

AE.ADV.EP **Advanced Mechanics**

Essential Discipline Goals

- Develop and apply the technical and related academic skills necessary to gain successful employment in the Power Mechanic Industry.
- Demonstrate the ability to communicate, solve problems, work independently and in teams, and apply technical knowledge effectively.
- Develop work habits and leadership skills, which will foster productivity and career advancement.
- Utilize laboratory projects and/or activities to apply related knowledge and skills.
- Acquire an awareness of the latest changes in technology, which will affect the methods of application now and in the future.
- Develop the ability to apply the knowledge and skills learned in Engine and Power Technology I and II.

Standards

Indicators

AE.ADV.10 Explore and develop an understanding of employment opportunities in power mechanics

- AE.ADV.10.01 Select and list qualities or traits needed for job success.
- AE.ADV.10.02 Construct or update a personal resume.
- AE.ADV.10.03 Complete a sample job application form.
- AE.ADV.10.04 Describe or demonstrate skills needed for a successful personal job interview.
- AE.ADV.10.05 Participate in a mock job interview.
- AE.ADV.10.06 List the advantages and disadvantages of entrepreneurship
- AE.ADV.10.07 Identify the benefits of outdoor power equipment certification
- AE.ADV.10.08 Maintain a record book on a Supervised Agricultural Experience Program (SAE).
- AE.ADV.10.08 Encourage students to maintain active FFA membership and apply for FFA awards

AE.ADV.20 Review and demonstrate safe work habits, and proper use of tools and equipment.

- AE.ADV.20.01 Review and demonstrate safe use of tools and equipment in the laboratory.
- AE.ADV.20.02 Review and demonstrate the use of safety rules and procedures.
- AE.ADV.20.03 Identify specialized tools used in making engine repairs.
- AE.ADV.20.04 Review and demonstrate the proper use of measuring instruments.
- AE.ADV.20.05 Select testing and measuring equipment to service engines.

AE.ADV.30 Demonstrate an understanding of Precision Agricultural practices.

- AE.ADV.30.01 Develop an understanding of GPS operation, types of GPS and use of GPS for spatial location data.
- AE.ADV.30.02 Be able to describe various GIS agriculture industry applications and expected future improvements or innovations.
- AE.ADV.30.03 Develop an understanding of the principles of operation of data collection equipment used in precision agriculture.
- AE.ADV.30.04 Gain an understanding of VRT (variable rate technology) development and applications of this technology in agriculture.

AE.ADV.40 Demonstrate the proper methods of preparing for and applying protective coatings

- AE.ADV.40.01 Prepare equipment surfaces for painting.
- AE.ADV.40.02 Estimate materials and costs associated with painting a particular project.
- AE.ADV.40.03 Identify the parts of a paint spray gun.
- AE.ADV.40.04 Demonstrate or explain the proper use of a paint gun.
- AE.ADV.40.05 Apply protective coatings to sample surfaces.
- AE.ADV.40.06 Demonstrate or explain proper cleaning of a paint gun.

AE.ADV.50 Develop a working knowledge of Flux-core Welding (FCAW) and its advantages

- AE.ADV.50.01 Describe the theory and demonstrate the welding technique used for FCAW.
- AE.ADV.50.02 Identify and select the appropriate flux-cored wire for use on common carbon steel.
- AE.ADV.50.03 Identify the advantages and disadvantages of FCAW
- AE.ADV.50.04 Perform a fillet weld on 1/8th mild steel using flux-cored wire.

AE.ADV.60 Develop a working knowledge of Gas Tungsten Arc Welding (GTAW)

- AE.ADV.60.01 Describe the theory and demonstrate the welding technique used for GTAW.
- AE.ADV.60.02 Identify, select and set-up TIG welding equipment.
- AE.ADV.60.03 Identify, select, sharpen and install a tungsten electrode.
- AE.ADV.60.04 Properly adjust polarity, current, gas flow, past flow and high frequency settings.
- AE.ADV.60.05 Select proper filler material based on base metal and its thickness.
- AE.ADV.60.06 Perform lap welds on various base metals.

AE.ADV.70 Plasma Arc Cutting (PAC)

- AE.ADV.70.01 Develop a working knowledge of Plasma Arc Cutting (PAC).
- AE.ADV.70.02 Describe the theory and cutting technique involved in (PAC).
- AE.ADV.70.03 Set up and operate a plasma cutting machine on 14 gauge, 3/8" plate steel.
- AE.ADV.70.04 Layout and perform straight line cuts.
- AE.ADV.70.05 Layout and perform circular cuts.
- AE.ADV.70.06 Lay out and perform pattern cuts
- AE.ADV.70.07 Identify and replace the consumable parts of Plasma Arc Torch.

AE.ADV.80 Using General Mechanical Skills and Procedures

- AE.ADV.80.01 Use measuring and diagnostic testing equipment.
- AE.ADV.80.02 Prepare a list of parts and supplies necessary to complete a repair or maintenance job.
- AE.ADV.80.03 Locate the operator's manual for various equipment.
- AE.ADV.80.04 Interpret manufacturer's specifications.
- AE.ADV.80.05 Demonstrate proper fastener tightening and torquing procedures.
- AE.ADV.80.06 Assemble equipment according to manufacturer's instructions.
- AE.ADV.80.07 Repair and adjust equipment according to manufacturer's instructions.
- AE.ADV.80.08 Weld with oxy-fuel gas welding equipment.

- AE.ADV.80.09 Weld with electric welding equipment (SMAW, GMAW, and GTAW).
- AE.ADV.80.10 Cut metals (oxy-fuel, plasma arc, other).
- AE.ADV.80.11 Plan and design a farm structure.
- AE.ADV.80.12 Figure a bill of material from a drawing of a proposed building.

AE.ADV.90 Maintaining and Servicing Batteries

- AE.ADV.90.01 Follow general safety when servicing batteries.
- AE.ADV.90.02 Properly connect jumper cables when boosting or charging a battery.
- AE.ADV.90.03 Activate dry charged battery.
- AE.ADV.90.04 Charge wet-cell battery.
- AE.ADV.90.05 Measure the specific gravity of a battery, using a hydrometer.
- AE.ADV.90.06 Measure the voltage of a battery, using a voltmeter.
- AE.ADV.90.07 Run a load test on battery.
- AE.ADV.90.08 Run a load test on a battery, using a starter motor.
- AE.ADV.90.09 Clean battery terminals, cables, and box.
- AE.ADV.90.10 Tighten battery cables and hold-down clamps.

AE.ADV.100 Selection, Maintenance and testing of Tires for Field performance.

- AE.ADV.100.01 Understanding slippage, and ballast
- AE.ADV.100.02 Selecting tires for 2WD and 4WD tractors

AE.ADV.110 Maintenance and Service of Wheels, Axels, Bearings, Seals, Gaskets and Hoses

- AE.ADV.110.01 Understand the methods of installing and replacing tubing and hoses.
- AE.ADV.110.02 Describe the proper procedure for applying sealants and adhesives.
- AE.ADV.110.03 Identify the types of seals and bearings found on equipment.

Advanced Mechanics

Grades 11-12

This semester course provides students with the opportunity to enhance and advance skills learned in Engine & Power Technology I and II through practical applications. Instruction will be primarily in the agricultural mechanics lab with emphasis on hands on learning. Units on precision agriculture, applying protective coatings, batteries, wheels axels and tires will be covered. Activities include a variety of mechanic skills including welding techniques, using measuring and diagnostic equipment and manuals to repair, assemble and adjust equipment to manufactures specifications. Students will explore career opportunities in agricultural mechanics and equipment industry.

Prerequisite of Engine & Power Technology I and II and strongly recommend the completion of Wood and Metal Structures.