Diploma Level Syllabus in Electronics and Communication Engineering for Paper-II

1. Basic Electronics

- **Semiconductors**: Properties, P-N junction diode, characteristics, and applications.
- **Rectifiers**: Half-wave, full-wave, bridge rectifiers, clippers and clampers.
- **Transistors**: Basics of Bipolar Junction Transistors (BJTs) - Types (NPN, PNP), biasing, characteristics, and applications as amplifiers and switches.
- **Operational Amplifiers (Op-Amps)**: Characteristics, applications (adders, subtractors, integrators, differentiators, comparators).
- **Oscillators**: Hartley, Colpitts, RC, LC, Crystal oscillators.

---

2. Digital Electronics

- **Number Systems**: Binary, Octal, Decimal, Hexadecimal, and conversions.
- **Logic Gates**: AND, OR, NOT, NAND, NOR, XOR, XNOR, and truth tables.
- **Boolean Algebra**: Simplification techniques, Karnaugh maps (K-Maps).
- **Combinational Circuits**: Multiplexers, Demultiplexers, Encoders, Decoders.
- **Sequential Circuits**: Flip-flops (SR, JK, D, T), Registers, Counters.
- **Memory Devices**: RAM, ROM, EEPROM.

---

3. Electrical Circuits and Machines

- **Basic Circuit Analysis**: Ohm's Law, Kirchhoff's Laws, Thevenin's and Norton's Theorems.
- **AC Circuits**: RMS values, power factor, RL, RC, RLC circuits, resonance.
- **Transformers**: Principles, types, efficiency, and losses.

---

4. Electronic Devices and Circuits

- **Amplifiers**: Small signal, large signal, Class A, B, AB, C amplifiers.
- **Feedback**: Positive and negative feedback, stability, gain.
- **Power Electronics**: SCR, TRIAC, DIAC, MOSFET, IGBT.
- **Voltage Regulators**: Zener diode regulator, IC regulators (78XX, 79XX series).

---

5. Communication Systems

- **Analog Communication**: Amplitude Modulation (AM), Frequency Modulation (FM), and Phase Modulation (PM).
- **Digital Communication**: Pulse Modulation (PAM, PWM, PPM), ASK, FSK, PSK.
- **Data Transmission**: Error detection and correction, multiplexing (TDM, FDM).
- **Antennas and Wave Propagation**: Types of antennas, radiation pattern, propagation modes (ground wave, skywave).

---

6. Microprocessors and Microcontrollers

- **Microprocessor Basics**: Architecture of 8085 and 8086, pin configuration, memory interfacing.
- **Microcontrollers**: 8051 architecture, timers, counters, serial communication, interrupts.

---

7. Electronic Measurements and Instrumentation

- **Measuring Instruments**: Multimeters, CROs, signal generators, frequency counters.
- **Sensors and Transducers**: Temperature, pressure, light, and proximity sensors.
- **Bridges**: Wheatstone, Maxwell, Kelvin bridges for resistance, inductance, and capacitance measurement.
- **Industrial Devices**: Thyristors, SCRs, rectifiers, inverters, choppers.
