

YOSEMITE REGIONAL OCCUPATIONAL PROGRAM

AGRICULTURAL DIESEL ENGINE TECHNOLOGY I AND II

CBEDS Codes: 4034

JOB TITLES

Power Equipment Mechanic (Small Engine)

DOT NO.

Course description:

This course is designed to prepare students for employment opportunities available within the agricultural/industrial industry. This course emphasizes skills necessary in the field of diesel equipment mechanics where students will learn major overhaul and tune-up of diesel engines. The course will focus on skills in power machinery and small engine repair and maintenance. A strong emphasis on safety, tool and equipment usage and preventative maintenance procedures will be covered in this course.

Students will develop leadership and employability skills. This advanced course follows the Model Curriculum Standards for Agricultural and Natural Resources.

Recommended Prerequisites:

Ag Mechanics or Small engines or Instructor permission

DURATION: up to 360 total hours

CREDIT: 10

Instructional Content: Instruction will include:	Student Outcomes At the end of instruction, the student will be able to:	Hours CL=Classroom L=Lab			
1. Classroom Orientation. 1. Class Procedures 2. Attendance 3. Grading 4. Paperwork 5. Career Development 6. Opportunities in Ag Business Mgt. 7. Occupational Goal setting 8. Work Values 9. Self-Assessment	Goal: The student will understand the general principles expected in the classroom A. Demonstrate proper classroom behavior B. Understand attendance, grading and flow of paperwork. C. Understand components of the agriculture industry D. Recognize agriculture as a business. E. Define & demonstrate Careers/Job Market/Employability. F. Participate in leadership/management. G. Understand the need for leadership & management in the field. H. Participate in self-assessment to increase knowledge and improve work habits.	CTE	Anchor CR Anchor 1,2,3,5,9, and 11 CR 1,2,3,5,7, 8,12	CL 5	L
2. Safety. 1. General shop safety. 2..Accident Prevention 3. Potential Hazard identification. 4. Handling emergencies 5. Power machinery 6. Servicing Equipment 7. Laws pertaining to Ag Machinery 6. OSHA rules & regulations. 7. Waste & material disposal. 8. Roll over Protection 9. Stability and center of gravity 10. Emergency start procedures	Goal: Student will understand the health hazards, safety practices, & environmental hazards related to their work in the shop. A. Comply with shop safety. B. Wear eye protection. C. Describe proper clothing & grooming. D. Use hand & power tools safely. E. Understand the relationship safety factors, seat belts, roll guard in cabs. F. Follow emergency fire & disaster procedures. G. Comply with OSHA rules & regulations. H. Handle & dispose of materials safely. I. Understand stability and center of gravity j. Demonstrate emergency start procedures	B1.1 B1.2 B1.3	Anchor 1,2,5,6,7,8 ,10,11 CR 1,2,5,6,7,8 ,10,11,12	3	2
3. FFA 1. Organization opportunities. 2. Teams and competitions. 3. Meetings. 4. Participation. 5. Record books 6. Communication skills 7. Critical thinking/problem solving.	Goal: The student will understand and participate in FFA activities. A. Understand the components of FFA B. Participate in team and individual competitions. C. Attend regular meetings D. Complete record books as necessary E. Exhibit good communication skills F. Demonstrate critical thinking and Problem solving		Anchor 7,8 CR 1,2,8,9	2	3

Instructional Content: Instruction will include:	Student Outcomes At the end of instruction, the student will be able to:	Hours CL=Classroom CC=Comm. Class			
4. Supervised Ag Experience (SAE) 1. Acceptable projects 2. Record Books 3. Monthly Updates	Goal: The student will participate in SAE activities A. Participate in projects B. Input timely and accurate information into record books. C. Provide monthly updates on activities and status of projects	CTE 4.1 4.2 4.4 4.5	Anchor/CR Anchor 2,3,5,7,8,9,10 CR 1,2,8,9	CL 8	L 2
5. Communication Skills. 1. Applying written communication skills in agricultural industry, including appointments, cost estimates, work orders, and using service manuals.	Goal: The student will be able to apply verbal communication skills in the agricultural industry. A. Schedule appointments. B. Prepare cost estimates. C. Prepare work orders. D. Prepare & close repair orders. E. Use service manuals & other information retrieval systems for diagnostic procedures. F. Understand the need for maintenance & document maintenance procedures. G. Understand fault diagnosis & the steps that lead to fault diagnosis, & inspect & analyze the cause of component failure. H. Understand the business practices of a shop, & generate & maintain service records in a manner consistent with current legal & industry requirements.		Anchor 2,3,4,5,6,7,8,9,10,11 CR1,2,4,5,7,8,9,10,12	5	2
6. Equipment Mechanics 1. Shop Procedures 2. Tool identification 3. Proper use of tools 4. Basic mechanics hand tools 5. Micrometers, dial indicators, bore gauges Telescoping gauges and calipers	Goal: The student will understand basic procedures and tools. A. Demonstrate shop procedures B. Identify tools C. Demonstrate proper use of tools D. Use basic mechanics hands tools E. Use of micrometers, dial indicators, F. Bore and telescoping gauges, and calipers	B9.3 B9.4 B9.5 B11.1 B11.2 B11.3 B11.4 B11.5 B11.6	Anchor 1,2,6,7,10,11 CR 1,2,4,7	8	8

Instructional Content: Instruction will include:	Student Outcomes At the end of instruction, the student will be able to:	Hours CL=Classroom CC=Comm. Class			
7. Forklifts, hoists jacks and jack stands <ol style="list-style-type: none"> 1. Tank steam cleans parts tanks, Cold tank cleaning, glass bead Machines, and sand blasting 2. Pullers, hydraulic presses and arbor presses 3. Valve grinders, boring machines, and lathes 4. Air impact tools 5. Drilling threading, and removal of broken 6. Bolts and threaded inserts 7. Grinders and metal cutting equipment 	Goal: The student will understand the use of forklifts, hoists jacks and jack stands <ol style="list-style-type: none"> A. Demonstrate cleaning of steam and cold Tanks using various methods B. Demonstrate use of pullers, hydraulics and arbor presses C. Demonstrate use of valve grinders, Boring machines and lathes D. Demonstrate use of air impact tools E. Demonstrate use of drilling threading and removal of broken bolts and threaded inserts F. Demonstrate use of grinders and metal cutting equipment 	CTE B11.1 B11.2 B11.3 B11.4 B11.5 B5.1 B5.2 B5.3 B5.4 B5.5	Anchor CR Anchor 1,2,6,7,9, 10,11 CR 1,4,7,9, 10	CL 10	L 5
8. Welding Equipment <ol style="list-style-type: none"> 1. Sharpening and Fitting tools 2. Fasteners 3. Identification 4. Copper Tubing's 5. Brass Fittings 6. Hoses and fittings 7. Hydraulic fittings and lines 	Goal: The student will understand basic welding tools and equipment <ol style="list-style-type: none"> A. Understand the use of sharpening and fitting tools B. Understand fasteners C. Demonstrate tool identification D. Understand copper tubings and their use E. Understand brass fittings and their use F. Identify hoses and fittings G. Understand hydraulic fittings and lines 	B5.1 B5.2 B5.3 B5.4 B5.5 B8.1 B8.2 B8.3 B8.4 B9.1 B9.2 B9.3 B9.4 B9.5 B9.6 B9.7 B11.4	Anchor 1,2,6,7,9, 10,11 CR 1,2,4,5,7, 9,10	10	5
9. Diesel Engines <ol style="list-style-type: none"> 1. History and general information of diesel engine development and field applications 2. Comparison of diesel and gas engines 3. Two and four stroke cycle engine design and operation principles. 4. Model, serial and general identification system 5. Order parts 6. Basic engine cylinder block assembly design, components parts disassembly, inspection and reassembly 7. Cylinder blocks 8. Crankshaft and main bearings 9. Flywheel, ring gear, clutch pilot 	Goal: The student will understand Diesel Engines <ol style="list-style-type: none"> A. Understand general information and history diesel engine development and field applications B. Understand the comparisons of a diesel and gas engines C. Understand two and four stroke cycle engines D. Demonstrate how to identify the model, Serial and identification system E. Demonstrate ordering parts F. Understand basic engine cylinder block assembly design, components parts, G. Demonstrate disassembly, inspection 	B10.1 B10.2 B10.3 B10.4 B10.5 B10.6 B11.1 B11.2 B11.3 B11.4 B11.5 B11.6	Anchor, 1,2,5,7,9, 10,11 CR 1,2,4,5,7,8, 9,10,11,1 2	4	5

bearing, flywheel housing and gear train cover 10. Vibration damper 11. Pistons and connection rods 12. Timing gear train and camshaft 13. Cylinder head and valves 14. Lubrication systems, purpose, circulation, and distribution system 15. Engine oil 16. Oil filters and strainers; purpose and application 17. Oil cooler requirements 18. Lubricating oil pump 19. Oil leakage test purpose and procedures 20. Oil pressure and heat safety control devices	and reassembly of a basic engine cylinder block H. Understand crankshaft and main bearings I. Understand flywheel, ring gear, clutch pilot bearing, flywheel housing and gear train cover. J. Understand Vibration damper K. Understand pistons and connection rods L. Understanding timing gear train and camshaft M. Understand Cylinder heads and valves N. Understand lubricating systems O. Understand and demonstrate the use of engine oil, filters, and strainers P. Understand requirements for oil cooler Q. Understand lubricating oil pump R. Demonstrate purpose and procedures for oil leakage test S. Understand how to read oil pressure and heat safety control devices				
10. Cooling System 1. Cooling system coolant circulation and component assemblies 2. Thermostatically controlled hydraulically driven fan, design operation and serving principles	Goal: The student will understand cooling systems A. Understand Cooling system coolant Circulation and component assemblies B. Understand Thermostatically controlled Hydraulically driven fan, design operation and serving principles	CTE B11.2 B11.3	Anchor/ CR Anchor 1,2, 10,11,12 CR 1,2,4,5	3	10
11. Air Intake Systems 1. Naturally aspirated engines 2. Turbocharger engines 3. Air cleaners	Goal: The student will understand Air Intake Systems A. Understand naturally aspirated and turbocharger engines B. Understand air cleaners.	B11.2 B11.3	Anchor 1,2, 10,11,12 CR 1,2,4,5	3	5
12. Fuel Injection Systems 1. Fuel system fundamental assemblies and their basic operation principles 2. Fuel oil recommendations 3. Transfer pumps 4. Field installation and service	Goal: The student will understand Fuel Injection Systems A. Demonstrate fuel system fundamentals and basic operating principles B. Describe fuel oil recommendations C. Understand transfer pumps D. Demonstrate installation and service in a field setting.	CTE B11.2 B11.3	Anchor/ CR Anchor 1,2, 10,11,12 CR 1,2,4,5	CL 5	L 4
13. Ending Balancers 1. Balancing requirements 2. Balancer purpose, theory and Operating principles 3. Balancer timing and servicing procedures	Goal: The student will understand Balancers A. Demonstrate the purpose, theory and operating principles of a balancer B. Demonstrate time and services procedures	B11.2 B11.3	Anchor 1,2, 10,11,12 CR 1,2,4,5	3	10

Instructional Content: Instruction will include:	Student Outcomes At the end of instruction, the student will be able to:	Hours CL=Classroom CC=Comm. Class			
14. Tractors 1. Introduction 2. Daily maintenance and service 3. Starting and stopping procedures 4. Driving and backing 5. Speed Control 6. Ground and Engine	Goal: The student will understand tractors A. Develop a maintenance and service schedule for farm tractors. B. Demonstrate proper procedures for driving a tractor and controlling speed	B1.1 B1.2 B1.3 B11.1 B11.2 B11.3 B11.4 B11.5 B11.6	Anchor 1,2,4,5,6, 8, 9,10,11 CR 1,2,4,5,6, 7, 9,10,12	5	5
15. Tracklayers 1. Introduction 2. Daily maintenance and service 3. Starting and stopping procedures 4. Driving and backing 5. Speed control 6. Ground Engine 7. Hitching 8. 3 point hitches 9. Category selection and engagement safety 10. PTO connection and engagement and safety 11. Auxiliary hydraulic connections	Goal: The student will understand tracklayers. A. Develop a maintenance and service schedule B. Demonstrate proper procedures driving, backing up and controlling speed C. Demonstrate hitching process and procedures D. Demonstrate safety E. Demonstrate connections	B1.1 B1.2 B1.3 B11.1 B11.2 B11.3 B11.4 B11.5 B11.6	Anchor 1,2,4,5,6, 8, 9,10,11 CR 1,2,4,5,6, 7, 9,10,12	2	3
16. Loaders 1. Introduction 2. Daily maintenance and service 3. Safety and stability 4. Operating and handling 5. Forklifts 6. Safety and loading handling 7. Speed control and efficiency	Goal: The student will understand Loaders A. Develop a maintenance and service schedule B. Demonstrate proper procedures driving, backing up and controlling speed C. Describe forklifts and their purpose D. Describe procedures for safe loading	B1.1 B1.2 B1.3 B11.1 B11.2 B11.3 B11.4 B11.5 B11.6	Anchor 1,2,4,5,6, 8, 9,10,11 CR 1,2,4,5,6, 7, 9,10,12	5	5

Instructional Content: Instruction will include:	Student Outcomes At the end of instruction, the student will be able to:	Hours CL=Classroom CC=Comm. Class			
17. Trucks 1. Starting and stopping 2. Driving and backing 3. Speed control hitching 4. Daily maintenance and service. 5. Safety and First Aid	Goal: The student will understand trucks. A. Demonstrate safe driving procedures F. Demonstrate maintenance and service procedures G. Demonstrate safety and first aide	CTE B1.1 B1.2 B1.3 B11.1 B11.2 B11.3 B11.4 B11.5 B11.6	Anchor/CR Anchor 1,2,4,5,6,8, 9,10,11 CR 1,2,4,5,6, 7, 9,10,12	CL 3	L 3
18. Employability Skills 1. Career Paths 2. Employment opportunities 3. Educational Certifications Requirements 4. Sources of Job Info 5. Communication Skills 6. Employment Literacy 7. Application 8. Resume 9. Cover Letter 10. Interviews 11. Grooming and Dress 12. Follow-up Letter 13. Job Retention Skills 14. Team Work – Cooperation 15. Ethics and Professionalism 16. Work Habits and Ethics 17. Leadership	Goal: The student will understand Employability Skills A. Discuss career paths B. Explore employment opportunities. C. Complete Educational Certificate requirements D. Research varied sources of job info E. Exhibit good communication skills F. Demonstrate proper completion of an application G. Complete a resume, cover letter and follow-up letter H. Participate in mock interviews I. Demonstrate proper grooming and dress J. Discuss skills for retaining a job K. Participate as a team member L. Demonstrate proper ethics and responsibilities M. Demonstrate good work habits and leadership	B12.7	Anchor 1,2,3,4,5,6,7,8,9,10, 11 CR 1,2,3,4,5, 6 7,8,9,10, 11,12	2	3