

MISSION TRAILS REGIONAL OCCUPATIONAL PROGRAM

- 1. **COURSE TITLE:** ENGINE MAINTENANCE & REPAIR
- 2. **CBEDS TITLE:** MECHANICS AND ENGINEERING TECHNOLOGY
- 3. **CBEDS NUMBER:** 4030 (OLD 5558)
- 4. **JOB TITLES:**

- 51 – 2031.00 Engine or other machine assembler
- 53 – 6031.00 Service Station Attendant
- 53 – 7199.99 Materials Moving Worker

5. **COURSE DESCRIPTION:**

Learn maintenance skills in minor repairs, engine performance, trouble-shooting electrical repairs, steering repairs and general lubrication services. Students will be able to safely operate and maintain tractors.

- 6. **HOURS:** up to 675 hours
- 7. **PREREQUISITES:** None
- 8. **REVISION DATE:** June 10, 2010

9. COURSE OUTLINE:

a. CONTENT AREA SKILLS:

COURSE OUTLINE

CONTENT AREA SKILLS	EXPECTED STUDENT OUTCOMES	HOURS CL= Classroom CC=Community Class CP=Co-op Ed.		
		CL	CC	CP
Instruction will include:	Student will be able to:			
1. Job Search Skills	<ul style="list-style-type: none"> • Write a resume, cover letter, and thank you note. • Know how to interview for a job. • Know how to assemble a Job Search Portfolio 	30	10	
2. Use of Basic Hand Tools	<ul style="list-style-type: none"> • Identify type of wrenches • Identify hand cutting tools • Identify special tools 	25	10	
3. Shop Safety	<ul style="list-style-type: none"> • Know Personal Safety • Practice how to use the Material Safety Data Sheet (MSDS) • Safely start and stop equipment • Properly support equipment for service. • Safely operate equipment in hazardous situations. • Pre-operational inspection • Perform fork lift operations 	30	10	
4. Use the Operators Manual and Maintain Service Records.	<ul style="list-style-type: none"> • Locate the lubrication points using the Operators Manual. • Identify and plan routine servicing. • Locate operating instructions. • Order spare parts. • Locate servicing instructions. • Fill out repair forms and service records. 	30	25	
5. Perform daily maintenance tasks.	<ul style="list-style-type: none"> • Service air cleaner assembly. • Check crankcase oil level. • Check the cooling system. • Grease the 10 hour fittings • Remove water and sediment from fuel. (diesel) • Perform safety checks. 	25	30	
6. Start and stop gasoline and diesel Engines.	<ul style="list-style-type: none"> • Properly start a diesel engine. • Properly start a gasoline engine with manual choke. • Properly stop gasoline and diesel engines. 	20	20	

7. Select, store and apply fuels and Lubricants.	<ul style="list-style-type: none"> Describe proper storage conditions for gasoline and diesel fuels. Use safety precautions when refueling. Select proper lubricants. Use grease gun to apply multi-purpose grease. Use measured output hand-pump to add oil. 	5	5	
8. Perform Maintenance tasks.	<ul style="list-style-type: none"> Perform battery maintenance tasks. Check and adjust V-belt tension. Service air cleaner assembly. 	25	10	
9. Perform (100 hour) maintenance Tasks.	<ul style="list-style-type: none"> Change crankcase oil. Replace oil filters. Service the crankcase breather. 	20	5	
10. Perform (250 hour) Maintenance Tasks.	<ul style="list-style-type: none"> Adjust valve clearance to specifications. Change spark plugs. Adjust carburetor. Adjust engine clutch Replace worn or defective parts as necessary. 	25	5	
11. Perform (500 hour) Maintenance Tasks.	<ul style="list-style-type: none"> Service the distributor. Time the engine to specifications. Inspect the starter and alternator. Flush and pressure test the cooling system. Service diesel fuel filters. 	25	5	
12. Perform annual (1000 Hour) Maintenance tasks.	<ul style="list-style-type: none"> Service oil bath air cleaner assembly. Adjust engine governor 	35	5	
13. Identify the parts of the engine.	<ul style="list-style-type: none"> Identify the parts inside the engine block. Explain the operation of the four-stroke cycle engine. Identify the parts of the cylinder head. Identify the parts of the air intake and exhaust system. Identify the parts of the cooling system. Identify the parts of the fuel system. Identify the parts of the electrical system 	40	5	
14. Trouble shoots the engine.	<ul style="list-style-type: none"> Trouble shoots the starting circuit. Trouble shoots the ignition circuit. Trouble shoots the fuel system. Purge a diesel fuel system of air. Evaluate engine performance. Take and interpret compression readings. List special precautions for operating new engines. 	60	5	
15. Identify parts of the engine Computer control system.	<ul style="list-style-type: none"> Know how a computer controls the engine. Identify the computer. Identify sensors. Identify actuators. 	25	5	

16. Service small gas engines and Pumps.	<ul style="list-style-type: none"> • Operate small gas engines. • Operate booster pumps. • Assess small engine performance. • Perform routine maintenance tasks. • Reassemble a small gas engine. • Service pump seals. 	50		
17. Identify parts of the power train And chassis.	<ul style="list-style-type: none"> • Identify the parts of the power train. • Identify the parts of the chassis. 	20		
18. Fork Lift Training	<ul style="list-style-type: none"> • Fundamental Safety Training • Practical forklift operation • Safety pre-operational inspection • Battery Maintenance/Removal • Site Hazards Training 	20	10	
	TOTALS	510	165	

COURSE OUTLINE:

a. General Work Place Skills

- 1) CAREER PERFORMANCE STANDARDS
- 2) EXPECTED STUDENT OUTCOMES
- 3) HOURS OF INSTRUCTION

GENERAL WORK PLACE SKILLS

CAREER PERFORMANCE STANDARDS	EXPECTED STUDENT OUTCOMES	HOURS
Instruction will include:	Student will be able to	
<p>Personal Skills</p> <ul style="list-style-type: none"> ▪ Classroom policies & procedures ▪ Ethics <ul style="list-style-type: none"> → Work → Business ▪ Sexual harassment laws ▪ Personal skills, including positive attitude, self-confident, honesty, perseverance & self-discipline ▪ Professional appearance ▪ Time management ▪ Lifelong learning 	<p>1. Understand how personal skill development, including positive attitude, honesty, self-confidence, time management, & other positive traits affect employability.</p> <ul style="list-style-type: none"> ▪ Demonstrate and understand classroom policies & procedures ▪ Define work and business ethics & demonstrate the importance of ethical standards & social responsibilities in the business environment. ▪ Discuss the laws applicable to sexual harassment & discuss tactics for handling harassment situations. ▪ Demonstrate personal skills in class and/or business environment: <ul style="list-style-type: none"> → Positive attitude → Self-confidence → Honesty → Perseverance → Self-discipline ▪ Demonstrate and model personal hygiene and acceptable professional attire ▪ Prioritize tasks and meet deadlines ▪ Explain the importance of lifelong learning 	<p>Integrated in content area skills</p>

<p>2. Interpersonal Skills</p> <ul style="list-style-type: none"> ▪ Group dynamics ▪ Conflict resolution and negotiation ▪ Team work ▪ Etiquette across gender and cultural groups 	<p>2. Understand principles of effective interpersonal skills, including group dynamics, conflict resolution, and negotiation.</p> <ul style="list-style-type: none"> ▪ Identify and explain the key concepts of group dynamics ▪ Discuss and demonstrate the dynamics of conflict resolution and negotiation, and their importance within the business environment ▪ Demonstrate effective teamwork, share responsibilities, accept supervision and assume leadership roles ▪ Demonstrate cooperative working relationships and proper etiquette across gender and cultural groups 	<p>Integrated in content area skills</p>
<p>3. Thinking and Problem-Solving Skills</p> <ul style="list-style-type: none"> ▪ Critical and creative thinking skills ▪ Logical reasoning and problem-solving skills ▪ Numerical estimation, measurement, and calculation ▪ Identify, locate, and organize needed information and propose, evaluate, and select alternative solutions 	<p>3. Understand the importance of critical thinking and problem-solving skills in the workplace.</p> <ul style="list-style-type: none"> ▪ Apply critical and creative thinking skills in a work environment and implement a plan of improvement as needed ▪ Demonstrate logical reasoning and problem solving skills in a work environment ▪ Apply numerical estimation, measurement and calculation skills to business applications including the following: <ul style="list-style-type: none"> → Whole number math → Decimals & fractions → Counting & monetary functions → Use of tables & graphs ▪ Recognize problem situations; identify, locate and organize needed information, and propose, evaluate and select from alternate solutions 	<p>Integrated in content area skills</p>

<p>4. Communication Skills</p> <ul style="list-style-type: none"> ▪ Written communications ▪ Verbal and Nonverbal communications ▪ Active and effective listening ▪ Proper etiquette in business communications ▪ Writing and editing skills ▪ Use of reference material and handbooks ▪ Oral presentations 	<p>4. Understand principles of effective communication.</p> <ul style="list-style-type: none"> ▪ Read and implement written instructions, technical manuals, written communication, and reference books ▪ Present a positive image of verbal and nonverbal communication through use of appropriate methods ▪ Demonstrate active and effective listening skills through verbal, nonverbal and written feedback ▪ Demonstrate proper etiquette in business communications, including an awareness of requisite for international communications (languages, customs, and time zones) ▪ Demonstrate the following writing and editing skills: <ul style="list-style-type: none"> → Use correct grammar, punctuation, capitalization, vocabulary and spelling → Write, proofread and edit → Select and use appropriate forms of communication ▪ Exhibit a proficiency in the use of reference materials such as dictionary, thesaurus, telephone directory, almanac, zip code directory, and office handbooks 	<p>Integrated in content area skills</p>
<p>5. Occupational Safety</p> <ul style="list-style-type: none"> ▪ Good safety practices 	<p>5. Understand occupational safety issues, including avoidance of physical hazards</p> <ul style="list-style-type: none"> ▪ Model and implement good safety practices including: <ul style="list-style-type: none"> → Avoidance and reporting of physical hazards in the work environment → Safe operation of equipment → Proper handling of hazardous materials → Proper use of personal protective equipment 	<p>Integrated in content area skills</p>

<p>6. Employment Literacy</p> <ul style="list-style-type: none"> ▪ Expand awareness of career opportunities ▪ Set employment goals and objectives ▪ Aptitudes, personal characteristics and interests ▪ Develop portfolio to C-TAP standards ▪ Develop interviewing techniques 	<p>6. Understand career paths and strategies for obtaining employment.</p> <ul style="list-style-type: none"> ▪ Explore career opportunities and develop a career plan ▪ Identify steps for setting goals and writing personal goals and objectives ▪ Examine aptitudes related to career options; relate personal characteristics and interests to educational and occupational opportunities ▪ Develop a portfolio to include the following: <ul style="list-style-type: none"> → Letter of Introduction → Cover letter → Resume → Thank you letter → Job application → Licenses, Certificates and Awards → Transcripts → Letters of Recommendation → Work Samples 	<p>Integrated in content area skills</p>
<p>7. Technology Literacy</p> <ul style="list-style-type: none"> ▪ Apply Industry specific technology ▪ Use Industry specific software ▪ Demonstrate Keyboarding ▪ Accessing information ▪ Lifelong enhancement of technology skills 	<p>7. Understand and adapt to changing technology.</p> <ul style="list-style-type: none"> ▪ Identify and demonstrate use of appropriate technology ▪ Identify and use industry specific software ▪ Demonstrate proficiency in alphanumeric keyboarding ▪ Input and retrieve information ▪ Understand the importance of lifelong learning in adapting to changing technology 	<p>Integrated in content area skills</p>

10. ADDITIONAL RECOMMENDED /OPTIONAL ITEMS

- a. **ARTICULATION:** **None**
- b. **VOCATIONAL CREDITS:** **10 Credits**
- c. **ACADEMIC CREDITS:** **Vocational credits only**
- d. **ELECTIVE CREDITS:** **10 Credits**
- e. **INSTRUCTIONAL STRATEGIES:**
Lecture, Demonstration, Hands-on Application, Group Work, Community Classroom
- f. **INSTRUCTIONAL MATERIALS:**
Basic Hand Tools, Technical Manuals, Diagnostic Tools, Multi-media, Live and Demonstration Tractors.
- g. **CERTIFICATES:** **Available upon completion of course or completion of a Semester.**