Technical Training

Apprenticeship technical training is delivered by the technical institutes and many colleges in the public post-secondary system throughout Alberta. The colleges and institutes are committed to delivering the technical training component of Alberta apprenticeship programs in a safe, efficient and effective manner. All training providers place great emphasis on safe technical practices that complement safe workplace practices and help to develop a skilled, safe workforce.

The following institutions deliver Millwright apprenticeship technical training:

- Northern Alberta Institute of Technology
- Keyano College
- Red Deer College
- Southern Alberta Institute of Technology
- Grande Prairie Regional College

Procedures for Recommending Revisions to the Course Outline

Enterprise and Advanced Education has prepared this course outline in partnership with the Millwright Provincial Apprenticeship Committee.

This course outline was approved on December 14, 2012 by the Alberta Apprenticeship and Industry Training Board on a recommendation from the Provincial Apprenticeship Committee. The valuable input provided by representatives of industry and the institutions that provide the technical training is acknowledged.

Any concerned individual or group in the province of Alberta may make recommendations for change by writing to:

Millwright Provincial Apprenticeship Committee
c/o Industry Programs and Standards
Apprenticeship and Industry Training
Enterprise and Advanced Education
10th floor, Commerce Place
10155 102 Street NW
Edmonton AB. T5J 4L5

It is requested that recommendations for change refer to specific areas and state references used. Recommendations for change will be placed on the agenda for regular meetings of the Millwright Provincial Apprenticeship Committee.
Apprenticeship Route toward Certification

APPLICATION / CONTRACT

RECORD BOOK

PROOF OF EDUCATIONAL PREREQUISITE

ENTRANCE EXAMINATION

PASS

FAIL

FIRST PERIOD
1560 HOURS - AND SUCCESSFULLY COMPLETE TECHNICAL TRAINING

SECOND PERIOD
1560 HOURS - AND SUCCESSFULLY COMPLETE TECHNICAL TRAINING

THIRD PERIOD
1560 HOURS - AND SUCCESSFULLY COMPLETE TECHNICAL TRAINING

FOURTH PERIOD
1560 HOURS - AND SUCCESSFULLY COMPLETE TECHNICAL TRAINING

JOURNEYMAN CERTIFICATE

INTERPROVINCIAL EXAMINATION FOR "RED SEAL"

REattempt

EDUCATIONAL IMPROVEMENT COURSE
# Millwright Training Profile
## First Period
(8 Weeks 30 Hours per Week – Total of 240 Hours)

### SECTION ONE

<table>
<thead>
<tr>
<th>SAFETY, RIGGING, CRANES AND HOISTS</th>
<th>30 HOURS</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Safety Legislation, Regulation &amp; Industry Policy in the Trades</td>
<td>8 Hours</td>
</tr>
<tr>
<td>B Climbing, Lifting, Rigging and Hoisting</td>
<td>2 Hours</td>
</tr>
<tr>
<td>C Hazardous Materials &amp; Fire Protection</td>
<td>2 Hours</td>
</tr>
</tbody>
</table>

### SECTION TWO

<table>
<thead>
<tr>
<th>MEASUREMENT, LAYOUT AND METALLURGY</th>
<th>34 HOURS</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Measuring</td>
<td>6 Hours</td>
</tr>
<tr>
<td>B Measuring Tools</td>
<td>12 Hours</td>
</tr>
<tr>
<td>C Layout</td>
<td>6 Hours</td>
</tr>
<tr>
<td>D Metallurgy</td>
<td>10 Hours</td>
</tr>
</tbody>
</table>

### SECTION THREE

<table>
<thead>
<tr>
<th>TOOLS AND FASTENERS</th>
<th>36 HOURS</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Hand Tools</td>
<td>8 Hours</td>
</tr>
<tr>
<td>B Portable Power and Air Tools</td>
<td>6 Hours</td>
</tr>
<tr>
<td>C Grinders</td>
<td>2 Hours</td>
</tr>
<tr>
<td>D Power Saws</td>
<td>2 Hours</td>
</tr>
<tr>
<td>E Explosive Actuated Tools</td>
<td>4 Hours</td>
</tr>
<tr>
<td>F Threaded Fasteners and Locking Devices</td>
<td>6 Hours</td>
</tr>
<tr>
<td>G Non-Threaded Fasteners and Locking Devices</td>
<td>4 Hours</td>
</tr>
<tr>
<td>H Installation and Removal of Fasteners</td>
<td>4 Hours</td>
</tr>
</tbody>
</table>

### SECTION FOUR

<table>
<thead>
<tr>
<th>MACHINING</th>
<th>64 HOURS</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Drilling</td>
<td>10 Hours</td>
</tr>
<tr>
<td>B Milling</td>
<td>10 Hours</td>
</tr>
<tr>
<td>C Lathe Components and Accessories</td>
<td>20 Hours</td>
</tr>
<tr>
<td>D Lathe Operations</td>
<td>24 Hours</td>
</tr>
</tbody>
</table>

### SECTION FIVE

<table>
<thead>
<tr>
<th>MACHINE INSTALLATION AND ALIGNMENT</th>
<th>24 HOURS</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Grouting, Levelling, and Anchoring</td>
<td>6 Hours</td>
</tr>
<tr>
<td>B Rim and Face Shaft Alignment</td>
<td>18 Hours</td>
</tr>
<tr>
<td>Section</td>
<td>Title</td>
</tr>
<tr>
<td>-------------</td>
<td>---------------------------------</td>
</tr>
<tr>
<td>A</td>
<td>Working With Numbers</td>
</tr>
<tr>
<td>B</td>
<td>Fractions and Decimals</td>
</tr>
<tr>
<td>C</td>
<td>Algebra</td>
</tr>
<tr>
<td>D</td>
<td>Measurements and Conversions</td>
</tr>
<tr>
<td>E</td>
<td>Ratio &amp; Proportion, Graphs and Tables</td>
</tr>
<tr>
<td>F</td>
<td>Introduction to Triangles and Trigonometry</td>
</tr>
<tr>
<td>G</td>
<td>Sketches, Drawings and Prints</td>
</tr>
<tr>
<td>H</td>
<td>Limits, Fits and Tolerances</td>
</tr>
</tbody>
</table>
# Second Period
(8 Weeks 30 Hours per week – Total of 240 Hours)

## SECTION ONE
**BEARINGS, GASKETS, SEALS AND LUBRICATION**
- **A**: Gaskets and Piping
  - 10 Hours
- **B**: Anti-Friction Bearings
  - 12 Hours
- **C**: Plain Bearings
  - 8 Hours
- **D**: Bearing Maintenance
  - 6 Hours
- **E**: Bearing Seals and Pillow Blocks
  - 4 Hours
- **F**: Lubrication
  - 8 Hours

## SECTION TWO
**POWER TRANSMISSION**
- **A**: Shafting, Fits and Accessories
  - 6 Hours
- **B**: Couplings
  - 10 Hours
- **C**: Clutches and Brakes
  - 8 Hours
- **D**: Belts
  - 8 Hours
- **E**: Chains
  - 8 Hours
- **F**: Gearing Fundamentals
  - 4 Hours
- **G**: Gearing Installation and Maintenance
  - 8 Hours

## SECTION THREE
**RECIPROCATING COMPRESSORS**
- **A**: Compressor Fundamentals
  - 12 Hours
- **B**: Compressor Valves
  - 8 Hours
- **C**: Compressor Cylinder Components
  - 6 Hours
- **D**: Compressor Crosshead and Distance Piece Components
  - 6 Hours
- **E**: Compressor Crankshaft and Frame Components
  - 6 Hours
- **F**: Compressor Auxiliary Systems
  - 12 Hours
- **G**: Compressor Overhaul and Start-up Procedures
  - 10 Hours

## SECTION FOUR
**ALIGNMENT, CUTTING, WELDING AND NON-DESTRUCTIVE TESTING**
- **A**: Cross Dial Alignment
  - 16 Hours
- **B**: Oxy-Fuel Equipment and Procedures
  - 8 Hours
- **C**: Electric Arc Welding
  - 8 Hours
- **D**: Non-Destructive Testing
  - 4 Hours

## SECTION FIVE
**MATH & PRINT READING**
- **A**: Area, Volume and Capacities
  - 8 Hours
- **B**: Transmission of Force and Motion
  - 8 Hours
- **C**: Gas Laws and Coefficient of Linear Expansion
  - 8 Hours
- **D**: Auxiliary Views and Assembly Drawings
  - 6 Hours
- **E**: Single Line Drawings
  - 6 Hours
- **F**: Basic Joints, Weld Types and Symbols
  - 4 Hours
### Fourth Period

**(8 Weeks 30 Hours per week – Total of 240 Hours)**

#### SECTION ONE
- **STATIONARY ENGINES**
  - 48 HOURS
  - **A** Stationary Engines Fundamentals 8 Hours
  - **B** Frame, Block and Crankshaft Assembly 6 Hours
  - **C** Pistons and Cylinders 6 Hours
  - **D** Cylinder Head and Valve Train 6 Hours
  - **E** Fuel, Induction, Ignition and Starting Systems 6 Hours
  - **F** Exhaust, Cooling, Lubrication and Ventilation 6 Hours
  - **G** Installation and Start-up 4 Hours
  - **H** Troubleshooting and Maintenance 6 Hours

#### SECTION TWO
- **TURBINES AND GOVERNORS**
  - 48 HOURS
  - **A** Steam Turbines 28 Hours
  - **B** Gas Turbines 8 Hours
  - **C** Governors 12 Hours
  - **D** Machinery Condition Monitoring and Analysis 16 Hours
  - **E** Balancing 8 Hours
  - **F** Advanced Alignment 12 Hours

#### SECTION THREE
- **MACHINERY MONITORING, BALANCE AND ALIGNMENT**
  - 48 HOURS
  - **A** Maintenance Planning 6 Hours
  - **B** Analytical Troubleshooting 6 Hours
  - **C** Positive Displacement Pumps 18 Hours

#### SECTION FOUR
- **PUMPS, MECHANICAL SEALS AND PACKING**
  - 62 HOURS
  - **A** Dynamic Pumps 6 Hours
  - **B** Dynamic Pump Operation 18 Hours
  - **C** Mechanical Seals 7 Hours
  - **D** Compression Packing 5 Hours
  - **E** Belt Conveyors 14 Hours
  - **F** Chain, Bucket and Screw Conveyors 8 Hours
  - **G** Roller and Pneumatic Conveyors 8 Hours

#### SECTION FIVE
- **MATERIAL HANDLING SYSTEMS, WORKPLACE COACHING SKILLS & INDUSTRY NETWORK**
  - 34 HOURS
  - **A** Belt Conveyors 14 Hours
  - **B** Chain, Bucket and Screw Conveyors 8 Hours
  - **C** Roller and Pneumatic Conveyors 8 Hours
  - **D** Workplace Coaching Skills 2 Hours
  - **E** Alberta’s Industry Network 1 Hour
  - **F** Interprovincial Standards Red Seal Program 1 Hour

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**NOTE:** The hours stated are for guidance and should be adhered to as closely as possible. However, adjustments must be made for rate of apprentice learning, statutory holidays, registration and examinations for the training establishment and Apprenticeship and Industry Training.