

Farm Mechanics Course Outline – 360 Hours

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|---|---|--|-------------|--------------|-------------------------------|
| Major Units of Instruction (Employability Skills, Content Area Skills, and Expected Student Proficiencies) Industry Sector and Pathway Aligned Agriculture and Natural Resources Industry – Agricultural Mechanics Pathway (B) | Expected Student Learning Results (ESLRs) | Methods of Assessment & Materials Used | Class Hours | CC/CVE Hours | Academic Standards Reinforced |
|---|---|--|-------------|--------------|-------------------------------|

A year 1 completer has demonstrated proficiency core course with 180 hours including optional units

A year 2 completer is proficient in the core curriculum (180) and Engine Repair (180) including optional units for 360 hours

| Year 1 – CORE | | | | | Academic Standards |
|--|--|---|----|--|--|
| 1. ARC Welding B1.1, B1.2, B8.0all A. Safety B. Equipment and accessories C. Overview and essential skills for welding D. Selecting electrodes E. Running a continuous bead 1. Flat position 2. Horizontal position 3. Vertical position 4. Overhead position F. Welding metallurgy G. Non-ferrous metal H. Gas Metal Arc Welding (GMAW) I. Pipe Sections J. Testing K. ARC cutting | Responsible Individuals Interpersonal Learner Effective Communicator Technological Producer Problem Solver | - Lecture demonstration - Guided practice - Independent practice - Use of models - Tests and quizzes - Class participation | 40 | | |
| 2. Oxy-acetylene Welding/Cutting B1.1, B1.2, B7.1, B7.2, B7.3, B7.4 A. Safety B. Equipment & Accessories C. Set-up D. Operation E. Flat position F. Other positions G. Brazing H. Silver soldering I. Flame cutting J. Cutting Oxy-Ace | Responsible Individuals Interpersonal Learner Effective Communicator Technological Producer Problem Solver | - Lecture demonstration - Guided practice - Independent practice - Use of models - Tests and quizzes - Class participation | 30 | | |
| 3. Small Gasoline Engines B1.1, B1.2, B10.0 all A. Orientation to small engines B. Efficiency small engine cycles C. Engine maintenance construction, design & materials 1. Valve operation 2. Carburation 3. Fuel supply 4. Lubrication 5. Cylinder resizing D. Electrical 1. Ignition/magneto system 2. Starter system 3. Generator/ alternators E. Cooling system F. Filters (coil/fuel/air) G. Tune-up | Responsible Individuals Interpersonal Learner Effective Communicator Technological Producer Problem Solver | - Lecture demonstration - Guided practice - Independent practice - Use of models - Tests and quizzes - Class participation | 40 | | |
| 4. SHOP MATHEMATICS A. Whole numbers B. Fractions C. Powers and roots D. Math Symbols E. Basic equations F. Measurements/ area/ weight/ volume | Responsible Individuals Interpersonal Learner Effective Communicator Technological Producer Problem Solver | - Lecture demonstration - Guided practice - Independent practice - Use of models - Tests and quizzes - Class participation | 15 | | 1.1 Mathematics: (alg) 10.0, 12.0, 15.0 and (geom.) 8.0 |
| 5. ENGINE TECHNOLOGY B1.1, B1.2, B10.0, B11.0 A. Safety B. Orientation to farm application C. Nomenclature D. Orientation of 1. Auto tools 2. Auto equipment | Responsible Individuals Interpersonal Learner Effective Communicator Technological Producer Problem Solver | - Lecture demonstration - Guided practice - Independent practice - Use of models - Tests and quizzes - Class participation | 50 | | |

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| 3. Measurement instruments E. Engine fundamentals F. Construction G. Electricity H. Fuel I. Reconditioning the engine <ol style="list-style-type: none"> 1. Cylinder/piston/ring 2. Shafts – crank & cam 3. Block 4. Rods 5. Heads/Valves 6. Lubrication 7. Cooling J. Basic Tune-up | | | | | |
| 6. ESSENTIAL EMPLOYABILITY SKILLS/CAREER PREPARATION STANDARDS (Standards specified below) A. Understand how personal skill development affect employability (positive attitude, honesty, self-confidence, time management) 8.0 B. Understand principles of effective interpersonal skills (group dynamics, conflict resolution negotiations) 9.0 C. Understand the importance of good academic skills, critical thinking and problem-solving in the workplace 1.0, 5.0 D. Understand principles of effective communication 2.0 E. Understand occupational safety issues and observes all safety rules B1.0 F. Understand career awareness, paths and strategies for obtaining employment 3.0 G. Understand and adapt to changing technology 10.0 H. Understand and prepare for employment (resume, job application, job interview, portfolio development) – job search skills 3.6 | Responsible Individuals Interpersonal Learner Effective Communicator Technological Producer Problem Solver | - Lecture demonstration - Guided practice - Independent practice - Use of models - Tests and quizzes - Class participation | 5 | | <u>STANDARDS</u> Language Arts R 1.3, 2.6 W1.3, 2.5. LC 1.4,1.5, 1.6 LS1.2, 1.3, 1.7 (9/10) R2.1, 2.2, 2.3,2.6; W2.5; LC1.4; LS 1.1, 2.3 (11/12) R2.3; W2.5; LC1.2 <u>Math (7)</u> NS1.2, 1.3, 1.7 MR 1.1,1.3,2.1, 2.7,2.8, 3.1 <u>CAHSEE</u> Lang. Arts R 8.2.1 (9/10) R 2.1, 2.3; W2.5 Math (7) NS 1.2, 1.3, 1.7 MR 1.1, 2.1, 3.1 |
| Total Part I (CORE) | | | 180 | | |

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| Year 2 – FARM MECHANICS | | | | | |
|---|--|---|-----|--|--|
| 1. INTRODUCTION TO ENGINE REPAIR B11.0 A. Operating principles 1. Fuel injection 2. Combustion chambers 3. Governors B. Construction of a diesel engine C. Fuel systems D. Air intake exhaust systems E. Lubrication systems F. Cooling systems G. Reconditioning the engine - Cylinder/piston/ring, Shafts –cranks & cam, Block, Rods, Heads/Valves, Lubrication and Cooling H. Engine diagnosis I. Engine tune-up J. Engines as irrigation pumps | Responsible Individuals Interpersonal Learner Effective Communicator Technological Producer Problem Solver | - Lecture demonstration - Guided practice - Independent practice - Use of models - Tests and quizzes - Class participation | 100 | | |
| 2. POWER TRANSMISSION SYSTEM B11.0 A. Orientation B. General Principles of force, friction, efficiency, levers/gears, shafts, universal joints, chains and belts C. Standard transmissions D. Hydraulics E. Cleaning and assembly F. Servicing G. Preventative maintenance H. Orientation II – Crawlers and Graders I. Peripheral equipment (irrigation pumps, conveyors, wind rowers, combines, balers, fork lifts, etc.) | Responsible Individuals Interpersonal Learner Effective Communicator Technological Producer Problem Solver | - Lecture demonstration - Guided practice - Independent practice - Use of models - Tests and quizzes - Class participation | 30 | | |
| 3. FLUID POWER B11.4 A. Orientation II - Physical laws of fluid power, Hydraulics and Pressure B. Fluid power cylinder C. Cylinder angle D. Cylinder speed E. Cylinder ratio F. Cylinder mounting G. Fluid valves H. Directional control I. Fluid motor valve J. Two-way solenoid valve K. Spool types L. Four-way controls M. Five-way controls N. Solenoid valve circuits O. Manual pumps P. Power pumps Q. Super charging R. Pump cavitation S. Oil reservoirs T. Filtering U. Air dryers V. Heat exchangers W. Accumulators | Responsible Individuals Interpersonal Learner Effective Communicator Technological Producer Problem Solver | - Lecture demonstration - Guided practice - Independent practice - Use of models - Tests and quizzes - Class participation | 50 | | |
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| OPTIONAL UNITS - Selection is based on student/teacher preference-optional units are available for Part I and/or Part II | | | | | |
|--|--|---|----|----|--|
| 1. ELECTRICAL B3.0 A. Safety B. Omes Law C. Electrical testing equipment D. Series circuitry E. Parallel circuitry F. Wiring diagrams G. Trouble shooting | Responsible Individuals Interpersonal Learner Effective Communicator Technological Producer Problem Solver | - Lecture demonstration - Guided practice - Independent practice - Use of models - Tests and quizzes - Class participation | 10 | | |
| 2. AIR CONDITIONING A. Theory of operation B. System operation C. System controls D. Automatic systems E. Servicing of system F. Diagnosis of system | Responsible Individuals Interpersonal Learner Effective Communicator Technological Producer Problem Solver | - Lecture demonstration - Guided practice - Independent practice - Use of models - Tests and quizzes - Class participation | 10 | | |
| 3. ADVANCED ARC WELDING B8.0 | Responsible Individuals Interpersonal Learner Effective Communicator Technological Producer Problem Solver | - Lecture demonstration - Guided practice - Independent practice - Use of models - Tests and quizzes - Class participation | 30 | | |
| 4. ADVANCED OXYACETYLENE WELDING B7.0 all | Responsible Individuals Interpersonal Learner Effective Communicator Technological Producer Problem Solver | - Lecture demonstration - Guided practice - Independent practice - Use of models - Tests and quizzes - Class participation | 30 | | |
| 5. ADVANCED SMALL ENGINES (Honda, Wisconsin, etc.) B10.0 all | Responsible Individuals Interpersonal Learner Effective Communicator Technological Producer Problem Solver | - Lecture demonstration - Guided practice - Independent practice - Use of models - Tests and quizzes - Class participation | 30 | | |
| 6. AUTOMOTIVE TRANSMISSION B10.0 all A. Clutch 1. Flywheel 2. Friction disk 3. Pressure plate 4. Throw out bearing 5. Clutch fork 6. Clutch housing B. Manual transmissions 1. Disassemble and assembly transmissions 2. Three-speed, four-speed, and five-speed transmissions 3. Gear selection 4. Shifting linkage 5. Lube 6. Diagnosis of problems C. Automatic transmission 1. Ford – C4 – C6 2. Chevrolet 350 – 400 3. Disassemble and assembly 4. Servicing 5. Adjustment – bands 6. Diagnosis | Responsible Individuals Interpersonal Learner Effective Communicator Technological Producer Problem Solver | - Lecture demonstration - Guided practice - Independent practice - Use of models - Tests and quizzes - Class participation | 30 | | |
| 7. COMMUNITY/COOPERATIVE CLASSROOM | Responsible Individuals Interpersonal Learner Effective Communicator Technological Producer Problem Solver | - Lecture demonstration - Guided practice - Independent practice - Use of models - Tests and quizzes - Class participation | | 50 | |