

<b>GANPAT UNIVERSITY</b>									
<b>FACULTY OF ENGINEERING &amp; TECHNOLOGY</b>									
Programme	Bachelor of Technology				Branch/Spec.	All			
Semester	I / II				Version	1.0.0.0			
Effective from Academic Year	2026-27				Effective from the batch admitted in	July 2026			
Course Code	<b>2ESC1106</b>				Course Name	<b>Engineering Workshop</b>			
Course Category	Engineering Science Courses (ESC)								
Teaching Scheme					Examination scheme (Marks)				
(Per week)	Lecture (DT)		Practical (Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	0	0	2	0	2	Theory	0	0	0
Hours	0	0	4	0	4	Practical	25	25	50
Pre-requisites:									
Not Applicable									
Course Outcomes									
COs	Description								
CO1	<b>Demonstrate</b> workshop safety practices and effective use of hand tools, machines, and measuring/electrical laboratory instruments used in engineering workshop activities.								
CO2	<b>Apply</b> fundamental engineering concepts to plan, organise, and execute workshop tasks and mini-projects across mechanical, electrical/electronic, and basic IT-oriented activities.								
CO3	<b>Analyze</b> and select appropriate engineering materials and electrical/electronic components based on properties, ratings, applications, and suitability for a given workshop requirement.								
CO4	<b>Fabricate/assemble</b> joints, circuits, wiring, and simple systems; perform testing, troubleshooting, repair/maintenance; and assemble/operate/manage computer systems, including OS installation and basic utility usage as required for workshop practice.								
Practical Syllabus									
Unit	Content								Hours
1	<b>Introduction to Workshop:</b> Workshop safety rules and personal protective equipment (PPE), Workshop layout and functions of different sections, Types of jobs carried out in various workshops, Standard work procedures and good engineering practices.								2
2	<b>Carpentry Shop:</b> Carpentry tools, machines, and safety precautions, Woodworking operations and common carpentry joints, Simple exercise using jack plane operations, Introduction to woodworking lathe and basic turning operations.								4
3	<b>Fitting Shop:</b> Fitting tools and measurement instruments, Marking, measuring, and filing operations, prepare a simple male–female (matching) joint with dimensional checks and inspection practices.								4
4	<b>Welding Shop:</b> Fundamentals of welding processes, Gas welding and arc welding equipment and safety, Preparation of butt and lap welded joints, Demonstration of oxy-acetylene flame cutting.								4
5	<b>Plumbing Shop:</b> Plumbing tools, pipe materials, and fittings, Pipe cutting, threading, and jointing methods, Simple piping exercises and applications								2
6	<b>Sheet-metal Shop:</b> Materials and tools, safety practices, marking and layout methods (baseline, allowance idea). Practice: basic operations—cutting, bending, rolling and joining process.								2
7	<b>3D Printing Shop:</b> Introduction to additive manufacturing, Types of 3D printing technologies, Materials used in 3D printing, Applications in engineering and demonstration of 3D printed								2

	components	
<b>Topics (B) Electrical</b>		
8	<b>Safety Precautions and Protective Devices:</b> Electric shock risks, precautions, and safety measures; precautions while handling electrical devices; first-aid treatment for electric shock; earthing importance and methods; protective devices	2
9	<b>Introduction to Electrical and Electronics Components:</b> Symbols used for electrical and electronic components; types and applications of components such as resistors, inductors, capacitors, diodes, Zener diodes, LEDs, photodiodes, transistors, and integrated circuits.	2
10	<b>Electrical Laboratory Instruments:</b> Introduction to DC power supply, function generator, multi-meter, ammeter, voltmeter, wattmeter, energy meter, clamp-on meter, and CRO; basic construction, working principles, and applications.	2
11	<b>Household and Industrial Electrical Wiring:</b> Types of switches and cables; tube-light wiring; fan and fan regulator wiring; staircase wiring; go-down wiring; panel layout and wiring; and single-line diagrams.	2
12	<b>Repair, Maintenance and Troubleshooting of Domestic Electrical Appliances:</b> Basic working of domestic appliances; common components; preventive maintenance practices; common faults and symptoms; systematic troubleshooting; repair and replacement of faulty parts; and testing and safety verification.	4
13	<b>Soldering, Electronic Circuit Assembly and Testing:</b> Through-hole and surface-mount soldering techniques; tools, materials, and safe practices; identification of soldering defects; reading circuit schematics; and assembly, testing, and troubleshooting of electronic circuits.	4
14	<b>Arduino-Based Systems for Mini Projects:</b> Introduction to the Arduino platform and Arduino Uno board; basics of the microcontroller; power supply options and USB interface; digital and analog I/O pins; interfacing of LEDs, switches, relays, buzzers, sensors, and DC motors.	4
<b>Topics (C) Information Technology</b>		
15	<b>Introduction to Computer Hardware &amp; Software:</b> Definition of computer, Computer hardware, Software and Firmware, Types of Software, Classification of computer, Basic parts of digital computer, Basics of PC Architecture :Pentium, Core, Core Cord, Core 2 Duo, I3, I5, I7 Processor.	4
16	<b>Output Devices:</b> Monitor: Types of monitor: LCD, LED, OLED, Faults of monitor, Basics of Display card. Printer: General features of the printer, Types of Printer; Impact Printer, Non-Impact Printer <b>Input Devices:</b> Keyboard: Types of keyboard: Wired and Wireless. Mouse: Types of mouse: Wired and Wireless. Other Input Devices <b>Motherboard:</b> Types of motherboard, Functional block diagram of motherboard, CPU, BIOS, CMOS, Expansion slots <b>Storage Devices:</b> Types of Memory: Primary storage: Registers, Cache, RAM, ROM Secondary storage: Hard Disk, CD, DVD, Flash Drive,SSD <b>Networking Devices and cables.</b>	6
17	<b>Assembling the computer system &amp; Installation of OS, Windows File System (NTFS, FAT 32)</b> Hardware troubleshooting, Software troubleshooting	4
18	<b>DOS Commands:</b> CLS, DATE, VER, VOL, DIR, COPY CON, TYPE, MKDIR, CHDIR (CD), RMDIR, RENAME, DEL, MOVE, COPY, PROMPT, DOSKEY, PATH <b>Document writing using a Word Processing Tool:</b> <b>Google Applications:</b> Gmail, Google search, Other services of Google	6
<b>Practical and Self Learning Content</b>		
Practical, assignments, quiz, industrial visit, field survey and tutorials are based on the above syllabus.		
Text Books		

1	Workshop technology by Hajra Chaudhary
2	S. K. Bhattacharya and S. Chatterji, Projects in Electrical, Electronics, Instrumentation and Computer Engineering, S. Chand Publishers
3	IBM - PC And Clones Govindarajulu, Tata McGraw Hill
<b>Reference Books</b>	
1	Elements of Mechanical Engineering by Mathur & Mehta.
2	Work shop technology by Chapmen
3	R. Sengupta, Principles and Reliable Soldering Techniques, New Age International Publishers
4	John Boxall, Arduino Workshop: A Hands-On Introduction with 65 Projects, No Starch Press.
5	K. B. Bhatia, Fundamentals of Maintenance of Electrical Equipments, Khanna Publishers
6	Surjit Singh, Textbook of Electrical Design, Estimating and Costing, Dhanpat Rai & Sons
7	S. Samaddar, Textbook of Electric Wiring, New Central Book Agency (P) Ltd.
8	The Complete PC Upgrade and Maintenance Guide, 16th Edition, Mark Minasi, Quentin Docter, Faithe Wempen, SYBEX publication
<b>ICT/MOOCs Reference</b>	
1	<a href="https://www.youtube.com/watch?v=A9m_3onoVV8">https://www.youtube.com/watch?v=A9m_3onoVV8</a> (Instruction and Demonstration)
2	<a href="https://www.youtube.com/watch?v=uBeBilcSioo">https://www.youtube.com/watch?v=uBeBilcSioo</a> (Carpentry Shop)
3	<a href="https://www.youtube.com/watch?v=KgQyuCrOKoU">https://www.youtube.com/watch?v=KgQyuCrOKoU</a> (Fitting shop)
4	<a href="https://www.youtube.com/watch?v=STWhYHhfYNo">https://www.youtube.com/watch?v=STWhYHhfYNo</a> (Plumbing Shop)
5	<a href="https://www.youtube.com/watch?v=BVev9ZYL8-k">https://www.youtube.com/watch?v=BVev9ZYL8-k</a> (Sheet-metal Shop)
6	<a href="https://www.youtube.com/watch?v=6Maq51yHSuc">https://www.youtube.com/watch?v=6Maq51yHSuc</a> (Identification of electrical and electronics components)
7	<a href="https://www.youtube.com/watch?v=hKtedrJKyOs">https://www.youtube.com/watch?v=hKtedrJKyOs</a> (Domestic and Industrial Electrical wiring)
8	<a href="https://www.youtube.com/watch?v=gaRyNiPn26o">https://www.youtube.com/watch?v=gaRyNiPn26o</a> (Troubleshooting of domestic devices)
9	<a href="https://www.youtube.com/watch?v=BRJ9azr61OA">https://www.youtube.com/watch?v=BRJ9azr61OA</a> (Electrical Energy meter)
10	<a href="https://www.youtube.com/watch?v=zLW_7TPf310">https://www.youtube.com/watch?v=zLW_7TPf310</a> (Earthing)
11	<a href="https://youtube.com/playlist?list=PL4B0LEKY-jrT_fjOGkX_NZ52ZHZf8s9S-&amp;si=msPO647_WkHqnh8J">https://youtube.com/playlist?list=PL4B0LEKY-jrT_fjOGkX_NZ52ZHZf8s9S-&amp;si=msPO647_WkHqnh8J</a> (Arduino-Based Systems for Mini Projects)
12	<a href="https://www.cybrary.it/course/comptia-aplus/">https://www.cybrary.it/course/comptia-aplus/</a>
13	<a href="https://alison.com/course/abc-it">https://alison.com/course/abc-it</a>
14	<a href="https://www.lynda.com/IT-and-Hardware-training-tutorials/5776-0.html">https://www.lynda.com/IT-and-Hardware-training-tutorials/5776-0.html</a>
15	<a href="https://www.learnvern.com/course/computer-hardware">https://www.learnvern.com/course/computer-hardware</a>
16	<a href="https://www.coursera.org/lecture/technical-support-fundamentals/introduction-to-computer-hardware-LSvh2">https://www.coursera.org/lecture/technical-support-fundamentals/introduction-to-computer-hardware-LSvh2</a>

<b>Mapping of COs, POs, and PSOs</b>														
COs	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	1	1	1	3	1	2	2	1	1	2	2	2	2
CO2	3	2	3	2	3	1	0	2	1	2	2	3	1	2
CO3	3	3	2	2	3	1	1	1	1	1	2	3	2	2
CO4	3	2	3	2	3	1	1	2	1	2	2	3	2	1

<b>Bloom's Taxonomy Level</b>				
Unit	Unit Title	Aligned COs	Learning Hours	BTL Level
1	Introduction to Workshop	CO1	2	U
2	Carpentry Shop	CO1, CO2	4	A
3	Fitting Shop	CO1, CO2	4	A
4	Welding Shop	CO1, CO2	4	A
5	Plumbing Shop	CO2	2	A
6	Sheet-Metal Shop	CO2	2	A

7	3D Printing Shop	CO2, CO3	2	U
8	Safety Precautions & Protective Devices	CO1	2	U
9	Introduction to Electrical & Electronic Components	CO3	2	U
10	Electrical Laboratory Instruments	CO3	2	A
11	Household & Industrial Electrical Wiring	CO4	2	A
12	Repair, Maintenance & Troubleshooting of domestic electrical appliances	CO4	4	N
13	Soldering & Circuit Assembly and Testing	CO4	4	A
14	Arduino-Based Systems for Mini Projects	CO2, CO4	4	N
15	Introduction to Computer Hardware & Software:	CO3	4	U
16	Computer Hardware Devices.	CO3	6	U
17	Assembling the computer system & Installation of OS, Windows File System (NTFS, FAT 32	CO4	4	A
18	DOS Commands:	CO2, CO4	6	A

**Note:**

- Version 1.0.0.0 (First Digit= New syllabus/Revision in Full Syllabus, Second Digit=Revision in Teaching Scheme, Third Digit=Revision in Exam Scheme, Forth Digit= Content Revision)
- 1 Hour Lecture = 1 Credit, 1 Hour Tutorial = 1 Credit, 2 Hours Practical = 1 Credit, 2 Hours Internship/Project/Seminar = 1 Credit
- Bloom's Taxonomy Level (BTL): R: Remember, U: Understand, A: Apply, N: Analyze, E: Evaluate, and C: Create