

Module Descriptions

Department of Mechanical Skills

Industrial Welding Skills

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2009



DEGREE PLAN

Industrial Welding Skills (IWLD)

Level 1

Sr.	Module Code	Module Name	Contact Hours
1	IWLD121	Symbols for Welding and Blueprint Reading for Welders and Fitters	32
2	IWLD122	Welding Process Technology	32
3	IWLD123	Oxyacetylene Welding and Cutting	56
4	IWLD124	Shielded Metal Arc Welding (Basic)	56
5	IWLD125	Shielded Metal Arc Welding (Advanced)	64
6	ENG102	English Communication 1	24
TOTAL HOURS			264

Level 2

Sr.	Module Code	Module Name	Contact Hours
1	IWLD226	Shielded Metal Arc Welding (Pipe 2G)	56
2	IWLD227	Shielded Metal Arc Welding (Pipe 5G)	64
3	IWLD228	Shielded Metal Arc Welding (Pipe 6G)	88
4	IWLD229	Project I	32
5	ENG203	English Communication 2	24
TOTAL HOURS			264

Level 3

Sr.	Module Code	Module Name	Contact Hours
1	IWLD330	Weldability of Metals	32
2	IWLD331	Arc Welding Inspection and Quality Control	32
3	IWLD332	Gas Metal Arc Welding (Basic)	88
4	IWLD333	Gas Metal Arc Welding (Aluminum)	32
5	IWLD334	Gas Metal Arc Welding (Pipe)	56
6	TRWT304	Technical Report Writing 1	24
TOTAL HOURS			264

Level 4

Sr.	Module Code	Module Name	Contact Hours
1	IWLD435	Gas Tungsten Arc Welding	56
2	IWLD436	Gas Tungsten Arc Welding (Pipe)	80
3	IWLD437	Gas Tungsten Arc Welding (Tubing)	72
4	IWLD438	Project II	32
5	TRWT405	Technical Report Writing 2	24
TOTAL HOURS			264

Coop (15 Weeks)

Sr.	Module Code	Module Name	Equivalent Contact Hours
1	IWLD539	Cooperative Training Program	128

Prerequisite —

Level 1

Contact Hours: 32

Module Description A theoretical overview of symbols used on isometric drawings in fabrication workshops and industrial plants.

Objectives To give students a working knowledge of the American Welding Society (AWS) Symbols for Welding as detailed in ANSI/AWS A2.4

Learning Outcomes The student should have the ability to read symbols and blueprints as they apply to welding.

- Contents**
- Fillet Welding symbols
 - Plug and slot welding symbols
 - Spot and seam welding symbols
 - Groove welding symbols Surfacing welds and edge welds
 - Combination welding symbols
 - Blueprint reading for welders
 - Blueprint reading for fitters
 - Set up and their use

Pacing Schedule

Contact Hours	Contents	Skills Gained
4	Fillet Welding symbols	The student should have the ability to read symbols and blueprints as they apply to welding.
4	Plug and slot welding symbols	
3	Spot and seam welding symbols	
3	Groove welding symbols	
3	Surfacing welds and edge welds	
4	Combination welding symbols	
4	Blueprint reading for welders	
4	Blueprint reading for fitters	
3	Set up and their use	

Reference: Symbols for Welding by Hobart Institute of Welding

Prerequisite —

Level 1

Contact Hours: 32

Module Description This course will acquaint students with different types of methods and machinery concerning welding requirements on industrial plants and fabrication workshops

Objectives To develop a practical understanding of welding with regard to welding processes, and auxiliary welding equipment for the welder.

Learning Outcomes The student will have knowledge of all arc welding processes including industrial applications, arc characteristics, and advantages.

- Contents**
- Oxyacetylene welding and cutting
 - Shielded metal arc welding
 - Gas Tungsten arc welding
 - Plasma arc welding
 - Gas metal arc welding
 - Flux-cored arc welding
 - Submerge arc welding
 - Stud arc welding
 - Electroslag welding

Pacing Schedule

Contact Hour/s	Contents	Skills Gained
3	Oxyacetylene Welding and Cutting	The student will have knowledge of all arc welding processes including industrial applications, arc characteristics, and advantages.
3	Shielded Metal Arc Welding	
4	Gas Tungsten Arc Welding	
4	Plasma arc welding	
3	Gas Metal Arc Welding	
4	Flux-cored arc welding	
4	Submerged arc welding	
3	Stud Arc Welding	
4	Electroslag Welding	

Reference: In-house made book on Welding Processes

Prerequisite —

Level 1

Contact Hours: 56

Module Description This course provides the students with a thorough technical understanding of oxyacetylene welding, flame cutting and brazing fundamentals and welding safety. It provides training to develop the hands-on skill necessary to produce high quality welds.

Objectives To develop entry level skills for gas welder

Learning Outcomes Upon completion, the student should be able to perform the industrial requirements of oxyacetylene welding and flame cutting that are essential for maintenance welding and cutting.

- Contents**
- Introduction to Oxyacetylene applications
 - Safety and health in oxyacetylene applications
 - Stringer bead flat positions without and with filler metal
 - Fillet weld lap joint horizontal position
 - Fillet weld inside corner joint horizontal position
 - Fillet weld lap joint vertical position, up
 - Square groove weld butt joint flat position
 - Square groove weld butt joint vertical position, up and review
 - Square groove weld butt joint overhead position
 - Square groove weld butt joint horizontal position
 - Introduction to flame cutting (manual and machine)
 - Square groove bevel, and hole cuts, flat position (manual)

Pacing Schedule

Contact Hours	Contents	Skills Gained
3	Introduction to oxyacetylene applications	Upon completion, the student should be able to perform the industrial requirements of oxyacetylene welding and flame cutting that are essential for maintenance welding and cutting.
4	Safety and health in oxyacetylene applications	
6	Stringer bead flat positions without and with filler metal	
4	Fillet weld lap joint horizontal position	
5	Fillet weld inside corner joint horizontal position	
5	Fillet weld lap joint vertical position, up	
4	Square groove weld butt joint flat position	
4	Square groove weld butt joint vertical position, up and review	
6	Square groove weld butt joint overhead position	
4	Square groove weld butt joint horizontal position	
3	Introduction to flame cutting (manual and machine)	
8	Square groove bevel, and hole cuts, flat position (manual)	

Reference: In-house made book on Oxyacetylene Welding

Module Description These module work toward developing the individual student from a position of relative inexperience to a point where they have the necessary skills to be qualified as an entry level welder as defined in AWS EG 2.0 and QC10.

Objectives These module works toward developing the individual student from a position of relative inexperience to a point where they have the necessary skills to be qualified as an entry-level welder as defined in AWS Eg2.0 and QC10.

Learning Outcomes Upon completion, the student should be able to perform production welding and general maintenance welding.

- Contents**
- Introduction to shielded metal arc welding
 - The five essentials
 - Striking and controlling the arc and pad of beads, flat positions (E6010)
 - Three-beads fillet weld, T-joint, lap and corner horizontal position
 - Square-groove weld, butt joint, horizontal position
 - Electrode selection
 - Fillet weld, lap joint, vertical position, up
 - Produce weld, T-joint, vertical position, up
 - Three-bead fillet weld T-joint, vertical position, up
 - Square-groove weld, butt joint, vertical position, up
 - Power sources
 - Fillet weld, lap joint, overhead position
 - Three-bead fillet weld, T-joint, overhead position
 - Square-groove weld, butt joint, overhead position
 - Multi-pass fillet weld, T-joint, vertical and overhead position up (E7018)

Prerequisite —

Level **1**Contact Hours: **56****Pacing Schedule**

Contact Hours	Contents	Skills Gained
3	Introduction to shielded metal arc welding	Upon completion, the student should be able to perform production welding and general maintenance welding.
3	The five essentials	
4	Striking and controlling the arc and pad of beads, flat positions (E6010)	
6	Three-beads fillet weld, T-joint, lap and corner horizontal position	
4	Square-groove weld, butt joint, horizontal position	
3	Electrode selection	
3	Fillet weld, lap joint, vertical position, up	
4	Produce weld, T-joint, vertical position, up	
4	Three-bead fillet weld T-joint, vertical position, up	
3	Square-groove weld, butt joint, vertical position, up	
3	Power Source	
4	Fillet weld, lap joint, overhead position	
4	Three-bead fillet weld, T-joint overhead position	
4	Square-groove weld, butt joint, overhead position	
4	Multi-pass fillet weld, T-joint, vertical and overhead position up (E7018)	

Reference:

- A. Shielded Metal Arc Welding Advanced by Hobart Institute of Welding Technology
- B. In-house made book on Shielded Metal Arc Welding (SMAW)

Prerequisite —

Level **1**Contact Hours: **64**

Module Description This course provides training to develop the manual skills necessary to produce quality multipass fillet and groove welds without backing in all positions. The course is designed using the E6010 and E7018 electrodes on thick carbon steel plate similar to many structural applications.

Objectives To produce quality, multi-pass groove welds with backing in all positions using E7018 electrodes on 3/8" and 1" mild steel in the horizontal, vertical, and overhead positions.

Learning Outcomes Upon completion of this course, the student should be able to perform bridge code welds and other related structural work, as well as preparation for pipe welding.

Contents Multi-pass fillet weld, T-joint, flat, horizontal, vertical and overhead positions (E7018)
Single vee groove weld-butt joint-vertical position, up
Single vee groove weld-butt joint overhead and flat position
Fillet weld lap joint (ring) all positions

Pacing Schedule

Contact Hour	Contents	Skills Gained
20	Multi-pass fillet weld, T-joint, flat, horizontal, vertical and overhead positions (E7018)	Upon completion of this course, the student should be able to perform bridge code welds and other related structural work, as well as preparation for pipe welding.
10	Single vee groove weld-butt joint-vertical position, up	
14	Single vee groove weld-butt joint overhead and flat position	
20	Fillet weld lap joint (ring) all positions	

Reference:

Shielded Metal Arc Welding Advanced 1 by Hobart Institute of Welding Technology

Prerequisite **BSLE 406**Level **1**Contact Hours: **24****Module Description**

English Communication 1 is a module for level 1 students of specialization program, as part of the English communicative competence requirement for their diploma. The module is built around a communicative competency-based program that focuses on general English language skills and workplace competencies.

Objectives

- To help students build on and enhance EL proficiency achieved at level 4 of BSEL 406.
- To help them achieve target language competencies required at work.
- To help them learn and practice the same competencies for job success.

Learning Outcomes

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

- Illustrate points and express preferences.
- Listen to and speak about job safety and team work.
- Participate effectively in meetings.
- Tell about cause and effect.
- Express disapproval, make counter-argument, conclude, compare and contrast statements

Contents

- Understanding Company Benefits
- Employees' Rights
- Job Safety
- Teamwork
- Meetings and Minutes
- Tools and Supplies
- Unions and Employment Contracts
- Using Business Machines
- Self-Employment

Prerequisite **BSLE 406**Level **1**Contact Hours: **24****Pacing Schedule**

Contact Hours	Contents	Skills Gained
3	Understanding Company Benefits	Illustrating points and express preferences using appropriate words and phrases
3	Employees' Rights	Describing events chronologically and telling about past situations using past perfect tense
Quiz 1		
3	Job Safety	Predicting consequences using past simple present and past
3	Teamwork	Telling about tasks and predicting consequences using causative verbs
Midterm		
3	Meetings and Minutes	Expressing indifference and disapproval and indicating order and sequence using unreal conditional with 'would' and 'could'
3	Tools and Supplies & Unions and Employment Contracts	Persuading and explaining using 'could have', 'would have' and 'however'
Quiz 2		
3	Using Business Machines	Talking about the future and inferring using passive simple future
3	Self-employment	Concluding, comparing and contrasting using 'might have', 'as---as'.
Final Examination		

Reference: Put English to Work , Level 5 by Sandra Linn

Prerequisite —

Level **2**

Contact Hours: **56**

Module Description To provide a technical understanding of Pipe Welding position nomenclature and the five essentials welding variable controlled by the welder to produce a quality weld.

Objectives To produce high quality single V-groove welds on 6" diameter schedule 80 carbon steel pipe in all positions

Learning Outcomes Upon completion of the course, the student should have developed skills for the pressure vessel and piping fields.

Contents

- Single vee groove weld butt joint vertical fixed position (2G) and visual inspection

Pacing Schedule

Contact Hour/s	Contents	Skills Gained
12	Single vee groove weld butt joint vertical fixed position (2G) and visual inspection	Upon completion of the course, the student should have developed skills for the pressure vessel and piping fields.
8	Single vee groove weld butt joint vertical fixed position (2G) and visual inspection (continuation)	
8	Single vee groove weld butt joint vertical fixed position (2G) and visual inspection (continuation)	
12	Single vee groove weld butt joint vertical fixed position (5G) and visual inspection	
8	Single vee groove weld butt joint vertical fixed position (5G) and visual inspection (continuation)	
8	Single vee groove weld butt joint vertical fixed position (5G) and visual inspection (continuation)	
8	Single vee groove weld butt joint vertical fixed position (5G) and visual inspection (continuation)	

Reference:
Shielded Metal Arc Welding (Pipe 2G) by Hobart Institute of Welding Technology

Module Description To provide a technical understanding of Pipe Welding position nomenclature and the five essentials welding variable controlled by the welder to produce a quality weld.

Objectives To produce high quality single V-groove welds on 6" diameter schedule 80 carbon steel pipe in all positions

Learning Outcomes Upon completion of the course, the student should have developed skills for the pressure vessel and piping fields.

Contents

- Single vee groove weld butt joint vertical fixed position (5G) and visual inspection

Pacing Schedule

Contact Hour/s	Contents	Skills Gained
10	Single vee groove weld butt joint vertical fixed position (2G) and visual inspection	Upon completion of the course, the student should have developed skills for the pressure vessel and piping fields.
10	Single vee groove weld butt joint vertical fixed position (2G) and visual inspection (continuation)	
10	Single vee groove weld butt joint vertical fixed position (2G) and visual inspection (continuation)	
12	Single vee groove weld butt joint vertical fixed position (5G) and visual inspection	
10	Single vee groove weld butt joint vertical fixed position (5G) and visual inspection (continuation)	
12	Single vee groove weld butt joint vertical fixed position (5G) and visual inspection (continuation)	

Reference:

Shielded Metal Arc Welding (5G) by Hobart Institute of Welding Technology

Prerequisite —

Level **2**Contact Hours: **88**

Module Description This course provides training to develop the manual skills necessary to produce quality single-v-groove welds (open root) in all positions. This course is designed using E6010 and E7018 electrodes on medium thickness carbon steel.

Objectives To develop skill to produce quality single vee groove welds on schedule 40 and 60 mild steel pipe in the 6G position, using E6010 for the root pass, and low hydrogen E7018 for the fill and cap passes.

Learning Outcomes Upon completion of the course, the student should have developed skills for the pressure vessel and piping fields.

Contents

- Single vee groove butt joint 45 degree fixed position (6G) and guided bend test

Pacing Schedule

Contact Hours	Contents	Skills Gained
24	Single vee groove butt joint 45 degree fixed position (6G) and guided bend test	Upon completion of the course, the student should have developed skills for the pressure vessel and piping fields.
20	Single vee groove butt joint 45 degree fixed position (6G) and guided bend test (continuation)	
20	Single vee groove butt joint 45 degree fixed position (6G) and guided bend test (continuation)	
24	Single vee groove butt joint 45 degree fixed position (6G) and guided bend test (continuation)	

Reference:

Shielded Metal Arc Welding Advanced 2 by Hobart Institute of Welding Technology

Module Description This course is designed for the students to use their initiative and hands-on skills to design any project that they so desire.

Objectives To allow the students to fabricate and manufacture projects as a motivation on the skills that they have learnt thus far.

Learning Outcomes Upon completion of the course, student will have achieved any project he desired to do within the welding skills.

- Contents**
- Cutting
 - Grinding
 - Oxygen welding
 - Shielded metal arc welding
 - Gas metal arc welding
 - TIG Welding

Pacing Schedule

Contact Hours	Contents	Skills Gained
6	Cutting	Upon completion of the course, student will have achieved any project he desired to do within the welding skills.
2	Grinding	
6	Oxygen Welding	
6	Shielded metal arc welding	
6	Gas metal arc welding	
6	TIG welding	

Reference:

Prerequisite **ENG 102**Level **2**Contact Hours: **24****Module Description**

English Communication 2 is a module for level 2 students of specialization program that builds on English Communication 1 as part of the communicative competence requirement for their diploma. The module is built around a communicative competency-based program that focuses on communication skills and workplace competencies.

Objectives

- To consolidate the students' communicative competence achieved at level 1 of the skill program.
- To develop language skills, document literacy, critical thinking and problem solving in workplace situations.
- To develop purposeful use of language in realistic contexts and communicative competence.

Learning Outcomes

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

- Check assumptions, express values and understand social systems
- Express wishes and confirming conjectures
- Summarize, bargain and predict things
- Analyze and express values and judgments, negotiate and talk about causes and effects.

Contents

- Career Planning and Self-Assessment
- Taxes and Tax Forma
- Rights, Responsibilities and Benefits.
- Performance Reviews
- Health Problems on the Job
- Emergency Procedures
- Scheduling and Budgeting
- Using Computers
- Job Promotions

Pacing Schedule

Contact Hours	Contents	Skills Gained
3	Career Planning and Self-Assessment	Checking assumptions, expressing values and analyzing using tag questions and appropriate noun clauses
3	Taxes and Tax forms	Paraphrasing and confirming conjectures using past subjunctive and direct speech
Quiz 1		
3	Rights and Responsibilities	Summarizing, bargaining and predicting using future perfect and future conditional
3	Performance Reviews	Reporting information and complimenting using passive simple future and passive present perfect
Midterm		
3	Health Problems on the Job	Predicting and analyzing using future perfect continuous.
3	Emergency Procedures	Expressing values, requesting information and predicting consequences using present continuous conditional and embedded questions.
Quiz 2		
3	Scheduling and Budgeting	Compromising and negotiating using clauses with 'although' and 'unless'.
3	Using Computers and Job Promotions	Talking about possibility, cause and effect and expressing judgment using causative and past unreal conditional
Final Examination		

Reference: Put English to Work – Level 6 by Sally Gearhart

Prerequisite —

Level **3**Contact Hours: **32**

Module Description A theoretical course to familiarize the students with the chemical and metallurgical properties of various steels and alloys.

Objectives To be able to explain the various kinds of metals, steels and alloys and their applications.

Learning Outcomes The students will be able to explain the various kinds of metal, steels and alloys and their applications

- Contents**
- Introduction
 - Heat Treatment
 - Properties of Metals
 - The Metallurgy and Weldability of Carbon steel
 - The Welding characteristics of stainless steel
 - The welding characteristics of aluminum

Pacing Schedule

Contact Hour/s	Contents	Skills Gained
1	Introduction	The students will be able to explain the various kinds of metal, steels and alloys and their applications
6	Heat Treatment	
3	Properties of Metals	
10	The Metallurgy and Weldability of Carbon steel	
	The Metallurgy and Weldability of Carbon steel (continuation)	
6	The Welding characteristics of stainless steel	
	The Welding characteristics of stainless steel (continuation)	
6	The welding characteristics of aluminum	
	The welding characteristics of aluminum (continuation)	

Reference: In-house made book on Weldability of Metals

Module Description This course enables the students to visually inspect welds. Familiarize them with the penetrant and magnetic particle testing.

Objectives To be able to assist in implementing the inspection technique or techniques that will best suit the company's needs.

Learning Outcomes Upon completion of this course, the student should be able to assist in implementing the inspection technique or techniques that will best suit the company's needs.

- Contents**
- SHIELDED METAL ARC WELDING
- Weldment Discontinuities/Defects
 - distortion control
 - metal identification for welding
 - procedure and welder qualification
 - destructive test
 - nondestructive test
- GAS TUNGSTEN ARC WELDING
- Visual inspection test stainless steel
 - The welding characteristics of Aluminum
 - Pipe weld quality
- GAS METAL ARC WELDING
- The quality of weld
 - Visual and micro etch test
 - Weld quality inspection

Prerequisite —

Level **3**Contact Hours: **32****Pacing Schedule**

Contact Hours	Contents	Skills Gained
20	Shielded Metal Arc Welding <ul style="list-style-type: none"> • Weldment Discontinuities/Defects • Distortion Control • Metal Identification for Welding • Procedure and welder qualification • Destructive test • Non-destructive test 	Upon completion of this course, the student should be able to assist in implementing the inspection technique or techniques that will best suit the company's needs.
6	Gas Tungsten Arc Welding <ul style="list-style-type: none"> • Visual inspection test stainless steel • The welding characteristics of Aluminum • Pipe weld quality 	
6	Gas Metal Arc Welding <ul style="list-style-type: none"> • The quality of weld • Visual and Micro etch test • Weld quality inspection 	

Reference:

Arc Welding Inspection and Quality Control by Hobart Institute of Welding Technology

Module Description A step-by-step method for acquiring the basic skills required to weld medium to thick carbon steel plate in all positions and schedule 80 pipe in the 2G and 5G positions with the flux-cored arc welding process.

Objectives To provide students with entry-level skills in flux-cored arc welding
To be able to properly adjust gas metal arc welding equipment and to produce and recognize a quality weld on carbon steel.

Learning Outcomes Upon completion of this course, students will be capable of welding tanks, vessels and pipe in production workshops.

- Contents**
- Course Overview
 - Practical Practice

Pacing Schedule

Contact Hours	Contents	Skills Gained
9	Course Overview Introduction to Gas Metal Arc Welding Safety & Health of Workers Installation, Set Up & Maintenance of Equipment Surface Welds, Flat Position Square Groove & Fillet Welds, Butt, Lap & T-Joints, Flat Position	Upon completion of this course, students will be capable of welding tanks, vessels and pipe in production workshops.
12	Practical Practice Square groove and fillet welds, butt lap and T-joints, flat position Square groove and fillet welds, butt, lap and T-joints, horizontal position	
23	Practical Practice The weld quality Square groove and fillet welds, butt, lap and T-joint, vertical position down Square groove and fillet welds, butt, lap and T-joint vertical position, up Metal transfer and shielding gasses Square groove and fillet welds, butt, lap and T-joint overhead position	
24	Practical Practice Single V-groove weld, butt joint, horizontal position Single V-groove weld, but joint, vertical up position Single V-groove weld, butt joint, vertical down position Single V-groove weld, butt joint, flat position	
20	Practical Practice Fillet welds lap and T-joint horizontal position Fillet welds lap and T-joint vertical down position Fillet welds lap and T-joint vertical up position Fillet welds lap and T-joint overhead position Fillet welds lap and T-joint horizontal position with spray transfer Single V-groove welds flat position with spray transfer	

Reference: Hobart Institute of Welding Technology

Prerequisite —

Level **3**Contact Hours: **32**

Module Description A step-by-step method for acquiring the basic skills required to weld medium to thick carbon steel plates in all positions and schedule 80 pipe in the 2G and 5G positions with the flux-cored arc welding process.

- Objectives**
- To provide students with entry-level skills in flux-cored arc welding
 - To be able to properly adjust gas metal arc welding equipment and to produce and recognize a quality weld on carbon steel.

Learning Outcomes Upon completion of this course, students will be capable of welding tanks, vessels and pipe in production workshops.

- Contents**
- Course Overview
 - Practical Practice

Pacing Schedule

Contact Hours	Contents	Skills Gained
5	Course Overview <ul style="list-style-type: none"> • Introduction to Gas Metal Arc Welding • Safety & Health of Workers • Installation, Set Up & Maintenance of Equipment • Surface Welds, Flat Position • Square Groove & Fillet Welds, Butt, Lap & T-Joints, Flat Position 	Upon completion of this course, students will be capable of welding tanks, vessels and pipe in production workshops.
4	Practical Practice <ul style="list-style-type: none"> • Square groove and fillet welds, butt lap and T-joints, flat position • Square groove and fillet welds, butt, lap and T-joints, horizontal position 	
8	Practical Practice <ul style="list-style-type: none"> • The weld quality • Square groove and fillet welds, butt, lap and T-joint, vertical position down • Square groove and fillet welds, butt, lap and T-joint vertical position, up • Metal transfer and shielding gasses • Square groove and fillet welds, butt, lap and T-joint overhead position 	
6	Practical Practice <ul style="list-style-type: none"> • Single V-groove weld, butt joint, horizontal position • Single V-groove weld, butt joint, vertical up position • Single V-groove weld, butt joint, vertical down position • Single V-groove weld, butt joint, flat position 	
9	Practical Practice <ul style="list-style-type: none"> • Fillet welds lap and T-joint horizontal position • Fillet welds lap and T-joint vertical down position • Fillet welds lap and T-joint vertical up position • Fillet welds lap and T-joint overhead position • Fillet welds lap and T-joint horizontal position with spray transfer • Single V-groove welds flat position with spray transfer 	

Reference: Hobart Institute of Welding Technology

Module Description

A step-by-step method for acquiring the basic skills required to weld medium to thick carbon steel plates in all positions and schedule 80 pipe in the 2G and 5G positions with the flux-cored arc welding process.

Objectives

- To provide students with entry-level skills in flux-cored arc welding
- To be able to properly adjust gas metal arc welding equipment and to produce and recognize a quality weld on carbon steel.

Learning Outcomes

Upon completion of this course, students will be capable of welding tanks, vessels and pipe in production workshops.

Contents

- Course Overview
- Practical Practice

Prerequisite —

Level **3**Contact Hours: **56****Pacing Schedule**

Contact Hours	Contents	Skills Gained
6	Course Overview <ul style="list-style-type: none"> • Introduction to Gas Metal Arc Welding • Safety & Health of Workers • Installation, Set Up & Maintenance of Equipment • Surface Welds, Flat Position • Square Groove & Fillet Welds, Butt, Lap & T-Joints, Flat Position 	Upon completion of this course, students will be capable of welding tanks, vessels and pipe in production workshops.
8	Practical Practice <ul style="list-style-type: none"> • Square groove and fillet welds, butt lap and T-joints, flat position • Square groove and fillet welds, butt, lap and T-joints, horizontal position 	
14	Practical Practice <ul style="list-style-type: none"> • The weld quality • Square groove and fillet welds, butt, lap and T-joint, vertical position down • Square groove and fillet welds, butt, lap and T-joint vertical position, up • Metal transfer and shielding gasses • Square groove and fillet welds, butt, lap and T-joint overhead position 	
14	Practical Practice <ul style="list-style-type: none"> • Single V-groove weld, butt joint, horizontal position • Single V-groove weld, butt joint, vertical up position • Single V-groove weld, butt joint, vertical down position • Single V-groove weld, butt joint, flat position 	
14	Practical Practice <ul style="list-style-type: none"> • Fillet welds lap and T-joint horizontal position • Fillet welds lap and T-joint vertical down position • Fillet welds lap and T-joint vertical up position • Fillet welds lap and T-joint overhead position • Fillet welds lap and T-joint horizontal position with spray transfer • Single V-groove welds flat position with spray transfer 	

Reference: Hobart Institute of Welding Technology

Module Description Technical Report Writing 1, is offered to students to improve their English language proficiency in writing short technical reports which is part of their diploma requirement. The module integrates different methods of report writing with the basic mechanics organized writing.

- Objectives**
- To consolidate and extend the writing skills they have learned in ENGC 203.
 - To help technical student write short reports involving technical expression.

- Learning Outcomes** After completing this module the student will be able to:
- use writing as a means of communication in work environments
 - write short reports involving technical expression
 - organize information using the mechanics of writing

- Contents**
- Introduction to Technical Report Writing
 - Precaution Instructions
 - Operational Instructions
 - Progress Reports
 - Accident Reports
 - Industrial Visit Reports

Pacing Schedule

Contact Hours	Contents	Skills Gained
3	Introduction to Technical Report Writing	Learning the basics of paragraph writing
3	Precaution Instructions	Sequencing precautionary instructions following the rules of writing
Quiz 1		
4	Operational Instructions	Writing operational instructions using the imperative form of verb
Midterm		
5	Progress Reports	Ability to write reports on jobs completed and not completed using present perfect and past simple verb forms
Quiz 2		
5	Accident Reports	Writing short reports on causes and consequences of accidents using past tense verb forms
4	Industrial Visit Reports	Reporting industrial visit experiences using past tense verb forms
Final Examination		

Reference: Technical Report Writing 1 (In-house made)

Prerequisite —

Level 4

Contact Hours: 56

Module Description This course provide the student with a thorough technical understanding of gas tungsten arc welding fundamentals, preparation for welding pipe and pipe welding defects.

Objectives To provide students with entry-level skills in gas tungsten arc welding.
To give students an overview of the Gas Tungsten Arc Welding process, equipment, shielding gases and applications.

Learning Outcomes The students will have learned to do precision welding on pipe and plate at various positions using the Gas Tungsten Arc method.

Contents

- Course Overview
- Practical Practice

Pacing Schedule

Contact Hours	Contents	Skills Gained
5	Course overview Introduction to gas tungsten arc welding Safety and health of welding Equipment set up, adjustment, and shut down	The students will have learned to do precision welding on pipe and plate at various positions using the Gas Tungsten Arc method.
14	Practical Practice Stringer bead, flat position (carbon steel) The essential of GTAW Fillet weld, lap joint, horizontal and flat position (carbon steel) Fillet weld outside corner joint, flat position (carbon steel) Fillet weld, T-joint, horizontal, vertical up and flat position (carbon steel) Square-groove weld, 1G destructive test Square-groove weld, butt joint, horizontal and vertical up position (carbon steel)	
14	Practical Practice Square-groove weld, butt joint, overhead position (carbon steel) Introduction to GTAW using pulse current Square-groove weld, butt joint flat position (stainless steel) Square-groove weld, butt joint horizontal position (stainless steel) Fillet weld, lap joint, horizontal and flat position (stainless steel)	
23	Practical Practice Stringer bead, flat position (Aluminum) Fillet weld, outside corner joint, flat position (Aluminum) Fillet weld outside corner joint, vertical up position (Aluminum) Fillet weld, lap joint, horizontal and flat position (aluminum) Square-groove weld, but joint flat position (aluminum) Fillet weld, T-joint vertical position, up (Aluminum)	

Reference: Hobart Institute of Welding Technology

Prerequisite —

Level 4

Contact Hours: 80

Module Description This course provide the student with a thorough technical understanding of gas tungsten arc welding and shielded metal arc welding fundamentals, preparation for welding pipe and pipe welding defects.

Objectives To provide students with entry-level skill sin gas tungsten arc welding. To give students an overview of the Gas Tungsten Arc Welding process, equipment, shielding gases and applications.

Learning Outcomes The students will have learned to do precision welding on pipe and plate at various positions using the Gas Tungsten Arc and shielded metal arc methods required in the industries.

Contents

- Course Overview
- Practical Practice

Pacing Schedule

Contact Hours	Contents	Skills Gained
4	Course Overview <ul style="list-style-type: none"> • Course overview • Introduction to gas tungsten welding • Safety and health of welding • Equipment set up, adjustment, and shut down 	The students will have learned to do precision welding on pipe and plate at various positions using the Gas Tungsten Arc and shielded metal arc methods.
22	Practical Practice <ul style="list-style-type: none"> • Stringer bead, flat position (carbon steel) • The essential of GTAW • Fillet weld, lap joint, horizontal and flat position (carbon steel) • Fillet weld outside corner joint, flat position (carbon steel) • Fillet weld, T-joint, horizontal, vertical up and flat position (carbon • Square-groove weld, 1G destructive test • Square-groove weld, butt joint, horizontal and vertical up position (carbon steel) 	
54	Practical Practice <ul style="list-style-type: none"> • Pipe preparation (bevel and root face) • Grinding and filling • 6" single V groove weld, 2G Horizontal position, stringer beads (Gas tungsten arc welding root and hot pass, shielded metal arc welding fill passes and cover pass) • 6" single v groove weld, 5G vertical position, weave • (Gas tungsten arc welding root and hot pass, shielded metal arc welding fill passes and cover pass) • 6" single v groove weld, 6G 45° position, stringer beads • (Gas tungsten arc welding root and hot pass, shielded metal arc welding fill passes and cover pass) 	

Reference: Hobart Institute of Welding Technology

Module Description This course provide the student with a thorough technical understanding of gas tungsten arc welding fundamentals, preparation for welding pipe and pipe welding defects.

Objectives To provide students with entry-level skill sin gas tungsten arc welding. To give students an overview of the Gas Tungsten Arc Welding process, equipment, shielding gases and applications.

Learning Outcomes The students will have learned to do precision welding on pipe and plate at various positions using the Gas Tungsten Arc method. They will be able to weld pipes and tubes from ¼" and 2".

- Contents**
- Course Overview
 - Practical Practice

Pacing Schedule

Contact Hours	Contents	Skills Gained
4	Course Overview <ul style="list-style-type: none"> • Course overview • Introduction to gas tungsten welding • Safety and health of welding • Equipment set up, adjustment, and shut down 	The students will have learned to do precision welding on pipe and plate at various positions using the Gas Tungsten Arc method.
20	Practical Practice <ul style="list-style-type: none"> • Stringer bead, flat position (carbon steel) • The essential of GTAW • Fillet weld, lap joint, horizontal and flat position (carbon steel) • Fillet weld outside corner joint, flat position (carbon steel) • Fillet weld, T-joint, horizontal, vertical up and flat position (carbon steel) • Square-groove weld, 1G destructive test • Square-groove weld, butt joint, horizontal and vertical up position (carbon steel) 	
48	Practical Practice <ul style="list-style-type: none"> • Pipe preparation (Bevel and Root Face) • Grinding and filing • 2" single V groove weld, 2G horizontal position, stringer beads (TIG Root, filler and cap) • 2" single V groove weld 5G vertical position, weave (TIG root, filler and cap) • 2" single V groove weld 6G, 45° position, stringer beads (TIG root, filler and cap). 	

Reference: Hobart Institute of Welding Technology

Prerequisite —

Level 4

Contact Hours: 32

Module Description This course is designed for the students to use their initiative and hands-on skills to design any project that they so desire.

Objectives To allow the students to fabricate and manufacture projects as a motivation on the skills that they have learnt this far.

Learning Outcomes Upon completion of the course, student will have achieved any project he desired to do within the welding skills.

- Contents**
- Cutting
 - Grinding
 - Oxygen welding
 - Shielded metal arc welding
 - Gas metal arc welding
 - TIG Welding

Pacing Schedule

Contact Hours	Contents	Skills Gained
10	Cutting	Upon completion of the course, student will have achieved any project he desired to do within the welding skills.
2	Grinding	
2	Oxygen Welding	
2	Shielded metal arc welding	
8	Gas metal arc welding	
8	TIG welding	

Reference:

Module Description Technical Report Writing 2, is offered to students to enhance and build on their proficiency in writing short technical reports which they learnt at level 3. The module integrates less- controlled methods of report writing with practicing the skill of filling out various forms required at workplace.

- Objectives**
- To consolidate and extend the report writing skills they have learned in TRWT 304.
 - To help technical student write resumes, more work related reports, and fill out forms involving technical and general vocabulary.

- Learning Outcomes** After completing this module the student will be able to:
- use writing as a means of communication in work environments
 - fill out forms and write short reports involving technical expression
 - write resumes and work related reports

- Contents**
- Making Descriptive Requisitions
 - Curriculum Vitae
 - Letter Writing
 - Cooperative Training Report
 - Filling out Requisition Forms
 - Filling Work -Related and General Forms

Pacing Schedule

Contact Hours	Contents	Skills Gained
4	Making Descriptive Requisitions	Making official requests in writing for materials needed at work.
3	Curriculum Vitae	Writing CV's in response to job ads
Quiz 1		
4	Letter Writing	Writing formal cover letters for different jobs
Midterm		
4	Cooperative Training Report	Writing relevant reports on cooperative training to department heads
Quiz 2		
5	Filling out Requisition Forms	Ability to make different requisitions by filling out specific forms
4	Filling out Work-related and General Forms	Ability to fill out different forms - an ability required in real life situations
Final Examination		

Reference: Technical Report Writing 2 (In-house made)