



**TOTAL CREDITS**

**PREREQUISITE(S):** A secondary school diploma with grade 10 general math is the minimum requirement (grade 12 math is strongly recommended). Alternately, a combination of education and experience equal to the above.

**L PHILOSOPHY/GOALS:**

To provide students with sufficient knowledge and practical skills training required by employers for entry into the fabrication trades. Students should have the confidence to identify) select and operate the required tools and equipment in a safe, well organized manner giving due consideration to the degree of accuracy required .

**n. STUDENT PERFORMANCE OBJECTIVES (OUTCOMES):**

Upon successful completion of this course the student will:

- 1) Identify, select and use typical hand, layout and measuring tools safely and correctly.
- 2) Identify, select, use and operate common power and metal cutting tools safely and correctly.
- 3) Identify and select mathematical formula appropriate to the needs of the tradesperson.
- 4) Perform basic layout and fabrication procedures in a safe, well organized manner.

**m. TOPICS TO BE COVERED:**

**Approximate Time**

- |  |         |
|--|---------|
| 1) Course Introduction and Orientation |         |
| 2) Hand and Measuring Tools            | @ 4 wks |
| Shop Assignments                       |         |
| ____Theory Test # 1 and Review ____    |         |
| 3) Hand and Power Tools                | @ 4 wks |
| Shop Assignments                       |         |
| ____Theory Test # 2 and Review ____    |         |
| 4) Basic Layout and Fitting            | @ 6 wks |
| Shop Assignments                       |         |
| ____Theory Test # 3 and Review ____    |         |

**rV. LEARNING ACTIVITIES/REQUIRED RESOURCES**

**Topic/Unit - # 1. Course Introduction and Orientation**

**Learning Activities:**

- 1.1 > A lecture presentation of the following major course documents:
- a) course outline
  - b) course guidelines
  - c) course marking system including attendance requirements

**Resources:**

- > printed handouts, overheads, chalkboard notes

**Topic/Unit: - # 2. Hand and Measuring Tools**

**Learning Activities:**

- 2.1 > A lecture presentation and classroom discussion of the following types of hand and measuring tools:
- a) steel tape rule
  - b) steel (bevel) square
  - c) combination square
  - d) straight edge
  - e) dividers
  - f) protractors
  - g) soapstone
- (Module: Introduction and Program Orientation )
- 2.2 > A shop demonstration with student participation and practice of the following major items:
- I. avoiding potential safety hazards associated with the above tools
  - n. the correct method(s) of performing the following geometric constructions on blank paper,
    - a) drawing perpendicular lines
    - b) bisecting lines and circles
    - c) subdividing lines and circles
    - d) drawing polygons
    - e) finding the centres of a square, circle and rectangle
    - f) generating 45 deg, 60 deg, and 30 deg bevels
- (Text: 'Metal Trades Handbook)

- 2.3 > A second lecture presentation with classroom demonstration of the above hand and measuring tools to include:**
- a) available types
  - b) standard features and scales
  - c) maximum obtainable accuracy
  - d) correct application / use
  - e) proper handling, storage and maintenance procedures
- 2.4 > A shop demonstration and practice involving the use of imperial and metric units of measurement with homework practice assignment to include:**
- a) feet, inches and fractions of an inch
  - b) metres, centimetres and millimetres
- 2.5 > Independent Study Assignment c/w review questions covering Learning Tasks 2.1 to 2.4 inclusive.**
- (Module: 'Introduction and Program Orientation' )**
- 2.6 > ASSIGNMENT # 1 and EVALUATION - BEVELS AND POLYGONS**
- 2.7 > A lecture presentation and classroom discussion of the following (additional) types of hand and measuring tools:**
- a) dividers
  - b) trammels
  - c) centre punch
  - d) number punch
  - e) scriber
  - f) hammers
  - g) files
- (Module: Introduction and Program Orientation )**
- 2.8 > A lecture presentation / review and classroom discussion of the conversions between metric and imperial units of measurement with homework practice assignment.**
- 2.9 > A shop demonstration with student participation and practice of the following major items:**
- a) avoiding potential safety hazards associated with the above tools
  - b) the correct technique for layout on mild steel plate
  - c) common layout practices for base, cap and connecting plates.
- 2.10 > A second lecture presentation with classroom demonstration of the above additional hand and measuring tools to include:**
- a) available types and sizes
  - b) standard features
  - c) application and limitations
  - d) correct use
  - e) proper handling, storage and maintenance procedures

- 2.11 > **Independent Study Assignment c/w review questions covering Learning Tasks 2.7 to 2.10 inclusive.** I  
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( Module: 'Introduction and Program Orientation')

2.12 > **ASSIGNMENT # 2 AND EVALUATION - CONNECTING PLATE**

**Resources;**

- > **Module: 'Introduction and Program Orientation'**  
**Text: ' Metal Trades Handbook'**  
printed handouts, chalkboard notes, assignment sheets, shop tools,  
template stock, mild steel plate.

**Topic / Unit: - THEORY TEST #1 and REVIEW**

**Resources:**

- > **Test Booklets, Student Response Sheets and Grade/Answer Sheets**

**Topic / Unit: - # 3 Hand and Power Tools**

**Learning Activities:**

- 3.1 > **A lecture presentation and classroom discussion of the following types of hand and metal cutting tools:**
- a) **wrenches**
  - b) **drill bits**
  - c) **hacksaws**
  - d) **chisels**
  - e) **files**
- ( Module: Introduction and Program Orientation )
- 3.2 > **A second lecture presentation with classroom/shop demonstration of the above hand and metal cutting tools to include:**
- a) **size(s) and shape**
  - b) **application to specific materials**
  - c) **operating range/limitations**
  - d) **strength and capacity**

- 3.3 > A shop demonstration with student participation and practice of the following major items:**
- a) avoiding potential safety hazards associated with the above tools
  - b) the correct technique for cutting and drilling metals
- 3.4 > Independent Study Assignment c/w review questions covering Learning Tasks 3.1 to 3.3 inclusive.**
- (Module: 'Introduction and Program Orientation')**
- 3.5 > ASSIGNMENT # 3 and EVALUATION - PRACTICE PLATES**
- 3.6 > A lecture presentation with classroom discussion of the following power and metal cutting tools:**
- a) radiograph
  - b) drill press
  - c) portable magnetic drill
  - d) pedestal grinder
  - e) portable angle grinder
- ( Module: Introduction and Program Orientation )**
- 3.7 > A second lecture presentation with classroom demonstration / discussion of the above power and metal cutting tools to include:**
- a) size and capacity
  - b) limitations and / or restricted operations
  - c) proper, safe operation
  - d) regular maintenance
- 3.8 > A shop demonstration with student participation and practice of the following major items:**
- I. potential safety hazards associated with the above tools
  - n. personal protective equipment to be worn and/or used by operator including but not limited to the following:
    - a) safety glasses
    - b) face shields
    - c) gloves
    - d) ear plugs
    - e) dust masks
- 3.9 > ASSIGNMENT # 4 and EVALUATION - BASE PLATES**

Resources:

- > **Module: 'Introduction and Program Orientation'**
- Text: 'Metal Trades Handbooc**
- printed handouts, chalkboard notes, assignment sheets, shop tools, template stock, mild steel plate.**

**Topic / Unit:** - THEORY TEST # 2 and RE\TEW  
( Fabrication and Layout -1 )

**Resources:**

- > Test Booklets, Student Response Sheets and Grade/Answer Sheets

**Topic / Unit:** - # 4 Basic Layout and Fitting

**Learning Activities:**

- 4.1 > A lecture presentation with classroom discussion of common weld faults and causes to include the following major items:
  - a) general classes of weld faults
  - b) dimensional faults
  - c) structural discontinuities(WIC Module # 10 'Weld Faults and Causes')
  
- 4.2 > Independent Study Assignment c/w review questions covering Learning Task 4.1  
(WIC Module # 10 'Weld Faults and Causes')
  
- 4.3 > A shop demonstration with student participation and practice of the following major items:
  - a) identification and selection of materials
  - b) checking materials for size, squareness, camber and sweep
  - c) 'squaring ofT the best end of the structural member
  - d) 'marking^ and flame-cutting material to the required length.
  - e) locating and marking web and flange centrelines
  - f) locate and punch centres for required holes
  - g) locate and mark positions for attachments( printed handouts — Metal Trades Handbook)
  
- 4.4 > ASSIGNMENT # 5 and EVALUATION - BEAMS
  
- 4.5 > A second lecture presentation and review of common weld faults and causes dealing specifically with problem areas and module review questions.  
(WIC Module # 10 'Weld Faults and Causes')

- 4.6 > A lecture presentation / review of decimals and the conversion between fractions and decimals with homework review assignment.
- 4.7 > A shop demonstration with student participation and practice of additional assembly and fabrication techniques to include:
  - a) control of distortion via clamping and/or the use of stiffeners
  - b) proper welding techniques
  - c) post-weld cleaning and identification of completed assembly
- 4.8 > Independent Study Assignment c/w review questions covering Learning Tasks 4.3 to 4.7 inclusive.  
(WIC Module # 7 - 'Welding Distortion and Residual Stress')
- 4.9 > A lecture presentation and review of distortion and residual stress dealing specifically with problem areas and module review questions.
- 4.10 > ASSIGNMENT # 6 and REVIEW -- COLUMNS

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Resources:

- > WIC Module U 7 : 'Welding Distortion and Residual Stress'
- WIC Module # 10 : 'Weld Faults and Causes'
- printed handouts, chalkboard notes, assignment sheets, shop tools, structural shapes and plate

Topic / Unit: - THEORY TEST #3 and REVIEW

Resources:

- > Test Booklets, Student Response Sheets and Grade/Answer Sheets

**V. EVALUATION METHODS: (INCLUDES ASSIGNMENTS, ATTENDANCE REQUIREMENTS, ETC.)**

<b>General Assessment:</b>	<b><u>Final Mark:</u></b>
A+ = 90 to 100%	Shop Assignments 60%
A = 80 to 89%	Theory Tests 40%
B = 70 to 79%	
C = 60 to 69%	Attendance (** see attached)
F/R = 0 to 59%	

**VI. PRIOR LEARNING ASSESSMENT:**

Students who wish to apply for advanced credit in FABRICATION & LAYOUT -1 should consult the instructor. Credit for prior learning will be given upon successful completion of the following:

1. The successful completion of a structural fabrication course with student outcomes and course topics that are at least 80% compatible with this course outline... AND
2. The successful challenge of all theory tests identified by this course outline with a resulting average mark of at least 75%.

<OR>

3. Written proof of at least three (3) years of competent trade experience involving the layout and fabrication of structural steel by means of welding ... AND
4. The successful challenge of all theory tests identified by this course outline with a resulting average mark of at least 75%.

**VII. REQUIRED STUDENT RESOURCES**

Work Boots (CSA Approved - steel toe and high cut)  
 Safety Glasses (CSA Approved - impact resistant)  
 Welding Gloves (CSA Approved - gauntlet type)  
 Steel Measuring Tape (16 ft c/w imperial and metric scales)  
 WIC Module # 7 Welding Distortion and Residual Stress  
 WIC Module # 10 Weld Faults and Causes  
 Metal Trades Handbook  
 Pencils, Pen, Notebook c/w paper  
 Module: Program Introduction and Orientation  
 Scientific Calculator with Trig Ratios

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## Vm. SPECIAL NOTES

Students with special needs (eg. physical limitations, visual impairments, hearing impairments, learning disabilities) are encouraged to discuss required accommodations confidentially with their professor.

Your professor reserves the right to modify the course as he/she deems necessary to meet the needs of students.

\* Student evaluations concerning the 'Final Mark' are further affected by the conditions set forth in the printed handout, 'Welding Department Guidelines'

\*\* Special guidelines for class attendance are included in the above paper.