

Devi Ahilya Vishwavidhyalaya, Indore, India Institute of Engineering & Technology				II Year B.Tech. (Electronics and Instrumentation Engineering)		
Course Code & Name	Instructions Hours per Semester and Credits					
4REPC6 ELECTRONIC WORKSHOP	Classroom Instruction (CI)		Lab Instruction (LI)	Term Work (TW) and Self Learning (SL)	Total no. of Hours Per semester	Total Credits (Total Hours/30)
	L	T	P	TW+SL	60	2
	0	0	40	20		

Course Learning Objectives:

- To familiarize students with electronic components, instruments, and safety practices required for effective and safe operation in an electronics laboratory.
- To develop hands-on skills in soldering, wiring, PCB fabrication, and the use of EDA tools for assembling electronic circuits.
- To enable students to assemble, test, and troubleshoot basic analog and digital electronic circuits using standard measurement and testing equipment.
- To encourage practical problem-solving and design skills through mini hardware projects, including proper documentation and performance evaluation.

Prerequisites: NIL

COURSE CONTENTS

UNIT 1: Electronic Components, Symbols & Tools

Electronic components: Resistors, capacitors, inductors, diodes, LEDs, Zeners, transistors, ICs, switches, relays, connectors.

Component specifications: color coding, tolerance, power rating, datasheet basics.

Workshop tools: Multimeter, LCR meter, oscilloscope basics, function generator, soldering tools.

Safety rules in electronic labs.

UNIT 2: Soldering, Wiring, and PCB Fabrication

Soldering techniques: Through-hole, SMD (intro), good vs bad solder.

Breadboard wiring, crimping, cable making.

PCB design steps: layout, UV/toner method, etching, drilling, finishing.

Introduction to EDA tools (KiCad/Proteus/Eagle).

UNIT 3: Basic Analog & Digital Circuit Assembly

Analog circuits: Rectifier, regulator, RC filters, transistor switch, small amplifier.

Digital circuits: Logic gates, adder, counters, flip-flops, 555 timer circuits.

Basic sensor interfacing.

UNIT 4: Testing, Measurement & Troubleshooting

Fault types: open/short, solder bridges.

Signal tracing and waveform analysis, Testing power supplies, continuity checks.

Component testing: diodes, transistors, IC basics.

UNIT 5: Mini Hardware Projects

Student-selected mini project: alarm, night lamp, temperature control, LED chaser, logic tester.

Project documentation: circuit diagram, PCB layout, testing report.

Course Outcomes:

CO.No.	CO
CO1	Identify and understand specifications of electronic components, tools, and instruments.
CO2	CO2: Perform soldering, wiring, and PCB fabrication following proper standards and safety rules.
CO3	Assemble and test basic analog and digital circuits.
CO4	Troubleshoot common faults in electronic circuits using test equipment.
CO5	Develop small hardware projects demonstrating electronic design and implementation skills.

BOOKS RECOMMENDED:

- [1] P. Horowitz and W. Hill, The Art of Electronics, 3rd ed. Cambridge, UK: Cambridge University Press, 2015.
- [2] M. Judd and K. Brindley, Soldering in Electronics Assembly, 2nd ed. Oxford, UK: Elsevier/Butterworth-Heinemann, 1999.
- [3] S. S. Srikant and P. K. Chaturvedi, Basic Electronics Engineering: Including Laboratory Manual. Singapore: Springer, 2020.
- [4] J. Varteresian, Fabricating Printed Circuit Boards. New York, NY, USA: McGraw-Hill
- [5] P. B. Zbar and J. J. Circuit, Basic Electronics: A Text-Lab Manual, 7th ed. New Delhi, India: Tata McGraw-Hill, 1995.
- [6] P. B. Zbar, Electronic Drafting and Printed Circuit Board Design. New Delhi, India: Galgotia, 1988.
- [7] T. Williams, The Circuit Designer’s Companion. Oxford, UK: Newnes/Elsevier (latest edition). [Note: widely used as PCB/design practical reference]
- [8] C. Platt, Encyclopedia of Electronic Components: Volume 1 & 2. Sebastopol, CA, USA: O’Reilly Media. [For detailed component explanations]

CO-PO-PSO Relationship

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
4RTPC6.CO1	3	3	2	1	2	1			1	1	1	2	2	3
4RTPC6.CO2	3	2	3	2	3	1			1	1	1	2	3	2
4RTHS1.CO3	3	2	3	2	2			1	2	2	1	3	3	3
4RTHS1.CO4	3	3	2	3	2			1	1	2	1	2	2	2

4RTHS1.CO5	3	2	3	2	3	1		1	2	2	2	3	3	3
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