

A PLAN OF TRAINING
FOR
STONEMASON OCCUPATION

Approved by
Provincial Apprenticeship Board
April, 1997
Revised June, 2000

Foreword

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

The plan that follows is a comprehensive one. It recognizes that apprenticeship training begins when a student first registers at a training institution, or signs a Contract of Apprenticeship with an employer, 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 an interprovincial examination. Passing this examination will result in the apprentice receiving Red Seal Certification which gives the tradesperson national mobility of trade 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 Red Seal 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 apprenticeable trade as a career choice will receive high quality training and thus will be prepared to compete for jobs worldwide.

Chair, Provincial Apprenticeship Board

Minister of Education

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CONDITIONS GOVERNING APPRENTICESHIP TRAINING

1.0 GENERAL

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

2.0 ENTRANCE REQUIREMENTS

2.1 Entry into the occupation as an apprentice requires:

The completion of designated first year courses specific to the occupation

OR

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

OR

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

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

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

2.4 A Registration for Apprenticeship form must be duly completed.

3.0 PROBATIONARY PERIOD

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

4.0 TERMINATION OF A MEMORANDUM OF UNDERSTANDING

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

5.0 APPRENTICESHIP PROGRESSION SCHEDULE AND WAGE RATES

5.1 Progression Schedule

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

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

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

4000 (Hairstylist) - The apprentice shall be paid no less than the minimum wage for hours worked and a commission agreed upon between the apprentice and the employer.

6.0 TOOLS

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

7.0 PERIODIC EXAMINATIONS

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

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

8.0 GRANTING OF CERTIFICATES OF APPRENTICESHIP

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

9.0 HOURS OF WORK

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

10.0 COPIES OF THE REGISTRATION FOR APPRENTICESHIP

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

11.0 RATIO OF APPRENTICES TO JOURNEYPERSONS

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

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

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

13.0 AMENDMENTS TO A PLAN OF APPRENTICESHIP TRAINING

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

14.0 EMPLOYMENT, RE-EMPLOYMENT AND TRAINING REQUIREMENTS

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

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

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

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

15.0 APPEALS TO DECISIONS BASED ON CONDITIONS GOVERNING
APPRENTICESHIP TRAINING

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

REQUIREMENTS FOR RED SEAL CERTIFICATION
IN THE STONEMASON 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. Normally, have a combination of training from an accredited training program and suitable work experience totalling 7200 hours

Or

Have a total of 9000 hours of suitable work experience.

3. Completion of a National Red Seal examination to be set at a place and time determined by the Industrial Training Division of the Department of Education.

4. Pay the appropriate examination fee.

ROLES AND RESPONSIBILITIES OF STAKEHOLDERS IN THE APPRENTICESHIP PROCESS

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

Apprentices

to complete all required technical training courses as approved by the Provincial Apprenticeship Board.

to find appropriate employment

to complete all required work experiences in combination with the required hours.

to ensure that the work experiences are well documented

to approach apprenticeship training with an attitude and commitment that fosters the qualities necessary for a successful career as a qualified tradesperson.

to obtain the required hand tools as specified by the Board for each period of training of the apprenticeship program.

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

to establish and maintain provincial program advisory committees under the direction of the Provincial Apprenticeship Board.

to promote apprenticeship training as a viable career option to prospective apprentices and other appropriate persons involved such as career guidance counsellor, teachers, parents, etc.

to establish and maintain a protocol with apprentices, training institutions, employers and other appropriate stakeholders to ensure the quality of apprenticeship training programs.

to ensure that all apprentices are appropriately registered and records are maintained as required.

to schedule all necessary technical training periods for apprentices to complete requirements for certification.

to administer provincial/interprovincial examinations.

Provincial Apprenticeship Board

to set policies to ensure that the provisions of the Apprenticeship Training Act are implemented.

to ensure that advisory and examination committees are established and maintained.

to accredit institutions to deliver apprenticeship training programs.

to designate occupations for apprenticeship training and / or certification.

TECHNICAL COURSE OUTLINES

SUGGESTED COURSE LAYOUT FOR STONEMASON

JOURNEYPerson CERTIFICATION

+

WORK EXPERIENCE

+

SEMESTER FOUR	
SY2101 - Hand Skills - Machinery Cutting & Polishing	157.5 Hrs.
SY2201 - Flooring, Walls, and Roof Construction (Complex Construction)	90 Hrs.
SY2430 - Setting Out Domes and Niches	45 Hrs.
SY1500 - Estimating	22.5 Hrs.
SY2440 - Setting Out Vaults	22.5 Hrs.
SY2450 - Setting Out Ramp and Twist	22.5 Hrs.
EG1130 - Engineering Graphics II	67.5 Hrs.

+

INTERSESSION	
SY1601 - Handskills Upgrading Workshop II	240 Hrs.

+

WORK TERM

+

SEMESTER THREE	
SY2100 - Hand Skills Intermediate	157.5 Hrs.
SY2200 - Flooring, Walls, and Roof Construction III	67.5 Hrs.
SY2400 - Setting out Staircases, Voussoirs (Arches) and Pediments	45 Hrs.
SY2410 - Staircase Construction	22.5 Hrs.
SY2420 - Setting out Historical Tracery	45 Hrs.
EG1120 - Engineering Graphics I	67.5 Hrs.

+

INTERSESSION	
SY1600 - Hand Skills Upgrading Workshop I	240 Hrs.

+

WORK TERM

+

SEMESTER TWO	
SY1101 - Hand Skills for Beginners II	157.5 Hrs.
SY1201 - Flooring, Walls, and Roof Construction II	90 Hrs.
DR1130 - Introduction to Computer Assisted Drafting	67.5 Hrs.
Related Courses	90 Hrs.

+

SEMESTER ONE	
SY1100 - Hand Skills for Beginners	157.5 Hrs.
SY1200 - Flooring, Walls, and Roof Construction I	45 Hrs.
SY1300 - Quarrying (Basics)	22.5 Hrs.
SU1120 - Survey Profiles	45 Hrs.
DR1110 - Basic Drawing and Sketching	67.5 Hrs.
Related Courses	105 Hrs.

+

Program and Apprenticeship Registration

COURSE DESCRIPTION - SY1100

Name and Number: Stonemasonry 1100

Descriptive Title: Masonry Hand Cutting Skills - Beginner's Course I

Summary Description:

This course in stone-cutting requires the use of masonry tools and equipment. It involves the principles of stone-cutting - coping or splitting rough blocks; preparation of surface of operation; working the marginal draft; boning the marginal draft; method of using boning blocks; pointing a surface; claw tooling and boasting a surface; squaring a surface; understanding freestone and its natural beds.

Prerequisites: None

Co-requisites: None

Credit Value: 7

Textbook(s)/Eastern College Stonemasonry Manual Number 1 and Eastern College Booklet (Shop Procedures) 'B'

Course Aims:

1. To develop an understanding and knowledge of using freestone hand cutting tools.
2. To develop the skills and knowledge required for cutting freestone stone by hand.
3. To develop an understanding of a stonemason cutting work place layout.
4. To apply appropriate building codes and standards in cutting stone.
5. To develop an appreciation for occupational health and safety in the workplace.
6. To develop a basic understanding of other occupations associated with the masonry trade.

Course Objectives (Knowledge):

1. Describe the uses of the following hand tools: masons mallet, masons steel hammer, iron hammer, battering tool, gouges, mallet headed chisels, drafting chisel, boaster, claw

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chisel, bevel or shift stock, points, waster, hammer headed tools, faults patent tool.

2. Describe tungsten carbide tools.
3. Tool sharpening, grinding wheels.

Major Tasks/Subtasks (Skills):

1. Cut (freestone) stone by hand.

Evaluation:

1. Written report.
2. Competence in simulated work and/or experience. 100%
3. Written tests.

Development History:

Date Developed: October, 1996

Instructor's Notes:

COURSE DESCRIPTION - SY1200

Name and Number: Stonemasonry 1200

Descriptive Title: Masonry Flooring, Walls and Roof Construction I (Basic Wall Construction)

Summary Description:

This course, in stone fixing, requires a 'hands-on' approach and theory in the use of tools and equipment and materials and supplies. It involves laying out and fixing stone. It includes information on site preparation and foundation work, methods of bonding, types, purposes and layout of foundations, course heights and bonding; coursed and uncoursed rubble walls, foundation restoration, types of wall and corner construction; and applications of steel construction and reinforced concrete to masonry and cutting shapes and sizes with hand skills on various stone units. Understanding mortars, and grouts and grouting procedures, and basic scaffolding and hoisting.

Prerequisites:

Co-requisites:

Credit Value: 2

Textbook(s)/Eastern College Stonemasonry Manual Number 1 and Eastern College Information Booklet Wall Construction (F)

Course Aims:

1. To develop the skills and knowledge required for basic stone wall construction.
2. To develop hand skills, cutting shapes on site.
3. To apply appropriate building codes and standards in the construction of stone walls.
4. To develop an understanding of working and architectural drawings.
5. To develop an appreciation for occupational health and safety in the workplace.
6. To develop an understanding of other occupations associated with the masonry trade.

Course Objectives (Knowledge):

1. Explain the procedure for site preparation and foundation work for masonry buildings.
2. Explain the planning and implementation process for foundation restoration.
3. Describe applications of steel construction to masonry.
4. Describe various types, purposes and layout of foundations.
5. Describe applications of reinforced concrete to masonry construction.
6. Explain the use of the following masons tools and equipment: bedding trowel; lifting trowel; pointing and slicker trowels; hand cutting tools; levels - water levels, surveyors levels; plumb rule and center bob; screening irons; hardwood wedges (shims), folding wedges, centering-headtree lintels; drilling equipment (small electrical tools); mortises and joggles; non-ferrous ties, anchors and dowels; brickwork; and beds and joints.
7. Describe types of footings:
 - a. Walls, Garden walls.
 - b. Retaining walls.
 - c. Compact - Ground.
8. Describe types of reinforcing steel and types of coatings. Explain the re-bar bending process.
9. Explain the following terms associated with concrete:
 - a. Ready-mix
 - b. Hand-mix
 - c. Cement-mixing machine.
 - d. Semi-dry concrete block work.
 - e. Compressive strength.
 - f. Aggregates.
 - g. Slump.
 - h. Vibration.
10. Explain the process of dam proofing masonry walls and describe the products used. What is a damp proof course?
11. Describe types of vapour barrier used in masonry construction.
12. Explain the effect of insulation (R value) in terms of wall cavities (air) and types of rigid

- insulating materials (styrofoam, fibreglass and polystyrene) in stone building construction.
13. Explain the function of weep holes.
 14. Explain the following terms associated with sill courses: sill, sill course, stooling, weathering or wash, throat, water bar, band-belt course, string course, plain ashlar, coping, head or lintel course and brickwork courses.
 15. Explain the following terms associated with archways: arch, flate arches, soffit, keystone, voussoir, radiating lines and springing line.
 16. Explain the following terms associated with doorways: threshold step, jambs (reveals), frame line, pilaster and bases and caps.
 17. Explain the following terms associated with window openings: sill (stooling), jamb (reveals), soffit (stooling) (moulded head) and window frame (fixing plugs).
 18. Explain the following terms associated with gables: springer, coping, kneelers, and apexstone.
 19. Describe the function of a buttress.
 20. Describe a flying buttress.
 21. Describe ashlar cladding and explain the purpose of using ashlar cladding in construction.
 22. Describe marble and explain the following terms associated with marble wall linings:
 - a. Birds mouth joint.
 - b. Wedges - setting in place.
 - c. Quick setting cements.
 - d. Grouting joints.
 23. Explain the following terms associated with flooring, paving and tiles:
 - a. Granite - Marble.
 - b. Prepared screen.
 - c. Setting out (joints).
 - d. Adhesive: Light colours marbles-staining.
 - e. Grouting: (Fine course grain).
 - f. Expanding metals in joints.

24. Explain the following terms associated with entrance steps: Granite (freestone), treads and risers, jointing, dowels and weather bar, grouting, flame honed (sparrow peaked finish).
25. Describe the design, construction and anchoring of marble chimney pieces (surround).
26. Describe uncoursed field stone (rough or common rubbled).
27. Describe the following types of rubble walls:
 - a. Uncoursed and roughly squared.
 - b. Uncoursed cobweb or polygonal rubble (rag walling).
 - c. Coursed and roughly squared.
 - d. Coursed fieldstone and rough or common rubble.
 - e. Random rubble walls build to course with "jumpers and bonders".
 - f. Random (sawn to size) ashlar cladding build in three height units.
 - g. Stone veneer over wood framed walls.
 - h. Landscaping (Garden walls and steps).
 - I. Flagstone paving.

Major Tasks/Subtasks (Skills):

1. Practice safety:
 - a. Become familiar with surrounding conditions.
 - b. Report what might be a health hazard or might cause injury.
 - c. Use good hygiene in the workplace.
 - d. Wear hard hats, safety glasses and steel toe boots.
2. Layout basic walls.
3. Mix mortar.
4. Fix stone units:
 - a. Install mortises and joggles.
 - b. Install non-ferrous ties, anchors and dowels.
 - c. Install brickwork.
 - d. Install beds and joints.
4. Clean and maintain tools.

Evaluation:

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1. Written report.
2. Competence in simulated work and/or experience. 75 %
3. Written tests. 25%

Development History:

Date Developed: October, 1996.

Instructor's Notes:

COURSE DESCRIPTION - SY1300

Name and Number: Stonemasonry 1300

Descriptive Title: Quarrying

Summary Description:

This course in quarrying requires the knowledge in the use of tools, equipment, materials and supplies. It involves selecting quarry block, cutting it to size and arranging transportation. It includes information on the geology of building stone, and selection and cutting techniques.

Prerequisites:

Co-requisites:

Credit Value: 1

Textbook(s)/Eastern College Stonemasonry Manual Number 1 and Eastern College Information Booklet (B).

Course Aims:

1. To develop the skills and knowledge required to select and cut quarry block.
2. To develop the skills and knowledge to select the differences between:
 1. Igneous rocks
 2. Aqueous rocks
 3. Metamorphic rocks
3. To apply appropriate building codes and standards in the cutting and selection of quarry block.
4. To develop an appreciation for occupational health and safety in the workplace.
5. To develop an understanding of other occupations associated with the masonry trade.

Course Objectives (Knowledge):

1. List the dimensional stone quarries in Newfoundland and Labrador and describe the type

of stone quarried.

2. Describe quarrying with respect to feasibility, permits, accessibility, cost and type of stone.
3. Describe core drills, fractures, vents, outcrops, material durability and workability in relation to natural rock formations.
4. Describe local quarry stone in terms of colour, decorative value, weathering and impurities found.
5. Describe the explosive method of quarrying in terms of block damage, trained expertise required and waste material.
6. Describe the use of the channelling machine in quarrying.
7. Explain the effects of quarry sap.
8. Describe the tools (especially roughing hammers) and machinery used in quarrying and explain how they are used.
9. Describe the plug and feathers operation.
10. Describe the slate quarrying industry.

Major Tasks/Subtasks (Skills):

1. Select quarry block.
2. Cut quarry block to size.
3. Prepare stone for transportation.
 - a. Use chain dogs.
 - b. Follow procedures for lifting.
 - c. Determine transportation costs (water or road rates).
 - d. Type of carrier required.

Evaluation:

1. Written report. 50%
2. Competence in simulated work and/or experience.

3. Written tests. 50%

Development History:

Date Developed: October, 1996.

Instructor's Notes:

COURSE DESCRIPTION - SU1120

Name and Number: Surveying 1120

Descriptive Title: Survey Profiles

Description:

This course in civil drawing requires the use of surveying equipment and drafting facilities. It involves surveying cross-sections and plotting the data. It includes information on plot plans, cross-sections, profiles, surveying instruments, contours and topographic maps.

Prerequisites: DR 1110; DR 1130

Co-requisites:

Credit Value: 2

Textbook(s)/Software used by Lead Institution:

Course Aims:

1. To develop the skills and knowledge to conduct cross-section surveys and plot the data.
2. To develop an appreciation of CSA, ANSI and ISO standards and CSAE drawing conventions.

Course Objectives (Knowledge):

1. Plot plans.
2. Cross-sections.
3. Profiles.
4. Surveying instruments.
5. Contours.
6. Topographic maps

Major Tasks/Subtasks (Skills):

1. Conduct survey
2. Analyse data.
3. Make calculations.
4. Plot data.
5. Prepare drawings.

Evaluation:

1. Written reports and/or tests. 50%
2. Competence in simulated work and/or experiential endorsements. 50%

Development History:

Date Developed: October, 1996.

Instructor's Notes:

COURSE OUTLINE - DR1110

Name and Number: Drafting 1110

Descriptive Title: Basic Drawing and Sketching

Description:

This drafting course requires the use of basic drawings, specifications, bills of materials, drawing instruments and facilities, and CAD software and hardware. It involves reading basic drawings and diagrams, sketching, interpretation of specifications, and operating the CAD system. It includes information on sketching techniques, types of drawings, and CAD commands.

Prerequisites: None

Co-requisites: None

Credit Value: 3

Text book(s) / Software used by Lead Institution:

Course Aims:

1. To develop the skills and knowledge required to read drawings and sketch views.

Course Objectives (Knowledge):

1. Describe the alphabet of lines
2. List the basic drawing symbols
3. Explain what is meant by quality of lines
4. Describe metric, mechanical, architectural and civil scales
5. Describe the different types of pencil lead grades
6. Describe letter types
7. Describe lettering instrument types
8. Explain spacing, sizes and lettering techniques
9. Describe different view orientations
10. Describe obliques, isometrics and perspectives
11. Explain sketching techniques
12. Explain main view and possible views
13. Describe the six principle views

14. Explain association of surfaces
15. Explain matching pictorials
16. Describe types of dimensions and lines used
17. Explain the rules of dimensioning
18. Explain the various methods of producing lines
19. Describe the purpose and types of sectional views
20. Explain conventions associated with sectional views such as symbols, cutting plane lines, broken-out lines, etc.
21. Identify standard drawing symbols used on electrical, hydraulic and pneumatic drawings
22. Identify colour codes used for electrical, hydraulic and pneumatic schematics
23. Explain the purpose and methods of dimensioning
24. Explain intersections and developments
25. Explain graphs reticulation
26. Explain the functions of the CAD system

Major Tasks / Subtasks (Skills):

1. Construct geometric shapes and lines
 - a. Draw lines to scale
 - b. Scale lines
 - c. Divide lines into equal parts
 - d. Bisect lines
 - e. Construct angles
 - f. Bisect angles
 - g. Construct concave and convex curves
 - h. Construct circles, arcs, tangents, ellipses, polygons, etc.
2. Sketch orthographic projections
 - a. Visualize object
 - b. Select views
 - c. Layout sketch
 - d. Sketch projection
 - e. Dimension sketch
 - f. Make notations
3. Sketch sectional views
 - a. Locate section
 - b. Select type of view
 - c. Determine scale
 - d. Sketch view
 - e. Dimension sketch
 - f. Make notations

4. Sketch primary auxiliary views
 - a. Visualize the view
 - b. Layout the sketch
 - c. Sketch view
 - d. Dimension sketch
 - e. Make notations

5. Identify information from blueprints and drawings
 - a. Visualize views and projections
 - b. Identify information from schematic diagrams, assembly drawings, views, feeder maps, etc.
 - c. Identify sequence of fabrication according to blueprint
 - d. Identify cut of materials from sketches
 - e. Interpret horizontal, vertical, curved, inclined lines, fillets, and radii on working drawings
 - f. Identify dimensions of holes, cylinders, circles, angles and arcs

6. Read mechanical drawings
 - a. Read welding drawings, hydraulics and pneumatics drawings, sheet metal drawings and piping drawings
 - b. Read and apply information from cut-away drawings

7. Read electrical drawings
 - a. Read schematic diagrams, flow diagrams, point-to-point diagrams, wireless diagrams and highway diagrams

8. Read architectural and structural drawings
 - a. Read plot plan, foundation plans, floor plans, details, elevations and sections

9. Interpret specifications
 - a. Interpret specifications
 - b. Identify tolerance specifications
 - c. Interpret specifications (company standards books)

10. Identify information from bill of materials

11. Operate the CAD system
 - a. Start up the system
 - b. Set up directories and manage files
 - c. Start AutoCAD
 - d. Operate the system

Evaluation:

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

Lead Institution:

Development History:

Date Developed: December 1993

Instructor's Notes:

COURSE DESCRIPTION - SY1201

Name and Number: Stonemasonry

Descriptive Title: Masonry Flooring, Walls and Roof Construction II (2)

Summary Description:

This course in stone fixing, requires a 'hands-on' approach and theory in the use of masonry tools and equipment, and materials and supplies. It involves laying out and installing flooring tiles and roofing shingles and masonry walls. It includes information on patterns, shapes, flashings, tiles, shingles and laying out, installing and site cutting techniques. (Marble, Granite, Freestone and Slate.). This course also includes stonemasonry restoration, dismantling, restoring and cleaning down techniques and masons scaffolding.

Prerequisites:

Co-requisites:

Credit Value: 4

Textbook(s)/Eastern College Stonemasonry Manual Number 1 and Eastern College Booklet (Wall Construction) “F”

Course Aims:

1. To develop the procedures and skills to repair old masonry walls.
2. To develop the basic skills to restore historical buildings and sites.
3. To develop a basic understanding of eaves, cornices and finishings.
4. To develop the skills and knowledge required for laying out and installing flooring tiles and roofing shingles.
5. To develop an understanding of roof flashings and counter flashings.
6. To develop an understanding between marble/granite and slate.
7. To apply appropriate building codes and standards in the laying out and fixing of flooring

tiles and roofing shingles.

8. To develop an appreciation for occupational health and safety in the workplace.
9. To develop an understanding of other occupations associated with the masonry trade.

Course Objectives (Knowledge):

1. Describe cleaning out of decayed masonry joints and repointing.
2. Describe various methods in cleaning down (wet, dry, sandblasting and chemical cleaners).
3. Describe natural stone eaves, cornice, frieze and band courses.
4. Describe various shapes and installation patterns used for flooring tiles and roofing shingles.
5. Describe the use of flashing.
6. Explain expanding metals in floor design.
7. Explain various layout and installing techniques for slate tiles and shingles.
8. Explain various installation procedures.
9. Explain setting with epoxies grouts and adhesives.
10. Explain masons independent scaffold, steel tubular scaffolding, suspended stages, cantilevered scaffolds and hoisting.

Major Tasks/Subtasks (Skills)

1. Historical wall repairs.
2. Layout tiles and singles for flooring and roofing.
3. Fix tiles and shingles.

Evaluation:

1. Written report. 10%

Stonemason Occupation

2. Competence in simulated work and/or experience. 30%
3. Written tests. 10%
4. Shop evaluations. 50%

Development History:

Date Developed: October, 1996.

Instructor's Notes:

COURSE DESCRIPTION - SY1101

Name and Number: Stonemasonry 1101

Descriptive Title: Masonry Hand Cutting Skills - Beginner's II

Summary Description:

This course in stone cutting requires the use of masonry tools and equipment. It involves masons shop set-up using templates, cutting stone by hand. It includes information on hard stone, soft stone, introducing the use of pneumatic hammers and tools, instructions to stone cutting assignments, tickets and schedule systems with table saw assignments.

Prerequisites:

Co-requisites:

Credit Value: 7

Textbook(s)/Eastern College Stonemasonry Manual Number 1 and Eastern College Booklet (Shop Procedures) "B"

Course Aims:

1. To develop the skills and knowledge required for cutting freestone stone by hand.
2. To develop an understanding of schedules and patterns instructions.
3. To apply modern machinery to stone cutting.
4. To develop an understanding of stonemason cutting work place layout.
5. To develop an understanding of full-size and scaled drawings.
6. To apply appropriate building codes and standards in cutting stone.
7. To develop an appreciation for occupational health and safety in the workplace.
8. To develop an understanding for other occupations associated with the masonry trade.

9. Describe the characteristics and uses of the following types of saw blades:
 - a. Carborundum
 - b. Diamond

10. Describe the characteristics and uses of the following planers: canting arm planer, rigid head planer, four tool planer and the open-side planer.

11. Describe the characteristics and uses of the following diamond and abrasive grits: diamond wire, steel wire, silica sand, carborundum rubbing blocks, fine rubbing wheels and sanding disc.

12. Describe the characteristics and uses of the stone turning lathe.

13. List the various types of machinery tools and their purposes.

14. Explain the importance of sharpening tools.

Major Tasks/Subtasks (Skills):

1. Operate machinery (Table Saw).
 - a. Practice work area safety.
 - I. Look for obstructions.
 - ii. Make sure the floor area is clear.
 - iii. Make sure loading equipment has been moved away.
 - iv. Make sure fellow workers are clear before starting saw.
 - v. Never change the saw blade before checking electrical breaker is OFF.

 - b. Practice safety around equipment.
 - I. Observe the operation of the machine.
 - ii. Read the operating manual.
 - iii. Check for the stop and start button - **KNOW WHERE TO REACH FOR A QUICK RESPONSE BEFORE OPERATING THE MACHINE.**
 - iv. Check the electrical circuit breakers.
 - v. Keep water away from electricity.
 - vi. Wear protective clothing and gloves.

 - c. Position material.
 - I. Check to see if you have the right material (plus no faults).
 - ii. Set material on wooden skids.

- iii. Always cut the longest and widest first. all other surfaces can be square from the first cut.
 - d. Cut material.
 - I. Check dimensions.
 - ii. ALWAYS ask a fellow worker for a size check before cutting valuable material.
 - iii. ALWAYS make sure your stone is against a stop and setting firm on the cutting table before cutting.
 - iv. WARNING! When cutting, make sure that you have taken precautions so that the “off cut” does not fall against the cutting blade. This could result in buckling of the saw blade.
 - e. Select and maintain saw blades.
 - I. Some cutting saw blades are very expensive. Make sure the right cutting blade is used for the material being cut.
 - ii. Protect and maintain saw blades.
 - f. After each cutting process, clean off saw cuts, broken pieces and slurry, and wash down the table.
 - I. Always check if moving parts require greasing before and after each cutting session.
 - ii. Check that all water feed hoses are OK.
 - g. Clean work area.
 - I. Sweep, wash down and disinfect floors.
 - ii. Clean and disinfect walls.
 - h. Clean out the slurry pit.
 - I. Check the operation of the circulation pump.
 - ii. Wash down slurry into channel.
 - iii. Make sure there is no blockage in the channel.
 - iv. Always clean out slurry channel and catch basin before commencing the days operations.
2. Keep up-to date with respect to modern machinery.
- a. Know what is available (Subscribe to trade magazines.).

Evaluation:

1. Written report.
2. Competence in simulated work and/or experience. 100%
3. Written tests.

Development History:

Date Developed: October, 1996

Instructor's Notes:

COURSE DESCRIPTION - DR1130

Name and Number: Introduction to AutoCAD I 1130

Descriptive Title: Computer-Assisted Drafting

Description:

This basic drafting course requires the use of CAD hardware and software. It involves using the CAD system to produce engineering drawings. It includes information on CAD commands and technical drawing concepts.

Prerequisites: DR 1110

Co-requisites:

Credit Value: 3

Textbook(s)/Software used by Lead Institution and Eastern College Stonemasonry Manual Number's 1 & 2:

Course Aims:

1. To develop the skills and knowledge to produce masonry working drawings using the CAD systems.
2. To develop an appreciation of CSA, ANSI and ISO standards and CSAE drawing conventions.

Course Objectives (Knowledge):

1. CAD commands.
2. Technical drawing concepts.

Major Tasks/Subtasks (Skills):

1. Set up.
2. Draw.
3. Edit

4. File

5. Print

Evaluation:

1. Written reports and/or tests. 50%

2. Competence in simulated work and/or experiential endorsements. 50%

Development History:

Date Developed: October, 1996

Instructor's Notes:

COURSE DESCRIPTION - SY2100

Name and Number: Stonemasonry 2100

Descriptive Title: Masonry Hand Cutting Skills - (Intermediate I)

Summary Description:

This course in stone-cutting requires the use of masonry tools and equipment. It involves masons shop set-up using templates, cutting stone by hand. It includes information on hard stone, soft stone, use of pneumatic hammers and tools and instructions to stone cutting assignments, moulded stone shapes and voussoir for semicircular arch, working keystones, working window sill, working return ends, working stop ends, working moulded bases, working concave and convex surfaces, working moulded jambs, working a pediment springer. Includes information on patterns, working tickets and schedules.

Prerequisites:

Co-requisites:

Credit Value: 7

Textbook(s)/Eastern College Stonemasonry Manual Number 1 and Eastern College Booklet (Shop Procedures) “B”

Course Aims:

1. To develop the skills and knowledge required for cutting freestone stone by hand.
2. To develop the skills and knowledge required for cutting granite and marbles by hand.
3. To develop an understanding of schedules and patterns instructions of intermediate stone cutting.
4. To apply modern machinery, sawing rough to finished shapes.
5. To develop an understanding of a stonemason cutting work place layout.
6. To develop an understanding of full-size and scaled drawings and work schedules.
7. To apply appropriate building codes and standards in cutting stone.

8. To develop an appreciation for occupational health and safety in the workplace.
9. To develop a basic understanding of other occupations associated with the masonry trade.
10. Explain the importance of sharpening special tools.

Course Objectives (Knowledge):

1. Describe the uses of the following hand tools: masons mallet, masons steel hammer, iron hammer, battering tool, gouges, mallet headed chisels, drafting chisel, boaster, claw chisel, bevel or shift stock, points, waster, hammer headed tools, faulds patent tool, steel wing-compass, spall-face hammer, axe hammer, cavel or pyramidal point hammer, lowising tool, electrical hammer drills, rotary hammer drills, masonry drill bits, sanders, carborundum and diamond abrasives.
2. Describe pneumatic hammers and tools.
3. Describe tungsten carbide tools.
4. Describe pneumatic carving tools.
5. Tool sharpening, grinding wheels and blacksmith shop.

Major Tasks/Subtasks (Skills):

1. Use templates.
 - a. I. Design.
 - ii. Scaled Drawings.
 - iii. Specifications
 - iv. Architect's Approval (stamp or in writing).
 - v. Materials Required.
 - vi. Understanding Pattern Making (Moulds)
2. Cut stone by hand.
3. Cut stone by pneumatic tools.
4. Operate advance machinery (Table Saw).
 - a. Practice work area safety.
 - I. Look for obstructions.
 - ii. Make sure the floor area is clean.

- iii. Make sure loading equipment has been moved away.
 - iv. Make sure fellow workers are clear before starting saw.
 - v. Never change the saw blade before checking electrical breaker is OFF.
- b. Practice safety around equipment.
- I. Observe the operation of the machine.
 - ii. Read the operating manual.
 - iii. Check for the stop and start button - **KNOW WHERE TO REACH FOR A QUICK RESPONSE BEFORE OPERATING THE MACHINE.**
 - iv. Check the electrical circuit breakers.
 - v. Keep water away from electricity.
 - vi. Wear protective clothing and gloves.
- c. Position material.
- I. Check to see if you have the right material (plus no faults).
 - ii. Set material on wooden skids.
 - iii. Always cut the longest and widest first. All other surfaces can be square from the first cut.
- d. Cut material.
- I. Check dimensions.
 - ii. **ALWAYS** ask a fellow worker for a size check before cutting valuable material.
 - iii. **ALWAYS** make sure your stone is against a stop and setting firm on the cutting table before cutting.
 - iv. **WARNING!** When cutting, make sure that you have taken precautions so that the “off cut” does not fall against the cutting blade. This could result in buckling of the saw blade.
- e. Select and maintain saw blades.
- I. Some cutting saw blades are very expensive. Make sure the right cutting blade is used for the material being cut.
 - ii. Protect and maintain saw blades.
- f. After each cutting process, clean off saw cuts, broken pieces and slurry, and wash down the table.
- g. Maintain saw.

Evaluation:

1. Written report. 10%
2. Competence in simulated work and/or experience. 80%
3. Written tests. 10%

Development History:

Date Developed: October, 1996

Instructor's Notes:

COURSE DESCRIPTION - SY2200

Name and Number: Stonemasonry 2200

Descriptive Title: Masonry Flooring, Walls and Roof Construction III (3)

Summary Description:

This course in the background of stonemasonry requires the use of engineering drawings and access to stone buildings. It involves identification of architectural features and writing a comprehensive report on contemporary stone buildings and structures. It includes information on modern materials, materials testing, anchorage systems, use of machinery and restoration and masonry terminology. It also involves the theory, layout and fixing structural stone, information on setting-out, centering for door and window openings, application of structural timbers in stone construction, buttresses, gable ends, arches, doorways, use of hand drafting equipment.

Prerequisites:

Co-requisites:

Credit Value: 3

Textbook(s)/Eastern College Stonemasonry Manual Number 1 and 2, Eastern College Booklet (Wall Construction) “F”.

Course Aims:

1. To develop a knowledge of contemporary stone buildings, structures and features.
2. To develop the skills and knowledge required to fix structural stone.
3. To develop the knowledge of mortars and grouts.
4. To develop the knowledge between brick and stone.
5. To develop basic carpentry skills.
6. To develop the knowledge of scaffoldings.
7. To develop an understanding of other occupations associated with the masonry trade.

8. To develop an understanding of detailed drawings.
9. To develop a skill for hand sketching.

Course Objectives (Knowledge):

1. Describe masonry definitions.
2. Describe various modern building materials used by masons.
3. Describe methods for testing the integrity of building stone.
4. Explain the use of various anchorage systems.
5. Describe the various types of machinery used by masons.
6. Explain procedures and problems associated with the restoration of stone buildings and structures.
7. List the various types of contemporary stone structures on which masons work.
8. List the types of stone generally used by stone masons.
9. List the various stone shapes used in masonry work.
10. Describe where marble is used in the masonry trade.
11. Describe the uses of polished marble.
12. Describe the uses of honed marble.
13. Describe marble tiles and cladding in hallways and bathrooms.
14. Describe where granite is used in the masonry trade.
15. Describe honed, rockfaced and flamed finished or tooled granite and list some uses of each type of finished stone.
16. Describe colours, inscriptions, shapes and polishing, bases and footings, sunken or raised lettering, gold leaf paints, material costs and cemetery "permission" with respect to granite and marble headstone monuments.

Stonemason Occupation

17. Describe sandblasting.
18. Describe types of rustication in marble and granite.
19. Describe natural slate ashlar rustication.
20. Describe stonemasonry shapes and freehand sketches.

Major Tasks/Subtasks (Skills):

1. Identify various features of contemporary stone buildings.
2. Identify various shaped arches.
3. Identify masonry finishings.

Evaluation:

1. Written report. 10%
2. Competence in simulated work and/or experience. 80%
3. Written tests. 10%

Development History:

Date Developed: October, 1996

Instructor's Notes:

COURSE DESCRIPTION - SY2400

Name and Number: Stonemasonry 2400

Descriptive Title: Setting Out Staircases, Voussoirs (Arches) and Pediments

Summary Description:

This course in setting out requires the use of drafting tools and computer equipment and materials and supplies. It involves setting out plain staircases, arches and pediments. It includes information on treads and risers, pattern making techniques, stone cutting and voussoirs shapes, basic geometry skills.

Prerequisites:

Co-requisites:

Credit Value: 2

Text book(s)/Software used by Lead Institution and Eastern College Stonemasonry Manual Number II (2):

Course Aims:

1. To develop the skills and knowledge required to set out staircases (spandrel and geometrical).
2. To develop the skills and knowledge required in setting out of arches.
3. To develop the understanding between straight wall and segmental pediments.
4. To apply appropriate building codes and standards in the setting out of staircases and arches.
5. To develop an appreciation for occupational health and safety in the workplace.
6. To develop an understanding of other occupations associated with the masonry trade.

Course Objectives (Knowledge):

1. Explain rectangular steps
2. Explain the difference between a spandrel step - winder step.
3. Describe the setting out of moulded treads and risers.
4. Describe open newel stair.
5. Describe the setting-out of a turret stair and landings.
6. Explain concrete steps covered with marble - granite
7. Explain shop drawings.
8. Detail advance full size working drawings.
9. Explain pattern making techniques.
10. Detail schedule and ticket systems.
11. Basic carpentry.
12. Describe stone cutting processes for voussoirs, advance pediment springers.
13. Describe stone cutting spandrel..
14. Describe keystones and arch stones (Voussoirs shapes).
15. Explain intersection of stone arch with splayed jambs. (Bevels)
16. Describe ramp and twist in marble skirting and dados
17. Basic carpentry.
18. Explain angles between lines and planes
19. Explain "vertical" and "horizontal" planes of projection.

Major Tasks/Subtasks (Skills):

1. Layout plain staircases.
2. Layout plinth or capping for a geometrical stair balustrade
3. Layout dog leg staircases.
4. Layout of helicoidal skew arch.
5. Layout semi-elliptical skew arch.
6. Layout segmental and straight pediments.

Evaluation:

1. Written report. 10%
2. Competence in simulated work and/or experience. 80%
3. Written tests. 10%

Development History:

Date Developed: October, 1996

Instructor's Notes:

COURSE DESCRIPTION - SY2410

Name and Number: Stonemasonry 2410

Descriptive Title: Staircase Construction

Summary Description:

This theory course in stone fixing requires the use of masonry tools and equipment and materials and supplies. It involves layout and fixing stone staircases. It includes information on treads and risers, spandrails and soffits. Knowledge of cladding and stairwells and specialty scaffolding..

Prerequisites:

Co-requisites:

Credit Value: 1

Textbook(s)/Eastern College Stonemasonry Manual Number 2.

Course Aims:

1. To develop the skills and knowledge required to layout and fix stone staircases.
2. To develop the skills and knowledge of geometric stairs.
3. To develop the knowledge and understanding of scaffolding and rigging.
4. To develop an understanding for skirting and dado rail.
5. To apply appropriate building codes and standards in the layout and fix stone staircases that applies to mortars and grouts.
6. To develop an appreciation for occupational health and safety in the workplace.
7. To develop an understanding of other occupations associated with the masonry trade.

Course Objectives (Knowledge):

1. Explain the design process for treads and risers.
2. Explain arrangement for winder steps.
3. Describe the layout of spandrils.
4. Explain the placing of soffits in staircases.
5. Explain anchoring systems.
6. Explain the support systems for staircases.

Major Tasks/Subtasks (Skills):

1. Layout rule for proportion between treads and risers.
2. Layout stone staircases.
3. Fix stone for staircases.

Evaluation:

1. Written report. 25%
2. Competence in simulated work and/or experience. 25%
3. Written tests. 25%
4. Site evaluations. 25%

Development History:

Date Developed: October, 1996

Instructor's Notes:

COURSE DESCRIPTION - SY2420

Name and Number: Stonemasonry 2420

Descriptive Title: Setting-out Historical Tracery

Summary Description:

This course in setting out requires the use of drafting tools and equipment and materials and supplies. It involves setting-out of advance tracery windows, blank tracery, rose windows, flying buttresses, gable ends and gothic entrance and door surrounds. It includes information on jams and mullions, capping, mouldings, pattern making techniques, stone cutting techniques, stained glass lead lights and geometry skills.

Prerequisites:

Co-requisites:

Credit Value: 2

Textbook(s)/Eastern College Stonemasonry Manual Number 2:

Course Aims:

1. To develop the skills and knowledge required for setting-out of tracery.
2. To develop an appreciation of solid and descriptive geometry setting-out.
3. To develop an understanding of plane geometry.
4. To develop an understanding of cusplings in tracery.
5. To develop an understanding of scaled detail and full size measurements.
6. To develop an appreciation of interlacing of embroidery windows.
7. To apply appropriate building codes and standards in the setting out of tracery.
8. To develop an appreciation for occupational health and safety in the workplace.
9. To develop an appreciation of interlacing of embroider window.

10. To develop an understanding of other occupations associated with the masonry trade.
11. To develop an understanding of screened tracery.
12. To develop an understanding of clerestory walls and windows.

Course Objectives (Knowledge):

1. Explain properties, tangents to a circle, circles in contact and loci..
2. Describe the purpose of jams and mullions, patterns and mouldings.
3. Describe gothic mouldings to columns and arches.
4. Explain gothic architecture and mouldings.
5. Explain pattern making techniques, face moulds and sections.
6. Explain carpentry techniques required in Gothic architecture.

Major Tasks/Subtasks (Skills):

1. Foundation of tracery.
2. Layout blank tracery.
3. Layout plain lacet windows.
4. Layout rose windows.
5. Layout stained glass (lead lights) positioning in windows.
6. Layout transome bar.
7. Layout geometrical tracery windows.
8. Layout structural buttresses.
9. Layout flying buttresses.
10. Layout gable ends.

Stonemason Occupation

11. Layout of finial's.
12. Layout turret lantern's
13. Layout saddle-back gothic capping - copings.
14. Layout Gothic mouldings.

Evaluation:

1. Written report. 5%
2. Competence in simulated work and/or experience. 80%
3. Written tests. 15%

Development History:

Date Developed: October, 1996

Instructor's Notes:

COURSE DESCRIPTION EG1120

Name and Number: Engineering Graphics I 1120

Descriptive Title: Engineering Graphics I 1100

Summary Description:

This is an introductory course in computer-aided design and drafting. Students are introduced to standard drafting principles using CAD. Emphasis is placed on graphic perception through sketching and blueprint reading of stonemasonry drawings..

Prerequisites: None

Co-requisites:

Credit Value: 4

Textbook(s)/Software used by Lead Institutions and Eastern College Stonemasonry Manuals Number's 1 and 2:

Course Aims:

1. To provide students with a knowledge of basic drafting fundamentals in stonemasonry.
2. To introduce students to computer-aided design and drafting in stonemasonry.
3. To enable students to create acceptable technical drawings and sketches in order to transmit technical information for stone cutting.
4. To provide students with a basic facility in reading and interpreting blueprints and conceptualizing 3D information in masonry openings and piers.
5. To ensure that students are able to take advantage of computers to create technical illustrations and graphics.

Course Objectives (Knowledge):

1. Principles of Engineering Graphics
 - a) Introduction to Technical Drawing
 - State the purpose of technical drawings.

- Discuss the relationship between design, drafting and manufacturing.
 - Describe the difference between detail and assembly drawings.
 - Identify the limitations of standard technical drawings.
- b) Two-dimensional Representation of Three-dimensional Objects.
- Describe how 3D objects can be represented in 2D.
 - Identify the difficulties with this type of translation.
 - Discuss the importance of accurate 2D representations.
- c) Principles of Scale.
- State the purpose of scaling as used in technical drawing.
 - List standard scales commonly used in engineering practice.
 - Choose appropriate scales given specific objects and paper sizes.
 - Manipulate engineering scales to draw scaled objects.
- d) Sketching Isometric Views.
- State the purpose of isometric views.
 - Sketch isometric views of objects on isometric grid paper.
- e) Introduction to Orthographic Views.
- State the principles of orthographic projection.
 - Apply drawing layout principles to create multiple view drawings.
 - Sketch orthographic views of 3D objects.
2. Introduction to CAD.
- a) Introduction to the CAD Environment.
- Create a new drawing file and edit existing files.
 - Save a finished drawing file to disk.
 - Check and modify the configuration of the system.
 - Manipulate the various available menus.
 - Exit the program, both with and without saving the file.
- b) Entity Creation.
- Create lines, arcs, circles, polylines/linestrings, and points.
 - Create and place text of given height, style and angle.
 - Set up units and limits for any given drawing.
 - Use snap, grid and orthogonal functions to assist in entity placement.
 - Use absolute, relative and polar coordinates for accurate data entry.
 - Snap to key points on existing objects for accurate point placement.
 - Manipulate the view magnification and location and screen refresh commands.

- c) Editing Existing Entities.
 - Describe selection set creation options.
 - Create detailed selection sets for editing.
 - Use the move, copy, erase, scale, mirror and array commands to edit entities.
 - Use the offset, fillet, chamfer, and break commands to modify entities.
 - Use the trim, extend and stretch commands to edit entities.

 - d) Layers, Line types and Colours.
 - Draw with any available colour
 - Describe the relationship between colour and the final plot.
 - List and load the default Line types.
 - Draw with any available line type.
 - Describe the advantages of multi-layer drawings.
 - Create and use new layers as appropriate for any drawing.
 - Create multiple Line types and colours on the same layer.
 - Use the change command to change existing entity properties.

 - e) Plotting and Printing.
 - Calculate plotting scales based on paper size and object extents.
 - Configure the package for the appropriate printer and plotter.
 - Plot both fitted and scaled drawings.
 - Adjust plotting parameters as appropriate for any desired output.

 - f) Advanced Features.
 - Create and use symbols for use in one or many drawings.
 - Cross-hatch or pattern any given area.
 - Use inquiry commands to query existing database.

 - g) Advantages of CAD systems.
 - Lay out and create drawings in an efficient fashion with CAD.
 - Describe the advantages of CAD over traditional board drafting.
3. Orthographic Projection.
- a) Drawing Layout (1st. and 3rd. Angle).
 - Analyse non-cylindrical objects and select required orthographic views.
 - Lay out orthographic views to create standard multi-view drawings.
 - Sketch and draw orthographic views of non-cylindrical objects.
 - Describe the relationship between views in multi-view drawings.

 - b) Orthographic Drawing - Non-cylindrical Objects.

- Analyse cylindrical objects and select required views.
 - Sketch and draw orthographic views of non-cylindrical objects.
- c) Orthographic Drawing - Cylindrical Objects.
- Describe objects given their orthographic views.
 - Create isometric sketches based on orthographic views.
4. Dimensioning and Notes.
- a) Dimensioning Basic Drawings.
- Describe the purpose of dimensioning.
 - Create both aligned and unidirectional dimensions.
 - Describe and use standard dimensioning rules of practice.
 - Position dimensions appropriately to describe given objects.
 - Dimension both cylindrical and non-cylindrical objects.
- b) Standard Conventions and Terminology.
- Discuss the need for technical drawing conventions.
 - Use standard conventions in dimensioning objects.
 - Locate and use the appropriate CSA standards documentation.
 - Describe the use of standard symbols (ie. welding, surface finish, etc)
- c) Drawing Notes.
- Create drawing notes, titles and other non-graphic information per CSA standards.
 - Create standard borders with revision list, title block and bill of materials (if required).
- d) CAD Dimensioning Special Features.
- Describe what is meant by associative dimensioning.
 - Sketch, trim and extend associative dimensions.
 - Edit, alter and update existing dimensions.
- e) Blueprint Exercises.
- Read blueprints to give dimensional and other data for an object.
 - Describe the process of creating blueprints and their purpose.

5. Sectional Views.

- a) Full Sections.
 - Create full-section views of objects.
 - Describe when full section views are appropriate.
- b) Half Sections.
 - Create half-section views of objects.
 - Describe when half-section views are appropriate.
- c) Offset Sections.
 - Create offset-section views of objects.
 - Describe when offset-section views are appropriate.
- d) Aligned and Revolved Sections.
 - Create aligned and revolved section views of objects.
 - Describe when aligned and revolved section views are appropriate.
- e) Rotated and Broken-out Sections.
 - Create rotated and broken-out section views of objects.
 - Describe when rotated and broken-out section views are appropriate.
- f) The Application of Sectional Views.
 - Determine how best to represent an object in a drawing.
 - Analyse objects and define what sectional views are required.
 - Use CSA standard section views as tools in technical drawing.

6. Pictorial Views

- a) Review of isometric drawing.
 - Sketch any object using isometric projection.
 - Use built-in functions to draw any object with CAD using isometric projection.
 - Describe the advantages and limitations of built-in isometric functions.
 - Describe other types of axonometric projection.
- b) Oblique Drawing.
 - Describe the differences between cavalier and cabinet projection.
 - Sketch objects using oblique pictorial views.
 - Draw oblique pictorial views of objects using CAD.

- c) Perspective Drawing.
 - Describe the difference between single, one-point and two-point perspective.
 - Sketch objects using perspective views of objects.
 - Draw perspective views of objects using CAD.
 - d) Combining Pictorial and Orthogonal Views.
 - Determine the appropriate pictorial view for any given situation.
 - Layout and create orthographic and pictorial views of any given object.
7. CAD Systems and Alternative CAD Packages.
- a) Introduction to CAD Systems Management.
 - Describe typical CAD systems management concerns.
 - Outline disadvantages of micro-based CAD (vs. mini or mainframe)
 - Synthesize solutions to CAD organizational problems.
 - b) Alternative CAD Software and Hardware.
 - Discuss the difference between specific alternative CAD packages.
 - Adapt quickly to utilizing alternative CAD packages.
 - Describe their exposure to various CAD software.

Major Tasks/Subtasks (Skills):

Evaluation:

1. Written assignments. 10%
2. Written tests. 10%
3. Completion of a project. 80%

Development History:

Date Developed: October, 1996

Instructor Notes:

COURSE DESCRIPTION - SY2440

Name and Number: Stonemasonry 2440

Descriptive Title: Theory Setting-out Vaults

Summary Description:

This course in setting out requires the use of masonry drafting tools and equipment, tools and supplies. It involves setting out barrel vaults and fan vaults. It includes information on tracery ribs, capping, mouldings and pattern making techniques and timber carrying system.

Prerequisites:

Co-requisites:

Credit Value: 1

Textbook(s)/Eastern College Stonemasonry Manual Number 2:

Course Aims:

1. To develop the skills and appreciation for advanced geometry.
2. To develop the skills and knowledge required for setting out vaults.
3. To develop special skills and knowledge in setting-out centerings.
4. To apply appropriate building codes and standards in the setting out of vaults.
5. To develop an appreciation of occupational health and safety in the workplace.
6. To develop an understanding of other occupations associated with the masonry trade.

Course Objectives (Knowledge):

1. Describe the setting geometry of vaults.
2. Describe tracery ribs, capping and mouldings.

Stonemason Occupation

3. Describe set out intersecting vaults of unequal span.
4. Explain pattern making techniques.
5. Explain cutting patterns on existing stonework

Major Tasks/Subtasks (Skills):

1. Set out barrel vaults.
2. Set out fan vaults.
3. Lunette vault (Welch Croin).
4. Set-out timber centerings.

Evaluation:

1. Written report. 10%
2. Competence in simulated work and/or experience. 80%
3. Written tests. 10%

Development History:

Date Developed: October, 1996.

COURSE DESCRIPTION - SY2450

Name and Number: Stonemasonry (Theory) 2450

Descriptive Title: Theory Setting-out Ramp and Twist

Summary Description:

This course in setting out requires the use of masonry drafting tools and equipment. It involves laying out staircases, slopping retaining walls, entrance ways, circular staircases and skirtings. It includes information on pattern making techniques, capping and producing materials lists from advanced geometry full-size setting-out.

Prerequisites:

Co-requisites:

Credit Value: 1

Textbook(s)/Eastern College Stonemasonry Manual Number 2:

Course Aims:

1. To develop an advance knowledge of geometry.
2. To apply solid and descriptive geometry and setting.
3. To develop the skills and knowledge required to set out ramp twist.
4. To apply the development of a cylinder.
5. To apply appropriate building codes and standards in the setting out of intermediate ramp twists.
6. To develop an appreciation for occupational health and safety in the workplace.
7. To develop an understanding of other occupations associated with the masonry trade.

Course Objectives (Knowledge):

1. Explain pattern making techniques.
2. Describe capping.
3. Describe unit number.
4. Describe techniques to reduce wastage during cutting.
5. Explain the ticketing system in terms of schedules, dimensions, description, finishing (surface) and materials required.
6. Describe hand sketching details in terms of shapes, rough sketches, isometrics and perspectives.
7. Describe geometrical stair balustrade.
8. Describe the helix and helical solids.

Major Tasks/Subtasks (Skills):

1. Numerate drawings.
 - a. Estimate from architect site drawings.
 - b. Make detail drawings (setting out).
 - c. Make working shop drawings.
 - d. Determine materials required.
2. Develop cutting schedules.
 - a. Select rough block.
 - b. Provide stone-cutting instructions.
 - c. Determine time allocations.
 - d. Determine materials required.

Evaluation:

1. Written report. 10%
2. Competence in simulated work and/or experience. 80%
3. Written tests. 10%

Development History:

Date Developed: October, 1996

Instructor's Notes:

COURSE DESCRIPTION - SY2201

Name and Number: Stonemasonry 2201

Descriptive Title: Flooring Walls and Roof Construction (Complex Wall Construction)

Summary Description:

This course in stone wall construction and fixing requires the use of masonry tools and equipment, and materials and supplies. It involves laying out and constructing complex stone walls and ceilings. It includes information on advanced construction techniques, architrades, columns, balustrades, entrance steps, canopy, cantilevers, dado, entrance surrounds, vaulting ceilings, domes, barrel vaults. It includes information on structural systems applied to masonry, timber centerings, rigging, complex scaffolds and hoisting, architectural and detail stone drawings.

Prerequisites:

Co-requisites:

Credit Value: 4

Textbook(s)/Eastern College Stonemasonry Manual Number 2

Course Aims:

1. To develop the knowledge in setting out timber centerings.
2. To develop understanding of various types of surveyors levels.
3. To develop the skills of reading complex masonry structural drawings.
4. To develop the skills and knowledge required for constructing complex stone walls.
5. To develop masonry anchorage systems.
6. To develop the knowledge of mortars and grouts.
7. To apply appropriate building codes and standards in the construction of complex stone walls.

8. To develop knowledge of scaffolding and rigging.
9. To develop an appreciation for occupational health and safety in the workplace.
10. To develop the necessary carpentry skills.
11. To develop an understanding of other occupations associated with the masonry trade.
12. To develop an understanding of prefix numbered detailed drawings.
11. To develop an understanding between brick, concrete block and stone construction work.

Course Objectives (Knowledge):

1. Describe advanced construction techniques of vaults and domes.
2. Explain the construction:
 - a. Architrades.
 - b. Columns.
 - c. Balustrades.
 - d. Entrance ways.
 - e. Steps.
 - f. High and circular ashlar wallings.
3. Explain cleaning down methods in masonry.

Major Tasks/Subtasks (Skills):

1. Layout complex vaults and domes.
2. Layout complex stone walls.
3. Fix complex vaults and domes.
4. Fix complex stone walls.

Evaluation:

1. Written report. 10%
2. Competence in simulated work and/or experience. 80%

3. Written tests. 10%

Development History:

Date Developed: October, 1996

Instructor's Notes:

COURSE DESCRIPTION - SY2430

Name and Number: Stonemasonry (Theory) 2430

Descriptive Title: Setting Out Domes and Niches

Summary Description:

This course in setting out requires the use of drafting tools and equipment and materials and supplies. It involves setting out circular recesses and radiating lines. It includes information on pattern making techniques, stone cutting, bosses, keystones and voussoirs (wedge-shaped stones) and timber carrying systems within advance geometry.

Prerequisites:

Co-requisites:

Credit Value: 2

Text book(s)/Eastern College Stonemasonry Manual Number 2

Course Aims:

1. To develop the skills in advanced geometry.
2. To develop the skills and knowledge required to set out domes and niches.
3. To apply appropriate building codes and standards in the setting out of domes and niches.
4. To develop an understanding in timber centering systems.
5. To develop an appreciation for occupational health and safety in the workplace.
6. To develop an understanding of other occupations associated with the masonry trade.

Course Objectives (Knowledge):

1. Explain shop drawings.
2. Describe pattern making techniques.

3. Detail full-size working drawings.
4. Describe the use of keystones and voussoirs.
5. Detail schedule and ticket systems.
6. Describe stone cutting procedures.

Major Tasks/Subtasks (Skills):

1. Set out pendentive dome.
2. Set out circular recesses.
3. Set out ribbed pendentive ceiling.
4. Set out radiating lines.
5. Set out interpenetration of dome.
6. Development of solids (the helix and helical).
7. Sections of a cylinder.
8. Development of sphere.
9. Set out spherical niche
10. Set-out timber structures.

Evaluation:

1. Written report. 10%
2. Competence in simulated work and/or experience. 80%
3. Written tests. 10%

Development History:

Date Developed: October, 1996

Instructor's Notes:

COURSE DESCRIPTION - SY1500

Name and Number: Stonemasonry Estimating 1500

Descriptive Title: Estimating I

Summary Description:

This course in estimating for stonemasonry construction requires the use of engineering drawings and information on materials and supplies. It involves the calculation of quantities and costs of materials and labour for stonemasonry construction. It includes information on transportation costs, installation costs and quarrying costs, royalties, taxes, drafting services and setting-out cost.

Prerequisites:

Co-requisites:

Credit Value: 1

Textbook(s)/Eastern College Stonemasonry Manual Number 2:

Course Aims:

1. To develop the operational skills and knowledge required for estimating the cost of stonemasonry construction.
2. To develop the skills and knowledge for time sheet control and wage cost.
3. To apply appropriate building codes and standards in estimating stonemasonry construction costs.
4. To develop an appreciation for occupational health and safety in the workplace.
5. To develop an understanding of other occupations associated with the masonry trade.

Course Objectives (Knowledge):

1. Describe costs associated with the quarrying of building stone.
2. Describe costs associated with the transportation of building stone.

Stonemason Occupation

3. Describe costs associated with the production of building stone.
4. Describe costs associated with the installation of building stone.
5. Describe costs associated with administration of building stone.
6. Describe costs associated with labour costs.

Major Tasks/Subtasks (Skills):

1. Calculate quantities and cost of materials and labour for stonemasonry construction and government taxes.
2. Final estimating cost (clientele).

Evaluation:

1. Written report. 40%
2. Competence in simulated work and/or experience. 10%
3. Written tests. 50%

Development History:

Date Developed: October, 1996

Instructor's Notes:

COURSE DESCRIPTION -SY2101

Name and Number: Stonemasonry 2101

Descriptive Title: Hand Skills IV Machinery Cutting and Polishing

Summary Description:

This course in stone cutting with pneumatic hammers and tools and polishing requires the use of machinery table saws, polishing equipment, stone planners and materials and supplies. It involves cutting stone to various shapes and polishing the stone, and maintaining the machinery. It includes information on stone shapes, types of saw blades, cutting techniques and the theory of polishing by mechanical means; advanced hand skills and an understanding between granite and marbles. Marble bathroom setting out. Shop fronts setting-out.

Prerequisites:

Co-requisites:

Credit Value: 7

Textbook(s)/Eastern College Stonemasonry Manual Number 1 and 2, Eastern College Booklet (Shop Procedures) “B”:

Course Aims:

1. To develop an understanding between marble and granites and softstones, their durability and workability.
2. To develop the skills and knowledge to cut and polish stone using machinery and hand skills.
3. To develop the knowledge of flooring and wall linings.
4. To develop the knowledge of polishing and cutting machinery maintenance.
5. To develop an understanding of material quality control.
6. To apply appropriate building codes and standards in the cutting and polishing of stone.

7. To develop an appreciation for occupational health and safety in the workplace.
8. To develop an understanding of other occupations associated with the masonry trade.
9. To develop an understanding of the monumental trade.

Course Objectives (Knowledge):

1. Describe the uses and characteristics of the following saws: frame saw, diamond saw, duplex saw, cross cut saw, gravity saw, gangsaw and bridge saw.
2. Describe the characteristics and uses of the following types of saw blades:
 - a. Carborundum
 - b. Diamond
3. Describe the characteristics and uses of the following planers: canting arm planer, rigid head planer, four tool planer and the open-side planer.
4. Describe the characteristics and uses of the following diamond and abrasive grits: diamond wire, steel wire, silica sand, carborundum rubbing blocks, fine rubbing wheels and sanding disc.
5. Describe the characteristics and uses of the stone turning lathe.
6. Explain how the surfaces of stones of crystalline texture are gradually reduced to a degree of constituting a polish.
7. List some types of stone that can be polished and describe the characteristics of each.
8. Explain why some natural stone must be honed rather than polished (example freestone).
9. Describe the functions of the following polishing head components: (Grinding and Honing)
 - a. Diamond heads.
 - b. Cast-iron disc.
 - c. Sanding block (coarse - fine).
 - d. Sanding discs (small tools).
 - e. Carborundum blocks.
 - f. Felt pads.
 - g. Lead pads.

10. Describe the uses of the following polishing supplies:
 - a. Sanding grits.
 - b. Carborundum powders.
 - c. Diamond dust.
 - d. Putty powders (oxide of tin).
 - e. Synthetic powders.
 - f. Crystals.
 - g. Wax.
11. List the production capacity, market, cost and required maintenance for various types of cutting and polishing machinery.
12. List the various types of machinery tools and their purposes.
13. Describe storage procedures for machinery tools - especially the more valuable ones.
14. Describe the importance of setting-out and schedules.
15. Site measuring and dimensions.
16. Explain the importance of sharpening tools.

Major Tasks/Subtasks (Skills):

1. Operate machinery (Table Saw).
 - a. Practice work area safety.
 - I. Look for obstructions.
 - ii. Make sure the floor area is clear.
 - iii. Make sure loading equipment has been moved away.
 - iv. Make sure fellow workers are clear before starting saw.
 - v. Never change the saw blade before checking electrical breaker is OFF.
 - b. Practice safety around equipment.
 - I. Observe the operation of the machine.
 - ii. Read the operating manual.
 - iii. Check for the stop and start button - **KNOW WHERE TO REACH FOR A QUICK RESPONSE BEFORE OPERATING THE MACHINE.**
 - iv. Check the electrical circuit breakers.
 - v. Keep water away from electricity.
 - vi. Wear protective clothing and gloves.

- c. Position material.
 - I. Check to see if you have the right material (plus no faults).
 - ii. Set material on wooden skids.
 - iii. Always cut the longest and widest first. All other surfaces can be square from the first cut.

- d. Cut material.
 - I. Check dimensions.
 - ii. ALWAYS ask a fellow worker for a size check before cutting valuable material.
 - iii. ALWAYS make sure your stone is against a stop and setting firm on the cutting table before cutting.

 - iv. WARNING! When cutting, make sure that you have taken precautions so that the "off cut" does not fall against the cutting blade. This could result in buckling of the saw blade.

- e. Select and maintain saw blades.
 - I. Some cutting saw blades are very expensive. Make sure the right cutting blade is used for the material being cut.
 - ii. Protect and maintain saw blades.

- f. After each cutting process, clean off saw cuts, broken pieces and slurry, and wash down the table.

- g. Maintain saw.
 - I. Always check if moving parts require greasing before and after each cutting session.
 - ii. Check that all water feed hoses are OK.

- h. Clean work area.
 - I. Sweep, wash down and disinfect floors.
 - ii. Clean and disinfect walls.
 - iii. Dust control.

- I. Clean out the slurry pit.
 - I. Check the operation of the circulation pump.
 - ii. Wash down slurry into channel.
 - iii. Make sure there is no blockage in the channel.
 - iv. Always clean out slurry channel and catch basin before commencing the days operations.

2. Polish stone.
 - a. Do basic polishing.
 - I. Polish stone by hand.
 - ii. Set up polishing table.
 - iii. Radial arm polisher (Jenny Lind).
 - iv. Operate computerized polishing equipment.
 - v. Use a rubbing bed for small pieces of stone.
 1. Router edge polished.
 2. Moulded edge trimmed.
 3. Cutting heads.
 4. Abrasive grit and diamond powders.
 - vi. Store polished stone. Protect from scratching by dust and grit.
 - b. Control water in the polishing process.
 - I. Lower the water rate.
 - ii. Control dampness.
 - iii. Wash down.
 - iv. Squeegee.
3. Storage of materials on racks.
4. Handling of materials for shipment.
5. Keep up-to-date with respect to modern machinery.
 - a. Know what is available (Subscribe to trade magazines).

Evaluation:

1. Written report. 10%
2. Competence in simulated work and/or experience. 80%
3. Written tests. 10%

Development History:

Date Developed: October, 1996

Instructor's Notes:

COURSE DESCRIPTION - EG1130

Name and Number: Drafting Stonemason 1130

Descriptive Title: Engineering Graphics II Stonemason

Description:

This basic blueprint reading and sketching course requires the use of basic blueprints, specifications in stonemason, bills of materials, drawing instruments and facilities, and CAD software and hardware. It involves basic blueprint reading, sketching, interpretation of various types of drawings and diagrams, interpretation of specifications, and operating the CAD system. It includes information on sketching techniques, types of drawings, and CAD commands.

Prerequisites:

Co-requisites:

Credit Value: 3

Textbook(s)/Software used by Lead Institution and Eastern College Stonemasonry Manual Number 2:

Course Aims:

1. To develop the skills and knowledge required to read blueprints and sketch views.
2. To develop the skills and knowledge required to prepare engineering drawings.
3. To develop an appreciation of CSA, ANSI and ISO standards and CSAE drawing conventions.

Course Objectives (Knowledge):

1. Describe the alphabet of lines.
2. List the basic drawing symbols.
3. Explain what is meant by quality of lines.

4. Describe metric, mechanical, architectural and civil scales.
5. Describe the different types of pencil lead grades.
6. Describe letter types.
7. Describe lettering instrument types.
8. Explain spacing, sizes and lettering techniques.
9. Describe different view orientations.
10. Describe obliques, isometrics and perspectives.
11. Explain sketching techniques.
12. Explain main view and possible views.
13. Describe the six principle views.
14. Explain association of surfaces.
15. Explain matching pictorials.
16. Describe types of dimensions and lines used.
17. Explain the rules of dimensioning.
18. Explain the various methods of producing lines.
19. Describe the purpose and types of sectional views.
20. Explain conventions associated with sectional views such as symbols, cutting plane lines, broken-out lines, etc.
21. Identify standard drawing symbols used on electrical, electronic, hydraulic and pneumatic drawings.
22. Identify colour codes used for electrical, electronic, hydraulic and pneumatic schematics.
23. Explain the purpose and methods of dimensioning.

24. Explain intersections and developments.
25. Explain graphs reticulation.
26. Explain the functions of the CAD system.
27. Explain the difference between first angle and third angle projections.
28. Describe orthographic projections.
29. Explain angles and planes of projection.
30. Describe true orthographic projection and explain violations of true projection.
31. Explain balancing views and missing views.
32. Describe conventional practices associated with orthographic projection drawing.
33. Describe secondary auxiliary views.
34. Describe isometric, perspective, dimetrics, trimetrics, cabinet oblique and cavalier oblique.
35. Describe pictorials.
36. Describe types of assembly drawings.
37. Describe fastener symbols.
38. Describe permanent and non-permanent fasteners.
39. Explain cutting plane line and broken-out line.
40. Explain the difference between primary and auxiliary views.

Major Tasks/Subtasks (Skills):

1. Construct geometric shapes and lines
 - a. Draw lines to scale.
 - b. Scale lines.
 - c. Divide lines into equal parts.
 - d. Bisect lines.

- e. Construct angles.
 - f. Bisect angles.
 - g. Construct concave and convex curves.
 - h. Construct circles, arcs, tangents, ellipses, polygons, etc.
2. Sketch orthographic projections.
- a. Visualize object.
 - b. Select views.
 - c. Layout sketch
 - d. Sketch projection.
 - e. Dimension sketch.
 - f. Make notations.
3. Sketch sectional views.
- a. Locate section.
 - b. Select type of view.
 - c. Determine scale.
 - d. Sketch view.
 - e. Dimension sketch
 - f. Make notations.
4. Sketch primary auxiliary views.
- a. Visualize the view.
 - b. Layout the sketch.
 - c. Sketch view.
 - d. Dimension sketch.
 - e. Make notations.
5. Identify Information from blueprints and drawings.
- a. Visualize views and projections.
 - b. Identify information from schematic diagrams, assembly drawings, views, feeder maps, etc.
 - c. Identify sequence of fabrication according to blueprint.
 - d. Identify cut of materials from sketches.
 - e. Interpret horizontal, vertical, curved, inclined lines, fillets, and radii on working drawings.
 - f. Identify dimensions of holes, cylinders, circles, angles and arcs.
6. Interpret architectural and masonry structural drawings and information.
- a. Interpret plot plan, foundation plans, floor plans, details, elevations and sections.
7. Interpret specifications.

- a. Interpret specifications.
 - b. Identify tolerance specifications.
 - c. Interpret specifications (company standards books)
8. Identify information from bill of materials.
9. Operate the CAD system.
- a. Start up the system.
 - b. Set up directories and manage files.
 - c. Start AutoCAD.
 - d. Operate the system.
10. Draw using the CAD system.
- a. Visualize object.
 - b. Establish parameters.
 - c. Make drawing.
 - d. Print drawing.
11. Draw orthographic projections.
- a. Visualize the object.
 - b. Select views.
 - c. Establish parameters.
 - d. Draw projections.
 - e. Print drawing.
12. Draw primary auxiliary views.
- a. Visualize the object.
 - b. Establish parameters.
 - c. Draw view.
 - d. Print drawing.
13. Draw pictorials.
- a. Visualize the object.
 - b. Establish parameters.
 - c. Sketch the pictorial.
 - d. Draw the pictorial.
 - e. Print the drawing.
14. Prepare assembly drawings.
- a. Visualize the object.
 - b. Establish parameters.
 - c. Make the drawing.

- d. Print drawing.
- 15. Draw fasteners.
 - a. Visualize thread representation.
 - b. Establish parameters.
 - c. Sketch the thread representation.
 - d. Draw fastener (use templates).
 - e. Print drawing.
- 16. Draw sectional views.
 - a. Locate section.
 - b. Select section type and view.
 - c. Establish parameters.
 - d. Follow conventions.
 - e. Draw section.
 - f. Print drawing.
- 17. Draw secondary auxiliary views.
 - a. Visualize the object.
 - b. Establish parameters.
 - c. Draw view.
 - d. Print drawing.

Evaluation:

- 1. Written reports and/or tests. 20%
- 2. Competence in simulated work and/or experiential endorsements. 80%

Development History:

Date Developed: October, 1996

Instructor's Notes:

REQUIRED RELATED COURSES

COURSE NAME & NUMBER: Workplace Correspondence CM2150

DESCRIPTIVE TITLE: Workplace Correspondence

CALENDAR TITLE:

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

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

PREREQUISITES: Nil

CO-REQUISITES: Nil

COURSE DURATION 45hrs

**SUGGESTED TEXT/
LEARNING RESOURCES:**

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

Student Projects and Activities for Business English and Communications,

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

Effective Business Writing, Jennifer MacLennon

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

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

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

References: Pittman Office Handbook, Smith/Hay-Ellis

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

McGraw Hill Handbook

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

Guest Speakers

Sell Yourself (Video)

COURSE AIMS:

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

MAJOR TOPICS/TASKS:

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

COURSE OUTLINE:

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

- 3.1 Examining the fundamentals of informal business reports
- 3.2 Applying informal report writing skills

LEARNING OBJECTIVES:

- 1.0 Review of Sentences and Paragraph Construction
 - 1.1.1 Define a sentence and review the four types.
 - 1.1.2 Identify the essential parts of a sentence, particularly subject and predicate, direct and indirect object.
 - 1.1.3 Differentiate among phrases, clauses, and sentences.
 - 1.1.4 Explore the major concepts related to subject-verb agreement.
 - 1.1.5 Apply rules and principles for writing clear, concise, complete sentences which adhere to the conventions of grammar, punctuation, and mechanics.
- 1.2 Examine and Apply Principles of paragraph Construction
 - 1.2.1 Discuss the basic purposes for writing.
 - 1.2.2 Define a paragraph and describe the major characteristics of an effective paragraph.
 - 1.2.3 Write well-developed, coherent, unified paragraphs which illustrate the following: A variety of sentence arrangements; conciseness and clarity; and adherence to correct and appropriate sentence structure, grammar, punctuation, and mechanics.
- 2.0 Business Correspondence
 - 2.1 Examine the Value of Business Writing Skills
 - 2.1.1 Discuss the importance of effective writing skills in business
 - 2.1.2 Discuss the value of well-developed writing skills to career success
 - 2.2 Examine Principles of Effective Business Writing
 - 2.2.1 Discuss the rationale and techniques for fostering goodwill in business communication, regardless of the circumstances
 - 2.2.2 Review the importance of revising and proofreading writing
 - 2.3 Examine Business Letters and Memos

- 2.3.1 Differentiate between letter and memo applications in the workplace
- 2.3.2 Identify the parts of a business letter and memo
- 2.3.3 Explore the standard formats for business letters and memos
- 2.3.4 Examine guidelines for writing an acceptable letter and memo which convey: acknowledgment, routine request, routine response, complaint, refusal, and persuasive request, for three of the six types listed
- 2.3.5 Examine samples of well-written and poorly written letters and memos

3.0 Informal Report

3.1 Examine the Fundamentals of Informal Business Reports

- 3.1.1 Identify the purpose of the informal report
- 3.1.2 Identify the parts and formats of an informal report
- 3.1.3 Identify methods of information gathering

3.2 Apply Informal Report Writing Skills and Oral Reporting Skills

- 3.2.1 Gather pertinent information
- 3.2.2 Organize information into an appropriate outline
- 3.2.3 Draft a five minute informal report
- 3.2.4 Edit, proofread, and revise the draft to create an effective informal report and present orally using visual aids.

RECOMMENDED EVALUATION:

Required Pass Mark 70%

DEVELOPMENT HISTORY:

Date Developed:

Date Revised: 1999 05 03

Name and Number: Customer Service MR1210

Descriptive Title: Customer Service

Summary Description:

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

Prerequisites: None

Co-requisites: None

Suggested Duration: 30 hrs

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

Course Aims:

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

Course Objectives (Knowledge):

1. **Providing Quality Service**
 - Define quality service
 - List the types of quality service
 - Define Service vs. Sales or Selling
 - Explain why quality service is important
 - Identify the various types of customers
 - Define customer loyalty

2. Determining Customers Wants and Needs

- List four levels of customer needs
- Identify important customer wants and needs
- Identify ways to ensure repeat business

3. Demonstrating a Positive Attitude

- List the characteristics of a positive attitude
- Explain why it is important to have a positive attitude
- List ways that a positive attitude can improve a customer's satisfaction
- Define perception
- Explain how perception can alter us and customers
- Understand how to deal with perception

4. Effectively Communicating with customers

- Describe the main elements in the communication process
- Identify some barriers to effective communication
- Define body language
- Explain how body language would affect customers
- Determine why body language is important
- Define active listening and state why it is important
- Describe the four components of active listening
- Contrast good and bad listeners
- List and discuss the steps of the listening process

5. Effectively using Questioning Techniques

- List questioning techniques
- Write two example of an open question
- Perform a questioning and listening role play

6. Using the Telephone Effectively

- List the qualities of a professional telephone voice
- Explain why telephone skills are important
- Demonstrate effective telephone skills

7. Asserting Oneself: Handling Complaints and Resolving Conflict

- Define assertiveness
- Define communication behaviors
- Relate assertions to effective communication
- Practice being assertive
- Understand the process of assertive guidelines for action
- Practice giving an assertive greeting
- Acknowledge multiple customers

8. Dealing with Difficult Customers

- Describe how you would deal with anger
- Complete a guide to controlling feelings
- Determine how you would feel dealing with an upset customer
- Suggest some techniques that might control your own feelings
- Understand leadership styles and the nature of organizations
- List ways to dealing with conflict / customer criticism
- Be aware of certain guidelines when confronting customers
- List ways of preventing unnecessary conflict with customers
- Review current skills and knowledge of customer service
- Develop a customer satisfaction improvement plan

COURSE OUTLINE - SP 2330

Name and Number: QA/QC SP2330

Descriptive Title: Quality Assurance / Quality Control

Description:

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

Prerequisites: None

Co-requisites: None

Suggested Duration: 30 Hrs

Course Aims:

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

Course Objectives (Knowledge):

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

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

Major Tasks / Subtasks (Skills):

1. Apply quality control to projects
 - a. Follow QA/QC procedures for drawings, plans and specifications in applicable occupations.
 - b. Calibrate measuring instruments and devices in applicable occupations.
 - c. Interpret required standards
 - d. Follow QA/QC procedures for accepting raw materials
 - e. Carry out the project
 - f. Control the quality elements (variables)

- g. Complete QA/QC reports

Evaluation:

Pass Mark Required 70%

Development History:

Date Developed: February 1994

Date Revised: April, 1999

COURSE DESCRIPTION

COURSE NAME & NUMBER: Introduction to Computers MC1050

DESCRIPTIVE TITLE: Introduction to Computers

CALENDAR ENTRY:

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

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

PRE-REQUISITES: Nil

CO-REQUISITES: Nil

SUGGESTED DURATION: 30 hours

SUGGESTED TEXT/

LEARNING RESOURCES:

Textbook(s):

References:

Other Resources:

COURSE AIMS:

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

MAJOR TOPICS:

1. Microcomputer System Hardware and Software Components

2. Word Processing
3. Spreadsheet
4. E-Mail and the Internet

COURSE OUTLINE:

1.0 Microcomputer System Hardware and Software Components

1.1 Microcomputer Hardware

1.1.1 System Components

1.1.2 Function of each Component

1.2 Microcomputer Software

1.2.1 Software Definition and Types

1.2.2 System Software (Windows 95)

1.2.3 File Management Commands (Windows 95)

2. Word Processing

2.1 Keyboarding Techniques

2.2 Word Processing

2.2.1 Understanding Word Processing

2.2.2 Create a Document

2.2.3 Save, Open and Edit a Document

2.2.4 Edit a Document: Cut and Paste

2.2.5 Understand Hidden codes.

2.2.6 The Select Feature (Block)

2.2.7 Change Layout Format

2.2.8 Change Text Attributes

2.2.9 Use Auxiliary Tools

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

3. Electronic Spreadsheet

3.1 Spreadsheet Basics

3.2 Operate Menus

- 3.3 Create a Worksheet
 - 3.4 Use Ranges
 - 3.5 Print a Worksheet
 - 3.6 Edit a worksheet
4. Electronic Mail and the Internet
- 4.1 Electronic Mail
 - 4.2 The Internet

Learning Objectives:

- 1. Microcomputer System Hardware and Software Components
 - 1.1 Microcomputer Hardware
 - 1.1.1 System Components
 - 1.1.1.1 Identify major components of a computer system.
 - 1.1.2 Function of each Component
 - 1.1.2.1 Describe the function of the microprocessor.
 - 1.1.2.2 Describe and give examples of I/O DEVICES.
 - 1.1.2.3 Describe primary storage (RAM, ROM, Cache).
 - 1.1.2.4 Define bit, byte, code and the prefixes k.m. and g.
 - 1.1.2.5 Describe secondary storage (diskettes and hard disks, CD ROMS, Zip Drives etc).
 - 1.1.2.6 Describe how to care for a computer and its accessories.
 - 1.2 Microcomputer Software
 - 1.2.1 Software Definition and Types
 - 1.2.1.1 Define software.
 - 1.2.1.2 Describe, operational and application software used in this course.
 - 1.2.1.3 Define file and give the rules for filenames and file extensions..
 - 1.2.2 System Software (Windows 95)
 - 1.2.2.1 Getting Started with Windows
 - 1.2.2.2 Start and quit a Program

1.2.2.3 Get Help

1.2.2.4 Locate a specific file using the **find** function of Win95

1.2.2.5 Changing system settings: wall paper, screen saver, screen resolution, background.

1.2.2.6 Starting a program by using the Run Command

1.2.2.7 Shutting down your computer

1.2.3 File Management Commands (Windows 95)

1.2.3.1 View directory structure and folder content

1.2.3.2 Organizing files and folders

1.2.3.3 Copy, delete, and move files and folders

1.2.3.4 Create folders

1.2.3.5 Maximize and minimize a window

1.2.3.6 Print directory/folder content

1.2.3.7 Describe the Windows 95 taskbar

2. Word Processing

2.1 Keyboarding Techniques

2.1.1 Identify and locate alphabetic and numeric keys

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

2.2 Word Processing

2.2.1 Understanding word processing

2.2.1.1 The Windows Component

2.2.1.2 The Menu Bar

2.2.1.3 Menu Indicators

2.2.1.4 The Document Window

2.2.1.5 The Status Bar

2.2.1.6 The Help Feature

2.2.1.7 Insertion Point Movements

2.2.2 Create a document

2.2.2.1 Change the Display

2.2.2.2 The Enter Key

2.2.2.3 Enter Text

2.2.3 Save, Open and Exit a document.

2.2.3.1 Save a document

2.2.3.2 Close a document.

2.2.3.3 Start a new document Window

2.2.3.4 Open a document

2.2.3.5 Exit Word Processor

2.2.4 Edit a Document

2.2.4.1 Add New Text

2.2.4.2 Delete text

2.2.4.3 Basic Format Enhancement (split and join paragraphs, insert text)

2.2.5 Understand Hidden Codes

2.2.5.1 Display Hidden Codes

2.2.5.2 Delete Text Enhancements

2.2.6 The Select Feature

2.2.6.1 Identify a Selection

2.2.6.2 Move a Selection

2.2.6.3 Copy a Selection

2.2.6.4 Delete a Selection

2.2.6.5 Select Enhancements

2.2.6.6 Save a Selection

2.2.6.7 Retrieve a Selection

2.2.7 Change Layout Format

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

2.2.8 Change Text Attributes

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

2.2.9 Use Auxiliary Tools

2.2.9.1 Spell Check

2.2.10 Select the Print Feature

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

2.2.10.2 Identify various options in print screen dialogue box

3. Electronic Spreadsheet

3.1 Spreadsheet Basics

3.1.1 The Worksheet Window

3.2 Operates Menus

3.2.1 Use a Menu Bar

3.2.2 Use a Control Menu

3.2.3 Use a Shortcut Menu

3.2.4 Save, Retrieve form Menus

3.3 Create a Worksheet

3.3.1 Enter Constant Values and Formulas

3.3.2 Use the Recalculation Feature

3.3.3 Use Cell References (relative and absolute references)

3.4 Use Ranges

3.4.1 Type a Range for a Function

3.4.2 Point to a Range for a Function

3.4.3 Select a Range for Toolbar and Menu Commands

3.5 Print a Worksheet

3.5.1 Print to the Screen

3.5.2 Print to the Printer

3.5.3 Print a Selected Range

3.6 Edit a Worksheet

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

4. Electronic Mail and the Internet

4.1 Electronic Mail

- 4.1.1 Compose and send an e-mail message
- 4.1.2 Retrieve an e-mail attachments
- 4.1.3 Send an e-mail message with attachments
- 4.1.4 Retrieve and save e-mail attachments
- 4.1.3 Print an e-mail message
- 4.1.4 Delete an e-mail message

4.2 The Internet

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

STUDENT EVALUATION:

Required Pass Mark 70%

DEVELOPMENT HISTORY:

Date Designed 1998
Date Revised 1999

COURSE OUTLINE - SD 1700

Name and Number: Workplace Skills SD 1700

Descriptive Title: Workplace Skills

Description:

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

Prerequisites: None

Co-requisites: None

Suggested Duration: 30 Hrs

Course Aims:

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

Course Objectives (Knowledge):

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

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

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

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

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

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

7. Human Rights
 - a. Describe what information cannot be included on an application.
 - b. Describe what information cannot be included in an interview
 - c. Why is there a Human Rights Code?

- d. Define sexual harassment.

Major Tasks / Subtasks (Skills):

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

Evaluation:

Required Pass Mark 70%

Development History:

Date Developed:
Date Revised: April, 1999

Name and Number: Job Search Techniques SD 1710

Descriptive Title: Job Search Techniques

Prerequisites: None

Co-requisites: None

Suggested Duration: 15 hrs.

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

Course Objectives (Knowledge):

1. Examine and Demonstrate Elements of Effective Job Search Techniques

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

DEVELOPMENT HISTORY:

Date Developed:

Date Revised: 1999 05 03

Name and Number: Entrepreneurial Awareness SD 1720

Descriptive Title: Entrepreneurial Awareness

Prerequisites: None

Co-requisites: None

Suggested Duration: 15 hrs

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

Course Objectives (Knowledge):

1. Explore Self-Employment: An Alternative to Employment

- Identify the advantages and disadvantages of self-employment vs. regular employment
- Differentiate between an entrepreneur and a small business owner
- Evaluate present ideas about being in business

2. Explore the Characteristic of Entrepreneurs

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

3. Identifying Business Opportunities

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

4. Demystifying the Entrepreneurial Process.

- Explain the entrepreneurial process
- Describe the purpose of a business plan
- Identify the main ingredients of a business plan
- Summarize the role of such agencies as BDC's, ACOA, Women's Enterprise Bureau etc.
- List other agencies where assistance - financial and otherwise - is available to those interested in starting a business venture.

REQUIRED WORK EXPERIENCES

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

REQUIRED WORK EXPERIENCES:

Disassemble and reassemble hydraulic and pneumatic systems; inspect, test, repair/replace component parts and make adjustments.

Select, install, calibrate, maintain, and repair temperature sensors; keep records.

Select, install, calibrate, maintain, and repair pressure and vacuum sensors; keep records.

Select, install, calibrate, maintain, and repair flow measuring devices; keep records.

Select, install, calibrate, maintain, and repair level and density measuring devices; keep records.

Install, test, calibrate, maintain, and repair monitoring systems; keep records.

Select, install, calibrate, maintain, and repair signal converters and transmitters; keep records.

Install, test, calibrate, maintain, and repair regulators and actuators; keep records.

Select, install, calibrate, maintain, and repair physical measurement devices; keep records.

Select, install, calibrate, repair, and maintain chemical measurement devices; keep records.

Tune, adjust, modify, and update control systems; keep records.

Select, install, calibrate, maintain, and repair electro-mechanical controllers; keep records.

Select, install, calibrate, maintain, and repair electronic and pneumatic controllers; keep records.

Install, test, and maintain computerized control systems; keep records.

Configure and/or program computerized control systems; keep records.