

**A PLAN OF TRAINING
FOR
SMALL EQUIPMENT REPAIR
OCCUPATION**

**Approved by
Provincial Apprenticeship Board**

**April, 1997
Revised June, 2000**

Foreword

Apprenticeship training in the Province of Newfoundland and Labrador is undergoing considerable change. This change is prompted by the need to keep pace with technological changes in industry, the need to be competitive, and the desire to be efficient and effective in meeting the needs of the apprentice. We feel that this training plan will lay the groundwork to meet both the demands of industry and the needs of the apprentice.

The plan that follows is a comprehensive one. It recognizes that apprenticeship training begins when a student first registers at a training institution and continues until such time as the apprentice has completed all of the required technical training and has received the required industry experiences necessary to write a provincial examination. Passing this examination will result in the apprentice receiving Provincial Certification which gives the journeyperson provincial qualifications. This plan also recognizes the need to provide flexible access to training based on the needs of the employer and the apprentice while at the same time recognizing the end goal is to complete the requirements for Provincial Certification.

It is realized that change in all facets of education and industry is continuous and sometimes rapid. This change will necessitate the review of this document on a continuous basis to ensure that current needs of industry and apprentices are being satisfied. Through a process of accreditation, regular input from industry advisory committees, as well as input from those involved in the administration and delivery of the training, we are confident that residents of our province who elect to pursue an apprenticeship occupation as a career choice will receive high quality training and thus will be prepared to compete for jobs worldwide.

Chair, Provincial Apprenticeship Board

Minister of Education

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CONDITIONS GOVERNING APPRENTICESHIP TRAINING

1.0 GENERAL

The following general conditions will apply to all apprenticeship training programs approved by the Provincial Apprenticeship Board in accordance with the Apprenticeship Act. Where an occupation requires additional conditions, these will be noted in the specific plan of training for that occupation. In no case should there be a conflict between these conditions and the additional requirements specified in certain plans of training.

2.0 ENTRANCE REQUIREMENTS

2.1 Entry into the occupation as an apprentice requires:

The completion of designated first year courses specific to the occupation

OR

Indenturing into the occupation by an employer who agrees to provide the appropriate training and work experiences as outlined in this plan of training.

OR

Enrolment in a program of studies that includes all entry and advanced level skills and required work experiences as approved by the Provincial Apprenticeship Board.

2.2 Notwithstanding the above, each candidate must have successfully completed a high school program or equivalent and in addition may be required to have completed certain academic subjects as specified in particular plans of training. Mature students, at the discretion of the Director of Institutional and Industrial Education, may be registered. A mature student is defined as one who has reached the age of 19 and who can demonstrate the ability and the interest to complete the requirements for certification.

2.3 At the discretion of the Director of Institutional and Industrial Education, credit towards the apprenticeship program may be awarded to an apprentice for previous work experience and/or training as validated through prior learning assessment.

2.4 A Registration for Apprenticeship form must be duly completed.

3.0 PROBATIONARY PERIOD

The probationary period for each memorandum of understanding will be six months. Within that period the memorandum may be terminated by either party upon giving the other party and the Provincial Apprenticeship Board one week notice in writing.

4.0 TERMINATION OF A MEMORANDUM OF UNDERSTANDING

After the probationary period referred to in Section 3.0 herein, the memorandum of understanding may be terminated by the Board by mutual consent of the parties thereto or cancelled by the Board for proper and sufficient cause in the opinion of the Board.

5.0 APPRENTICESHIP PROGRESSION SCHEDULE AND WAGE RATES

5.1 Progression Schedule

7200 Hour Programs	Requirements for Progression	Progress To
First Year Apprentice	25% of Course Credit Hours, Plus relevant work experience totaling 1800 hours	Second Year
Second Year Apprentice	50% of Course Credit Hours, Plus relevant work experience totaling 3600 hours	Third Year
Third Year Apprentice	75% of Course Credit Hours, Plus relevant work experience totaling 5400 hours	Fourth Year
Fourth Year Apprentice	100% of Course Credit Hours, Plus completion and sign-off of workplace skills required for certification totaling 7200 hours	Write Certification Examination
5400/4800 Hour Programs		
First Year Apprentice	33% of Course Credit Hours, Plus relevant work experience totaling 1800/1600 hours	Second Year
Second Year Apprentice	66% of Course Credit Hours, Plus relevant work experience totaling 3600/3200 hours	Third Year
Third Year Apprentice	100% of Course Credit Hours, Plus completion and sign-off of workplace skills required for certification totaling 5400/4800 hours	Write Certification Examination

5.2 For the duration of each Apprenticeship Training Period, the apprentice, who is not covered by a collective agreement, shall be paid a progressively increased schedule of wages which shall not be less than:

Program Duration	Wage Rates		Comments
7200 Hours	1 st Year	55%	These wage rates are percentages of the prevailing journey person's wage rate in the place of employment of the apprentice. No apprentice shall be paid less than the wage rate established by the Labour Standards Act (1988), as now in force or as hereafter amended, or by other Order, as amended from time to time replacing the first mentioned Order.
	2 nd Year	65%	
	3 rd Year	75%	
	4 th Year	90%	
5400 Hours and 4800 Hours	1 st Year	55%	
	2 nd Year	70%	
	3 rd Year	85%	
4000 (Hairstylist) - The apprentice shall be paid no less than the minimum wage for hours worked and a commission agreed upon between the apprentice and the employer.			

6.0 TOOLS

Apprentices shall be required to obtain hand tools as and when specified by the Board.

7.0 PERIODIC EXAMINATIONS

7.1 Every apprentice shall submit to such occupational tests and examinations as the Board shall direct. If after such occupational tests and examinations the apprentice is found to be making unsatisfactory progress, his/her rate of wage shall not be advanced as provided in Section 5 until his/her progress is satisfactory to the Director of Institutional and Industrial Education and his/her date of completion shall be deferred accordingly. Persistent failure to pass required tests shall be a cause for revocation of his/her Memorandum of Understanding.

7.2 Upon receipt of reports of accelerated progress of the apprentice, the Board may shorten the term of apprenticeship and advance the date of completion accordingly.

8.0 GRANTING OF CERTIFICATES OF APPRENTICESHIP

Upon the successful completion of apprenticeship, the Board shall issue a Certificate of Apprenticeship

9.0 HOURS OF WORK

Any hours employed in the performance of duties related to the designated occupation will be credited towards the completion of the term of apprenticeship. Appropriate documentation of these hours must be provided.

10.0 COPIES OF THE REGISTRATION FOR APPRENTICESHIP

The Director of Institutional and Industrial Education shall provide copies of the Registration for Apprenticeship form to all signatories to the document.

11.0 RATIO OF APPRENTICES TO JOURNEYPERSONS

The ratio of Apprentices to Journeypersons normally shall not exceed one apprentice to every one journeyperson employed. Exceptions for specific occupations may occur with the approval of the Provincial Apprenticeship Board.

12.0 RELATIONSHIP OF THE PLAN OF TRAINING TO A COLLECTIVE BARGAINING AGREEMENT

Collective agreements take precedence over the conditions outlined in the plan of training.

13.0 AMENDMENTS TO A PLAN OF APPRENTICESHIP TRAINING

A plan of training may be amended at any time by the Provincial Apprenticeship Board.

14.0 EMPLOYMENT, RE-EMPLOYMENT AND TRAINING REQUIREMENTS

14.1 The plan of training requires Apprentices to attend regularly their place of employment.

14.2 The plan of training requires Apprentices to regularly attend training programs for that occupation as prescribed by The Provincial Apprenticeship Board.

14.3 Under the plan of training the employer is required; to keep each apprentice employed as long as work is available, and if the apprentice is laid off due to lack of work, to give opportunity to be re-employed before another is hired.

14.4 The employer will permit each apprentice to attend regularly training programs as prescribed by the Provincial Apprenticeship Board.

15.0 APPEALS TO DECISIONS BASED ON CONDITIONS GOVERNING APPRENTICESHIP TRAINING

Persons wishing to appeal any decisions based on the above conditions must do so in writing to the Minister of Education within 30 days of the decision.

REQUIREMENTS FOR PROVINCIAL CERTIFICATION
IN THE SMALL EQUIPMENT REPAIR OCCUPATION

1. Evidence that the required work experiences outlined in this plan of training has been obtained. This evidence must be in a format that clearly outlines the experiences and a signature (s) of an appropriate person(s) attesting that these experiences have been obtained to the level required.
2. Have a combination of training from an accredited training program and suitable work experience totalling 5400 hours

Or

Have a total of 7200 hours of suitable work experience.

3. Completion of provincial examination to be set at a place and time determined by the Industrial Training Division of the Department of Education.
4. Pay the appropriate examination fee.

ROLES AND RESPONSIBILITIES OF STAKEHOLDERS IN THE APPRENTICESHIP PROCESS

Apprenticeship process involves a number of stakeholders playing significant roles in the training of apprentices. This section captures, in a broad sense, these roles and the responsibilities that result from them.

Apprentices

- ▶ to complete all required technical training courses as approved by the Provincial Apprenticeship Board.
- ▶ to find appropriate employment
- ▶ to complete all required work experiences in combination with the required hours.
- ▶ to ensure that the work experiences are well documented
- ▶ to approach apprenticeship training with an attitude and commitment that fosters the qualities necessary for a successful career as a qualified journeyman.
- ▶ to obtain the required hand tools as specified by the Board for each period of training of the apprenticeship program (Appendix A).
- ▶ to provide feedback to Training Institutions, the Industrial Training Division and Employers in an effort to establish a process of continuous quality improvement.

Employers

- ▶ to provide high quality work experiences in an environment that is conducive to learning.
- ▶ to remunerate apprentices as set out in the Plan of Training or Collective Agreements.
- ▶ to provide feedback to Training Institutions, Industrial Training Division and Apprentices in an effort to establish a process of continuous quality improvement.
- ▶ where appropriate, to release apprentices for the purpose of returning to a training institution to complete the necessary technical courses.
- ▶ to ensure that work experiences of the apprentices are documented

Training Institutions

- ▶ to provide a high quality learning environment.
- ▶ to provide the necessary student support services that will enhance an apprentices ability to be successful.
- ▶ to participate with other stakeholders in the continual updating of programs.

Industrial Training Division

- ▶ under the direction of the Provincial Apprenticeship Board, to establish and maintain provincial program advisory committees.
- ▶ to promote apprenticeship training as a viable career option to prospective apprentices and other appropriate persons involved such as career guidance counsellor, teachers, parents, etc.
- ▶ to establish and maintain a protocol with apprentices, training institutions, employers and other appropriate stakeholders to ensure the quality of apprenticeship training programs.
- ▶ to ensure that all apprentices are appropriately registered and records are maintained as required.
- ▶ to schedule all necessary technical training periods for apprentices to complete requirements for certification.
- ▶ to administer provincial/interprovincial examinations.

Provincial Apprenticeship Board

- ▶ to set policies to ensure that the provisions of the Apprenticeship Training Act are implemented.
- ▶ to ensure that advisory and examination committees are established and maintained.
- ▶ to accredit institutions to deliver apprenticeship training programs.
- ▶ to designate occupations for apprenticeship training and / or certification.

TECHNICAL COURSE OUTLINES

SUGGESTED COURSE LAYOUT FOR THE SMALL EQUIPMENT REPAIR OCCUPATION

JOURNEYPERSON CERTIFICATION

REQUIRED WORK EXPERIENCE

+

SEMESTER FOUR	
SR1110 - Lawn & Garden equipment. Troubleshooting & Repair	90 Hrs.
SR1210 - Snowmobile Troubleshooting & Repair	90 Hrs.
SR1310 - Motorcycle & ATV Troubleshooting & Repair	90 Hrs.
SR1410 - Marine Equipment. Troubleshooting & Repair	90 Hrs.
Related Courses	90 Hrs.

+

SEMESTER THREE	
MV1330 - Carburetted Fuel Systems	67.5 Hrs.
MV1620 - Light & Medium Duty Cooling Systems	67.5 Hrs.
MV1550 - Small Equipment Transmissions	67.5 Hrs.
SR1100 - Lawn & Garden Equipment. Servicing Fundamentals	45 Hrs.
SR1200 - Snowmobile Servicing Fundamentals	67.5 Hrs.
SR1300 - Motorcycle & ATV Servicing Fundamentals	45 Hrs.
SR1400 - Marine Equipment Servicing Fundamentals	67.5 Hrs.

+

0INTERSESSION	
MV1310 - Gas Engine Air & Fuel Delivery Systems	90 Hrs.
MV2310 - Gas Injection Systems	90 Hrs.

+

SEMESTER TWO	
WD1130 - Gas Metal Arc Welding Fundamentals	45 Hrs.
MP1310 - AC/DC Fundamentals	90 Hrs.
MV1160 - Light Duty Engines	90 Hrs.
MV1430 - Light & Medium Duty Starting & Charging Systems	67.5 Hrs.
MV1420 - Ignition Systems	90 Hrs.
Related Courses	45 Hrs.

+

SEMESTER ONE	
TS1100 - Shop Fundamentals	90 Hrs.
TS1200 - Precision Measurement	67.5 Hrs.
WD1210 - Oxy-Fuel Cutting and Welding	60 Hrs.
MV1100 - Engine Operations	45 Hrs.
MV1110 - Lubrication Systems	45 Hrs.
Related Courses	60 Hrs.

+

Program and Apprenticeship Registration

COURSE OUTLINE - TS1100

NAME AND NUMBER: General Studies 1100

DESCRIPTIVE TITLE: Shop Fundamentals

DESCRIPTION:

This general studies course requires the use of safety equipment, tools, fasteners, shop equipment and facilities and manuals. It involves the development of safety practices in the operation and maintenance of shop tools, equipment and facilities.. It includes information on general safety regulations, occupational health and safety, and fire prevention and suppression.

PREREQUISITES: None

CO-REQUISITES: None

CREDIT VALUE: 4

COURSE AIMS:

1. To gain an appreciation of the need for safety regulations in the operation and maintenance of shop tools, equipment and facilities
2. To be able to administer first aid and CPR
3. To develop an awareness of hazardous workplace materials

COURSE OBJECTIVES (KNOWLEDGE):

1. List general workplace safety regulations
2. List fire safety regulations
3. Describe the operation and uses of different types of fire extinguishers
4. Explain the safety standards prescribed by the Occupational Health and Safety Regulations

5. Describe the use of the different types of precision measuring tools
6. Describe safety requirements for using hand tools and fasteners
7. Describe the different types of fasteners
8. Explain oxidation, corrosion, tensile strength and shear strength
9. Describe types of hydraulic and pneumatic lines and fittings and explain their applications
10. Describe types of tubing and flaring tools and explain the application of each
11. Explain the purpose of threading taps and dies
12. Describe the types of fastener tools
13. Describe types and explain the uses of pullers, drivers and presses
14. Describe soldering tools, materials and applications
15. Describe methods of tinning and soldering
16. Describe types of solders
17. Describe the different types of power tools
18. Describe the different types of hydraulic tools
19. Describe safety requirements for using power tools
20. Describe the parts of a twist drill
21. Describe drill sizes and speed requirements
22. Describe types and uses of reaming tools
23. Explain the purpose of cutting power tools
24. Describe types and explain applications of:
 - i. portable and stationary grinders
 - ii. grinding wheels
 - iii. grinding discs

- iv. grinder dressers
 - v. rotary wire brushes
25. Describe types of compressors and components
26. Describe the pliers (all types), screwdrivers (all types), wrenches (all types), clamps (all types) and vices (all types) used for fitting and assembling as per assigned information to within specifications required
27. Describe as per the assigned information, rivets, keys, nuts, screws, pins, splines, studs, bolts, snaprings, bonds (thread locking compounds), washers, lock wires and self-locking nuts

MAJOR TASKS / SUBTASKS (SKILLS):

1. Practice safety
 - a. Interpret occupational safety code
 - b. Apply safe work habits at all times
 - c. Use and maintain personal safety equipment
 - d. Implement exhaust control procedures
 - e. Use fire fighting equipment
 - f. Respect noise level regulations
 - g. Reduce factors that contribute to spontaneous combustion
 - h. Identify potential hazards to personal safety
 - i. Check for unsafe conditions
 - j. Report accident
2. Complete a St. John's Ambulance Standard First Aid Course
3. Complete a Workplace Hazardous Materials Information Systems Course
4. Use and maintain gripping and turning tools, measuring devices and levels
 - a. Use measuring tools (measuring tapes, rules, scale rules, calipers, micrometers, gauges, straight edges, plumb bobs, squares, and calculators) and levels
 - b. Use pliers, screwdrivers, wrenches, torque multipliers, hammers and mallets and other gripping and turning tools
 - c. Use torque wrench
 - d. Use scribes and markers
5. Use and maintain flaring tools
 - a. Single and double flare tubing
 - b. Bend tubing

- c. Measure and cut tubing
 - d. Use compression fittings
 - e. Anneal tubing before flaring as may be necessary
 - f. Test and inspect flared fittings
6. Use and maintain cutting tools
- a. Identify, maintain and use punches, chisels, files and saws
 - b. Sharpen chisels and twist drills and drill bits
 - c. Shape and sharpen a cold chisel
 - d. Maintain and store cutting tools
 - e. Cut sheet metal
 - f. Make bench projects
 - g. Cut bolts
 - h. Drill and ream holes
7. Use and maintain threading devices
- a. Select and safely use proper tools for given job
 - b. Maintain threading tools
 - c. Make an internal thread
 - d. Make an external thread
 - e. Restore damaged thread
 - f. Remove broken screw
 - g. Use tap and drill chart
8. Install fasteners
- a. Use and identify fasteners such as rivets, nails, wood screws, sheet metal screws, bolts, nuts, washers, masonry anchors and shields
 - b. Describe specific uses for each fastener
 - c. Recognize sizes of fasteners
 - d. Rivet and soft solder lap joint in galvanized sheet
 - e. Torque bolts
 - f. Identify bolt grades
 - g. Identify miscellaneous anchoring devices
9. Safely and effectively use, maintain and store pullers, drivers and presses
10. Solder metals
- a. Select solder and heating unit
 - b. Solder wire connections, sheet metal, and copper fittings and tubing
 - c. Shut down and store equipment
11. Use power tools
- a. Operate portable power tools

- b. Operate treading machines
 - c. Operate power cleaning equipment
 - d. Operate hydraulic punches, pullers, drivers and presses
12. Drill materials
- a. Safely and effectively operate power drilling equipment (hammer and portable drill)
 - b. Select and use cutting fluids
 - c. Identify and select clamping devices
 - d. Maintain drilling equipment
13. Cut metals (power)
- a. Safely and effectively use power operated saws, friction cut-off equipment and shears
 - b. Maintain metal cutting power tools
 - c. Identify and use abrasives
14. Grind and finish metals
- a. Install grinding wheel disc and brush
 - b. Adjust tool rest
 - c. Dress grinding wheel
 - d. Safely and effectively operate stationary and portable grinders
 - e. Maintain equipment
15. Use explosive actuated tools
- a. Select the proper tool for a specific use
 - b. Follow Occupational Health and Safety regulations
 - c. Choose the correct shot and fastener for the job
 - d. Apply safety practices while using explosive actuated tools
 - e. Fasten construction material to masonry and steel
 - f. Maintain and clean explosive actuated tools
16. Use and maintain compressed air system
- a. Demonstrate safety precautions when using and maintaining compressors
 - b. Identify components of air controller (transformer)
 - c. Use and maintain air controller (transformer)
 - d. Use and maintain air and fluid hoses
17. Use and maintain shop equipment
- a. jacks
 - b. shop cranes
 - c. chain hoists
 - d. steam cleaner

- e. solvent cleaning tanks
18. Interpret mechanical drawings and information
- a. Interpret service manual information
 - b. Read and sketch simple mechanical and schematic diagrams
 - c. Demonstrate following job procedures for major components
 - d. Complete various types of work related forms such as: work orders, log books, requisitions, and purchase orders
 - e. Access manufacturers service information

EVALUATION:

Written reports and/or tests.
Competence in simulated work.

DEVELOPMENT HISTORY:

Date Developed: December 1993
Course Updated: June 1996

INSTRUCTOR'S NOTES:

COURSE OUTLINE - TS1200

NAME AND NUMBER: General Studies 1200

DESCRIPTIVE TITLE: Precision Measurement

DESCRIPTION:

This general studies course requires the use of precision measuring instruments. It involves operating, maintaining and storing precision measuring instruments. It includes information on decimals, measuring systems, measurement conversion and purposes of precision measurement.

PREREQUISITES: None

CO-REQUISITES: None

CREDIT VALUE: 3

COURSE AIMS:

1. To develop the skills and knowledge required for making precision measurements

COURSE OBJECTIVES (KNOWLEDGE):

1. Describe types and explain the uses of semi-precision measuring tools such as combination, set, steel rule, trammels, dividers, keyset rule, inside and outside calipers, surface gauges, combination depth and hook rule, measuring tape, hermaphrodite calipers and short rule
2. Describe types and explain the use of precision measuring tools such as micrometers (all types), vernier calipers (all types), vernier level protractor, surface plates (all types), telescopic gauges, small hole gauges, depth gauges, precision square, machinists level, gauge blocks, cylindrical square, angle plates, height gauge, dial indicators (all types), sine bars, sine plate and toolmaker buttons
3. Solve problems on decimals
4. Solve problems using metric measurements

5. Solve problems on English/Metric conversions

MAJOR TASKS / SUBTASKS (SKILLS):

1. Use and maintain precision and semi-precision measuring tools
 - a. Identify and explain the purpose of the given measuring tools
 - b. Measure outside and inside diameters
 - c. Measure projection and depth
 - d. Measure runout, endplay and backlash
 - c. Maintain measuring tools

EVALUATION:

Written reports and/or tests.

Competence in simulated work and/or experiential endorsements.

DEVELOPMENT HISTORY:

Date Developed: February 1994

INSTRUCTOR'S NOTES:

COURSE OUTLINE - WD1210

NAME AND NUMBER: Welding 1210

DESCRIPTIVE TITLE: Oxy-Fuel Cutting and Welding

DESCRIPTION:

This OFW course requires the use of welding equipment and accessories, materials and supplies and safety equipment. It involves setting up OFW equipment; preparing, cutting and welding metal; and shutting down, disassembling and storing equipment. It includes information on safety requirements, cylinder pressures, combustion and flames, storage and transporting of cylinders, and types of regulators.

PREREQUISITES: None

CO-REQUISITES: None

CREDIT VALUE:

COURSE AIMS:

1. To develop the skills and knowledge required for welding metal structures with respect to various codes and standards
2. To practice safety in potentially harmful situations

COURSE OBJECTIVES (KNOWLEDGE):

1. Describe oxy-fuel equipment and components
2. Explain lighting procedures and describe types of flame
3. Explain cutting procedures and equipment used
4. List metals that can be cut and metals that cannot be cut
5. Explain the procedure use to weld in a FLAT POSITION

6. Describe braze welding processes as applied to various metals including cast iron
7. Explain the purpose of filler metals in the brazing process
8. Describe type of flame adjustment for brazing
9. Explain the steps in oxy-fuel welding
10. Describe the types of metals that are suitable for the welding process
11. Explain the steps in oxy-fuel cutting
12. Describe types of flames, pressures and tip sizes and the application of each
13. Describe the principle of the brazing process

MAJOR TASKS / SUBTASKS (SKILLS):

1. Set-up and use welding equipment (OFW)
 - a. Demonstrate safety precautions when handling this equipment
 - b. Set up, adjust equipment and check for leaks
 - c. Light torch and make flame adjustments
 - d. Shut down equipment and place in designated location
2. Set up and use cutting equipment
 - a. Set up and adjust the cutting equipment for the assigned project
 - b. Cut mild steel 90° FREEHAND
 - c. Cut mild steel 90° GUIDED
 - d. Cut mild steel at a 30° BEVEL FREEHAND
 - e. Cut mild steel at a 30° BEVEL GUIDED
 - f. Cut regular and irregular shapes FREEHAND
 - g. Cut off bolt and/or nut FREEHAND (optional)
3. Fusion weld flat (OFW)
 - a. Prepare metal for welding
 - b. Set up and adjust welding equipment
 - c. Run fusion welding beads
 - d. Weld mild steel single vee butt joint
 - e. Weld mild steel open-corner butt joint
 - f. Weld mild steel lap joint
 - g. Fuse weld sheet metal
4. Braze weld metals (OFW)

- a. Prepare metal
 - b. Set up and adjust welding equipment
 - c. Tack weld metal
 - d. Braze weld tee joint (m.s. in flat position)
 - e. Braze weld butt joint (m.s. in flat position)
 - f. Prepare and bronze weld cast iron
 - g. Perform silver brazing
5. Assemble metals using brazing process
- a. Operate oxy-fuel equipment to assemble metals using the brazing process
 - b. Prepare joints for brazing:
 - i. 3/4 copper tee with fittings
 - ii. tee joint (1/8x4x4 flat bar, m.s.)
 - c. Braze tee joint 1/8x1x4 copper to mild steel
 - d. Braze stainless steel tee joint (1/8x1x4"s.s.)

EVALUATION:

Written reports and/or tests.

Competence in simulated work and/or experiential endorsements.

DEVELOPMENT HISTORY:

Date Developed: December 1993

INSTRUCTOR'S NOTES:

COURSE OUTLINE - MV1100

NAME AND NUMBER: Mechanics 1100

DESCRIPTIVE TITLE: Engine Operations

DESCRIPTION:

This course in engines requires the use of basic tools, shop equipment and test equipment. It involves compression testing and valve timing. It includes information on the operation of different types of engines and component parts.

PREREQUISITES: None

CO-REQUISITES: None

CREDIT VALUE: 2

COURSE AIMS:

1. To develop the skills and knowledge required for maintaining and repairing engines
2. To develop the skills to use service information effectively
3. To practice safety in potentially harmful situations
4. To develop an appreciation for environmental protection.

COURSE OBJECTIVES (KNOWLEDGE):

1. Describe major engine components
2. Describe types of engines
3. Describe basic engine terminology
4. Describe engine operating cycles
 - i. 4 Cycle Gasoline
 - ii. 4 Cycle Diesel

- iii. 2 Cycle Gasoline
 - iv. 2 Cycle Diesel
 - v. Rotary
- 5. Describe valve timing mechanisms and explain setting procedure
 - 6. Describe test equipment and explain testing procedure
 - 7. Explain distributor timing

MAJOR TASKS / SUBTASKS (SKILLS):

- 1. Set valve timing
 - a. Replace timing belt/chain
 - b. Set valve timing
 - c. Service and repair reed valves on 2 cycle engines
- 2. Check engine compression (gasoline and diesel)
 - a. Remove spark plugs/injectors
 - b. Test compression:
 - i. gas engine
 - ii. diesel engine
 - c. Compare readings to indicate engine condition
 - d. Replace and torque spark plugs/injectors
 - e. Bleed injectors

EVALUATION:

Written reports and/or tests.

Competence in simulated work and/or experiential endorsements.

DEVELOPMENT HISTORY:

Date Developed: February 1994

INSTRUCTOR'S NOTES:

COURSE OUTLINE - MV1110

NAME AND NUMBER: Mechanics 1110

DESCRIPTIVE TITLE: Lubrication Systems

DESCRIPTION:

This course in lubrication systems requires the use of basic tools, shop equipment and test equipment. It involves disassembling and reassembling lubrication systems; and inspecting, testing and repairing/replacing component parts and making adjustments. It includes information on the operation of different types of lubrication systems and component parts.

PREREQUISITES: None

CO-REQUISITES: None

CREDIT VALUE: 2

COURSE AIMS:

1. To develop the skills and knowledge required for maintaining and repairing lubrication systems
2. To develop the skills to use service information effectively
3. To practice safety in potentially harmful situations
4. To develop an appreciation for environmental protection.

COURSE OBJECTIVES (KNOWLEDGE):

1. Describe the types, qualities, characteristics, and classifications of engine oils
2. Describe the functions of engine oils
3. Describe contaminants and explain their effects

4. Describe types of lubricating systems and filters
5. Explain the operation of lubrication systems and components including
 - i. stand-by system
 - ii. pre-lubricating systems
 - iii. Cylinder lubricators
6. Describe the types and explain the purpose of lubricating oil filters
7. Describe the types and explain the operation of lubricating pumps:
 - i. gear
 - ii. herringbone
 - iii. vane
 - iv. rotor
8. Describe the types and explain the operation of pressure relief valves and components
9. Describe the types and explain the operation of lubrication oil coolers

MAJOR TASKS / SUBTASKS (SKILLS):

1. Identify and service lubrication systems
 - a. Identify and maintain charts for pre-mixing
 - b. Service oil filters and check for leaks
 - c. Check oil level
 - d. Check oil pressure
 - e. Identify and maintain dirty oil tank
 - f. Flush crankcase
 - g. Test lubricating oil for contamination
 - h. Select and replace engine oil and check for leaks
 - i. Maintain appropriate service records
2. Service oil filters
 - a. Remove, clean, inspect, and replace oil filters
 - b. Drain filter housing
 - c. Review gaskets and "O" rings and replace filter
 - d. Fill and bleed system (if necessary)
 - e. Remove, clean and inspect the filter by-pass valve
3. Service stand-by and pre-lubrication systems
 - a. Service and maintain stand-by systems
 - b. Service and maintain pre-lubricating system
 - c. Service and maintain cylinder (mechanical) lubricators

4. Service pressure relief valves
 - a. Remove, clean and inspect valve components
 - b. Assemble and replace valve

5. Service lubricating oil pump
 - a. Identify, remove and disassemble oil pumps
 - b. Inspect and replace worn components
 - c. Assemble and test pump
 - d. Replace, prime and test on engine
 - e. Identify and adjust two-cycle oil pumps
 - f. Service lubricating valves
 - g. Test oil pressure

6. Service lubricating oil coolers
 - a. Drain and dismantle unit
 - b. Clean, inspect and test components
 - c. Replace zincs if necessary
 - d. Replace all "O" rings, gaskets and seals and assemble

EVALUATION:

Written reports and/or tests.

Competence in simulated work and/or experiential endorsements.

DEVELOPMENT HISTORY:

Date Developed: February 1994

INSTRUCTOR'S NOTES:

COURSE OUTLINE - WD1130

NAME AND NUMBER: Welding 1130

DESCRIPTIVE TITLE: Gas Metal Arc Welding Fundamentals

DESCRIPTION:

This GMAW course requires the use of safety equipment, GMAW equipment and accessories, and materials and supplies. It involves setting up GMAW equipment, preparing and welding the joint, shutting down the equipment and testing the joint. It includes information on types of shielding gasses, power supplies, types of wire, methods of transfer, welding techniques, codes and standards, and GMAW parameters.

PREREQUISITES: None

CO-REQUISITES: None

CREDIT VALUE: 2

TEXT BOOK(S) / SOFTWARE USED BY LEAD INSTITUTION:

COURSE AIMS:

1. To develop the skills and knowledge required for welding metal structures with respect to various codes and standards
2. To practice safety in potentially harmful situations

COURSE OBJECTIVES (KNOWLEDGE):

1. Describe the GMAW process methods of metal transfer, power source constant current and potential, polarity, arc voltage, slope and adjustment, inductance, shielding gas and regulation, electrode wire, assembly of equipment, gun, feeder, welding variables and effects, electrode extension, welding voltage and current, travel speed, penetration, travel and work angles, manipulation, maintenance of tube, nozzle, cable and conduit pulsed arc machines.

2. Describe shielding gas selection, drift and mixtures for steel, addition of carbon dioxide, electrode wires, wires for carbon steel, operating problems, work and travel angles, and gun manipulation
3. Describe methods of establishing the arc and starting the weld, stopping the weld at the finishing end of the joint, shielding gas after or post weld flow, work and travel angles, and common faults
4. Describe flat position butt welds, joint design fit up, defects commonly encountered, gun manipulation, and work and travel angles

MAJOR TASKS / SUBTASKS (SKILLS):

1. Disassemble and reassemble GMAW welding system
2. Fillet weld flat (GMAW)
 - a. Run stringer beads in a flat position on m.s. material
 - b. Weld in a flat position (GMAW)
 - i. "T" joint
 - ii. lap joint
3. Fillet weld horizontal (GMAW)
 - a. Run stringer beads in horizontal position m.s.
 - b. Weld in horizontal position:
 - i. "T" joint
 - ii. lap joint
4. Butt weld flat (GMAW)
 - a. Weld in flat position:
 - i. square butt joint
 - ii. single vee butt joint
 - b. Perform guided bend test on coupons

EVALUATION:

Written reports and/or tests.

Competence in simulated work and/or experiential endorsements.

LEAD INSTITUTION:

DEVELOPMENT HISTORY:

Date Developed: February 1994

INSTRUCTOR'S NOTES:

COURSE OUTLINE - MP1310

NAME AND NUMBER: Electrical 1310

DESCRIPTIVE TITLE: AC/DC Fundamentals

DESCRIPTION:

This course in electrical fundamentals requires the use of electrical tools, circuit components, and measuring instruments. It involves constructing circuits, taking measurements, reading scales and making calculations. It includes information on Ohm's Law and Kirchhoff's Laws; DC voltage, current and resistance; conductor sizes and resistivity, line voltage drop, open circuit voltage, electric power and energy, power loss, static electricity, electron theory, units and symbols; meter operations and utilization techniques, operational circuits, characteristics of conductors and insulators and system grounding; DC series and parallel circuits; magnetic fields, electromagnetism and electromagnetic induction; AC current and voltage, capacitance and inductance, AC circuits, AC power, power factor and vector analysis.

PREREQUISITES: None

CO-REQUISITES: None

CREDIT VALUE: 4

TEXT BOOK(S) / SOFTWARE USED BY LEAD INSTITUTION:

COURSE AIMS:

1. To develop the skills and knowledge required to construct and test basic DC and AC circuits.
2. To practice safety in potentially harmful situations
3. To develop an appreciation for conservation and environmental issues

COURSE OBJECTIVES (KNOWLEDGE):

1. Describe the operation of three wire circuits.

2. Explain minimization of voltage drop.
3. Solve problems on Ohm's Law and Kirchhoff's Law.
4. Explain conductor sizes and resistivity and line voltage drop.
5. Solve problems on power loss and voltage drop.
6. Explain static electricity and the electron theory.
7. Describe the use of electric meters.
8. Describe the characteristics of conductors and insulators.
9. Explain system ground.
10. Describe the reaction of inductors, capacitors, transistors and diodes to electric current
11. Diagram and label an emergency lighting system
12. Explain magnetic fields.
13. Explain electromagnetism and electromagnetic induction
14. Explain AC current and voltage
15. Describe single phase current and voltage
16. Describe capacitance and inductance.
17. Describe AC power and power factor.
18. Solve problems using vector analysis

MAJOR TASKS / SUBTASKS (SKILLS):

1. Set up an Edison Three-Wire Circuit
2. Construct basic series and parallel circuits
 - a. Construct a series circuit
 - i. Measure voltage, current, resistance and power
 - ii. Troubleshoot circuit problems
 - b. Construct a parallel circuit

- i. Measure voltage, current, resistance and power
 - ii. Troubleshoot circuit problems
 - c. Construct a series/parallel circuit
 - i. Measure voltage, current, resistance and power
 - ii. Troubleshoot circuit problems
3. Test and replace basic wiring components such as terminals, fuses, circuit breakers and resistors
4. Use VOM and DVOM to check circuit voltage
5. Use ammeter to check circuit amperage
6. Use VOM and DVOM to check circuit resistance
7. Construct basic AC circuits
 - a. Construct series AC circuits (R, RL, RC, and RLC)
 - i. Measure voltage, current and resistance
 - ii. Make calculations
 - iii. Troubleshoot circuit problems
 - b. Construct parallel AC circuits (R, RL, RC, RLC)
 - i. Measure voltage, current and resistance
 - ii. Make calculations
 - iii. Troubleshoot circuit problems
 - c. Construct series/parallel AC circuits (R, RL, RC, RLC)
 - i. Measure voltage, current and resistance
 - ii. Make calculations
 - iii. Troubleshoot circuit problems
8. Use oscilloscope
 - a. Specify the use of oscilloscopes
 - b. Measure characteristics of sine waves
 - c. Compare wave forms
 - d. Apply oscilloscope to position from diagram
 - e. Measure voltage of grounded and ungrounded system

EVALUATION:

- Written reports and/or tests.
- Competence in simulated work.

LEAD INSTITUTION:

DEVELOPMENT HISTORY:

Date Developed: December 1993

INSTRUCTOR'S NOTES:

COURSE OUTLINE - MV1160

NAME AND NUMBER: Mechanics 1160

DESCRIPTIVE TITLE: Light Duty Engines

DESCRIPTION:

This course in engines requires the use of basic tools, shop equipment and test equipment. It involves disassembling and reassembling light duty engines; and inspecting, testing, adjusting and repairing/replacing component parts. It includes information on the operation of different types of light duty engines and component parts.

PREREQUISITES: MV1100

CO-REQUISITES: None

CREDIT VALUE: 4

TEXT BOOK(S) / SOFTWARE USED BY LEAD INSTITUTION:

COURSE AIMS:

1. To develop the skills and knowledge required for maintaining and repairing light duty engines
2. To develop the skills to use service information effectively
3. To practice safety in potentially harmful situations
4. To develop an appreciation for environmental protection.

COURSE OBJECTIVES (KNOWLEDGE):

1. Identify basic types of cylinder heads and blocks
2. Describe pressure changes in engine cylinders

3. Explain heat transfer with respect to engine cooling
4. Describe stress with respect to metal parts
5. Explain the effects of corrosion
6. Explain torque
7. Describe the basic metallurgy of aluminum and cast iron
8. Describe the types of light duty engine blocks and components
9. Describe basic piston types
10. Describe the cylinder types which can be reconditioned
11. Describe the types and explain the purpose of crankshafts
12. Describe the types and explain the purpose of camshafts
13. Describe the various types of engine bearings and seals
14. Explain compression pressure
15. Describe the combustion process
16. Explain stresses in engine blocks
17. Explain the heat transfer associate with engine cooling
18. Describe the metallurgy of engine blocks
 - a. Aluminum
 - b. Cast iron
 - c. Composites
19. Explain the effects of corrosion
20. Explain the casting process

MAJOR TASKS / SUBTASKS (SKILLS):

1. Recondition basic cylinder heads and valves
 - a. Disconnect and remove engine from unit

- b. Remove, clean, inspect, and recondition cylinder head
 - c. Remove, clean, inspect, and reface valves
 - d. Clean, inspect, regrind, or replace valve seats
 - e. Inspect and test valve return springs
 - f. Replace and adjust cylinder heads and valves
 - g. Replace and re-connect engine to unit
2. Recondition basic pistons, rings and cylinders
- a. Remove basic pistons, rings, and cylinders
 - b. Use ridge reamers, deglazers and cylinder bones
 - c. Clean, inspect, and install piston rings and pistons
 - d. Perform broaching operations to within specified tolerances
 - e. Make gaskets
3. Replace basic crankshafts, crankshafts and bearings
- a. Remove, clean, and inspect crankshafts
 - b. Remove, clean, and inspect camshafts
 - c. Remove, clean, inspect, and replace engine bearings and seals
 - d. Inspect and replace if necessary timing chains and gears

EVALUATION:

Written reports and/or tests.

Competence in simulated work and/or experiential endorsements.

DEVELOPMENT HISTORY:

Date Developed: February 1994

INSTRUCTOR'S NOTES:

COURSE OUTLINE - MV1430

NAME AND NUMBER: Mechanics 1430

DESCRIPTIVE TITLE: Light and Medium Duty Starting and Charging Systems

DESCRIPTION:

This electromechanical course requires the use of basic tools, shop equipment and test equipment. It involves disassembling and reassembling light duty starting and charging systems; and inspecting, testing and repairing/replacing component parts and making adjustments. It includes information on the operation of different types of light duty starting and charging systems and component parts.

PREREQUISITES: MP1310

CO-REQUISITES: None

CREDIT VALUE: 3

TEXT BOOK(S) / SOFTWARE USED BY LEAD INSTITUTION:

COURSE AIMS:

1. To develop the skills and knowledge required for maintaining and repairing light duty starting and charging systems
2. To develop the skills to use service information effectively
3. To practice safety in potentially harmful situations
4. To develop an appreciation for environmental protection.

COURSE OBJECTIVES (KNOWLEDGE):

1. Explain the electron theory, basic circuits, current, voltage, resistance, Ohm's Law, conductors, insulators, magnetism, inductors, capacitors, transistors and diodes

2. Describe types and purposes of batteries
3. Describe types of starting systems and explain their operations
4. Describe types and explain the operation of electrical relays, switches and voltage regulators
5. Describe types and explain the operation of starting motors
6. Describe types and explain the operation of alternators

MAJOR TASKS / SUBTASKS (SKILLS):

1. Service and repair starting and charging systems
 - a. Inspect and replace rope-wind starter
 - b. Remove, inspect, repair and/or replace rope-rewind starters
 - c. Remove, inspect, repair and/or replace wind-up starters
 - d. Remove, inspect, repair and/or replace electrical starters
 - e. Remove, inspect, repair and/or replace starter drives
 - f. Maintain starting system
 - g. Identify the types and operations of the charging system
 - h. Remove, inspect, repair and/or replace DC generator
 - i. Remove, inspect, repair and/or replace alternator
 - j. Remove, inspect, and replace voltage regulators and rectifiers
 - k. Maintain charging system
2. Service batteries
 - a. Test battery
 - b. Recharge and replace batteries
3. Test and replace relays, switches and voltage regulators
4. Service and replace starting motors
 - a. Test and overhaul starting motor
 - b. Replace starting motor
5. Service and replace alternators
 - a. Inspect and test alternator
 - b. Repair and replace alternator

EVALUATION:

Written reports and/or tests.

Competence in simulated work and/or experiential endorsements.

DEVELOPMENT HISTORY:

Date Developed: February 1994

INSTRUCTOR'S NOTES:

COURSE OUTLINE - MV1420

NAME AND NUMBER: Mechanics 1420

DESCRIPTIVE TITLE: Ignition Systems

DESCRIPTION:

This course in ignition systems and emissions requires the use of basic tools, shop equipment and test equipment. It involves disassembling and reassembling ignition systems; and inspecting, testing and repairing/replacing component parts and making adjustments. It includes information on the operation of different types of ignition systems and component parts.

PREREQUISITES: MP1310

CO-REQUISITES: None

CREDIT VALUE: 4

TEXT BOOK(S) / SOFTWARE USED BY LEAD INSTITUTION:

COURSE AIMS:

1. To develop the skills and knowledge required for maintaining and repairing ignition systems
2. To develop the skills to use service information effectively
3. To practice safety in potentially harmful situations
4. To develop an appreciation for environmental protection.

COURSE OBJECTIVES (KNOWLEDGE):

1. Explain, electron theory, basic circuits, current, voltage, resistance, Ohm's Law, conductors, insulators, magnetism, inductors, capacitors, transistors and diodes

2. Describe types and explain the purpose and basic operations of ignition systems
3. Describe conventional ignition system components
4. Explain the basic operation of the on-board computer
5. Explain the operation of the distributor and timing mechanisms

MAJOR TASKS / SUBTASKS (SKILLS):

1. Service ignition systems
 - a. Test electronic ignition system components to identify problems
 - b. Scan test on-board computers, inputs and outputs
 - c. Test individual computer components (sensors and outputs)
2. Set distributor timing
 - a. Set distributor timing-electronic ignition:
 - i. with engine stopped
 - ii. with engine running
 - b. Set distributor timing-computer controlled ignition: with engine running
3. Clean, adjust and replace spark plugs
4. Check resistance of high voltage wires and terminals
5. Remove, inspect, repair and/or replace magneto ignition systems, solid state ignition systems, CD ignition systems and battery ignition systems
6. Diagnose and tune-up engine
 - a. Diagnose engine electrical problems
 - b. Replace spark plugs
 - c. Test compression
 - d. Remove and check rotor and cap
 - e. Test ignition coil
 - f. Test pick-up coil
 - g. Replace air and fuel filter
 - h. Test antifreeze
 - i. Check fan belt
 - j. Interpret vacuum gauge readings

EVALUATION:

Written reports and/or tests.

Competence in simulated work and/or experiential endorsements.

LEAD INSTITUTION:

DEVELOPMENT HISTORY:

Date Developed: February 1994

INSTRUCTOR'S NOTES:

COURSE OUTLINE - MV1310

NAME AND NUMBER: Mechanics 1310

DESCRIPTIVE TITLE: Gasoline Engine Air and Fuel Delivery Systems

DESCRIPTION:

This course in fuel systems requires the use of basic tools, shop equipment and test equipment. It involves disassembling and reassembling gasoline air and fuel delivery systems; and inspecting, testing and repairing/replacing component parts and making adjustments. It includes information on the operation of different types of gasoline air and fuel delivery systems and component parts.

PREREQUISITES: None

CO-REQUISITES: None

CREDIT VALUE: 4

TEXT BOOK(S) / SOFTWARE USED BY LEAD INSTITUTION:

COURSE AIMS:

1. To develop the skills and knowledge required for maintaining and repairing gasoline air and fuel delivery systems
2. To develop the skills to use service information effectively
3. To practice safety in potentially harmful situations
4. To develop an appreciation for environmental protection.

COURSE OBJECTIVES (KNOWLEDGE):

1. Explain the characteristics and uses of the following fuels:
 - a. regular leaded
 - b. high test leaded

- c. regular unleaded
 - d. high test unleaded
 - e. diesel
 - f. L.P.G.
2. Describe types of fuel filters
 3. Describe types of fuel lines and fittings
 4. Describe types and Explain the operation of fuel pumps (mechanical and electric)
 5. Explain purpose of the intake manifold
 6. Describe turbocharging and supercharging
 7. Explain the function of atmospheric pressure in the operation of fuel systems

MAJOR TASKS / SUBTASKS (SKILLS):

1. Replace fuel and air filters
 - a. Replace fuel filters
 - b. Identify and specify the use of charcoal canisters
 - c. Identify and replace air filters
 - d. Identify and specify the use of heated air intake assembly
2. Test and replace fuel lines and tanks
 - a. Test and replace faulty fuel line
 - b. Test and replace fuel tank
3. Test and replace fuel pumps
 - a. Replace fuel pumps
 - b. Test fuel pump for vacuum, pressure and flow rate
4. Inspect and replace intake manifolds
 - a. Test manifolds
 - b. Replace manifold gaskets

EVALUATION:

- Written reports and/or tests.
- Competence in simulated work and/or experiential endorsements.

DEVELOPMENT HISTORY:

Date Developed: February 1994

INSTRUCTOR'S NOTES:

COURSE OUTLINE - MV2310

NAME AND NUMBER: Mechanics 2310

DESCRIPTIVE TITLE: Gasoline Injection Systems

DESCRIPTION:

This course in fuel systems requires the use of basic tools, shop equipment and test equipment. It involves disassembling and reassembling gasoline injection systems; and inspecting, testing and repairing/replacing component parts and making adjustments. It includes information on the operation of different types of gasoline injection systems and component parts.

PREREQUISITES: MP1310

CO-REQUISITES: None

CREDIT VALUE: 4

TEXT BOOK(S) / SOFTWARE USED BY LEAD INSTITUTION:

COURSE AIMS:

1. To develop the skills and knowledge required for maintaining and repairing gasoline injection systems
2. To develop the skills to use service information effectively
3. To practice safety in potentially harmful situations
4. To develop an appreciation for environmental protection.

COURSE OBJECTIVES (KNOWLEDGE):

1. Explain purpose of intake manifolds
2. Describe fuel injection systems such as:
 - i. diesel

- ii. gas
- 3. Describe types of gas injection systems such as:
 - i. CFI
 - ii. PFI
- 4. Explain the use of air and fuel system cleaners
- 5. Explain the operation of electric pumps
- 6. Explain the operation of pressure regulators
- 7. Explain the operation of electronic carburetors
- 8. Explain the purpose of sensors, actuators and computer control modules
- 9. Describe how to service and adjust carburetors including the electrically operated choke
- 10. Describe how to test and replace manifolds

MAJOR TASKS / SUBTASKS (SKILLS):

- 1. Service fuel injection systems
 - a. Test and adjust system
 - b. Remove, clean, inspect, repair, and/or replace injectors
 - c. Inspect, remove, clean, and replace fuel injection pumps
 - d. Bleed and adjust system
- 2. Identify and inspect fuel injection systems
 - a. Inspect fuel injection system
 - b. Identify and specify the use of fuel injector cleaners
- 3. Service and replace electronic injection systems
 - a. Replace fuel filters
 - b. Replace fuel rail and pressure regulator
 - c. Replace fuel injectors

EVALUATION:

Written reports and/or tests.

Competence in simulated work and/or experiential endorsements.

DEVELOPMENT HISTORY:

Date Developed: February 1994

INSTRUCTOR'S NOTES:

COURSE OUTLINE - MV1330

NAME AND NUMBER: Mechanics 1330

DESCRIPTIVE TITLE: Carburetted Fuel Systems

DESCRIPTION:

This course in fuel systems requires the use of basic tools, shop equipment and test equipment. It involves disassembling and reassembling carburetted fuel systems; and inspecting, testing and repairing/replacing component parts and making adjustments. It includes information on the operation of different types of carburetted fuel systems and component parts.

PREREQUISITES: None

CO-REQUISITES: None

CREDIT VALUE: 3

COURSE AIMS:

1. To develop the skills and knowledge required for maintaining and repairing carburetted fuel systems
2. To develop the skills to use service information effectively
3. To practice safety in potentially harmful situations
4. To develop an appreciation for environmental protection.

COURSE OBJECTIVES (KNOWLEDGE):

1. Describe the types of fuels and their uses
2. Describe the types of fuel systems and explain how they work
3. Describe the types of air intake systems

4. Describe the types of fuel filters
5. Describe the types of carburetors
6. Explain the function of carburetor circuits
7. Describe the types of governors and explain their purposes
8. Describe the types of carburetors and explain their operations
9. Explain purpose of intake manifolds

MAJOR TASKS / SUBTASKS (SKILLS):

1. Recondition and synchronize carburetors
 - a. Remove, clean, inspect and replace carburetor kits
 - b. Replace carburetor and adjust settings
 - c. Adjust and synchronize multi-carburetor systems
2. Maintain air intake systems
3. Service governors
 - a. Inspect, clean, repair and/or replace air-vane governor
 - b. Inspect, clean, and replace components of centrifugal governors
 - c. Adjust and maintain the governor
4. Inspect and replace intake manifolds
 - a. Test manifolds
 - b. Replace manifold gaskets

EVALUATION:

Written reports and/or tests.
Competence in simulated work and/or experiential endorsements.

DEVELOPMENT HISTORY:

Date Developed: February 1994

INSTRUCTOR'S NOTES:

COURSE OUTLINE - MV1620

NAME AND NUMBER: Mechanics 1620

DESCRIPTIVE TITLE: Light & Medium Duty Cooling Systems

DESCRIPTION:

This course in cooling systems requires the use of basic tools, shop equipment and test equipment. It involves disassembling and reassembling light and medium duty cooling systems; and inspecting, testing and repairing/replacing component parts and making adjustments. It includes information on the operation of different types of light and medium duty cooling systems and component parts.

PREREQUISITES: None

CO-REQUISITES: None

CREDIT VALUE: 3

TEXT BOOK(S) / SOFTWARE USED BY LEAD INSTITUTION:

COURSE AIMS:

1. To develop the skills and knowledge required for maintaining and repairing light and medium duty cooling systems
2. To develop the skills to use service information effectively
3. To practice safety in potentially harmful situations
4. To develop an appreciation for environmental protection.

COURSE OBJECTIVES (KNOWLEDGE):

1. Describe types of cooling systems
2. Describe the components of the cooling system

3. Explain damage caused by cooling system failure
4. Describe types of coolant and explain the purposes and operation of the cooling system
5. Describe types of belts and explain their purposes
6. Explain the operation of the coolant pump
7. Explain the operation of thermostats
8. Describe types of radiators and components
9. Describe types of coolant (block) heaters
10. Describe the use of air conditioning systems
11. Explain the purpose of expansion plugs
12. Describe the effects of chemical corrosion on the cooling system
13. Describe temperature control systems

MAJOR TASKS / SUBTASKS (SKILLS):

1. Service and recondition basic cooling systems
 - a. Remove, clean, inspect, repair, and/or replace air cooling parts
 - b. Adjust and maintain fan belts and pulleys
 - c. Test liquid cooling system
 - d. Remove, inspect and replace thermostats
 - e. Remove, inspect and replace water pumps
 - f. Remove, inspect, test, repair and/or replace radiators
 - g. Clean and flush cooling systems
 - h. Maintain cooling systems
2. Test and replace coolant
 - a. select engine coolants
 - b. Test coolant condition and check system for leakage
 - c. Replace coolant
3. Inspect and replace belts and pulleys
 - a. Inspect belts for wear and breakage. Inspect pulleys
 - b. Replace and adjust belt
 - c. Inspect fan and shrouding

4. Inspect and replace water pumps
 - a. Inspect and replace water pump
 - b. Refill and check system for leaks
 - c. Test coolant

5. Inspect and replace thermostats
 - a. Inspect and test a thermostat
 - b. Replace a thermostat
 - c. Refill and check for leaks
 - d. Test coolant
 - e. Test cooling system temperature

6. Pressure test cooling system
 - a. Inspect cooling system
 - b. Check radiator cap pressure and vacuum release
 - c. Check cooling system leaks using pressure
 - d. Refill and check system

7. Check thermostatic fan controls
 - a. Check fan motor for power supply and ground
 - b. Check thermo switch
 - c. Check thermostat
 - d. Inspect and test wiring harness

8. Inspect, test and replace radiators
 - a. Inspect and test radiator
 - b. Replace radiator
 - c. Inspect and replace recovery tank
 - d. Check and replace radiator shutters and mountings
 - e. Check cooling system for leakage
 - f. Test coolant

9. Test and install coolant (block) heaters

10. Inspect and replace heaters and controls
 - a. Identify and inspect heater-defroster assembly
 - b. Remove and inspect heater core.
 - c. Replace core
 - d. Adjust and check operation of controls

11. Inspect and replace expansion plugs
 - a. Locate, inspect and replace expansion plugs
 - b. Refill and pressure test system

- c. Test coolant

EVALUATION:

Written reports and/or tests.

Competence in simulated work and/or experiential endorsements.

DEVELOPMENT HISTORY:

Date Developed: February 1994

INSTRUCTOR'S NOTES:

COURSE OUTLINE MV1550

NAME AND NUMBER: Mechanics 1550

DESCRIPTIVE TITLE: Small Equipment Transmissions

CALENDAR ENTRY:

This course in small equipment transmissions involves servicing lawn and garden equipment transmissions and differentials, chainsaws and drive systems, hydrostatic drives, snowmobile chain cases, motorcycle transmissions and crankshafts, motorcycle clutches, and marine equipment transmissions and velvet drives. It includes information on the design and function of transmissions, types of snowmobile chain cases, motorcycle transmission operations, motorcycle gear shifting mechanisms, motorcycle kickstarting operations, and motorcycle primary drives and clutch operations.

PREREQUISITES: None

CO-REQUISITES:

COURSE CREDIT VALUE: 3

SUGGESTED TEXT / LEARNING RESOURCES:

COURSE AIMS:

1. To develop the skills and knowledge to service small equipment transmissions

MAJOR TOPICS/TASKS:

1. Service lawn and garden equipment transmissions and differentials.
2. Service chainsaw and drive systems.
3. Service hydrostatic drives.
4. Service snowmobile chain cases.

5. Service motorcycle transmissions and crankskafts.
6. Service motorcycle clutches.
7. Service marine equipment transmissions and velvet drives.

COURSE OUTLINE / LEARNING OBJECTIVES:

Part I (Information):

1. Describe the design and function of transmissions.
2. Describe types of snowmobile chain cases.
3. Describe motorcycle transmission operations.
4. Describe motorcycle gear shifting mechanisms.
5. Describe motorcycle kickdtarting operations.
6. Describe motorcycle primary drives and clutch operations.

Part II (Experience):

1. Service lawn and garden equipment transmissions and differentials.
 - a. Perform maintenance on transmissions.
 - b. Troubleshoot transmission problems.
 - c. Service differentials.
2. Service chainsaw and drive systems.
 - a. Service chains and bars.
 - b. Service drive systems.
 - c. Service chain oilers.
3. Service hydrostatic drives.
 - a. Identify hydrostatic systems and operations.
 - b. Service hydrostatic drive systems.
4. Service snowmobile chain cases.
 - a. Repair chain cases and drive axles.
 - b. Service jackshaft and driveshaft.
5. Service motorcycle transmissions and crankskafts.
 - a. Troubleshoot transmission malfunctions.

- b. Disassemble and assemble transmissions.
 - c. Remove, check and replace two cycle crankshafts.
 - d. Remove, check and replace four cycle crankshafts.
6. Service motorcycle clutches.
- a. Service primary drives and clutches.
 - b. Service one-way clutches.
 - c. Service centrifugal clutch.
 - d. Service multi-plate clutch.
7. Service marine equipment transmissions and velvet drives.

RECOMMENDED EVALUATION:

LABORATORIES AND SHOPS:

DEVELOPMENT HISTORY:

Developed by: Provincial Advisory Committee

Date Developed: September 1996

Date Revised/Recommended by Provincial Standing Committee:

INSTRUCTOR'S NOTES:

COURSE OUTLINE SR1100

NAME AND NUMBER: Small Equipment 1100

DESCRIPTIVE TITLE: Lawn and Garden Equipment Servicing Fundamentals

CALENDAR ENTRY:

This course involves servicing carburetor intake systems; performing routine maintenance and tune-ups; servicing engine auxiliary components, single component ignition modules and mower decks and attachments; reconditioning carburetor and auxiliary systems; servicing brake and steering components; and servicing chain saws. It includes information on the operation of governors and chainsaw chain and bar failures.

PREREQUISITES: None

CO-REQUISITES:

COURSE CREDIT VALUE: 2

SUGGESTED TEXT / LEARNING RESOURCES:

COURSE AIMS:

1. To identify components and service lawn and garden equipment.

MAJOR TOPICS/TASKS:

1. Service carburetor intake systems.
2. Perform Routine maintenance and tune-ups.
3. Service engine auxiliary components.
4. Service single component ignition modules.
5. Service mower decks and attachments.

6. Recondition carburetor and auxiliary systems.
7. Service brake and steering components
8. Service chain saws.

COURSE OUTLINE / LEARNING OBJECTIVES:

Part I (Information):

1. Describe the operation of governors.
2. Describe causes of bar failure.
3. Describe causes of chain failure.

Part II (Experience):

1. Service carburetor intake systems.
 - a. Service air filters.
 - b. Service fuel strainers.
 - c. Service crankcase breathers
2. Perform Routine maintenance and tune-ups.
 - a. Maintain a service schedule.
 - b. Use tune-up check list.
 - c. Prepare equipment for off-season storage
3. Service engine auxiliary components.
 - a. Adjust belt deflection.
 - b. Align pulleys.
 - c. Remove and install generators, water pumps and auxiliary attachments.
 - d. Remove and install reduction drives.
4. Service single component ignition modules.
5. Service mower decks and attachments.
 - a. Identify mower deck components and attachments.
 - b. Service mower decks.
 - c. Service attachments.
6. Recondition carburetor and auxiliary systems.
 - a. Service the fuel delivery system.
 - b. Service the carburetor

- c. Service the governor.
- 7. Service brake and steering components
 - a. Identify brake and steering components
 - b. Service brake systems.
 - c. Service steering systems.
- 8. Service chain saws.
 - a. Service chains and bars.

RECOMMENDED EVALUATION:

LABORATORIES AND SHOPS:

DEVELOPMENT HISTORY:

Developed by: Provincial Advisory Committee

Date Developed: September 1996

Date Revised/Recommended by Provincial Standing Committee:

INSTRUCTOR'S NOTES:

COURSE OUTLINE SR1200

NAME AND NUMBER: Small Equipment 1200

DESCRIPTIVE TITLE: Snowmobile Servicing Fundamentals

CALENDAR ENTRY:

This course in snowmobile maintenance involves servicing and repairing recoil operations, carburetors, oil injection systems, braking systems, cooling systems, steering components, independent front suspensions, frame components, cosmetic damage, and track suspension units. It includes information on the operation of fuel systems, the venturi principle, variable and fixed venturi carburetors, starters, oil injection systems, liquid and air cooling systems, cosmetic repair procedures, drive clutches, driven clutches, bogie wheel suspensions, slide rail suspensions and snowmobile handling.

PREREQUISITES: None

CO-REQUISITES:

COURSE CREDIT VALUE: 3

SUGGESTED TEXT / LEARNING RESOURCES:

COURSE AIMS:

1. To help learners develop the skills and knowledge to identify components and service snowmobiles.

MAJOR TOPICS/TASKS:

1. Repair recoil operations.
2. Service snowmobile carburetors.
3. Adjust oil injection systems.
4. Service braking systems.

5. Service Snowmobile cooling systems.
6. Service steering components.
7. Service independent front suspensions.
8. Replace frame components.
9. Identify damage and make cosmetic repairs.
10. Service track suspension units.

COURSE OUTLINE / LEARNING OBJECTIVES:

Part A (Information):

1. Describe the parts of a snowmobile fuel system.
2. Describe the venturi principle
3. Describe the operation of variable venturi carburetors
4. Describe the operation of fixed venturi carburetors.
5. Describe the starter parts and operation.
6. Describe the operation of oil injection systems.
7. Describe the basics of cooling systems.
8. Describe the parts and operation of liquid cooling systems.
9. Describe the parts and operation of air cooling systems.
10. Describe small cosmetic repair procedures.
11. Describe snowmobile drive clutch operation.
12. Describe snowmobile driven clutch operation.
13. Describe the operation of bogie wheel suspensions.
14. Describe the operation of slide rail suspensions

15. Describe how different types of snowmobile suspension systems affect handling.

Part B (Experience):

1. Repair recoil operations.
2. Service snowmobile carburetors.
 - a. Disassemble and reassemble Tilloston carburetors.
 - b. Disassemble and reassemble Mikuni V.M. carburetors.
 - c. Disassemble and reassemble Mikuni butterfly/floar carburetors.
3. Adjust oil injection systems.
4. Service braking systems.
 - a. Identify braking systems.
 - b. Adjust and repair hydraulic lines and cables.
5. Service snowmobile cooling systems.
 - a. Identify snowmobile cooling systems.
 - b. Perform cooling system service operations.
 - c. Service snowmobile air cooled systems.
6. Service steering components.
 - a. Identify steering components.
 - b. Replace ski leg.
 - c. Replace steering column.
 - d. Align skis and handle bars.
7. Service independent front suspensions.
 - a. Identify types of independent suspensions.
 - b. Repair independent suspensions.
8. Replace frame components.
 - a. Identify different frame components.
 - b. Replace rivetted frame components.
9. Identify damage and make cosmetic repairs.
 - a. Repair polyplastic compounds
 - i. Repair thermosetting plastic
 - ii. Prepare and check alignment
 - iii. Prepare and apply adhesive
 - iv. Complete repair
 - v. Check repair of components
 - b. Fill damaged area with plastic filler

- i. Prepare damaged area for filling
 - ii. Mix plastic filler
 - iii. Apply plastic filler
 - iv. Shape plastic filler to contour

10. Service track suspension units.
 - a. Service bogie wheel suspensions.
 - b. Service slide wheel suspensions.
 - c. Service rubber tracks.
 - d. Service cleated tracks.

RECOMMENDED EVALUATION:

LABORATORIES AND SHOPS:

DEVELOPMENT HISTORY:

Developed by: Provincial Advisory Committee

Date Developed: September 1996

Date Revised/Recommended by Provincial Standing Committee:

INSTRUCTOR'S NOTES:

COURSE OUTLINE SR1300

NAME AND NUMBER: Small Equipment 1300

DESCRIPTIVE TITLE: Motorcycles and ATV Servicing Fundamentals

CALENDAR ENTRY:

This course in motorcycle and ATV maintenance involves servicing and repairing recoil starters, engines, motorcycle air cleaners, wheels and tires, brake systems, front forks, final drives, handling problems, clutches, and body damage. It includes information on the operation of starters, motorcycle air filters, drum and hydraulic disk brakes, motorcycle front forks and clutches.

COURSE PREREQUISITES/CO-REQUISITES:

COURSE CREDIT VALUE: 2

SUGGESTED TEXT / LEARNING RESOURCES:

COURSE AIMS:

1. To develop the skills and knowledge to service motorcycles and ATVs.

MAJOR TOPICS/TASKS:

1. Repair recoil starters
2. Tune-up engines.
3. Service motorcycle air cleaners.
4. Service wheels and tires.
5. Service brake systems.
6. Service front forks.
7. Service final drives.

8. Diagnose/service handling problems.
9. Identify types of clutches.

COURSE OUTLINE / LEARNING OBJECTIVES:

Part I (Information):

1. Describe starter parts and operation.
2. Describe types and functions of motorcycle air filters.
3. Describe drum and hydraulic disk brake operation and design.
4. Describe drum brake inspection and service.
5. Describe hydraulic disc brake inspection and service.
6. Describe the operation of motorcycle front forks.
7. Describe types of clutches.

Part II (Experience):

1. Repair recoil starters
2. Tune-up engines.
 - a. Use compression tester.
 - b. Perform engine tune-up.
 - c. Prepare machine for off-season storage.
3. Service motorcycle air cleaners.
4. Service wheels and tires.
 - a. Service wheel bearings.
 - b. Repair tires.
 - c. Service spoked wheels.
 - d. Respoke wheels.
 - e. Balance wheel and tire.
 - f. Align motorcycle wheels.
 - g. Check ATV tire pressure.
5. Service brake systems.

6. Service front forks.
 - a. Recondition the front forks
 - b. Identify steering head parts.
 - c. Service steering head bearings.

7. Service final drives.
 - a. Identify types of final drives.
 - b. Service chain drives.
 - c. Service swing arms.
 - d. Service belt drives.
 - e. Service shaft drives
 - f. Service final drives.
 - g. Service bearings and CV joints.

8. Diagnose/service handling problems.
 - a. Identify types of handling problems.
 - b. Troubleshoot a variety of handling problems.

9. Identify types of clutches.

10. Perform plastic welding and bonding on motorcycle and ATV bodies.
 - a. Prepare plastic for bonding
 - b. Set up and use plastic welder
 - c. Use bonding method

RECOMMENDED EVALUATION:

LABORATORIES AND SHOPS:

DEVELOPMENT HISTORY:

Developed by: Provincial Advisory Committee

Date Developed: September 1996

Date Revised/Recommended by Provincial Standing Committee:

INSTRUCTOR'S NOTES:

COURSE OUTLINE SR1400

NAME AND NUMBER: Small Equipment 1400

DESCRIPTIVE TITLE: Marine Equipment Servicing Fundamentals

CALENDAR ENTRY:

This course in marine equipment maintenance involves servicing recoil starters, carburetors, outboard powerheads, remote controls, cooling systems, stern drive engines, electrical systems, stern drive boat and motor rigging, fibreglass hulls, outboard controls and accessories, marine toilets, bilge pumps, bilge blowers and boat trailers. It includes information on carburetor components and circuits, carburetor fundamentals, the operation of a fuel injection system, corrosion protection systems, maintenance procedures for stern drive engines, four-stroke engine operating principles, safe boating practices, rigging requirements and powerboat fibreglass hull design.

PREREQUISITES: None

CO-REQUISITES:

COURSE CREDIT VALUE: 3

SUGGESTED TEXT / LEARNING RESOURCES:

COURSE AIMS:

1. To develop the skills and knowledge to service marine equipment.

MAJOR TOPICS/TASKS:

1. Repair recoil starters.
2. Service carburetors.
3. Service outboard powerheads
4. Repair remote controls.

5. Service cooling systems.
6. Perform routine maintenance on stern drive engines.
7. Service stern drive engine electrical systems.
8. Tune-up engine.
9. Align engines.
10. Rig stern drive boat and motor unit.
11. Repair fibreglass hulls.
12. Service outboard controls and accessories.
13. Service marine toilets, bilge pumps and bilge blowers.
14. Service boat trailers.

COURSE OUTLINE / LEARNING OBJECTIVES:

Part I (Information):

1. Describe carburetor components and circuits.
2. Describe carburetor fundamentals.
3. Describe the components and explain the operation of a fuel injection system.
4. Describe corrosion protection systems.
5. Describe routine maintenance procedures for stern drive engines.
6. Describe four-stroke engine operating principles.
7. Describe safe boating practices.
8. List rigging requirements.
9. Describe powerboat fibreglass hull design.

Part II (Experience):

1. Repair recoil starters.
 - a. Replace rope.
 - b. Rebuild coil assembly.
2. Service carburetors.
3. Service outboard powerheads
 - a. Prepare outboard powerheads for disassembly.
 - i. Handle and clean the outboard motor.
 - ii. Salvage submerged outboards.
 - b. Service powerhead components.
 - i. Identify components.
 - ii. Overhaul cylinders.
 - iii. Overhaul pistons, rods and rings.
 - c. Perform preventative maintenance and tune-ups.
 - i. Identify tune-up procedures.
 - ii. Perform tune-ups.
 - iii. Describe procedures for storing an outboard.
4. Repair remote controls.
 - a. Service steering controls.
 - b. Service remote shaft controls.
5. Service cooling systems.
 - a. Service water pumps.
 - b. Service thermostats.
 - c. Service personal watercraft cooling systems.
 - d. Service cooling systems on stern drive engines.
 - i. Identify cooling system problems.
 - ii. Repair stern drive water pumps.
 - iii. Service engine water pumps.
 - iv. Service exhaust manifolds and circulation systems.
 - e. Service and flush freshwater cooling systems.
 - f. Pressure test manifolds.
 - g. Clean and service exhaust elbows.
6. Perform routine maintenance on stern drive engines.
 - a. Change oil and filter.
 - b. Prepare engine for off-season storage.
7. Service stern drive engine electrical systems.
 - a. Service the starting system.

- b. Service the ignition system.
 - c. Service the charging system.
8. Tune-up engine.
- a. Troubleshoot engine problems.
 - b. Tune-up engine.
 - c. Time ignition.
 - d. Synchronize carburetor.
9. Align engines.
- a. Align personal watercraft engines.
 - b. Align stern drive engines.
 - c. Align inboard engines.
10. Rig stern drive boat and motor unit.
11. Repair fibreglass hulls.
- a. Maintain boat bottoms.
 - b. Repair and fill fibreglass panels.
 - i. Identify fibre glass damage.
 - ii. Prepare panel for repairs.
 - iii. Repair and fill small damage on fibre glass panel.
12. Service outboard controls and accessories.
- a. Rig and repair remote control assembly.
 - b. Rig and repair remote steering assembly.
13. Service marine toilets, bilge pumps and bilge blowers.
14. Service boat trailers.
- a. Set up trailer.
 - b. Wire trailer and tow vehicle.
 - c. Service trailer undercarriage.

RECOMMENDED EVALUATION:

LABORATORIES AND SHOPS:

DEVELOPMENT HISTORY:

Developed by: Provincial Advisory Committee

Date Developed: September 1996

Date Revised/Recommended by Provincial Standing Committee:

INSTRUCTOR'S NOTES:

COURSE OUTLINE SR1110

NAME AND NUMBER: Small Equipment 1110

DESCRIPTIVE TITLE: Lawn and Garden Equipment troubleshooting and Repair

CALENDAR ENTRY:

This course involves servicing valve trains, engine components, clutches and drives, hydraulic systems, engine driven water pumps, chainsaw engines, lawn and garden equipment cooling systems, AC generators, and remote starters. It includes information on the causes for piston failure, types of bearing failure and the causes, the importance of maintaining the correct quantity and quality of lubrication, the design and function of clutches, hydraulic theory and systems, the operation of water pumps, function of chainsaw engine components, and the operation of AC generators.

PREREQUISITES: SR1100

CO-REQUISITES:

COURSE CREDIT VALUE: 4

SUGGESTED TEXT / LEARNING RESOURCES:

COURSE AIMS:

1. To develop the skills for troubleshooting and repairing lawn and garden equipment.

MAJOR TOPICS/TASKS:

1. Service valve trains.
2. Service engine components.
3. Service clutches and drives.
4. Service hydraulic systems.

5. Overhaul engine driven water pumps.
6. Overhaul chainsaw engines.
7. Service lawn and garden equipment cooling systems.
8. Service AC generators.
9. Service remote starters

COURSE OUTLINE / LEARNING OBJECTIVES:

Part I (Information):

1. Describe the causes for piston failure.
2. Describe types of bearing failure and the causes.
3. Explain the importance of maintaining the correct quantity and quality of lubrication.
4. Describe the design and function of clutches.
5. Describe hydraulic theory.
6. Illustrate hydraulic systems
7. Describe the operation of water pumps.
8. Explain the function of chainsaw engine components.
9. Describe the operation of AC generators.

Part II (Experience):

1. Service valve trains.
 - a. Identify proper engine valve service procedures.
 - b. Service valves on four cycle engines.
 - c. Service valves on two cycle engines.
2. Service engine components.
 - a. Repair pistons, rods and rings.
 - b. Repair cylinders.
 - c. Repair camshaft assemblies.
 - d. Repair crankshaft assemblies.

- e. Analyze piston failure
 - f. Analyze bearing failure.
3. Service clutches and drives.
 - a. Perform maintenance on clutches.
 - b. Troubleshoot clutch problems.
 - c. Service drives.
 4. Service hydraulic systems.
 5. Overhaul engine driven water pumps.
 - a. Identify water pump parts.
 - b. Perform maintenance and repair on water pumps.
 6. Overhaul chainsaw engines.
 - a. Identify the components of chainsaw engines.
 - b. Perform routine maintenance on chainsaw engines.
 - c. Disassemble and reassemble chainsaw engines.
 - d. Troubleshoot problems with chainsaw engines.
 7. Service lawn and garden equipment cooling systems.
 8. Service AC generators.
 - a. Perform maintenance on AC generators.
 - b. Troubleshoot and repair AC generators.
 9. Service remote starters.

RECOMMENDED EVALUATION:

LABORATORIES AND SHOPS:

DEVELOPMENT HISTORY:

Developed by: Provincial Advisory Committee

Date Developed: September 1996

Date Revised/Recommended by Provincial Standing Committee:

INSTRUCTOR'S NOTES:

COURSE OUTLINE SR1210

NAME AND NUMBER: Small Equipment 1210

DESCRIPTIVE TITLE: Snowmobile Troubleshooting and Repair

CALENDAR ENTRY:

This course in snowmobile servicing involves troubleshooting and repair of electronic ignition systems, lighting and charging systems, fuel systems, gas charged shocks, drive clutches, driven clutches, engines, and exhaust systems. It includes information on operation of a fuel injection systems, carbureted fuel systems, altitude-compensated carburetors, clutches, engines and labyrinth seals.

PREREQUISITES: SR1200

CO-REQUISITES:

COURSE CREDIT VALUE: 4

SUGGESTED TEXT / LEARNING RESOURCES:

COURSE AIMS:

1. To develop the skills and knowledge to troubleshoot and repair snowmobile engines.

MAJOR TOPICS/TASKS:

1. Service electronic ignition systems.
2. Service lighting and charging systems.
3. Diagnose fuel system malfunctions.
4. Service gas charged shocks.
5. Recondition drive clutches.

6. Recondition driven clutches.
7. Replace engine pistons and rings.
8. Replace snowmobile engine crankshafts.
9. Diagnose/service engine malfunctions
10. Service snowmobile exhaust systems.

COURSE OUTLINE / LEARNING OBJECTIVES:

Part I (Information):

1. Describe the parts and operation of a fuel injection system.
2. Explain the advantages of fuel injection.
3. Describe the procedures involved in troubleshooting the fuel system.
4. Explain how altitude-compensated carburetor systems work.
5. Explain the following terms associated with clutch tuning:
 - a. maximum rpm
 - b. shift rpm
 - c. engagement rpm
 - d. backshift
 - e. clutch weights
6. Describe the parts of snowmobile engines.
7. Describe crankshaft operation.
8. Describe the systematic approach to diagnosing engine malfunctions.
9. Describe the function and purpose of labyrinth seals.

Part II (Experience):

1. Service electronic ignition systems.
 - a. Identify electronic magneto ignition components and their operation.
 - b. Service point type ignition components.
 - c. Adjust ignition timing.

2. Service lighting, starting and charging systems.
 - a. Service magneto alternator systems.
 - b. Service electrical accessories.
3. Diagnose fuel system malfunctions.
 - a. Identify spark plug readings and carbon patch readings.
 - b. Service and adjust throttle safety systems.
4. Service gas charged shocks.
5. Recondition drive clutches.
 - a. Identify different types of drive clutches.
 - b. Service drive clutches.
6. Recondition driven clutches.
 - a. Recondition driven pulleys and set alignments.
 - b. Diagnose belt failure.
7. Replace engine pistons and rings.
 - a. Disassemble the top end.
 - b. Measure the pistons, rings and cylinders.
 - c. Perform honing and boring operations.
 - d. Reassemble the top end.
8. Replace snowmobile engine crankshafts.
 - a. Replace crankshaft.
 - b. Align crankshaft
9. Diagnose/service engine malfunctions
10. Service snowmobile exhaust systems.

RECOMMENDED EVALUATION:

LABORATORIES AND SHOPS:

DEVELOPMENT HISTORY:

Developed by: Provincial Advisory Committee

Date Developed: September 1996

Date Revised/Recommended by Provincial Standing Committee:

INSTRUCTOR'S NOTES:

COURSE OUTLINE SR1310

NAME AND NUMBER: Small Equipment 1310

DESCRIPTIVE TITLE: Motorcycle and ATV Troubleshooting and Repair

CALENDAR ENTRY:

This course motorcycle and ATV maintenance involves servicing and repairing lubrication systems, four-stroke engines, magneto and battery ignition systems, electronic ignition systems, charging systems, electrical malfunctions, carburetor malfunctions, starter systems and cooling systems. It includes information on the operation of two- and four-stroke lubrication systems, motorcycle head gaskets, cylinder heads and parts, pistons and rings, engines, battery ignition systems, capacitor discharge systems, transistor ignition systems, motorcycle charging systems, fuel systems, and carburetors.

PREREQUISITES: SR1300

CO-REQUISITES:

COURSE CREDIT VALUE: 4

SUGGESTED TEXT / LEARNING RESOURCES:

COURSE AIMS:

1. To develop the skills and knowledge to troubleshoot and repair motorcycles and ATVs.

MAJOR TOPICS/TASKS:

1. Service lubrication systems.
2. Adjust valve clearances on four-stroke engine.
3. Recondition cylinder heads.
4. Replace pistons and rings.

5. Diagnose/service engine malfunctions.
6. Service magneto and battery ignition systems.
7. Service electronic ignition systems.
8. Service motorcycle charging systems.
9. Diagnose/service electrical malfunctions.
10. Diagnose/service carburetor malfunctions
11. Service motorcycle starter systems.
12. Identify and inspect cooling systems.

COURSE OUTLINE / LEARNING OBJECTIVES:

Part I (Information):

1. Describe two-stroke lubrication systems.
2. Describe four-stroke lubrication systems.
3. Describe motorcycle head gaskets.
4. Describe cylinder head functions and parts.
5. Describe disassembly procedures for removing pistons and rings.
6. Describe a systematic approach to diagnosing engine malfunctions.
7. Describe magnetism.
8. Describe battery ignition systems.
9. Describe the operation of a capacitor discharge system.
10. Describe the operation of a transistor ignition system.
11. Describe motorcycle charging systems.
12. Describe motorcycle fuel system components.

13. Describe basic carburetor operation.
14. Describe the operation of a slide valve carburetor.
15. Describe the operation of a C.V. carburetor.
16. Describe the operation of a fixed venturi carburetor.
17. List the procedures involved in carburetor service and repair.
18. Describe carburetor troubleshooting procedures.

Part II (Experience):

1. Service lubrication systems.
 - a. Test and service lubrication systems.
 - b. Change oil and filters.
2. Adjust valve clearances on four-stroke engine.
3. Recondition cylinder heads.
 - a. Replace valve guides.
 - b. Recondition valve seats.
 - c. Recondition valves.
4. Replace pistons and rings.
 - a. Measure clearances to check for wear of pistons, rings and cylinders.
 - b. Describe operations to deglaze and bore cylinder
 - c. Replace pistons and rings.
5. Diagnose/service engine malfunctions.
 - a. Service crankshafts.
6. Service magneto and battery ignition systems.
 - a. Adjust timing on magneto ignition.
 - b. Test electrical components.
7. Service electronic ignition systems.
 - a. Test and time electronic ignition systems.
8. Service motorcycle charging systems.
 - a. Test charging systems.
9. Diagnose/service electrical malfunctions.

- a. Troubleshoot switches.
 - b. Troubleshoot lighting and starter circuits.
- 10. Diagnose/service carburetor malfunctions
 - 11. Service motorcycle starter systems.
 - a. Service one-way clutches.
 - 12. Identify and inspect cooling systems.

RECOMMENDED EVALUATION:

LABORATORIES AND SHOPS:

DEVELOPMENT HISTORY:

Developed by: Provincial Advisory Committee

Date Developed: September 1996

Date Revised/Recommended by Provincial Standing Committee:

INSTRUCTOR'S NOTES:

COURSE OUTLINE SR1410

NAME AND NUMBER: Small Equipment 1410

DESCRIPTIVE TITLE: Marine Equipment Troubleshooting and Repair

CALENDAR ENTRY:

This course in marine equipment involves the troubleshooting and repair of ignition systems, starting and charging systems, fuel systems, tilt and trim systems, propellers, impellers, upper gear housings, lower gear housings and lower units. It include information on carburetor fundamentals and the theory of propeller operation.

PREREQUISITES: SR1400

CO-REQUISITES:

COURSE CREDIT VALUE: 4

SUGGESTED TEXT / LEARNING RESOURCES:

COURSE AIMS:

1. To develop the skills and knowledge to troubleshoot and repair marine equipment.

MAJOR TOPICS/TASKS:

1. Service ignition systems.
2. Service starting and charging systems.
3. Service fuel systems.
4. Service tilt and trim systems.
5. Repair tilt and trim systems.

6. Select and replace propellers.
7. Select service and repair impellers.
8. Repair upper gear housings.
9. Repair lower gear housings.
10. Service lower units.

COURSE OUTLINE / LEARNING OBJECTIVES:

Part I (Information):

1. Describe carburetor fundamentals.
2. Describe the theory of propeller operation.

Part II (Experience):

1. Service ignition systems.
 - a. Identify outboard ignition systems.
 - b. Service point type ignition systems.
 - c. Service CD magneto systems.
2. Service starting and charging systems.
 - a. Identify outboard starting and charging systems.
 - b. Repair electrical starting systems.
 - c. Repair charging systems.
3. Service fuel systems.
 - a. Service the fuel intake system.
 - b. Service the carburetor.
 - c. Service fuel intake systems.
 - i. Service intake manifold.
 - ii. Service fuel pump system.
 - iii. Service oil injection system.
 - iv. Service fuel tank system.
 - d. Diagnose fuel system problems.
4. Service tilt and trim systems.
 - a. Identify tilt and trim systems.
 - b. Service tilt and trim components.

5. Repair tilt and trim systems.
 - a. Service the OMC tilt unit.
 - b. Service the OMC trim system.
 - c. Service the Mercruiser tilt/trim system.
6. Select and replace propellers.
 - a. Identify procedures for selection and replacement of propellers.
 - b. Select and replace propellers.
7. Select service and repair impellers.
8. Repair upper gear housings.
 - a. Remove stern drive unit.
 - b. Service upper gear housing.
9. Repair lower gear housings.
 - a. Service Mercruiser lower units.
 - b. Service OMC lower units.
 - c. Pressure test lower gear housings.
10. Service lower units.
 - a. Identify mechanical gear case components.
 - b. Service lower unit and mechanical gear case.

RECOMMENDED EVALUATION:

LABORATORIES AND SHOPS:

DEVELOPMENT HISTORY:

Developed by: Provincial Advisory Committee

Date Developed: September 1996

Date Revised/Recommended by Provincial Standing Committee:

INSTRUCTOR'S NOTES:

REQUIRED RELATED SUBJECTS

COURSE NAME & NUMBER: Workplace Correspondence CM2150

DESCRIPTIVE TITLE: Workplace Correspondence

CALENDAR TITLE:

1.0 Type and Purpose Communications 2150 gives students the opportunity to study the principles of effective writing. Applications include letters, memos, and short report writing.

2.0 Major Topics Review of Sentence and Paragraph Construction; Business Correspondence; Informal Report; Job Search Techniques.

PREREQUISITES: Nil

CO-REQUISITES: Nil

COURSE DURATION 45hrs

**SUGGESTED TEXT/
LEARNING RESOURCES:**

Textbooks: Business English and Communications, Fourth Canadian Edition, Clark, Zimmer, et al., McGraw-Hill Ryerson, 1990

Student Projects and Activities for Business English and Communications,

Fourth Canadian Edition, Clark, et al., McGraw-Hill, 1990

Effective Business Writing, Jennifer MacLennon

Simon and Shuster Handbook for Writers, Second Edition, Troyka Lynn Quitman, Prentice Hall

College English Communication, Third Canadian Edition, Stewart, Zimmer, et al., McGraw-Hill Ryerson Limited, 1989

Business and Administrative Communication, Second Edition, Kitty O. Locker. IRWIN, 1991

References: Pittman Office Handbook, Smith/Hay-Ellis

The Gregg Reference Manual, Fourth Canadian Edition, Sabin/O'Neill

McGraw Hill Handbook

Other Resources: Business Letter Business (Video), Video Arts

Guest Speakers

Sell Yourself (Video)

COURSE AIMS:

1. To help students understand the importance of well-developed writing skills in business and in career development.
2. To help students understand the purpose of the various types of business correspondence.
3. To examine the principles of effective business writing.
4. To examine the standard formats for letters and memos.
5. To provide opportunities for students to practice writing effective letters and memos.
6. To examine the fundamentals of informal reports and the report writing procedure.
7. To provide an opportunity for students to produce and informal report.

MAJOR TOPICS/TASKS:

- 1.0 Review of Sentence and Paragraph Construction
- 2.0 Business Correspondence
- 3.0 Informal Report/Present Orally

COURSE OUTLINE:

- 1.0 Review of Sentence and Paragraph Construction
 - 1.1 Examining and applying principles of sentence construction
 - 1.2 Examining and applying principles of paragraph construction
- 2.0 Business Correspondence
 - 2.1 Examining the value of well-developed business writing skills
 - 2.2 Examining principles of effective business writing
 - 2.3 Examining business letters and memos
- 3.0 Informal Report
 - 3.1 Examining the fundamentals of informal business reports
 - 3.2 Applying informal report writing skills

LEARNING OBJECTIVES:

- 1.0 Review of Sentences and Paragraph Construction
 - 1.1.1 Define a sentence and review the four types.
 - 1.1.2 Identify the essential parts of a sentence, particularly subject and predicate, direct and indirect object.
 - 1.1.3 Differentiate among phrases, clauses, and sentences.
 - 1.1.4 Explore the major concepts related to subject-verb agreement.
 - 1.1.5 Apply rules and principles for writing clear, concise, complete sentences which adhere to the conventions of grammar, punctuation, and mechanics.
- 1.2 Examine and Apply Principles of paragraph Construction
 - 1.2.1 Discuss the basic purposes for writing.
 - 1.2.2 Define a paragraph and describe the major characteristics of an effective paragraph.
 - 1.2.3 Write well-developed, coherent, unified paragraphs which illustrate the following: A variety of sentence arrangements; conciseness and clarity; and adherence to correct and appropriate sentence structure, grammar, punctuation, and mechanics.
- 2.0 Business Correspondence
 - 2.1 Examine the Value of Business Writing Skills

- 2.1.1 Discuss the importance of effective writing skills in business
- 2.1.2 Discuss the value of well-developed writing skills to career success
- 2.2 Examine Principles of Effective Business Writing
 - 2.2.1 Discuss the rationale and techniques for fostering goodwill in business communication, regardless of the circumstances
 - 2.2.2 Review the importance of revising and proofreading writing
- 2.3 Examine Business Letters and Memos
 - 2.3.1 Differentiate between letter and memo applications in the workplace
 - 2.3.2 Identify the parts of a business letter and memo
 - 2.3.3 Explore the standard formats for business letters and memos
 - 2.3.4 Examine guidelines for writing an acceptable letter and memo which convey: acknowledgment, routine request, routine response, complaint, refusal, and persuasive request, for three of the six types listed
 - 2.3.5 Examine samples of well-written and poorly written letters and memos
- 3.0 Informal Report
 - 3.1 Examine the Fundamentals of Informal Business Reports
 - 3.1.1 Identify the purpose of the informal report
 - 3.1.2 Identify the parts and formats of an informal report
 - 3.1.3 Identify methods of information gathering
 - 3.2 Apply Informal Report Writing Skills and Oral Reporting Skills
 - 3.2.1 Gather pertinent information
 - 3.2.2 Organize information into an appropriate outline
 - 3.2.3 Draft a five minute informal report
 - 3.2.4 Edit, proofread, and revise the draft to create an effective informal report and present orally using visual aids.

RECOMMENDED EVALUATION:

Required Pass Mark 70%

DEVELOPMENT HISTORY:

Date Developed:

Date Revised: 1999 05 03

NAME AND NUMBER: Customer Service MR1210

DESCRIPTIVE TITLE: Customer Service

SUMMARY DESCRIPTION:

This course focuses on the role of providing quality customer service. It is important to have a positive attitude and the necessary skills to effectively listen and interpret customer concerns about a product, resolve customer problems, and determine customer wants and needs. Students will be able to use the skills and knowledge gained in this course to effectively provide a consistently high level of service to the customer.

PREREQUISITES: None

CO-REQUISITES: None

SUGGESTED DURATION: 30 hrs

EVALUATION: Theory and Practical Applications Require a Pass Mark of 70%.

COURSE AIMS:

1. To know and understand quality customer service
2. To know why quality service is important
3. To know and understand the relationship between “service” and “sales”
4. To understand the importance of and to demonstrate a positive attitude
5. To recognize and demonstrate handling of customer complaints

COURSE OBJECTIVES (KNOWLEDGE):

1. Providing Quality Service
 - Define quality service

- List the types of quality service
 - Define Service vs. Sales or Selling
 - Explain why quality service is important
 - Identify the various types of customers
 - Define customer loyalty
2. Determining Customers Wants and Needs
- List four levels of customer needs
 - Identify important customer wants and needs
 - Identify ways to ensure repeat business
3. Demonstrating a Positive Attitude
- List the characteristics of a positive attitude
 - Explain why it is important to have a positive attitude
 - List ways that a positive attitude can improve a customer's satisfaction
 - Define perception
 - Explain how perception can alter us and customers
 - Understand how to deal with perception
4. Effectively Communicating with customers
- Describe the main elements in the communication process
 - Identify some barriers to effective communication
 - Define body language
 - Explain how body language would affect customers
 - Determine why body language is important
 - Define active listening and state why it is important
 - Describe the four components of active listening
 - Contrast good and bad listeners
 - List and discuss the steps of the listening process
5. Effectively using Questioning Techniques
- List questioning techniques
 - Write two example of an open question
 - Perform a questioning and listening role play
6. Using the Telephone Effectively
- List the qualities of a professional telephone voice
 - Explain why telephone skills are important
 - Demonstrate effective telephone skills
7. Asserting Oneself: Handling Complaints and Resolving Conflict
- Define assertiveness
 - Define communication behaviors

- Relate assertions to effective communication
 - Practice being assertive
 - Understand the process of assertive guidelines for action
 - Practice giving an assertive greeting
 - Acknowledge multiple customers
8. Dealing with Difficult Customers
- Describe how you would deal with anger
 - Complete a guide to controlling feelings
 - Determine how you would feel dealing with an upset customer
 - Suggest some techniques that might control your own feelings
 - Understand leadership styles and the nature of organizations
 - List ways to dealing with conflict / customer criticism
 - Be aware of certain guidelines when confronting customers
 - List ways of preventing unnecessary conflict with customers
 - Review current skills and knowledge of customer service
 - Develop a customer satisfaction improvement plan

COURSE OUTLINE - SP 2330

NAME AND NUMBER: QA/QC SP2330

DESCRIPTIVE TITLE: Quality Assurance / Quality Control

DESCRIPTION:

This general studies course requires the use of basic tools and equipment and materials and supplies. It requires controlling drawings and specifications and/or calibrating measuring devices in applicable occupations. It involves interpreting standards, controlling the acceptance of raw materials, controlling quality variables and documenting the process. It includes information on quality concepts, codes and standards, documentation, communications, human resources, company structure and policy, teamwork and responsibilities.

PREREQUISITES: None

CO-REQUISITES: None

SUGGESTED DURATION: 30 Hrs

COURSE AIMS:

1. To develop the skills and knowledge required to apply quality assurance/quality control procedures
2. To develop an awareness of quality management principles and processes

COURSE OBJECTIVES (KNOWLEDGE):

1. Describe the reasons for quality assurance and quality plans.
2. Explain the relationship between quality assurance and quality control.
3. Describe quality control procedures as applied to the production and checking of engineering drawings in applicable occupations.
4. Describe quality control procedures as applied to the acceptance and checking of raw materials.
5. Explain the role of communications in quality management.
6. Explain why it is important for all employees to understand the structure of the

- company and its production processes.
7. Explain how human resource effectiveness is maximized in a quality managed organization.
 8. Explain the role of company policy in quality management.
 9. Explain the purpose of codes and standards.
 10. Explain the concepts of quality
 - a. cost of quality
 - b. measurement of quality
 - c. quality control and quality assurance
 - d. elements of quality
 - e. elements of the quality audit
 - f. quality standards
 - g. role expectations and responsibilities
 11. Explain the structure of quality assurance and quality control
 - a. Define quality assurance, quality control and documentation terminology
 - b. Describe organizational charts
 - c. List the elements of a quality assurance system
 - d. Explain the purpose of the quality assurance manual
 - e. Describe quality assurance procedures
 - f. Explain the key functions and responsibilities of personnel
 12. Complete quality assurance/quality control documentation
 - a. Describe methods of recording reports in industry
 - b. Describe procedures of traceability (manual and computer-based recording)
 - c. Identify needs for quality control procedures

MAJOR TASKS / SUBTASKS (SKILLS):

1. Apply quality control to projects
 - a. Follow QA/QC procedures for drawings, plans and specifications in applicable occupations.
 - b. Calibrate measuring instruments and devices in applicable occupations.
 - c. Interpret required standards
 - d. Follow QA/QC procedures for accepting raw materials

- e. Carry out the project
- f. Control the quality elements (variables)
- g. Complete QA/QC reports

EVALUATION:

Pass Mark Required 70%

DEVELOPMENT HISTORY:

Date Developed: February 1994

Date Revised: April, 1999

COURSE DESCRIPTION

COURSE NAME & NUMBER: Introduction to Computers MC1050

DESCRIPTIVE TITLE: Introduction to Computers

CALENDAR ENTRY:

Type and Purpose This course is designed to give the student an introduction to computer systems. Particular emphasis is given to word processing, spreadsheet, e-mail and the Internet.

Major Topics Microcomputer System Hardware and Software Components; Word Processing; Electronic Spreadsheets; Electronic Mail and the Internet.

PRE-REQUISITES: Nil

CO-REQUISITES: Nil

SUGGESTED DURATION: 30 hours

SUGGESTED TEXT/ LEARNING RESOURCES:

Textbook(s):

References:

Other Resources:

COURSE AIMS:

1. To provide students with a introduction to computer systems and their operation.
2. To introduce students to popular software packages, their applications and future trends

in computer applications.

MAJOR TOPICS:

1. Microcomputer System Hardware and Software Components
2. Word Processing
3. Spreadsheet
4. E-Mail and the Internet

COURSE OUTLINE:

- 1.0 Microcomputer System Hardware and Software Components
 - 1.1 Microcomputer Hardware
 - 1.1.1 System Components
 - 1.1.2 Function of each Component
 - 1.2 Microcomputer Software
 - 1.2.1 Software Definition and Types
 - 1.2.2 System Software (Windows 95)
 - 1.2.3 File Management Commands (Windows 95)
2. Word Processing
 - 2.1 Keyboarding Techniques
 - 2.2 Word Processing
 - 2.2.1 Understanding Word Processing
 - 2.2.2 Create a Document
 - 2.2.3 Save, Open and Edit a Document
 - 2.2.4 Edit a Document: Cut and Paste
 - 2.2.5 Understand Hidden codes.
 - 2.2.6 The Select Feature (Block)
 - 2.2.7 Change Layout Format
 - 2.2.8 Change Text Attributes
 - 2.2.9 Use Auxiliary Tools

2.2.10 Select the Print Feature (number of copies and current document)

3. Electronic Spreadsheet

- 3.1 Spreadsheet Basics
- 3.2 Operate Menus
- 3.3 Create a Worksheet
- 3.4 Use Ranges
- 3.5 Print a Worksheet
- 3.6 Edit a worksheet

4. Electronic Mail and the Internet

- 4.1 Electronic Mail
- 4.2 The Internet

Learning Objectives:

1. Microcomputer System Hardware and Software Components

1.1 Microcomputer Hardware

1.1.1 System Components

- 1.1.1.1 Identify major components of a computer system.

1.1.2 Function of each Component

- 1.1.2.1 Describe the function of the microprocessor.
- 1.1.2.2 Describe and give examples of I/O DEVICES.
- 1.1.2.3 Describe primary storage (RAM, ROM, Cache).
- 1.1.2.4 Define bit, byte, code and the prefixes k.m. and g.
- 1.1.2.5 Describe secondary storage (diskettes and hard disks, CD ROMS, Zip Drives etc).
- 1.1.2.6 Describe how to care for a computer and its accessories.

1.2 Microcomputer Software

1.2.1 Software Definition and Types

- 1.2.1.1 Define software.

- 1.2.1.2 Describe, operational and application software used in this course.
- 1.2.1.3 Define file and give the rules for filenames and file extensions..

1.2.2 System Software (Windows 95)

- 1.2.2.1 Getting Started with Windows
- 1.2.2.2 Start and quit a Program
- 1.2.2.3 Get Help
- 1.2.2.4 Locate a specific file using the **find** function of Win95
- 1.2.2.5 Changing system settings: wall paper, screen saver, screen resolution, background.
- 1.2.2.6 Starting a program by using the Run Command
- 1.2.2.7 Shutting down your computer

1.2.3 File Management Commands (Windows 95)

- 1.2.3.1 View directory structure and folder content
- 1.2.3.2 Organizing files and folders
- 1.2.3.3 Copy, delete, and move files and folders
- 1.2.3.4 Create folders
- 1.2.3.5 Maximize and minimize a window
- 1.2.3.6 Print directory/folder content
- 1.2.3.7 Describe the Windows 95 taskbar

2. Word Processing

2.1 Keyboarding Techniques

- 2.1.1 Identify and locate alphabetic and numeric keys
- 2.1.2 Identify and locate function keys: special keys, home keys, page up key, page down key, numeric key pad, shift keys, punctuation keys, tab key

2.2 Word Processing

2.2.1 Understanding word processing

- 2.2.1.1 The Windows Component
- 2.2.1.2 The Menu Bar
- 2.2.1.3 Menu Indicators

- 2.2.1.4 The Document Window
- 2.2.1.5 The Status Bar
- 2.2.1.6 The Help Feature
- 2.2.1.7 Insertion Point Movements

2.2.2 Create a document

- 2.2.2.1 Change the Display
- 2.2.2.2 The Enter Key
- 2.2.2.3 Enter Text

2.2.3 Save, Open and Exit a document.

- 2.2.3.1 Save a document
- 2.2.3.2 Close a document.
- 2.2.3.3 Start a new document Window
- 2.2.3.4 Open a document
- 2.2.3.5 Exit Word Processor

2.2.4 Edit a Document

- 2.2.4.1 Add New Text
- 2.2.4.2 Delete text
- 2.2.4.3 Basic Format Enhancement (split and join paragraphs, insert text)

2.2.5 Understand Hidden Codes

- 2.2.5.1 Display Hidden Codes
- 2.2.5.2 Delete Text Enhancements

2.2.6 The Select Feature

- 2.2.6.1 Identify a Selection
- 2.2.6.2 Move a Selection
- 2.2.6.3 Copy a Selection
- 2.2.6.4 Delete a Selection
- 2.2.6.5 Select Enhancements
- 2.2.6.6 Save a Selection
- 2.2.6.7 Retrieve a Selection

2.2.7 Change Layout Format

2.2.7.1 Change layout format: (margins, spacing, alignment, paragraph indent, tabs, line spacing, page numbering)

2.2.8 Change Text Attributes

2.2.8.1 Change text attributes: (bold, underline, font, etc.)

2.2.9 Use Auxiliary Tools

2.2.9.1 Spell Check

2.2.10 Select the Print Feature

2.2.10.1 Select the Print Feature: (i.e; number of copies and current document)

2.2.10.2 Identify various options in print screen dialogue box

3. Electronic Spreadsheet

3.1 Spreadsheet Basics

3.1.1 The Worksheet Window

3.2 Operates Menus

3.2.1 Use a Menu Bar

3.2.2 Use a Control Menu

3.2.3 Use a Shortcut Menu

3.2.4 Save, Retrieve form Menus

3.3 Create a Worksheet

3.3.1 Enter Constant Values and Formulas

3.3.2 Use the Recalculation Feature

3.3.3 Use Cell References (relative and absolute references)

3.4 Use Ranges

3.4.1 Type a Range for a Function

3.4.2 Point to a Range for a Function

3.4.3 Select a Range for Toolbar and Menu Commands

3.5 Print a Worksheet

3.5.1 Print to the Screen

- 3.5.2 Print to the Printer
- 3.5.3 Print a Selected Range

- 3.6 Edit a Worksheet
 - 3.6.1 Replace Cell Contents
 - 3.6.2 Insert and Delete Rows and Columns
 - 3.6.3 Change Cell Formats
 - 3.6.4 Change Cell Alignments
 - 3.6.5 Change Column Width
 - 3.6.6 Copy and Move Cells

- 4. Electronic Mail and the Internet
 - 4.1 Electronic Mail
 - 4.1.1 Compose and send an e-mail message
 - 4.1.2 Retrieve an e-mail attachments
 - 4.1.3 Send an e-mail message with attachments
 - 4.1.4 Retrieve and save e-mail attachments
 - 4.1.3 Print an e-mail message
 - 4.1.4 Delete an e-mail message

 - 4.2 The Internet
 - 4.2.1 Overview of the World Wide Web
 - 4.2.2 Accessing Web sites
 - 4.2.3 Internet Web Browsers
 - 4.2.4 Internet Search Engines
 - 4.2.5 Searching Techniques

STUDENT EVALUATION:

Required Pass Mark 70%

DEVELOPMENT HISTORY:

Date Designed 1998
Date Revised 1999

COURSE OUTLINE - SD 1700

NAME AND NUMBER: Workplace Skills SD 1700

DESCRIPTIVE TITLE: Workplace Skills

DESCRIPTION:

This course involves participating in meetings, doing safety inspections, completing employment insurance forms, writing letters of employment insurance appeal, and filing a human rights complaint. Includes information on formal meetings, unions, worker's compensation, employment insurance regulations, worker's rights and human rights.

PREREQUISITES: None

CO-REQUISITES: None

SUGGESTED DURATION: 30 Hrs

COURSE AIMS:

1. Participate in meetings (conduct meetings).
2. Be aware of union procedures.
3. Be aware of workers' compensation regulations.
4. Be aware of occupational health and safety regulations.
5. Be aware of employment insurance regulations
6. Be aware of workers' rights.
7. Be aware of human rights

COURSE OBJECTIVES (KNOWLEDGE):

1. Meetings
 - a. Explain preparation requirements prior to conducting a meeting
 - b. Explain the procedures for conducting a meeting.
 - c. Explain participation in meetings.
 - d. Explain the purpose of motions.
 - e. Explain the procedure to delay discussion of motions.
 - f. Explain how to amend and vote upon a motion.

2. Unions
 - a. Why do unions exist?
 - b. Give a concise description of the history of Canadian labour.
 - c. How do unions work?
 - d. Explain labour's structure.
 - e. Describe labour's social objectives.
 - f. Describe the relationship between Canadian labour and the workers.
 - g. Describe the involvement of women in unions.

3. Worker's Compensation
 - a. Describe the aims, objectives, benefits and regulations of the Workers Compensation Board.
 - b. Explain the internal review process.

4. Occupational Health and Safety
 - a. Describe the rules and regulations directly related to your occupation.

5. Employment Insurance Regulations
 - a. Explain employment insurance regulations
 - b. Describe how to apply for employment insurance.
 - c. Explain the appeal process.

6. Worker's Rights
 - a. Define labour standards.
 - b. Explain the purpose of the Labour Standards Act.
 - c. List regulations pertaining to:
 - i. Hours of work.
 - ii. Minimum wage.
 - iii. Employment of children.
 - iv. Vacation pay

7. Human Rights
 - a. Describe what information cannot be included on an application.
 - b. Describe what information cannot be included in an interview

- c. Why is there a Human Rights Code?
- d. Define sexual harassment.

MAJOR TASKS / SUBTASKS (SKILLS):

1. Participate in meetings.
 - a. Follow the form of getting a motion on the floor
 - b. Discuss a motion
 - c. Amend a motion
 - d. Vote on a motion.
2. Complete a safety inspection of your shop.
3. Complete an employment insurance application form.
4. Write a letter of appeal.
5. Analyze a documented case of a human rights complaint with special emphasis on the application form, time-frame, documentation needed, and legal advice available.

EVALUATION:

Required Pass Mark 70%

DEVELOPMENT HISTORY:

Date Developed:

Date Revised: April, 1999

NAME AND NUMBER: Job Search Techniques SD 1710

DESCRIPTIVE TITLE: Job Search Techniques

PREREQUISITES: None

CO-REQUISITES: None

SUGGESTED DURATION: 15 hrs.

EVALUATION: Theory and Practical Applications Require a Pass Mark of 70%.

COURSE OBJECTIVES (KNOWLEDGE):

1. Examine and Demonstrate Elements of Effective Job Search Techniques
 - Identify and examine employment trends and opportunities
 - Identify sources that can lead to employment
 - Discuss the importance of fitting qualifications to job requirements
 - Discuss and demonstrate consideration in completing job application forms
 - Establish the aim/purpose of a resume
 - Explore characteristics of effective resumes, types of resumes, and principles of resume format
 - Explore characteristics of and write an effective cover letter
 - Explore, and participate in a role play of a typical job interview with commonly asked questions and demonstrate proper conduct
 - Explore other employment related correspondence
 - Explore the job market to identify employability skills expected by employer
 - Conduct a self-analysis and compare with general employer expectations

DEVELOPMENT HISTORY:

Date Developed:

Date Revised: 1999 05 03

NAME AND NUMBER: Entrepreneurial Awareness SD 1720

DESCRIPTIVE TITLE: Entrepreneurial Awareness

PREREQUISITES: None

CO-REQUISITES: None

SUGGESTED DURATION: 15 hrs

EVALUATION: Theory and Practical Applications Require a Pass Mark of 70%.

COURSE OBJECTIVES (KNOWLEDGE):

1. Explore Self-Employment: An Alternative to Employment
 - Identify the advantages and disadvantages of self-employment vs. regular employment
 - Differentiate between an entrepreneur and a small business owner
 - Evaluate present ideas about being in business

2. Explore the Characteristic of Entrepreneurs
 - Identify characteristics common to entrepreneurs
 - Relate their own personal characteristics with those of entrepreneurs.
 - Evaluate their present ideas about business people

3. Identifying Business Opportunities
 - Distinguish between an opportunity and an idea.
 - List existing traditional and innovative business ventures in the region.
 - Explain the general parameters between which business ventures should fit.
 - Summarize the role of such agencies Regional Economic Development Boards, Business Development Corporations, etc.
 - Identify potential business opportunities within the region.

4. Demystifying the Entrepreneurial Process
 - Explain the entrepreneurial process
 - Describe the purpose of a business plan

Small Equipment Repair

- Identify the main ingredients of a business plan
- Summarize the role of such agencies as BDC's, ACOA, Women's Enterprise Bureau etc.

List other agencies where assistance - financial and otherwise - is available to those interested in starting a business venture.

REQUIRED WORK EXPERIENCES

Provincial Certification requires that all Apprentices obtain appropriate industry based work experiences. The required work experiences identified in this section are written in the broadest terms so as to ensure the apprentices receive experiences in each of the required areas and to ensure that employers have a degree of flexibility in applying the terms and conditions implicit in a Contract of Apprenticeship. What is important is that both the apprentice and the employer understands the obligations laid out in this plan of training which is design to ensure that at the completion of both the technical training and the required hours of work experience the apprentices has both the knowledge and the skills necessary to successfully complete the Provincial Examination.

REQUIRED WORK EXPERIENCES:

Use precision measuring tools including dial indicators, bore gauges, metric and standard micrometers, vernier calipers, and telescopic gauges.

Cut, weld, and braze using oxy-acetylene equipment, with emphasis on safe use.

Weld in flat and horizontal positions using gas metal arc welding equipment, with emphasis on safe use.

Troubleshoot AC/DC circuit components for electrical malfunctions in starting systems, charging systems, and electrical accessories.

Service, troubleshoot, and carry out electrical and compression tests on engines using basic tools, and shop & test equipment.

Disassemble and assemble light duty engines including inspecting, testing, adjusting and repairing/replacing component parts.

Disassemble and assemble lubrication systems including inspecting, testing, and repairing/replacing component parts and making adjustments.

Disassemble and assemble gasoline air and fuel delivery systems including inspecting, testing, and repairing/replacing component parts and making adjustments.

Disassemble and assemble carburetted fuel systems including inspecting, testing, and repairing/replacing component part and making adjustments, with an emphasis on rebuilding carburettors.

Disassemble and assemble gasoline injection systems including inspecting, testing, and repairing/replacing component parts and making adjustments including throttle body and multi-

port systems.

Disassemble and assemble light and medium duty cooling systems such as heat exchangers, keel coolers, and thermostatically controlled fans including inspecting, testing, and repairing/replacing component parts and making adjustments .

Disassemble and assemble ignition systems including inspecting, testing, and replacing/repairing component parts such as timing chains, timing belts, and timing gears as well as making adjustments.

Disassemble, assemble, and service charging systems including troubleshooting such systems and the testing and servicing of batteries.

Service various transmissions including lawn and garden equipment transmissions and differentials, chainsaws and drive systems, hydrostatic drives, snowmobile chaincases, motorcycle transmissions and crankshafts, motorcycle clutches, and marine equipment transmissions and velvet drives, and outboard motor lower units.

Service, troubleshoot, and repair lawn and garden equipment including performing routine maintenance and tune-ups, servicing brake and steering components, servicing mower decks and attachments, engine driven water pumps, remote starters, valve trains, and hydraulic systems.

Service, troubleshoot, and repair various snowmobiles including servicing and repairing recoil operations, braking systems, steering components, suspensions, frame components, track suspension units, carburetors, electronic ignition systems, lighting and charging systems, gas charged shocks, clutches, and exhaust systems.

Service, troubleshoot, and repair various motorcycles and ATV's including motorcycle air cleaners, wheels and tires, brake systems, final drives, electronic ignition systems, magneto and battery ignition systems, and electrical malfunctions.

Service, troubleshoot, and repair various marine equipment items including outboard powerheads, stern drive engines, fibreglass hulls, outboard controls and accessories, bilge pumps and blowers, tilt and trim systems, propellers, impellers, upper and lower gear housings, and lower units.

APPENDIX “A”

TOOL LIST

Combination Wrench 8 - 19 MM
Combination Wrench 1/4" - 1"
3/8" Drive 8 - 19 MM Socket
1/4" - 7/8" Socket
1/2" Drive 10 - 24MM Set
3/8"- 1 1/4" SAE Set
Minimum 18" - 1/2" Drive Power Bar

T Handle Allen Keys . Set MM/SAE
3/8" Drive Ext. 3" and 6"
Screw driver with inter-change tips
Set Screw Drivers
Philip #1
#2
#3
Slotted Stubby
4"
8"

2 lb. Hammer
1 Soft face Hammer
Pliers combination
Vise Grips
Needle Nose Pliers
Snap Ring Pliers
Hacksaw
Punch Set
Metal Tool Box
Measuring Tape
Calipers
Multi Meter
Feeler Gauge

This is a basic tool list. Other tools may be deemed mandatory by Instructor.