

## COURSE SYLLABUS

**Course Title:** AUMT 1306-271 Automotive Engine Removal and Installation (3:2:4)  
**Semester/Year:** Spring 2021  
**Instructor:** Mr. Gary Ufford CDX course ID # 68229E  
**Office/Location:** Lubbock Center, 3907 Ave. Q, Lubbock, TX. 79412, Room 136B  
**Phone/E-mail:** 716-4911 ; gufford@southplainscollege.edu  
**Office Hours:** Check posted hours after classes begin or by appointment.

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

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: Automotive Engine Removal and Installation (3:2:4) –**  
This course covers the fundamentals of engine inspection, removal and installation procedures. Safety procedures are emphasized throughout the course along with operation of all existing components. Elements of the course may be taught manufacturer specific. Co-requisite: concurrent enrollment with AUMT 1419.
- B. Course Goals/Objectives:** Utilize appropriate safety procedures; perform mechanical engine tests to determine extent of repair or service; remove and install engines in various types of vehicles; lubrication and cooling systems diagnosis and repair. May be taught manufacturer specific.
- 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 1306 and AUMT 1419 in order to successfully complete this course since these are concurrent enrollment courses.
- 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) 1,2,3,4,5,6,8,9,10,11,12,14. Competencies (C): 5,6,7,11,14,15,16,18,19,20. 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 Automotive Engine Repair.

## II SPECIFIC COURSE/INSTRUCTOR REQUIREMENTS

### A. **Textbook & Other Required Materials:**

1. VanGelder Kirk, Fundamentals of Automotive Technology, Principles and Practice. 2nd Edition, Jones & Bartlett Learning Publishers, Copyright 2018 ( with on-line curriculum)
2. Pen or pencil, and paper or 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. Excessive absences in this course may cause you to be withdrawn from AUMT 1419 also since AUMT 1306 and AUMT 1419 are concurrent enrollment courses.**

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 MySPC 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.

- C. **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 in order 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.

- 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 = 25%

Unit skills tests/Lab sheets = 50%

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 your 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.

- E. 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. No smoking, chewing, or dipping 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.** These activities will be limited to break time in the designated areas only. Breaks will be limited to 20 minutes. A detailed list of lab/shop guidelines will be handed to you at the beginning of class, you are expected to follow them whenever you are in the shop. Please turn off all cell phones, pagers, etc. during class. 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 waist line. 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.

### **Americans with Disabilities Act 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.  
716-4677 – Lubbock Center    716-2923 – Reese Center (mobile 893-5705)**

Foundation Skills	<b>Unit I:</b> Shop Safety, Engine Components, and Measuring Tools. Upon completion of this unit, students will be able to:	Competencies
F1,2,5,6,8,12	<ul style="list-style-type: none"> <li>• Functionally discuss each stroke of a four-stroke engine.</li> </ul>	C5,6,7,15
F1,2,5,6,8,12	<ul style="list-style-type: none"> <li>• Discuss the operation of a basic valve train.</li> </ul>	C5,6,7,15
F1,2,5,6,8,12	<ul style="list-style-type: none"> <li>• Functionally discuss the importance of a firing order, companion cylinders, and how they relate to the four-stroke cycle.</li> </ul>	C5,6,7,15
F1,2,5,6,8,12	<ul style="list-style-type: none"> <li>• Understand basic units of measure and how to use a conversion table.</li> </ul>	C5,6,7,15
F1-6,8,12	<ul style="list-style-type: none"> <li>• Functionally use precision measuring tools, such as an outside or inside micrometer, a dial indicator, a venire caliper and a telescoping gauge.</li> </ul>	C5,6,7,15
F1,2,5,6,8,12	<ul style="list-style-type: none"> <li>• Research applicable vehicle and service information, such as internal engine operation, vehicle service history, service precautions and technical service bulletins. (Includes Hybrid Vehicle)</li> </ul>	C5, 6,7,15,18, 19
F1, 2,5,6,8,12	<ul style="list-style-type: none"> <li>• Locate and interpret vehicle and major component identification numbers (VIN, vehicle certification labels, and calibration decals). (Includes Hybrid Vehicle)</li> </ul>	C5, 6,7,15,18, 19
F1, 2,5,6,8,12	<ul style="list-style-type: none"> <li>• Complete work order to include customer information, vehicle ID information, customer concern, cause, correction, and related service history. Includes Hybrid</li> </ul>	C5, 6,7,15,18, 19

Foundation Skills	<b>Unit II:</b> Gas and/or Hybrid Engine Condition Diagnosis. Upon completion of this unit, students will be able to:	Competencies
F1, 2,5,6,8-12,15,16	<ul style="list-style-type: none"> <li>• Identify and interpret customer concerns; stall or road test vehicle to determine repair.</li> </ul>	C5, 6,7,11,14,15
F1, 2,5,6,8,12	<ul style="list-style-type: none"> <li>• Inspect an engine for fuel, oil, coolant, and other leaks; determine needed repairs.</li> </ul>	C5, 6,7,11,14,15
F1-6, 8-12	<ul style="list-style-type: none"> <li>• Perform vacuum tests; determine needed repair.</li> </ul>	C5-7, 15,16,18-20
F1-6, 8-12	<ul style="list-style-type: none"> <li>• Perform cylinder power balance tests; determine needed repairs.</li> </ul>	C5-7, 15,16,18-20
F1-6, 8-12	<ul style="list-style-type: none"> <li>• Adjust valves (mechanical or hydraulic lifters).</li> </ul>	C5-7, 15,16,18-20
F1-6, 8-12	<ul style="list-style-type: none"> <li>• Perform cylinder cranking compression tests; determine needed repairs.</li> </ul>	*
F1-6, 8 -12	<ul style="list-style-type: none"> <li>• Perform cylinder leakage tests; determine needed repairs.</li> </ul>	*
F1-6, 8-12	<ul style="list-style-type: none"> <li>• Perform oil pressure test; determine needed repair.</li> </ul>	

F1-6, 8-12	<ul style="list-style-type: none"><li>• Diagnose the cause of excessive oil consumption, unusual engine exhaust color, odor, and sound; determine needed repair.</li></ul>	*
F1-6, 8-12	<ul style="list-style-type: none"><li>• Diagnose engine noises and vibrations; determine necessary action.</li></ul>	*

Foundation Skills	COURSE OBJECTIVES	Competencies
	<p><b>Unit III:</b> Engine Removal, Transfer of Parts, Installation, Starting and Final Inspections.</p> <p>Upon completion of this unit, students will be able to:</p> <ul style="list-style-type: none"> <li>• Remove and disassemble an engine as necessary; either FWD or RWD. Includes Hybrid Vehicle as applicable.</li> <li>• Verify camshafts timing according to manufacturer’s specifications and procedures.</li> <li>• Inspect and replace timing belts (chains), overhead cam drive sprockets, and tensioners; check belt/chain tension; adjust as necessary.</li> <li>• Remove and install cylinder heads and gaskets; tighten according to manufacturer’s specifications and procedures.</li> <li>• Establish camshaft(s) timing and cam sensor indexing according to manufacturer’s specifications and procedures.</li> <li>• Perform common fastener and thread repair to include; remove broken bolt, restore internal and external threads, and repair internal threads with thread insert.</li> <li>• Select correct gaskets and seals and reassemble an engine.</li> <li>• Reassemble and install an engine; either FWD / RWD or Hybrid as applicable.</li> <li>• Road test the vehicle and perform final adjustments and check before customer delivery. (Includes Hybrid)</li> <li>• Diagnose engine mechanical, electrical, electronic, fuel, and ignition concerns with an oscilloscope and or engine diagnostic equipment; determine necessary action.</li> <li>• Obtain and interpret scan tool data. (Includes Hybrid)</li> <li>• Access and use service information to perform step-by-step diagnosis. (Includes Hybrid)</li> </ul>	<p>C5, 6,7,15,16</p> <p>C5, 6,7,15,16</p> <p>C5, 6,7,15,16</p> <p>C5, 6,7,15,16</p> <p>C5, 6,7,15,16</p> <p>C5, 6,7,15,16</p> <p>C5, 6,7,15,16</p> <p>C5, 6,7,15,16</p> <p>C5, 6,7,15,16</p> <p>C5, 6,7,15,16</p> <p>C5, 6,7,15,16</p> <p>C5-7,15,16,18-20</p> <p>C5, 6,7,15,16</p> <p>C5, 6,7,15,16</p>

Foundation Skills	COURSE OBJECTIVES	Competencies
<p>F1-6,8-11,14</p> <p>F1-6,8-11,14</p> <p>F1-6,8-11,14</p> <p>F1-6,8-11,14</p> <p>F1-6,8-11,14</p> <p>F1-6,8-11,14</p> <p>F1-6,8-11,14</p> <p>F1-6,8-11,14</p> <p>F1-6,8-11,14</p>	<p><b>Unit IV:</b> Battery Diagnosis/Testing; Cranking System Operation/Diagnosis/Testing.</p> <p>Upon completion of this unit, students will be able to:</p> <ul style="list-style-type: none"> <li>• Perform battery state-of-charge test; determine necessary action.</li> <li>• Perform battery capacity test; (or conductance test); confirm proper battery capacity for vehicle application; determine necessary action.</li> <li>• Start a vehicle using jumper cables and a battery or auxiliary power supply. (Includes Hybrid Vehicle.)</li> <li>• Perform starter current draw test; determine necessary action</li> <li>• Perform starter circuit voltage drop test; determine necessary action.</li> <li>• Inspect and test switches, connectors, and wires of starter control circuits; perform necessary action.</li> <li>• Inspect and test starter relays and solenoid; determine necessary action.</li> <li>• Discuss safety techniques for battery testing and service (includes Hybrid vehicle)</li> <li>• Perform Hybrid battery and High Voltage disconnect according to manufacturer procedures</li> </ul>	<p>C5-7, 15,16,18-20</p> <p>*</p> <p>*</p> <p>*</p> <p>*</p> <p>*</p> <p>*</p> <p>*</p> <p>*</p>



Foundation Skills	COURSE OBJECTIVES	Competencies
<p>F1-6, 8-12</p> <p>F1-6, 8-12</p> <p>F1, 2,5,6,8-12,</p> <p>F1, 2,5,6,8-12</p> <p>*</p> <p>*</p> <p>*</p> <p>*</p> <p>*</p> <p>*</p> <p>*</p> <p>*</p> <p>*</p>	<p><b>Unit V:</b> Engine Cooling and Lubrication Systems.</p> <p>Upon completion of this unit, students will be able to:</p> <ul style="list-style-type: none"> <li>• Discuss the operation of an engine lubrication system. Includes Hybrid Engine.</li> <li>• Discuss the operation of an engine cooling system. Includes Hybrid Engine</li> <li>• Perform an LOF (includes turbo charged and Hybrid Engines.)</li> <li>• Perform oil pressure test; determine necessary action.</li> <li>• Inspect oil pump gears or rotors, housing, pressure relief devices, and pump drive; perform necessary action.</li> <li>• Inspect, test, and replace oil temperature, and oil pressure switches and sensors.</li> <li>• Perform cooling system pressure tests; check coolant condition; inspect and test radiator, pressure cap, coolant recovery tank, and hoses; determine necessary action.</li> <li>• Inspect, replace, and adjust drive belts; tensioners, and pulleys; check pulley and belt alignment.</li> <li>• Test coolant; drain and recover coolant; flush, and refill cooling system with recommended coolant; bleed as required. (Includes Hybrid Engines.)</li> <li>• Inspect and replace coolant hoses, thermostat, by-pass circuit, and water-pump.</li> <li>• Remove and replace radiator.</li> <li>• Inspect and test fan(s) (electrical and mechanical); fan shroud, clutch, air dams and sensors; determine needed repair.</li> </ul>	<p>C5, 6,7,15,16</p> <p>*</p> <p>*</p> <p>*</p> <p>*</p> <p>*</p> <p>*</p> <p>*</p> <p>*</p> <p>*</p> <p>*</p> <p>*</p>

## AUMT 1306

### Unit Assignments and Test Dates

Log on to this course on Blackboard using your SPC credentials, also log on to the on-line curriculum using your purchased CDX access from the bookstore and course ID # provided by your instructor. Become familiar with the website and look for all on line assignments. It is your responsibility to keep up with all assignments and turn in by the due dates listed below and on line.

#### **Unit 1: January 20th – February 4th**

**Unit I Assignment: Log on to the on-line curriculum.** In your textbook and/or on-line through CDX, read Chapter 12 & 16 and be prepared to discuss this material in class or in the shop. Complete the on – line assignments for chapter 12 & 16 and turn in on the due date. Other written and in-class assignments will be assigned throughout the unit, maybe even on-line.

**Unit I Assignment Due date: February 4th (possibly on-line)**

**Unit I Skills Test: February 4th**

**Unit I Written Exam: February 4th (possibly on-line)**

#### **Unit II: February 8th – February 25th**

**Unit II Assignment:** Read Chapters 13, 14, 15, & 17 and be prepared to discuss this material in class or in the shop. Complete the on – line assignments for chapters 13, 14, 15, & 17 and turn in on the due date. Other written and in-class assignments will be assigned throughout the unit, maybe even on-line

**Unit II Assignment Due Date: February 25th (on-line)**

**Unit II Skills Exam: February 25th**

**Unit II Written Exam: February 25th (on-line)**

### **Spring Break March 15th – 19th**

#### **Unit III: March 1st – April 1st**

**Unit III Assignment:** Read Chapter 18 and be prepared to discuss this material in class or in the shop. Complete the on – line assignments for chapter 18 and turn in on the due date. Other written and in-class assignments will be assigned throughout the unit, maybe even on-line.

**Unit III Assignment Due Date: April 1st (on-line)**

**Unit III Skills Exam: April 1st**

**Unit III Written Exam: April 1st (on-line)**

### **Easter Holiday – April 2nd**

#### **Unit IV: April 5th – April 22nd**

**Unit IV Assignment:** Read Chapters 19, 20,21, & 22 and be prepared to discuss this material in class or in the shop. Complete the on – line assignments for chapters 19, 20, 21, & 22 and turn in on the due date. Other written and in-class assignments will be assigned throughout the unit, maybe even on-line.

**Unit IV Assignment Due Date: April 22nd (on-line)**

**Unit IV Skills Exam: April 22nd**

**Unit IV Written Exam: April 22nd (on-line)**

# Final Exam: May 4<sup>th</sup> at 1:30pm, please allow yourself adequate study time for this important 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 makes adjustments to 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.

