



PROVINCIAL PLAN OF TRAINING

FOR

SMALL EQUIPMENT SERVICE TECHNICIAN

OCCUPATION

Document Status	Date Distributed	Mandatory Implementation Date	Comments
Original Version	July 2004	September 2005	
Addendum #1	November 2004	September 2005	Refer to Addendum Page
Addendum #2	March 2005	September 2005	Refer to Addendum Page

July, 2004

Addendum #1

1. Course name corrections:
 - WD-1260 (Gas Metal Arc Welding Fundamentals) to **Shielded Metal Arc Welding Fundamentals**
 - WD-1320 (Mig Welding) to **Gas Metal Arc Welding**
2. Corrections in course WD-1250 (Oxy-Fuel Cutting and Heating)
 - **Outcome - removed “Braze Welding”**
 - #1 Practical - removed “Oxy-fuel Welding”
3. Overall course hours change from 1785 to **1811**
4. Entry level courses have additional required courses:

Occupational Health and Safety	6 hours
WHMIS	6 hours
First Aid	14 hours
Total	26 hours

Total Entry level changed from 1065 to **1091**

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 journey person 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 apprenticable occupation as a career choice will receive high quality training and thus will be prepared to compete for jobs worldwide.

Chair, Provincial Apprenticeship and Certification Board

Minister of Education

Apprenticeship Plan of Training Evaluation Form

Thank you for your interest in the development and revision of this Plan of Training. Upon review of this document, please record your feedback in relation to the following items:

- course division and organization
- relevancy of the content
- errors or omissions
- other suggestions for improvement and consideration

Overall comments are to be entered on this evaluation form and specific changes are to be entered directly on the document in the relevant area(s). When all feedback has been recorded, return this evaluation form along with the revised Plan of Training to the Apprenticeship Office noted at the bottom of the page.

(PLEASE PRINT)

Trade: Small Equipment Service Technician

Full Name: _____

Type of Position: (Trade Practitioner, Instructor, etc.): _____

Company: _____

Address: _____

Telephone: _____

Comments: (Use a separate sheet of paper if necessary)

Return Evaluation Form and Plan of Training to:

*Manager, Industrial Training
Division of Institutional and Industrial Education
Department of Education
P.O. Box 8700
St. John's, NF
A1B 4J6*

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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 and Certification 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:

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

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 and Certification 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	Completion of entry level (Block 1) courses, plus relevant work experience totaling a minimum of 1800 hours *	Second Year
Second Year Apprentice	Completion of advanced level (Block 2) courses, plus relevant work experience totaling a minimum of 3600 hours	Third Year
Third Year Apprentice	Completion of advanced level (Block 3) courses, plus relevant work experience totaling a minimum of 5400 hours	Fourth Year
Fourth Year Apprentice	Completion of advanced level (Block 4) courses and (Block 5) <i>if applicable</i> , plus sign-off of workplace skills required for certification totaling a minimum of 7200 hours**	Write Certification Examination
5400 Hour Programs	Requirements for Progression	Progress To
First Year Apprentice	Completion of entry level (Block 1) courses, plus relevant work experience totaling a minimum of 1800 hours *	Second Year
Second Year Apprentice	Completion of advanced level (Block 2) courses, plus relevant work experience totaling a minimum of 3600 hours	Third Year
Third Year Apprentice	Completion of advanced level (Block 3) courses, plus sign-off of workplace skills required for certification totaling a minimum of 5400 hours	Write Certification Examination

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4800 Hour Programs	Requirements for Progression	Progress To
First Year Apprentice	Completion of entry level courses (Block 1), plus relevant work experience totaling a minimum of 1600 hours *	Second Year
Second Year Apprentice	Completion of advanced level (Block 2) courses, plus relevant work experience totaling a minimum of 3200 hours	Third Year
Third Year Apprentice	Completion of advanced level (Block 3) courses, plus sign-off of workplace skills required for certification totaling a minimum of 4800 hours	Write Certification Examination

* All direct entry apprentices must meet the **Requirements for Progression** either through Prior Learning Assessment and Recognition or course completion before advancing to the next year.

** Apprentices in a 7200 hour program which incorporates more than four blocks of training are considered fourth year apprentices pending completion of 100% course credits and workplace skills requirements.

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 journeyman'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 Hours			(Hairstylist Program) - 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.

7.3 For each and every course, a formal assessment is required for which 70% is the pass mark. At the discretion of the instructor, the summative mark may be for completion of a theory examination or a combination of the theory examination and an assigned practical project.

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 and Certification 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 and Certification 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 and Certification Board.

14.3 Failure to comply with Sections 14.1 and/or 14.2 will result in cancellation of the Memorandum of Understanding. Apprentices may have their M.O.U.'s reinstated by the Provincial Apprenticeship and Certification Board but would be subject to a commitment to complete the entire program as outlined in the General Conditions of Apprenticeship. Permanent cancellation in the said occupation is the result of non-compliance.

14.4 Cancellation of the Memorandum of Understanding to challenge journeyperson examinations, if unsuccessful, would require an apprentice to serve a time penalty of two (2) years before reinstatement as an apprentice or registering as a Trade Qualifier.

14.5 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.

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

14.7 Apprentices who cannot acquire all the workplace skills at their place of employment will have to be evaluated in a simulated work environment at a training institution and have sign-off done by instructors to meet the requirements for certification.

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 SERVICE TECHNICIAN 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 and Certification 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 and Certification 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 and Certification 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

Small Equipment Service Technician

PROGRAM CONTENT

NF Course No.	Course Name	Hours	Pre-requisites	Page No.
TS-1190	Shop Fundamentals	90	-	15
TS-1220	Precision Measurement	30	-	18
TS-1510	Occupational Health and Safety	6	-	20
TS-1520	WHMIS	6	-	22
TS-1530	First Aid	14	-	26
WD-1250	Oxy-fuel Cutting and Heating	30	TS-1190	27
WD-1260	Shielded Metal Arc Welding Fundamentals	30	TS-1190	28
WD-1320	Gas Metal Arc Welding	30	TS-1190	29
MP-1440	Electrical and Electronic Basic Principles	90	TS-1190; SR-1120	30
SR-1120	Service Information Systems	30	-	32
SR-1130	Engine Operations	45	TS-1190; SR-1120	34
SR-1140	Lubrication Systems	45	TS-1190; SR-1120	36
SR-1220	Small Equipment Engines	90	SR-1130	38
SR-1230	Small Equipment Starting and Charging Systems	75	MP-1440	41
SR-1240	Ignition Systems	60	MP-1440	43
SR-1320	Gasoline Engine Air and fuel delivery systems	30	TS-1190; SR-1120	45
SR-1330	Gas Injection Systems	60	SR-1320; MP-1440	47
SR-1340	Carburetted Fuel Systems	60	SR-1320	49
SR-1420	Small Equipment Cooling Systems	45	TS-1190; SR-1120	51
SR-1430	Emission Control Systems	30	SR-1330; SR-1340; SR-1240	53
SR-1500	Small Equipment Transmissions	120	ALL ENTRY LEVEL	54
SR-2100	Lawn & Garden Equipment, Servicing Fundamentals	45	ALL ENTRY LEVEL	56
SR-2110	Lawn & Garden Equipment, Troubleshooting & Repair	80	SR-2100	58
SR-2200	Snowmobile Servicing Fundamentals	60	ALL ENTRY LEVEL	60
SR-2210	Snowmobile Troubleshooting & Repair	80	SR-2200	62

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NF Course No.	Course Name	Hours	Pre-requisites	Page No.
SR-2300	Motorcycle & ATV Servicing Fundamentals	60	ALL ENTRY LEVEL	65
SR-2310	Motorcycle & ATV Troubleshooting & Repair	120	SR-2300	67
SR-2400	Marine Equipment Servicing Fundamentals	75	ALL ENTRY LEVEL	70
SR-2410	Marine Equipment Troubleshooting & Repair	80	SR-2400	73
CM-2150	Workplace correspondence	45	-	76
MR-1220	Customer Service	30	-	78
SP-2330	Quality Assurance/Quality Control	30	-	80
MC-1050	Introduction to Computers	30	-	82
SD-1700	Workplace skills	30	-	87
SD-1710	Job Search Techniques	15	-	89
SD-1720	Entrepreneurial Awareness	15	-	90
Total Hours		1811		

PROGRAM STRUCTURE

Entry Level Courses				
NF Course No.	Course Name	Hours	Pre-requisites	Page No.
TS-1510	Occupational Health and Safety	6		20
TS-1520	WHMIS	6		22
TS-1530	First Aid	14		26
TS-1190	Shop Fundamentals	90	-	15
TS-1220	Precision Measurement	30	-	18
WD-1250	Oxy-fuel Cutting and Heating	30	TS-1190	27
WD-1260	Shielded Metal Arc Welding Fundamentals	30	TS-1190	28
WD-1320	Gas Metal Arc Welding	30	TS-1190	29
MP-1440	Electrical and Electronic Basic Principles	90	TS-1190; SR-1120	30
SR-1120	Service Information Systems	30	-	32
SR-1130	Engine Operations	45	TS-1190; SR-1120	34
SR-1140	Lubrication Systems	45	TS-1190; SR-1120	36

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Entry Level Courses				
NF Course No.	Course Name	Hours	Pre-requisites	Page No.
SR-1220	Small Equipment Engines	90	SR-1130	38
SR-1230	Small Equipment Starting and Charging Systems	75	MP-1440	41
SR-1240	Ignition Systems	60	MP-1440	43
SR-1320	Gasoline Engine Air and fuel delivery systems	30	TS-1190; SR-1120	45
SR-1330	Gas Injection Systems	60	SR-1320; MP-1440	47
SR-1340	Carburetted Fuel Systems	60	SR-1320	49
SR-1420	Small Equipment Cooling Systems	45	TS-1190; SR-1120	51
SR-1430	Emission Control Systems	30	SR-1330; SR-1340; SR-1240	53
CM-2150	Workplace correspondence	45	-	76
MR-1220	Customer Service	30	-	78
SP-2330	Quality Assurance/Quality Control	30	-	80
MC-1050	Introduction to Computers	30	-	82
SD-1700	Workplace skills	30	-	87
SD-1710	Job Search Techniques	15	-	89
SD-1720	Entrepreneurial Awareness	15	-	90
Total Hours		1091		

REQUIRED WORK EXPERIENCE

Block #2				
NF Course No.	Course Name	Hours	Pre-requisites	Page No.
SR-2100	Lawn & Garden Equipment, Servicing Fundamentals	45	ALL ENTRY LEVEL	56
SR-2200	Snowmobile Servicing Fundamentals	60	ALL ENTRY LEVEL	60
SR-2300	Motorcycle & ATV Servicing Fundamentals	60	ALL ENTRY LEVEL	65
SR-2400	Marine Equipment Servicing Fundamentals	75	ALL ENTRY LEVEL	70
Total Hours		240		

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REQUIRED WORK EXPERIENCE

Block #3				
NF Course No.	Course Name	Hours	Pre-requisites	Page No.
SR-1500	Small Equipment Transmissions	120	ALL ENTRY LEVEL	54
SR-2310	Motorcycle & ATV Troubleshooting & Repair	120	SR-2300	67
Total Hours		240		

REQUIRED WORK EXPERIENCE

Block #4				
NF Course No.	Course Name	Hours	Pre-requisites	Page No.
SR-2110	Lawn & Garden Equipment, Troubleshooting & Repair	80	SR-2100	58
SR-2210	Snowmobile Troubleshooting & Repair	80	SR-2200	62
SR-2410	Marine Equipment Troubleshooting & Repair	80	SR-2400	73
Total Hours		240		

TS-1190

SHOP FUNDAMENTALS

Description:

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

Course Aims:

1. To gain an appreciation of the need for safety regulations in the operation and maintenance of shop tools, equipment and facilities

Objectives and Content:

1. Identify safe working habits:
 - i) purpose and maintenance of personal safety equipment
 - ii) respect noise level regulations
 - iii) identify potential hazards to personal safety
 - iv) check for unsafe conditions
 - v) reporting of accidents
2. Identify fire hazards:
 - i) fire hazards
 - classifications of fire types
 - purpose and use of fire extinguishers
 - ii) explosions
 - spontaneous combustion
 - storage and handling of fuels
 - iii) ventilation and hazardous gases
 - carbon monoxide
 - storage batteries
3. Describe procedures to select and use hand tools:
 - i) pliers
 - ii) screwdrivers
 - iii) wrenches
 - iv) hammers and mallets
 - v) gripping tools
 - vi) turning tools
4. Describe the procedures to select and use tubing, fittings and flaring tools:
 - i) single and double flaring
 - ii) ISO flaring

- iii) measure and cut tubing
 - iv) compression fittings
 - v) double flare union
5. Describe the procedures to select and use cutting tools:
- i) punches
 - ii) chisels
 - iii) files
 - iv) saws
 - v) sharpen chisels
 - vi) sharpen drill bits
 - vii) maintain and store cutting tools
6. Describe the procedures to select and use threading devices:
- i) taps
 - ii) dye
 - iii) thread restorers
 - iv) thread inserts
 - v) extractors
 - vi) tap and drill chart
7. Describe the procedures to select and use fasteners:
- i) rivets
 - ii) sheet metal screws
 - iii) bolts
 - iv) nuts
 - v) washers
 - vi) torque procedures
 - vii) identify bolt grades
 - viii) keys and pins
 - ix) c-clips and snap rings
 - x) plastic fastening devices
8. Describe the procedures to select, use and maintain shop equipment
- i) pullers
 - ii) drivers
 - iii) presses
 - iv) portable power tools
 - v) power cleaning equipment
 - vi) portable crane
 - vii) jacks
 - viii) chain hoist
 - ix) solvent cleaning tanks
 - x) winches

9. Describe the procedures for wire repair:
 - i) soldering
 - ii) crimping
 - iii) terminal removal tools
 - iv) heat shrink
 - v) neoprene sealers

10. Describe the procedures to drill materials:
 - i) operation of power drilling equipment
 - ii) selection and use cutting fluids
 - iii) identify and selection of clamping devices
 - iv) maintenance of drilling equipment

11. Describe the procedures to grind and finish metals:\
 - i) installation of grinding wheel disc and brush
 - ii) adjustment of tool rest
 - iii) dressing a grinding wheel
 - iv) operation of stationary and portable grinders
 - v) maintenance of equipment
 - vi) identification and use of abrasives

12. Describe the procedures to use and maintain compressed air systems

Practical Projects:

Practical skills enhance the apprentices' ability to meet the objectives of the unit.

Required Practical Projects include:

- i) locate fire exits, fire alarms
- ii) locate shop ventilation system
- iii) prepare a floor plan showing fire exit routes
- iv) use hand and shop tools for small equipment while working on bench projects
- v) identify and use common fasteners

TS-1220

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 measurement conversion and purposes of precision measurement.

Course aims:

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

Course objectives (knowledge):

1. Describe the procedures to select and use semi-precision measuring tools
 - i) combination set
 - ii) steel rule
 - iii) dividers
 - iv) inside and outside calipers
 - v) measuring tape,
 - vi) angle gauge,
 - vii) calipers
 - viii) straight edges
2. Describe the procedures to select and use precision measuring tools
 - i) micrometers (all types)
 - ii) vernier calipers (all types)
 - iii) surface plates (all types)
 - iv) telescopic gauges
 - v) small hole gauges
 - vi) depth gauges
 - vii) dial indicators (all types)
 - viii) v-blocks
 - ix) cylinder bore gauge
 - x) torque wrench
3. Solve problems on English/Metric conversions

Practical Projects:

Practical skills enhance the apprentices' ability to meet the objectives of the unit.

Required Practical Projects include:

- i) Identify and explain the purpose of the given measuring tools
- ii) Measure outside and inside diameters of a given object
- iii) Measure projection and depth of a given object

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- iv) Measure runout, endplay and backlash on given object
- v) Maintain measuring tools as required by the manufacture

TS-1510 OCCUPATIONAL HEALTH AND SAFETY

Description:

This course is designed to give participants the knowledge and skills necessary to interpret the Occupational Health and Safety Act, laws and regulations; understand the designated responsibilities within the laws and regulations; the right to refuse dangerous work; and the importance of reporting accidents.

Course Outcomes:

Upon successful completion of this unit, the apprentice will be able to:

- i) prevent accidents and illnesses
- ii) improve health and safety conditions in the workplace

Theory:

1. Interpret the Occupational Health and Safety Act laws and regulations
 - i) Explain the scope of the act
 - Application of the act
 - Federal/Provincial jurisdictions
 - Canada Labour Code
 - Rules and regulations
 - Private home application
 - Conformity of the Crown by the Act
2. Explain responsibilities under the Act & Regulations
 - i) Duties of employer, owner, contractors, sub-contractors, employees, and suppliers
3. Explain the purpose of joint health and safety committees
 - i) Formation of committee
 - ii) Functions of committee
 - iii) Legislated rights
 - iv) Health and safety representation
 - v) Reporting endangerment to health
 - vi) Appropriate remedial action
 - vii) Investigation of endangerment
 - viii) Committee recommendation
 - ix) Employer's responsibility in taking remedial action
4. Examine right to refuse dangerous work
 - i) Reasonable grounds for refusal
 - ii) Reporting endangerment to health
 - iii) Appropriate remedial action

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- iv) Investigation of endangerment
 - v) Committee recommendation
 - vi) Employer's responsibility to take appropriate remedial action
 - vii) Action taken when employee does not have reasonable grounds for refusing dangerous work
 - viii) Employee's rights
 - ix) Assigning another employee to perform duties
 - x) Temporary reassignment of employee to perform other duties
 - xi) Collective agreement influences
 - xii) Wages and benefits
5. Describe discriminatory action
- i) Definition
 - ii) Filing a complaint procedure
 - iii) Allocated period of time a complaint can be filed with the Commission
 - iv) Duties of an arbitrator under the Industrial Relations Act
 - v) Order in writing inclusion
 - vi) Report to commission Allocated period of time to request Arbitrator to deal with the matter of the request
 - vii) Notice of application
 - viii) Failure to comply with the terms of an order
 - ix) Order filed in the court
6. Explain duties of commission officers
- i) Powers and duties of officers
 - ii) Procedure for examinations and inspections
 - iii) Orders given by officers orally or in writing
 - iv) Specifications of an order given by an officer to owner of the place of employment, employer, contractor, sub-contractor, employee, or supplier
 - v) Service of an order
 - vi) Prohibition of persons towards an officer in the exercise of his/her power or duties
 - vii) Rescinding of an order
 - viii) Posting a copy of the order
 - ix) Illegal removal of an order
7. Interpret appeals of others
- i) Allocated period of time for appeal of an order
 - ii) Person who may appeal order
 - iii) Action taken by Commission when person involved does not comply with the order
 - iv) Enforcement of the order
 - v) Notice of application
 - vi) Rules of court

8. Explain the process for reporting of accidents
 - i) Application of act
 - ii) Report procedure
 - iii) Reporting notification of injury
 - iv) Reporting accidental explosion or exposure
 - v) Posting of act and regulations

Practical:

Practical skills enhance the apprentices' ability to meet the objectives of this course. The learning objectives below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

1. Describe work situations that one might want to refuse.
2. Interview someone in your occupation on two or more aspects of the act and report results.

TS-1520 WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS)

Description:

This course is designed to give participants the knowledge and skills necessary to define WHMIS, examine hazard identification and ingredient disclosure, explain labeling and other forms of warning, and introduce material safety data sheets (MSDS).

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- i) interpret and apply the Workplace Hazardous Materials Information System (WHMIS) Regulation under the Occupational Health & Safety Act.

Required Knowledge and Skills:

1. Define WHMIS safety
 - i) Rational and key elements
 - ii) History and development of WHMIS
 - iii) WHMIS legislation
 - iv) WHMIS implementation program
 - v) Definitions of legal and technical terms

2. Examine hazard identification and ingredient disclosure
 - i) Prohibited, restricted and controlled products
 - ii) Classification and the application of WHMIS information requirements
 - iii) Responsibilities for classification
 - iv) the supplier
 - v) the employer
 - vi) the worker - Classification: rules and criteria
 - vii) information on classification
 - viii) classes, divisions and subdivision in WHMIS
 - ix) general rules for classification
 - x) class A - compressed gases
 - xi) class B - flammable and combustible materials
 - xii) class C - oxidizing material
 - xiii) class D - poisonous and infectious material
 - xiv) class E - corrosive material
 - xv) class F - dangerously reactive material
 - xvi) Products excluded from the application of WHMIS legislation
 - consumer products
 - explosives
 - cosmetics, drugs, foods and devices

- pest control products
 - radioactive prescribed substances
 - wood or products made of wood
 - manufactured articles
 - tobacco or products of tobacco
 - hazardous wastes
 - products handled or transported pursuant to the Transportation of Dangerous Goods (TDG) Act
 - Comparison of classification systems - WHMIS and TDG
 - General comparison of classification categories
 - Detailed comparison of classified criteria
3. Explain labeling and other forms of warning
- i) Definition of a WHMIS label
 - supplier label
 - workplace label
 - other means of identification
 - ii) Responsibility for labels
 - supplier responsibility
 - employer responsibility
 - worker responsibility
 - iii) Introduce label content, design and location
 - supplier labels
 - workplace labels
 - other means of identification
4. Introduce material safety data sheets (MSDS)
- i) Definition of a material safety data sheet
 - ii) Purpose of the data sheet
 - iii) Responsibility for the production and availability of data sheets
 - supplier responsibility
 - employer responsibility
 - workers responsibility

Practical

Practical skills enhance the apprentices' ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

1. Locate WHMIS label and interpret the information displayed.
2. Locate a MSDS sheet for a product used in the workplace and determine what personal protective equipment and other precautions are required when handling this product.

SUGGESTED RESOURCES:

1. WHMIS Regulation
2. Sample MSDS sheets

TS-1530

FIRST AID

Description:

This course is designed to give the apprentice the ability to recognize situations requiring emergency action and to make appropriate decisions concerning first aid.

Complete a **St. John Ambulance** Standard First Aid Certificate course.

WD-1250 OXY-FUEL CUTTING AND HEATING

Outcome:

Upon successful completion of this course, the apprentice will be able to identify procedures for the safe and effective set up and operation of oxy-fuel equipment for heating, cutting and braze welding.

Content:

1. Describe the procedures to operate oxy-fuel heating and cutting equipment to industrial safety standards for the removal and/or installation of parts.
 - i) Safety precautions
 - Safety apparel
 - Storage and handling of welding gases
 - Pre-operational inspection
 - ii) Setting up equipment
 - Cylinders
 - Gauges
 - Regulators
 - Valves-flame arrestor
 - Torches and tips
 - Hoses
 - Testing for leaks
 - iii) Operating the torch
 - Lighting procedures
 - Types of flame (adjustment)
 - Shutting down procedures

2. Describe the procedures to perform flame cutting with oxy-acetylene equipment
 - Flame cutting
 - Cutting torch and tips
 - Use of cutting torch

Practical Projects:

Practical skills enhance the apprentices' ability to meet the objectives of the unit. Required Practical Projects include:

1. Assemble, test, light and adjust oxy-fuel welding and cutting equipment.
2. Perform flame cutting with oxy-fuel equipment.
3. Perform proper shut down procedures.

WD-1260 SHIELDED METAL ARC WELDING FUNDAMENTALS

Course outcomes:

Upon successful completion of this course, the apprentice will be able to:

- set up arc welding equipment.
- describe the different types of electrodes and identify the purpose.
- describe the different types of joints.
- perform basic arc welding procedures.

Theory:

1. Describe how to set up and operate arc welding equipment.
 - AC and DC machines
 - straight and reverse polarity
 - proper grounding methods
 - electrode holders
 - amperage settings for various electrodes
2. Describe the numbering system for electrodes.
 - electrode numbering system
 - tensile strength
 - welding position recommended for the electrode
 - penetration
3. Define terms involved in electric arc welding.
 - duty cycle
 - arc blow
 - polarity
 - spatter
4. Demonstrate a working knowledge of the different types of joints encountered in welding.
 - butt, tee, lap, corner, edge joints;
5. Describe procedures for welding in the flat position

Practical Projects:

Practical skills enhance the apprentices' ability to meet the objectives of the unit.

Required Practical Projects include:

1. Set up and shut down arc welding equipment
2. Deposit a fillet weld in a tee joint (one side using welding rod #6011 and one side using welding rod #7018).

WD-1320

GAS METAL ARC WELDING

Outcome:

Upon successful completion of this course, the apprentice will be able to describe the basic MIG (GMAW) welding process and provide the trainee with the skills and knowledge needed to use MIG Welding equipment.

Content:

1. Describe the procedures to operate MIG welding equipment to industrial safety standards as needed for various motorized equipment
 - i) Equipment used in MIG welding
 - ii) Shielding gases used in MIG welding
 - iii) Filler wire used in MIG welding
 - iv) The basic MIG welding process
 - v) Advantages of MIG welding
 - vi) Types of MIG welding
 - vii) Proper penetration
 - viii) Electrical system cautions when MIG welding
 - Location of ground cables
 - Possible bearing damage from welding
 - Possible computer and electrical accessory damage from welding
 - Procedures to prevent electrical and bearing damage
 - ix) Set up and shut down procedures

Practical Projects:

Practical skills enhance the apprentices' ability to meet the objectives of the unit. Required Practical Projects include:

1. Identify the equipment used in MIG welding.
2. Describe the shielding gases used in MIG welding.
3. Describe the filler wire used in MIG welding.
4. Describe the basic MIG welding process.
5. List the advantages of MIG welding.
6. List the types of MIG welding.
7. Weld using MIG equipment.
8. Perform set up and shut down procedures.

MP-1440 ELECTRICAL & ELECTRONIC BASIC PRINCIPLES

Outcome:

Upon successful completion of this unit, the apprentice will be able to apply basic electrical and electronic principles.

Objectives and content:

1. Demonstrate knowledge of electrical basic principles
 - i) Safety practices and procedures working with electrical equipment
 - ii) Terminology - abbreviations and glossary of electrical terms
 - iii) Sources of Electricity
 - generation of electricity
 - use of chemical, magnetism, heat, light and DC power supply
 - theory and laws of electricity
 - theory and laws of magnetism and inductance
 - iv) Ohms Law - volts, ohms and amperes
 - v) Symbols and schematics - common electrical symbols
 - read schematics/wiring diagrams

2. Apply electrical principles using ohms law to calculate volts, ohms, watts and amperes
 - i) Application of Ohms Law to Electrical Circuits
 - Series circuit
 - Parallel circuit
 - Series and parallel circuit

3. Use instruments to test components of series, parallel and series parallel circuits to determine cause of malfunctions in an electrical circuit
 - i) Circuit testing devices
 - Applications of volt, ohm and ammeters
 - Meter ranges
 - Correct hookup of meters
 - Test lights, circuit breakers
 - ii) Circuit problems and testing problems
 - Short, open and grounds
 - Diagnostic trouble shooting procedures
 - Testing procedures and equipment

4. Identify electronic components
 - i) Wires and terminals
 - Types and sizes
 - Terminals and connectors
 - Conductors, semi conductors and insulators

- ii) Capacitors
 - Construction
 - Purpose
 - Uses
- iii) Resistors
 - Identification
 - Purpose
 - Uses
- iv) Transistors
 - Identification
 - Purpose
 - Uses
- v) Diodes
 - Identification
 - Purpose
 - Uses

Practical Projects:

Practical skills enhance the apprentices' ability to meet the objectives of the unit.
Required Practical Projects include:

1. Read schematics and wiring diagrams
2. Use circuit testing devices.
 - ammeter
 - ohmmeter
 - voltmeter
 - test lights
 - peak voltage meter
3. Apply Ohms Law to Electrical Circuit
4. Identify wires and terminals
 - demonstrate back probing
5. Test electronic circuit

SR-1120

SERVICE INFORMATION SYSTEMS

Outcome:

Upon successful completion of this unit, the apprentice will be able to select and use different types of service manuals found in Small Equipment Repair industry.

Contents and objectives:

1. Identify the procedures to use operator's manual
 - i) methods of using
 - ii) interpretation of sections

2. Identify the procedures to use service manual
 - i) Methods of using
 - ii) Interpretation of sections

3. Identify the procedures to use parts manual
 - i) Methods of using
 - micro-fiche
 - ii) Interpretation of sections

4. Identify the procedures to use special bulletins
 - i) Methods of using
 - ii) Purpose
 - iii) Interpretation
 - iv) Introduction to computers
 - computerized parts information
 - computerized service and repair information

6. Identify the procedures to use computerized information systems
 - i) Work order
 - ii) Warranty claims
 - iii) Time ticket
 - iv) Tracking procedures

Practical Projects:

Practical skills enhance the apprentices' ability to meet the objectives of the unit.

Required Practical Projects include:

1. Find serial number and decode on the following items:
 - chassis
 - engine
 - transmission

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2. With the appropriate manual, find the type and amount of engine oil recommended on an all-terrain vehicle.
3. With the appropriate manual find the step by step removal procedure of the engine and transmission of a motorcycle
4. With the appropriate manual, create a parts list of a cylinder head.

Suggested resources:

1. Manufacturer's manual.
2. Use appropriate audio-visual material where available.

SR-1130

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.

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.

Objectives and content:

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) Rotary
5. Describe the procedures to set valve timing
 - i) replace timing belt/chain
 - ii) valve timing
 - iii) service and repair reed valves on 2 cycle engines
 - iv) rotary valve timing on 2 cycle engine
 - v) distributor timing
6. Describe the procedures to check engine compression (gasoline)
 - i) remove spark plugs
 - ii) test compression:
 - gas engine
 - iii) compare readings to indicate engine condition
 - iv) replace and torque spark plugs

- v) cylinder leak down test

Practical Projects:

Practical skills enhance the apprentices' ability to meet the objectives of the unit.

Required Practical Projects include:

1. identification of major engine components
2. set valve timing on a two cycle and a four cycle engine
3. perform a compression test on a gasoline engine

SR-1140

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.

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.

Objectives and content:

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. Explain the operation of lubrication systems
 - splash
 - pressure
5. Describe the types and explain the purpose of lubricating oil filters
6. Describe the types and explain the operation of lubricating pumps:
 - gear
 - vane
 - rotor
7. Describe the types and explain the operation of pressure relief valves and components
8. Describe the types and explain the operation of lubrication oil coolers

9. Describe the procedures to identify and service lubrication systems
 - i) charts for pre-mixing
 - ii) oil filters and check for leaks
 - iii) oil level
 - iv) oil pressure
 - v) dirty oil tank
 - vi) oil for contamination
 - vii) engine oil
 - viii) Maintain appropriate service records

10. Describe the procedures to service oil filters
 - i) replace oil filters
 - ii) gaskets and "o" rings and filter
 - iii) fill and bleed system (if necessary)

11. Describe the procedures to service lubricating oil pump
 - i) Identify, remove and disassemble oil pumps
 - ii) Inspect and identify worn components
 - iii) Replace, prime and test on engine
 - iv) identify and adjust two-cycle oil pumps
 - v) Test oil pressure

12. Describe the procedures to service lubricating oil coolers
 - i) Clean, inspect components
 - ii) "O" rings, gaskets and seals

Practical Projects:

Practical skills enhance the apprentices' ability to meet the objectives of the unit.
Required Practical Projects include:

1. perform an oil pressure check on an engine
2. remove, clean, inspect and replace an oil filter
3. remove, clean, inspect and replace a pressure relief valve and components
4. remove, clean, inspect and replace oil pump

SR-1220

SMALL EQUIPMENT 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.

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.

Objectives and content:

1. Describe the principles of engine operation
 - i) cylinder pressures
 - ii) heat transfer
 - iii) stress
 - iv) torque
 - v) compression
 - vi) combustion
 - vii) atmospheric pressure
 - viii) friction
 - ix) vacuum
 - x) inertia
 - xi) horsepower
2. Describe the construction, operation and purpose of engine components.
 - i) cylinder head
 - ii) cylinder block
 - iii) pistons
 - iv) crankshaft
 - v) camshaft
 - vi) bearings
 - vii) seals
 - viii) valves
 - ix) Connecting rods
 - x) rings

- xi) lubrication pump
 - xii) manifolds
 - xiii) valve arrangements
 - xiv) cam chains
3. Describe the metallurgy of engine blocks
- i) Aluminum
 - ii) Cast iron
 - iii) Composites
4. Describe the procedures to recondition cylinder heads and valves
- i) cylinder head removal
 - ii) cleaning
 - iii) inspection
 - iv) valve guides
 - inspection
 - removal
 - installation
 - reaming
 - v) valves
 - removal
 - inspection
 - cutting
 - installation
 - lapping
 - vi) valve springs
 - disassemble
 - inspection
 - measuring
 - installation
 - vii) cylinder head assembly
 - inspection
 - measuring
 - seat reconditioning
 - viii) cylinder head installation
2. Describe the procedures to recondition pistons, rings and cylinders
- i) pistons
 - removal
 - inspection
 - cleaning
 - measuring
 - installation
 - ii) rings
 - removal
 - inspection

- measuring
 - installation
 - iii) cylinders
 - measuring
 - deglazing
3. Describe the procedures to remove and replace crankshafts, camshafts and bearings
- i) crankshaft
 - removal
 - inspection
 - measuring
 - installation
 - phasing
 - ii) camshaft
 - removal
 - inspection
 - measuring
 - installation
 - iii) bearings and seals
 - removal
 - inspection
 - measuring
 - installation
 - iv) timing chains, belts and gears
 - disassemble
 - inspection
 - measuring
 - installation

Practical Projects:

Practical skills enhance the apprentices' ability to meet the objectives of the unit.

Required Practical Projects include:

1. Recondition a cylinder head
2. Recondition cylinder bores, pistons and rings
3. Remove, clean, inspect crankshafts and camshafts
4. Remove, clean, inspect and replace bearings and seals

SR-1230 SMALL EQUIPMENT 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.

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. Describe types and purposes of batteries
2. Describe the procedures to service batteries
 - i) test
 - ii) recharge
 - iii) replace
3. Describe the procedures to disassemble, inspect and service starting system
 - i) operating principles of starting systems
 - ii) rope-wind starter
 - iii) rope-rewind starters
 - iv) wind-up starters
 - v) relays and switches
 - vi) electrical starters
 - vii) starter drives
 - viii) maintain starting system
4. Describe the procedures to service and replace starting motors
5. Describe the procedures to disassemble, inspect and service charging system
 - i) operating principles of a charging system
 - ii) DC generator

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- iii) AC generator
 - iv) voltage regulators
 - v) rectifiers
 - vi) maintain charging system
6. Describe the procedures to service and replace ac generators, voltage regulators and rectifiers.

Practical Projects:

Practical skills enhance the apprentices' ability to meet the objectives of the unit.

Required Practical Projects include:

1. Recharge a battery
2. Test a battery
3. Remove, inspect, repair and/or replace rope rewind starters
4. Remove, inspect, repair and/or replace rope wind-up starters
5. Remove, inspect, repair and/or replace starter drives
6. Remove, inspect, repair and/or replace electrical starters
7. Remove, inspect, repair and or replace DC generator
8. Remove, inspect, repair and or replace AC generator
9. Remove, inspect, repair and or replace voltage regulators and rectifiers

SR-1240

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.

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.

Objectives and content:

1. Describe types, purpose and operations of ignition systems
2. Identify the components of a conventional/electronic ignition system
3. Describe the purpose and operation of on-board computer
4. Explain the operation of the distributor and timing mechanisms
5. Describe the procedures to test and service ignition systems
 - i) conventional ignition (magneto)
 - ii) electronic ignition (solid state, CD)
 - iii) computers
 - iv) inputs and outputs
 - v) sensors
6. Describe the procedures to check, adjust and set distributor timing
7. Describe the procedures to clean, adjust and replace spark plugs
8. Describe the procedures to check resistance of high voltage wires, terminals and plug caps

Practical Projects:

Practical skills enhance the apprentices' ability to meet the objectives of the unit.

Required Practical Projects include:

1. Scan test on-board computer systems
2. Set static and dynamic timing
3. Remove, clean, adjust and/or replace spark plugs
4. Determine resistance of high voltage wires
5. Test output of ignition system components
6. Test sensors readings as per manufactures specifications

SR-1320

**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.

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.

Objectives and content:

1. Explain the characteristics and uses of fuels
 - i) regular unleaded
 - ii) high test unleaded
 - iii) diesel
 - iv) L.p.g.
2. Describe the types, purpose and operation of fuel system components
 - i) filters
 - ii) tanks
 - iii) fuel lines
 - iv) fittings
 - v) pumps (mechanical, electric, impulse)
 - vi) manifolds
 - vii) shut offs
3. Describe the procedures to inspect and service fuel system components
 - i) filters
 - ii) tanks
 - iii) fuel lines
 - iv) fittings

- v) pumps (mechanical, electric, impulse)
 - vacuum
 - pressure
 - flow rate
 - rebuilding
- 4. Describe the types, purpose and operation of air intake system components
 - i) air filters
 - ii) manifolds
 - iii) air boxes
 - iv) gaskets
- 5. Describe the procedures to inspect and service air intake system components
 - i) air filters
 - ii) air boxes
 - iii) gaskets
- 6. Describe the purpose and explain the operation of turbochargers, superchargers, intercoolers and nos systems
- 7. Explain the effect that temperature, atmospheric pressure and humidity have on the operation of fuel systems

Practical Projects:

Practical skills enhance the apprentices' ability to meet the objectives of the unit.

Required Practical Projects include:

- 1. Replace a fuel filter
- 2. Replace an air filter
- 3. Test a fuel pump for flow and pressure

SR-1330

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.

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. Describe types of injection systems and their operation for gasoline and diesel fuels
 - i) direct fuel injection
 - ii) semi-direct fuel injection
 - iii) high pressure injection
2. Explain the operation of high pressure pumps and pressure regulators
3. Explain the purpose of sensors, actuators and computer control modules
4. Describe the procedure to inspect, test and service fuel system components
 - i) injectors
 - ii) injection pumps
 - iii) filters
 - iv) fuel lines
 - v) fuel rails
 - vi) pressure regulators
 - vii) injector cleaning
 - viii) bleed and adjust system

Practical projects:

Practical skills enhance the apprentices' ability to meet the objectives of the unit.

Required practical projects include:

1. Test fuel injectors
2. Test fuel pressure regulators
3. Remove and replace fuel injectors
4. Test sensor outputs
5. Perform an output test on a high pressure injection pump
6. Bleed and adjust an injection system

SR-1340

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.

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.

Objectives and content:

1. Describe carburetted fuel systems and explain the operation
2. Describe the types of carburetors and explain their operations
 - i) circuits
3. Describe the types of governors and explain their operation
4. Describe the procedure to recondition and synchronize carburetors
 - i) replace carburetor kits
 - ii) adjust settings
 - iii) synchronize multi-carburetor systems
 - iv) Pressure tests
5. Describe the procedures to service governors
 - i) air-vane governor
 - ii) centrifugal governor

Practical projects:

Practical skills enhance the apprentices' ability to meet the objectives of the unit.

Required practical projects include:

1. Recondition a carburetor
2. Synchronize a multi-carburetor system
3. Remove, clean and install governor components
4. Adjust a governor

SR-1420 SMALL EQUIPMENT 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.

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.

Objectives and content:

1. Describe types of cooling systems and their operation
 - i) air
 - ii) liquid
2. Describe the components of the cooling system and their operation
 - i) belts
 - ii) pumps
 - iii) thermostats
 - iv) radiators
 - v) block heaters
 - vi) heat exchanger
 - vii) fans (mechanical, electric)
 - viii) pulleys
 - ix) shrouds
 - x) recovery tank
 - xi) anodes
3. Explain damage caused by cooling system failure
4. Describe types of coolant and explain the purposes
5. Describe the effects of chemical corrosion on the cooling system

6. Describe temperature control systems
7. Describe the procedures to remove, service and replace cooling system components
 - i) belts
 - ii) pumps
 - iii) thermostats
 - iv) radiators
 - v) block heaters
 - vi) heat exchanger
 - vii) fans (mechanical, electric)
 - viii) pulleys
 - ix) adjustments
 - x) anodes
8. Describe the procedures to test and replace coolant
 - i) cleaning and flushing
 - ii) select engine coolants
 - iii) test coolant condition
 - iv) replace coolant as per manufactures specifications
 - v) check system for leakage
9. Describe procedures to pressure test a cooling system
 - i) inspect cooling system
 - ii) test cooling system temperature
 - iii) check radiator cap pressure and vacuum release
 - iv) check cooling system leaks using pressure
 - v) refill and check system
10. Describe procedures to check thermostatic fan controls
 - i) check fan motor for power supply and ground
 - ii) check thermo switch
 - iii) inspect and test wiring harness

Practical projects:

Practical skills enhance the apprentices' ability to meet the objectives of the unit. Required practical projects include:

1. Drain and refill cooling system as per manufactures specifications
2. Test coolant condition
3. Test cooling system for leaks
4. Adjust belts and pulleys
5. Replace a thermostat
6. Replace a water pump
7. Check a cooling fan motor operation.

SR-1430

EMISSION CONTROL SYSTEMS

Outcome:

Upon successful completion of this unit, the apprentice will be able to service and repair vehicle emission control systems while maintaining industry and provincial standards.

Overview of objectives:

1. Identify the components of an emission control system.
2. Using testing equipment to inspect, test and repair emission control systems.

Content:

1. Identify the components of an emission control system
 - i) describe the purpose of crankcase ventilation systems
 - positive
 - opened and closed
 - ii) describe the purpose of air injection systems
 - secondary
 - iii) Describe the purpose of catalytic converters (types and functions)
 - monolithic type
 - 2 way
 - 3 way
 - iv) Describe the purpose of evaporation controls
 - tank vent
 - v) describe the purpose of spark timing controls
 - thermal valves
 - knock sensors
 - vi) describe the purpose of oxygen sensors
2. Describe testing equipment to inspect, test and repair emission control systems
 - i) gas analysis
 - ii) scan tools

Practical projects:

Practical skills enhance the apprentices' ability to meet the objectives of the unit.

Required practical projects include:

1. Ability to diagnose and repair emission systems while maintaining industry standards.

SR-1500 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.

Course aims:

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

Objectives and content:

1. Describe the design and function of small equipment transmissions.
2. Describe the procedures to service and repair lawn and garden equipment transmissions and differentials.
 - i) Friction wheel drives
 - ii) hydrostatic drives.
 - iii) Troubleshoot transmission problems.
 - iv) Perform maintenance on transmissions.
 - v) Service differentials.
3. Describe the procedures to service and repair cvt's(constant variable transmission)
4. Describe types and purpose of snowmobile chain cases.
5. Describe the procedures to service and repair chainsaw and drive systems.
 - i) chains and bars.
 - ii) drive systems.
 - iii) chain oilers.
6. Describe the procedures to service and repair hydrostatic drives.
7. Describe the procedures to service and repair snowmobile chain cases.
 - i) chain cases
 - ii) drive axles.
 - iii) jackshaft and driveshaft.
8. Describe the operation of motorcycle primary drives and clutches.

9. Describe the types and operation of motorcycle transmissions.
10. Describe the types and operation of motorcycle gear shifting mechanisms.
11. Describe the procedures to service and repair motorcycle transmissions
 - i) troubleshoot transmission malfunctions.
 - ii) disassemble and assemble transmissions.
12. Describe motorcycle kick starting operations.
13. Describe the procedures to service and repair motorcycle and all-terrain vehicle clutches.
 - i) primary drives and clutches.
 - ii) one-way clutches.
 - iii) centrifugal clutch.
 - iv) multi-plate clutch.
14. Describe the procedures to service and repair marine equipment transmissions

Practical projects:

Practical skills enhance the apprentices' ability to meet the objectives of the unit.

Required practical projects include:

1. Diagnosis small equipment transmission and differential problems
2. Disassemble, inspect, service and reassemble friction wheel drives
3. Disassemble, inspect, service and reassemble hydrostatic drives
4. Disassemble, inspect, service and reassemble a constant variable transmission
5. Disassemble, inspect, service and reassemble a snowmobile chain case
6. Disassemble, inspect, service and reassemble chainsaw chain and bar
7. Disassemble, inspect, service and reassemble chainsaw drive system
8. Disassemble, inspect, service and reassemble a motorcycle transmission
9. Disassemble, inspect, service and reassemble all-terrain vehicle clutches
10. Disassemble, inspect, service and reassemble a marine equipment transmission

SR-2100

**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.

Course aims:

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

Objectives and content:

1. Describe the procedures to perform routine maintenance and tune-ups.
 - i) maintain a service schedule.
 - ii) use tune-up check list.
 - iii) prepare equipment for off-season storage
2. Describe the procedures to service single component ignition module
3. Describe the procedures to service engine auxiliary components.
 - i) adjust belt deflection.
 - ii) align pulleys.
 - iii) remove and install generators, water pumps and auxiliary attachments.
 - iv) remove and install reduction drives.
4. Identify and explain the purpose of mower deck components and attachments.
5. Describe the procedures to service mower decks and attachments.
6. Identify and explain the purpose of brake and steering components
7. Describe the procedures to service brake and steering components
8. Describe the procedures to service chain saws.
 - i) causes of bar failure.
 - ii) causes of chain failure.

Practical projects:

Practical skills enhance the apprentices' ability to meet the objectives of the unit.

Required practical projects include:

1. Perform a routine maintenance and tune-up using a check list
2. Remove and install auxiliary attachments(generators, water pumps, reduction drives)
3. Adjust belts and pulleys on engine auxiliary components
4. Remove and install mower decks
5. Disassemble, inspect, service and reassemble a brake system
6. Service a steering system

SR-2110

**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.

Course aims:

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

Objectives and content:

1. Identify and describe the causes for piston failure.
2. Identify and describe types of bearing failure and the causes.
3. Identify and describe the importance of maintaining the correct quantity and quality of lubrication.
4. Identify and describe hydraulic operation on lawn and garden equipment
 - i) hydraulic theory
 - ii) hydraulic systems
5. Describe the procedures to service hydraulic systems on lawn and garden equipment.
6. Describe the procedures to service valve trains on lawn and garden equipment.
 - i) valve service procedures.
 - ii) four cycle engines.
 - iii) two cycle engines.
7. Describe the procedures to service engine components on lawn and garden equipment.
 - i) pistons, rods and rings.
 - ii) cylinders.
 - iii) camshaft.
 - iv) crankshaft.
 - v) Analyse piston failure

- vi) Analyse bearing failure.
- 8. Describe the procedures to service clutches and drives on lawn and garden equipment.
 - i) Perform maintenance on clutches.
 - ii) Troubleshoot clutch problems.
 - iii) Service drives.
- 9. Describe the procedures to service cooling systems on lawn and garden equipment.
- 10. Describe the procedures to overhaul engine driven water pumps.
 - i) Identify water pump parts.
 - ii) Perform maintenance and repair on water pumps.
- 11. Describe the procedures to overhaul chainsaw engines.
 - i) Identify the components of chainsaw engines.
 - ii) Perform routine maintenance on chainsaw engines.
 - iii) Disassemble and reassemble chainsaw engines.
 - iv) Troubleshoot problems with chainsaw engines.
- 12. Describe the procedures to service remote starters.
- 13. Identify portable generating units
 - i) types
- 14. Describe the procedures to diagnosis and service portable generating equipment
 - i) resistance test
 - ii) voltage test
 - iii) brush measurement
 - iv) Rpm
 - v) hertz

Practical projects:

Practical skills enhance the apprentices' ability to meet the objectives of the unit.
Required practical projects include:

- 1. Perform a lubrication service on lawn and garden equipment
- 2. Drain and refill a lawn and garden hydraulic system
- 3. Disassemble, analyze, and rebuild a lawn and garden engine
- 4. Perform a maintenance on a lawn and garden clutch system
- 5. Overhaul a chainsaw engine
- 6. Perform an output test on a portable generator

SR-2200 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.

Course aims:

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

Objectives and content:

1. Describe the operation of snowmobile systems and components
 - i) fuel system
 - ii) oil injection system
 - iii) cooling system (liquid and air)
 - iv) drive clutch
 - v) driven clutch
 - vi) bogie wheel suspension
 - vii) slide rail suspension
 - viii) braking systems
 - ix) steering system
 - x) suspension upgrades
2. Describe the procedures to inspect snowmobile components as per manufactures check list.
 - i) carburetors
 - ii) oil injection system
 - iii) braking system
 - iv) cooling system
 - v) steering system
 - vi) front suspension system
 - vii) frame components
 - viii) track suspension units
 - ix) drive system
3. Describe the procedures to service snowmobile carburetors.

4. Describe the procedures to adjust snowmobile oil injection systems.
5. Describe the procedures to service snowmobile braking systems.
 - i) hydraulic lines
 - ii) cables.
 - iii) disc (rotor)
 - iv) linings
 - v) drum
6. Describe the procedures to service snowmobile cooling systems.
7. Describe the procedures to service snowmobile steering components.
 - i) skis
 - ii) ski leg.
 - iii) steering column.
 - iv) handle bars.
 - v) linkage
8. Describe the procedures to service snowmobile independent front suspensions.
9. Describe the procedures to replace snowmobile frame components.
 - i) bolt on
 - ii) rivetted
10. Describe the procedures to service snowmobile track suspension units.
 - i) bogie wheel
 - ii) slide rail
 - iii) tracks

Practical projects:

Practical skills enhance the apprentices' ability to meet the objectives of the unit.
Required practical projects include:

1. Disassemble, service and reassemble a snowmobile carburetor
2. Adjust a snowmobile oil injection system
3. Disassemble, service and reassemble a snowmobile braking system (disc and drum)
4. Disassemble, service and reassemble a snowmobile steering system
5. Disassemble, service and reassemble track suspension units

SR-2210 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.

Course aims:

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

Objectives and content:

1. Describe the parts and operation of a snowmobile fuel injection system.
2. Explain the advantages and disadvantages of fuel injection.
3. Describe the procedures involved in troubleshooting the fuel system.
4. Describe how an altitude-compensated carburetor system work.
5. Identify and describe how the following terms are associated with clutch tuning:
 - i) maximum rpm
 - ii) shift rpm
 - iii) engagement rpm
 - iv) backshift
 - v) clutch weights
 - vi) spring preload
 - vii) spring rate
 - viii) spring total force
6. Identify and describe how the crankshaft operates the following
 - i) water pump
 - ii) rotary valve drive
 - iii) oil pump
 - iv) counterbalance shafts
7. Describe the procedure to systematically diagnose engine malfunctions.
8. Describe the function and purpose of labyrinth seals.
9. Describe the procedures to diagnose and repair conventional ignition systems.

- i) adjust ignition timing
10. Describe the procedures to diagnose and repair electronic ignition systems.
- i) adjust ignition timing.
11. Describe the procedures to diagnose and repair lighting, starting and charging systems.
12. Describe the procedures to diagnose and repair fuel system malfunctions.
- i) spark plug readings
 - ii) carbon patch readings.
 - iii) adjust throttle safety systems
13. Describe the procedures to service gas charged shocks.
- i) safety precautions
14. Describe the procedures to recondition drive clutches.
15. Describe the procedures to recondition driven clutches.
- i) set alignments.
 - ii) diagnose belt failure
16. Describe the procedures to disassemble, inspect, repair and assemble a snowmobile engine
- i) cylinder head
 - ii) valve train
 - iii) cylinder block
 - honing
 - iv) pistons and rings
 - v) crankshafts
 - alignment
 - vi) engine installation and alignment
17. Describe the procedures to service engine power valve systems
- i) pressure
 - ii) electric
18. Describe the procedures to service snowmobile exhaust systems.

Practical projects:

Practical skills enhance the apprentices' ability to meet the objectives of the unit.

Required Practical Projects include:

1. Diagnose systematically engine system malfunctions
2. Adjust ignition timing (conventional and electronic)
3. Diagnose and service starting system malfunctions
4. Diagnose and service charging system malfunctions
5. Diagnose fuel management problems
6. Recondition a drive clutch
7. Recondition a driven clutch
8. Disassemble, inspect, service and assemble a snowmobile engine

SR-2300 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 aims:

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

Objectives and content:

1. Describe starter parts and operation.
2. Describe types and functions of motorcycle air filters.
3. Describe motorcycle drum and hydraulic disk brake operation and design.
4. Describe the operation of motorcycle front forks.
5. Describe types of motorcycle clutches.
6. Describe the procedures to repair recoil starters
7. Describe the procedures to tune-up engines.
 - i) compression test
 - ii) perform engine tune-up.
 - iii) prepare machine for off-season storage.
8. Describe the procedures to inspect and service motorcycle air cleaners.
9. Describe the procedures to inspect and service wheels and tires.
 - i) Remove and replace tire
 - ii) service wheel bearings.
 - iii) repair tires.
 - iv) service spoked wheels.
 - v) respoke wheels.
 - vi) balance wheel and tire.
 - vii) align motorcycle wheels.
 - viii) check atv tire pressure.

10. Describe the procedures to inspect and service brake systems
 - i) hydraulic system
 - ii) disc
 - iii) drum

11. Describe the procedures to inspect and service front forks.
 - i) Recondition the front forks
 - ii) steering head parts.
 - iii) steering head bearings.

12. Describe the procedures to inspect and service final drives.
 - i) Identify types of final drives.
 - ii) chain drives.
 - iii) swing arms.
 - iv) belt drives.
 - v) shaft drives
 - vi) final drives.
 - vii) bearings and cv joints.

13. Describe the procedures to diagnose and service handling problems.
 - i) types of handling problems.

Practical projects:

Practical skills enhance the apprentices' ability to meet the objectives of the unit.
Required practical projects include:

1. Perform an engine tune-up
2. Remove and replace a motorcycle and atv tire
3. Balance a motorcycle and atv wheel and tire
4. Disassemble, service and reassemble a atv and motorcycle brake system (disc and drum)
5. Disassemble, service and reassemble front forks
6. Disassemble, service and reassemble chain drives, belt drives, shaft drives
7. Disassemble, service and reassemble final drives

SR-2310 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.

Course aims:

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

Objectives and content:

1. Describe two-stroke lubrication and four-stroke lubrication systems
2. Describe the procedures to service lubrication systems.
 - i) Test and service lubrication systems.
 - ii) Change oil and filters.
3. Describe the construction and application of motorcycle and atv head gaskets.
4. Describe a systematic approach to diagnosing engine malfunctions.
5. Describe the procedures to adjust valve clearances on four-stroke engine.
 - i) Shim
 - ii) rocker arm
6. Describe the procedures to disassemble, inspect, service and reassemble motorcycle and atv cylinder heads.
 - i) valves
 - ii) valve guides.
 - iii) valve seats.
 - iv) springs
7. Describe the procedures to service engine power valve systems

8. Describe the procedures to disassemble, inspect, service and reassemble motorcycle and atv cylinder blocks
 - i) pistons and rings.
 - ii) crankshafts
 - iii) connecting rod
 - iv) measure clearances.
 - v) deglaze cylinder bore

9. Identify and explain the operation of motorcycle and atv ignition systems
 - i) conventional
 - ii) electronic

10. Describe the procedures to diagnose and service motorcycle and atv magneto and battery ignition systems.
 - i) Adjust timing on magneto ignition.
 - ii) Test electrical components.

11. Describe the procedures to diagnose and service motorcycle and atv electronic ignition systems.
 - i) Test and time electronic ignition systems.

12. Identify and explain the operation of motorcycle and atv starting and charging systems

13. Describe the procedures to diagnose and service motorcycle and atv charging systems.
 - i) Test charging systems.

14. Describe the procedures to diagnose and service motorcycle and atv starter systems.
 - i) Service one-way clutches.

15. Identify and explain motorcycle and atv carburetor operation
 - i) slide valve
 - ii) C.v.
 - iii) Fixed venturi
 - iv) troubleshooting

16. Describe the procedures to diagnose and service motorcycle and atv carburetor malfunctions

17. Identify and explain motorcycle and atv electronic fuel injection operation

18. Describe the procedures to diagnose and service motorcycle and atv cooling systems.

19. Describe the procedures to diagnose and service motorcycle and atv electrical malfunctions.
 - i) Troubleshoot switches.
 - ii) Troubleshoot lighting and starter circuits.

Practical projects:

Practical skills enhance the apprentices' ability to meet the objectives of the unit.

Required practical projects include:

1. Diagnose systematically engine system malfunctions
2. Perform a valve adjustment on a four-stroke engine
3. Disassemble, inspect, service and reassemble a motorcycle and atv cylinder head
4. Disassemble, inspect, service and reassemble a motorcycle and atv cylinder block
5. Diagnose and service starting system malfunctions
6. Diagnose and service charging system malfunctions
7. Perform a ignition output test
8. Diagnose and service carburetor malfunctions
9. Diagnose and service electrical malfunctions
10. Diagnose and service cooling system malfunctions

SR-2400

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.

Course aims:

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

Objectives and content:

1. Describe the procedures to repair recoil starters.
 - i) replace rope.
 - ii) rebuild coil assembly.
2. Describe the procedures to service marine equipment carburetors.
3. Describe the procedure to service marine equipment fuel injection system.
4. Describe the procedures to diagnose and service outboard powerheads
 - i) prepare outboard powerheads for disassembly.
 - handle and clean the outboard motor.
 - salvage submerged outboards.
 - ii) service powerhead components.
 - identify components.
 - cylinders.
 - pistons, rods and rings.
5. Describe the procedures to diagnose and service marine equipment remote controls.
 - i) steering controls.
 - ii) remote shift controls.
6. Describe the procedures to diagnose and service marine equipment cooling systems.
 - i) water pumps.
 - ii) thermostats.
 - iii) personal watercraft cooling systems.

- iv) cooling systems on stern drive engines.
 - open and closed systems
 - identify cooling system problems.
 - repair stern drive water pumps.
 - service engine water pumps.
 - service exhaust manifolds and circulation systems.
 - v) flush freshwater cooling systems.
 - vi) pressure test manifolds.
 - vii) clean and service exhaust elbows.
7. Describe the procedures to perform routine maintenance on stern drive engines.
- i) change oil and filter.
 - ii) prepare engine for off-season storage.
8. Describe the procedures to diagnose and service stern drive engine electrical systems.
- i) starting system.
 - ii) ignition system.
 - iii) charging system.
9. Describe the procedures to tune-up engine.
- i) troubleshoot engine problems..
 - ii) time ignition.
 - iii) synchronize carburetor.
 - iv) prepare engine for off-season storage.
10. Describe the procedures to align engines.
- i) personal watercraft engines.
 - ii) stern drive engines.
 - iii) inboard engines.
11. Describe the procedures to rig stern drive boat and motor unit.
12. Describe the procedures to service outboard controls and accessories.
- i) rig and repair remote control assembly.
 - ii) rig and repair remote steering assembly.
13. Describe the procedures to service bilge pumps and bilge blowers.
14. Describe the procedures to service boat trailers.
- i) set up trailer.
 - ii) wire trailer and tow vehicle.
 - iii) service trailer undercarriage.
15. Describe the components of a jet drive system

16. Describe corrosion protection systems.
17. Identify rigging requirements.

Practical projects:

Practical skills enhance the apprentices' ability to meet the objectives of the unit.
Required practical projects include:

1. Overhaul an outboard powerhead
2. Service remote controls
3. Service a marine equipment open cooling system
4. Service a marine equipment closed cooling system
5. Perform a starting system check on a stern drive unit
6. Perform a charging system output test on a stern drive unit
7. Align a stern drive engine
8. Perform a tune-up

SR-2410 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.

Course aims:

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

Objectives and content:

1. Describe the procedures to diagnose and service marine equipment ignition systems.
 - i) Identify ignition systems.
 - ii) Service point type ignition systems.
 - iii) Service cdi and solid state systems.
2. Describe the procedures to diagnose and service marine equipment starting and charging systems.
3. Describe the procedures to diagnose and service fuel systems.
 - i) air intake system
 - ii) carburetor
 - iii) manifold.
 - iv) fuel pump
 - v) oil injection
 - vi) fuel tank
 - vii) lines
 - viii) anti-siphon valve
 - ix) fuel scavenging systems
4. Describe the operation and purpose of tilt and trim systems.
5. Describe the procedures to diagnose and service tilt and trim systems.
 - i) tilt unit.
 - ii) trim system.
 - iii) tilt/trim system.
6. Describe the theory of propeller operation.
7. Describe the procedure to select propellers.
 - i) applications

- ii) replacements
- 8. Describe the procedures to repair water pump impellers.
- 9. Describe the procedures to diagnose and repair upper gear housings.
 - i) stern drive unit.
 - ii) upper gear housing.
- 10. Describe the procedures to diagnose and repair lower gear housings.
 - i) lower units.
 - ii) Pressure test lower gear housings.
- 11. Describe the procedures to diagnose and service lower units.
 - i) Identify mechanical gear case components.
 - ii) Service lower unit and mechanical gear case.
- 12. Describe the procedures to diagnose and service jet drive units

Practical projects:

Practical skills enhance the apprentices' ability to meet the objectives of the unit.

Required practical projects include:

- 1. Diagnose systematically fuel and ignition system malfunctions
- 2. Diagnose and service starting system malfunctions
- 3. Diagnose and service charging system malfunctions
- 4. Service a tilt and trim system
- 5. Remove and service a jet drive unit
- 6. Disassemble, inspect, service and reassemble an upper gear housing
- 7. Disassemble, inspect, service and reassemble a lower gear housing

REQUIRED RELATED COURSES

CM-2150 WORKPLACE CORRESPONDENCE

Description:

This course is designed to give students the opportunity to study the principles of effective writing. Applications include letters, memos, and short report writing.

Course Outcomes:

Upon completion of the course, students will be able to:

- understand the importance of well-developed writing skills in business and in career development.
- understand the purpose of the various types of business correspondence.
- examine the principles of effective business writing.
- examine the standard formats for letters and memos.
- writing effective letters and memos.
- examine the fundamentals of informal reports and the report writing procedure.
- produce and informal report

Required Knowledge and Skills:

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.

MR-1220

CUSTOMER SERVICE

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.

Course Outcomes:

Upon successful completion of this course, students will:

- know and understand quality customer service
- know why quality service is important
- know and understand the relationship between “service” and “sales”
- understand the importance of and to demonstrate a positive attitude
- recognize and demonstrate handling of customer complaints

Required Knowledge and Skills:

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 examples 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 behaviours
 - 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

SP-2330 QUALITY ASSURANCE/QUALITY CONTROL

Description:

This course is designed to give students an understanding of the concepts and requirements of QA/QC such as, 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.

Course Outcomes:

Upon completion of this course, students will be able to:

- develop the skills and knowledge required to apply quality assurance/quality control procedures
- develop an awareness of quality management principles and processes

Required Knowledge and Skills:

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
13. 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

MC-1050 INTRODUCTION TO COMPUTERS

Description:

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.

Course Outcomes:

Upon completion of this course, students will have a basic understanding of:

- computer systems and their operation.
- popular software packages, their applications and future trends in computer applications

Required Knowledge and Skills:

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

SD-1700

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.

Course Outcomes:

Upon completion of this course, students will be able to:

- Participate in meetings (conduct meetings).
- Be aware of union procedures
- Be aware of workers' compensation regulations.
- Be aware of occupational health and safety regulations.
- Be aware of employment insurance regulations
- Be aware of workers' rights.
- Be aware of human rights

Required Knowledge and Skills:

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 wages.
 - 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.
8. 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.
9. Complete a safety inspection of your shop.
10. Complete an employment insurance application form.
11. Write a letter of appeal.
12. Analyze a documented case of a human rights complaint with special emphasis on the application form, time frame, documentation needed, and legal advice available.

SD-1710

JOB SEARCH TECHNIQUES

Description:

This fifteen-hour seminar is designed to give students an introduction to the critical elements of effective job search techniques.

Required Knowledge and Skills:

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

SD 1720

ENTREPRENEURIAL AWARENESS

Description:

This fifteen-hour seminar is designed to introduce the student to the field of entrepreneurship, including the characteristics of the entrepreneur, the pros and cons of self-employment, and some of the steps involved in starting your own business.

Required Knowledge and Skills:

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 the 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
 - 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.