

## COURSE SYLLABUS

**Course Title:** AUMT 2334-271 Engine Performance Analysis II  
**Semester/Year:** Spring 2021  
**Instructor:** Mr. Marc Wischkaemper  
**Office/Location:** Advanced Technology Center 3907 Ave. Q. Lubbock, TX. 79411 RM 136C  
**Phone/E-mail:** 806-716-4902 mwischkaemper@southplainscollege.edu  
**Office Hours:** Check posted hours after classes begin or by appointment.

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### *SOUTH PLAINS COLLEGE IMPROVES EACH STUDENTS LIFE*

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#### **SPC Face Covering Statement**

It is the policy of South Plains College for the Spring 2021 semester that as a condition of on-campus enrollment, all students are required to engage in safe behaviors to avoid the spread of COVID-19 in the SPC community. Such behaviors specifically include the requirement that all students properly wear CDC-compliant face coverings while in SPC buildings including in classrooms, labs, hallways, and restrooms. Failure to comply with this policy may result in dismissal from the current class session. If the student refuses to leave the classroom or lab after being dismissed, the student may be referred to the Dean of Students on the Levelland campus or the Dean/Director of external centers for Student Code of Conduct Violation. Students who believe they have been exposed or may be COVID-19 positive, must contact Health Services, DeEtte Edens, BSN, RN at (806) 716-2376 or dedens@southplainscollege.edu.

#### **I. GENERAL COURSE INFORMATION**

- A. Course Description: (4:2:8)** – Prerequisite: AUMT 2417 or consent of instructor. This course is a study in the diagnosis and repair of emission systems, computerized engine performance systems, and advanced ignition and fuel systems, as well as proper use of advanced engine performance diagnostic equipment. This course may be taught manufacturer specific.
- B. Course Goals/Objectives:** Utilizing appropriate safety procedures, the student will explain the operation, diagnosis, and repair of emission control systems; describe the operation, diagnosis, and repair of computerized engine performance systems and advanced ignition and fuel systems; and demonstrate proper use of advanced engine performance diagnostic equipment.
- C. Course Competencies:** A = 100-90 B = 89-80 C = 79-70 F = 69 or below  
A grade of a C or higher is required in AUMT 2434 to successfully complete this course.
- D. Academic Integrity.** It is the aim of the faculty of South Plains College to foster a spirit of complete honesty and a high standard of integrity. The attempt of any student to present as his own, any work which he has not honestly performed, is regarded by the faculty and administration as a most serious offense and renders the offender liable to serious consequences, possibly suspension. For further information concerning Cheating and Plagiarism, read the section on Academic Integrity in the SPC General Catalog. **If you have a question as to whether you may work with other students on any assignment, ASK YOUR INSTRUCTOR. On some assignments working with others is encouraged.**
- E. SCANS and Foundation Skills.** Specific SCANS competencies and foundation skills applicable to this course are listed adjacent to each objective in the course objective table. They include: Foundation Skills (F): 2, 3, 4, 6, 8, 9, 10,12.

Competencies (C): 5, 7, 8, 15, 16, 17, 18, 19, 20. A complete list of SCANS competencies and foundation skills is attached at the end of this syllabus.

- F. Verification of Workplace Competencies-Technical Education Division.** The learning outcomes of this course will prepare the student to meet the competencies measured in a comprehensive elective course experience (Course #s AUMT 1366, AUMT 2366). In addition, the student will also be prepared to take the ASE Student Certification test for Engine Performance.

## II SPECIFIC COURSE/INSTRUCTOR REQUIREMENTS

### A. Textbook & Other Required Materials:

1. VanGelder Kirk, Fundamentals of Automotive Technology, Principles and Practicice Second Edition, Jones & Bartlett Learning Publishers, Copyright 2018(with on-line curriculum)
2. Pen or pencil, and notebook for note taking and assignments
3. Safety Glasses, and Hearing Protection sufficient for course length.

**B. Class Attendance Policy.** Students are expected to attend all classes in order to be successful in a course. When absences become excessive, and you have a failing grade average at the time of the excessive absence, you may be administratively dropped from the course and any concurrent courses, **without notice. Any combination of absences or tardies that equals 4 or more is considered excessive. Other than COVID-19 issues, there are no excused absences. Excessive absences cause you to miss key points of a class and show you are not reliable/dependable for employment. Two (2) tardies will count as one absence. Leaving class without instructor approval is considered an absence, regardless of the time you leave.**

When an unavoidable reason for class absence arises, such as illness, an official trip authorized by the college or an official activity, the instructor may permit the student to make up work missed. It is the student's responsibility to complete work missed within a reasonable period of time as determined by the instructor. Students are officially enrolled in all courses for which they pay tuition and fees at the time of registration. Should a student, for any reason, delay in reporting to a class after official enrollment, absences will be attributed to the student from the first-class meeting.

Students who enroll in a course but have "Never Attended" by the official census date, as reported by the faculty member, will be administratively dropped by the Office of Admissions and Records. A student who does not meet the attendance requirements of a class as stated in the course syllabus and does not officially withdraw from that course by the official census date of the semester, may be administratively withdrawn from that course and receive a grade of "X" or "F" as determined by the instructor.

It is the student's responsibility to verify administrative drops for excessive absences through My SPC using his or her student online account. If it is determined that a student is awarded financial aid for a class or classes in which the student never attended or participated, the financial aid award will be adjusted in accordance with the classes in which the student did attend/participate and the student will owe any balance resulting from the adjustment.

**B. Assignment Policy:** All assignments are due at the beginning of class on the due date unless otherwise stated by your instructor. **Part of these assignments will be on-line through the on-line curriculum, you should log on to the on-line curriculum at the beginning of the semester to complete them on time. There may be no makeup assignments and no late**

**assignments will be accepted.** The dates printed in this syllabus can change. Every effort will be made to inform students of those changes, but the students are ultimately responsible for all assignments regardless of any changed dates. Please check the dates with your instructor throughout the course.

- C. **D. Grading Policy/ Procedure and/or Methods of Evaluation:** All exams are mandatory for effective student evaluation. Exams will cover theory and practical skills pertaining to all aspects of material presented. Adequate study time should be set aside for exam reviews. **There may be no makeup exams. All fees owed to South Plains College, including projects, are required to be paid in full before you take your final exam.** The ASE Student Certification test mentioned above can be used in place of your final exam.

You will be evaluated during this course by the following method:

Unit exams, written assignments, pop quizzes, and attendance = 25%

Lab sheets, Unit skills tests = 50% (approximately 4 skills tests)

Final Exam: = 25%

A unit skills test is a measure of how well you follow instructions, your safety in the shop, your use of tools, your cleanliness in the work area and your attention to detail while you perform diagnostics or repairs within a required time period. **If you're late for a skills test the following will happen; 0 to 5 minutes late = -10pts; more than 5 min. but less than 10 min. late = -20pts; more than 10 min. but less than 15 min. late = -30pts. If you are more than 15 minutes late you will have earned a "0" for the test.**

A task sheet is used to plan and track students while they perform required skills in the shop. This is not used to average your grade, but it is a professional evaluation of how well you work independently and your level of expertise in completing assigned tasks. Prospective employers will want to see this during an interview, so please follow the shop and repair procedures to the best of your ability.

- D. **Special Requirements: A student's conduct is expected to follow the guidelines stated in the college catalogue and student handbook, any deviation will result in immediate disciplinary action.** Please turn off all cell phones, pagers, etc. during class. A detailed list of lab/shop guidelines will be distributed to you at the beginning of this class; you are expected to follow all guidelines when in the shop. **No smoking is permitted in the building or outside the back doors of the shop and food and drinks are not allowed in any classroom, lab, or shop.** All these activities will be limited to break time in designated areas only. Breaks will be limited to 20 minutes. Do not park on the back lot unless preauthorized by your instructor, unauthorized vehicles can be towed at the owner's expense.

**Dress Code:** The Automotive Program requires you to dress appropriately. Flip flops or opened toed shoes are not allowed in the shop, proper foot attire should be worn to protect your feet, leather work boots are recommended. Jeans/ pants will be worn so that neither one falls to your thighs or knees, belts must hold them at your waistline. Safety glasses will be worn at all times in the shop. If a student fails to comply with the above dress code, he or she will be sent home and given an absence for that day.

# **LUBBOCK CAMPUS GUIDELINES**

## **CHILDREN ON CAMPUS**

Many of the students attending classes at South Plains College - Lubbock Camps are also parents who value the opportunity to participate in higher education. Sometimes students are faced with the decision of whether to remain at home with their children, bring children with them to class, or be absent from class. The following guidelines address concerns for the safety of children on campus and provide for an environment conducive to learning.

### **CHILDREN IN THE CLASSROOM**

**Students are not allowed to bring children to class** and will be asked to leave in the interest of providing an environment conducive for **all** students enrolled in the class. Students are responsible for adherence to the attendance requirements set forth by the instructor in the course syllabus.

### **UNATTENDED CHILDREN ON CAMPUS**

**Children may not be left unattended.** In order to provide for the safety of children on campus, parents or other guardians are responsible for supervising children while utilizing services or conducting business on campus.

### **DISRUPTIVE CHILDREN**

**Disruptive children will not be allowed to interfere with college business.** Parents or other guardians are responsible for supervising and controlling the behavior of children they have brought on campus.

### **Diversity Statement**

In this class, the teacher will establish and support an environment that values and nurtures individual and group differences and encourages engagement and interaction. Understanding and respecting multiple experiences and perspectives will serve to challenge and stimulate all of us to learn about others, about the larger world and about ourselves. By promoting diversity and intellectual exchange, we will not only mirror society as it is, but also model society as it should and can be.

### **ADA Statement**

Students with disabilities, including but not limited to physical, psychiatric, or learning disabilities, who wish to request accommodations in this class should notify the Disability Services Office early in the semester so that the appropriate arrangements may be made. In accordance with federal law, a student requesting accommodations must provide acceptable documentation of his/her disability to the Disability Services Office. For more information, call or visit the Disability Services Office at Levelland Student Health & Wellness Center 806-716-2577, Reese Center (also covers ATC) Building 8: 806-716-4675, Plainview Center Main Office: 806-716-4302 or 806-296-9611, or the Health and Wellness main number at 806-716-2529.

## **GENERAL SAFETY ON CAMPUS**

South Plains College recognizes the importance of safety on campus. The protection of persons and property is a responsibility, which we all share. Personal safety begins with the individual. The following guidelines are intended to assist you in protecting yourself and to encourage practices that contribute to a safe environment for our campus community.

- Never leave your personal property unsecured or unattended.
- Look around and be aware of your surroundings when you enter and exit a building.
- Whenever possible, avoid walking alone, particularly after dark. Walk to your vehicle with other class members or request that the Security Guard walk you to your car.
- When approaching your vehicle, keep your keys in your hand; look under your car and in the back seat and floorboard. Lock the doors as soon as you are inside your car.

## **FOOD AND DRINK IN CLASSROOMS**

It is the policy of South Plains College not to permit food or drink in the classrooms or laboratories.

**In case of emergency, contact the following numbers, but DO NOT leave a voice mail message.**  
**806-241-1516 – Lubbock Center**  
**806-716-2923 – Reese Center**

**CONTENT OUTLINE**

Foundation Skills

COURSE OBJECTIVES

Competencies

Foundation Skills	COURSE OBJECTIVES	Competencies
	<b>Unit I: Review of OBDII System Control Diagnosis</b> Upon completion of this unit, the student will be able to:	
F6, 8,9,10,12	<ul style="list-style-type: none"><li>• Discuss computerized system operations</li></ul>	C5, 15,16
F6,10	<ul style="list-style-type: none"><li>• Discuss various types of computer memory</li></ul>	C5,15
F6,8,9,10,12	<ul style="list-style-type: none"><li>• Explain how microprocessors function</li></ul>	C5,15
F6,10	<ul style="list-style-type: none"><li>• Discuss the operation and makeup of input sensors</li></ul>	C5,15
F6,10	<ul style="list-style-type: none"><li>• Discuss the operation and makeup of output actuators</li></ul>	C5,15
F6,8,9,10,12	<ul style="list-style-type: none"><li>• Retrieve and record stored diagnostic trouble codes (DTC's)</li></ul>	C5,15
F6,10	<ul style="list-style-type: none"><li>• Inspect, test, and diagnose input sensors</li></ul>	C5,15
F6,10	<ul style="list-style-type: none"><li>• Inspect, test, and diagnose output actuators</li></ul>	C5,15
F6,8,9,10,12	<ul style="list-style-type: none"><li>• Diagnose the causes of emissions or drivability problems resulting from the failure of computerized engine controls with stored diagnostic trouble codes</li></ul>	C5, 15
F6, 8,9,10,12	<ul style="list-style-type: none"><li>• Diagnose emission or drivability problems resulting from the failure of computerized engine controls with no diagnostic trouble codes stored</li></ul>	C5,15
F6,8,9,10, 12	<ul style="list-style-type: none"><li>• Discuss what Freeze Frame Data is and how to use this for diagnostics</li></ul>	C5, 15
F6,8,9,10,12	<ul style="list-style-type: none"><li>• Discuss and be able to perform a Drive Cycle, both completely and partially for diagnostic purposes</li></ul>	C5,15

Foundation Skills

COURSE OBJECTIVES

Competencies

Foundation Skills	COURSE OBJECTIVES	Competencies
	<b>Unit II: CAN and Hybrid System Diagnosis and Repair.</b> Upon completion of this unit, you will be able to:	
F6,11,12	<ul style="list-style-type: none"><li>• Discuss and compare OBDII and CAN systems</li></ul>	C5,7,8,15,17
F6,8,9,10,12	<ul style="list-style-type: none"><li>• Inspect, test, adjust, and replace CAN control system sensors, control modules, actuators and circuits</li></ul>	C5, 15
F6,8,9,10,12	<ul style="list-style-type: none"><li>• Retrieve and record stored DTC's</li></ul>	C5, 15
F3,6,10,12	<ul style="list-style-type: none"><li>• Discuss and diagnose the different CAN data communication lines.</li></ul>	C5, 15
F6,8,9,10,12	<ul style="list-style-type: none"><li>• Diagnose emission or drivability problems resulting from the failure of CAN controls with stored diagnostic trouble codes (DTC's)</li></ul>	C5, 15

Foundation Skills

COURSE OBJECTIVES

Competencies

	<p><b>Unit III: Advanced Ignition, Fuel Systems and Throttle Control Diagnosis and Repair.</b> Upon completion of this unit, you will be able to:</p>	
F4,8,9,10,12	<ul style="list-style-type: none"> <li>• Diagnose ignition system and engine problems using an Lab scope and a graphing multimeter or scan tool</li> </ul>	C5,15,16,20
F6, 10,12	<ul style="list-style-type: none"> <li>• Discuss Waste Spark and COP electronic ignition systems</li> </ul>	C5, 15,16,19,20
F6,10,12	<ul style="list-style-type: none"> <li>• Discuss the advantages of electronic ignition systems (COP)</li> </ul>	C15,16,19
F6,10,12	<ul style="list-style-type: none"> <li>• Discuss what is meant by waste spark concerning a electronic ignition system</li> </ul>	C5,15,16,19,20
F6,10,12	<ul style="list-style-type: none"> <li>• List the special tools required to test a electronic ignition system (COP)</li> </ul>	C5, 15 C5, 15
F8, 9,10,12	<ul style="list-style-type: none"> <li>• Diagnose no-starting, drivability, and emission problems on vehicles with electronic ignition systems and determine needed repairs</li> </ul>	
F8, 9,10,12	<ul style="list-style-type: none"> <li>• Inspect, test adjust, or replace fuel injectors, fuel pressure regulator and fuel rail. (MPI and GDI)</li> </ul>	C5, 15
F8,9,10,12	<ul style="list-style-type: none"> <li>• Inspect, test, and repair electric fuel pumps and control on a fuel injected engine. (MPI and GDI)</li> </ul>	C5, 17
F6,8,9,10,12	<ul style="list-style-type: none"> <li>• Diagnose hot or cold no-start, hard starting, poor drivability, Incorrect idle speed, poor idle, flooding, hesitation, surging, engine misfire, power loss, stalling, poor mileage, dieseling, and emission problems on vehicles with injection-type fuel systems and determine needed action.</li> </ul>	C5,15
F8, 9,10,12	<ul style="list-style-type: none"> <li>• Inspect and test cold enrichment system components and adjust or replace as needed</li> </ul>	C5, 15
F8, 9,10,12	<ul style="list-style-type: none"> <li>• Discuss the operation of an Electronic Throttle System</li> </ul>	C5, 15
F8, 9,10,12	<ul style="list-style-type: none"> <li>• Inspect, test, and repair an Electronic Throttle System</li> </ul>	C5, 15
F8, 9,10,12	<ul style="list-style-type: none"> <li>• Inspect and test a diesel fuel injection system</li> </ul>	C5, 15
F8, 9,10,12	<ul style="list-style-type: none"> <li>• Inspect , test, and repair a diesel exhaust filter system</li> </ul>	C5, 15

Foundation Skills	COURSE OBJECTIVES	Competencies
	<b>Unit IV: Emission Control Systems Diagnosis and Repair.</b> Upon completion of this unit, you will be able to:	
F8,9,10,12	<ul style="list-style-type: none"> <li>Inspect, test, repair, or replace electronic EGR valves, system wiring and electrical controls</li> </ul>	C5,15
F8,9,10,12	<ul style="list-style-type: none"> <li>Inspect and test mechanical components of secondary air injection systems and repair as needed</li> </ul>	C5,15
F8,9,10,12	<ul style="list-style-type: none"> <li>Inspect and test electrical / electronically operated components and circuits of air injection systems and repair as needed</li> </ul>	C5,15
F6,8,9,10,12	<ul style="list-style-type: none"> <li>Discuss the difference between dual bed and honey comb catalytic converters</li> </ul>	C5,15,20
F8,9,10,12	<ul style="list-style-type: none"> <li>Inspect and test components of catalytic converter systems and replace as needed</li> </ul>	C5,15
F6,8,9,10,12	<ul style="list-style-type: none"> <li>Diagnose emissions and drivability problems resulting from the failure of secondary air injection and catalytic converter systems</li> </ul>	C5,15
F6,8,9,10,12	<ul style="list-style-type: none"> <li>Prepare a 4 or 5 gas analyzer, inspect and test vehicles to obtain exhaust gas readings</li> </ul>	C5,15
F6,8,9,10,11,12	<ul style="list-style-type: none"> <li>Interpret exhaust gas readings and determine needed repairs and/or action</li> </ul>	C5,7,8,15,17
F8,9,10,12	<ul style="list-style-type: none"> <li>Discuss the 5 gases produced by the internal combustion gasoline engine</li> </ul>	C5,15
F6, 10 F8,9,10,12	<ul style="list-style-type: none"> <li>Discuss how NO<sub>x</sub> emissions are reduced by the EGR valve</li> </ul>	C5,15,16
F6,8,9,10,12	<ul style="list-style-type: none"> <li>Inspect and test components of early fuel evaporation control systems and service as needed</li> </ul>	C5,15
F6, 8,9,10,12	<ul style="list-style-type: none"> <li>Diagnose emissions and drivability problems resulting from the failure of early fuel evaporation control systems</li> </ul>	C5,15
F6, 8,9,10,12	<ul style="list-style-type: none"> <li>Inspect and test components and hoses of evaporative emissions control systems (EVAP) and replace as needed</li> </ul>	C5,15
F6,8,9,10,12	<ul style="list-style-type: none"> <li>Diagnosis emissions and drivability problems resulting from the failure of evaporative emission control systems (EVAP)</li> </ul>	C5,15
F6,8,9,10,11,12	<ul style="list-style-type: none"> <li>Includes Hybrid Vehicles</li> <li>Discuss and perform the new changes for state inspection concerning gas caps and the canister system.</li> </ul>	C5,15,16,20

## **AUMT 2434 Engine Performance Analysis II** **Assignments and Test Schedule**

### **Unit I: Review of OBDII System Control Diagnosis**

**January 19<sup>th</sup> – February 4<sup>th</sup>**

**Unit I Assignment Log on to the on-line curriculum:** Read Chapters 63 & 64 in your textbook. Perform any on-line activities as required by your instructor. Be prepared to discuss this material in the classroom and shop.

**Unit I Homework due date: February 4<sup>th</sup>**

**Unit I Skills Exam: February 4<sup>th</sup>**

**Unit I Written Exam: February 4<sup>th</sup>**

### **Unit II: CAN and Hybrid System Diagnosis and Repair.**

**February 9<sup>th</sup> – Feb 25<sup>th</sup>**

Read Chapter 56 in your textbook. Perform any on-line activities as required by your instructor. Be prepared to discuss this material in the classroom and shop.

**Unit II Homework due date: Feb 25<sup>th</sup>**

**Unit II Skills Exam: Feb 25<sup>th</sup>**

**Unit II Written Exam: Feb 25<sup>th</sup>**

### **SPRING BREAK MARCH 15<sup>th</sup> – 19<sup>th</sup>**

### **Unit III: Advanced Ignition, Fuel Systems and Throttle Control Diagnosis and Repair**

**March 2<sup>nd</sup> – April 1<sup>st</sup>**

Read Chapters 61-62 in your textbook. Perform any on-line activities as required by your instructor. Be prepared to discuss this material in the classroom and shop.

**Unit III Homework due date: April 1<sup>st</sup>**

**Unit III Skills Exam: April 1<sup>st</sup>**

**Unit III Written Exam: April 1<sup>st</sup>**

**Easter Holiday April 2<sup>nd</sup>**

### **Unit IV: Emission Control Systems Diagnosis and Repair**

**April 6<sup>th</sup> - April 29<sup>th</sup>**

Read Chapter 66 in your textbook. Perform any on-line activities as required by your instructor. Be prepared to discuss this material in the classroom and shop.

**Unit IV Homework due date: April 29<sup>th</sup>**

**Unit IV Skills Exam: April 29<sup>th</sup>**

**Unit IV Written Exam: April 29<sup>th</sup>**

**FINAL EXAM MAY 11<sup>th</sup> 1:00pm (subject to change)**

**This will be a comprehensive exam and could include hands on type test. Please allow yourself adequate study time for this test.**

## **SCANS COMPETENCIES**

- C-1 **TIME** - Selects goal - relevant activities, ranks them, allocates time, prepares and follows schedules.
- C-2 **MONEY** - Uses or prepares budgets, makes forecasts, keeps records and adjusts meet objectives.
- C-3 **MATERIALS AND FACILITIES** - Acquires, stores, allocates, and uses materials or space efficiently.
- C-4 **HUMAN RESOURCES** - Assesses skills and distributes work accordingly, evaluates performances and provides feedback.

### **INFORMATION - Acquires and Uses Information**

- C-5 Acquires and evaluates information.
- C-6 Organizes and maintains information.
- C-7 Interprets and communicates information.
- C-8 Uses computers to process information.

### **INTERPERSONAL–Works With Others**

- C-9 Participates as members of a team and contributes to group effort.
- C-10 Teaches others new skills.
- C-11 Serves Clients/Customers–works to satisfy customer’s expectations.
- C-12 Exercises Leadership–communicates ideas to justify position, persuades and convinces others, responsibly challenges existing procedures and policies.
- C-13 Negotiates–works toward agreements involving exchanges of resources; resolves divergent interests.
- C-14 Works With Diversity–works well with men and women from diverse backgrounds.

### **SYSTEMS–Understands Complex Interrelationships**

- C-15 Understands Systems–knows how social, organizational, and technological systems work and operates effectively with them.
- C-16 Monitors and Corrects Performance–distinguishes trends, predicts impacts on system operations, diagnoses systems performance and corrects malfunctions.
- C-17 Improves or Designs Systems–suggests modifications to existing systems and develops new or alternative systems to improve performance.

### **TECHNOLOGY–Works With a Variety of Technologies**

- C-18 Selects Technology–chooses procedures, tools, or equipment, including computers and related technologies.
- C-19 Applies Technology to Task–understands overall intent and proper procedures for setup and operation of equipment.
- C-20 Maintains and Troubleshoots Equipment–prevents, identifies, or solves problems with equipment, including computers and other technologies.

## FOUNDATION SKILLS

### **BASIC SKILLS—Reads, Writes, Performs Arithmetic and Mathematical Operations, Listens and Speaks**

- F-1 Reading—locates, understands, and interprets written information in prose and in documents such as manuals, graphs, and schedules.
- F-2 Writing—communicates thoughts, ideas, information and messages in writing and creates documents such as letters, directions, manuals, reports, graphs, and flow charts.
- F-3 Arithmetic—performs basic computations; uses basic numerical concepts such as whole numbers, etc.
- F-4 Mathematics—approaches practical problems by choosing appropriately from a variety of mathematical techniques.
- F-5 Listening—receives, attends to, interprets, and responds to verbal messages and other cues.
- F-6 Speaking—organizes ideas and communicates orally.

### **THINKING SKILLS—Thinks Creatively, Makes Decisions, Solves Problems, Visualizes and Knows How to Learn and Reason**

- F-7 Creative Thinking—generates new ideas.
- F-8 Decision-Making—specifies goals and constraints, generates alternatives, considers risks, evaluates and chooses best alternative.
- F-9 Problem Solving—recognizes problems, devises and implements plan of action.
- F-10 Seeing Things in the Mind’s Eye—organizes and processes symbols, pictures, graphs, objects, and other information.
- F-11 Knowing How to Learn—uses efficient learning techniques to acquire and apply new knowledge and skills.
- F-12 Reasoning—discovers a rule or principle underlying the relationship between two or more objects and applies it when solving a problem.

### **PERSONAL QUALITIES—Displays Responsibility, Self-Esteem, Sociability, Self-Management, Integrity and Honesty**

- F-13 Responsibility—exerts a high level of effort and perseveres towards goal attainment.
- F-14 Self-Esteem—believes in own self-worth and maintains a positive view of self.
- F-15 Sociability—demonstrates understanding, friendliness, adaptability, empathy and polite-ness in group settings.
- F-16 Self-Management—assesses self accurately, sets personal goals, monitors progress and exhibits self-control.
- F-17 Integrity/Honesty—chooses ethical courses of action.

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CDX ID#  
Engine Performance [FAD7DF](#)  
Electrical [5F729F](#)