

VOCATIONAL CURRICULUM - 2020

**ELECTRONICS AND
COMMUNICATION
TECHNICIAN**



State Institute of Vocational Education

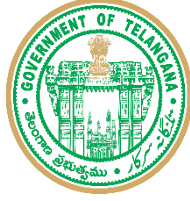
**O/o the Commissioner of Intermediate Education,
Telangana State, Hyderabad**

&

Board of Intermediate Education

Telangana State, Hyderabad

Dr. A.AshokI.A.S
COMMISSIONER



INTERMEDIATE EDUCATION
Government of Telangana
Nampally, Hyderabad- 500001
Phone: 040-24655915

Fore word

In any developing society with a booming population, Vocational Education occupies an important position for generating large scale employment opportunities. Viewed in this context the importance of Vocational Education for our country cannot be over emphasized. Vocationalization of Secondary Education was introduced in 1988 at the Intermediate level. Recently, the Government of India has developed a National Skills Qualification Framework for establishing a clear path for vocational education from the school level to the highest level. The Department of Intermediate Education has recently framed a new curriculum to bring greater value to the system of vocational education. The primary aim of this reform is to prepare the students with employable skills for absorption in organized sectors and in few cases, even for self-employment.

State Institute of vocational education and Board of Intermediate Education, Telangana have reviewed the curriculum of vocational courses in order to reorient them for their practical approach. Greater emphasis is now being placed on Laboratory work and on the job training.

Simultaneously, The State Institute of Vocational Education and the department of Intermediate Education are presently making efforts to upgrade the quality of infrastructure in the colleges to meet the challenges of the changed curriculum. I am confident that the revised curriculum and the new text books would prove to be beneficial to the students in the vocational stream and help them train in need based productive courses leading to gainful employment.

Commissioner of Intermediate Education
Government of Telangana

A handwritten signature in green ink, appearing to be 'A. Ashok', written over the printed name of the Commissioner.

| S No. | Contents | Page No. |
|-----------------|---|-----------------|
| I | Introduction | 5 |
| II | Objectives of the Course | 5 |
| III | Skills to be provided | 5 |
| IV | Job Opportunities a) Wage Employment b) Self-Employment | 5 |
| V | Scheme of Instruction and Examination | 6 |
| SYLLABUS | | |
| VI | 1st year Intermediate Theory Paper I: Circuit Theory and Electronic Components. Paper II: Electronic Devices and Circuits. Paper III: Digital Electronics and Computer Fundamentals Practicals Paper I: Engineering Drawing Paper II: Electronic Devices and Circuits. Paper III: Digital Electronics and Computer Fundamentals | 10 |
| VII | 2nd Year Intermediate Theory Paper I: Communication Engineering Paper II: Modern Communication Systems Paper III: Measuring Instruments and Consumer Electronics Practicals Paper I: Communication Engineering Paper II: TV and Mobile Phone Servicing Lab Paper III: Instrumentation and Measurements Lab | 22 |
| VIII | Model Question Papers | 34 |
| IX | List of Equipment a) Collaborating Institutions for curriculum transaction b) On – the – Job Training Sites | 40 |
| X | Teaching staff and their Qualification | 42 |
| XI | Vertical Mobility | 42 |
| XII | Reference Books | 42 |
| XIII | List of Participants | 43 |

I.**INTRODUCTION**

Competency based curriculum on Analog, Digital Electronics and Communication Engineering had been developed for two-year Intermediate Vocational Course at the plus two level of education. It had been designed to ensure attainment of knowledge and skills required for performing the job.

II.**OBJECTIVE OF THE COURSE**

To learn theory and practical skills in the field of Electronics and Communication Engineering along with assembling, testing and maintenance of Analog and digital electronic equipment with computer knowledge.

III.**SKILLS TO BE PROVIDED**

Assembling, Testing and Maintenance of all Electronics and Communication equipment

IV.**JOB OPPORTUNITIES****a) Wage Employment**

- 1) Electronic Equipment Assemblies
- 2) Electronic Equipment Testing
- 3) Electronic Equipment Repairing
- 4) Installation and Maintenance of Analog and Digital Electronic Equipment
- 5) Electronic Equipment Sales and Service

b) Self Employment

- 1) Servicing of Electronic Equipment
- 2) Dealership/Agency for Electronic Equipment
- 3) Manufacturing of Electronic Equipment

V. **SCHEME OF INSTRUCTION AND EXAMINATION**
ANNUAL SCHEME OF INSTRUCTION AND EXAMINATION FOR
ELECTRONICS AND COMMUNICATION TECHNICIAN
FIRST YEAR

| Part-A | Theory | | Practicals | Practicals | | Total | | |
|---------------|---|------------|------------|---|------------|------------|-------------|------------|
| | Periods | Marks | | Periods | Marks | Periods | Marks | |
| 1. | English | 150 | 50 | - | 0 | 0 | 150 | 50 |
| 2. | General Foundation course | 150 | 50 | - | 0 | 0 | 150 | 50 |
| Part-B | | | | - | | | | |
| 3. | Paper-I Circuit Theory and Electronic Components. | 135 | 50 | Paper –I Engineering Drawing | 135 | 50 | 270 | 100 |
| 4. | Paper-II Electronic Devices and Circuits. | 135 | 50 | Paper –II Electronic Devices and Circuits Lab | 135 | 50 | 270 | 100 |
| 5. | Paper-III Digital Electronics and Computer Fundamentals | 135 | 50 | Paper –III Digital Electronics and Computer Fundamental Lab | 135 | 50 | 270 | 100 |
| 6 | Part-C OJT | 0 | 0 | | 365 | 100 | 365 | 100 |
| Total | | 705 | 250 | | 770 | 250 | 1475 | 500 |

*on the Job Training for 1st year from 1stDecember to 31st December

ON JOB TRAINING - FIRST YEAR

1. During first year the student has **to identify** the different types of wires,cables, ribbon cables, switches, connectors, heat sinks, nuts, screws, screw drivers, spanners and Instruments.
2. Identification of Active &Passive components, Semiconductor devices,ICs. Pin Configuration.
3. Develop the skills to work with soldering/tools and instruments.
4. Understand the First aid and Safety precautions in Industry

SECOND YEAR

| Part-A | | Theory | | | Practicals | | Total | |
|--|--|------------|------------|---|------------|------------|-------------|-------------|
| | | Periods | Marks | | Periods | Marks | Periods | Marks |
| 1. | English | 150 | 50 | - | 0 | 0 | 150 | 50 |
| 2. | General Foundation course | 150 | 50 | - | 0 | 0 | 150 | 50 |
| Part-B | | | | | | | | |
| 3. | Paper-I Communication Engineering | 110 | 50 | Paper –I Communication Engineering Lab | 115 | 50 | 225 | 100 |
| 4. | Paper-II Modern Communication Systems | 110 | 50 | Paper –II TV and Mobile Phone Servicing Lab | 115 | 50 | 225 | 100 |
| 5. | Paper-III Measuring Instruments and Consumer Electronics | 110 | 50 | Paper –III Instrumentation and Measurements Lab | 115 | 50 | 225 | 100 |
| 6. | Part-C OJT | 0 | 0 | | 450 | 100 | 450 | 100 |
| Total | | 630 | 250 | | 795 | 250 | 1425 | 500 |
| TOTAL 1st YEAR AND 2nd YEAR MARKS | | | | | | | | 1000 |

*OJT Programme for 2nd year students from 15th October 30th November

ON JOB TRAINING - SECOND YEAR

1. During Second year the student has to **identify** the different types of **Modules**
2. Measurement of Input and Output Voltages of the modules with Digital Multimeter.
3. Identifications of faults in soldering joints.
4. Quality control tests.
5. Understand the First aid and Safety precautions in Industry

EVALUATION OF ON THE JOB TRAINING:

The “On the Job Training” shall carry 100 marks for each year and pass marks is 50. During on the job training the candidate shall put in a minimum of 90 % of attendance.

The evaluation shall be done in the last week of January.

Marks allotted for evaluation:

| S.No | Name of the activity | Max. Marks allotted for each activity |
|------|-------------------------------------|---------------------------------------|
| 1 | Attendance and punctuality | 30 |
| 2 | Familiarity with technical terms | 05 |
| 3 | Familiarity with tools and material | 05 |
| 4 | Manual skills | 05 |
| 5 | Application of knowledge | 10 |
| 6 | Problem solving skills | 10 |
| 7 | Comprehension and observation | 10 |
| 8 | Human relations | 05 |
| 9 | Ability to communicate | 10 |
| 10 | Maintenance of diary | 10 |
| | Total | 100 |

NOTE: The On the Job Training mentioned is tentative. The spirit of On the Job training is to be maintained. The colleges are at liberty to conduct on the job training according to their local feasibility of institutions & industries. They may conduct the entire on the job training periods of (365) First year and (450) Second year **either by conducting classes in morning session and send the students for OJT in afternoon session or two days in week or weekly or monthly or by any mode which is feasible for both the college and the institution.** However, the total assigned periods for on the job training should be completed. The institutions are at liberty to conduct On the Job training during summer also, however there will not be any financial commitment to the department.

SCHEME OF INSTRUCTION PER WEEK

| | Part-A | Theory | Practicals | Total |
|----|---------------------------|---------------|-------------------|--------------|
| 1. | English | 4 | - | 4 |
| 2. | General Foundation Course | 4 | - | 4 |
| | Part-B | | | |
| 3. | Paper –I | 4 | 4 | 8 |
| 4. | Paper-II | 4 | 4 | 8 |
| 5. | Paper-III | 4 | 4 | 8 |
| 6. | Total | 20 | 12 | 32 |

**ELECTRONICS AND COMMUNICATION TECHNICIAN
FIRST YEAR
PAPER I: CIRCUIT THEORY AND ELECTRONIC COMPONENTS (THEORY)
TIME SCHEDULE**

| Sl. No | Major Units | No. of periods | Weight age of marks | Short Answer Questions | Essay Questions |
|--------|----------------------------------|----------------|---------------------|------------------------|-----------------|
| 1 | Resistors | 15 | 8 | 1 | 1 |
| 2 | Inductors & Transformers | 15 | 8 | 1 | 1 |
| 3 | Capacitors | 15 | 8 | 1 | 1 |
| 4 | Fundamentals of DC & AC circuits | 25 | 10 | 2 | 1 |
| 5 | Miscellaneous components | 20 | 10 | 2 | 1 |
| 6 | Soldering & PCB's | 15 | 8 | 1 | 1 |
| 7 | SMD components | 15 | 8 | 1 | 1 |
| 8 | Batteries & Cells | 15 | 8 | 1 | 1 |
| | Total | 135 | 68 | 10 | 8 |

DETAILED SYLLABUS

| <u>S.No</u> | <u>SYLLABUS</u> |
|-------------|--|
| 1. | <p>RESISTORS</p> <p>1.1. Types of Resistors, Fixed & Variable 1.2. Fixed-carbon film, wire wound, metal film 1.3. Colour codes 1.4. Measurement of resistance 1.5. Variable -types: potentiometers, presets 1.6. Power rating: 1/8Watt, 1/4 Watt, 1/2Watt, 1 Watt, 2 Watt, Metal/ carbon film resistors and Wire Wound Resistors from 5 Watt to few 1000 Watt etc. 1.7. Resistors in Series and Parallel</p> |
| 2. | <p>INDUCTORS & TRANSFORMERS</p> <p>2.1. Electromagnetic induction 2.2. Faraday's laws and Lenz law 2.3. Self-inductance L 2.4. Mutual inductance M concept 2.5. Co-efficient of coupling 2.6. Inductors in Series and Parallel 2.7. Ratings and Specifications 2.8. Factors effecting the inductance 2.9. Transformer – working principle 2.10. Types of transformers: Step up / down, AF, RF & IF 2.11. Types of Cores used Iron core, Silicon Core (and usage) 2.12. Power transformer and other types 2.13. Ratings and Specifications</p> |

| | |
|----|--|
| 3. | <p>CAPACITORS</p> <p>3.1. Working principle</p> <p>3.2. Types of capacitors: Fixed & Variable</p> <p>3.3. Types of Dielectrics used: air, paper, mica, glass, ceramic, electrolyte and its applications</p> <p>3.4. Types polarized and non-polarized</p> <p>3.5. Colour codes of Capacitors</p> <p>3.6. Measurement of capacitance</p> <p>3.7. Capacitors in series and parallel</p> <p>3.8. Ratings and Specifications</p> |
| 4. | <p>FUNDAMENTALS OF DC & AC CIRCUITS</p> <p>4.1. Electrical quantities: Voltage, Current, Resistance, Conductance, Admittance, Power, VA etc.</p> <p>4.2. Ohm's Law</p> <p>4.3. Kirchhoff's Current Law, Voltage Law</p> <p>4.4. Kirchhoff's Series & Parallel circuits-simple calculations</p> <p>4.5. Power calculations</p> <p>4.6. A.C.Fundamentals : Sinusoidal ac, Phase, Phase difference, Periodic time, Frequency</p> <p>4.7. Instantaneous values, peak values, average values, notations used</p> <p>4.8. AC power : Real Power & Apparent Power</p> <p>4.9. AC circuits containing RL, RC & RLC in Series & Parallel Circuits</p> <p>4.10. Derive expression for Series and Parallel Resonance</p> |
| 5. | <p>MISCELLANEOUS COMPONENTS</p> <p>5.1. Wires : Single Core/, Multi-core</p> <p>5.2. SWG's, Ratings , Wire Joints</p> <p>5.3. Types of Connectors</p> <p>5.4. Types of Terminators</p> <p>5.5. Making terminations using tools</p> <p>5.6. Classify switches according to poles and throws (SPST, SPDT, DPST, DPDT, Multi-pole multi-throw), symbols and ratings</p> <p>5.7. Relays: Working Principle, types, symbols and ratings</p> <p>5.8. Contactors: Working Principle, types, symbols and ratings</p> <p>5.9. Microphone: Working Principle, types, symbols and ratings</p> <p>5.10. Loud speaker: Working Principle, types, symbols and ratings</p> <p>5.11. Testing of all above components with meter</p> |
| 6. | <p>SOLDERING & PCBs</p> <p>6.1. Soldering basics</p> <p>6.2. Soldering irons, de soldering pumps -types, soldering lead-types, ratings, fluxes</p> <p>6.3. Temperature controlled soldering/De-soldering stations</p> <p>6.4. PCB-types, single sided, double sided, multi-layered</p> <p>6.5. Soldering drills</p> |

| | |
|-----------|--|
| | 6.6. Steps in preparation of PCB |
| 7. | SMD COMPONENTS 7.1. SMD components –types 7.2. SMD soldering stations 7.3. Give an idea of Surface Mount Technology (SMT). 7.4. State the advantages of SMT over Pin Through Hole (PTH) mounting |
| 8. | BATTERIES & CELLS 8.1. Primary cells and Secondary cells-Applications 8.2. Types: Ni-Cd, Alkaline, Ni-ion, Li-ion, Li-polymer –Applications 8.3. Charging and discharging of cells 8.4. Cells in series and parallel-effect on current/voltage 8.5. Testing of Cells with meter 8.6. Ratings & Specifications 8.7. Batteries – Lead acid & maintenance free batteries 8.8. Testing of batteries 8.9. Ratings & Specifications of batteries |

**ELECTRONICS AND COMMUNICATION TECHNICIAN
FIRST YEAR
PAPER I: ENGINEERING DRAWING(PRACTICALS)**

| S.NO | Major Units | Periods | Weightage of marks | Essay type questions |
|--------------|--|----------------|---------------------------|-----------------------------|
| 1 | Importance of Engineering Drawing | 3 | - | - |
| 2 | Drawing instruments | 2 | | |
| 3 | Free hand lettering & Numbering | 10 | 5 | - |
| 4 | Dimensioning Practice | 10 | 5 | - |
| 5 | Geometrical construction | 25 | 8 | |
| 6 | Projection of points, Lines, Planes and solids | 25 | 8 | |
| 7 | Orthographic Projection | 20 | 8 | |
| 8 | Sectional views | 20 | 8 | |
| 9 | Development of surfaces | 20 | 8 | |
| Total | | 135 | 50 | |

**ELECTRONICS AND COMMUNICATION TECHNICIAN
FIRST YEAR
PAPER II: ELECTRONIC DEVICES AND CIRCUITS(THEORY)**

| Sl. No | Major Units | No. of Periods | Weight age of marks | No. of Short questions | No. of Essay questions |
|--------|-------------------------------------|----------------|---------------------|------------------------|------------------------|
| 1 | Semi-Conductor Components | 20 | 14 | 1 | 2 |
| 2 | Power Supplies and Filters | 20 | 10 | 2 | 1 |
| 3 | Voltage % Power amplifiers | 20 | 8 | 1 | 1 |
| 4 | Power Amplifiers | 15 | 8 | 1 | 1 |
| 5 | Feed Back Amplifiers and Oscillator | 15 | 8 | 1 | 1 |
| 6 | Analog Integrated Circuits | 20 | 8 | 1 | 1 |
| 7 | Power Electronic Devices | 25 | 12 | 3 | 1 |
| | TOTAL | 135 | 68 | 10 | 8 |

DETAILED SYLLABUS

| | |
|-----------|--|
| 1. | <p>SEMICONDUCTOR COMPONENTS</p> <p>1.1. Introduction to materials and its classification(insulators, semiconductors and conductors,)</p> <p>1.2. State the electrical properties of solid state Semiconductor materials.</p> <p>1.3. Describe the formation of P- type and N- type materials</p> <p>1.4. Identify Majority and Minority carriers in P and N -Type materials.</p> <p>1.5. Explain the formation of PN junction diode.</p> <p>1.6. Describe the working of PN Junction Diode Forward/Reverse Bias with V-I characteristics</p> <p>1.7. Interpret the manufacturer specifications of a given diode from data sheet</p> <p>1.8. Know the formation of transistor & Draw the symbol of transistor.</p> <p>1.9. Explain the working of PNP and NPN Transistors with characteristics</p> <p>1.10. Define alpha, beta and gamma Factors</p> <p>1.11. Understand the specifications in DATA SHEET of transistors</p> <p>1.12. FET & MOSFET principle of working and symbols</p> <p>1.13. Advantages of FET over BJT</p> |
|-----------|--|

| | |
|------------------|--|
| <p>2.</p> | <p>POWER SUPPLIES & FILTERS</p> <p>2.1. Draw the block diagram of regulated DC power supply and explain the function of each block.</p> <p>2.2. Draw and describe the working of half wave rectifier with waveforms.</p> <p>2.3. Write the equations for RMS value, average value, ripple factor and efficiency for the half wave rectifier.</p> <p>2.4. Draw and describe the working of centre tapped full wave rectifier with waveforms.</p> <p>2.5. Draw and describe the working of bridge rectifier with waveforms.</p> <p>2.6. Write the equations for RMS value, average value, ripple factor and efficiency for the full wave rectifier.</p> <p>2.7. Compare the above rectifier circuits.</p> <p>2.8. Explain the need for a filter in power supplies and list different types of filters.</p> <p>2.9. Explain the operation of a rectifier circuit using capacitor input, series inductor and CLC filters.</p> <p>2.10. Define voltage regulation.</p> <p>2.11. Explain the operation of simple Zener regulator</p> <p>2.12. SMPS block diagram, ratings and specifications</p> <p>2.13. SMPS uses and applications</p> |
| <p>3.</p> | <p>VOLTAGE & POWER AMPLIFIERS</p> <p>3.1. Draw the CB, CC and CE transistor configurations & list applications</p> <p>3.2. Know cut off, saturation and active regions.</p> <p>3.3. Compare characteristics of CB, CC and CE configurations</p> <p>3.4. Explain the need for proper biasing in amplifier circuits and List the types of biasing circuits.</p> <p>3.5. Explain the need for stabilization</p> <p>3.6. Understand the working of transistor as an amplifier</p> <p>3.7. Explain why a voltage amplifier cannot be used as a power amplifier.</p> <p>3.8. Distinguish between voltage amplifiers and power amplifiers.</p> <p>3.9. Classify the amplifier circuits on the basis of frequency, period of conduction, and configurations.</p> <p>3.10. Define efficiency of a power amplifier.</p> <p>3.11. Draw the circuit of a class-A amplifier with resistor load at the collector and explain the operation.</p> <p>3.12. Write an expression for efficiency of the above circuit.</p> <p>3.13. Draw the circuit of a class-A amplifier with transformer at the collector and explain the operation.</p> <p>3.14. Write an expression for efficiency of the above circuit.</p> <p>3.15. List the advantages of push pull power amplifier.</p> <p>3.16. Explain the operation of class-B push-pull amplifier and mention its disadvantages.</p> <p>3.17. Write an expression for efficiency of the above circuit.</p> <p>3.18. List the applications of power amplifiers.</p> <p>3.19. List different IC numbers for power amplifiers</p> |

| | |
|------------------|---|
| <p>4.</p> | <p>FEEDBACK APLIFIERS AND OSCILLATORS</p> <p>4.1. Compare Negative and Positive feedback.</p> <p>4.2. Draw the block diagram of negative feedback amplifier and explain</p> <p>4.3. List the types of negative feedback amplifiers</p> <p>4.4. State the condition for an amplifier to work as an oscillator.</p> <p>4.5. Classify oscillator circuits.</p> <p>4.6. Draw and Explain the working of an R.C. phase shift oscillator</p> <p>4.7. List the advantages of crystal oscillators over other types</p> <p>4.8. Draw and explain the working of transistor crystal oscillator.</p> <p>4.9. State the reasons for instability in oscillator circuits.</p> <p>4.10. List the applications of oscillators</p> |
| <p>5.</p> | <p>ANALOG INTEGRATED CIRUITS</p> <p>5.1. Explain the operation of transistor series voltage regulator.</p> <p>5.2. Explain the operation of transistor shunt voltage regulator</p> <p>5.3. What is an Integrated Circuit(IC), list advantages and its classifications</p> <p>5.4. List the types of IC regulators and give the advantage of IC regulators.</p> <p>5.5. Explain the operation of fixed positive and negative voltage regulators.(using 78xx series and 79xx series)</p> <p>5.6. Draw and explain the differential amplifier.</p> <p>5.7. State the function of an operational amplifier.</p> <p>5.8. Know the operational amplifier characteristics like Input impedance, Open loop gain, Slew rate, CMRR, Input offset voltage, Input offset Current,</p> <p>5.9. List the specifications of ideal operational amplifier.</p> <p>5.10. Draw and explain the block diagram and pin configuration of IC 741</p> <p>5.11. Illustrate the use of operational amplifier as summer, integrator, differentiator, inverter and multiplier, voltage follower, voltage to current converter, current to voltage converter, comparator, square wave generator</p> <p>5.12. Draw the block diagram of 555 IC and explain.</p> <p>5.13. Explain the working of Astablemultivibrator using 555 IC.</p> |
| <p>6.</p> | <p>POWER ELECTRONIC DEVICES</p> <p>6.1. List different Thyristors family devices.</p> <p>6.2. Sketch the ISI circuit symbols for each device.</p> <p>6.3. Describe constructional details of SCR.</p> <p>6.4. Draw & Explain the Volt – Ampere characteristics of SCR.</p> <p>6.5. Mention the ratings of SCR.</p> <p>6.6. Give constructional details of DIAC & TRIAC</p> <p>6.7. Draw & Explain the Volt-ampere characteristics of DIAC&TRIAC under forward / reverse bias.</p> <p>6.8. State the different modes of TRIAC triggering.</p> <p>6.9. Draw & Explain SCR circuit triggered by UJT.</p> <p>6.10. Explain power control circuits DIAC, TRIAC& SCR's.</p> <p>6.11. Briefly explain the working of Reverse conducting Thyristors (RCT), Asymmetrical SCR (ASCR), Power BJT, Insulated gate bipolar transistor (IGBT), MOS-controlled Thyristors (MCT) with characteristics.</p> <p>6.12. Study of Manufacturer's data sheet of power electronic devices.</p> <p>6.13. List the applications of all power electronic devices</p> <p>6.14. Power Control Schematic</p> |

**ELECTRONICS AND COMMUNICATION TECHNICIAN
FIRST YEAR
PAPER II: ELECTRONIC DEVICES AND CIRCUITS LAB(PRACTICAL)
Maximum Marks: 50**

1. Measurement of Resistance, Capacitance and inductance by E and I method and verification of Resistance by Color code
2. Resistors in Series and Parallel Circuits
3. Measurement of Coefficient of coupling of an iron core transformer
4. Series Resonance Circuit and determination of its resonant frequency, bandwidth
5. Parallel resonance circuit, determination of its resonant frequency, bandwidth
6. PN Diode Characteristics - Forward and Reverse characteristics
7. Zener Diode characteristics
8. Transistor characteristics - CE and CB
9. FET Characteristics
10. SCR Characteristics
11. Zener Voltage regulators and measurement of percentage of regulation
12. RC coupled Amplifier : Obtain the frequency response and calculate the gain
13. Study of Push pull power Amplifier
14. Half wave Rectifier, Full wave Rectifier with and without filter, calculate the ripple factor and percentage of regulation
15. Measurement of frequency of Hartley and Collpits Oscillators
16. Measurement of frequency of Tuned Collector and Crystal Oscillators
17. Study of different IC packages and pin identification
18. Study of different types of batteries
19. Photo diode characteristics
20. Know the various cut-in voltages of different LEDs (All colors)

**ELECTRONICS AND COMMUNICATION TECHNICIAN
FIRST YEAR**

PAPER III: DIGITAL ELECTRONICS AND COMPUTER FUNDAMENTALS(THEORY)

| Sl. No | Major Units | No. of periods | Weightage of marks | Short Answer Questions | Essay Questions |
|--------------|---------------------------------------|----------------|--------------------|------------------------|-----------------|
| 1 | NUMBER SYSTEMS | 15 | 8 | 1 | 1 |
| 2 | LOGIC GATES AND DIGITAL IC FAMILIES | 15 | 8 | 1 | 1 |
| 3 | COMBINATIONAL CIRCUITS | 15 | 8 | 1 | 1 |
| 4 | SEQUENTIAL CIRCUITS | 20 | 8 | 1 | 1 |
| 5 | D/A AND A/D CONVERTORS | 10 | 6 | 0 | 1 |
| 6 | SEMICONDUCTOR MEMORIES | 20 | 10 | 2 | 1 |
| 7 | COMPUTER HARDWARE & NETWORKING BASICS | 25 | 12 | 3 | 1 |
| 8 | MICROSOFT OFFICE | 15 | 8 | 1 | 1 |
| Total | | 135 | 68 | 10 | 8 |

DETAILED SYLLABUS

| | |
|-----------|--|
| 1. | <p>NUMBER SYSTEMS</p> <p>1.1. Explain Binary, Octal, Hexadecimal number systems and compare with decimal system.</p> <p>1.2. Convert a given decimal number into Binary, Octal, and Hexadecimal numbers and vice versa.</p> <p>1.3. Convert a given binary number into octal and hexadecimal number system and vice versa.</p> <p>1.4. Perform binary Addition, Subtraction, Multiplication and Division.</p> <p>1.5. Write 1's complement and 2's complement numbers for a given binary number.</p> <p>1.6. Perform subtraction of binary numbers in 2's complement method.</p> <p>1.7. Explain the use of alphanumeric codes (ASCII & EBCDIC)</p> <p>1.8. State different postulates in Boolean algebra.</p> |
| 2. | <p>LOGIC GATES AND DIGITAL IC FAMILIES</p> <p>2.1. Explain AND, OR, NOT gates with truth table.</p> <p>2.2. Explain the working of universal logic gates (NAND, NOR gates) using truth tables.</p> <p>2.3. Explain the working of an exclusive – OR gate with truth table.</p> <p>2.4. State and explain De-Morgan's theorems.</p> <p>2.5. Develop AND, OR, NOT operations using NAND, NOR gates.</p> <p>2.6. List different digital logic families.</p> <p>2.7. Explain the characteristics of digital ICs such as logic levels, propagation delay, Noise margin, Fan-in, Fan-out, and Power dissipation.</p> <p>2.8. Compare the TTL, CMOS and ECL logic families.</p> <p>2.9. List the numbers of Digital IC Logic gates and understand the specifications</p> |

| | |
|----|--|
| 3. | <p>COMBINATIONAL CIRCUITS</p> <p>3.1. Give the idea of combinational logic circuits.</p> <p>3.2. Draw Half adder circuit using Exclusive OR gate and AND gate and explain its function using truth table.</p> <p>3.3. Realise a Half-adder using NAND gates only and NOR gates only.</p> <p>3.4. Draw the full adder circuit and explain its operation with truth table.</p> <p>3.5. Show that two Half-adders and an OR – gate constitutes a full-adder.</p> <p>3.6. Draw and explain a 4 Bit parallel adder using full – adders.</p> <p>3.7. Draw and explain the operation 4 X 1 Multiplexer</p> <p>3.8. Draw and explain the operation 1 to 4 demultiplexer.</p> <p>3.9. Draw and explain 3 X 8 decoder.</p> <p>3.10. List the applications of multiplexers and decoders.</p> <p>3.11. List some of the popular digital ICs and appreciate the applications</p> |
| 4. | <p>SEQUENTIAL CIRCUITS</p> <p>4.1. Give the idea of Sequential logic circuits.</p> <p>4.2. Explain NAND and NOR latches with truth tables</p> <p>4.3. State the necessity of clock and give the concept of level triggering and edge triggering,</p> <p>4.4. Draw and explain clocked SR flip flop using NAND gates.</p> <p>4.5. Study the need for preset and clear inputs.</p> <p>4.6. Construct level clocked JK flip flop using S-R flip-flop and explain with truth table</p> <p>4.7. Explain the level clocked D and T flip flops with the help of truth table and circuit diagram.</p> <p>4.8. Give only the truth tables of edge triggered D and T flip flops with their symbols.</p> <p>4.9. List the applications of flip flops.</p> <p>4.10. State the need for a Register and list the types of registers.</p> <p>4.11. Draw and explain working of 4 bit shift left and shift right registers(7475)</p> <p>4.12. Draw and explain parallel in parallel out shift register</p> <p>4.13. Explain the working of Universal shift register (74194)</p> <p>4.14. Draw and explain asynchronous decade counter.</p> <p>4.15. Distinguish between synchronous and asynchronous counters.</p> <p>4.16. List applications of counters.</p> <p>4.17. List the IC numbers of flip flops, registers and counters.</p> |
| 5. | <p>D/A AND A/D CONVERTERS</p> <p>5.1. State the need for A/D and D/A converters.</p> <p>5.2. Explain the terms resolution, Accuracy, Monotonicity and settling time of D/A converter.</p> <p>5.3. Explain D/A conversion using binary weighted resistors.</p> <p>5.4. Explain D/A conversion using R-2R ladder network.</p> <p>5.5. Explain A/D conversion using counter method.</p> <p>5.6. Explain A/D conversion using successive approximation method.</p> |

| | |
|----|--|
| 6. | <p>SEMICONDUCTOR MEMORIES</p> <p>6.1. State memory read operation, writes operation, access time, memory capacity, address lines and word length.</p> <p>6.2. Classify various types of memories.</p> <p>6.3. Differentiate between ROM and RAM</p> <p>6.4. Explain basic principle of working of diode ROM</p> <p>6.5. Distinguish between EEPROM and UVPROM.</p> <p>6.6. List different ROM and RAM ICs</p> <p>6.7. Explain the working of basic dynamic MOS RAM cell.</p> <p>6.8. Compare static RAM and dynamic RAM</p> <p>6.9. Explain the working principle of NVRAM</p> <p>6.10. State difference between Flash ROM and NV RAM</p> <p>6.11. Give an idea of memory modules used in computers</p> |
| 7. | <p>COMPUTER HARDWARE AND NETWORKING BASICS</p> <p>7.1. Study the layout of components in the motherboard.</p> <p>7.2. List different expansion slots available on the motherboard.</p> <p>7.3. Describe the functions of chip set & know chipset numbers in use.</p> <p>7.4. Know the specifications of processor.</p> <p>7.5. Know different types of RAMs in use.</p> <p>7.6. Know about cache memory.</p> <p>7.7. Know about accelerated graphics port/card.</p> <p>7.8. Study about power supply connectors and external devices.</p> <p>7.9. Know about Serial, parallel and USB ports(basics).</p> <p>7.10. Know the connector details for printer, serial port, mouse, keyboard and USB.</p> <p>7.11. Know different voltages in SMPS and connector details.</p> <p>7.12. Know about SCSI Hard Disk controller.</p> <p>7.13. Describe the functioning of Network card and list its specifications.</p> <p>7.14. Understand BIOS, Operating system, application software</p> <p>7.15. Appreciate the need for networking of computers</p> <p>7.16. Explain the concepts of router and routing</p> <p>7.17. Categorise the computer networks</p> <p>7.18. Explain the working of LAN</p> <p>7.19. Understand Bluetooth technology</p> <p>7.20. Write the role of DNS server.</p> <p>7.21. Explain how email is transferred.</p> <p>7.22. Explain file transfer operation (FTP) in web applications</p> <p>7.23. Explain the working of Web server.</p> <p>7.24. Explain the working of Web browser.</p> <p>7.25. Discuss about hyperlinks.</p> <p>7.26. Know the concept of remote login</p> |
| 8. | <p>MICROSOFT OFFICE</p> <p>8.1. Word: Basics of creating a document, editing and formatting</p> <p>8.2. Excel: Basics of creating a excel sheet, editing and formatting</p> <p>8.3. Power point: Basics of creating a power point presentation, editing and formatting</p> |

**ELECTRONICS AND COMMUNICATION TECHNICIAN
FIRST YEAR**

PAPER III: DIGITAL ELECTRONICS AND COMPUTER FUNDAMENTALS (PRACTICALS)

Maximum Marks: 50

1. Logic gates - I - AND, OR, NOT (Using IC's)
2. Logic gates - II - NAND, NOR, EX-OR (Using IC's)
3. Half Adders - Sub tractor (Using IC Logic gates)
4. Full adder - Sub tractor (Using IC Logic gates)
5. Verification of truth tables of RS, RST, D, T
6. To study details of counters IC's like 7490
7. To study shift register IC's like 7495
8. Observe the output of decade counter 7490 On a seven segment display using a decoder
9. A/D, D/A Converter
10. Identify the various peripherals
11. Know how to open an application program
12. Know how to create a folder in a specified location
13. Open MS-word and Identify the components on the screen
14. Create a document using MS-word and save it
15. Familiarise with spell checker facility of MS-Word
16. Open MS-Excel and identify the components on the screen
17. Create a Worksheet in MS-Excel and save it
18. Sort and filter data in a worksheet
19. Create a simple Power point presentation for a small unit
20. Backup required files and folders to a CD-ROM

**ELECTRONICS ENGINEERING TECHNICIAN
SECOND YEAR
PAPER I: COMMUNICATION ENGINEERING (THEORY)**

| Sl. No | Major Units | No. of periods | Weightage of marks | Short Answer Questions | Essay Questions |
|--------------|----------------------------------|----------------|--------------------|------------------------|-----------------|
| 1 | Analog Communication | 25 | 16 | 2 | 2 |
| 2 | Radio Transmitters and Receivers | 20 | 16 | 2 | 2 |
| 3 | Digital Communication | 20 | 8 | 1 | 1 |
| 4 | Transmission lines and Antennas | 20 | 8 | 1 | 1 |
| 5 | Satellite Communication | 15 | 10 | 2 | 1 |
| 6 | Cable TV and DTH | 15 | 10 | 2 | 1 |
| Total | | 110 | 68 | 10 | 8 |

DETAILED SYLLABUS

1. ANALOG COMMUNICATION

- 1.1. Basic elements of Analog communication system.
- 1.2. Block diagram of communication system.
- 1.3. Need for modulation in communication systems.
- 1.4. Distinguish between base band, carrier, and modulated signals with waveforms.
- 1.5. Define bandwidth in a communication system
- 1.6. Explain the relationship between channel bandwidth, base band bandwidth and transmission time
- 1.7. Introduction to Amplitude Modulation
- 1.8. Define the modulation index of AM signal
- 1.9. Write the time-domain equation for AM signal and bandwidth
- 1.10. Measurement of modulation index using oscilloscope.
- 1.11. Introduction to Angle modulation.
- 1.12. Explain the types of Angle modulation.
- 1.13. Explain the differences between Amplitude and Angle modulation techniques.
- 1.14. Write the time-domain equation for an FM signal.
- 1.15. Write equations for bandwidth, sideband frequencies of FM signal.
- 1.16. Define modulation index for FM signal.
- 1.17. Explain the merits and demerits of FM over AM

| | |
|------------------|--|
| <p>2.</p> | <p>RADIO TRANSMITTERS AND RECEIVERS</p> <ul style="list-style-type: none"> 2.1. Introduction to transmitters and receivers 2.2. List specifications of transmitters. 2.3. Distinguish between high level and low level modulation. 2.4. Draw the block diagram of a Low level AM transmitter. 2.5. Draw the block diagram of a High level AM transmitter 2.6. Basic functions of a Radio receiver. 2.7. Define sensitivity, selectivity, fidelity of a receiver. 2.8. Explain the process of super heterodyning in radio receiver. 2.9. Draw block diagram of super heterodyne receiver and explain its operation. 2.10. Explain the need for AVC (AGC). 2.11. Draw the block diagram of TRF receiver and explain its working. 2.12. Draw the block diagram of a FM receiver and explain its working 2.13. Compare AM and FM receivers 2.14. List various ICs used in receivers with internal block diagrams 2.15. List common faults and servicing techniques |
| <p>3.</p> | <p>DIGITAL COMMUNICATION</p> <ul style="list-style-type: none"> 3.1. Basic elements of Digital Communication system 3.2. Advantages of Digital Communication systems over Analog Communication Systems 3.3. Introduction to Multiplexing Schemes such as FDM and TDM 3.4. Introduction to TDD, FDD, Simplex, Half-Duplex and Full Duplex. 3.5. Introduction to Pulse Analog Modulation Schemes such as PAM,PWM and PPM 3.6. Introduction to Pulse Digital Modulation Schemes such as PCM and DM 3.7. Describe the basic types of digital carrier modulation. 3.8. State the need for digital carrier modulation. 3.9. Briefly explain ASK, FSK and PSK. |
| <p>4.</p> | <p>TRANSMISSION LINES AND ANTENNAS</p> <ul style="list-style-type: none"> 4.1. Introduction to transmission lines and different types. 4.2. Describe the nature and behaviour of radio waves. 4.3. Describe reflection, refraction and diffraction of EM waves. 4.4. Describe the ground wave propagation of EM waves. 4.5. Describe the space wave propagation of EM waves. 4.6. Describe the sky wave propagation of EM waves. 4.7. Explain the principle of radiation 4.8. Define an antenna system. 4.9. Sketch the radiation pattern of isotropic and half wave dipoles. 4.10. Define radiation resistance. 4.11. Define antenna gain, directivity, beam width, and front to back ratio. 4.12. Explain the basic principles of operation of antenna systems. 4.13. Explain the principle of parabolic reflector. 4.14. Explain the operation of Dish antenna system. |

5.

SATELLITE COMMUNICATION

- 5.1. State the need for satellite communication
- 5.2. Define foot print of a satellite
- 5.3. Explain fixed microwave link with block diagram.
- 5.4. List the advantages of satellite communication over terrestrial radio communication.
- 5.5. Explain geostationary satellites.
- 5.6. List the advantages and disadvantages geostationary satellites.
- 5.7. Define uplink frequency and down link frequency
- 5.8. List the functions of a transponder
- 5.9. Explain the working of the three types of transponders.
- 5.10. Draw and explain the block diagram of communication satellite.
- 5.11. Draw and explain the block diagram of Earth station.
- 5.12. Explain the working of GPS
- 5.13. List the applications of satellites.

6.

CABLE TELEVISION AND DIRECT TO HOME(DTH)

- 6.1. Draw and explain the block diagram of CABLE TV.
- 6.2. Explain the cable TV components such as amplifiers directional couplers and converters.
- 6.3. Explain the necessity of midband and super band channels
- 6.4. State the need for satellite in TV broadcasting over wide area.
- 6.5. Explain the DTH reception with block diagram.
- 6.6. List the deficiencies in the existing TV system.
- 6.7. Explain how the existing TV system can be improved in HDTV system

**ELECTRONICS ENGINEERING TECHNICIAN
SECOND YEAR
PAPER I: COMMUNICATION ENGINEERING (PRACTICALS)**

1. Study of Servicing tools and instruments (Soldering Iron, Screw Driver Set, Tweezers, Nose Pliers, Cutter, Hammer, File, Desolder pump, Squeezer)
2. Electronic Lab safety precautions (Regarding wiring, Flooring, First Aid Treatment)
3. Soldering Practice on PCB and wiring practice
4. Familiarization and Testing of Electronic Components like resistor, capacitor, inductor, transformer, loud speaker, switches, relays, connectors, fuses and cables and semiconductor devices like diode, transistor, IC packages
5. Study of power supply stage in Radio Receiver (Full wave Bridge Rectifier with Filter)
6. Study of output stage, voltage measurement
7. Study of Detector and AF Voltage Amplifier, Voltage measurement
8. Study of IF Amplifier Stage and Voltage measurement.
9. Study of RF Amplifier, Mixer, Local oscillator stage and voltage measurement
10. Study of FM receiver
11. Study of IC version 2-band Radio AM/FM Radio receiver
12. Study of Multiband Radio receiver
13. Mention typical faults in a Radio receiver and observe the effect on voltage data and performance of the Radio Receiver
14. Study of PA system and measurement of standard voltages at various points
15. Rectifying the faults in PA system
16. Study of Tape Recorder, Two-in-one and Audio CD player
17. Rectify the faults in the Tape Recorder, Two-in-one
18. Rectify the faults in Audio CD player
19. Rectify the faults in DVD player
20. Familiarization of SMD handling tools used for soldering/Desoldering

**ELECTRONICS ENGINEERING TECHNICIAN
SECOND YEAR
PAPER II: MODERN COMMUNICATION SYSTEMS(THEORY)**

| Sl. No | Major Units | No. of periods | Weight age of marks | Short Answer Questions | Essay Questions |
|--------|---|----------------|---------------------|------------------------|-----------------|
| 1 | Opto Electronic Devices | 20 | 8 | 1 | 1 |
| 2 | Optical Fibre Communication Fundamentals | 20 | 16 | 2 | 2 |
| 3 | OPTICAL FIBRE COMMUNICATION SYSTEMS | 20 | 16 | 2 | 2 |
| 4 | Telephone And Cellular Communication System | 20 | 10 | 2 | 1 |
| 5 | Understand Multiple Access Techniques | 15 | 8 | 1 | 1 |
| 6 | Comprehend Digital Cellular Mobile System | 15 | 10 | 2 | 1 |
| | Total | 110 | 68 | 10 | 8 |

DETAILED SYLLABUS

| | |
|-----------|--|
| 1. | <p>OPTO ELECTRONIC DEVICES</p> <p>1.1. Classify optoelectronic devices</p> <p>1.2. Explain the operation of LDR</p> <p>1.3. Explain the construction, working principle and characteristics of LED</p> <p>3.4 Understand the generation of different colour LEDs, their forward voltages, and specifications.</p> <p>3.5 Explain the construction and working principle of LCD.</p> <p>3.6 Explain the applications of LED and LCD in discrete displays, dot-matrix and seven segment displays.</p> <p>3.7 Explain the construction, operation and characteristics of photo diode.</p> <p>3.8 Explain the construction, operation and characteristics of photo transistor.</p> <p>3.9 List the applications of photo diode and photo transistor</p> <p>3.10 Give an idea of opto-coupler</p> |
| 2. | <p>OPTICAL FIBRE COMMUNICATION FUNDAMENTALS</p> <p>2.1. Basic Introduction to Fibre Optic communication.</p> <p>2.2. Explain total internal reflection phenomena used in optical fibres.</p> <p>2.3. Define numerical aperture, modes, dispersion.</p> <p>2.4. List various losses with reference to optical fibre.</p> <p>2.5. Explain the advantages of optical fibres in communication.</p> <p>2.6. Explain types of fibre optic cables,</p> <p>2.7. Mention different splices and connectors, optical couplers, switches and relays</p> <p>2.8. Explain the operation of LED used in optical fibre communication</p> <p>2.9. Explain the operation of Laser diodes used in optical fibre communication.</p> <p>2.10. Explain the operation of PIN diode used as detector in optical fibre Communication</p> <p>2.11. Explain the operation of APD used as detector in optical fibre Communication</p> |

3. OPTICAL FIBRE COMMUNICATION SYSTEMS

- 3.1. Explain basic fibre optic communication system with block diagram.
- 3.2. Explain repeaters and optical amplifiers.
- 3.3. Define wavelength division multiplexing.
- 3.4. Explain the principle of DWDM.
- 3.5. Discuss use of optical fibre in local area network.
- 3.6. Discuss Ethernet on optical fibre and gigabit Ethernet.
- 3.7. Mention the applications of optical fibres.
- 3.8. Discuss the applications of optical fibres in local telephone and cable TV applications
- 3.9. Know the various tools used and methods for measurement of parameters on OFCs
- 3.10. OTDR applications in servicing

4. TELEPHONE AND CELLULAR COMMUNICATION SYSTEM

- 4.1. Understand a basic telephone system
- 4.2. Explain the operation of basic telephone equipment
- 4.3. Understand a simple intercom system
- 4.4. Basic concepts of Cellular & Mobile Communication system and its evolution
- 4.5. Explain cellular concept
- 4.6. Describe block diagram of cellular system
- 4.7. Define the terms mobile station and base station
- 4.8. State the functions of Mobile Switching Centre (MSC)
- 4.9. Significance of frequency re-use and hand off mechanism.
- 4.10. Concepts of digital cellular mobile system.
- 4.11. Know GSM standards and service aspects
- 4.12. List the radio characteristics of GSM
- 4.13. Basic concepts of CDMA systems used in mobile communication.
- 4.14. Define voice and control channels in mobile communication
- 4.15. Define Roamer
- 4.16. List the features of various mobile radio systems around the world
- 4.17. Define uplink and downlink channels in mobile communication
- 4.18. Explain the process of call progress in a cellular telephone system

5. UNDERSTAND MULTIPLE ACCESS TECHNIQUES

- 5.1. State the need for multiple access techniques
- 5.2. List the three types of multiple access techniques.
- 5.3. Explain FDMA
- 5.4. List the features of FDMA
- 5.5. Explain TDMA
- 5.6. Draw the TDMA frame structure
- 5.7. List the features of TDMA
- 5.8. Explain the concept of spread spectrum technique
- 5.9. List two types of spread spectrum techniques
- 5.10. Explain the Direct sequence spread spectrum (DSSS) technique
- 5.11. Explain the frequency hopped spread spectrum (FHSS) multiple access technique.
- 5.12. Explain code division multiple access technique.
- 5.13. List the features and advantages of CDMA
- 5.14. Compare FDMA, TDMA and CDMA
- 5.15. State near-far effect in CDMA
- 5.16. Explain the concept of soft hand off and power control in CDMA

6. COMPREHEND DIGITAL CELLULAR MOBILE SYSTEM

- 6.1. List the specifications of analog mobile phone system (Advanced mobile phone system AMPS).
- 6.2. Explain the radio interface of AMPS.
- 6.3. State the features of Narrow band AMPS (N-AMPS)
- 6.4. List the demerits of analog cellular system.
- 6.5. Mention the features of digital cellular system.
- 6.6. Explain the United States Digital Cellular system (IS-54)
- 6.7. Explain the radio interface specifications of USDC
- 6.8. Explain the Global system for mobile communication (GSM)
- 6.9. Explain the GSM architecture with block diagram.
- 6.10. List various interfaces in GSM architecture
- 6.11. Explain the GSM radio subsystem
- 6.12. Explain the frame structure of the GSM
- 6.13. List the service and security aspects of GSM.
- 6.14. Compare AMPS and GSM
- 6.15. List the advantages of GSM over AMPS

**ELECTRONICS ENGINEERING TECHNICIAN
SECOND YEAR
PAPER II:TV AND MOBILEPHONE SERVICING LAB(PRACTICALS)**

1. Study of pattern generator and its use
2. Set up an ASK/FSK/PSK modulator and observe the waveforms.
3. Set up an ASK/ FSK/PSK demodulator and observe the waveforms.
4. Set up a Pulse Code Modulator / Demodulator circuit and the waveforms.
5. Set up Time Division Multiplexing/ De multiplexing circuit and observe waveforms.
6. DC characteristics of LED and PIN photodiode.
7. Optical transmitter using analogue modulator.
8. Data transmission through fiber optic link.
9. Setting of fiber optics voice link using AM modulation.
10. PI characteristics of LASER diode.
11. Construct and test the Yagi-Uda antenna.
11. Study the DTH antenna and connect the DTH antenna to the TV.
12. Plot and analyse the radiation pattern of following antennas using Antenna trainer Kit a) Dipole b) Half wave dipole.
13. Rectify the given faults in various stages of LED T.V.
14. Study of SMPS and measurement of the output voltages
15. Identify the stages of SMPS, and mention the faults in SMPS and rectification of the faults
16. Study of different types of Tuners
17. Study of LCD/LED TV
18. Familiarization of different voltages in LCD TV
19. Familiarization of different voltages in LED TV
20. Connection and Tuning of Cable TV

**ELECTRONICS ENGINEERING TECHNICIAN
SECOND YEAR**

**PAPER III: MEASURING INSTRUMENTS AND CONSUMER ELECTRONICS (THEORY)
TIME SCHEDULE**

| Sl. No | Major Units | No. of periods | Weightage of marks | Short Answer Questions | Essay Questions |
|--------|-------------------------------------|----------------|--------------------|------------------------|-----------------|
| 1 | Measuring And Testing Of Components | 20 | 16 | 2 | 2 |
| 2 | Cro And Function Generators | 15 | 8 | 1 | 1 |
| 3 | Television Receivers | 20 | 14 | 1 | 2 |
| 4 | Pa System And Disc Players | 20 | 10 | 2 | 1 |
| 5 | Ups And Inverters | 15 | 10 | 2 | 1 |
| 6 | Consumer Appliances | 20 | 10 | 2 | 1 |
| | TOTAL | 110 | 68 | 10 | 8 |

DETAILED SYLLABUS

| | |
|-----------|--|
| 1. | <p>MEASURING AND TESTING OF COMPONENTS</p> <p>1.1. Measurement of AC/DC Voltages and currents using voltmeters and current meters</p> <p>1.2. Study and use of various regulated power supply units</p> <p>1.3. Measurement of voltages, currents and resistance using analogue and digital Multimeters and continuity test.</p> <p>1.4. Test and measure the values of capacitor using R.L.C meter and compare with the marked/color code value</p> <p>1.5. Test the given Transformer and measure Primary and secondary DC resistance and Voltages by using Multimeter</p> <p>1.6. Test the given Loud speaker and measure the Voice coil resistance –using Multimeter</p> <p>1.7. Test the working of different types of switches ,Relays ,Connectors and Cables</p> |
| 2. | <p>CRO AND FUNCTION GENERATORS</p> <p>2.1. Study and Use CRO(single trace and Dual Trace) for measuring frequency and amplitude (CRT type)</p> <p>2.2. Study and use of A.F/R.F signal generators</p> <p>2.3. Study and use Digital Storage Oscilloscope for measuring frequency, Amplitude, Phase</p> <p>2.4. Identify leads and testing of different diodes and transistors.</p> <p>2.5. Study of data manuals/ application manuals for diodes and transistors</p> |

3. TELEVISION RECEIVERS

- 3.1. Draw the block diagram of basic TV system and explain the function of each block.
- 3.2. Explain formation of picture.
- 3.3. CCIR - B standards and specifications for Monochrome TV.
- 3.4. Name the different types of camera tubes.
- 3.5. Draw the block diagram of a T.V. receiver and state the function of each block.
- 3.6. Introduction to Color Television System.
- 3.7. Explain the main characteristic of human eye with regard to perception of colors.
- 3.8. Explain complementary colors, hue, saturation, and Color circle.
- 3.9. Explain compatibility and reverse compatibility in TV system.
- 3.10. Mention the different standards of Color transmission system like NTSC, PAL and SECAM.
- 3.11. Draw the block diagram of a Color TV receiver and state the function of each block.
- 3.12. State the different Color receiver- operating & servicing controls.
- 3.13. Describe constructional features of Color picture tubes.
- 3.14. Understand the principle of LCD/LED monitor
- 3.15. Understand block diagram of LCD/LED TVs
- 3.16. List various ICs USED in the above with a typical schematic circuit
- 3.17. List advantages of LCD/LED TV technology
- 3.18. Discuss common faults in all the above with servicing procedures to rectify
- 3.19. Draw and explain the block diagram of CATV.
- 3.20. Explain the cable TV components such as amplifiers directional couplers and Converters.
- 3.21. Explain the necessity of mid-band and super-band channels
- 3.22. State the need for satellite for TV broadcasting over wide area.
- 3.23. Explain the merits of DTH system
- 3.24. With a block diagram explain DVB-S channel reception with block diagram.
- 3.25. State the need for Set Top Box.
- 3.26. List main features of Projection TV
- 3.27. List applications of Projection TV
- 3.28. Explain the features of HDTV
- 3.29. Explain the features of SMART TV.
- 3.30. List the important specifications of UHD TV

| | |
|------------------|--|
| <p>4.</p> | <p>PUBLIC ADDRESS SYSTEM AND DISC PLAYERS</p> <p>4.1. Define speech, music and noise. 4.2. Know the nature of sound, reflection, refraction, diffraction and absorption. 4.3. Know the concept of Hi-Fi and Stereo. 4.4. Know the need of bass, treble, balance, and volume control in stereo amplifier. 4.5. Explain a simple circuit showing the above controls. 4.6. Briefly explain the principle of magnetic recording and reproduction. 4.7. List the advantages and disadvantages magnetic recording. 4.8. List the types of optical recording. 4.9. Explain the method optical recording of sound on film. 4.10. Explain the method optical recording of sound on Compact Disc. 4.11. List the advantages and disadvantages of CDs. 4.12. Explain optical pick-up system. 4.13. Explain working of compact disc player with block diagram. 4.14. Know the MP3 format and differentiate this with audio CD. 4.15. Differentiate CD and DVD. 4.16. Explain the working principle of DVD player. 4.17. Explain the concept of noise reduction using DOLBY system. 4.18. Arrange the Public Address system and test the performance. 4.19. Know the block diagram and understand with a typical schematic diagram</p> |
| <p>5.</p> | <p>UPS AND INVERTERS</p> <p>5.1. Compare online UPS and OFF line UPS 5.2. Classify inverters 5.3. Explain the working of single-phase bridge inverter using MOSFET 5.4. Explain the working of voltage source inverter 5.5. State the need for uninterrupted power supply(UPS) 5.6. Explain the working of three-phase inverter 5.7. List different types of UPS 5.8. Draw and explain the block diagram of off-line UPS 5.9. Draw and explain the block diagram of on-line UPS 5.10. Understand a typical schematic of each and 5.11. Discuss ICs used and servicing procedure</p> |
| <p>6.</p> | <p>CONSUMER APPLIANCES</p> <p>6.1. Explain the working principle of Microwave oven 6.2. Explain functional block diagram of Microwave oven 6.3. List three advantages of Microwave oven 6.4. Explain the principle of Induction heater. 6.5. Give the reasons for using magnetic metals for use with induction heater. 6.6. List the 4 merits of induction heating. 6.7. Explain the functional block diagram of Electronic Washing machine 6.8. List any three advantages of Fuzzy logic in washing machines 6.9. Introduction to basic medical equipment 6.10. Functional block diagram of ECG, BP equipment and clinical equipment. 6.11. First level maintenance of hospital equipment</p> |

**ELECTRONICS ENGINEERING TECHNICIAN
SECOND YEAR
PAPER III: INSTRUMENTATION AND MEASUREMENTS LAB (PRACTICALS)**

1. Conversion of Ammeter into Voltmeter.
2. Study and use of Analog Multimeter
3. Study and use of Digital Multimeter
4. Study and use of Audio Frequency Oscillator
5. Study and use of AMSSG
6. Study and use of Digital R-L-C meter
7. Measurement of DC and AC Voltage, frequency using CRO
11. Study of Battery Eliminator and measurement of standard voltages at various points.
12. Rectify the faults in the Battery Eliminator
13. Study of Electronic Stabilizer and measurement of standard voltages at various points.
14. Rectify the faults in the Electronic stabilizer...
15. Block Diagrams of Hospital Equipments like ECGRecorders, B.P Equipments, and
Clinical Equipments etc.
16. First Level Maintenance of Hospital Equipments etc.
17. Mobile Cellular Transmitters lab
18. Mobile Receivers lab
19. Maintenance of Cellular Towers lab
20. Types of Mobile Communication systems lab

MODEL QUESTION PAPERS
ELECTRONICS ENGINEERING TECHNICIAN
SECOND YEAR
PAPER I: COMMUNICATION ENGINEERING

Time: 3 hrs

Marks: 50

SECTION – A

Note: i) Answer all questions

10 x 2 =20

ii) Each question carries two marks

1. Define Modulation index in AM.
2. Write any two advantages AM over FM.
3. Define Selectivity, Fidelity.
4. Write any two advantages of digital Communication.
5. Expand TDD, FDD.
6. Write antenna parameters.
7. What are the advantages of Satellites Communication?
8. Write functions of earth station.
9. Write basic elements of digital Communication.
10. Define FDM.

SECTION – B

Note: i) Answer any five questions

5 x 6 = 30

ii) Each question carries Six marks

11. Draw the block diagram of Analog Communication systems. Explain working of each block.
12. Write procedure to measure modulation in with Oscilloscope.
13. Draw the block diagram of AM high level transmitter explain working of each block.
14. Write comparisons of analog and digital communication systems.
15. Explain the working of parabolic antenna with diagram.
16. Explain working of Geostationary Satellites.
17. Explain the DTH reception with block diagram.
18. Describe the basic types of Digital Carrier Modulation.

MODEL QUESTION PAPERS
ELECTRONICS ENGINEERING TECHNICIAN
SECOND YEAR
PAPER II: MODERN COMMUNICATION SYSTEMS

Time: 3 hrs

Marks: 50

SECTION – A

Note: i) Answer all questions

10 x 2 =20

ii) Each question carries two marks

1. Write working principle of LDR.
2. Define internal reflection phenomena of Optical fibers.
3. Write operating controls of LED.
4. Write working Principle of DWDM.
5. Write applications of Optical fibers.
6. State working principle of telephone.
7. Expand GSM, TDMA.
8. How many types of Multiple Accessing.
9. Expand AMPS.
10. State the demerits of analog communications system.

SECTION – B

Note: i) Answer any five questions

5 x 6 = 30

ii) Each question carries Six marks

11. Explain construction and working of LED.
12. Explain the operation of LEDs used in Optical Fiber Communication.
13. Explain briefly Optical Fiber Communication system.
14. Explain working of repeaters and optical amplifiers.
15. Explain concepts of Ethernet on optical fiber and Gigabit Ethernet.
16. Explain the functions of Mobile Switching Centre.
17. Write comparisons of FDMA, TDMA and CDMA.
18. Explain the radio receivers specifications OF USDC.

MODEL QUESTION PAPERS
ELECTRONICS ENGINEERING TECHNICIAN
SECOND YEAR
PAPER III: MEASURING INSTRUMENTS AND CONSUMER ELECTRONICS

Time: 3 hrs

Marks: 50

SECTION – A

Note: i) Answer all questions

10 x 2 = 20

ii) Each question carries two marks

1. Write applications of regulated power supplies.
2. How do you test the transformer?
3. Write operating controls of CRO.
4. Expand CCIR.
5. Define music and noise.
6. State DVD working principle.
7. Write applications of UPS and Inverters.
8. Write ICs No used in UPS.
9. State working principle of micro woven.
10. State any two merits of induction heating.

SECTION – B

Note: i) Answer any five questions

5 x 6 = 30

ii) Each question carries Six marks

11. Write testing procedure of Switches ,Relays, Connectors, Terminators, Contactors And Cables.
12. Explain procedure to measure Capacitance with Digital LCR meter.
13. Draw and explain working of AF/RF Signal generator.
14. Explain the working of Cable TV Components.
15. Draw the block diagram of TV Receiver and explain.
16. Draw and Explain DVB-S channel reception procedure.
17. Draw and explain working of DVD Player.
18. Explain working of single - phase bridge inverter using MOSFET.

PRACTICAL QUESTION PAPER

By giving four or five practical questions from the prepared practical question paper and select one practical question by a lot

Scheme of Evaluation:

1. Record- 5 marks
2. Viva - 5 marks
3. Presentation- 10marks
4. Practical- 30marks

Total 50marks

XI.

**MODEL QUESTION PAPERS
ELECTRONICS AND COMMUNICATION TECHNICIAN
FIRST YEAR
PAPER I: CIRCUIT THEORY AND ELECTRONIC COMPONENTS**

Time: 3 hrs

Marks: 50

SECTION – A

Note: i) Answer all questions

10 x 2 =20

ii) Each question carries two marks

1. Find the resistance value log using color code Brown, Black, Orange and Gold.
2. State Lenz's Law.
3. What are the specifications of the Transformer?
4. Name the Different Types of Capacitor's according to Die electronics
5. State Kirchhoff's Law.
6. Define the Terms frequency, average Value .
7. Classify the switches according to Poles and Throws
8. What is meant by relay
9. What are the advantages of SMT over Pin through Hole module?
10. What are the applications of Secondary cell?

SECTION – B

Note: i) Answer any five questions

5 x 6 = 30

ii) Each question carries Six marks

11. Calculate the equivalent resistance of resistors connected in series.
12. Explain the working principle of EHT Transformer.
13. Find the Capacitance of Capacitor connected in parallel?
14. Derive an expression of RLC series resonance of an A.C Circuits.
15. Write the construction & Working PMMC Microphone
16. Write the Procedure what steps taken for preparing PCB.
17. a). State faraday's Laws
b). what are the factors effects the Inductance value
18. Write the Construction & Working of a Lead- Acid Cell with Neat Sketch.

**MODEL QUESTION PAPERS
ELECTRONICS AND COMMUNICATION TECHNICIAN
FIRST YEAR
PAPER II: ELECTRONIC DEVICES AND CIRCUITS**

Time: 3 hrs

Marks: 50

SECTION – A

Note: i) Answer all questions

10 x 2 =20

ii) Each question carries two marks

1. Draw the Symbols of PNP& NPN Transistors
2. Define Ripple factor of Full Wave Rectification
3. List the types of Biasing Circuits used in Amplifier
4. Distinguish between Voltage Amplifier and Power Amplifier
5. What are the advantages of Crystal Oscillator over other type
6. What are the applications of PLL
7. Draw the symbols of SCR
8. List the application of all power Electronic Devices
9. Draw the Power control schematic Diagram
10. List the application of Photo diode and Photo Transformer

SECTION – B

Note: i) Answer any five questions

5 x 6 = 30

ii) Each question carries Six marks

11. Describe the working of PN Junction Diode under forward Bias and Draw its voltage characteristics
12. Draw & Describe the working of Centre Tapped Full wave rectifier with Wave forms
13. Compare input & Output Characteristics of CB, CC and CE configurations
14. Draw the circuit of Class- A Amplifier with Transformer at the Collector and Explain the operation
15. Draw & Explain working of R-C phase shift oscillator
16. Explain the working of Astable Multi using 555 I.C.
17. Draw and Explain the V-I Characteristics of TRIAC under forward bias
18. Explain the construction & working Principle LCD

MODEL QUESTION PAPERS
ELECTRONICS AND COMMUNICATION TECHNICIAN
FIRST YEAR
PAPER III: DIGITAL ELECTRONICS AND COMPUTER FUNDAMENTALS

Time: 3 hrs

Marks: 50

SECTION – A

Note: i) Answer all questions

10 x 2 =20

ii) Each question carries two marks

1. Convert a given Decimal Number in to binary, octal and Hexa decimal Number vice-versa.
2. Write 1's compliment and 2's Compliment member for a Given binary number
3. List the different Digital logic families
4. What are the applications of Multiplexers
5. State and need of Resistors
6. State the Memory Terminology of access time and word length
7. Write the differences between static RAM & Dynamic RAM
8. Explain the concept of Router
9. What are the specifications of Network card
10. Write the application of (WAP) wide photo cell

SECTION – B

Note: i) Answer any five questions

5 x 6 = 30

ii) Each question carries Six marks

11. Explain Binary Octal Hexa Decimal number systems and Compare with Decimal Systems
12. Explain the working of Universal logic gates (NAND, NOR gates) using Truth Tables
13. Draw the full adder circuit and explain its operation with Truth Table
14. Draw and Explain the working of 4 Bit – 5 Bit left register
15. Explain D/A conversion using R-2R ladder Network
16. Explain Basic Principle of Working of Diode ROM
17. Explain the importance of cache memory
18. Write notes of creating a power point presentation editing and formatting

**MODEL QUESTION PAPERS
ELECTRONICS AND COMMUNICATION TECHNICIAN
SECOND YEAR
PAPER I: COMMUNICATION ENGINEERING**

Time: 3 hrs

Marks: 50

SECTION – A

Note: i) Answer all questions

10 x 2 =20

ii) Each question carries two marks

19. Define Modulation index in AM.
20. Write any two advantages AM over FM.
21. Define Selectivity, Fidelity.
22. Write any two advantages of digital Communication.
23. Expand TDD, FDD.
24. Write antenna parameters.
25. What are the advantages of Satellites Communication?
26. Write functions of earth station.
27. Write basic elements of digital Communication.
28. Define FDM.

SECTION – B

Note: i) Answer any five questions

5 x 6 = 30

ii) Each question carries Six marks

29. Draw the block diagram of Analog Communication systems. Explain working of each block.
30. Write procedure to measure modulation in with Oscilloscope.
31. Draw the block diagram of AM high level transmitter explain working of each block.
32. Write comparisons of analog and digital communication systems.
33. Explain the working of parabolic antenna with diagram.
34. Explain working of Geostationary Satellites.
35. Explain the DTH reception with block diagram.
36. Describe the basic types of Digital Carrier Modulation.

**MODEL QUESTION PAPERS
ELECTRONICS AND COMMUNICATION TECHNICIAN
SECOND YEAR
PAPER II: MODERN COMMUNICATION SYSTEMS**

Time: 3 hrs

Marks: 50

SECTION – A

Note: i) Answer all questions

10 x 2 =20

ii) Each question carries two marks

19. Write working principle of LDR.
20. Define internal reflection phenomena of Optical fibers.
21. Write operating controls of LED.
22. Write working Principle of DWDM.
23. Write applications of Optical fibers.
24. State working principle of telephone.
25. Expand GSM, TDMA.
26. How many types of Multiple Accessing.
27. Expand AMPS.
28. State the demerits of analog communications system.

SECTION – B

Note: i) Answer any five questions

5 x 6 = 30

ii) Each question carries Six marks

29. Explain construction and working of LED.
30. Explain the operation of LEDs used in Optical Fiber Communication.
31. Explain briefly Optical Fiber Communication system.
32. Explain working of repeaters and optical amplifiers.
33. Explain concepts of Ethernet on optical fiber and Gigabit Ethernet.
34. Explain the functions of Mobile Switching Centre.
35. Write comparisons of FDMA, TDMA and CDMA.
36. Explain the radio receivers specifications OF USDC.

MODEL QUESTION PAPERS
ELECTRONICS AND COMMUNICATION TECHNICIAN
SECOND YEAR
PAPER III: MEASURING INSTRUMENTS AND CONSUMER ELECTRONICS

Time: 3 hrs

Marks: 50

SECTION – A

Note: i) Answer all questions

10 x 2 =20

ii) Each question carries two marks

19. Write applications of regulated power supplies.
20. How do you test the transformer?
21. Write operating controls of CRO.
22. Expand CCIR.
23. Define music and noise.
24. State DVD working principle.
25. Write applications of UPS and Inverters.
26. Write ICs No used in UPS.
27. State working principle of micro woven.
28. State any two merits of induction heating.

SECTION – B

Note: i) Answer any five questions

5 x 6 = 30

ii) Each question carries Six marks

29. Write testing procedure of Switches, Relays, Connectors, Terminators, Contactors And Cables.
30. Explain procedure to measure Capacitance with Digital LCR meter.
31. Draw and explain working of AF/RF Signal generator.
32. Explain the working of Cable TV Components.
33. Draw the block diagram of TV Receiver and explain.
34. Draw and Explain DVB-S channel reception procedure.
35. Draw and explain working of DVD Player.
36. Explain working of single - phase bridge inverter using MOSFET.

PRACTICAL QUESTION PAPER

By giving four or five practical questions from the prepared practical question paper and select one practical question by a lot

Scheme of Evaluation:

- | | |
|------------------|---------|
| 5. Record- | 5 marks |
| 6. Viva - | 5 marks |
| 7. Presentation- | 10marks |
| 8. Practical- | 30marks |

Total 50marks

IX . List of Equipment**ELECTRONICS AND COMMUNICATION TECHNICIAN**

| S.No | Name of the equipment specifications | Quantity | Amount Rs. |
|------|--|---------------|------------|
| 1. | Regulated power supply 30V/1A | 10 | 50,000 |
| 2. | Digital multimeters | 05 | 15,000 |
| 3. | Analog multimeters (Motwane) | 08 | 40,000 |
| 4. | Audio signal generator | 05 | 15,000 |
| 5. | Oscilloscopes 20 MHZ | 04 | 60,000 |
| 6. | RF Voltmeters | 05 | 20,000 |
| 7. | AM/FM Signal Generators | 05 | 7,000 |
| 8. | T.V. Pattern generator (monochrome) | 2 | 4,000 |
| 9. | Decade Resistance box | 10 | 15,000 |
| 10. | Decade Inductance box | 10 | 15,000 |
| 11. | Decade capacitance box | 10 | 15,000 |
| 12. | a).Study of pattern generator and its use b).Set up an ASK/FSK/PSK modulator kits. c).Set up a Pulse Code Modulator / Demodulator kits d).Set up Time Division Multiplexing/ De multiplexing kits e).DC characteristics of LED and PIN photodiode. f).Optical transmitter using analogue modulator. g).Data transmission through fiber optic link. h).Setting of fiber optics voice link using AM modulation. i).PI characteristics of LASER diode. j).Construct and test the Yagi-Uda antenna. k).Study the DTH antenna and connect the DTH antenna to the TV. l).Plot and analyze the radiation pattern of following antennas using | | |
| 13 | Antenna trainer Kit a) Dipole b) Half wave dipole. | 2x 13x3000 | 78,000 |
| 14 | Rectify the given faults in various stages of LED T.V. | 1 | 20,000 |
| 15 | Two-in-one | 2 | 2,000 |
| 16 | Public Address Amplifiers 100W | 2 | 20,000 |
| 17 | Column loud speakers | 1 | 1,600 |
| 18. | DVD Player | 2 | 4,000 |
| 19. | CD Player | 6 | 9,000 |
| 20. | Audio tapes | 24 | 600 |
| 21. | CD Video & Audio | 24 | 500 |
| 22. | Speakers | 10 | 1,000 |
| 23. | Experimental Boards | | |
| | Transistor CB,CE amplifiers | 2 | 3,000 |
| | Oscillators Hartley, Collpitzs, tuned voltage each two | 6 | 9,000 |
| | SCR Characteristics | 2 | 3,000 |
| | FET Amplifier | 2 | 3,000 |
| | UJT characteristics | 2 | 3,000 |
| | Zenor diode characteristics | 2 | 3,000 |
| | Zenor diode voltage regulators | 2 | 3,000 |
| | AM generator | 2 | 3,000 |

| | | | |
|----|--|----|----------|
| | FM generator | 2 | 3,000 |
| | Tuned RF amplifier | 2 | 3,000 |
| | Class A, RC coupled power amplifier | 2 | 3,000 |
| | Class-B, push-pull power Amplifier each two | 4 | 3,000 |
| | Crystal control oscillator | 2 | 3,000 |
| 24 | Digital frequency counters | 10 | 15,000 |
| 25 | Rheostats 5 Amperes | 4 | 4,000 |
| 26 | Digital LCR meters | 4 | 8,000 |
| 27 | LED TV 30 Demonstration model | 2 | 30,000 |
| 28 | Coaxial cables 100 meters | 1 | 1,200 |
| 29 | Balun & other accessories | 5 | 400 |
| 30 | Tool kit boxes | 10 | 5,000 |
| 31 | Soldering iron with stands | 10 | 2,000 |
| 32 | Desoldering pump | 10 | 1,000 |
| 33 | Bread Boards | 20 | 2,000 |
| 34 | Insulation tester | 3 | 6,000 |
| 35 | Battery eliminators 0-3V-45V-6V-9V, 12V Tapings | 4 | 600 |
| 36 | Emergency light | 2 | 1,000 |
| 37 | Inverters 100VA, 500VA each two | 4 | 8,000 |
| 38 | Electronic stabilizer | 2 | 1,000 |
| 39 | Digital trainers To conduct experiments AND, OR, NOT, NAND, NOR EX-OR, EX-OR FLIP-FLOPS RS, JK, T, D, Master slave 7490, shift registers Decoder, seven segment display | 6 | 30,000 |
| 40 | Computers | 10 | 4,00,000 |
| 41 | Digital IC Tester | 4 | 20,000 |
| 42 | LED Demonstration models | 4 | 80,000 |

a) Collaboration Institutions for Curriculum Transaction

With JNTUH, OU College of Engineering State Board of Technical Education and Training
Telangana

b) On Job Training Centers

Electronic Industries locally available / service centres

Employment Opportunities:

Employment Opportunities Technician in Electronics and Communication Engineering
Technicians or ITI (Electronics) equivalent in Government/ Public Sector departments/
Organizations

X. Qualifications of Junior Lecturer in ECET:

Qualifications of Junior Lecturer in Engineering: Must possess a Second Class Degree of B.E. / B. Tech in (Electrical/Mechanical/Automobile/Civil etc.) as case may be A.M.I.E., in the concerned subject or any other equivalent qualifications of a University in India established or incorporated by or under a Central Act or State Act or Provincial Act, or an Institution recognized by the University Grants Commission or an equivalent qualification with not less than 50% of marks in the Engineering concerned branch.

XI. Vertical Mobility

a) With Bridge Course

1. Admission into IInd year DECE
2. Admission into B.Sc in any University
3. Eligible to EAMCET

b). Without Bridge Course

Admission into B.A`/B.Com

XII. Reference Books

1. Electronic Components - D.V.Prasad
2. Electronic Components - Padmanabham
3. Circuit Theory - Schaum Series
4. Principles of Electronics - V.K.Mehta
5. Electronic Devices and Circuits - G.K.Mithal
6. Digital Electronics - R.P.Jain
7. Digital Fundamentals - Malvinas& Bates
8. Network Analysis - G.K. Mithal
9. Network & Lines - Umesh Sinha
10. T.V.Engineering - Dhake
11. Radio Communication - G.K.Mithal
12. Color Television - R.R.Ghulati
13. Electronic Communication System - Roy Blake
14. Fundamentals of Satellite
Communication - Raja Ram, PHI
15. Fiber Optic Communication - Kaiser
16. Electronic Measurements &
17. Instruments - Copper/ A.K. Sahwany
18. Opto Electronic Devices by V.K. Mehta, S.Chand
19. Digital Applications – Tocci
20. Linear IC's - Gaykvad

XIII. LIST OF PARTICIPANTS:

| | |
|----|---|
| 1. | Dr. B.N. BHANDARI Professor in ECE, JNTU Hyderabad. |
| 2. | Dr. D.RAMA KRISHNA Assoc. Professor in ECE, O.U., Hyderabad |
| 3. | Sri. T.RAM MOHAN H.O.D.ECE, QQ Govt. Polytechnic, Hyderabad |
| 4. | Sri. M.SHANMUKHA CHARY J.L. in EET, GJC Malkajgiri. |
| 5. | <u>VERIFIED AND FINALISED BY</u> Dr. T. Satyasavithri Professor & HOD of ECE, JNTUH, HYDERABAD |
| 6. | <u>Co-ordinator:-</u> Sri. K.VISHWESHWAR Lecturer in S.I.V.E. O/o the C.I.E. Telangana, Hyderabad |

Sd/- Dr A. Ashok
COMMISSIONER OF INTERMEDIATE EDUCATION