COURSE STRUCTURE

DIPLOMA IN ELECTRONICS

&

COMMUNICATION ENGINEERING

2ND YEAR (IIIrd SEM.)

GLA UNIVERSITY POLYTECHNIC

COURSE STRUCTURE, CONTACT HOURS and CREDITS

DISCIPLINE :ELECTRONICS & COMMUNICATION ENGINEERING
SEMESTER : III (FULL-TIME)

Sr. No.	Subject Code	Subject Name	Periods Per Week			Cr
			L	T	P/D	
1	DCS 3012	Programming in 'C'	3	0	0	3
2	DEC 3001	Basic Electronics	3	0	0	3
3	DEC 3004	Basic Electrical Engineering	3	1	0	4
4	DEC 3002	Digital Electronics	3	0	0	3
5	DEC 3003	Electronics Instruments & Measurements	3	0	0	3
6	DCS 3092	Programming in 'C' Lab	0	0	4	2
7	DEC 3081	Basic Electronics Lab	0	0	4	2
8	DEC 3082	Digital Electronics Lab	0	0	4	2
9	DEC 3083	Electronics Instruments & Measurement `Lab	0	0	4	2
10	DEC 3085	Field Visits & Presentations	0	0	2	1
11	DEC 3091	General Proficiency	0	0	0	1
TOTAL			**15**	**1**	**18**	**26**

L- Lecture Period, **T**-Tutorial Period, **P**- Practical Period, **D**- Drawing Practice Period, **Cr**. - Credits,

DEC 3001 – Basic Electronics

Credits: 3 **Semester III** **L-T-P: 3-0-0**

Module No.	Contents	Teaching Hours
Unit –I	**Semiconductor Physics**: Basic of Semiconductor materials and effect of temperature on semiconductor. **PN Junction Diode**:P-N junction diode with its Forward & Reverse Characteristics. Important specifications of P-N junction diode(ratings) , Break down in P-N junction, Voltage regulation **Rectifiers & Filters**: Rectifier circuit (HWR, FWR). Their comparison on the basis of circuit operation, waveforms, average (dc) value of rectifier output, ripple factor, ripple frequency, transformer utilization factor, rectification efficiency,	12
Unit – II	**Clipping & Clamping circuits**: Types and applications.Voltage Multiplier circuits: Types and applications. **Special purpose diode**: Light Emitting Diode, Liquid Crystal Display & Opt-couplers, Tunnel diode(with tunneling function),varactor diode,Schottky-Barrier diode, Zener diode, Zener diode as a voltage regulator. **Bipolar Junction Transistor (BJT):**Construction, working principle of PNP and NPN transistors, characteristics of CB, CE and CC configurations. D.C load line, Thermal stability factor. Different types of biasing methods (Fixed biasing, Collector–Base bias, Potential divider biasing,).	12
Unit - III	**Applications of BJT:** **a) Small Signal Amplifier:** Approximate hybrid model for Common Emitter Amplifier. Analysis of CE single stage Small Signal Amplifier (with un-bypassed & bypassed emitter resistor), using approximate hybrid equivalent circuit (amplifier input, output impedance, current & voltage gain). **b) Application of BJT CE inverter switch**. FETs	12

RECOMMENDED BOOKS

1. Electronic Devices and Circuit Theory, 9th Edition by Robert Boylestad & LouisNashelsky, Prentice Hall India Private Limited.

Reference Books:-

2. Electronic Principles,7th Edition by Albert Paul Malvino, (Tata McGraw - Hill Publishing Company Ltd).
3. Electronic Devices and Circuits, 5th Edition by David Bell, Oxford University Press.
4. Basic Electronics and Linear Circuits, 4th Edition by Bhargava, Kulshresthaand Gupta (Tata McGraw - Hill Publishing Company Limited).

DEC-3004: BASIC ELECTRICAL ENGINEERING

Credits: 4 **Semester III** **L-T-P: 3-1-0**

Module No.	Contents	Teaching Hours
Unit –I	**NETWORKS & A.C. FUNDAMENTALS**: Definitions & explanation: Active & passive elements as well as networks – Linear & non-linear networks – Unilateral & bilateral networks. Statement, explanation, limitation & problems on Thevenin's theorem, Norton's theorem, Maximum power transfer theorem, Star-delta conversion. Single-phase A.C. Circuits: Concept of complex impedance – Rectangular & polar form. R-L-C Series Circuit: Representation of impedance, voltage, current and power in complex form phasor diagram Impedance triangle – problems. Parallel Circuit: Phasor diagram, problems (maximum 3 branches).	16
Unit – II	**RESONANCE & SELECTIVITY:** Series Resonance: General aspects – Impedance & phase angle of series resonant circuit – Voltages & current in series resonant circuit – Study of different curves – Quality factor – Selectivity & bandwidth – Voltage magnification – Problems – Acceptor Circuit (concept only). Parallel Resonance: Resonant frequency for a tank circuit study of curves attaining resonance by varying frequency & RL – Current magnification – Quality Factor – Selectivity & bandwidth – Applications – Problems – Rejector circuit (concept only). Comparison between series & parallel resonance.	16
Unit - III	**TRANSFORMERS:** Principle of operation. E.M.F equation, Voltage & Current relations. Construction and applications of small transformers used in electronics and communication engg., construction of auto transformers, constant voltage transformer. Phasor diagram of a transformer on load; Definition of regulation and efficiency; Elementary idea of losses in transformer, open circuit and short circuit test. **D.C. MACHINES: D. C. Generator:** Working principle, constructional details. **SYNCHRONOUS MACHINES:** Alternators: Working principle, types of alternators, **INDUCTION MOTOR**: Working principle and constructional details, types of induction motor.	16

Text Books:-

1. Fundamentals of Electric Circuit Alexander Mc Graw Hill
2. Electric Circuit David A. Bell Oxford
3. Circuits & Network Sukhua, Nagsarkar Oxford
4. A Text Book of Electrical Technology Part-I B.L. Thereja S. Chand &. Co

DEC-3002: DIGITAL ELECTRONICS

Credits: 3 **Semester III** **L-T-P: 3-0-0**

Module No.	Contents	Teaching Hours
Unit –I	**Introduction To Digital Techniques:-** Digital circuit. Digital signal, Use of digital circuit and digital signal, Advantages and Disadvantages of Digital circuits, Generation of digital signal. Introduction to digital ICs, Characteristics of digital ICs. Number System – Introduction to Binary, Octal, Decimal, Hexadecimal number system, Conversion of number systems, 1's complement and 2's complement, Binary arithmetic (addition, subtraction). BCD code, BCD arithmetic (addition, subtraction). Logic Gates And Boolean Algebra:- Logical symbol, logical expression and truth table of AND, OR, NOT, NAND, NOR, EX-OR and EX-NOR gates. Universal gates – NAND and NOR gates. Basic laws of Boolean algebra, Duality theorem. De Morgan's 1 theorems.	12
Unit – II	**Combinational Logic Design/Circuits**:- Simplification of Boolean expression using Boolean algebra, Construction of logical circuits forms Boolean expressions, Boolean expressions using Sum of products and product of sums forms, K-map representation of logical functions, Minimization of logical expressions using K-map (2, 3, 4 variables). Standardization of SOP & POS equations, Concept of Adders / Sub tractors, Truth table, K-map, Simplified logical expression and logical circuit using basic gates and universal gates of: (a) Half adder and full adder (b) Half sub tractor and full sub tractor. Block diagram, Truth table, Logical expression and logic diagram of Multiplexers (4:1 and 8:1), Multiplexer IC.	12
Unit – III	**Flip Flops And Sequential Logic Design:-** Registers and Counters ,One-bit memory cell, clock signal, Symbol and Logic diagram using NAND gates, working and truth table of R S flip-flop. Symbol and Logic diagram using NAND gates, working, truth table and timing diagram of Clocked R S flip flop. Symbol and Logic diagram using NAND gates, working, truth table and timing diagram of J-K flip flop. Block diagram and truth table of Master slave J-K flip flop. Symbol, working and truth table of D-flip flop and T-flip flop. Applications of flip flops. Introduction of Logic families (TTL, ECL, C-MOS), **Memories:-** Classification of memories, RAM, ROM, PROM, EPROM, E2PROM.	16

Text Books:-

1. Malvino & Leach "Digital Principles and Applications", Tata McGraw Hill, Delhi.
2. Gayakwad R.A. "Op-Amps and Linear Integrated Circuits", Prentice Hall of India, Delhi.

Reference Books:-

3. Taub & Schilling "Digital Electronics", Tata McGraw Hill, Delhi.
4. Nagrath IJ. "Electronics Analog and Digital", Prentice Hall of India Ltd Delhi.
5. Jain R.P. "Modern Digital Electronics", Tata Mc-Graw Hill Delhi.

DEC 3003: ELECTRONICS INSTRUMENTS & MEASUREMENTS

Credits: 03 **Semester III** **L-T-P: 3-0-0**

Module No.	Contents	Teaching Hours
I	**MEASUREMENT FUNDAMENTALS:** Explanation of accuracy, precision, sensitivity, resolution, dynamic range, response and repeatability of measuring instruments. Role of Units in measurements and different types of units – Definition of Errors and type of errors – Definition of Primary and Secondary Standards – Concept of Calibration. **PERMANENT MAGNET MOVING COIL METER:** Theory of operation, working principle and construction of PMMC. Measurement of voltage, current and resistance. Loading effect, extension of range and PMMC Multimeter.	14
II	**ELECTRONIC VOLTMETER & MULTI METER:** Advantages of electronic voltmeter over ordinary voltmeter. Working principle of Digital Multi Meter – Different types of DMM: Integration and successive approximation type. Advantages of DMM over Conventional Multi Meter. **CATHODE RAY OSCILLOSCOPE:** Block diagram of CRO, constructional features of CRT and principle of operation.	14
III	**DSO:**Features of dual trace oscilloscopes, chopper beam switch, alternate beam switch. Block schematic description of digital storage oscilloscope. Measurement of amplitude, frequency, time period, phase angle and delay time by CRO. **TIME & FREQUENCY MEASUREMENT :** Measurement of frequency by heterodyne method – Block schematic description of digital frequency counter. Measurement of frequency, time period and time interval through frequency counter. **SIGNAL GENERATOR:** Block schematic descriptions, specifications and uses of: Audio & Radio Frequency Signal Generator – Function Generator – Pulse Generator	14

References

1. Fundamentals of Industrial Instrumentation A Barua Wiley India Pvt Ltd
2. Instrumentation Devices & System Rangan, Sarma, Mani Mc Graw Hill
3. Sensors & Transducers D. Patranabis PHI
4. Measurement System Application & Design E.O. Doeblin Mc Graw Hill
5. Principles of Measurement & Instrumentation Alan S. Morris PHI

DCS-3012: PROGRAMMING IN 'C'

Credits: 3 **Semester III** **L-T-P: 3-0-0**

Module No.	Contents	Teaching Hours
Unit - 1	Basics of C:- History of C, where C stands, C character set, tokens, constants, variables, keywords, C operators (arithmetic, Logical, assignment, relational, increment, and decrement, conditional, bit wise, special, operator precedence), C expressions data types, Formatted input, formatted output. Decision making:- Decision making and branching, if statement (if, if-else, else-if ladder, nested if-else), Switch case statement, break statement. Decision making and looping while, do, do-while statements for loop, continue statement	12
Unit - 2	Arrays and Strings:- Declaration and initialization of one dimensional, two dimensional and character arrays, accessing array elements. Declaration and initialization of string variables, string handling functions from standard library (strlen(), strcpy (), strcat (),strcmp ()). Functions:- Need of functions, scope and lifetime of variables, defining functions, function call (call by value, call by reference), return values, storage classes. Category of function (No argument No return value, No argument with return value, argument with return value), recursion.	16
Unit - 3	Structure:- Defining structure, declaring and accessing structure members, initialization of structure, arrays of structure. Pointers:- Understanding pointers, declaring and accessing pointers, Pointers arithmetic, pointers and arrays.	14

Text Books:-

1. Schaum Series, Programming in C, McGraw Hills Publishers, New York.

References Books:-

2. Yashwant Kanetkar, Exploring – BPB Publications, New Delhi.
3. Complete reference C,BY Herbert Shield, Tata Mc-Graw Hill
4. The C++ Programming Language by Stroustrup, Bjarne 3rd.ed. New Delhi : Pearson Education, c2000

DEC-3081: BASIC ELECTRONICS LAB

Credits: 2 **Semester III** **L-T-P: 0-0-4**

List of Practical

Exp No.	Contents	Teaching Hours
1	**a)** Identification and testing of electronic components such as resistor, inductor, capacitor,diode, transistor and different types of switches used in Electronic circuits **b)** Measurement of resistances using multimeter and their comparison with color code values.	48
2	Study of V-I characteristics of a Semiconductor diode and to calculate its static and dynamicresistance.	
3	Study of Zener diode as a voltage regualtor and finding its reverse breakdown voltage..	
4	Observation of input and output wave shapes of a half-wave rectifier and verification andrelationship between dc output and ac input voltage.	
5	Observation of input and output wave shapes of a full wave rectifier and verification andrelationship between dc and ac input voltage.	
6	Observation of input and output wave shapes of a Bridge full wave rectifier and verification and relationship between dc and ac input voltage.	
7	Study of different types of filter circuits (shunt capacitor, series inductor).	
8 9	Plotting input and output characteristics of a transistor in CB configuration.	
10	Plotting input and output characteristics of a transistor in CE configuration.	
11	To measure the voltage gain and band width by plotting frequency response curve of a single stage amplifier using CE configuration at different loads. To plot V-I characteristics of a FET.	

List of experiments for advance learners:

1. Study of Rectifier circuit using PSPICE.
2. Study of Filter circuit using PSPICE.
3. Study of V-I characteristics of a Semiconductor diode and Zener diode to using Simulation.

DEC-3082: DIGITAL ELECTRONICS LAB

Credits: 2 **Semester III** **L-T-P: 0-0-4**

List of Practical

Module No.	Contents	Teaching Hours
1	Verification of truth table of AND, OR, NOT, NAND, NOR, EXOR gate.	48
2	To realize different Boolean expressions with logic gates.	
3	Verification of NAND and NOR gate as universal gates.	
4	To realize half adder and full adder by using different logic gates.	
5	To realize half subtractor and full subtractor by using different logic gates.	
6	Construction of half adder and full adder circuits using only NAND gate.	
7	Verify the operation of 4 bit multiplexer using an IC.	
8	Verify the operation of de-multiplexer (2:4 and 3:8) using an IC.	
9	Verify the operation of decoder (1:2 and 2:4) using an IC.	
10	Verify the operation of encoder (2:1 and 4:2) using an IC.	
11	Verify operation of SR, JK, D, flip-flop using different logic gates.	
12	To implement 4bit shift register.	

List of experiments for advance learners:

1. Verification of truth table for AND, OR, NOT, NAND, EX-OR, NOR gate using PSPICE.
2. Verification of NAND and NOR gate as universal gates using PSPICE.
3. Study of half - adder and full adder circuits using PSPICE
4. Verify the operation of multiplexer (4:1) using PSPICE.
5. Verify the operation of de-multiplexer(1:4) using PSPICE

DEC-3082: ELECTRONICS INSTRUMENTS & MEASUREMENTS LAB

Credits: 2 **Semester III** **L-T-P: 0-0-4**

List of Practical

Module No.	Contents	Teaching Hours
1	Use of analog and digital Multimeter for measurement of voltage, current (AC/DC) and resistance.	48
2	Understand and identify the different parts function of CRO and function generator.	
3	Understand and identify the different parts function of CRT	
4	Understand and identify the different parts function of DSO and function generator.	
5	Measurement of voltage and frequency of a sinusoidal signal using CRO and draw wave shape of signal.	
6	Measurement of voltage, frequency, time period, phase angle and delay time using CRO: (use of Lissagious Figures).	
7	Measurement of rise, fall and delay time using a CRO.	
8	Measurement of distortion of a LF signal generator using distortion factor meter.	

List of Experiments for advance learners:

1. Study of Wattmeter
2. Use of LCR meter for measuring inductance, capacitance and resistance.
3. To measure the value of earth resistance using earth tester.

ANNEXURE – C

COURSE STRUCTURE

DIPLOMA IN ELECTRONICS

&

COMMUNICATION ENGINEERING

2ND YEAR (IVth SEM.)

GLA UNIVERSITY POLYTECHNIC

COURSE STRUCTURE, CONTACT HOURS and CREDITS

DISCIPLINE : ELECTRONICS & COMMUNICATION ENGINEERING
SEMESTER : IV (FULL-TIME)

Sr. No.	Subject Code	Subject Name	Periods Per Week			Cr
			L	T	P/D	
1	DEC-4001	Network Analysis & Transmission Lines	3	1	0	4
2	DEC-4002	Analog Communication Engineering	3	0	0	3
3	DEC-4003	Electronic devices & Circuits	3	0	0	3
4	DEC-4004	Instrumentation and control engineering	3	0	0	3
5	DEC-4005	Microprocessor	3	0	0	3
6	DEC-4081	PCB-Design-Lab	0	0	4	2
7	DEC-4082	Analog Communication Engineering Lab	0	0	4	2
8	DEC-4083	EDC Lab	0	0	4	2
9	DEC-4084	Microprocessor lab	0	0	4	2
10	DEC-4085	Field Visits & Presentations-I	0	0	2	1
11	DEC-4091	General Proficiency	0	0	0	1
TOTAL			**15**	**1**	**18**	**26**

L- Lecture Period, **T**-Tutorial Period, **P**- Practical Period, **D**- Drawing Practice Period, **Cr**. - Credits,

Member **Member** **Chairman**
Joint Board of Studies

DEC-4001: NETWORK ANALYSIS & TRANSMISSION LINES

Credits: 4 **Semester IV** **L-T-P: 3-1-0**

Module No.	Contents	Teaching Hours
Unit –I	**NETWORK FUNDAMENTALS**: Active and passive network – Balanced and unbalanced network – Symmetrical and asymmetrical network – T and Π network and their conversion – Simple problems. Characteristic impedance – Propagation constant and image impedance – Open and short circuit impedance and their relation to characteristic impedance. **FILTER CIRCUITS:** Definition and relationship between neper and decibel. Basic idea of passive filter – Definitions of pass band, stop band and cut-off frequency. Constant-K prototype Filters: a) Low pass filter, b) High pass filter, c) Band pass filter, and, d) Band stop filter. Active Filters: Basic idea – Their advantages and disadvantages over passive filters – Applications of filter circuits.	14
Unit – II	**ATTENUATOR & EQUALISER:** Basic idea of Attenuator and Equalizer – Difference between attenuator and equaliuzer. TRANSMISSION LINES: Types of transmission lines: Parallel wire and coaxial cable, Primary and secondary constants of transmission lines. Characteristic impedance – Reflection co-efficient – Standing wave ratio and their relationship. Simple matching methods, single and double stub match for transmission lines. Losses in transmission lines. Distortion in transmission line – Causes of distortion and condition for distortionless transmission – Practical feasibility for distortionless transmission.	14
Unit - III	**TRANSIENT RESPONSE IN ELECTRICAL NETWORK**: Laplace Transform: Definition – Condition of existence - Transforms of some elementary functions – Linearity property – First shifting property – Change of scale property – Inverse Laplace Transform. Transient response in electrical networks with sinusoidal and step function – Analysis with RL, RC, RLC circuits, time constant.	14

Text Books:-

1. J. P. Ryder-Network Filters & Transmission Line- PHI
2. A. Chakravorty- An Introduction to Network, Filters & Transmission Line- Dhanpat rai & Co.
3. D. R. Chaudhry- Network Analysis-Dhanpat Rai & Co.
4. V. K. Aatre- Network Theory & Filter Design- New Age International Pub.

References:

1) Network, Filters and Transmission Lines / Jain & Kaur / Tata McGraw-Hill
2)) Circuit and networks / Sudhakar / Tata McGraw-Hill
3) 3) Introduction to network, Filters and Transmission Lines / A. K. Chakraborty / Dhanpat Rai & Sons
4) 4) Network Analysis / V. Valkenburg / Prentice Hall of India, N. Delhi
5) 5) Engineering Circuit Analysis / Hayt / Tata McGraw-Hill
6) 6) Electric Circuits / Edminister / Tata McGraw-Hill
7) Network, Lines and Fields / Ryder / Prentice Hall of India, N.

DEC-4002: ANALOG COMMUNICATION ENGINEERING

Credits: 3 **Semester IV** **L-T-P: 3-0-0**

Module No.	Contents	Teaching Hours
Unit –I	INTRODUCTION TO ELECTRONIC COMMUNICATION: Importance of communication – Elements of a communication system – Types of electronic communication - Electromagnetic spectrum – Bandwidth – Basic idea of Fourier series and Fourier transform. ANALOG MODULATION: Concept and necessity of modulation. Definition of amplitude, frequency and phase modulation. Derivation of sidebands in AM systems – Evaluation of power – Sideband depth – Percentage of modulation. Methods of AM: Principles of operation of plate modulated Class C amplifier – Collector modulator – Balanced modulator. Expression of sidebands in FM and PM systems and its interpretation – Modulation index and bandwidth requirement Principles of operation of varactor diode modulation. Comparison of AM, FM and PM. Basic ideas of Pulse Amplitude Modulation (PAM), Pulse Width Modulation (PWM) and Pulse Position Modulation (PPM) – Principle of generation and reception of PAM, PWM & PPM with block diagram and their applications.	14
Unit – II	TRANSMITTING SYSTEMS: Block diagram and function of different stages of AM and FM broadcast transmitter. Working principles of SSB systems with block diagram: Filter Method – Phase Shift Method – Third Method. Cooling and shielding arrangement of transmitter. DEMODULATION: Principle of detection with diode detector AGC circuit delayed AGC Foster-Seeley discriminator – Ratio Detector – Limiter – Standard AFC Circuits (basic principles only, no derivation	14
Unit - III	RECEIVING SYSTEM: Block diagram and principle of operation of super heterodyne receiver – IF amplifier and choice of IF – Mixer and converter – Alignment and tracking – Tone and volume control – Band spreading – Receiver characteristics – Testing. Block diagram and principle operation of FM receiver – Pre-emphasis and de-emphasis – AFC and alignment of FM receiver. PROPAGATION OF WAVES: Elementary concepts about propagation of waves. Propagation of ground wave, space wave and sky wave. Iono-spheric layers – Skip distance – Plasma frequency – Critical frequency – MUF – Virtual height. Duct propagation – Single hop & multi hop – Fadding.	14

References:

1) Principles of Communication Systems, Taub & Schilling, TMH.
2) Modern Digital and Analog Communication Systems, B. P. Lathi, OUP
3) Communication System, Hykin, Wheeler
4) Electronic Communication System, Kenndy, TMH

DEC-4003:ELECTRONIC DEVICES & CIRCUITS

Credits: 3 **Semester IV** **L-T-P: 3-0-0**

Module No.	Contents	Teaching Hours
Unit –I	MULTISTAGE AMPLIFIER: Coupling: RC coupled – Direct coupled – Transformer-coupled amplifiers – Effect on Gain & Bandwidth and Frequency response for cascading – Comparison of different types of cascading. POWER AMPLIFIER: Characteristics of Class A, Class B, Class C and Class AB amplifier. Difference between Voltage and Power Amplifier. Transformer coupled Class A Power Amplifier: Circuit operation – Calculation of power, efficiency & distortion. Class B Push Pull Amplifier: Circuit operation – Calculation of power, efficiency & distortion – Crossover distortion – Advantages and disadvantages – Complementary symmetry and quasi-complementary symmetry Class B Push Pull Amplifier. Noise in amplifier circuits	14
Unit – II	TUNED AMPLIFIER: Circuit operation of single tuned and double tuned amplifiers. Features of staggered tuned amplifier and their applications. FEEDBACK AMPLIFIER: Basic idea of positive and negative feedback – Effect of negative feedback on gain, gain stability, distortion, noise, bandwidth, phase shift, input and output impedances. Voltage and current, series and shunt feedback. Performance of emitter follower circuit – Calculation of gain and input & output impedances – Darlington pair.	14
Unit - III	OSCILLATORS: Concept of oscillation – Barkhausen criteria. Operation of following sinusoidal oscillators: a) tuned collector, b) Hartley, c) Colpitt, d) Wein-bridge, e) Phase Shift, and, f) Crystal. Introduction of 555 timer and OP-AMP IC's with their applications.	14

References:

1. Bhargava, Kulshreshtha & Gupta - "Baisc Electronics & Linear Circuits" - TMH.
2. Malvino, A. P. - "Electrinics Principles" - Tata Mcgraw-Hill.
3. Sedra, Adel S. Smith, Kenneth. C. " Micro Electronics Circuits" - Oxford University Press 5th Edtion

DEC-4004: INSTRUMENT AND CONTROL ENGINEERING

Credits: 3 **Semester IV** **L-T-P: 3-0-0**

Module No.	Contents	Teaching Hours
Unit –I	TRANSDUCERS FUNDAMENTALS: Principle of operation of transducer and sensor – Their applications – Factors affecting the choice of transducer. Measurement of physical quantities with transducer, displacement, potentiometer, LVDT, strain gauge, piezoelectric crystal.Tachogenerator, resolution counters. Pressure: Manometer – Elastic type- Bourdon tubes – Diaphragm – Bellows. Temperature: RTD – Thermistors – Thermocouple. Flow: Positive displacement – Electromagnetic heat – Thermal heat. Other applications like measurement of pH and conductivity. Transducer as system components. Input-Output Specification – Sensitivity – Accuracy – Repeatability – Resolution – Hysterisis. Factors for choice of transducer	14
Unit – II	POSITION & DISPLACEMENT MEASUREMENT: Principle of Potentiometric Transducer. Capacitance Transducer. Linear Variable Differential Transformer. PRESSURE OF FORCE & VIBRATION MEASUREMENT: Representative unit of pressure of force. Primary pressure of force sensing alignments. Electrical transducer alignments — Electrical strain gauges: Types – Gauge Factor – Temperature Specification. Semiconductor Strain Gauges: Properties of piezoelectric alignments, application. TEMPERATURE MEASUREMENT: Basic types of temperature transducer: Resistance detectors, thermistors, thermocouple — Principle of operation, specifications, features and applications. Application of platinum thin film and sensors SIGNAL CONDITIONING: Signal conditioning requirements for AC and DC transducer signal. Transducer circuit modification. Specification and characteristics of instrumentation amplifier. Signal processing. Features and advantages of computerized data acquisition	14
Unit - III	INTRODUCTION TO CONTROL ENGINEERING: Examples of control system. Classification of control system. Representation of control system. Transfer function. Block diagram of a feedback control system. Simplification of a feedback control system. SYSTEM ELEMENT BEHAVIOUR: Standard test. The steady state and transient response. Steady State Error – Rise Time – Delay Time – Settling Time. Damping: Over damped – Under damped – Critically damped. First order and second order response – Examples. CLOSED LOOP SYSTEM: Introduction to Routh stability and Nyquist criteria. Analog computers: Multiplication by factor – Solving differential equation – Magnified scale factor – True scale factor. Analog computer simulation of physical systems. Example of frequency response. Root Locus technique.	14

References:

1. Control System Engineering, R. Ananda Natarajan & P. Ramesh Babu, Scitech, Chennai.
2. Kuo B.C. Automatic Control System, PHI
3. Das Gupta S : Control System Theory ; Khanna Pub.
4. Nagrath I. J. & Gopal M : Control Systems Engineering, New Age International Pub.

DEC-4005: MICROPROCESSOR

Credits: 3 **Semester IV** **L-T-P: 3-0-0**

Module No.	Contents	Teaching Hours
Unit –I	INTRODUCTION TO MICROPROCESSOR: Generation and evolution of microprocessors. Basic Architecture of 8-Bit Microprocessor. Tristate register and switch. ARCHITECTURE OF INTEL-8085: registers, timing and control, add buffer and data buffer, interrupts control, serial input and output control, Pin out configuration Demultiplexing and buffering the system bus. TIMING CYCLE OF 8085: Machine cycle, instruction cycle, Instruction fetch cycle, read cycle and write cycle, Bus idle cycle, Hold and Halt state.	14
Unit – II	PROGRAMMING OF 8085: Software model of 8085A, Addressing modes of 8085A. Classification of instruction and Instruction set of 8085A, Concept of assembly language programming- basic assembler directives and labels. MEMORY INTERFACING : Generalized internal structure of memory device. Basic bus interface. Address space provided by 8085A, Address decoding. Interfacing ROM, static RAM and dynamic RAM	14
Unit - III	I / O INTERFACING AND DATA TRANSFER: Interfacing I/O devices, Address decoding, Isolated I/O versus memory mapped I/O. Synchronous and asynchronous data transfer. Interrupt driven data transfer, single interrupt, multiple interrupt- polling, priority interrupt controller, dairy chaining. Interrupts in 8085A – Software and hard ware – Vectored. Enabling, disabling and masking of interrupts. Direct memory access – Block transfer DMA – Cycle stealing DMA I / O INTERFACING DEVICES: Functional block diagram and programming of : — a) 8253(programmable counter), b) 8255(PPI), c) 8279(Keyboard and display controller) Functional block description and control word development of :— a) 8237(programmable DMA controller), b) 8259 (programmable interrupt controller), c) 8251 (USART). Interfacing DAC & ADC with 8085. Introduction of 8086, difference between 8086 and 8085.	14

References:

1) Microprocessors Architectures and Applications / Gaonkar / New Age International
2) Introduction to microprocessors / A. P. Mathur / Tata McGraw-Hill
3) Microprocessors: Principles and Applications / A. K. Pal / Tata McGraw-Hill
4) Microprocessors Principle and Applications / C. M. Gilmore / Tata McGraw-Hill
5) Microprocessors and its applications / Leventhal

DEC-4081: PCB DESIGN LAB

Credits: 2 **Semester IV** **L-T-P: 0-0-4**

List of Practical

Module No.	Contents	Teaching Hours
1	Study of Single layer and double layer PCB manufacturing process.	48
2	Development of Single layer PCB for common circuits like rectifier, amplifier etc.	
3	To make a layout diagram/ artwork of Op-Amp based Simple circuit /BJT as a switch	
4	To study the process of transferring of Artwork on Cu-cladded sheet i.e. printing.	
5	To perform the etching operation of printed cu-cladded sheet.	
6	To perform drilling operation of PCB.	
7	To study the mounting of component on the PCB and its soldering.	
8	Testing of fabricated PCB for its function.	

List of experiments for advance learners:

1. To design and winding of step down transformer for given parameters.

DEC-4082: ANALOG COMMUNICATION ENGINEERING LAB.

Credits: 2 **Semester IV** **L-T-P: 0-0-2**

List of Practical

Module No.	Contents	Teaching Hours
1	Realization of amplitude modulation using transistors and determine its modulation Index.	48
2 3	Realization of envelope detector for demodulation of AM wave and observe diagonal peak clipping effect.	
4	Realization of frequency modulation & demodulation. Find its modulation index.	
5	Realization of DSB-SC modulation and demodulation.	
6	Realization of SSB modulation and demodulation.	
7	Realization of pulse amplitude modulation and demodulation. Realization of pulse width modulation and emodulation.	
8	Measurement of characteristic impedance of transmission line.	
9	Measurement of selectivity, sensitivity and fidelity of super heterodyne receiver.	

List of experiments for advance learners:

1. Plot the radiation pattern of Yagi-Uda antenna and find its beam width.
2. Plot the radiation pattern of micro strip antenna and find its beam width.

DEC-4083: EDC LAB.

Credits: 2 **Semester IV** **L-T-P: 0-0-4**

List of Practical

Module No.	Contents	Teaching Hours
1	.To measure (a) voltage gain (b) input and output impedance for an emitter follower circuit.	48
2	To study the effect of coupling capacitor on lower cut off frequency and upper cut off frequency by plotting frequency response curve of a single stage RC coupled amplifier.	
3	Clipping of both portion of sine-wave using: diode and DC source & zener diodes.	
4	Clamping a sine-wave to: a) Negative dc voltage b) positive voltage.	
5	To measure frequency generation in R-C Phase Shift oscillator.	
6	To measure frequency generation in Hartley and colpitt oscillator .	
7	To generate square-wave using an astable multivibrator and to observe the wave form on a CRO using 555 timer IC.	
8	To observe triggering and working of a monostable multivibrator circuit and observe its output wave form on a CRO using 555 timer IC	
9	To use the op-Amp (IC 741) as inverting one and non-inverting amplifiers.	
10	To use the op-Amp (IC 741) as adder and subtractor.	
11	To use the op-Amp (IC 741) as integrator and differentiator	

List of experiments for advance learners:

1. Study of frequency generation in R-C Phase Shift oscillator using PSPICE.
2. Study of Clipper and clamper circuit using PSPICE.
3. Simulation of OP-AMP as integrator and Differentiator using TANNER/PSPICE.
4. Study of IC 555 timer using PSPICE.

DEC 4084 – MICROPROCESSOR LAB

Credits: 2 **Semester IV** **L-T-P: 0-0-4**

List of Practical

Module No.	Contents	Teaching Hours
1	To Study of 8085 Microprocessor Kit.	48
2	To Study of 8086 Microprocessor Kit.	
3	Write a program to add two 8-bit numbers.	
4	Write a program to add two 16-bit numbers.	
5	Write a program to subtract two 8-bit number.	
6	Write a program to subtract two 16-bit number.	
7	Write a program to multiply two 8 bit numbers by repetitive addition method.	
8	Write a program to divide two 8 bit numbers.	
9	To develop and run a program for finding out the largest from a given set of numbers.	
10	To develop and run a program for finding out the smallest from a given set of numbers.	
11	To develop and run a program for arranging in ascending/descending order of a set of numbers.	
12	To perform computation of square of a given number	
13		

List of experiments for advance learners:

1. Write a program to transfer the block of data from one memory location to other memory location.
2. To perform interfacing of keyboard controller. Interfacing with 8253 to 8085/8086 based system