

INSTITUTE OF ADVANCED STUDIES IN  
EDUCATION (DEEMED UNIVERSITY)  
GANDHI VIDYA MANDIR  
SARDARSHAHAR

*Detailed Syllabus  
of*

**CERTIFICATE IN WELDER MECHANIC  
(CWM)**

**COURSE TITLE** : CWM  
**DURATION** : 01 YEARS (YEARLY SYSTEM)  
**TOTAL DEGREE MARKS** : 400

**FIRST YEAR**

<b>COURSE TITLE</b>	<b>PAPER CODE</b>	<b>MARKS</b>		
		<b>THEORY</b>	<b>INTERNAL</b>	<b>TOTAL</b>
<b>TRADE THEORY</b>	<b>CWM-110</b>	<b>70</b>	<b>30</b>	<b>100</b>
<b>WORKSHOP CALU.&amp; SECINCE</b>	<b>CWM-120</b>	<b>70</b>	<b>30</b>	<b>100</b>
<b>ENGENEERING DRAWING</b>	<b>CWM-130</b>	<b>70</b>	<b>30</b>	<b>100</b>
<b>PRACTICAL</b>	<b>CWM-140</b>	<b>70</b>	<b>30</b>	<b>100</b>

S.NO.	THEORY
1	General discipline in the institute :----Elementary First Aid—Importance of Welding in Industry—Safety in Manual Metal Arc Welding—Safety in Oxy-Acetylene Welding and Cutting—Marking and Measuring Tools.
2	Gas Welding Hand Tools :---Uses Care and Maintenance—Various Welding Processes –
3	Different Process of metal joining---Bolting-Riveting--Soldering-Brazing-etc
4	Oxy-Acetylene Cutting Equipment—Principle and Application—their care and Maintenance.
5	Simple Electrical terms and their definition—Uses of Electricity as applied to Welding electricity-AC-DC-Type of electric Welding and application.
6	Common Gases used for Welding—Oxygen, Hydrogen, Acetylene. Coal gas etc. Types of oxy-acetylene flames—their setting—uses—various gas combinations—flame temperatures and their uses.
7	Nomenclature of Welding joints—Terms applied to each joints—Explanation with simple sketches-- Welding symbols.
8	Principle of Arc Welding—Necessity of Welding machines—Type of machines – construction—care and maintenance.
9	Acetylene—its properties—acetylene Generators carbide to water type—Working principle-care and maintenance.comparison of two types of generators. Acetylene purifier—hydraulic back pressure valve.
10	Arc and its characteristics-arc length types uses advantage and disadvantages . polarity — types—method of identification-uses of each type.
11	Safety precaution in welder shop—steel rule type—punches Trysquare—Scriber-- and its uses.
12	Chisel—Type and construction—Hacksaw Frame&Blade- and its type---Hammer –Vice and Clamps and its uses.
13	Oxygen --- its properties Manufacturing methods oxygen cylinder—D.A. cylinder-Description-care and maintenance.
14	Welding positions—flat--Horizontal—vertical and over-head-slope and rotation electrodes—type—object of flux coating—Criteria for choice of electrodes.
15	Regulators---types---Construction and uses. care and maintenance.Welding blow pipes—types-- care and maintenance..Difference between H.P &L.P. system.
16	Effect of Moisture on Electrodes—Necessity and importance of baking electrodes before use—storage condition and handling of electrodes for better welding quality.
17	Fault in gas welding—definition of faults, their effects—causes—corrections. Manifold system ---operations—limitation--- care and maintenance.
18	Arc Blow—Definition—its causes and effects—method of overcome in practice—Fault in arc welding –causes and correction of each fault.
19	Welding Technique—Right hand—left hand explanation—method—linde welding—application.
20	Sheet Metal Shop Safety rules—Measuring tools—marking tools—sheet metal hammers—Pullers—punches. Grooves—rivet set and uses-type of sheets—soft Solder and soldering process.

- 21 Development of Parallel line method—Examples Taper tray and different elbow  
And pipes—hand liver shears—Guillettine shearing machine-circular cutting—machine parts.
- 21 Method employed to control distortion in gas welding—Stress relieving-outdoor  
method—edge preparation—methods –applications.
- 22 Welding of M.S. Pipes—Difference between pipe and plate welding—pipe develop  
-ment 90 degree and 45 degree branch pipe.
- 23 Specification for filler rods and wires for gas welding—effect of atmosphere on  
Metals . use of welding flux and rod for different methods—effect of alloying element on  
weldability.
- 24 Resistance welding—Principle of Resistance welding –types application,  
Advantages—laser beam welding and cutting --Principle of laser beam.
- 25 Modern welding Process—Submerged Arc welding-- Principle of Process  
Equipment used weld Procedure—advantage—Advantages limitations.

(MACHINAL TRADE ONLY)

- 1     **UNITS:-**  
          Introduction--Defination--classification of units--interrrelationship  
          between Metric and British System of units
- 2     **SIMPLIFICATION :-**  
          Introduction--fractions--decimal fractions--lowest common  
          multiple, LCM.
- 3     **SQUARE ROOT :-**  
          Square and square root--symbol of root--method of finding  
          out the squre root of a number-- factorization method--division method.
- 4     **RATIO AND PROPORTION :-**  
          Introduction--ratio--proportion-
- 5     **PERCENTANCE :-**  
          Introduction--percentance method
- 6     **ALGEBRA :-**  
          Introduction-careful consideration of subject items--addition and  
          subtraction--multiplication and division--algebraic formulac-  
          factorization—equations
- 7     **MENSURATION :-**  
          Introduction-rectangle--square--parallelogram—  
          rhombus--trapezium--trianglesh--circle
- 8     **TRIGONOMETRY :-**  
          definition--formula--measurement of angles--
- 9     **METALS :-**  
          Introduction--properties of metal--types of metals--ferrous metals—  
          cast iron-steel- ferrous metals
- 10    **HEAT TREATMENT :-**  
          Introduction--purposes of heat treatment--processes of  
          heat treatment
- 11    **FORCE:-** newton's law of motion--space diagram--vector diagram
- 12    **MOMENT AND LEVER :-** moment--unit--lever
- 13    **SIMPLE MACHINES :-**  
          efficiency of machine--effort and load--mechanical  
          advantage--velocity ratio--out and in put
- 14    **WORK ,POWER AND ENERGY :-**  
          work--unit of work--power--unit of power--  
          energy--uses of energy--
- 15    **FRICTION :-**  
          Introduction--advantage and disadvantage of friction--normal  
          reaction--limiting friction
- 16    **VELOCITY AND SPEED :-**  
          rest and motion--speed--velocity--acceleration--motion  
          under gravity

(MACHINAL TRADE ONLY)

- 1 INTRODUCTION, DRAWING INSTRUMENTS AND MATERIALS :-  
Introduction—Drawing—drawing board—set-square—  
instrument box—pencil—rubber—drawing sheet--
- 2 CONVENTIONS FOR LINES, MATERIALS AND BREAKS :-  
Introduction—convention for lines—grouping of lines—conventional breaks
- 3 FREE HAND LETTERING AND SKETCHING :-  
Introduction—lettering—type of lettering—free hand sketching--
- 4 GEOMETRICAL DRAWING :-  
Introduction—points—line—curved line—angle—circle—square—rectangle--
- 5 SCALE :-  
Introduction—plain scale—diagonal scales—comparative scales—  
vernier scales--
- 6 ISOMETRIC PROJECTION :-  
Introduction— isometric projection—axis—lines--
- 7 ORTHOGRAPHIC PROJECTION AND IDENTIFICATION OF  
SURFACES :-  
Introduction—projection—pictorial projection—orthographic  
projection—first angle projection—third angle projection--
- 8 BLUE PRINT READING :-  
Introduction—blue print—some important conventions—  
diameter—radius—
- 9 WELD AND WELDED JOINTS :-  
Introduction—lapjoint—buttjoint—edge joint—corner joint—tee joint--
- 10 HAND TOOLS :-  
Hammers—files—pipe wrench—plier—spanner—hackaws—  
drilling machines—screw driver—tester—chisel—try-square—vice—etc.

- 1 Introduction of Trade and safety precautions
- 2 Welding shop tools
- 3 Welding process and their classification
- 4 gases used in welding
- 5 High pressure and low pressure
- 6 gas welding fault
- 7 Type of welding joints
- 8 gas welding of various metals
- 9 Soldering and brazing
- 10 Metal cutting by gas flame
- 11 Hard facing
- 12 Heat and Temperature
- 13 Pipe welding - gas & arc
- 14 Electric arc welding
- 15 Resistance welding
- 16 Arc welding of different Metals