



# COURSE OUTLINE

## TCT715



Prepared: Sylvain Belanger    Approved:

<b>Course Code: Title</b>	TCT715: VEHICLE MNGT ELECTRONICS/EMISSIONS SYST
<b>Program Number: Name</b>	6081: T/C TECHN LEVEL II
<b>Department:</b>	MOTIVE POWER APPRENTICESHIP
<b>Semester/Term:</b>	18S
<b>Course Description:</b>	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.
<b>Total Credits:</b>	2
<b>Hours/Week:</b>	2
<b>Total Hours:</b>	16
<b>Essential Employability Skills (EES):</b>	#2. Respond to written, spoken, or visual messages in a manner that ensures effective communication. #3. Execute mathematical operations accurately. #4. Apply a systematic approach to solve problems. #5. Use a variety of thinking skills to anticipate and solve problems. #6. Locate, select, organize, and document information using appropriate technology and information systems. #7. Analyze, evaluate, and apply relevant information from a variety of sources. #10. Manage the use of time and other resources to complete projects.
<b>General Education Themes:</b>	Science and Technology
<b>Course Evaluation:</b>	Passing Grade: 50%, D
<b>Other Course Evaluation &amp; Assessment Requirements:</b>	Theory testing 70% Practical application testing 30%  Grade Definition Grade Point Equivalent A+ 90 - 100% 4.00 A 80 - 89%

	<p>B 70 - 79% 3.00  C 60 - 69% 2.00  D 50 - 59% 1.00  F (Fail)49% and below 0.00</p> <p>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  W Student has withdrawn from the course without academic penalty.</p>						
<b>Evaluation Process and Grading System:</b>	<table> <tr> <th>Evaluation Type</th><th>Evaluation Weight</th></tr> <tr> <td>practical application testing</td><td>30%</td></tr> <tr> <td>theory testing</td><td>70%</td></tr> </table>	Evaluation Type	Evaluation Weight	practical application testing	30%	theory testing	70%
Evaluation Type	Evaluation Weight						
practical application testing	30%						
theory testing	70%						
<b>Books and Required Resources:</b>	<p>Medium/heavy duty truck engines,fuels and computerized management systems by Sean Bennett  Publisher: Cengage Edition: 5</p>						
<b>Course Outcomes and Learning Objectives:</b>	<p><b>Course Outcome 1.</b></p> <p>Upon successful completion, the apprentice is able to use generic and proprietary ESTs and PCs to read, troubleshoot and reprogram vehicle electronic systems.</p> <p><b>Learning Objectives 1.</b></p> <p>Upon successful completion, the apprentice is able to:</p> <p>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 &amp; boxes  - labsscopes</p> <p>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 &amp; boxes  - scope meter</p> <p>5.1.3 Describe the principle(s) of operation of ESTs  [1/0]  - digital multimeters  - accuracy  - resolution  - display interpretation</p>						

- 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.

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

## Learning Objectives 2.

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.**

Upon successful completion, the apprentice is able to understand the principles of operation diagnose and repair electronic input circuit components.

### **Learning Objectives 3.**

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
- piezoresistive
- 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
- 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 manufacturersâ€™™ procedures on electronic input circuit components.

[0/1]

- outline procedure for replacing defective input circuit components
- performance test replaced input circuit components

**Date:**

Tuesday, April 24, 2018

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