DIPLOMA IN WELDING TECHNOLOGY-ONE YEAR

SYLLABUS

COURSE CODE: TTC036
COURSE NAME: DIPLOMA IN WELDING TECHNOLOGY
COURSE DURATION: ONE YEAR

SL	CODE	SUBJECT
1	TTC036-01	COMMUNICATIVE ENGLISH & COMPUTER FUNDAMENTALS (MS OFFICE)
2	TTC036-02	BASIC WELDING TECHNOLOGY
3	TTC036-03	TIG & MIG STRUCTURAL TECHNOLOGY
4	TTC036-04	PRACTICAL - I
5	TTC036-05	PRACTICAL - II
6	TTC036-06	PRACTICAL - III

SUBJECT :COMMUNICATIVE ENGLISH & COMPUTER FUNDAMENTALS

LISTENING AND SPEAKING COMPETENCE

Learning Objectives and Expected Outcome:

To impart knowledge about the appropriateness, grammaticality and acceptability of the English language

To assist the students in learning the concepts of register, style and jargon as well as the various varieties of English At the end of the semester the students will be able to:

Differentiate between acceptable and unacceptable sentences in English

Apply and use various kinds of jargon's and register as per context

*Listen to a text and identify specific and global information

Read aloud a text with proper stress and intonation

Enact a dialogue on a specific situation with proper contextual language markers and turn taking

* Speak independently on a given topic

• Listening and feedback: the hearing listening distinction, stages of listening process, types of listening, variables affecting listening

• Developing Listening Skills: understanding gist, main points, deduce meaning.

• Communicative Functions

• Listening for specific information

• Listening to a conversation, speech and lecture

• Listening for global information

• Loud Reading for pronunciation and fluency

• Situational Conversation

• Extempore

ENGLISH COMPREHENSION & COMPOSITION

• Reading Comprehension – Skimming and Scanning, Identifying Main Ideas, Drawing inferences

• Summarizing

• Precis

• Reports

• Abstract

• Article Writing

• Expansion Writing

• Composition: Reflective, Descriptive, Narrative and Argumentative

• Dialogue Writing

TECHNICAL ENGLISH AND COPY EDITING

*Learning Objectives and Expected Outcomes:

*To train the students in technical writing in English in writing descriptions of gadgets, preparing texts and reports as well as comprehending technical texts

*To prepare the students in content writing and copy editing

At the end of the semester the students will be able to:

* Write descriptions of gadgets and prepare technical reports

*Prepare a content, proof read and edit it appropriately

Unit 1: Technical English

Writing Descriptions of gadgets and processes

• General and safety instructions

• Preparing checks lists

• Technical texts for comprehension

• Survey Report Writing

• Industrial accident Report Writing

Unit 2: Copy Editing Scope and needs

• Various types of scripts

• Qualities and duties of a copy writer

• Steps of copy editing

• Interaction with the author 10

• Title and cover description

• Main features

• Incorporating illustrations

• Copy rights

• Dealing with Multi authorship

• In house manuals

• Proof reading and editing

ENGLISH LANGUAGE TEACHING

Learning Objectives and Expected Outcomes:

* To train the learners in the various approaches and methods in language teaching

* To impart knowledge about lesson planning and language testing

At the end of the semester the students will be able to:

* Apply strategies to teach the skills of listening, speaking, reading and writing

*Design lesson plans

* Plan and implement language tests

• Aims and objectives in language teaching

• Language Perspectives: First, Second and Foreign Language

• Acquisition vs. Learning

• Techniques, approaches and methods of Language Teaching – Grammar-translation method, Audio-lingual method, Structural approach, Communicative approach

• Teaching listening

• Teaching speaking

• Teaching reading

• Teaching writing

• Lesson planning

• Testing and Evaluation

• Materials for language teaching

BUSINESS ENGLISH COMMUNICATION

1. Communication in Business

i. Role of communication in the business world

ii. Patterns of business communication

2. Business Correspondence

i. Business letters

ii. Writing memos

iii. Writing minutes

iv. Writing agenda

v. Writing circulars

vi. Writing notices

vii. Writing CV

viii. E-communication

3. Writing Project Reports

i. Types of report

ii. Project proposal

iii. Writing a project report

iv. Appraisal report

4. Oral Communication

i. Placement interview

ii. Presentation skills

NEWS READING AND WRITING, PUBLIC SERVICE ANNOUNCEMENT, COMMENTARY AND COMPERING

Learning Objectives and Expected Outcomes:

* To help students to enhance their creative skills in media reading, writing, compering, presenting

* To prepare students to act as media professionals in the electronic and digital media 15 At the end of the semester the students will be able to:

*Prepare and present news for radio and television

* Present and market commercial products

* Design and present radio or television talk shows and discussions.

• News writing and reading- radio and television

• Public service announcements

• Making commentary or demonstration (with visual aids)

• Compering (in given situations), making a speech or radio/ T.V panel discussion

COMPUTER FUNDAMENTALS

Course Content

MS WINDOWS, COMPUTER BASICS

- Computer Basic, Creating Folder, Paint
- Directories, input units, Output unit
- Central Processing Units,
- What is hard ware, what is Soft ware
- Windows short cut keys

MS WORD

Module 1: Text Basics

- Typing the text, Alignment of text
- Editing Text: Cut, Copy, Paste, Select All, Clear
- Find & Replace

Module 2: Text Formatting and saving file

- New, Open, Close, Save, Save As
- Formatting Text: Font Size, Font Style
- Font Color, Use the Bold, Italic, and Underline
- Change the Text Case
- Line spacing, Paragraph spacing
- Shading text and paragraph
- Working with Tabs and Indents

Module 3: Working with Objects

- Shapes, Clipart and Picture, Word Art, Smart Art
- Columns and Orderings - To Add Columns to aDocument
- Change the Order of Objects
- Page Number, Date & Time
- Inserting Text boxes
- Inserting Word art
- Inserting symbols
- Inserting Chart

Module 4: Header & Footers

- Inserting custom Header and Footer
- Inserting objects in the header and footer
- Add section break to a document

Module 5: Working with bullets andnumbered lists

- Multilevel numbering and Bulleting
- Creating List
- Customizing List style
- Page bordering
- Page background

Module 6: Tables

- Working with Tables, Table Formatting
- Table Styles
- Alignment option
- Merge and split option

Module 7: Styles and Content

- Using Build- in Styles, Modifying Styles
- Creating Styles, Creating a list style
- Table of contents and references
- Adding internal references
- Adding a Footnote
- Adding Endnote

Module 8: Merging Documents

- Typing new address list
- Importing address list from Excel file
- Write and insert field
- Merging with outlook contact
- Preview Result
- Merging to envelopes
- Merging to label
- Setting rules for merges
- Finish & Merge options

Module 9: Sharing and MaintainingDocument

- Changing Word Options
- Changing the Proofing Tools
- Managing Templates
- Restricting Document Access
- Using Protected View
- Working with Templates
- Managing Templates
- Understanding building blocks

Module 10: Proofing the document

- Check Spelling As You Type.
- Mark Grammar Errors As You Type.
- Setting AutoCorrect Options

Module 11: Printing

- Page Setup, Setting margins
- Print Preview, Print

MS EXCEL

Module 12: Introduction to Excel

- Introduction to Excel interface
- Understanding rows and columns, Naming Cells
- Working with excel workbook and sheets
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Module 13:Formatting excel work book:

- New, Open, Close, Save, Save As
- Formatting Text: Font Size, Font Style
- Font Color, Use the Bold, Italic, and Underline
- Wrap text, Merge and Centre
- Currency, Accounting and other formats
- Modifying Columns, Rows & Cells

Module 14: Perform Calculations withFunctions

- Creating Simple Formulas
- Setting up your own formula
- Date and Time Functions, Financial Functions
- Logical Functions, Lookup and Reference
- Functions Mathematical Functions
- Statistical Functions, Text Functions.

Module 15: Sort and Filter Data with Excel

- Sort and filtering data
- Using number filter, Text filter
- Custom filtering
- Removing filters from columns
- Conditional formatting

Module 16: Create Effective Charts to PresentData Visually

- Inserting Column, Pie chart etc.
- Create an effective chart with Chart Tool
- Design, Format, and Layout options
- Adding chart title
- Changing layouts
- Chart styles
- Editing chart data range
- Editing data series
- Changing chart

Module 17: Analyze Data Using PivotTablesand Pivot Charts

- Understand PivotTables, Create a PivotTable
- Framework Using the PivotTable and PivotChart
- Create Pivot Chart from pivot Table.
- Inserting slicer
- Creating Calculated fields

Module 18: Protecting and Sharing thework book

- Protecting a workbook with a password
- Allow user to edit ranges
- Track changes
- Working with Comments
- Insert Excel Objects and Charts in Word Document and Power point Presentation.

Module 19: Use Macros to Automate Tasks

- Creating and Recording Macros
- Assigning Macros to the work sheets
- Saving Macro enabled workbook

Module 20: Proofing and Printing

- Page setup, Setting print area, Print titles
- Inserting custom Header and Footer
- Inserting objects in the header and footer
- Page Setup, Setting margins, Print Preview, Print
- Enable back ground error checking
- Setting AutoCorrect Options

MS POWERPOINT

Module 21: Setting Up PowerPointEnvironment:

- New, Open, Close, Save, Save As
- Typing the text, Alignment of text
- Formatting Text: Font Size, Font Style
- Font Color, Use the Bold, Italic, andUnderline
- Cut, Copy, Paste, Select All, Clear text
- Find & Replace
- Working with Tabs and Indents

Module 22:Creating slides and applyingthemes

- Inserting new slide
- Changing layout of slides
- Duplicating slides
- Copying and pasting slide
- Applying themes to the slide layout
- Changing theme color
- Slide background
- Formatting slide background
- Using slide views

Module 23: Working with bullets andnumbering

- Multilevel numbering and Bulleting
- Creating List
- Page bordering
- Page background
- Aligning text
- Text directions
- Columns option

Module 24: Working with Objects

- Shapes, Clipart and Picture, Word Art, SmartArt
- Change the Order of Objects
- Inserting slide header and footer
- Inserting Text boxes
- Inserting shapes, using quick styles
- Inserting Word art
- Inserting symbols
- Inserting Chart

Module 25: Hyperlinks and Action Buttons

- Inserting Hyperlinks and Action Buttons
- Edit Hyperlinks and Action Button
- Word Art and Shapes

Module 26: Working With Movies andSounds

- Inserting Movie From a Computer File
- Inserting Audio file
- Audio Video playback and format options
- Video options, Adjust options
- Reshaping and bordering Video

Module 27: Using SmartArt and Tables

- Working with Tables, Table Formatting
- Table Styles
- Alignment option
- Merge and split option

Converting text to smart art

Module 28:Animation and Slide Transition

- Default Animation, Custom Animation
- Modify a Default or Custom Animation
- Reorder Animation Using Transitions
- Apply a Slide Transition, Modifying a
- Transition, Advancing to the Next Slide

Module 29: Using slide Master

- Using slide master
- Inserting layout option
- Creating custom layout
- Inserting place holders
- Formatting place holders

Module 30: Slide show option

- Start slide show
- Start show from the current slide
- Rehearse timing
- Creating custom slide show

Module 31: Proofing and Printing

- Check Spelling As You Type
- Setting AutoCorrect Options
- Save as video
- Save as JPEG files
- Save as PowerPoint Show file
- Print Preview, Print

INTERNET & E-MAIL

- What is Internet?, Receiving Incoming Messages
- Sending Outgoing Messages, Email addressing
- Email attachments, Browsing, Search engines
- Text chatting, Job Searching
- Downloading video and Music
- Uploading Video or Music, Voice chatting,Webcam Chatting etc.
- Introduction to Blogging, Facebook

BASIC/ADVANCED WELDING TECHNOLOGY

Unit-I

Introduction : Importance and application of welding, classification of welding process. Selection of welding process. 2 Brief review of conventional welding process : Gas welding, Arc welding, MIG, TIG welding. Resistance welding. Electroslag welding, Friction welding etc. Welding of MS.CI, Al, Stainless steel & Maurer/Schaefflar Diagram. Soldering & Brazing.

Unit-II

Advanced welding Techniques- Principle and working and application of advanced welding techniques such as Plasma Arc welding, Laser beam welding, Electron beam welding, Ultrasonic welding etc.

Unit-III

Advanced welding Techniques (continued) : Principle and working and application of advanced welding techniques such as explosive welding/ cladding, Underwater welding, Spray-welding / Metallising, Hard facing.

Unit-IV

Weld Design : Welding machines/equipments and its characteristics and arc-stability, Weld defects and distortion and its remedies, Inspection/testing of welds, Weld Design, Welding of pipe-lines and pressure vessels. Life predication. Thermal and Metallurgical consideration.: Thermal considerations for welding, temperature distribution, Analytical/Empirical analysis/formulae, heating & cooling curves. Metallurgical consideration of weld, HAZ and Parent metal, micro & macro structure. Solidification of weld and properties.

TIG / MIG Structural Technology

Block– I - Basic Training

Sl.No.	Workshop Calculation and Science	Duratio n (hrs.)	Engineering Drawing	Duration (hrs.)
1.	Unit: Systems of unit- FPS, CGS, MKS/SI unit, unit of length, Mass and time, Conversion of units	20	Introduction to Engineering Drawing and Drawing Instruments : - Conventions - Viewing of engineering drawing sheets. - Method of Folding of printed Drawing Sheet as per BIS SP:46-2003 - Drawing board, T-Square, Drafter (Drafting M/c), Set Squares, Protractor, Drawing Instrument Box (Compass, Dividers, Scale, Diagonal Scales etc.), Pencils of different Grades, Drawing pins / Clips.	30
2.	Basic Mathematics - BODMAS rule Fraction-Addition, Subtraction, multiplication and Division-Problem solving, Decimal- Addition. Simple calculation using Scientific Calculator.		Lines : Definition, types and applications in Drawing as per BIS SP:46-2003 Classification of lines (Hidden, centre, construction, Extension, Dimension, Section) Drawing lines of given length (Straight, curved) Drawing of parallel lines, perpendicular line - Methods of Division of line	

			segment	
3.	Conversion of Fraction to Decimal and vice- versa.		Free hand drawing of Lines, polygons, ellipse, etc. geometrical figures and blocks with dimension	

			Transferring measurement from the given object to the free hand sketches.	
4.	Percentage: Introduction, Simple calculation. Changing percentage to fraction and decimal & vice-versa.		Drawing of Geometrical Figures: Definition, nomenclature and practice of Angle: Measurement and its types, method of bisecting. Triangle -different types Rectangle, Square, Rhombus, Parallelogram. - Circle and its elements.	
5.	Material Science : Definition, properties (physical & mechanical) and uses of Metal, Non-metal, Alloy &Insulator. Types of ferrous and Non-ferrous metals. Difference between Ferrous and Non- Ferrous metals.		Sizes and Layout of Drawing Sheets Selection of sizes Title Block, its position and content Item Reference on Drawing Sheet (Item List)	
6.	Mass, Weight and Density: Mass, Unit of Mass, Weight, difference between mass and weight. Density, unit of density. Relation between mass, weight & density. Simple problems related to mass, weight, and density.		Method of presentation of Engineering Drawing Pictorial View Orthographic View Isometric view	
7.	Mensuration : Area and perimeter of square, rectangle, parallelogram, triangle, circle, semi circle, Volume of solids – cube, cuboid, cylinder and		- Drawing of Solid figures (Cube, Cuboids, Cone) with dimensions.	

	Sphere. Surface area of solids –			

	cube, cuboid, cylinder and Sphere.			
8.	Elasticity: Elastic & Plastic material. Stress & strain and their units. Young's modules. Ultimate stress and breaking stress.		Free hand Drawing of Solid figures (Prism, Pyramid, Frustum of Cone and Pyramid.) with dimensions.	
9.	Heat & Temperature: Heat and temperature, their units, difference between heat and temperature, boiling point, melting point, Scale of temperature, relation between different scale of temperature. Thermometer, pyrometer. Transmission of heat, conduction, convection, radiation.		Free Hand sketch of hand tools and measuring tools used in respective trades.	
10.	Basic Electricity: Introduction and use of Electricity. AC, DC & their comparisons. Current, Voltage,Resistance& their units. Power, Energy & their units. Insulator and conductors & their uses.		Projections: Concept of axes plane and quadrant. Orthographic projections Method of first angle and third angle projections (definition and difference) Symbol of 1st angle and 3rd angle projection as per IS specification.	
11.	-----		Drawing of Orthographic projection	

			in 3rd angle.	

DETAIL SYLLABUS OF PROFESSIONAL SKILLS & PROFESSIONAL KNOWLEDGE

Block –I

Basic Training Institute Level Training: - (03 Months)

Week No	Trade Practical	Trade Theory
1	Induction Training Importance of trade Training Machinery used in the trade. Introduction to safety equipment and their use etc. Hack sawing, filing square to dimensions. Marking out on MS plate and punching.	General Elementary First Aid Different process of metal joining methods: Bolting, riveting, soldering, brazing, seaming etc. Introduction and definition of welding. Importance of Welding in Industry. Arc and Gas Welding Equipments, tools and accessories - Arc and Gas Welding terms and definitions.
2	- Setting up of Arc welding machine & accessories and striking an arc. - Setting of oxy-acetylene welding equipment, Lighting and setting of flame. - Setting up of GMAW/GTAW welding machine & accessories.	- Various Welding Processes and its applications. - Types of welding joints and its applications. Edge preparation and fit up for different thickness, Surface Cleaning. Safety precautions in Shielded Metal Arc Welding, and Oxy-Acetylene Welding and Cutting. Safety precautions pertaining to GTAW & GMAW. Role of stiffeners in controlling distortion.
3	Gas Welding & Cutting Practice - Fusion run without and with filler rod	Gas Welding And Cutting - Common gases used for welding &

	on M.S. sheet 2 mm thick in flat position. - Edge joint on MS sheet 2 mm thick in flat position without filler rod. - Marking and straight line cutting of MS plate. 10 mm thick by gas.	cutting, flame temperatures and uses. Chemistry of oxy-acetylene flame. Types of oxy-acetylene flames and uses. - Oxy-Acetylene Cutting Equipment, principle, parameters and application. - Color coding for different gas cylinders. Gas regulators, types and uses. Purging : Importance, Method of giving. - Oxy acetylene gas welding Systems

		(Low pressure and High pressure). - Difference between gas welding blow pipe(LP & HP) and gas cutting blow pipe.
4	Gas WeldingPractice Straight line beads on M.S. plate 10 mm thick in flat position. Weaved bead on M. S plate 10mm thick in flat position. Square butt joint on M.S. sheet 2 mm thick in flat Position . Fillet "T" joint on M.S. Plate 10 mm thick in flat position.	Gas Welding And Cutting Gas welding techniques. Rightward and Leftward techniques. Gas welding filler rods, specifications and sizes. Gas welding fluxes - types and functions. Gas Brazing &Soldering : principles, types fluxes & uses. Gas welding defects, causes and remedies.
5	GMAW Practices Straight line beads on MS plate by GMAW welding. Lap joint on MS plate by GMAW welding in down hand position. Open corner joint on MS plate in down hand position. "T" joint on MS sheet in flat position by GMAW welding.	GMAW Basic electricity applicable to arc welding and related electrical terms & definitions. Heat and temperature and its terms related to welding. Principle of arc welding and characteristics of arc. Arc welding power sources: Transformer, Motor Generator set, Rectifier and Inverter type welding machines and its care & maintenance. Advantages and disadvantages of A.C. and D.C. welding machines. Welding positions as per EN &ASME : flat, horizontal, vertical and over head position. Weld slope and rotation. Welding symbols as per BIS & AWS. Recent advances in power sources which gives better penetration and better root fusion with minimum heat addition.

6	GMAW Practices "T" joint on MS sheet in horizontal, vertical, overhead positionby GMAW welding. CO2 straight line bead, different position of CO2, Single "V' butt joint by CO2 welding in down hand position, Single "V' butt joint by	GMAW Introduction to GMAW - equipment - accessories. Various names of the process.(MIG- MAG/ CO2 WELDING, FCAW). Advantages& Limitations Trouble shooting in MIG welding Electrode : types, functions of flux,

	Argoshield welding in flat position (Gas: Argon and CO2 mixture).	coatingfactor, sizes of electrode Coding of electrode as per BIS, AWS, Effects of moisture pick up. Storage and baking of electrodes. Special purpose electrodes and their applications. Types of weld defects, causes and remedy in GMAW process. Data and Tables related to CO2 welding.
7	GTAW Practices Setting up GTAW welding plant and establishing the arc. Beading practice on MS sheet by GTAW.	GTAW Introduction to GTAW welding. Various names of the process.(TIG, Argon arc welding). Equipments& accessories. Advantages & Limitations. Reading of Welding procedure specifications (WPS). Reading of Procedure qualification Record (PQR)
8	GTAW Practices Square butt joint on MS in down hand position. Beading practice on SS, aluminum by TIG/GTAW.	GTAW Arc length - types - effects of arc length. Polarity: Types and applications. Tungsten electrode, Types, sizes, and uses. coding as per BIS,AWS. Type of shielding gases- Types & properties.

9	GTAW Practices Open corner joint on MS sheet in down hand position. Lap joint on MS sheet in down hand position by GTAW. Tee joint on MS sheet in down hand position. Lap joint on MS sheet in Horizontal position by GTAW.	GTAW GTAW Welding consumables -Types & Specifications as per BIS & AWS Tables & data relating to TIG welding. Different type of weld joints- plates & pipes Advantages of root pass welding of pipes by TIG welding Types of weld defects, causes and remedy in GTAW process.
10	Horizontal, Vertical, Downward and Overhead welding by GMAW/GTAW. Gas cutting, plasma cutting, profile cutting. Bending.	Other Processes Submerged Arc welding - Principles, application-Types of fluxes, welding head, power source and Parameter setting. Micro plasma welding principles, Equipment, power source, parameter settings, Advantages & limitations.

		Plasma Cutting principles and advantages. Specification of pipes, various types of pipe joints, pipe welding positions and procedure. Difference between pipe welding and plate welding. Pipe development for Elbow joint, "T" joint, Y joint and branch joint. Manifold System.
11	Structural Welding Practice Structural pipe welding butt joint on MS pipe 0 50 and 3mm WT in 1G position. Fillet Lap joint on M.S. Plate 10 mm in vertical position	Metals & Properties Classification of steel. Welding of low, medium and high carbon steel and alloy steels. Effects of alloying elements on steel Basic welding metallurgy. Weldability of metals, Importance of pre-heating, post heating and maintenance of inter pass temperature. Stainless steel types- Weld decay and Weldability. Arc blow - causes and methods of controlling. Distortion in arc & gas welding and methods employed to minimize distortion. Arc Welding defects, causes and Remedies. Preheating and Post heating. Distortion and methods of control. Stress Relieving or Post Welding Heat Treatment (PWHT).

12	Testing Practices Dye penetrant Magnetic particle testing	Inspection Inspection & testing of weldments. Visual inspection methods. Inspection kits - universal gauge, Fillet gauge, etc. Non-destructive Testing methods. PT, MPT, UT & RT. Destructive testing - Bend test & tensile test.
13	- Revision & Internal assessment.	