 4 (1, 2 in-context)</p>	<p>18.02 Diagnoses electrical components and accessories</p> <p>3, 4 (1, 2 in-context)</p>	
<p>D-19 Services, diagnoses and repairs vehicle management systems and electronic components</p>	<p>19.01 Services vehicle management systems and electronic components</p> <p>4 (1, 2, 3 in-context)</p>	<p>19.02 Diagnoses vehicle management systems and electronic components</p> <p>4 (1, 2, 3 in-context)</p>	<p>19.03 Repairs vehicle management systems and electronic components</p> <p>4 (1, 2, 3 in-context)</p>

E – Drivetrain

12%

E-20 Services, diagnoses and repairs clutches	20.01 Services clutches 3	20.02 Diagnoses clutches 3	20.03 Repairs clutches 3
E-21 Services, diagnoses and repairs manual transmission and transfer cases	21.01 Services manual transmission and transfer cases 3	21.02 Diagnoses manual transmission and transfer cases 3	21.03 Repairs manual transmission and transfer cases 3
E-22 Services, diagnoses and repairs automatic transmissions	22.01 Services automatic transmissions 3	22.02 Diagnoses automatic transmissions 3	22.03 Repairs automatic transmissions 3
E-23 Services, diagnoses and repairs automated transmissions	23.01 Services automated transmissions 4	23.02 Diagnoses automated transmission 4	23.03 Repairs automated transmissions 4
E-24 Services, diagnoses and driveline systems	24.01 Services driveline system 3	24.02 Diagnoses driveline systems 3	24.03 Repairs driveline systems 3
E-25 Services, diagnoses and repairs differentials	25.01 Services differentials 3	25.02 Diagnoses differentials 3	25.03 Repairs differentials 3
E-26 Services, diagnoses and repairs drive train retarders	26.01 Services drive train retarders 3	26.02 Diagnoses drive train retarders 3	26.03 Repairs drive train retarders 3

F – Steering, Chassis/Frames, Suspension, Wheels, Hubs and Tires

14%

<p>F-27 Services, diagnose, and repairs steering system</p>	<p>27.01 Services steering system</p> <p>1, 2</p>	<p>27.02 Diagnoses steering system</p> <p>1, 2</p>	<p>27.02 Repairs steering system</p> <p>1, 2</p>
<p>F-28 Services, diagnoses, and repairs chassis/frames</p>	<p>28.01 Services chassis/frames</p> <p>1, 2</p>	<p>28.02 Diagnoses chassis/frames</p> <p>1, 2</p>	<p>28.03 Repairs chassis/frames</p> <p>1, 2</p>
<p>F-29 Services, diagnoses, and repairs suspension</p>	<p>29.01 Services suspension</p> <p>1, 2</p>	<p>29.02 Diagnoses suspension</p> <p>1, 2</p>	<p>29.03 Repairs suspension</p> <p>1, 2</p>
<p>F-30 Services, diagnoses, and repairs hitches and couplers</p>	<p>30.01 Services hitches and couplers</p> <p>1, 2</p>	<p>30.02 Diagnoses hitches and couplers</p> <p>1, 2</p>	<p>30.03 Repairs hitches and couplers</p> <p>1, 2</p>
<p>F-31 Services, diagnoses, and repairs tires, wheels and hubs</p>	<p>31.01 Services tires, wheels and hubs</p> <p>1, 2</p>	<p>31.02 Diagnoses tires, wheels and hubs</p> <p>1, 2</p>	<p>31.03 Repairs tires, wheels and hubs</p> <p>1, 2</p>

G – Cab

4%

G-32 Services, diagnoses, and repairs interior cab components	32.01 Services interior cab components 2	32.02 Diagnoses interior cab components 2	32.03 Repairs interior cab components 2
G-33 Services, diagnoses and repairs exterior cab components	33.01 Services exterior cab components 1	33.02 Diagnoses exterior cab components 1	33.03 Repairs exterior cab components 1

H – Trailers

5%

H-34 Services, diagnoses and repairs trailer components and accessories	34.01 Services trailer components and accessories 2	34.02 Diagnoses trailer components and accessories 2	34.03 Repairs trailer components and accessories 2
H-35 Services, diagnoses and repairs heating refrigeration systems	35.01 Services, heating refrigeration systems 2	35.02 Diagnoses heating refrigeration systems 2	35.03 Repairs heating refrigeration systems 2

I – Climate Control

6%

I-36 Services, diagnoses and repairs heating and ventilation systems

36.01 Services heating and ventilation systems

1, 4

36.02 Diagnoses heating and ventilation systems

1, 4

36.03 Repairs heating and ventilation systems

1, 4

I-37 Services, diagnoses and repairs air conditioning systems

37.01 Services air conditioning systems

1, 4

37.02 Diagnoses air conditioning systems

1, 4

37.03 Repairs air conditioning systems

1, 4

J – Hydraulic Systems

5%

J-38 Services, diagnoses and repairs hydraulic components

38.01 Services hydraulic components

1, 2

38.02 Diagnoses hydraulic components

1, 2

38.03 Repairs hydraulic components

1, 2

TRAINING PROFILE CHART

This Training Profile Chart represents Saskatchewan Apprenticeship and Trade Certification Commission (SATCC) 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	24
	HYDR 109 – Shop	36
Steering Systems	STER 100 – Theory	12
	STER 101 – Shop	18
Structural Components	MAIN 102 – Theory	12
	MAIN 103 – Shop	18
		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	12
	DRTR 401 – Shop	18
Electrical	ELCT 400 – Theory	40
	ELCT 401 – Shop	50
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 National Occupational Analysis (NOA) 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
<p>Basic Tools – Theory</p> <ul style="list-style-type: none"> describe safety rules and regulations describe the purpose and care of shop and hand tools describe various types of fasteners, adhesives and sealing devices <p>Basic Tools – Shop</p> <ul style="list-style-type: none"> demonstrate safety explain legislative regulations demonstrate use and care of hand tools and shop equipment <p>NOA topics covered in this section of training:</p> <p>A-1 Performs safety-related functions. A-1.01 Maintains safe work environment A-1.02 Uses personal protective equipment (PPE) and safety equipment</p> <p>A-2 Uses and maintains tools and equipment A-2.01 Maintains hand, power, measuring, testing and diagnostic tools A-2.02 Maintains shop equipment A-2.04 Uses welding and cutting equipment</p>		<p>12 hours</p> <p>12 hours</p>
<p>Brake Systems – Theory</p> <ul style="list-style-type: none"> describe hydraulic brake system operation describe air brake system operation describe various types of park brake systems <p>Brake Systems – Shop</p> <ul style="list-style-type: none"> evaluate hydraulic brake system operation evaluate air brake system operation evaluate various park brake systems conduct final adjustments and performance tests repair faults <p>NOA topics covered in this section of training:</p> <p>C-12 Services, diagnoses and repairs air systems C-12.01 Services air systems C-12.02 Diagnoses air systems C-12.03 Repairs air systems</p> <p>C-13 Services, diagnoses and repairs brake systems C-13.01 Services brake systems C-13.02 Diagnoses brake systems C-13.03 Repairs brake systems</p>		<p>24 hours</p> <p>36 hours</p>

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

NOA topics covered in this section of training:**D-14 Services, diagnoses and repairs batteries**

- D-14.01 Performs servicing and repair of batteries
- D-14.02 Diagnoses batteries

D-15 Services, diagnoses and repairs charging systems

- D-15.01 services charging systems
- D-15.02 Diagnoses charging systems
- D-15.03 Repairs charging systems

D-16 Services, diagnoses and repairs spark ignition systems

- D-16.01 Performs servicing and repair of spark ignition systems
- D-16.02 Diagnoses spark ignition systems

D-17 Services, diagnoses and repairs starting systems

- D-17.01 Performs servicing and repair of starting systems
 - D-17.02 Diagnoses starting systems
-

Environmental Control Systems – Theory**6 hours**

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

NOA topics covered in this section of training:**I-36 Services, diagnoses and repairs heating and ventilation systems**

- I-36.01 Services heating and ventilation systems
- I-36.02 Diagnoses heating and ventilation systems
- I-36.03 Repairs heating and ventilation systems

I-37 Services, diagnoses and repairs air conditioning systems

- I-37.01 Services air conditioning systems
 - I-37.02 diagnoses air conditioning systems
 - I-37.03 Repairs air conditioning systems
-

Hydraulics – Theory**24 hours**

- explain the fundamentals of a basic hydraulic system and related components
- interpret hydraulic symbol diagrams
- describe hydraulic system maintenance and testing procedures
- describe open and closed center hydraulic systems

Hydraulics – Shop**36 hours**

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

NOA topics covered in this section of training:

J-38 Services, diagnoses and repairs hydraulic components

- J-38.01 Services hydraulic components
- J-38.02 Diagnoses hydraulic components
- J-38.03 Repairs hydraulic components

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
- repair system faults

NOA topics covered in this section of training:

F-27 Services, diagnoses and repairs steering system

- F-27.01 Services steering systems
- F-27.02 Diagnoses steering systems
- F-27.03 Repairs steering systems

F-28 Services, diagnoses and repairs chassis/frames

- F-28.01 Services chassis/frames
- F-28.02 Diagnoses chassis/frames
- F-28.03 Repairs chassis/frames

F-29 Services, diagnoses and repairs suspension

- F-29.01 Services suspension
- F-29.02 Diagnoses suspension
- F-29.03 Repairs suspension

F-30 Services, diagnoses and repairs hitches and couplers

- F-30.01 Services hitches and couplers
- F-30.02 Diagnoses hitches and couplers
- F-30.03 Repairs hitches and couplers

F-31 Services, diagnoses and repairs tires, wheels and hubs

- F-31.01 Services tires, wheels and hubs
- F-31.02 Diagnoses tires, wheels and hubs
- F-31.03 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

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

NOA topics covered in this section of training:

A-2 Uses and maintains tools and equipment

A-2.03 Uses hoisting and lifting equipment

F-28 Services, diagnoses and repairs chassis/frames

F-28.01 Services chassis/frames

F-28.02 Diagnoses chassis/frames

F-28.03 Repairs chassis/frames

G-33 Services, diagnoses and repairs exterior cab components

G-33.01 Services exterior cab components

G-33.02 Diagnoses exterior cab components

G-33.03 Repairs exterior cab components

Level One topics from the NOA that are taught in-context:

Scheduled Maintenance

Operational Testing

Planning and Communication

For details regarding the In-Context Topics, see page 30

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

NOA topics covered in this section of training:

C-12 Services, diagnoses and repairs air systems

C-12.01 Services air systems

C-12.02 Diagnoses air systems

C-12.03 Repairs air systems

C-13 Services, diagnoses and repairs brake systems

C-13.01 Services brake systems

C-13.02 Diagnoses brake systems

C-13.03 Repairs brake systems

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

This section of training (Drivetrain Systems) exceeds NOA scope of work in Level Two and exceeds the minimum sequencing as set out in the Truck and Transport Mechanic NOA. Its purpose is mainly to assist in the understanding of the topic Steering and Directional Control Systems.

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

NOA topics covered in this section of training:

D-15 Services, diagnoses and repairs charging systems

D-15.01 services charging systems

D-15.02 Diagnoses charging systems

D-15.03 Repairs charging systems

D-17 Services, diagnoses and repairs starting systems

D-17.01 Performs servicing and repair of starting systems

D-17.02 Diagnoses starting systems

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

NOA topics covered in this section of training:

J-38 Services, diagnoses and repairs hydraulic components

J-38.01 Services hydraulic components

J-38.02 Diagnoses hydraulic components

J-38.03 Repairs hydraulic components

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

NOA topics covered in this section of training:

F-27 Services, diagnoses and repairs steering system

F-27.01 Services steering systems

F-27.02 Diagnoses steering systems

F-27.03 Repairs steering systems

F-28 Services, diagnoses and repairs chassis/frames

F-28.01 Services chassis/frames

F-28.02 Diagnoses chassis/frames

F-28.03 Repairs chassis/frames

F-29 Services, diagnoses and repairs suspension

F-29.01 Services suspension

F-29.02 Diagnoses suspension

F-29.03 Repairs suspension

F-30 Services, diagnoses and repairs hitches and couplers

F-30.01 Services hitches and couplers

F-30.02 Diagnoses hitches and couplers
F-30.03 Repairs hitches and couplers

F-31 Services, diagnoses and repairs tires, wheels and hubs

F-31.01 Services tires, wheels and hubs
F-31.02 Diagnoses tires, wheels and hubs
F-31.03 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 SGI safety inspection procedures for truck and trailers
- 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
- perform SGI safety inspection
- evaluate the engine and cab heating and auxiliary power generation units
- repair defects

NOA topics covered in this section of training:

F-30 Services, diagnoses and repairs hitches and couplers

F-30.01 Services hitches and couplers
F-30.02 Diagnoses hitches and couplers
F-30.03 Repairs hitches and couplers

G-32 Services, diagnoses and repairs interior cab components

G-32.01 Services interior cab components
G-32.02 Diagnoses interior cab components
G-32.03 Repairs interior cab components

H-34 Services, diagnoses and repairs trailer components and accessories

H-34.01 Services trailer components and accessories
H-34.02 Diagnoses trailer components and accessories
H-34.03 Repairs trailer components and accessories

H-35 Services, diagnoses and repairs heating and refrigeration systems

H-35.01 Services heating and refrigeration systems
H-35.02 Diagnoses heating and refrigeration systems
H-35.03 Repair heating and refrigeration 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

NOA topics covered in this section of training:

A- 2 Uses and maintains tools and equipment

A-2.04 Uses welding and cutting equipment

Level Two topics from the NOA that are taught in-context:

Scheduled Maintenance

Operational Testing

Planning and Communication

For details regarding the In-Context Topics, see page 30



Level Three	8 weeks	240 hours
Alternative Fuels – Theory		10 hours
<ul style="list-style-type: none"> describe the ignition process of a spark ignition engine describe the fuel delivery process for various fuel types 		
Alternative Fuels – Shop		20 hours
<ul style="list-style-type: none"> perform servicing, diagnoses and replacement of spark ignition components perform servicing, diagnosing and replacement of components related to fuel delivery 		
NOA topics covered in this section of training:		
B-8 Services, diagnoses and repairs fuel delivery system		
B-8.01 Services fuel delivery system		
B-8.02 Diagnoses fuel delivery system		
B-8.03 Repairs fuel delivery system		
Electrical – Theory		14 hours
<ul style="list-style-type: none"> explain common electrical components and their applications interpret wiring diagrams explain common electrical faults 		
Electrical – Shop		16 hours
<ul style="list-style-type: none"> construct electrical circuits measure electrical values analyze circuit operation 		
NOA topics covered in this section of training:		
D-18 Services, diagnoses and repairs electrical components and accessories		
D-18.01 Performs servicing and repair of electrical components and accessories		
D-18.02 Diagnoses electrical components and accessories		
Engine and Engine Support Systems – Theory		55 hours
<ul style="list-style-type: none"> 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. describe diesel engine failure diagnosis 		

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

NOA topics covered in this section of training:

B-4 Services, diagnoses and repairs base engine

- B-4.01 Services base engine
- B-4.02 Diagnoses base engine
- B-4.03 Repairs base engine

B-5 Services, diagnoses and repairs lubrication system

- B-5.01 Services lubrication system
- B-5.02 Diagnoses lubrication system
- B-5.03 Repairs lubrication system

B-6 Services, diagnoses and repairs intake and exhaust system

- B-6.01 Services intake and exhaust systems
- B-6.02 Diagnoses intake and exhaust systems
- B-6.03 Repairs intake and exhaust systems

B-7 Services, diagnoses and repairs engine management system

- B-7.01 Services engine management system
- B-7.02 Diagnoses engine management system
- B-7.03 Repairs engine management system

B-8 Services, diagnoses and repairs fuel delivery system

- B-8.01 Services fuel delivery system
- B-8.02 Diagnoses fuel delivery system
- B-8.03 Repairs fuel delivery system

B-9 Services, diagnoses and repairs emission systems for diesel engines

- B-9.01 Services emission systems for diesel engines
- B-9.02 Diagnoses emission systems for diesel engines
- B-9.03 Repairs emission systems for diesel engines

B-10 Services, diagnoses and repairs engine retarder systems

- B-10.01 Services and repairs engine retarder systems
- B-10.02 Diagnoses engine retarder systems

B-11 Services, diagnoses and repairs cooling system

- B-11.01 Services cooling system
- B-11.02 Diagnoses cooling system
- B-11.03 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

NOA topics covered in this section of training:

E-20 Services, diagnoses and repairs clutches

- E-20.01 Services clutches
- E-20.02 Diagnoses clutches
- E-20.03 Repairs clutches

E-21 Services, diagnoses and repairs manual transmissions and transfer cases

- E-21.01 Services manual transmissions and transfer cases
- E-21.02 Diagnoses manual transmissions and transfer cases
- E-21.03 Repairs manual transmissions and transfer cases

E-22 Services, diagnoses and repairs automatic transmissions

- E-22.01 Services automatic transmissions
- E-22.02 Diagnoses automatic transmissions
- E-22.03 Repairs automatic transmissions

E-24 Services, diagnoses and repairs driveline systems

- E-24.01 Services driveline systems
- E-24.02 Diagnoses driveline systems
- E-24.03 Repairs driveline systems

E-25 Services, diagnoses and repairs differentials

- E-25.01 Services differentials
- E-25.02 Diagnoses differentials
- E-25.03 Repairs differentials

E-26 Services, diagnoses and repairs drive train retarders

- E-26.01 Services drive train retarders
- E-26.02 Diagnoses drive train retarders
- E-26.03 Repairs drive train retarders

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

Scheduled Maintenance

Operational Testing

Planning and Communication

For details regarding the In-Context Topics, see page 30

Level Four

8 weeks

240 hours

Drivetrains – Theory

12 hours

- describe the operation of a hybrid drive system
- describe the operating principles of an automated manual transmission
- describe electronic controls related to automated shift technology

Drivetrains – Shop

18 hours

- evaluate hybrid drive systems
- evaluate automated manual transmissions
- diagnose electronic faults

NOA topics covered in this section of training:

E-23 Services, diagnoses and repairs automated transmissions

E-23.01 Services automated transmissions

E-23.02 Diagnoses automated transmissions

E-23.03 Repairs automated transmissions

Electrical – Theory

40 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
- explain the operation of cranking system and related components
- explain the operation of alternating current (AC) charging systems and related components
- explain common electrical and electronic components and their applications
- interpret wiring diagrams
- describe operation of electrical accessories and engine control circuits
- describe basic computer components using correct terminology
- explain operation of various electronic control systems and related components

Electrical – Shop

50 hours

- diagnose electrical faults
- evaluate a lead acid battery
- evaluate an alternating current (AC) charging system and related components
- evaluate a cranking system and related components
- utilize wiring diagrams for fault diagnosis
- troubleshoot the accessory systems and engine control circuits
- operate various electronic control systems to check for proper function
- utilize diagnostic equipment
- repair defects

NOA topics covered in this section of training:

D-18 Services, diagnoses and repairs electrical components and accessories

D-18.01 Performs servicing and repair of electrical components and accessories

D-18.02 Diagnoses electrical components and accessories

D-19 Services, diagnoses and repairs vehicle management systems and electronic components

D-19.01 Services vehicle management systems and electronic components

D-19.02 Diagnoses vehicle management systems and electronic components

D-19.03 Repairs vehicle management systems and electronic components

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

NOA topics covered in this section of training:

I-36 Services, diagnoses and repairs heating and ventilation systems

I-36.01 Services heating and ventilation systems

I-36.02 Diagnoses heating and ventilation systems

I-36.03 Repairs heating and ventilation systems

I-37 Services, diagnoses and repairs air conditioning systems

I-37.01 Services air conditioning systems

I-37.02 diagnoses air conditioning systems

I-37.03 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

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

NOA topics covered in this section of training:

D8 Services, diagnoses and repairs fuel delivery system

B-8.01 Services fuel delivery system

B-8.02 Diagnoses fuel delivery system

B-8.03 Repairs fuel delivery system

B-9 Services, diagnoses and repairs emission systems for diesel engines

B-9.01 Services emission systems for diesel engines

B-9.02 Diagnoses emission systems for diesel engines

B-9.03 Repairs emission systems for diesel engines

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

Scheduled Maintenance
Operational Testing
Planning and Communication
Electrical

For details regarding the In-Context Topics, see page 30



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.

Scheduled Maintenance

A-3 Performs routine trade activities

- A-3.01 Uses documentation and reference materials
- A-3.02 Maintains fluids, lubricants and coolants
- A-3.03 Services hoses, tubing and fittings
- A-3.04 Services filters
- A-3.05 Services bearings, bushings and seals
- A-3.06 Uses fasteners, sealing devices, adhesives and gaskets

Operational Testing

In-context with learning. No specific Sub-tasks with direct relation to or listed for *Operational Testing* in the harmonized curriculum.

Planning and Communication

In-context with learning. No specific Sub-tasks with direct relation to or listed for *Planning and Communication* in the harmonized curriculum.

Electrical

D-18 Services, diagnoses and repairs electrical components and accessories

- D-18.01 Performs servicing and repair of electrical components and accessories
- D-18.02 Diagnoses electrical components and accessories

D-19 Services, diagnoses and repairs vehicle management systems and electronic components

- D-19.01 Services vehicle management systems and electronic components
- D-19.02 Diagnoses vehicle management systems and electronic components
- D-19.03 Repairs vehicle management systems and electronic components