COURSE OUTLINE: TCT715 - VEH MANAGEMENT ELEC

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Approved: Corey Meunier, Chair, Technology and Skilled Trades

Course Code: Title	TCT715: VEHICLE MNGT ELECTRONICS/EMISSIONS SYST
Program Number: Name	6081: T/C TECHN LEVEL II
Department:	MOTIVE POWER APPRENTICESHIP
Academic Year:	2022-2023
Course Description:	Upon successful completion the apprentice is able to use generic and proprietary ESTs and PCs to read, troubleshoot and reprogram vehicle electronic systems, is able to understand the basics of a vehicle computer control system and how it functions to process information and produce outcomes, and is able to understand the principles of operation, diagnose and repair electronic input circuit components.
Total Credits:	2
Hours/Week:	2
Total Hours:	16
Prerequisites:	There are no pre-requisites for this course.
Corequisites:	There are no co-requisites for this course.
Essential Employability Skills (EES) addressed in this course:	EES 2 Respond to written, spoken, or visual messages in a manner that ensures effective communication. EES 3 Execute mathematical operations accurately. EES 4 Apply a systematic approach to solve problems. EES 5 Use a variety of thinking skills to anticipate and solve problems. EES 6 Locate, select, organize, and document information using appropriate technology and information systems. EES 7 Analyze, evaluate, and apply relevant information from a variety of sources. EES 10 Manage the use of time and other resources to complete projects.
General Education Themes:	Science and Technology
Course Evaluation:	Passing Grade: 50%, D A minimum program GPA of 2.0 or higher where program specific standards exist is required for graduation.
Other Course Evaluation & Assessment Requirements:	Theory testing 70% Practical application testing 30% Grade Definition Grade Point Equivalent A+ 90 - 100% 4.00 A 80 - 89%

	B 70 - 79% 3.00 C 60 - 69% 2.00 D 50 - 59% 1.00 F (Fail)49% and below 0.00 CR (Credit) Credit for diploma requirements has been awarded. S Satisfactory achievement in field /clinical placement or non-graded subject area. U Unsatisfactory achievement in field/clinical placement or non-graded subject area. X A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a course. NR Grade not reported to Registrar`s office. W Student has withdrawn from the course without academic penalty.
Books and Required Resources:	Medium/heavy duty truck engines,fuels and computerized management systems by Sean Bennett Publisher: Cengage Edition: 6th
Course Outcomes and Learning Objectives:	

Course Outcome 1	Learning Objectives for Course Outcome 1
Upon successful completion, the apprentice is able to use generic and proprietary ESTs and PCs to read, troubleshoot and reprogram vehicle electronic systems.	Upon successful completion, the apprentice is able to: 5.1.1 Explain the purpose and fundamentals of electronic service tools (ESTs). [1/0] - digital multimeters (DMMs) - generic ESTs - proprietary ESTs - personal computers (PCs) - online service information systems - diagnostic software - breakout Ts & boxes - labscopes 5.1.2 Identify the functions, construction and application of ESTs and manufacturer software. [1/0] - digital multimeters (DMMs) - generic reader / programmers - proprietary reader / programmers - personal computers (PCs) - breakout Ts & boxes - scope meter 5.1.3 Describe the principle(s) of operation of ESTs [1/0] - digital multimeters - accuracy - resolution - display interpretation - voltage, amperage, continuity and resistance measurements - scope meter - generic reader / programmers - software cartridges - upgrading PROM

- proprietary reader / programmers
- upgrading software
- personal computers
- communications adapters
- SAE communications protocols
- data retention media
- connections

5.1.4 Perform readout, diagnostic and networking tasks using ESTs and shop PC units
including:
[0/2]
- select and use ESTs to troubleshoot live and simulated circuit conditions
- internet familiarization
- saving data
- identify hard and soft EST malfunctions
- distinguish between electrical and software performance problems on
malfunctioning ESTs
- outline procedures for updating ESTs

Course Outcome 2	Learning Objectives for Course Outcome 2
Upon successful completion, the apprentice is able to understand the basics of a vehicle computer control system and how it functions to process information and produce outcomes	Upon successful completion, the apprentice is able to: 5.2.1 Explain the purpose and fundamentals of onboard computers, input devices and output actuators. [1/0] - analog / digital computers - binary systems - digital computers - logic gates - data links - networking - fiber optics 5.2.2 Identify the functions, construction and application of vehicle computers. [1/0] - input sensors - central processing unit (CPU) - main memory (RAM) - non-volatile data retention - ROM - PROM - EEPROM - output actuators 5.2.3 Describe the principle(s) of operation of vehicle computers. [2/0] - analog to digital converters - signal filtration

		- Central Processing Unit (CPU) - processing cycle - baud rate (Clock speed) - logic sequencing - main memory (RAM) - non-volatile data retention - ROM - PROM - EEPROM - ECM intergral outputs
	Course Outcome 3	**Learning Objectives for Course Outcome 3**
	Upon successful completion, the apprentice is able to understand the principles of operation diagnose and repair electronic input circuit components.	Upon successful completion, the apprentice is able to: 5.3.1 Explain the purpose and fundamentals of electronic input circuit components. [1/0] - electronics - computer basics - electronic schematic interpretation 5.3.2 Identify the function, construction and application of electronic input circuit components. [1/0] - reference voltage - thermistor - potentiometers - variable capacitance sensors - pulse wheel generators - rotary hall-effect sensors - linear hall-effect sensors - electromechanical switches - smart (ladder) switches - semiconductors - optical sensors - gasoline exhaust gas sensors - piezoelectric - piezioresistive - wheatstone bridges - pressure differential (Delta) sensors 5.3.2 Describe the principle(s) of operation of electronic input circuit components. [3/0] - reference voltage - thermistor - potentiometers - variable capacitance sensors - pulse wheel generators - hall-effect sensors - optical sensors - gasoline exhaust gas sensors - switches - piezoelectric

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	- piezoresistive - wheatstone bridges 5.3.4 Perform inspection, testing and diagnostic procedures on electronic input circuit components. [0/1] - test functional and malfunctioning input circuit components - diagnose performance conditions produced malfunctioning input circuit components 5.3.5 Recommend reconditioning or repairs following manufacturers` procedures on electronic input circuit components. [0/1] - outline procedure for replacing defective input circuit components - performance test replaced input circuit components

Evaluation Process and Grading System:

Evaluation Type	Evaluation Weight
practical application testing	30%
theory testing	70%

Date: August 15, 2022

Addendum: Please refer to the course outline addendum on the Learning Management System for further information.