NEHRU MEMORIAL COLLEGE (AUTONOMOUS)
PUTHANAMPATTI -621 007
DEPARTMENT OF PHYSICS

CERTIFICATE/DIPLOMA/ADVANCED DIPLOMA IN ELECTRICAL AND ELECTRONIC EQUIPMENT MAINTENANCE

S.No.	Semester	Course	Exam.Hrs	Max.Marks	Credits
1	II	Paper -I Basic Electricity	3	100	4
2	II	Practical - I Basic Electricity	3	100	8
3	II	On the Job Training/project	--	100	4
4	III	Paper -II Principles of Electronics	3	100	4
		Total			**20**
5	III	Paper -III Electrical Wiring	3	100	4
6	IV	Paper -IV Linear Integrated Circuits	3	100	4
7	IV	Practical - II Electronics and Electrical wiring	3	100	8
8	IV	On the Job Training/Project	--	100	4
		Total			**20**
9	V	Paper -V Electrical Technology	3	100	4
10	V	Paper -VI Troubleshooting in Electrical equipment	3	100	4
11	VI	Practical - III Linear integrated circuits and Troubleshooting Lab	3	100	8
12	VI	On the Job Training/Project	--	100	4
		Total		**1200**	**20**

Semester II

Paper – I Basic Electricity

Unit – I: The Nature of Electricity

Structure of the Atom – The electric charge – Electrostatic field – potential difference – current – current flow – sources of electricity – Direct and alternating currents and voltages – graphical symbols and electrical diagrams – standard circuit symbols.

Unit – II: Electric circuits

The electric circuit – resistance – fixed & variable resistors – Ohm's law – electric power – Horse power – electric energy – Direct current series circuits- voltage , current & resistance in series circuits – polarity of voltage drops – conductors – wire measurement – Temperature Co-efficient – total power in a series circuit – voltage drop by proportional parts – problems.

Unit – III: DC parallel circuits & Electric Laws

Voltage and current in a parallel circuit – resistances in parallel – open and short circuits – division of current in two parallel branches – conductors in parallel – power in parallel circuits – Kirchhoff's laws – KVL – KCL- mesh currents – node voltages – network calculation – Y2 delta networks – superposition – Thevenin's theorem – Nortan's theorem – seven parallel circuits maximum power transition.

Unit – IV: Alternate Current, Inductance & capacitance

Generating an alternating voltage – Alternating current – frequency and period – phase relationships – phasors – characteristic values of voltage to current – resistance in ac circuits – Induction – characteristics of coils – inductive reactance – inductors in series or parallel – inductive circuits – Q of a coil – power in RL circuits – capacitor- capacitance – types of capacitor – capacitor in series and parallel – capacitive circuits.

Unit – V: Single phase, three phase system & series and parallel resonance & transformers

RLC in series – RLC in parallel – RL and RC branches in parallel – power and power factor – ideal transformer characteristics – transformer ratings – auto transformer – losses of deficiency – no load condition – coil polarity – characteristics of three phase systems – three phase transformer connections – series resonance – Q of series circuit – parallel resonance – Q of parallel circuit – bandwidth ad power of resonant circuit.

Study and Reference Book

1. Basic Electricity , Milton Gussow , Tata, Mcgraw – Hill publishing company Ltd., New Delhi.(schaum's outlines), second edition, 2004.

Semester II

Practical - I Basic electricity

(Any ten experiments)

1. Study of resistance using colour code and finding their values when they are in series and in parallel.
2. Study of Kirchhoff's voltage law.
3. Study of Kirchhoff's current law.
4. Study of Thevenin's theorem
5. Study of Norton's theorem
6. Study of superposition theorem
7. Study of capacitors in series and in parallel
8. Characteristics of RC network
9. Characteristics of LC network
10. Characteristics of RLC network
11. Characteristics of RL network
12. Determination of quality factor of coil

Semester III

Paper -II Principles of Electronics

Unit-I – Semiconductor diodes

Classification of semiconductors – properties of Intrinsic semiconductors- variation in semiconductor parameters with temperature – PN junction diode – applications – Zener diode – varactor diode- Tunnel diode – Gunn diode – Laser diode

Unit –II Transistor and FET

Transistor – construction – Operation of NPN transistor and PNP – Types of Configuration – JFET – Construction and operation of N Channel FET – Comparison of JFET and BJT – Applications of FET

Unit – III MOSFET

MOSFET – Enhancement MOSFET – Depletion MOSFET – Comparison of MOSFET with JFET – FET as Voltage variable resistor – Charge Transfer Devices

Unit-IV Thrysistors

Introduction – Construction and operation of PNPN diode –SCR – LASCR – TRIAC – DIAC - UJT

Unit –V Oscillators

Basic concept of Feedback – Effects of Negative feedback – Classification of oscillators – Barkhausen criterion – Hartley oscillator – Colpitts oscillator – Crystal oscillator.

BOOK FOR STUDY AND REFERENCE

1. S.Salivahanan, N.Suresh Kumar, A.Vallavaraj, Electronic Devices and Circuits, Tata McGraw – Hill Publishing Company Limited, New Delhi, , 21th reprint 2006.

Semester III

Paper -III Electrical Wiring

Unit -I Home Wiring

Install DPDT switching - Install Three way switching - Install a door bell, buzzer- DPDT switch- Four way switches - types-The languages of switches -Wires - Types - wire joints -Cables -Types of cables-Laying of UG cables - Selection of cables

Unit -II Wiring system and Fuse

Selecting a particular type of wiring - General rules for wiring - Various systems of wiring - Wood casing capping wiring - Wood casing capping joints - Conduit wiring systems - Fuse - rated current of fuse - fusing current of fuse - types - earth - Why earthing is done - Earth electrode .

Unit -III Method of Testing

To make a series parallel testing board -study of Megger - Testing of House installation by Megger - Testing of polarity - Measurement of earth resistance - Testing of underground cables

Unit -IV Electrical Lighting

Stair-case lighting - different types of lamps used for lighting - Connection and study of sodium lamp and Mercury vapour lamp - Fluorescent tube in ac supply - High fidelity sound system receptacles- first floor receptacle - install electrical outlet strips - precautions in using an outlet strip-external wall wiring

Unit-V Distribution

Service connections - Conditions relating to service line - Indian Electricity rules pertaining to overhead lines - conditions relating to distribution and transmission - DC and AC distribution system - Colour marking standard distribution - advantages of HV transmission- Comparison of DC and AC system.

Books for study and reference

1. B.D.Arora A Handbook of Electrical wiring estimating and Costing, R.B.Publications, Delhi, 12th edition, 2000.

Semester IV

Paper –IV LINEAR INTERGRATED CIRCUITS

Unit I-OPERATIONAL AMPLIFIER

Basic information of Operation Amplifier-Circuit Symbol-Op-Amp Terminals-Power Supply Connections-Ideal Operation Amplifier- Ideal Operation Amplifier-Open Loop Operation of Op-Amp-Feedback in Ideal Op-Amp-Inverting Amplifier-Non Inverting Amplifier- Voltage Follower-Differential Amplifier-Common Mode Rejection Ratio-D.C Characteristics-A.C Characteristics.

Unit II-OPERATIONAL AMPLIFIER APPLICATIONS

Basic Op-Amp Applications-Summing Amplifier-Inverting Summing Amplifier-Non Inverting Summing Amplifier-Adder-Subtractor-Instrumentation Amplifier-A.C Amplifier-Voltage to Current and Current to Voltage Converter-Sample and Hold Circuit-Log and Antilog Amplifiers-Differentiator-Integrator.

Unit III-WAVEFORM GENERATORS AND ACTIVE FILTERS

Comparator-Applications of Comparator-Square Wave Generator (Astable Multivibrator)-Monostable Multivibrator-Triangular Wave Generator-Sine Wave Generators-Phase Shift Oscillator-Wien Bridge Oscillator-RC Active Filters-Low Pass Filter-High Pass Filter-Band Pass Filter-Band Reject Filter.

Unit IV- 555 TIMER AND PHASE LOCKED LOOPS

555 Timer-Description of Functional Diagram-Monostable Operation-Astable Operation-Schmitt Trigger-Phase Locked Loops-Basic Principles-Phase Detector/Comparator-Voltage Controlled Oscillator-Low Pass Filter-PLL Application.

Unit V-D-A AND A-D CONVERTERS

Basic DAC Techniques-Weighted Resistor DAC-R-2R Ladder DAC-Inverted R-2R Ladder-A-D Converters-Parallel Comparator Converter-Counter type Converter-Successive Approximation Converter-Dual-Slope ADC-DAC/ADC Specifications.

BOOK FOR STUDY AND REFERENCE:

1. D.Roy Choudhury, Shail Jain Linear Integrated Circuits, New Age International (P) Limited, Publishers.

Semester IV

Practical – II Electronics and Electrical wiring

(Any ten experiments)

Electronics

1. Characteristics of Rectifier Diode.
2. Characteristics of Zener Diode.
3. Characteristics of NPN transistor (CE mode)
4. Study of Lissajous Figures.
5. Characteristics of FET
6. Construction of full wave rectifier
7. Regulated power supply (IC based)

Electrical wiring system

1. Connecting switches
2. Identification of cables
3. Install door bells and buzzer
4. Connecting switches and lamps
5. Install two way and three way switch

Semester V

Paper -V ELECTRICAL TECHNOLOGY

Unit I -ELECTRO-MACHANICAL ENERGY CONVERSION AND GENERATOR

Introduction-Salient aspects of conversion-Energy Balance-Magnetic field system: Energy and Co-energy - Generator Principal-Simple Loop Generator-Practical Generator-Yoke- Armature Core-Types of Generators- E.M.F. Equation of a Generator-Iron Loss in Armature-Total loss in a D.C. Generator-Stray Losses—standing losses - Power Stages-Condition for Maximum Efficiency.

Unit II- GENERATOR CHARACTERISTICSAND D.C. MOTOR

Characteristics of D.C. Generators-Serial Generators-Compound wound Generators-Uses of D.C. Generators. D.C. MOTOR - Motor Principle-Comparison of Generators and Motor Action-Voltage Equation of a Motor-Condition for Maximum Power-Motor Characteristics-Characteristics of Series Motors- Characteristics of Shunt Motors-Compound Motors-Comparison of Shunt and Series Motors-Losses Power Stages.

Unit III- INDUCTION MOTOR

Classification of AC Motors-Induction Motors: General Principal-Construction-Squirrel cage Rotor-Phase wound Rotor-Three phase Supply-The Rotor Rotate-Plugging of an Induction Motor-Induction Motor Operating as a Generator-Power Stages in an Induction Motor-Liner Induction Motor-Properties of a Linear Induction Motor-Equivalent Circuit of an Induction Motor- Maximum Power Output.

Unit IV-SINGLE-PHASE MOTORS

Types of Single Phase Motors-Single Phase Induction Motor-Making Single Phase Induction Motor Self Starting-Equivalent Circuit of Single Phase Induction Motor-Without Core Loss-With Core Loss-Types of Capacitors-Start Motors-Capacitor Start and Run Motor--Universal Motor. ALTERNATORS:Basic Principle-Stationary Armature-Details of Construction-Rotor-Damped Winding-Speed and Frequency-Armature Winding-Concentric or Chin Windings

Unit V- SYNCHRONOUS MOTOR

Synchronous Motor General-Principle of Operation-Method of Starting-Motor on Load with Constant Excitation-Power Flow within a Synchronous Motor-Equivalent Circuit of a Synchronous Motor- Methods of Starting-Procedure for Starting a Synchronous Motor-Comparison between Synchronous and Induction Motor-Synchronous Motor Application.

SPECIAL MACHINES -Induction-Stepper Motor- Permanent Magnet Stepping Motor-Hybrid Stepper Motor-Summary of Stepper Motor-Permanent Magnet DC Motor-Printed Circuit (Disc) DC Motor-Synchros-Types of Synchros-Application of Synchros.

BOOK FOR STUDY AND REFERENCE:

1. B.L.Theraja, A.K.Theraja, A Text Book of Electrical Technology,Volume II AC&DC Machines, S.Chand and Company Ltd., New Delhi.

Semester V

Paper -VI TROUBLE SHOOTING IN ELECTRONIC EQUIPMENT

Unit I-MODERN ELECTRONIC EQUIPMENT AND MAINTENACE CONCEPTS

Modern Electronic Equipment - Potential Problems-Quality-Failures-Failures Rate-Mean Time between Failures-Mean Time to Fail-Maintainability-Mean Time to Repair-Fail Safe Design- Maintenance Policy-Stage of Maintenance.

MAINTENANCE AIDS AND RECORDS: Test Instruments-Tools-Service Manual-Transistor and IC Data Book-Logbook-Service Engineer.

TROUBLESHOOTING AND REPAIR PROCEDURE: Steps in Troubleshooting-Users Complaint and Report-Testing of power supply Unit-Identification of Faulty Section-Identification of Faulty Component.

SOLDERING AND DESOLDERING TECHNIQUES:

Solder Joining-Dry Solder Joint- Good and bad Solder Joints-Soldering material- Soldering Tools-Soldering Iron-De soldering.

Unit II PASSIVE AND ACTIVE COMPONENTS

Resistor-Common Fault in Resistor- Testing of Resistor- Capacitors- Common Fault in Capacitor-Testing of Capacitor-Inductors-Common Fault in Inductor-Testing of Inductors-Transformers-Common Fault in Transformers-Testing of Transformers.

ACTIVE COMPONENTS: Junction Diode-Rectifier Circuits-Zener Diodes-Faults in Zener Diodes-Photodiode and Photocell-Light Emitting Diodes (LED)-Bipolar Junction Transistor-Amplification Action-Faults in Transistor -Field Effect Transistor- Faults in Field Effect Transistor.

Unit III - OPERATIONAL AMPLIFIERS AND DIGITAL CIRCUITS

Typical Faults in Operational Amplifier-Measurement of Parameters- DIGITAL CIRCUITS Basic Logic Gates-Special Gates (XOR and XNOR)-SR Flip Flop-D Latch-D Flip Flop-JK Flip Flop-T Flip Flop-Advantage and Disadvantage of Digital Circuit.

Unit IV-TROUBLESHOOTING IN POWER SUPPLY UNITS

Troubleshooting Procedure for Power Supply Units-Series Regulator-Tree Terminal Regulators-Switched Mode Power Supply (SMPS)-Testing of Power Supply Units-Uninterrupted Power Supply Unit (UPS)

TROUBLESHOOTING IN MEASURING INSTRUMENTS

Troubleshooting in CRO-Typical Faults and Remedies in CRO-RF Signal Generator-Troubleshooting in Digital Millimeter's.

Unit V- TROUBLESHOOTING IN COMPUTERS AND OTHER DEVICES

Part of Computer- Diagnostic Software-Testing Computers in Core Elements-Faults Diagnosis in Peripheral Units and Disks.

Digital Clock-Washing Machine-Microwave Oven-Electronic Ignition System-Cellular phone-Electronic Calculators.

BOOK FOR STUDY AND REFERENCE:

1. R.G Gupta, Electronic Instruments and Systems Principles, Maintenance and Troubleshooting, Tata McGraw-Hill Publishing Company Limited, New Delhi.

Semester VI

Practical – III Linear Integrated circuits and troubleshooting lab

(Any Ten experiments)

Linear Integrated circuits

1. Inverting amplifier
2. Non inverting amplifier
3. Inverting summing amplifier
4. Phase shifter
5. Subtractor
6. Integrator
7. Differentiator
8. 3- bit D/A converter

Troubleshooting lab

1. Power supply
2. Diodes and transistors
3. Operational amplifier
4. Digital ICs

[redacted]	
2 courses + Practical + on the job Training/project/In plant training	20 credits
[redacted]	
4Courses + 2 Practical + On the job Training/Project/ In plant training	40 credits
[redacted]	
6 Courses + 3 Practical + on the job training/project/ In plant training	60 credits

FOR PROVISIONAL CERTIFICATE

NEHRU MEMORIAL COLLEGE

(Autonomous, Accredited with 'A' Grade by NAAC & Affiliated to Bharathidasan University, Tiruchirappalli)

Puthanampatti-621007, Tiruchirappalli- District

Particulars of Advanced Diploma Student(s) who has/have completed his/her/their programmes in the Examinations held in APRIL 2016.

Diploma : D.E.E.E.,

Programme : ELECTRICAL AND ELECTRONICS EQUIPMENT MAINTENANCE

Centre	Batch	Degree	Subject	Ftpt	Dayeven	Regno	Stuname	CGPA MAX	CGPA MARK	CLASS	GRADE	Monthyear
18	2013	ADVANCED DIPLOMA	ELECTRICAL AND ELECTRONICS EQUIPMENT MAINTENANCE	PT	E	2K13ADQ101	NIRMALA T	10.00	8.91	D	D++	APR 16
18	2013	ADVANCED DIPLOMA	ELECTRICAL AND ELECTRONICS EQUIPMENT MAINTENANCE	PT	E	2K13ADQ102	PRABHAVATHI B	10.00	7.97	D	D	APR 16
18	2013	ADVANCED DIPLOMA	ELECTRICAL AND ELECTRONICS EQUIPMENT MAINTENANCE	PT	E	2K13ADQ103	SARANYA S	10.00	8.30	D	D+	APR 16
18	2013	ADVANCED DIPLOMA	ELECTRICAL AND ELECTRONICS EQUIPMENT MAINTENANCE	PT	E	2K13ADQ104	SARASWATHI C	10.00	8.07	D	D+	APR 16
18	2013	ADVANCED DIPLOMA	ELECTRICAL AND ELECTRONICS EQUIPMENT MAINTENANCE	PT	E	2K13ADQ105	VASANTHI S	10.00	8.40	D	D+	APR 16
18	2013	ADVANCED DIPLOMA	ELECTRICAL AND ELECTRONICS EQUIPMENT MAINTENANCE	PT	E	2K13ADQ106	KARTHICK M	10.00	8.13	D	D+	APR 16
18	2013	ADVANCED DIPLOMA	ELECTRICAL AND ELECTRONICS EQUIPMENT MAINTENANCE	PT	E	2K13ADQ107	MEENA A	10.00	8.53	D	D++	APR 16

PAGE TOTAL : 7

GRAND TOTAL : 7

19/8/17

PRINCIPAL

PRINCIPAL
NEHRU MEMORIAL COLLEG
(AUTONOMOUS)
PUTHANAMPATTI-621 007