

**CERTIFICATE COURSE IN ELECTRICAL  
AND ELECTRONIC INSTRUMENTATION**



**Sadakathullah Appa College  
(Autonomous) Tirunelveli**



**Certificate Course for UG Students**

**ELECTRICAL AND ELECTRONIC INSTRUMENTATION**

**Offered by Department of Physics**

Instructional Design

*This course is of twelve months duration which includes Theory classes , Practical session , Assignments and Project work.*

**Benefits**

- ❖ Job Opportunities in various fields like Electronics and Instrumentation
- ❖ Easy handling electrical appliances at home
- ❖ Gain Practical knowledge on Changing fuse ,replacing of electrical equipment such as bulbs and fan's etc
- ❖ Arrange Your own LED light settings at home
- ❖ Design simple electronics circuits of home such as Automatic water level irrigation system , Burglar alarm etc)

## DEPARTMENT OF PHYSICS

CERTIFICATE COURSE IN ELECTRICAL AND ELECTRONIC INSTRUMENTATION			
<b>PAPER I</b>	<b>FUNDAMENTALS OF ELECTRICAL &amp; ELECTRONIC MACHINES &amp; MEASURING INSTRUMENTS</b>	<b>18NPHC11</b>	
<b>Total Hrs:45</b>	<b>Hrs/week:2</b>	<b>Hrs./ UNIT : 9</b>	<b>Credit: 3</b>

**Unit-01: Fundamentals of Electricity** Electron theory & fundamental terms-Basic Electrical circuits- Ohm's Law- , Laws of resistance. Resistances in series and parallel. Voltage and current division, Kirchoff's Laws and applications.

**Unit-02:Magnetism-** Principle of electro-magnetism, MMF, Flux density, reluctance. Alternating current circuits: Fundamentals and characteristics of AC circuits, Ac through R, L and C load. Power factor.

**Unit-03:Semiconductor materials:** 'P' type and 'N' type –P-N-junction. Basic concept of diode, transistor, MOSFET, SCR and IGBT. D.C. rectifier circuit: Half wave, Full wave and Bridge type rectifier circuit. Filter circuits.

**Unit-04: DC machines:** General concept of Electrical Machines, Types of DC Machine, Constructional features of D.C machine- Principle of D.C. generator and motor.

**Unit-05: Electrical Measuring Instruments:** classification, PMMC & MI meter (Ammeter, Voltmeter)- Range extension Study of Multimeter (Digital/Analog), Wattmeter, P.F. meter, - Energy meter (Digital/Analog), Insulation Tester (Megger), Frequency meter, Phase Sequence meter, Tachometer. Study of Oscilloscope.

### TEXT AND REFERENCE BOOKS:

1. Fundamentals of Electricity and Magnetism by Vasudeva D.N
2. Operation and maintenance of electrical appliances Vol I& II by B V S Rao
3. V.K.Mehtha "PRINCIPLES OF ELECTRONICS", S.Chand & Co, New Delhi, II Edition

<b>CERTIFICATE COURSE IN ELECTRICAL AND ELECTRONIC INSTRUMENTATION</b>			
<b>PAPER II</b>	<b>ELECTRICAL APPLIANCES,EQUIPMENTS INSTALLATION AND MAINTENANCE</b>		<b>18NPHC12</b>
<b>Total Hrs:45</b>	<b>Hrs/week:2</b>	<b>Hrs./ UNIT : 9</b>	<b>Credit: 3</b>

**Unit-01: Lighting:** Basics of illumination, Types of light (GLS,FTL, CFL, LED, MVL etc.) construction, working and applications, Light selection by manual method, IE rules.

**Unit-02: Electric Fans:** Types and selection of fans used at home: Ceiling fans, Table fan, Stand fan and Exhaust Fan. Construction and working of Heating appliances.

**Unit-03: Types of batteries:** construction, methods of charging, methods of connection and maintenance-Precautions to be taken. Ni-cadmium & Lithium cell, Different types of lead acid cells.

**Unit-04: Domestic installation** – Estimation- Domestic Installation – Practical- Principle of different methods of earthing. i.e. Pipe, Plate, etc Importance of Earthing. Improving of earth resistance, Earth Leakage circuit breaker (ELCB). Selection of Earthing according to the requirement of buildings.

**Unit-05: Lightning Arrestors:** Introduction to Lightning Arresters. Basic principles of Electroplating and Electro chemical effects. Explanation of cells, Electrical appliances: Servicing Fans, Stabilizer, UPS, TV–Instructions for maintenance. Electrical Hazards. Basic safety introduction, Personal protection. Use of Fire extinguishers.

#### **TEXT AND REFERENCE BOOKS:**

1. Electronic Instrumentation by Kalsi
2. Operation and maintenance of electrical appliances Vol I & II by B V S Rao

<b>CERTIFICATE COURSE IN ELECTRICAL AND ELECTRONIC INSTRUMENTATION</b>		
<b>PAPER III</b>	<b>Practical in Electrical &amp; Electronic Instrumentation</b>	<b>18NPHCP1</b>
<b>Total Hrs:30</b>		<b>Credit: 2</b>

#### **UNIT I**

1. Verification of ohms law by using ammeter, voltmeter in dc circuit or low voltage.
2. Verification of the characteristics of DC series & Parallel circuits
3. Verification of Kirchhoff's laws by using Meter Bridge or appropriate method or by using series and parallel circuits.
4. Verification of Resistance laws by using ohm meter.
5. Measurement of Power by voltmeter and ammeter.
6. Dismantling, re-assembling and troubleshooting of Electric Fan and Exhaust fan

#### **UNIT II**

7. Construction and verification of OR , AND , NOT gate
8. Construction and verification of Universal gates: NOR, NAND – XOR gate
9. Practice on fixing electrical/electronic accessories on switch boards/main boards/spread boards.
10. Rectifier circuits-Halfwave & Fullwave.
11. Testing of Electronic components Resistors, Capacitors, Induction coil, Transistors, Diode.
12. Methods of Soldering & Dri Soldering.



## **Sadakathullah Appa College (Autonomous)**

**Rahmath Nagar, Tirunelveli -627 011.**

**Certificate Course in Electrical and Electronic Instrumentation**

**Offered by Department of Physics**

**Upon completion of the Course students will be able to:**

- Understand the fundamentals of electricity, magnetism and the working of electronic machines and electrical measuring instruments.
- Understand the installation, working and manufacture of various electrical appliances.
- Get an insight about the basic concepts of electronic instrumentation.
- Experiment to verify the basic circuit theorems.
- Develop the knowledge in various electronic fields with a view to reducing power consumption.