Lok Jagruti Kendra University
University with a Difference

Diploma in Automation & Robotics

LJ Polytechnic

Course Code: 025120106

Mechanical and Electronics Workshop

Programme / Branch Name			Diploma in Automation and Robotics			
Course Name	Mechanical and Electronics Workshop				**Course Code**	025120106
Course Type	HSSC	BSC	ESC	PCC	OEC	PEC

Legends: HSSC: Humanities and Social Sciences Courses BSC: Basic Science Courses
ESC: Engineering Science Courses PCC: Program Core Courses
OEC: Open Elective Courses PEC: Program Elective Courses

1. Teaching and Evaluation Scheme

Teaching Hours / Week				**Evaluation Scheme**			
L	**T**	**P**	**Total Credit**	**CCE**	**SEE (Th)**	**SEE (Pr)**	**TOTAL**
0	0	4	2	50	-	50	100

Legends:
L: Lectures T: Tutorial P: Practical
CCE: Continuous & Comprehensive Evaluation
SEE (Th): Semester End Evaluation (Theory)
SEE (Pr): Semester End Evaluation (Practical)

2. Prerequisites

- ✓ NA

3. Rationale

Integration of theory and practice is required for diploma engineers to have healthy overall growth. The curriculum includes general workshop practices to give students hands-on exposure to various tools and basic manufacturing techniques. This course seeks to improve students' general manual and machining skills. Other goals include the advancement of labor dignity, workplace safety, teamwork, and the cultivation of a positive mindset. The backbone of the genuine industrial environment is workshop practice, which aids in the development and enhancement of key technical hand skills required by technicians working in diverse engineering sectors and workshops. This course aims to teach students the fundamentals of various hand tools and how to use them in diverse manufacturing applications.

Each skill experience should be approached with remembrance, knowledge, and application in mind, with a special emphasis on an attitude of inquiry to learn why and how for the many instructions and practices transmitted to them in each shop.

4. Objectives

- ✓ To identify tools, work materials, and measuring instruments useful for fitting, welding, carpentry, and electronic devices practice.
- ✓ To handle tools and instruments and use them to prepare joints of specific shapes and sizes.
- ✓ To provide knowledge of job materials in various shops.
- ✓ To analyze the material on the basis of their properties and thus assign different weightage to their use for technical purposes.
- ✓ To understand Welding and soldering operations.
- ✓ Expected to be able to identify and solve the small problems occurring in their household devices like fans, irons, washing machines, electric kettles, mixers, etc…

5. Contents

Unit No.	Unit Name	Topics	Learning Outcome	% Weightage	Hours
1.	**Introduction & Demonstration of Workshop**	1.1. Sketch general workshop layout. 1.2. Follow preliminary safety rules in workshop. 1.3. Importance of worshop in engineering. 1.4. Different types of materials. 1.5. Identification and use of each tool and equipment. 1.6. Method of processing in workshop. 1.7. Safety practices and general guideline.	• Workshop layout. • Importance of various sections/shops of workshop. • Types of jobs done in each shop. • General safety rules and work procedure in workshop.	-	4
2.	**Fitting Shop**	2.1. Introduction to fitting shop tools, marking and measuring devices / equipment. 2.2. Identification of materials. (Iron, Copper, Stainless Steel, Aluminium etc.). 2.3. Identification of various steel sections (flat, angle, channel, bar etc.). 2.4 Introduction to various fitting shop operations/processes (Hacksawing, Drilling, Chipping and Filing). 2.5. Prepare the jobs as per specification using fitting tools.	• Learn about applications of fitting work holding tools. • Understand methods of using of fitting cutting tools. • Preparation of simple and male- female joints • Understand Safety precautions. • Practice marking operations.	-	12
3.	**Sheet Metal Shop**	3.1. Introduction to sheet metal shop. 3.2. Introduction and demonstration of hand tools used in sheet metal shop. 3.3. Study of various types of nuts, bolts, rivets, screws etc. 3.4. Introduction and demonstration of various raw materials	• Understanding of sheet metal working tools. • Study of various types of nuts, bolts, rivets, screws etc. • Learn various raw materials used in sheet metal shop.	-	12

		used in sheet metal shop e.g. black-plain sheet, galvanized-iron plain sheet, galvanised corrugated sheet, aluminium sheet etc. 3.5. Making sheet metal comnponents using soldering.			
4.	**Carpentry Shop**	4.1. Select appropriate carpentry tool for the required application. 4.2. Types of woods and their applications. 4.3. Types of carpentry hardwares and their uses. 4.4. Demonstration of carpentry operations such as marking, sawing, planning, chiseling, grooving , boring, joining, etc. 4.5. Safety precautions	• Understanding of carpentry tools. • Study of furniture making hand tools-Marking and measuring tools-steel rule, steel tape, marking gauge, try square, compass and divider, scriber or marking knife, bevel etc. • Learn carpentry operations.	-	12
5.	**Electronic Devices**	5.1. Understanding & identification of Resistor,Capacitors 5.2. Types of Inductors, diodes,transistors 5.3. Understanding of IC and LED. 5.4. Types of switechs, fuses,batteries and Power plugs. 5.5. Demonstration of active components and passive components. 5.6. Types and application of various connectors, wires and cables.	• Learn types, of electronic components and their applications. • Understand the functions of various electronic components • Understand the symbols of various electronic components • Familiarization, identification and testing of active and passive components.	-	16
	Electrical	5.7. Identification of electrical components. 5.8. Domestic wiring. e.g. tube light, Connection of table fan, ceiling fan with regulators, switch board etc. 5.9. Operation of Protective & Safety devices e.g. Fuse, MCB, ELCB.	• Understand about basic electrical components. • Learn basic maintenance of domestic equipmens. • Solve general breakdowns.		

		5.10. Troubleshooting of domestic devices. 5.11. Batteries & Cells.			
				Total Hours	**56**

6. List of Practicals / Exercises

The practicals/exercises have been properly designed and implemented in an attempt to develop different types of skills, so that students can acquire the competencies/programme outcomes. Following is the list of practicals/exercises.

Sr. No.	Practical / Exercises	Key Competency	Hours
1.	To make students aware of basic safety precautions in Workshop.	Learn to aware with the safety precautions.	4
2.	To prepare a given specimen by using fitting shop tools.	To prepare a fitting job.	12
3.	To prepare a given specimen by using sheet metal tools.	To prepare a sheet metal job.	12
4.	To prepare a given specimen by using carpentry tools.	To prepare a carpentry job.	12
5.	To understand & draw the symbols of various electronic devices.	To understand about the electronic components.	8
6.	To give connection to two lights controlled by one switch.	To understand about the electrical lights connection.	8
		Total Hours	**56**

7. Textbooks

1) Workshop Preactice by Bawa H S, McGraw Hill Education, Noida
2) Workshop Technology Vo-1 by B.S. Raghuvanshi; Dhanpatrai Publication, New Delhi.

8. Reference Books

1) Workshop Preactice by Bawa H S, McGraw Hill Education, Noida
2) A Textbook of Manufacturing Process by J.K. Gupta & R.S. Khurmi,S. Chand and Co., New Delhi.
3) Introduction to Basic Manufacturing Process and Workshop Technology by Rajendra Singh. New Age International, New Delhi.
4) Workshop Technology Vo-1 by B.S. Raghuvanshi; Dhanpatrai Publication, New Delhi.
5) Manual on Workshop Practice by Venkata Reddy, Mac Millan India Ltd., New Delhi
6) Workshop Technology by SK Hajra, Choudhary and AK Choudhary, Media Promoters and Publishers Pvt. Ltd, Mumbai.
7) Workshop Practice Manual by K. Venkata Reddy, B.S. Publications.
8) Basic Electronics and Linear circuit by NN Bhargava and Kulshreshta, Tata McGraw Hill, New Delhi.
9) Electronics Devices and circuits by D.C. Kulshereshtha; New Age Publishers, New Delhi.
10) Principle of Electrical and Electronics Engineering by VK Mehta; S Chand and Co. New Delhi.

9. Open Sources (Website, Video, Movie)

1) https://www.youtube.com/watch?v=m6a-I4y8CG4

2) https://www.youtube.com/watch?v=-f7tTNRH_04
3) https://www.youtube.com/watch?v=DGST2NvATKI
4) https://www.youtube.com/watch?v=jbRgJbIGAwc
5) https://www.youtube.com/watch?v=_k0h0-Z1igg
6) https://www.youtube.com/watch?v=1j7EI9Hkah0
7) https://www.youtube.com/watch?v=GfNUaVFmxaY
8) https://www.youtube.com/watch?v=bkM_IwVv_yI
9) https://www.youtube.com/watch?v=t_jmGoUpqWQ
10) https://www.youtube.com/watch?v=jVY19hBY_a8
11) https://www.youtube.com/watch?v=4sBgu_tUpiI
12) https://www.youtube.com/watch?v=N8_1wb0r0DQ