COURSE DESCRIPTION: A course designed to develop skills in selection, operation and maintenance of small air-cooled engines, multi-cylinder engines, hydraulics, electric motors, and agricultural machinery and tractors.

<table>
<thead>
<tr>
<th>UNITS OF INSTRUCTION</th>
<th>MINUTES OF INSTRUCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety</td>
<td>470</td>
</tr>
<tr>
<td>Operating Principals</td>
<td>1,175</td>
</tr>
<tr>
<td>Fuels and Lubes</td>
<td>235</td>
</tr>
<tr>
<td>Power Transmission</td>
<td>1,175</td>
</tr>
<tr>
<td>Troubleshooting and Tune-up</td>
<td>1,175</td>
</tr>
<tr>
<td><strong>TOTAL MINUTES</strong></td>
<td><strong>4,230</strong></td>
</tr>
</tbody>
</table>

A. **Safety**

1. Identify safety equipment necessary for agricultural power systems
2. Apply basic laboratory safety instruction
3. Describe safety practices when working with large engines
4. Apply safety practices when using tractors
5. Identify the safe tractor operation practices for field and highway conditions

B. **Agricultural Tractors**

1. Identify and describe the operating principles of internal combustion engines--both spark ignition and diesel
2. Identify the daily service and care operations from the operator's manual
3. Identify the operating principles of the air cleaning, fuel and oil filtering and engine cleaning systems
4. Interpret the circuit diagram of the electrical and fuel injection systems of a diesel tractor
5. Interpret Nebraska Tractor Test information
6. Conduct pre-operation inspection of a farm tractor
7. Start, operate and stop the tractor engine properly
C. Fuels and Lubes

1. Select, safely store and use fuels and lubricants for gasoline, LPG and diesel tractors
2. Decide what octane rating to select for gasoline engines with different compression ratios
3. Explain why the correct octane is important
4. Decide what grade of diesel fuel to select for different diesel engines
5. Decide what cetane rating of diesel fuel to select for different diesel engines
6. Explain why the proper grade and cetane rating are important
7. Describe how the store gasoline, L.P. -GAS and diesel fuel
8. Describe why the proper storage of fuels is important
9. Describe crank case oil classifications and grade
10. Decide what class and grade of crank case oil to select for different engines and operating conditions
11. Explain why the correct oil is important
12. Select gear lubricant
13. Select hydraulic fluid
14. Select bearing grease
15. Describe how to store oils and greases
16. Explain why the proper storage of oils and greases is important

D. Power Transmission

1. Identify the function and operating principles of tractor clutches, transmission, control systems, including brakes
2. Lubricate the clutch release mechanism
3. Check and service the hydraulic system oil reservoir

E. Troubleshooting and Tune-up

1. Use ignition test equipment including dwell meters, tachometers, and timing devices
2. Test and service the battery and battery circuit
3. Adjust drive belts
4. Service the cooling system
5. Test and service the charging and cranking systems
6. Install diesel fuel filters and bleed the fuel system
7. Adjust control linkages including brakes, clutches, and safety disconnects
8. Properly pack front wheel bearings
9. Check and service the air cleaner
10. Change crankcase oil
11. Replace the oil filter
12. Check and service the crankcase breather
13. Check and maintain tractor tires
14. Adjust valve tappet clearance
15. Check and service tractor spark plugs
16. Clean the sediment bowl and fuel filter
17. Adjust the carburetor
18. Adjust tractor brakes
19. Adjust the engine clutch
20. Check and service the distributor
21. Time the ignition
22. Check and service the drive mechanism
23. Check and service the hydraulic system
24. Adjust the engine governor
25. Prepare the tractor for storage