**UNIVERSITY POLYTECHNIC**
**B.I.T., MESRA, RANCHI**

**Syllabus of Diploma in Engineering (Electronics Engineering) (Semester V)**

**COURSE STRUCTURE**
**(W.E.F. 2011 Batch Students)**
**(Total Unit 7.0)**

| Course Code | Theory | Unit | Course Code | Sessional | Unit |
|---|---|---|---|---|---|
| DEC 5001 | Industrial Electronics | 1.0 | DEC 5002 | Industrial Electronics Lab. | 0.5 |
| DEC 5003 | Microprocessor & Its Applications | 1.0 | DEC 5004 | Microprocessor Lab. | 0.5 |
| DEC 5005 | Telecommunication Systems | 1.0 | DEC 5006 | Telecommunication Lab | 0.5 |
| DEC 5007 | Modern Communication Systems | 1.0 | DEC 5008 | Modern Communication Systems Lab. | 0.5 |
| | | | DEC 5012 | Project | 1.0 |
| | | **4.0** | | | **3.0** |

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**Subject : Industrial Electronics** **Course Code : DEC 5001**

**Module – 1**

Rectifiers and Regulated Power Supplies : Introduction, Classification of Rectifiers, Voltage Multiplying Rectifier Circuits, Metal Rectifiers, Classification of Voltage Regulation, Short Period Accuracy of a Regulator, Long Period Accuracy of a Voltage Regulator, Principle of Automatic Voltage Regulator, DC Voltage Regulators, Serie Voltage Regulators, Polyphase Rectifier, Three-phase Half-wave Delta-wye Rectifier, Six-phase Star Half-wave Rectifier, Transformer Utility factor, Rectifier Performance. (8)

**Module – 2**

Thyristors : Structure of Thyristor (SCR), Operation and Static I.V. Characteristics of a Thyristyor, Thyristor Turn-on Methods, Switching Characteristics of Thyristors, Thyristor Gate Characteristic, Two Transistor Model of an SCR, Thyristor Ratings, Voltage Ratings of Thyristors, Current Ratings of Thyristors, Power Rating of Thyristors, Thermal Ratings of Thyristors, Turn-on and Turn-off Time Ratings, Thyristor Protection,di/dt protection, dv/dt protection, Over voltage Protection, Overcurrent Protection, Gate Protection of Thyristors, Cooling and Mounting of Thyristors, DIAC, TRIAC, UJT. (8)

**Module – 3**

Firing Circuits for Thyristor : Introduction, Resistance firing Circuit, RC firing cuicuit, UJT Oscillator as a Gate Trigger Source. (4)

**Module – 4**

Thyristor Inverters : Introduction, Classification of Inverters, Single phase Inverters, Mc Muny Inverter, Overcurrent Protection, O/P voltage Control in Inverter, Waveform Control, Thyristor Rating for Inverter Circuit. (5)

**Module – 5**

Amplifiers in Industrial Electronic Circuits : Direct Coupled (DC) Amplifiers, Basic DC amplifiers, Chopper Stabilized DC amplifiers, Chopper Stabilised DC amplifier. (4)

**Module – 6**

Industrial Timing Circuits : Timers, Classification of timer, Electronic-timer, Classification of Electronic timer, SCR Delay timers, IC Electronic Timer. (4)

**Module – 7**

Automatic Control and Recording : Block Diagram Representation, Classification of Application Based Control System, Automatic Controllers.

Programmable Logic Controllers : Introduction to Microcomputers, Programmable Controllers, Programmable Logic Controllers (PLCs), PLC programmings, Ladder Diagram, PLC communications and Networking. (8)

**Books** :


1. Industrial and Power Electronics – by – G.K. Mithal, Dr. Maneeshar Gupta Khanna Publisher.
2. Industrial Instrumentation and Control – by – S. K. Singh (TMH).

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**Subject : Microprocessor & its Applications** **Course Code : DEC 5003**

**Module – 1**

Introduction, Organisation and Block-Diagram of a Simple Micro-Computer, Word-length of a Computer/Microprocessors, Microcontrollers, Embedded Microprocessors, Hardware, Software, Firmware, CPU/Microprocessor – Schematic Diagram, Memory, Buses, Input device, Output device, Microprocessor Applications. (8)

**Module – 2**

Introduction to 8085 – Microprocessor : Architecture, Pin-description, System Bus – Address Bus, Data Bus, Control Bus, Instruction Cycle, Timing-diagram. (8)

**Module – 3**

Instruction sets of Intel - 8085 : Addressing Modes, Groups of Instructions. Simple Programming on Addition, Subtraction, Multiplication, Counting, Looping, BCD to BINARY conversion, BINARY to BCD conversion, sorting etc. (8)

**Module – 4**

Peripheral Devices and their Interfacing : Address space partitioning – Memory mapped I/O Scheme, I/O mapped I/O scheme, Memory and I/O interfacing, Data-transfer schemes, Interrupts of Intel 8085, Brief Introduction to 8255, 8253. Interfacing of these chips with Microprocessor. (8)

**Module – 5**

8259 interfacing chip – Pin description, interfacing of 8259 and I/O devices, Internal Register of 8259. Introduction to 8086, pin-description, operating modes, pin –description for Minimum and Maximum mode, operation, Registers. (8)

**Module – 6**

Microprocessor Based Data Acquisition system : Analog to Digital converter, Digital to Analog converter. D/A-A/D accuracy & Resolution, Interfacing DAC & ADC with microprocessor. (6)

**Module – 7**

Microprocessor Applications : Industrial Examples of Temperature Control and Pressure monitoring. (4)

**Books** :

1. Fundamentals of Microprocessors & Microcontrollers – By – B. Ram

**Reference** :

1. Digital Computer Electronics – By – Malvino, Brown.
2. Microprocessor Architecture, Programming & Applications – By – R.S.Gaonkar.

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**Syllabus of Diploma in Engineering (Electronics Engineering) (Semester V)**

**Subject : Telecommunication Systems** **Course Code : DEC 5005**

**Module – 1**

Digital Communication :- Introduction, Pulse Modulation Pulse code Modulation. Delta Modulation, Line codes, TDM, Vocoders & data compression, FSK, PSK, Quadrature ASK.

(5)

**Module – 2**

Telecommunication Switching Systems : Introduction, Evolution of Telecommunications, Basics of a switching system, Electronic space division switching : Stored Program Control, Traffic Engg : Network traffic load and parameters, Grade of service and Blocking probability.

(7)

**Module – 3**

The Telephone system : Introduction, Public Switched Telephone Network (PSTN). The local loop, signals & Noise in the Telephone System, FDM, Digital transmission, Telephone Network signalling, Digital Local Loops.

(7)

**Module – 4**

Data Transmission : Introduction, Data coding, Asynchronous Transmission, Synchronous Transmission, Error detection & correction, Data compression & Encryption.

(6)

**Module – 5**

Networks : Circuit switched networks, circuit switching concept, packet switch networks, routing, Congestion Control.

(5)

**Module – 6**

LANS : Introduction, Local – Area Network Topologies. Token – ring system, Ethernet, Ethernet wiring, Broad band Networks.

(5)

**Module – 7**

WANS : Network Structure, Network Protocols, connecting LANS to WANS, TCP / IP Networks, The internet & internets, Convergence of voice & data Networks.

(5)

**Books Recommended** :


1. Data & Computer Communication – William Stallings.
2. Electronic Communications systems - Roy Blake.
3. Telecommunication Switching Systems & Networks – Thiagarajan Viswanathan

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**Syllabus of Diploma in Engineering (Electronics Engineering) (Semester V)**

**Subject : Morden Communication Systems** **Course Code : DEC 5007**

**Module – 1**

Microwave devices : Introduction, Wave guides, Passive components, Microwave solid state devices, Microwave tubes, Microwave antennas.

(8)

**Module – 2**

Terrestrial Microwave Communication System : Introduction, Terminal & Repeater siting, Path calculation, Fixed Microwave Links.

(4)

**Module – 3**

Satellite Communication : Introduction, Satellite orbits, Geostationary satellites, Application of geostationary satellites, Satellite in Low & medium earth orbits, Satellite Telephone systems using LEO & MEO Satellites.

(6)

**Module – 4**

Cellular Radio : Introduction, The Advanced Mobile Phone System, (AMPS), AMPS Control System, Security and Privacy.

(5)

**Module – 5**

Cellular Telephone : Specification and operation, Cell site Equipment, Fax and Data Communication using cellular phones, Digital Cellular System.

( )

**Module – 6**

Personal Communication System : Introduction, Differences between cellular & PCS Systems, TDMA-PCS, GSM, CDMA PCS, comparison of PCS schemes, data communication with PCS.

(4)

**Module – 7**

Radar Systems : Radar Concepts & Displays, Pulse shapes, Radar System Circuitry and components, Advanced Radar Systems. (8)

**Books Recommended** :

1. Electronic Communication System – Roy Blake.
2. Microwave Engineering – A. K. Gautam

**Reference**

1. Satellite Communication – Prett & Bostian

## DEC 5002 INDUSTRIAL ELECTRONICS LAB.

1. Identification and testing of thyristor using analog multimeter.
2. Study and construction of halfwave gate controlled rectifier using SCR.
3. To observe and verify the effect of varying gate current on the firing point of an SCR when used as a half wave rectifier.
4. Study and construction of autocut circuit a voltage stabilizer using zener diode and transistor.
5. To design and fabricate an emergency light.
6. LDR application in light activated turn-off circuit by using DIAC and TRIAC.
7. Study and construction of Astable multivibrator.
8. Study and construction of series voltage regulator.
9. Study and construction of automatic water pump controller.
10. Study and testing of a triac and obtain its V-I characteristic.

**Vth Semester** **DEC 5004 Microprocessor Lab.** **List of Experiments**

1. (a) Write an ALP to add two 8-bit numbers; sum being of 8 Bits.
   (b) Write an ALP to add two 8-bit numbers; sum may be of 16 Bits.

2. Write an ALP to subtract two unsigned numbers, store the result in memory location XX90H. How would you determine the result obtained is straight binary number or 2's complement ? Verify with examples.

3. Write an ALP to multiply two 8-bit numbers, product being of 16 bits.

4. Write an ALP to arrange a data array in ascending order.

5. Write an ALP to arrange a data array in descending order.

6. Write an ALP for 2-bit BCD to BINARY conversion.

7. Write an ALP for BINARY to BCD conversion.

8. Write an ALP for block transfer of data.

9. Write an ALP for addition of two 16-bit numbers, sum may be of 16 bits or more.

10. Write an ALP to find the largest number in a data array.

11. Six bytes of data are stored in memory locations starting at 2050H. Add all the data bytes. Use register B to save any carries generated, while adding the data bytes. Store the sum at two consecutive memory locations 2070H & 2071H. Write an ALP for the above mentioned problem statement.

12. Register BC contains 2793H, and registers DE contain 3182H. Write an ALP to add these two 16-bit numbers, and place the sum in memory locations 2050H & 2051H.

## DEC 5006 TELECOMMUNICATION LAB.

1. Analog signal sampling and its reconstruction.
2. To study the effect of different sampling frequencies on the reconstructed signal.
3. To study the effect of varying duty cycle of sampling frequency on the aptitude of reconstructed signal.
4. To study the Pulse Amplitude Modulation (PAM)
5. To study the delta modulation and demodulation.
6. To study the Compounding System.
7. Study the pulse position modulation and demodulation.
8. Study of pulse width modulation and demodulation.
9. To study the CVSD (Continuously Variable Slope Overload).
10. To study the slope overload & increased integrator gains.

LIST OF EXPERIMENTS ELECTRONICS – V

## DEC 5008 MODERN COMMUNICATION SYSTEM LAB.

1. Setting up a fiber Analog link.
2. Setting up a Fiber Optic Digital link.
3. Study of losses in Optical Fiber.
4. Study of bending losses in optical fiber.
5. Study of Microwave Component.
6. Determination of Square Law Characteristics of a Microwave Crystal Detector.
7. Study of V-I characteristics of Gunn diode.
8. Measurement of parameter of a rectangular x-band wave guide.
9. Measurement of power gain of pyramidal horn antenna.
10. Measurement of frequency and line parameter of a two wire VHF transmission line.