GUJARAT TECHNOLOGICAL UNIVERSITY (GTU)

Competency-focused Outcome-based Green Curriculum-2021 (COGC-2021)
Semester - IV

Course Title: Welding Technology-2
(Course Code: 4345503)

Diploma programmer in which this course is offered	Semester in which offered
Fabrication Technology	4th Syllabus

1. RATIONALE

Welding is a leader of today's high-tech approach to manufacturing. Because of its versatility and simplicity, it is particularly dominant in the maintenance and repair industries, and is heavily used in the construction of steel structures and in industrial fabrication. As the pass out student will have to work in the field of production, operation and maintenance of fabrication, chemical & petrochemical industries so, it is necessary for the student to learn different welding techniques, equipment and tools. By undergoing learning experiences under this subject, students will understand the theoretical and practical aspects of various welding processes. Students will be conversant with the application of relevant standards & codes, operation and maintenance of different welding equipment like welding transformers, welding rectifiers etc. Thus it is very important course for fabrication engineers.

2. COMPETENCY

The course content should be taught and curriculum should be implemented with the aim to develop required skills in the students so that they are able to acquire following competency:

- **Apply knowledge and skills for a given welding job by using appropriate welding process, equipment, tools, along with optimum process parameters and safe working procedures as per standards and codes.**

3. COURSE OUTCOMES (COs)

The practical exercises, the underpinning knowledge and the relevant soft skills associated with the identified competency are to be developed in the student for the achievement of the following COs:

a) Prepare set-up of GMAW process variants for given job.
b) Prepare set-up of GTAW & PAW process for given job.
c) Describe ESW, Stud & LBM Welding Processes.
d) Describe Dissimilar metal welding, Hard facing of materials & welding jigs and fixture.
e) Interpret PQR, WPS and WPQ Format as per ASME section-IX.

4. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P/2)	Examination Scheme				
				Theory Marks		Practical Marks		Total Marks
L	T	P	C	CA	ESE	CA	ESE	
4	0	2	5	30*	70	25	25	150

(*): Out of 30 marks under the theory CA, 10 marks are for assessment of the micro-project to facilitate integration of COs and the remaining 20 marks is the average of 2 tests to be taken during the semester for the assessing the attainment of the cognitive domain UOs required for the attainment of the COs.

***Legends: L**-Lecture; **T** – Tutorial/Teacher Guided Theory Practice; **P** -Practical; **C** – Credit, **CA** - Continuous Assessment; **ESE** -End Semester Examination.*

5. SUGGESTED PRACTICAL EXERCISES

The following practical outcomes (PrOs) are the sub-components of the COs. *These PrOs need to be attained to achieve COs.*

Sr. No.	Practical Outcomes (PrOs)	Unit No.	Approx. Hrs. Required
1	Prepare list of tools, equipment and accessories used inwelding laboratory with their Specification.	1,2, 3,4	02
2	Demonstrate welding operation using speed glass weldingscreen.	1,2, 3,4	02
3	Measure OCV, CCV and Ampere using Clamp (TONG)tester.	1,2, 3,4	02
4	Demonstrate GMAW welding process on mild steel job which includes plate cutting, marking, weld edge preparation, welding process set-up, tacking, welding operations, etc.	1	02
5	Demonstrate FCAW welding process on mild steel job which includes plate cutting, marking, weld edge preparation, welding process set-up, tacking, welding operations, etc.	1	02
6	Demonstrate GTAWwelding process on mild steel job which includes plate cutting, marking, weld edge preparation, welding process set-up, tacking, welding operations, etc.	2	02
7	Demonstrate GTAWwelding process on StainlessSteel job which includes plate cutting, marking, weld edge preparation, welding process set-up, tacking, welding operations, etc.	2	02
8	Demonstrate GTAWwelding process on Aluminium job which includes plate cutting, marking, weld edge preparation, welding process set-up, tacking, welding operations, etc.	2	02
9	Demonstrate Stud welding process using stud welding gun.	3	02
10	Demonstrate Arc welding operation on Dissimilar metal job which includes plate cutting, marking, weld edge preparation, welding process set-up, tacking, welding operations, etc.	4	02
11	Demonstrate welding jigs and fixtures.	4	02

Sr. No.	Practical Outcomes (PrOs)	Unit No.	Approx. Hrs. Required
12	Interpret given PQR Format for any welding process.	5	02
13	Interpret given WPS Format for any welding process.	5	02
14	Interpret given WPQ Format for any welding process.	5	02
	Total		**28**

Note

i. *More **Practical Exercises** can be designed and offered by the respective course teacher to develop the industry relevant skills/outcomes to match the COs. The above table is only a suggestive list.*
ii. *Boiler suit, safety shoes and necessary tools & instruments are compulsory while attending laboratory and has to be brought by students (Annexure-1).*

The following are some **sample** 'Process' and 'Product' related skills (more may be added/deleted depending on the course) that occur in the above listed **Practical Exercises** of this course required which are embedded in the COs and ultimately the competency.

S. No.	Sample Performance Indicators for the PrOs	Weightage in %
For Pros No. 1 to 11		
1	Knowledgeof experiment	20
2	Performance	30
3	Procedure Followed	30
4	Quality of Report	10
5	Punctuality	10
Total		**100**

S. No.	Sample Performance Indicators for the PrOs	Weightage in %
For Pros No. 12 to 14		
1	Knowledge	30
2	Quality of Report	30
3	Participation	20
4	Punctuality	10
5	Originality	10
Total		**100**

6. MAJOR EQUIPMENT/ INSTRUMENTS REQUIRED

These major equipment/ instruments with broad specificationsfor the PrOsis a guide to procure them by the administrators to user in uniformity of practical's in all institutions across the state.

No.	Equipment Name with Broad Specifications	PrO. No.
1	Hand gloves, Welding face guard, Safety goggles, Hand sleeve, Leg guard etc.	1 to 11
2	Welding transformer,Welding rectifier,Welding motor generator,	1,2,3
3	CO_2/MIG/FCAW Welding machine	1,4,5
4	TIG/GTAW Welding machine	1,6,7,8,10
5	Welding electrodes/consumables	1 to 11
6	Stud welding Gun	1,9
7	Tri square, Scriber, Hacksaw blade & frame, Flat files, Hand files, Half round file, Triangular file, Rough files, Smooth files, Bevel protractor, Hammer, Chisels, Bench vice, C-clamp, Power cable, Earthing clamp, Electrode holder, chisels, Wire brush, Chipping hammer, clamp (Tong) tester, Speed glass, Digital weight gauge etc.	1 to 11

7. AFFECTIVE DOMAIN OUTCOMES

The following ***sample*** Affective Domain Outcomes (ADOs) are embedded in many of the above mentioned COs and PrOs. More could be added to fulfill the development of this course competency.

a) Follow safety practices in laboratory.
b) Practice good housekeeping.
c) Work as a leader/a team member.
d) Maintain tools/equipment
e) Follow ethical practices
f) Practice environmental friendly methods and processes. (Environment related)

The ADOs are best developed through the laboratory/field based exercises. Moreover, the level of achievement of the ADOs according to Krathwohl's 'Affective Domain Taxonomy' should gradually increase as planned below:

i. 'Valuing Level' in 1st year
ii. 'Organization Level' in 2nd year.
iii. 'Characterization Level' in 3rd year and 4th year.

8. UNDERPINNING THEORY

The major underpinning theory is given below based on the higher level UOs of *Revised Bloom's taxonomy* that are formulated for development of the COs and competency. If required, more such UOs could be included by the course teacher to focus on attainment of COs and competency.

Unit	Unit Outcomes (UOs)	Topics and Sub-topics
Unit-I **GMAWWelding Processvariants**	1a. Describe GMAW / MIG procedure with advantages, disadvantages &applications 1b. Describe GMAW / MIG process parameters 1c. Prepare set-up forGMAW/ MIG in a given situation 1d. Describe CO_2 / MAG welding procedure and its advantages, disadvantages &field applications 1e. Describe CO_2 / MAG welding process parameters 1f. Describe Procedure, advantages, limitations and applications of FCAW 1g. Describe FCAW process parameters 1h. Prepare set-up for FCAW welding process	1.1 Classification of welding processes 1.2 Gas Metal Arc Welding (GMAW) or Metal Inert Gas (MIG) Welding 1.2.1 Definition 1.2.2 Principle of operation 1.2.3 Welding parameters for different materials 1.2.4 Welding equipment 1.2.5 Different metals welded 1.2.6 Joint design 1.2.7 Advantages, disadvantages &applications 1.3 CO_2 Welding or Metal Active Gas (MAG) Welding 1.3.1 Definition 1.3.2 Principle of operation 1.3.3 Welding equipment 1.3.4 Welding variables and parameters 1.3.5 Joint design 1.3.6 Welding procedure 1.3.7 Advantages, disadvantages &applications 1.4 Flux Cored Arc Welding (FCAW) 1.4.1 Definition and concept 1.4.2 Principle of operation 1.4.3 Welding equipment 1.4.4 Weldable metals 1.4.5 Joint design 1.4.6 Welding parameters 1.4.7 Flux cored electrode wire and its functions 1.4.8 Advantages, limitations&applications
Unit– II **GTAW &PAWWelding Processes**	2a. Describe GTAW /TIG process parameters 2b. Describe GTAW /TIG procedure with advantages, disadvantages &applications 2c. Prepare set-up for GTAW / TIG process	2.1 Gas Tungsten Arc Welding (GTAW) or Tungsten Inert Gas (TIG) Welding 2.1.1 Definition 2.1.2 Principle of operation 2.1.3 Welding parameters for different materials 2.1.4 Welding equipment 2.1.5 Base metals welded

Unit	Unit Outcomes (UOs)	Topics and Sub-topics
	2d. Describe process parameters, procedure and equipment of PAW 2e. Distinguish between PAW and TIG Welding 2f. Describe applications of PAW and its advantages, disadvantages	2.1.6 Joint design 2.1.7 Advantages, disadvantages & applications 2.2 Plasma Arc Welding(PAW) 2.2.1 Definition and Concept 2.2.2 Principle of Operation (a) Non-transferred Arc Process (b) Transferred Arc Process 2.2.3 Equipment 2.2.4 Process description 2.2.5 Welding parameters for different metals 2.2.6 Base metals welded 2.2.7 Joint design 2.2.8 Backing requirement 2.2.9 Comparison between PAW and TIG welding 2.2.10 Advantages, disadvantages & applications
Unit-III **ESW, Stud&LBM Welding Processes**	3a. Describe principle of operation and process parameters of ESW 3b. Describe ESW equipment,advantages, disadvantagesand applications 3c. Describe Stud Welding principle of operation and its equipment 3d. Describe advantages, disadvantages &applications of Stud welding process 3e. Describe LBW Welding principle of operation and its equipment 3f. Describe advantages, disadvantages &applications of LBWwelding process	3.1 Electro Slag Welding (ESW) 3.1.1 Definition and concept 3.1.2 Principle of operation 3.1.3 Conventional Electro Slag Welding 3.1.4 Consumable Guide Electro Slag Welding 3.1.5 Welding equipment 3.1.6 Joint preparation 3.1.7 Weldingparameters for different plate thicknesses 3.1.8 Advantages, disadvantages & applications 3.2 Stud Welding 3.2.1 Definition and Concept 3.2.2 Classification 3.2.3 Principle of Operation (a) Non Conductor Ferrule Method (b) Semi-Conductor cartridge Method 3.2.4 Equipment 3.2.5 Stud welded metals 3.2.6 Advantages, limitation & applications

Unit	Unit Outcomes (UOs)	Topics and Sub-topics
		3.3 Laser Beam Welding (LBW) 3.3.1 Definition & Concept 3.3.2 Principle & Theory of Operation 3.3.3 Forms of Laser 3.3.4 Joint Design 3.3.5 Advantages, disadvantages&applications 3.3.6 Safety Aspect
Unit-IV **Dissimilar metal welding, Hardfacing&Jigs-Fixture**	4a. Describe Concept of dissimilar metal welding 4b. Describe Metallurgical problems in dissimilar metal welding 4c. Describe Techniques for dissimilar metal welding 4d. Describe Hardfacing of materials 4e. Describe Welding Jigs and Fixture	4.1 Welding of Dissimilar Metal 4.1.1 Concept of dissimilar metal welding 4.1.2 Metallurgical problems in dissimilar metal welding 4.1.3 Techniques for dissimilar metal welding 4.1.4 Welding various dissimilar metals combinations 4.2 Hardfacing of materials 4.2.1 Definition and Concept 4.2.2 Objectives of Hardfacing 4.2.3 Types of surfacing (cladding, Hardfacing, built up, buttering) 4.2.4 Principle of operation, steps involved 4.2.5 Hardfacing alloys 4.2.6 Base metals 4.2.7 Surfacing methods 4.3 Welding Jigs and Fixture 4.3.1 Introduction 4.3.2 Welding Jigs 4.3.3 Welding Fixtures 4.3.4 Consideration in fixture selection 4.3.5 Principles governing design of good welding jigs and fixtures 4.3.6 Various types of Jigs and Fixtures
Unit-V **PQR, WPS, & WPQ**	5a. Interpret PQR, WPS and WPQ Format	5.1 Introduction of ASME Sec-IX 5.2 Definition of Code & Standard 5.3 Definition of PQR, WPS, & WPQ

Unit	Unit Outcomes (UOs)	Topics and Sub-topics
and Welding variables		5.4 Welding variables for SMAW, SAW, GMAW and GTAW processes (Essential, Supplementary- Essential and Non-Essential) 5.5 Interpretation of Procedure Qualification Record (PQR) 5.6 Interpretation of Welding Procedure Specification (WPS) 5.7 Interpretation of Welder Performance Qualification (WPQ) 5.8 Difference between WPSand PQR 5.9 Type of Tests Required for PQR and WPQ 5.10 Welder position qualification table

9. SUGGESTED SPECIFICATION TABLE FOR QUESTIONPAPER DESIGN

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
I	GMAW Welding Process variants	12	4	7	4	15
II	GTAW & PAW Welding Processes	10	6	7	0	13
III	ESW, Stud & LBM Welding Processes	14	7	7	4	18
IV	Dissimilar metal welding, Hardfacing & Jigs-Fixture	12	7	7	0	14
V	PQR, WPS, & WPQ and Welding variables	8	3	7	0	10
Total		**56**	**27**	**35**	**8**	**70**

Legends: *R=Remember, U=Understand, A=Apply and above (Revised Bloom's taxonomy)*
Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks and marks at different taxonomy levels (of R, U and A) in the question paper may vary slightly from above table.

10. SUGGESTED STUDENT ACTIVITIES

Other than the classroom and laboratory learning, following are the suggested student-related **co-curricular** activities which can be undertaken to accelerate the attainment of the various outcomes in this course: Students should perform following activities in group and prepare reports of about 5 pages for each activity. They should also collect/record physical evidences for their (student's) portfolio which may be useful for their placement interviews:

a) Prepare solutions of different assignments given by subject faculty.
b) Report writing on various topics from syllabus and beyond syllabus.
c) Prepare sketchbook of Tools and Equipment required for welding.
d) Prepare sketchbook of drawing of various welding process, joint details, welding symbol etc.
e) PPT presentation (10 minutes) on given Sub-topic of subject beyond the syllabus.
f) Prepare a list of specifications for various tools/equipment/machines used in the arc welding.
g) Visit the local metal trader/ fabricator and collect all relevant information regarding welding electrodes, filler wire etc., and prepare detail report on it.
h) Student will visit the respective discipline industry / site and will prepare the list of welding technology related to equipment/machineries used by that industry / site.
i) Show video/animation films of different welding process used in fabrication industries.
j) Collect some industrial weld component, identify type of weld in it & justify welding process used to manufacture that component.
k) Download videos showing correct practices for different types of welding processes.
l) Collect videos, animation showing different welding process used in fabrication industries.
m) Prepare chart showing different types welding process with its principle, advantages, disadvantages, and applications.
n) Prepare chart showing various types of welding defects, causes and its remedies.
o) Arrange visit to fabrication industry to show different types of welding processes used in it.

11. SUGGESTED SPECIAL INSTRUCTIONAL STRATEGIES (if any)

These are sample strategies, which the teacher can use to accelerate the attainment of the various outcomes in this course:

a) Massive open online courses (***MOOCs***) may be used to teach various topics/sub topics.
b) Guide student(s) in undertaking micro-projects.
c) ***'L' in section No. 4*** means different types of teaching methods that is to be employed by teachers to develop the outcomes.
d) About ***20% of the topics/sub-topics*** which are relatively simpler or descriptive in nature is to be given to the students for ***self-learning***, but to be assessed using different assessment methods.
e) With respect to ***section No.10***, teachers should create opportunities and provisions for ***co-curricular activities***.

12. SUGGESTED MICRO-PROJECTS

Only one micro-project is planned to be undertaken by a student that needs to be assigned to him/her in the beginning of the semester. In the first four semesters, the micro-project are group-based (group of 3 to 5). However, **in the fifth and eighth semesters**, the number of students in the group should **not exceed three**.

The micro-project could be industry application based, internet-based, workshop-based, laboratory-based or field-based. Each micro-project should encompass two or more COs which are in fact, an integration of PrOs, UOs and ADOs. Each student will have to maintain dated work diary consisting of individual contribution in the project work and give a seminar

presentation of it before submission. The duration of the micro project should be about **14-16 (fourteen to sixteen) student engagement hours** during the course. The students ought to submit micro-project by the end of the semester to develop the industry-oriented COs.

A suggestive list of micro-projects is given here. This has to match the competency and the COs. Similar micro-projects could be added by the concerned course teacher:

a) **Creating Digital Portfolio:** Students should observe and collect photographs and images of industrial/domestic components/items/equipment etc. and make a report on it.
b) **Chart making:** Prepare chart / drawing of different types welding process with its principle, advantages, disadvantages, and applicationsetc.given by the subject teacher.
c) **Model Making:** Students should build 3D model of various object as per shape and dimension from thermocol, hardboard scrap, wooden scrap, plastic or metal scrap or drawing sheet etc.
   - Prepare a model of different types of welding processes set-up.
   - Prepare a model of different types of welding joint design.
d) **Video Preparation:** Student have to prepare his/her video on demonstrating different types of welding processes, preparation of weld joint design, welding tools-equipment and consumable selection,welding process set-up preparation, any other activities performed in laboratory etc. given by the subject teacher.
e) **E-learning projects:** Students have to use internet and other online resources for preparation of report and/or download video on the topic given by the subject teacher within the syllabus or beyond the syllabus.
f) **Report preparation:** Student has to use different books, technical magazine, journals etc. for preparation of a report on the topic given by the subject teacher within the syllabus or beyond the syllabus.
g) **Power point presentation**: Students has to prepare a power point presentation of 10 to 15 slides on the topic given by the subject teacher within the syllabus or beyond the syllabus. In the end of presentation student has to ask at least 3 to 5 MCQ based question to identify the gain of listeners at the end presentation.
h) **Collect and study brochure**of different types of welding machines, welding tools, equipment, consumables and accessories from local vendor/ online vendor.

13. SUGGESTED LEARNING RESOURCES

Sr. No.	Title of Book	Author	Publication with place, year and ISBN
1	Welding Technology	Dr. O.P. Khanna	DHANPATRAI PUBLICAITONS
2	Welding Processes and Technology	Dr. R.S. Parmar	KHANNA PUBLISHERS ISBN:81-7409-126-2
3	Welding Engineering and Technology	Dr. R.S. Parmar	KHANNA PUBLISHERS ISBN:81-7409-028-2
4	Modern Arc Welding Technology	S.V. Nadkarni	Oxford & IBH Publishing co., Latest edition

Sr. No.	Title of Book	Author	Publication with place, year and ISBN
5	Welding Technology for Engineers	Baldev Raj, V Shankar, A K Bhaduri	Narosha Publishing House ISBN:978-81-7319-607-2
6	Welding Technology & Design	V.M. Radhakrishnan	New age international publisher ISBN (10): 81-224-1672-1 ISBN (13): 978-81-224-1672-5
7	Welding and Welding Technology	Richard L Little	Tata McGraw-Hill Publishing Company Limited, ISBN: 0-07-099409-9
8	Welding	A.C. Davies	CAMBRIDGE UNIVERSITY PRESS (Tenth Edition), ISBN:0 521 56702 5
9	Material Science & Technology	Dr. O.P. Khanna	DHANPATRAI PUBLICAITONS
10	ASME Code Sec-IX	ASME	ASME
11	Training Material for welding Technology	------	L&T

14. SOFTWARE/LEARNING WEBSITES

- https://www.aws.org
- https://iiwindia.com
- www.lincolnelectric.com
- www.esab.com
- www.pwsweld.com
- https://www.fronius.com/en-in/india
- www.asme.org
- https://www.thefabricator.com/thewelder/about
- https://weldguru.com/welding-processes/
- https://www.welding-world.com/
- https://www.lincolntech.edu/news/skilled-trades/welding-technology/types-of-welding-procedures
- https://www.themanufacturer.com/articles/different-types-of-welding-and-what-they-are-used-for/
- https://youtube.com/playlist?list=PLwdnzlV3ogoUQnGO8eFFygVBTjF0xyYMq
- https://www.youtube.com/playlist?list=PLyqSpQzTE6M-KwjFQByBvRx464XpCgOEC
- https://www.youtube.com/playlist?list=PLbMVogVj5nJSjLB85-HKhw1aCIBxn3pWj
- https://www.youtube.com/playlist?list=PLwdnzlV3ogoW9g44SFbiiCjyMOMPnNBL8
- https://www.youtube.com/playlist?list=UULFNsevwV4DudhNrePQGWKADA
- https://www.youtube.com/playlist?list=PLD7A954517F4AE47A

15. PO-COMPETENCY-CO MAPPING

Semester IV	Welding Technology-2(Course Code: 4345503)						
	POs						
Competency & Course Outcomes	PO 1 Basic & Discipline specific knowledge	PO 2 Problem Analysis	PO 3 Design/ develop-ment of solutions	PO 4 Engineering Tools, Experimen-tation&Testing	PO 5 Engineering practices for society, sustainability & environment	PO 6 Project Manage-ment	PO 7 Life-long learning
Competency	• Apply knowledge and skills for a given welding job by using appropriate welding process, equipment, tools, along with optimum process parameters and safe working procedures as per standards and codes.						
Course Outcomes CO1)Prepare set-up of GMAW process variants for given job.	3	1	-	2	-	1	2
CO2)Prepare set-up of GTAW & PAW process for given job.	3	1	-	2	-	1	2
CO3)Describe ESW, Stud & LBM Welding Processes.	3	-	-	-	-	-	-
CO4)Describe Dissimilar metal welding, Hardfacing of materials & welding jigs and fixture.	3	-	-	2	-	-	1
CO5)Interpret PQR, WPS and WPQ Format as per ASME section-IX.	3	-	-	-	2	1	1

*Legend: '**3**' for high, '**2**' for medium, '**1**' for low and '**-**' for no correlation of each CO with PO.*

16. COURSE CURRICULUM DEVELOPMENT COMMITTEE

GTU Resource Persons

S. No.	Name and Designation	Institute	Contact No.	Email
1.	Mr.Ashoksinh M. Gohil Lecturer in Fabrication Technology	Sir Bhavsinhji Polytechnic Institute Bhavnagar	9924682010	amgohilges@gmail.com
2.	Mr.Nilesh M. Bhangale Lecturer in Fabrication Technology	Sir Bhavsinhji Polytechnic Institute Bhavnagar	9016926792	nmbhangale@gmail.com
3.	Mr. KapilkumarB. Pipavat Lecturer in Fabrication Technology	Sir Bhavsinhji Polytechnic Institute Bhavnagar	9427343525	Kbpipavat.bpti@gmail.com

ANNEXURE-1

❖ SAMPLE SEFTY CONTRACT:

(To be filled by the students and submitted to concerned faculty/staff)

-- Use for reference purposes only –

1. You have to read and sign the safety contract.
2. The safety contract says that you understand that safety is your responsibility.
3. The safety contract to be signed before you carry out any work in the laboratory and if youdon't observe and obey the safety rules, you will not be allowed in the laboratory.

::

Safety Contract

Date: ________________

Name of Institute: ____
Name of Course with Code: Welding Technology-2(4345503)
Name of Faculty/Staff with Designation: 1. ______________________________________
2. ______________________________________
3. ______________________________________

I RECOGNIZE THAT:

1. Safety is my responsibility when using a tool.
2. Safety regulations have been provided to me.
3. The possibility of accident and injury increases if I do not follow all the safety guidelines.
4. I must act responsibly to ensure my own safety & the safety of others in the work area.

I AGREE TO:

1. Never work in the shop without my faculty's/ instructor'ssupervision.
2. Read and practice all the safety regulations that have been distributed to me in this course or have been posted in the work areas.
4. Act in a responsible manner at all times in the laboratory.
5. Follow all instructions given by the faculty.
6. Immediately report any unsafe condition or activity to my faculty / instructor.
7. Wear eye protection at all times when working with tools or working anywhere near someone who is using tools.
8. Cut or Tie back long hair, remove jewellery, secure loosed clothing, and wear boiler suit & safety shoes in the laboratory.
9. Clean all work areas and put equipment away before leaving the laboratory.

I, ____, have read and agree with all the safety instructions.

Particulars:

Programme: ______________________ Student Signature
Batch No.: ______________________ ________________________
Enrollment No.: __________________