Workshop Practice

Semester No	Code	Credit Hours
1	ME-120	0-2

COURSE DESCRIPTION:

This course covers introduction to commonly used metals, measurement and layout tools used in metalworking shops as well as to different hand tools, fasteners/ fastening techniques, drill and grinding machines with their appropriate use. During Lab work students are provided an opportunity to practice the use of hand tools and general metal working machines. The most common machine tools in this course are the Lathe machine and Milling machine. Proper selection of cutting speed, feed and depth of cut on these machines is taught. Nontraditional machining technique like Electrical Discharge Machine EDM is also covered. Introduction and hands-on practice to electrical wiring of aircraft, soldering/de-soldering techniques and basic trouble shooting of electrical circuits. Usage of tools/ machines required for woodworking with its practice for the specified work piece is also included.

TEXT AND MATERIAL

Textbooks:

1. Modern Metal Working by John R Walker, 10th Edition, 2017

Reference Material:

1. Introduction to Technology of Machine Tools by S F Krar, A R Gill & Peter Smid, 6thEdition (2004).
2. Introduction to Workshop Technology: Written by Engr. Muhammad Naweed Hassan
3. Workshop Practice: Written by WA. J Chapman
4. Welding Technology: Written by Althouse

PREREQUISITE:

Nil

COURSE LEARNING OUTCOMES:

Upon successful completion of the course, the student should be able to:

S No	CLO Statement	PLO	Blooms Taxonomy
1	Understand and demonstrate safety concepts, usage of hand tools, identification of metals and selection of machining processes for a prescribed job	1	C2

2	Apply different types of techniques and machining processes to produce work pieces with different shapes by using modern conventional engineering tools and workshop equipment	5	P3

ASSESSMENT SYSTEM:

Quizzes	10%-15%
OHTs	30% - 40%
Lab Assignments	5% - 10%
Lab ESE and Viva	40% -50%

COURSE DETAILS / TEACHING PLAN

Details of Syllabus:-

Basic Theory of the following shops.

Week No	Shops / Labs	Practical	Demo	Contact Hrs.	CLOs
1.	**Introduction to Workshop Technology** a. Definitions and Terminologies b. Process of Manufacturing c. Industrial Safety d. Industrial Materials e. Manufacturing Standards f. Quality Control	---	1	1	1
2.	**Measuring Techniques** a. Measuring System / Standards b. Manufacturing Metrology c. Limits, Fits Allowances and Tolerances d. Measuring Instruments and their Uses	3	--	3	
3.	**Bench Fitting Practice** a. Fib and Tolerances b. Filling Work, Jigs and Fixtures, Taps and Die work c. Drilling and Grinding, Marking and Punching	3	---	3	2
4.	**Machining Practice (Lathe)** a. Types of Lathe Machines and Operations b. Cutting Tools, Accessories and Attachments c. Parts of lathe machines d. Safety Precautions	3	---	3	

5.	**Machining Practice (Milling)** a. Types of milling Machines and Operations b. Cutting Tools, Accessories and Attachments c. Parts of Milling Machine d. Safety Precautions	3	---	3	
6.	**Pattern Making / Wood Work** a. Introduction to wood and Classification b. Seasoning of Wood c. Engg application of wood d. Properties of wood and wood joints e. Pattern Making, Wood Defects f. Wood Working Tools and Machines	3	---	3	
7.	**Forging Work** a. Forging Tools b. Hot and Cold Forging c. Properties and Crystals, Structure of Metals d. Forging Types / Operations e. Safety Precautions	3	---	3	
8.	**Foundry Work** a. Introduction to Foundry b. Different methods of casting including latest techniques c. Different types of furnaces d. Mold and Die casting e. Casting defects f. Safety precautions	3	---	3	
9.	**Electrical Technology** a. Basic Electrical Technology b. Power Supply Circuits, Types of Cables and Insulators c. Electrical Tools and Instruments d. Basic Fault Diagnosis in Circuits e. Electrical Devices f. Electrical Shock prevention and treatment g. Electrical Safety Precautions	3	---	3	1
10.	**Welding Technology** a. Introduction to Welding Theory b. Types of Welding, Welding Joints c. ARC Welding Techniques d. Gas Welding Techniques e. Safety Precautions	3	---	3	2
11.	**Sheet Metal Work / Fabrication** a. Form and Size of Sheet Metals b. Shearing and Bending of Process c. Sheet Development and Marking d. Sheet Metal Joints e. Properties of Metals related to Sheet	3	---	3	

	Forming f. Safety Precautions				
12.	**Surface Treatment and Paint Work** a. Electroplating Processes b. Electroplating Techniques c. Preparation of Work Piece (Degreasing and Pickling etc) d. Solution preparation for plating and their environmental issues e. Paints and application f. Primers and Solvents	3	---	3	
13-16	**Term Project + Case Study + Presentations**	14	--	14	
TOTAL CONTACT HOURS		**47**	**1**	**48**	
END SEMESTER EXAMINATION					

Course Rubrics

SNo	Assessment Parameters	Outstanding	Good	Average	Below Average	Poor
		(5)	**(4)**	**(3)**	**(2)**	**(1)**
1	Safety Consciousness **(x1.5)**	Student followed allsafety rules	Student attempted to follow safety rulesbut failed to meet several	Student failed tofollow a significant number of safetyrules	Student made noeffort to follow safety rules	Violation of safetyprocedures
2	Independent Work**(x1.5)**	Student was able tocomplete the task without assistance	Student was able tocomplete the task with little assistance	Student was ableto complete the task with major assistance	Student was able to complete half ofthe task with major assistance.	Student wasunable to complete thetask.
3	Job Completion **(x5)**	The job was 100% completed according to the task description within allocated time	The job was completed within allocated time, butneeded minor modifications	The job was completed within allocated time, but needed major modifications.	The job was completed but notin allocated time and needed major modifications	The job was incomplete
4	Group Participation **(x6)**	Used time extremely well in lab and focused attention on the experiment all thetime	Used time adequately, stayedfocused on the lab experiment most ofthe time	Lab report was conducted with average interest. Focus was lost onseveral occasions	Participation wasminimal OR student participated with least interest	Student did not atall participate in the lab experiment
5	Accuracy **(x5)**	All dimensions werewithin acceptable tolerances	Most dimensions were within acceptable tolerances	Some major dimensions wereoutside of acceptable tolerances	Several major dimensions wereoutside of acceptable tolerances	Dimensions did not coincide withmajority of plan dimensions
6	House-keeping**(x1)**	Keeps the tool as per told layout and cleans the work area after completion of	Partially Keeps the tool as per told layout and clean thework area after completion of	Keeps the tool asper told layout and partially cleans the work area after	Partially Keeps thetool as per told layout andpartially clean the work area after	Did not Keep thetool as per told layout and didn'tclean the work area after completion

		task	task	completion oftask	completion of task	oftask
TOTAL						