



ST. ALOYSIUS COLLEGE(AUTONOMOUS), JABALPUR

Reaccredited 'A+' Grade by NAAC(CGPA:3.68/4.00)
College with Potential for Excellence by UGC
DST-FIST Supported & STAR College Scheme by DBT

Department of Physics

UG IV Semester

Paper-Vocational

ELECTRICAL TECHNOLOGY (MODULE 2)

Course Outcomes

CO. No.	Course Outcomes	Cognitive Level
CO 1	The manufacturing of different appliances.	An, Ap, C
CO 2	The concepts, principles of working, maintenance, constructional details and functions of electrical motors, electrical appliances, measuring and testing instruments and electrical circuits.	U,An,Ap, E
CO 3	Different types of electrical wiring.	U,R

Credit and Marking Scheme

	Credits	Marks		Total Marks
		Internal	External	
Theory	2	40	60	100
Practical	2	40	60	100
Total	4	200		





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Content of the Course

Theory

No. of Lectures (in hours per week): 2.2 Hrs. per week

Total No. of Lectures: 30 Hrs.

Maximum Marks: 60

Unit	Topic	Lectures
I	<p>1. Electric Current</p> <p>1.1 Electron drift velocity</p> <p>1.2 The idea of electric potential</p> <p>1.2.1 Resistance - Laws of resistance, units of resistance and resistivity.</p> <p>1.2.2 Colour Code for carbon resistors</p> <p>1.3 Types of resistors</p> <p>1.3.1 Non Linear resistor</p> <p>1.3.2 Varistor- Short and open circuit</p> <p>1.3.3 short in a series and parallel circuits</p> <p>1.3.4 opens in a series and parallel circuits</p> <p>1.4 Division of current in parallel circuit- Equivalent resistance.</p> <p>1.5 Maintenance of steady current in a circuit.</p> <p>1.6 Ideal constant-Voltage source: constant current source.</p> <p>1.7 Relation between electric field and potential. 1.7.1 Measurement of internal resistance.</p> <p>2. Electrical Instruments general idea about construction, working principle and measurement of</p> <p>2.1 Potentiometer- Sensitiveness and applications.</p> <p>2.2 Moving coil galvanometer- Measurement of current and voltage.</p> <p>2.2.1 Sensitivity of a Galvanometer.</p> <p>2.3 Wheatstone bridge and meter bridge</p>	15





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	<p>2.3.1 Principle and applications to measure potential difference and for comparing electromotive force of two cells.</p> <p>2.4 Moving iron and moving coil voltmeters and ammeters,</p> <p>2.5 Dynamometer types of wattmeter.</p> <p>2.6 Ohm meter, megger and induction type energy meter- their circuit connection and application for measurement of electrical quantities.</p> <p>2.7 Digital Multimeter</p> <p>2.8 Induction Motor- General Principle and construction Rotor</p> <p>2.9.1 Phase wound motor</p> <p>2.10 AC generator- Advantages and disadvantages of AC over DC</p> <p>(i) Photovoltaic cell (ii) Fuel cell Principle of operation</p>	
II	<p>Domestic Appliances- General idea-</p> <p>1.1 Safety policy, purpose of scope, Do's and Don'ts, earthing, permit to work system, safety instructions, housekeeping, personal protective equipment and devices, constructions, transportation, safe guarding the public, fire, accident report, record and investigations, first aid, emergency preparedness and response, "5S" practice.</p> <p>1.2 Testing equipment's and basic control equipment's- Electronic linetester, series and parallel test lamp for simple and three phase system, thermostat, bimetallic relay, thermocouple, overload switch, electromagnetic relay.</p> <p>1.3 Electric Iron - Types- ordinary, automatic, steam, spray and laundry.</p> <p>1.4 Electric induction cooker- Electric induction</p>	15





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<p>plate cooker, simpliserise Maker.</p> <p>1.5 Water Purifier- UV/RO, UV light effect on bacteria, reversesosmosis membrane process.</p> <p>2 Electrical wiring and Electrical Engineering Drawing</p> <p>2.1 Wiring diagram for domestic simple wiring.</p> <p>2.2 Symbols used for different electrical devices and equipments.</p> <p>2.3 Types of wiring cleat wiring, casing and capping.</p> <p>2.4 C.T.S./T.R.S. wiring, metal sheath wiring.</p> <p>2.5 Factors of selection of a particular wiring system</p> <p>2.6 Importance of switch</p> <p>2.7 Fuse and earthing of wiring system, types of faults, their causes andremedies.</p> <p>2.8 Types of earthing- Plate earthing and Pipe earthing. their procedure and application.</p> <p>2.9 Loop in system of wiring connections I E rules related to wiring.</p>	
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References

Test/Reference Books:

1. Jagathesan K, Vionoth Kumar and Sarvan Kumar R, Basic Electrical
2. Theraja B.L., Basic Electronics, S. Chand & Company New Delhi 2000.
3. Theraja B.L., A textbook of Electrical Technology. Volume 1, S. Chand & Company New Delhi 2005
4. Khandpur P, Morden Electronic Equipment Troubleshooting .Repair and Maintenance TMH 2006
5. Deo V. R., Electronics components and application.
6. Grob Bernard, Basic Electronics, McGraw Hill Book Co. 1985
7. Loveday G.C., Electronic Testing and Fault Diagnosis, A.H Wheeler Publishing.2002.
8. Chattopodhya D and Rakshit K K, Electronics fundamental Application, Age International.
9. Gupta S.L. and Kumar V., A hand book of Electronics, Pragti Prakashan.
10. Mithal K K Electronics Practical Computech Publication LTD.
11. Mehta V.K. and Rohit Mehta, Principles of Electronics, S. Chand & Company New Delhi 2005
12. Mithal G.K., Electronic devices and circuits, Khanna Publishers, 1990, 16th edn.
13. Sawhney AK, A course in electrical and electronic measurements and instrumentation, Dhanpat Rai and Co. (P) Ltd. 2003.
14. Talbar N Talbar and Upadhyay Akhilesh R, Electronic instrumentation (Analog and Digital) Dhanpat Rai and Co. (P) Ltd. 2001.

Web Links:

1. <https://www.electricaltechnology.org/2013/09/electrical-wiring.html> <http://vlabs.iitkgp.ac.in/be/>) 2.
2. <https://nptel.ac.in/courses/108/108/108108076/>





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3. <https://peda.net/kenya/ass/subjects2/physics/form-32/heoacc>
4. <https://youtu.be/w5ginsN8UX4>
5. <https://youtu.be/atXRn-cba88>
6. <https://youtu.be/ZGv9pblhg1g>





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List of Practical

1. To assemble a household circuit comprising three bulbs, three(on/off) switches,a fuse and a power source.
2. To assemble the component of a given electrical circuits
3. **Multimeter-** Testing, Checking of components and measurement of Resistance. Inductance, Capictance, Diode, Transistor. Voltage (AC/DC) current and checking of continuityof a given circuit
4. Verification of Ohm's law
5. Study of resistances in series, parallel and series parallel.
6. Study of voltage sources in series, parallel and series parallel
7. To study the change in the current in an electric circuit bychanging its resistance.
8. Determination of e.m.f. of a thermocouple.
9. Determination of efficiency of electrical cattle with variablevoltages.
- 10. General idea about construction, working principle andmeasurement of**
 - a. Battery charger- circuit and different components.
 - b. Filter circuit and voltage regulator- TL and 7 types filter circuits,IC voltage regulator.
 - c. Emergency Torch- Miniature lamp type, Farmer Torch.
 - d. Oven and Tandoor-Oven, Tandoor maker, microwave oven.
 - e. Electric Toster- Ordinary, sandwich. Popup and Automatic.
 - f. Coffee Maker- Coffee percolator, electric coffee Mug/Stirrer

