



**Subject:** Mechanical and Electronic Workshop-BETME12203

**Type of course:** Skill Enhancement Course (SEC)

**Prerequisite:** NA

**Rationale:**

The field of engineering continues to grow rapidly, transcending disciplines & driving economic growth. Workshop practices have become significant in the industrial environment to manufacture products for the service of the mankind. Workshop Practice is a core subject & is highly essential for all engineers & technocrats for formalizing themselves with the latest techniques & concepts of manufacturing & is the basic requirement for all the engineering students. In addition to introduction of various tools, processes & materials, the student has to acquire practical knowledge & skills of using machines & equipment, Various Cutting, measuring & marking tools, performing main operations through simple exercises.

**Teaching and Examination Scheme:**

Teaching Scheme			Credits	Examination Marks					Total Marks
CI	T	P		C	Theory Marks		Practical Marks		
			ESE		MSE	V	P	ALA	
0	0	4	2	-	-	10	40	50	100

*Legends: CI-Class Room Instructions; T – Tutorial; P - Practical; C – Credit; ESE - End Semester Examination; MSE- Mid Semester Examination; V – Viva; CA - Continuous Assessment; ALA- Active Learning Activities.*



**Course Content:**

Unit No	Course content	Hrs	% Weightage
1	<p><b>Machine shop</b></p> <ul style="list-style-type: none"> <li>• Demonstration of job on Lathe machine</li> <li>• Demonstration of job on Drilling machine</li> <li>• Study of different types of power tools</li> </ul> <p><b>Wood working</b></p> <ul style="list-style-type: none"> <li>• Demonstration &amp; practice of different carpentry operation like Planning, sawing &amp; chiselling and joints</li> </ul> <p><b>Fitting Shop:</b></p> <ul style="list-style-type: none"> <li>• Demonstration of all basic hand tools/ measuring tools &amp; equipment's.</li> <li>• Demonstration of simple operations such as marking, punching, filing, sawing, scrapping, drilling</li> </ul>	15	25%
2	<p><b>Smithy / Tin Shop:</b></p> <ul style="list-style-type: none"> <li>• Demonstration &amp; practice of MS rod into forged MS ring.</li> </ul> <p><b>Welding shop:</b></p> <ul style="list-style-type: none"> <li>• Hands on Practice and job making using Electric arc Welding</li> <li>• Demonstration of different types of joints by using arc welding &amp; gas welding.</li> <li>• Inspection of metal pipes and welding portion using LPT.</li> </ul> <p><b>Plumbing and its fitting:</b></p> <ul style="list-style-type: none"> <li>• Demonstrate a plumbing job and inspect the leakage portion.</li> <li>• Precaution to make a leakage free joint in pipelines.</li> </ul> <p><b>Foundry</b></p> <ul style="list-style-type: none"> <li>• Demonstration of Pattern Making by sand moulding</li> </ul>	15	25%
3	<p><b>Symbol used in electrical circuit.</b></p> <ul style="list-style-type: none"> <li>• Identify symbol used in electrical circuit Diagram</li> <li>• Identify Electrical component value based on Chart and test methods</li> </ul> <p><b>Measure and testing of various Electrical parameters</b></p> <ul style="list-style-type: none"> <li>• Performing ohms law to measure electrical parameters like voltage current and power</li> </ul>	15	25%





	<ul style="list-style-type: none"> <li>Common testing instruments used in electrical workshop</li> </ul> <p><b>Different types of wiring system:</b></p> <ul style="list-style-type: none"> <li>To study about Different types of electrical wiring system and domestic wiring.</li> <li>Demonstrate of staircase wiring circuit diagram and working</li> </ul>		
4	<p><b>Electrical Safety and hazards</b></p> <ul style="list-style-type: none"> <li>Study about safety procedures for first aid in case of electrical Hazards.</li> <li>To study types of Earthing</li> </ul> <p><b>PCB Design</b></p> <ul style="list-style-type: none"> <li>To practice soldering and desoldering electrical &amp; electronics component.</li> </ul> <p><b>Project Design</b></p> <ul style="list-style-type: none"> <li>Make a mini electrical and electronics mini projects</li> </ul>	15	25%

**Continuous Assessment:**

Sr. No	Active Learning Activities	Marks
1	<b>Fitting shop</b> Prepare a part with the help of fitting shop and upload it on GMIU Web Portal.	10
2	<b>Carpentry shop</b> Prepare a part with the help of carpentry shop and upload it on GMIU Web Portal.	10
3	<b>Welding shop</b> Prepare a part with the help of welding shop and upload it on GMIU Web Portal.	10
4	<b>Fun with Learn</b> Make model working Video of mini Electrical project and upload it on GMIU Web Portal.	10
5	<b>Poster Presentation</b> Make poster on the application of assigned electrical project and upload it on GMIU Web Portal.	10
Total		50





**List of Practical:**

Sr. No	Descriptions	Unit No	Hrs
1	Demonstration of job on Lathe machine	1	2
2	Demonstration of job on Drilling machine	1	2
3	Study of different types of power tools.	1	2
4	Hands on Practice and job making in Fitting shop.	1	4
5	Hands on Practice and job making in Carpentry shop.	1	4
6	Hands on Practice and job making using Electric arc Welding / Resistance welding process	2	4
7	Hands on Practice and job making using Soldering process.	2	4
8	Demonstration of Pattern Making by sand moulding.	2	2
9	Hands on Practice and job making in Smithy/ Tin smithy shop	2	4
10	Study on Plumbing and its fitting	2	2
11	Identification of Various Electrical and Electronics component symbols.	3	2
12	Find the value of Resistors using Colour coding Technique	3	2
13.	To Practice Soldering and De- Soldering of Electrical and Electronics Component.	4	2
14	Identify and connect various electrical measuring instruments and measure various electrical parameters like voltage, current and power.	3	2
15	To study the working of various electrical protective devices (Fuse, MCB and ELCB).	3	2
16	To study different types of domestic wiring & study about types of cables.	3	2
17	Identify and specified different types of switches used for different applications as per current and voltage rating.	3	4
18	Demonstrate Staircase Wiring circuit diagram & its Working	3	2
19	Study about safety procedures for first aid in case of electrical hazards	4	2
20	Make mini Electrical project	4	10
		<b>Total</b>	<b>60</b>





**Course Outcome:**

After learning the course, the students should be able to:	
CO1	Prepare job in carpentry shop and welding shop.
CO2	Perform plumbing fitting for engineering application.
CO3	Identify, test the Electrical component and develop electrical circuit and measures electrical parameters using multimeter.
CO4	Implement projects on design board with soldering and disordering of electrical & electronics component.

**Instructional Method:**

The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

From the content 10% topics are suggested for flipped mode instruction.

Students will use supplementary resources such as online videos, NPTEL/SWAYAM videos, e-courses, Virtual Laboratory.

The internal evaluation will be done on the basis of Active Learning Assignment

Practical/Viva examination will be conducted at the end of semester for evaluation of performance of students in laboratory.

**Reference Books:**

- [1] Dr.UmeshRathore, Naresh Kumar Sharma,” A Textbook of Electrical Workshop Practices”, S. K. Kataria& Sons
- [2] Tarlok Singh, "Fundamental of Electrical Engineering", S. K. Kataria& Sons
- [3] Charles K. Alexander & Matthew N. O.Sadiku ,”Fundamentals of Electric Circuits ”
- [4] V.K. Mehta “Principles of Electrical Engineering and Electronics”,S.Chand.
- [5] John. K. C “Mechanical workshop practice”,PHI Publication

