



8675

CHASSIS, FRAME, AND  
UNDERCARRIAGE SYSTEMS  
(11B)

30S/30E/30M

A Heavy Duty Equipment Technician Course



# 8675: CHASSIS, FRAME, AND UNDERCARRIAGE SYSTEMS (11B) 30S/30E/30M

## Course Description

A student wanting to develop skills in the heavy duty equipment industry must have knowledge of the basic principles of the vehicle chassis, frame, and undercarriage systems. The student will be able to describe, diagnose, and repair problems with vehicle chassis, frame, and undercarriage systems, and with steering alignment.

Cross-curricular learning outcomes, or essential skills from subject areas including, but not limited to, information and communication technologies, science, English language arts, and mathematics, are to be integrated into the authentic learning activities of the course.

The curriculum is not sequential. For instructional purposes, the sequence of learning outcomes can vary based on the learning activities within the course.

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**Goal 1:** Describe and apply appropriate **safety** practices for heavy duty equipment technicians.

**GLO 1.1:** Describe and apply appropriate **safety** practices for heavy duty equipment technicians.

- SLO 11B.1.1.1 Describe and apply appropriate health and safety practices as they pertain to working with chassis, frame, and undercarriage systems.
- SLO 11B.1.1.2 Create and maintain a safe working environment as it applies to chassis, frame, and undercarriage systems.
- SLO 11B.1.1.3 Describe safety practices, Workplace Hazardous Material Information System (WHMIS), and preventative maintenance. (A1.01)
- SLO 11B.1.1.4 Describe cab, canopy, and ROP/FLOP components, and their operation, inspection, repair, and replacement procedures. (A1.02)
- SLO 11B.1.1.5 Describe the servicing of fire suppression systems. (A1.03)
- SLO 11B.1.1.6 Describe forklift operation and safety. (A1.04)
- SLO 11B.1.1.7 Describe restraint systems and their components, and inspection procedures, manufacturers' tests, and repair/replacement of them. (A1.05)
- SLO 11B.1.1.8 Demonstrate safety procedures for hydraulic hydrostatic system servicing.

SLO 11B.1.1.9	Demonstrate safety procedures for HVAC system servicing.
SLO 11B.1.1.10	Describe the importance of using personal protective equipment (PPE). (TSA 16)
SLO 11B.1.1.11	Describe safety procedures when handling wheels, tires, and hubs. (F1.04)
SLO 11B.1.1.12	Maintain a safe and organized work environment.
SLO 11B.1.1.13	Document an understanding of the safe use of heavy duty tools and equipment.
SLO 11B.1.1.14	Describe and apply the appropriate health and safety practices as they pertain to transmission systems, drivelines, transfer cases, and power takeoffs.

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**GLO 1.2:** Demonstrate knowledge of the *Trade Safety Awareness Manual*.

No applicable SLOs.

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**Goal 2:** Identify, select, use, and maintain **tools, equipment, materials, and consumables**.

**GLO 2.1:** Identify, select, use, and maintain **tools, equipment, materials, and consumables**.

SLO 11B.2.1.1	Identify, select, use, and maintain tools, equipment, materials, and consumables used in the maintenance and repair of chassis, frame, and undercarriage systems.
SLO 11B.2.1.2	Describe and use basic hand tools, basic shop tools, and fasteners. (D1.01)
SLO 11B.2.1.3	Select and use diagnostic tools, such as infrared temp guns, calipers, and ultrasonic cleaners.

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**Goal 3:** Describe and demonstrate equipment **access/transport** procedures.

**GLO 3.1:** Describe and demonstrate equipment **access/transport** procedures.

SLO 11B.3.1.1	Describe lifting equipment. (A2.01)
SLO 11B.3.1.2	Describe safety practices that apply to lifting and to the maintenance of lifting equipment. (A2.02)
SLO 11B.3.1.3	Describe towing, transporting, and coasting precautions. (A2.03)
SLO 11B.3.1.4	Describe manual lifting procedures using correct body mechanics. (A2.04)

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- SLO 11B.3.1.5 Describe lifting equipment construction, grading, sizing, and limits. (A2.05)
  - SLO 11B.3.1.6 Select the correct equipment for rigging typical loads. (A2.06)
  - SLO 11B.3.1.7 Describe wire rope applications. (A2.07)
  - SLO 11B.3.1.8 Describe winch design, and operational and troubleshooting procedures. (A2.08)
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**Goal 4: Diagnose and repair** problems with heavy duty equipment systems.

**GLO 4.1: Diagnose** problems with heavy duty equipment systems.

- SLO 11B.4.1.1 Diagnose issues related to chassis, frame, and undercarriage systems.
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**GLO 4.2: Describe and repair** problems with heavy duty equipment.

- SLO 11B.4.2.1 Describe chassis, frame, and undercarriage systems.
  - SLO 11B.4.2.2 Repair chassis, frame, and undercarriage systems.
  - SLO 11B.4.2.3 Describe and install sealing devices, and perform seal service. (D1.02)
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**GLO 4.3: Perform maintenance** on heavy duty equipment systems.

- SLO 11B.4.3.1 Perform maintenance on chassis, frame, and undercarriage systems.
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**Goal 5: Describe and demonstrate the transferable cross-curricular** knowledge and skills pertaining to heavy duty equipment technology.

**GLO 5.1: Read, interpret, and communicate** information relevant to heavy duty equipment technology.

- SLO 11B.5.1.1 Acquire and interpret service-related information. (B1.02)
  - SLO 11B.5.1.2 Read, interpret, and communicate information found on components and equipment.
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**GLO 5.2: Apply** knowledge and skills from **mathematics**.

- SLO 11B.5.2.1 Demonstrate the mathematics skills required for working with chassis, frame, and undercarriage systems.
  - SLO 11B.5.2.2 Demonstrate proficiency in the use of fractions, decimals, ratios, and percentages.
  - SLO 11B.5.2.3 Convert between imperial and metric measurements.
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**GLO 5.3:** Apply knowledge and skills from **the sciences**.

No applicable SLOs.

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**GLO 5.4:** Apply knowledge and skills from **information and communication technology**.

- SLO 11B.5.4.1 Demonstrate the use of service information retrieval systems unique to the service and repair industry (e.g., Mitchell ProDemand, All Data, iATN).
  - SLO 11B.5.4.2 Demonstrate an awareness of shop management software (e.g., electronic work order software).
  - SLO 11B.5.4.3 Describe basic Internet components and operations, and use Internet functions. (B1.01)
  - SLO 11B.5.4.4 Demonstrate an understanding of the use of electronic diagnostic tools.
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**Goal 6:** Demonstrate an awareness of **sustainability** as it pertains to heavy duty equipment technology.

**GLO 6.1:** Describe the heavy duty equipment industry's **sustainability practices** and its impact on the environment.

- SLO 11B.6.1.1 Discuss the use of second-hand or rebuilt parts versus new parts.
  - SLO 11B.6.1.2 Discuss rebuilding components versus replacing with new components.
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**GLO 6.2:** Describe the impact of the heavy duty equipment industry on **human health and well-being**.

- SLO 11B.6.2.1 Discuss the long-term health hazards related to the servicing and maintenance of chassis, frame, and undercarriage systems.
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**GLO 6.3:** Describe **sustainable business practices** within the heavy duty equipment service and repair industry.

No applicable SLOs.

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**Goal 7:** Demonstrate an awareness of the **ethical and legal standards** as they pertain to the heavy duty equipment service and repair industry.

**GLO 7.1:** Demonstrate an awareness of the **ethical and legal expectations** of heavy duty equipment technicians.

- SLO 11B.7.1.1 Demonstrate an awareness of liability concerns related to heavy duty equipment systems and service.
- SLO 11B.7.1.2 Demonstrate an awareness of legislation related to heavy duty equipment systems and service.

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**Goal 8:** Demonstrate **employability skills** related to the heavy duty equipment service and repair industry.

**GLO 8.1:** Demonstrate fundamental **employability skills**.

- SLO 11B.8.1.1 Demonstrate problem-solving skills.
- SLO 11B.8.1.2 Demonstrate critical thinking skills.
- SLO 11B.8.1.3 Demonstrate regular attendance and punctuality.
- SLO 11B.8.1.4 Demonstrate accountability by taking responsibility for own actions.
- SLO 11B.8.1.5 Demonstrate adaptability, initiative, and effort.
- SLO 11B.8.1.6 Demonstrate the ability to accept and follow direction and feedback.
- SLO 11B.8.1.7 Demonstrate teamwork skills.
- SLO 11B.8.1.8 Demonstrate the ability to stay on task and to make effective use of time in class and shop environments.
- SLO 11B.8.1.9 Demonstrate the ability to communicate respectfully and effectively with coworkers and customers.

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**GLO 8.2:** Demonstrate an understanding of the **business operation** of a heavy duty equipment service and repair facility.

- SLO 11B.8.2.1 Discuss the importance of documentation and service reporting.
  - SLO 11B.8.2.2 Discuss the effects of technicians' errors on the financial viability of a service and repair facility.
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**Goal 9:** Understand **career opportunities** in heavy duty equipment technology and associated professions.

**GLO 9.1:** Demonstrate an understanding of **career opportunities** in heavy duty equipment technology and associated professions.

SLO 11B.9.1.1 Describe career and employment opportunities related to heavy duty equipment technology.

SLO 11B.9.1.2 Demonstrate an awareness of specialized occupations in the heavy duty equipment service and repair industry.

SLO 11B.9.1.3 Demonstrate an awareness of career paths related to the heavy duty equipment service and repair industry.

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**Goal 10:** Demonstrate an awareness of the **evolution** of heavy duty equipment technology, including its **technological progression and emerging trends**.

**GLO 10.1:** Describe the **evolution** of heavy duty equipment service and repair, including its **technological progression and emerging trends**.

SLO 11B.10.1.1 Identify changes to vehicle design and their effect on safety, fuel economy, emissions, and equipment performance.

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