INVERTIS UNIVERSITY BAREILLY

Established by Govt. of U.P. u/s 2F of UGC Act, 1956 vide U.P. Act 22 of 2010.

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

SCHEME OF INSTRUCTIONS AND DETAILED SYLLABI OF DIPLOMA PROGRAM IN ELECTRONICS AND COMMUNICATION ENGINEERING

Diploma in Electronics and communication Engineering

Vision of the Institute

To develop responsible citizens who would 'think global and act local' and become the change agents of society to meet the challenges of future.

Mission of the Institute

To impart high quality Engineering and Management education to the budding professionals and provide the ambience needed for developing requisite skills to make a mark of excellence in Education, Business and Industry.

Vision of Department

To provide the students excellent education for developing them into high class electronics engineers so that they could meet the challenges of modern industry and blossom into extra-ordinary entrepreneurs.

Mission of Department

To create learning, development and testing environment to meet ever challenging needs of electronic industry.

To become a global partner in training human resources in the fields of chip design, instrumentation and networking.

To be highly competent in various fields of Electronics and Communication engineering through the best breed laboratory facilities.

To associate with internationally reputed Institutions for academic excellence and collaborative research.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs) FOR DIPLOMA ELECTRONICS AND COMMUNICATION ENGINEERING

The Diploma program aims to:

- **PEO-1** To acquire a strong background in basic science and mathematics and ability to use these tools in electronics and communication engineering.
- **PEO-2** To develop the ability to demonstrate technical competence in the fields of electronics and communication engineering and develop solutions to the problems in various areas of electronics and communication engineering.
- **PEO-3** To attain professional excellence through life-long learning.
- **PEO-4** To attain the qualities of professional leadership to deliver effectively in a multi-disciplinary team and domains.
- **PEO-5** To produce graduates who ensure ethical and moral behaviour.

PROGRAM OUTCOMES (POs) FOR DIPLOMA ELECTRONICS AND COMMUNICATION ENGINEERING

After successful completion of the Diploma program, learners shall be able to:

PO1 An ability to apply knowledge of mathematics (including probability, statistics and discrete mathematics), science, and engineering for solving Engineering problems and modeling.

PO2 An ability to design, simulate and conduct experiments, as well as to analyze and interpret data including hardware and software components.

PO3 An ability to design a complex electronic system or process to meet desired specifications and needs.

PO4 An ability to identify, formulate, comprehend, analyze, design synthesis of the information to solve complex engineering problems and provide valid conclusions.

PO5 An ability to use the techniques, skills and modern engineering tools necessary for engineering practice.

PO6 An understanding of professional, health, safety, legal, cultural and social responsibilities.

PO7 The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental and demonstrate the knowledge need for sustainable development.

P**O8** Apply ethical principles, responsibility and norms of the engineering practice

PO9 Individual and team work an ability to function on multi-disciplinary teams.

PO10 An ability to communicate and present effectively.

PO11 ability to use the modern engineering tools, techniques, skills and management principles to do work as a member and leader in a team, to manage projects in multi-disciplinary environments.

PO12 A recognition of the need for, and an ability to engage in, to resolve contemporary issues and acquire lifelong learning.

STUDY AND EVALUATION SCHEME
Diploma in Electronics & Communication Engineering
(Effective from session 2019-20)
YEAR II, SEMESTER III

L-Lecture, **T-** Tutorial, **P-** Practical, **CT –** Cumulative Test,**TA –**Teacher Assessment,**AT –** Attendance, **E-Sem. –** End Semester Marks

S.NO.	CODE	SUBJECT	PERIODS			EVALUATION SCHEME					TOTAL	CREDIT
						SESSIONAL				END SEMESTER		
			L	T	P	CT	TA	AT	Total	E-Sem.		
1	DEC-301	Digital Electronics	3	1	0	20	10	10	40	60	100	4
2	**DEC-302**	Basic Network Analysis and Filters	3	1	0	20	10	10	40	60	100	4
3	**DEC-303**	Fundamentals of Electronics Instrumentation And Measurements	3	1	0	20	10	10	40	60	100	4
4	DEC-304	Introduction to Electronic Circuits	3	1	0	20	10	10	40	60	100	4
5	DEC-305	Elements of Electromagnetic Theory	3	1	0	20	10	10	40	60	100	4
PRACTICAL/TRAINING/PROJECT												
6	DEC-351	Digital Electronics Lab.	0	0	4	0	0	0	50	50	100	2
7	**DCS-352**	Network analysis and Filters Lab.	0	0	4	0	0	0	50	50	100	2
8	**DEC-353**	Electronics Inst. & Measurement Lab.	0	0	4	0	0	0	50	50	100	2
9	DEC-354	Fundamental Electronic Circuits Lab.	0	0	4	0	0	0	50	50	100	2
10	DGP-301	General Proficiency	-	-	-	-	-	-	50	-	50	1
			15	5	16				450	500	950	29

DEC-301	DIGITAL ELECTRONICS	DIPLOMA ECE	3-1-0	4 Credits

Pre-requisites: None.

Course Educational Objectives:

CEO1	To perform decimal, octal, hexadecimal, and binary conversions.
CEO2	To analyze digital decoding & multiplexing circuits.
CEO3	To apply logic design circuits with Programmable Logic Devices

Course Outcomes: At the end of the course, the student will be able to:

CO1	Acquired knowledge about solving problems related to number systems conversions and Boolean algebra and design logic circuits using logic gates to their simplest forms using De Morgan'sTheorems; Karnaugh Maps.
CO2	Design of combinational circuits
CO3	Design of various synchronous and asynchronous sequential circuits using State Diagrams & Tables.
CO4	Understand DAC & ADC technique and corresponding circuits
CO5	Understand counters and shift registers

UNIT-I

BOOLEAN ALGEBRA:
Number systems, Conversion from one number system to other, Boolean algebra, Basic laws and Demorgan's Theorems.
Binary Codes: Concept of code, weighted and non-weighted codes, BCD codes, excess-3 codes,Gray Codes, ASCII Codes and EBCDIC codes.
Logic Circuits: BasicLogicgates their symbols and truth tables (AND, OR, NOT, XOR).Concept of Universal Gates, Realization of gates using universal gates NAND, and NOR (Logic Circuits up to 4 variables).
Arithmetic Operation in various number systems, subtraction using r's and (r-1)'s complement methods.

UNIT-II

Switching Theory and Logic Circuits: Concepts of Minterms, Maxterms, POS, SOP forms, Inter-conversion from SOP to POS and vice versa. Minimization canonical forms, using K-map (4 Bit)(don't care conditions also).
Combinational Circuits: Half adder, Full adder, Half subtractor, Full subtractor.

UNIT-III

Multiplexers and De-multiplexers: Introduction and basic functions, symbols and logic diagrams of 4- inputs and 8-inputs Multiplexers and De-multiplexers, Realization of Boolean expression using Multiplexers and De-multiplexers.

UNIT-IV

Sequential Circuits: Introduction to latches and Flip-Flops. Difference between latches and Flip Flops Classification of Latches (SR, D). Classification of Flip Flops (S-R, D, J-K,T), Master-Slave Flip-Flop combination.

UNIT-V

Counters: Counters classification, Binary and decade counters, Divide by N counters.
Shift Registers: Introduction, Basic idea of SISO, SIPO, PISO& PIPO.

Reference books:

1. Digital Systems and Applications by RJ Tocci, Prentice Hall of India, New Delhi
2. Morris Mano "Digital Computer Design", PHI 2003.
3. Devid A. Bell "Electronic Devices and Circuits", 5th Edition, OXFORD University Press 2008
4. R.P. Jain " Modern Digital Electronics", Tata McGraw-Hill Education

DEC-302	BASIC NETWORK ANALYSIS AND FILTERS	DIPLOMA ECE	3-1-0	4 Credits

Pre-requisites: None.

Course Educational Objectives:

CEO1	Electrical Circuit is essential everywhere in Electronic and Communication engineering whether it is core electronics applications or communication applications
CEO2	Analysis of AC circuits
CEO3	to learn circuit analysis technique with the help of networks theorem and methods both for DC and AC consideration .

Course Outcomes: At the end of the course, the student will be able to:

CO1	Students able to estimate parameters of two port network through open circuit & short circuit test
CO2	Students able to apply Theorem.
CO3	Students able to analyse series and parallel resonance circuit based on parameters : resonance frequency , band-width , upper & lower cut-off frequency , quality factor and impedance
CO4	Students is able to learn Definition of conductance, susceptance and admittance.
CO5	students is able to learn Applications of filters in communication system and Active Filters

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UNIT-I

Introduction to networks

Two Port (Four Terminal) Network - Two port parameters (impedance and hybrid parameters), Interconnection of two ports (series connection, parallel connection, cascade connection)
Equivalent networks, T-network, Pi-networks, ladder networks, Symmetrical and asymmetrical networks.

UNIT-II

Network theorems

Star & delta conversion, statement and explanation of superposition Theorem, Duality, Tellegen'sTheorem, Thevenin's Theorem, Norton's Theorem, Reciprocity – maximum power transfer theorem.

UNIT-III

AC Circuits :

Inductive reactance and Capacitive reactance, Alternating voltage applied to resistance and inductance in series, Alternating voltage applied to resistance and capacitance in series, Impedance triangle and phase angle, Solutions and phasor diagrams for simple RLC circuits (series and parallel), Introduction to series and parallel resonance and its conditions.

UNIT-IV

Power in pure resistance, inductance and capacitance, power in combined RLC, circuits. Power factor, Active and Reactive power and their significance.Importance of power factor, j-notation and its application in solving series and parallel a.c circuits, Definition of conductance, susceptance and admittance.

UNIT-V

Filters:

Applications of filters in communication system- Concept of low pass, high pass, band pass, band stop.

Proto-type Filter Section- Reactance vs. attenuation constant and characteristic of a low pass filter and its impedance, Attenuation vs. frequency, phase shift vs. frequency characteristics, Impedance vs. frequency of T and Pi curve and their significance.

Active Filters- Basic concept and comparison with passive filters.

Reference Books:

1. M.E. Van Valkenburg, “Network Analysis”, Prentice Hall of India
2. A.Chakrabarti, “Circuit Theory” Dhanpat Rai & Co.
3. C.L Wadhwa, “Network Analysis and Synthesis” New Age International Publishers, 2007.
4. D.RoyChoudhary, “Networks and Systems” Wiley Eastern Ltd.
5. Vasudev K. Aatre, “Network Theory and Filter Design”, New Age Internation Publishers; 2nd edition, 2007

DEC-303	FUNDAMENTALS OF ELECTRONIC INSTRUMENTATION& MEASUREMENTS	DIPLOMA ECE	3-1-0	4 Credits

Pre-requisites: None.

Course Educational Objectives:

CEO1	to acquire knowledge about the construction and working of Bridges to measure resistance , capacitance, inductors
CEO2	to acquire knowledge about analog and electronic measuring instrument , Sensor-transducer system , telemetry system ,data acquisition system
CEO3	to acquire knowledge about advance instruments like Like OTDR , virtual instrument and PLC

Course Outcomes: At the end of the course, the student will be able to:

CO1	Students able to explain the characteristics , construction and working principle analog instruments like : PMMC , MI , Electrodynamometer type and Energy meter
CO2	Students able to explain the Units of Measurements, Accuracy, Precision, static sensitivity, linearity, threshold, noise floor, resolution, hysteresis and dead space
CO3	Students able to explain the Impedance Bridges and Q Meters
CO4	nts able to explain the AC Potentiometer and Calibration of instruments for voltage, nt, time, frequency, impedance and other applications.
CO5	Students able to explain the the construction and working principle of electronic instrument like CRO and DSO

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UNIT-I

Measurement & Instrumentation System
Methods of Measurement, Measurement System, Classification of instrument system, Characteristics of Errors in measurement & its analysis, Standards.Statistical Analysis.Measurement definitions.
Measurement of voltage & current using PMMC, Moving Iron, Electrodynamics type instruments.Wattmeter, Three Phase Wattmeter, Power in three phase system, Energy meter.

UNIT-II

Performance characteristics: Units of Measurements, Accuracy, Precision, static sensitivity, linearity, threshold, noise floor, resolution, hysteresis and dead space. Static stiffness & input impedance.

UNIT-III

Impedance Bridges and Q Meters: Wheat stone bridge, AC bridges: Maxwell's induction bridge, LCR Bridge, Hay's bridge, De-Sauty's bridge and Anderson bridge, Schering bridge, working principle and use of Q meters.

UNIT-IV

AC Potentiometer: Polar type & Co-ordinate type AC potentiometers, application of AC Potentiometers in electrical measurement.

Calibration of instruments for voltage, current, time, frequency, impedance and other applications.

UNIT-V

Cathode Ray Oscilloscope:

Block diagram and working principal of CRO of and description of a basic CRO and triggered sweep oscilloscope, front panel controls. Specifications of CRO and their explanation, Measurement of current, voltage, frequency, time period and phase using CRO (Lissajous Pattern), special features of dual beam, dual trace, delay sweep, Digital storage oscilloscope.

Text Book:

1. E.W. Golding & F.C. Widdis, "Electrical Measurement &Measuring Instrument", A.W. Wheeler& Co. Pvt. Ltd. India.
2. A.K. Sawhney,"Electrical & Electronic Measurement & Instrument", Dhanpat Rai & Sons , India .
3. WD Cooper, AD Helfrick, "Electronic Instrumentation and Measurement Techniques" Prentice Hall of India Pvt. Ltd. New Delhi

DEC-304	INTRODUCTION TO ELECTRONIC CIRCUITS	DIPLOMA ECE	3-1-0	4 Credits

Pre-requisites: None

Course Educational Objectives:

CEO1	To Analyze the behaviour of semiconductor diodes in Forward and Reverse bias .
CEO2	To design a half wave and full wave rectifiers , Explore V-I characteristics of Bipolar Junction Transistor n CB, CE & CC configurations.
CEO3	To acquire the basic engineering technique and ability to design and analyze the circuits of Op-Amps

Course Outcomes: At the end of the course, the student will be able to:

CO1	Study PN junction diode, ideal diode, diode models and its circuit analysis, application of diodes , wave shaping circuits
CO2	Study of BJT and stability of the biasing ciruits.
CO3	Study of JFET and MOSFETS ,its Construction and itsWorking principle
CO4	study of Operational Amplifiers its Ideal Characteristics and Parameters
CO5	Learn how operational amplifiers are modeled and analyzed, and to design Op-Amp circuits to perform operations such as integration, differentiation on electronic signals.

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UNIT-I

Application of Diodes:
Rectifiers: Half Wave Rectifier, Full Wave Rectifier, Calculation of Ripple Factor, PIV and Efficiency. **Filters:** Shunt Capacitor, Series Inductor and L-Section and Pi-Section filters.
Wave Shaping Circuits: Introduction to Clippers & Clampers.
Voltage Regulator: Zener Regulator
Voltage Multipliers: Study of Voltage Doubler, Tripler and Quadrupler circuits.

UNIT-II

DC Biasing Circuits of BJT:
Concept of Operating Point, Fixed-Bias and Voltage-Divider Bias circuits, Load Line analysis for the stability of the biasing circuits, Stability Factor.

UNIT-III

JFET: Construction, Working principle of JFET, Input and output characteristics, JFET amplifier (Common source Amplifier).

MOSFET: Basics of MOSFET, Construction of Depletion and Enhancement Type MOSFET, Input and Output characteristics.

UNIT-IV

Operational Amplifiers:
Introduction, Ideal Characteristics and Parameters, Inverting and Non-Inverting and unity gain configuration Concept of Virtual Ground, Op-Amp as Adder, difference, integrator and differentiating amplifier.

UNIT-V

Opto-Electronic Devices: LDR, LED, 7 segment LED, LCD, Solar Cell, Photodiode.

REFERENCE BOOKS:

1. Robert L. Boylestad/ Louis Nashelsky "Electronic Devices and Circuit Theory", 9th EditionPearson Education 2007.
2. David A. Bell "Electronic Devices and Circuits", 5th Edition, OXFORD University Press 2008
3. Electronics Devices and Circuits - Allen Mottershed, Tata McGraw – Hill Publication
4. Electronics Devices and Circuits – Jacob Millman and Halkies, Tata McGraw – Hill Publication .

DEC-305	ELEMENTS OF ELECTROMAGNETIC THEORY	DIPLOMA ECE	3-1-0	4 Credits

Pre-requisites: None.

Course Educational Objectives:

CEO1	Behaviour of electrostatic and electromagnetic fields and their application in electrical and electronics engineering fields.
CEO2	Maxwell's equation in integral and differential form, their interpretation and applications.
CEO3	Propagation of EM wave in free space, conductors & dielectrics.

Course Outcomes: At the end of the course, the student will be able to:

CO1	study of vector algebra and Co-ordinate Systems and their Transformation
CO2	study of Vector calculus in Cartesian, cylindrical and spherical co-ordinate systems
CO3	Gain knowledge of static and time varying fields. Know the phenomenon of wave propagation with the aid of Maxwell's equations.
CO4	Gain knowledge of Electric Fields in material space:
CO5	Calculate magnetic fields from stationary and dynamic charge and current distributions

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UNIT-I

Vector Algebra: Scalar and vector quantity, Unit vector, Vector Multiplication, Components of Vector.

Co-ordinate Systems and their Transformation: Cartesian/Rectangular co-ordinates, cylindrical co-ordinates and Spherical Co-ordinates Systems.

UNIT-II

Vector calculus in Cartesian, cylindrical and spherical co-ordinate systems: Calculations of differential length, area and volume.Del operator, Gradient, Divergence and Curl.

UNIT-III

Electrostatics: Electrostatic Field, Coulombs law, Electric Filed due to line charge, due to surface charge, due to volume charge distribution, Electric Flux density, Gauss' law and its application, Energy density in electrostatic fields. Electric dipole, flux lines and relationship between electric field and voltage.

UNIT-IV

Electric Fields in material space: Properties of materials, Convection and Conduction currents, Polarization in Dielectrics, Dielectric constants and Strength. Linear, Isotropic, and homogeneous dielectrics.

UNIT-V

Magnetostatics: Biot-Savart law, Ampere's Circuit law, Magnetic flux Density, Maxwell's equation for static EM fields, Magentic and Scalar Vector potential, Derivation of Biot-Savart's law.
Magnetic Forces, Materials and Devices: Force due to magnetic field, Magnetic Torque & moment, Magnetic Dipole, Classification of magnetic materials, Magnetization in materials, Inductance, Force on magnetic materials, Magnetic Energy.

Reference Books:

1. M.N.O.Sadiku, "Elements of Electromagnetics", 4thEd.Oxford University Press, 2007
2. John D Krauss,Ronald J Marhefka and Ahmad S.Khan ,"Antenna and Wave Propagation" , 4th Ed. Tata Mc Graw Hill,2010
3. W.H.Hayat and J.A.Buck "Electromagnetic field theory", 7th Ed. TMH, 2006
4. A.Das, SisirK.Das "Microwave Engineering", Tata McGraw Hill, 2007

DEC-351	DIGITAL ELECTRONICS LAB	DIPLOMA ECE	0-0-4	2 Credits

Course Educational Objectives:

CEO1	To understand the concepts of flipflops, registers and counters
CEO2	TO KNOW THE CONCEPTS OF COMBINATIONAL CIRCUITS
CEO3	Learn about counters

Course Outcomes: At the end of the course, the student will be able to:

CO1	Learn the basics of gates.
CO2	Construct basic combinational circuits and verify their functionalities
CO3	To understand the basic digital circuits and to verify their operation

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1. Verification of Truth table of OR, AND, NOT, NOR NAND and XOR gate.
2. Realization of basic gates using NAND and NOR gates.
3. Realization of logic circuit for a given Boolean expression.
4. Study of Half adder, full adder Circuits.
5. Study of Half subtractor, full subtractor Circuits.
6. Verification of truth table for D, T Flip-Flops.
7. Verification of truth table for JK Flip-Flops.
8. Construction and verification of truth table for RS Flip-Flops.
9. Study of Analog to Digital Converter.
10. Study of Digital to Analog Converter.

DEC-352	NETWORK ANALYSIS AND FILTERS LAB	DIPLOMA ECE	0-0-4	2 Credits

Course Educational Objectives:

CEO1	Analyze the frequency response of circuits and to obtain the correlation between time-domain and frequency domain response
CEO2	LEARN ABOUT 3 PHASE SUPPLY AND TO PERFORM SYMMETRICAL TRANSFORMATION
CEO3	Learn about working of filters

Course Outcomes: At the end of the course, the student will be able to:

CO1	Design low pass, high pass, band pass and band elimination filter networks
CO2	Do the time-domain and S- domain analysis of circuits
CO3	Obtain steady state solutions for non-sinusoidal inputs using fourier series and to analyze the effect of harmonics in circuits

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1. Verification of Kirchhoff's Voltage and Current law.
2. Measurement of characteristics impedance of a symmetrical Pi and T networks.
3. Verification of principle of superposition with dc circuits.
4. Verification of Thevenin's theorem in dc circuits.
5. Verification of Norton theorems in dc circuits.
6. Verification of Maximum power transfer theorems in dc circuits.
7. Study of low pass filter.
8. Study ofhigh pass filter.
9. Determination of frequency response of current in RLC circuit with sinusoidal ac input.
10. Study of butter-worth's active filter: First order low pass and high pass.

DEC-353	ELECTRONICS INST. & MEASUREMENT LAB	DIPLOMA ECE	0-0-4	2 Credits

Course Educational Objectives:

CEO1	Calibration and testing of measuring instruments
CEO2	UNDERSTAND THE MATHEMATICAL AND PHYSICAL INTERPRETATION OF VARIOUS MEASUREMENT TECHNIQUE
CEO3	Apply appropriate techniques and modern engineering hardware and software tools

Course Outcomes: At the end of the course, the student will be able to:

CO1	Measure the electrical parameters using measuring instruments
CO2	to handle various instruments for the measurement of electrical quantities
CO3	Demonstrate Cathode Ray Oscilloscope (CRO) and Signal generator and analyzer.

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1. Measurement of low resistance using Kelvin's double bridge.
2. Voltage and current measurement using PMMC instruments.
3. Study of Load Measurement using load measurement trainer.
4. Calibration of Wheatstonebridge.
5. Study of LCR bridge and determination of the value of given the component.
6. Capacitance measurement using De-Sauty's Bridge& Schering's Bridge
7. Inductance measurement using Anderson'sBridge, Hay's Bridge & Maxwell's bridge.
8. Calibration of AC Potentiometer for voltage, current, time, frequency, impedance and other applications.
9. General analysis of any electrical signal over CRO analyzing the changes in it using front panel options and basic calculations using time per division and volts per division concept.
10. Voltage measurement, time period and frequency measurement using Lissajous Pattern in CRO.

DEC-354	FUNDAMENTAL ELECTRONIC CIRCUITS LAB	DIPLOMA ECE	0-0-4	2 Credits

Course Educational Objectives:

CEO1	Set up testing strategies and select proper instruments to evaluate performance characteristics of electronic circuit.
CEO2	DEMONSTRATE CATHODE RAY OSCILLOSCOPE (CRO) AND SIGNAL GENERATOR AND ANALYZER.
CEO3	Choose testing and experimental procedures on different types of electronic circuit and analyze their operation different operating conditions

Course Outcomes: At the end of the course, the student will be able to:

CO1	Analyse the characteristics of Rectifier
CO2	Analyse the characteristics of clipper and clamper
CO3	Analyse the characteristics and parameters of FET.

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1. Diode and Transistor Testing.
2. To Plot V-I Characteristics of P-N Junction diode and Zener diode.
3. To Plot the input and output waveforms of Half wave and Full Wave Rectifiers (Center-Tap or Bridge) with the help of CRO without using any filter.
4. To Plot the input and output waveforms of Half wave and Full Wave Rectifiers (Center-Tap and Bridge) with the help of CRO using Shunt Capacitor Filter and Pi-Filter implementing on Bread-Board.
5. Implementation of Clipper circuits on Bread Board and analyzing the output on CRO.
6. Implementation of Clamper circuits on Bread Board and analyzing the output on CRO.
7. Study of NPN Transistor Characteristics.
8. Characteristics of FET and its parameters and FET Amplifier.
9. Perform basic mathematical operations like Addition, Subtraction using an Op-Amp.
10. Study of 7-segment display.

STUDY AND EVALUATION SCHEME
Diploma in Electronics & Communication Engineering
(Effective from session 2019-20)
YEAR II, SEMESTER IV

L-Lecture, **T-** Tutorial, **P-** Practical, **CT –** Cumulative Test, **TA –**Teacher Assessment, **AT –**

S.NO.	CODE	SUBJECT	PERIODS			EVALUATION SCHEME					TOTAL	CREDIT
						SESSIONAL				END SEMESTER		
			L	T	P	CT	TA	AT	Total	E-Sem.		
1	DEC-401	Fundamentals of Electronic Communication	3	1	0	20	10	10	40	60	100	4
2	DEC-402	Industrial Instrumentation	3	1	0	20	10	10	40	60	100	4
3	DEC-403	Advanced Electronic Circuits	3	1	0	20	10	10	40	60	100	4
4	DEC-404	Concepts of Signals And Systems	3	1	0	20	10	10	40	60	100	4
5	DEC-405	Electrical Machines	3	1	0	20	10	10	40	60	100	4
PRACTICAL/TRAINING/PROJECT												
6	DEC-451	Communication Engg. Lab	0	0	4	0	0	0	50	50	100	2
7	DEC-452	Industrial Instrumentation Lab	0	0	4	0	0	0	50	50	100	2
8	DEC-453	Advanced Electronics Lab	0	0	4	0	0	0	50	50	100	2
9	DEC-456	Electronics Workshop	0	0	4	0	0	0	50	50	100	2
10	DGP-401	General Proficiency	-	-	-	-	-	-	50	-	50	1
TOTAL			15	5	16				450	500	950	29

Attendance , **E-Sem. –** End Semester Marks

Detailed Syllabus

DEC-401	Fundamentals of Electronic Communication	Diploma ECE	3-1-0	4 credits

Pre-requisites: None.

Course Educational Objectives:

CEO1	To identify and solve the different modulation problem.
CEO2	Understand the mathematical and physical interpretation noise recerver
CEO3	Apply the properties different demodulation.

Course Outcomes: At the end of the course, the student will be able to:

CO1	Discuss principles of different analog modulation technique
CO2	Explain blocks used for building communication systems
CO3	Identify Modulation/demodulation circuits
CO4	Compare noise performance of receivers
CO5	Describe various Pulse modulation techniques

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UNIT-I

Introduction to Communication Systems: Introduction, Elements of Communication System,Introduction to Electromagnetic Spectrum, Need of Modulation.

Noise: Definition, Classification of Noise, Introduction to different types of noises. Introduction to SNR and Noise Figure.

Modulation: Introduction to Modulation techniques, Concept of Modulating signal and Carrier Signal, Needs of Modulation, types of modulation and their general equations.

UNIT-II

Amplitude Modulation: Theory of Amplitude Modulation technique, Mathematical Expression of AM spectrum and side bands (DSB-FC) and relative power distribution in carrier and sidebands, Modulation Index and its effect on AM wave. Modulation and Demodulation of DSB-FC AM wave using Square Law Modulator and Demodulator circuit. Basic idea about DSB-SC and SSB-SC and VSB-SC (study of general equations and conditions)

UNIT-III

Angle Modulation: Basic Concepts of Angle Modulation, Definitions of FM and PM, Concept of Frequency Deviation, Relationship between FM and PM, Types of FM, Mathematical Expression of Narrowband FM. Comparison of Narrowband FM with AM.

Basic idea of Wideband FM (without mathematical expression), Study of FM spectrum, modulationIndexand effects of modulation index on the frequency spectrum.

Direct method of FM Generation: Working Principle of Varactor Diode modulator. FM detection using simple frequency discriminator circuit.

UNIT-IV

Pulse and Digital Modulation: Concept of Impulse function and Dirac Comb function, Basic idea of sampling theorem, Basic idea using graphical illustrations of PAM, PWM and PPM.
Elements of Digital Communication System, Introduction to basic digital modulation schemes, Basic ideas of ASK, FSK and PSK, general idea about PCM and concept of quantizing noise.

UNIT-V

Antenna and Wave Propagation: Propagation of waves**,** Introduction to Electromagnetic Radiations, Introduction to Antenna, Antenna Terminology (Radiation pattern, Gain, Directivity, Effective Area and Power Density), Antenna Aperture and Effective Height. Basic Concept of Dipole antenna and Isotropic Radiator.

Text books:

1. George Kennedy, Bernard Davis, "Electronic Communication Systems", 5^{TH} Edition, TMH.
2. Electronic Communication – Dennis Roddy and John colen – PHI
3. H. Taube, D L Schilling, GoutomSaha, "Principles of Communication", 3rd Edition, TMH
4. B.P. Lathi, "Modern Digital and Analog communication Systems", 3rd Edition, Oxford University Press, 2009.
5. K.D. Prasad, " Antenna and Wave Propagation" , Satya Publication.

Detailed Syllabus

DEC-402	Industrial Instrumentation	Diploma ECE	3-1-0	4 credits

Pre-requisites: None.

Course Educational Objectives:

CEO1	To identify the transducer mode
CEO2	Understand the mathematical and physical interpretation of various measurement technique

Course Outcomes: At the end of the course, the student will be able to:

CO1	Discuss the different mode of transducer.
CO2	Explain the different measuring device
CO3	Identify the different method of flow measurement
CO4	Compare the different method of temperature measurement
CO5	Describe various measurement techniques.

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UNIT-I

Transducers: Functional elements of an instrument; active & passive transducers; analog & digital modes of operation; null & deflection methods; construction and use of various transducers such as (resistance, inductance, capacitance, electromagnetic, piezo electric, optical etc.).
Introduction to smart transducers.

UNIT-II

Displacement Measuring Devices: wire wound potentiometer, LVDT, strain gauges, different strain gauges such as inductance type, resistive type, wire and foil etc. Gauge factor, gauge materials, and their selections.

UNIT-III

Flow and Pressure Measurement: Flow Measurement: Introduction, Methods of Flow Measurement, Introduction to Inferential Flow Measurement Methods: Differential meters, Magnetic Flow meters and Ultrasonic flow meters.
Pressure Measurement: Introduction, Pressure and its types, Manometers, Introduction to Elastic Pressure Transducers, Bourdon pressure gauges, electrical pressure pick ups and their principle, Construction, application and use of pressure cells.

UNIT-IV

Temperature measurement: Methods of Temperature Measurements.
Introduction to Expansion Thermometers: Study of Bimetallic thermometers, liquid-in-glass thermometers and gas thermometers.

Electrical Temperature Measurement: Resistance thermometer, thermocouple, Thermistor.
Study of Pyrometers and Ultrasonic thermometers.Calibration of Thermometers.

UNIT-V

Dimension Measurement: Introduction, Thickness Measurement, Laser Based Length Measurement and Laser Diameter Gauge.

Density, Viscosity and pH Measurements: Introduction, Density Measurement, Viscosity Measurement and pH Measurement.

Introduction to Transmitters, Telemetry Systems and Recorders.

Text Books:

1. E. DOEBELIN and D. N. Manik, "Measurement systems application and design", 5th Ed., TMH, 2007, New Delhi.
2. S.K. Singh, "Industrial Instrumentation and Control", 2nd Edition TMH Publication.
3. Instrument Engineers Hand Book (process measurement), LIPTAK .
4. H S Kalsi, "Electronic Instrumentation", TMH Publication
5. WD Cooper, AD Helfrick, "Electronic Instrumentation and Measurement Techniques", Prentice Hall of India Pvt. Ltd
6. AK Sawhney, "Electronics Measurement and Instrumentation" DhanpatRai& Sons, Delhi

Detailed Syllabus

DEC-403	Advanced Electronic Circuit	Diploma ECE	3-1-0	4 credits

Pre-requisites: None.

Course Educational Objectives:

CEO1	To identify and solve the problem of Two port network
CEO2	Understand the mathematical and physical interpretation of different type of power amplifier
CEO3	Apply the properties of Oscillator circuit

Course Outcomes: At the end of the course, the student will be able to:

CO1	Discuss principles of port active network
CO2	Explain the different type of amplifier.
CO3	Identify the different type of Oscillator
CO4	Compare with the different type of power amplifier
CO5	Describe various PIN diagram of ICs

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UNIT-I

2 Port Active Networks:BJT as a four terminal and two port networks, transistor modelling: The '$\mathbf{r_e}$' transistor Model, h-parameter Equivalent circuit, Analysis of a single-stage CE amplifier using hybrid model, Small Signal Analysis of Transistor as an single stage amplifier, Input and Output Impedance, Current and Voltage Gain of Common Emitter Amplifier only.
Concept of current Mirror using BJT's.

UNIT-II

Amplifiers: General Theory of Feedback**,** Detailed Classification of Feedback Amplifiers: Positive, Negative, Voltage Series/Shunt, Current Series/Shunt Amplifiers.
Multistage Amplifiers: Cascaded Systems, Miller's Theorem, RC Coupled amplifiers, Darlington Connection.

UNIT-III

Sinusoidal Oscillators: Basics of Sinusoidal Oscillators, Types of sinusoidal oscillations, Oscillatory Circuits, Undamped Oscillation from Tank Circuit, Barkhauson's Criterion for self-sustained oscillations, Positive feedback Amplifier Oscillator.
RC Oscillators: RC Phase shift Oscillator, Wein Bridge Oscillator Circuit.
LC Oscillators: Hartley Oscillator, Colpitts Oscillator.
Crystal Oscillators.

UNIT-IV

Introduction to Power Amplifiers: Study of Power Amplifiers, Difference between Voltage and power amplifiers. Introduction to Class A, B, AB, C, D amplifiers. Working principle of push pull

amplifier and circuits. Concept of Regulated Power Supply

UNIT-V

Op-Amp IC-741: Pin diagram, biasing circuits, AC and DC analysis of Op-Amp. Biasingcircuits.
Multivibrators: Study of Monostable and Astable multi-vibrators.
555 Timer IC: Introduction, Pin Diagram& datasheet, Applications.

Reference books:

5. Robert L. Boylestad/ Louis Nashelsky "Electronic Devices and Circuit Theory", 9th Edition, Pearson Education 2007.
6. K.Lal Kishore "Electronic Devices And Circuit Analysis", BS Publications, 2004.
7. SmarajitGhosh, "Fundamentals of Electrical And Electronics Engineering, PHI Publication, 2003.
8. Sanjeev Gupta "Electronic Devices and Circuits", DhanpatRai Publications, 2011
9. Ramakant A. Gaikwad, "OpAmps and Linear Integrated Circuits", PHI.

Detailed Syllabus

DEC-404	Concepts of Signals and Systems	Diploma ECE	3-1-0	4 credits

Pre-requisites: None.

Course Educational Objectives:

CEO1	To identify and solve the different transformation method
CEO2	Understand the mathematical and physical interpretation of Z transformation.
CEO3	Apply the properties Fourier transformation

Course Outcomes: At the end of the course, the student will be able to:

CO1	Discuss the different type of signals concept.
CO2	Explain the different types of System.
CO3	Identify the Fourier Transformation technique
CO4	Compare the Fourier and Laplace transformation
CO5	Describe various properties of Z transformation.

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UNIT-I

Signals: Definition, types of signals and their representations: continuous-time and discrete-time, periodic and non-periodic, even/odd, energy and power, unit impulse, unit step, unit ramp, exponential, rectangular signals.

UNIT-II

Systems: Classification, linearity, time-invariance and causality, impulse response, characterization of linear time-invariant (LTI) systems, unit sample response, convolution summation, step response of discrete time systems, stability, Convolution integral.

UNIT-III

Fourier Series and Transforms (FT): Introduction to Fourier Series, Definition of Fourier Transform and its relation with series, conditions of existence of FT, properties, magnitude and phase spectra, FT theorems, Parseval's theorem, Inverse FT, relation between LT and FT.

UNIT-IV

Laplace-Transform (LT): Laplace transform of some common signals, important theorems and properties of Laplace Transform, Inverse Laplace Transform, solutions of differential equations using Laplace Transform, Regions of convergence (ROC)

UNIT-V

Z-transform (ZT): Z-transform, Z-transform of some common signals, ROC and its properies, Properties and Theorems of Z-Transform, solution of difference equations using one-sided Z-transform, Basics of Inverse Z transform (Long Division and Partial Fraction method).

Reference Books:

1. P. Ramakrishna Rao, `Signal and Systems' 2008 Ed., Tata McGraw Hill, New Delhi
2. Chi-Tsong Chen, `Signals and Systems', 3rd Ed., Oxford University Press, 2004
3. V. Oppenheim, A.S. Willsky and S. Hamid Nawab, 'Signals & System', Pearson Education, 2nd Ed., 2003.

Detailed Syllabus

DEC-405	Electrical Machine	Diploma ECE	3-1-0	4 credits

Pre-requisites: None.

Course Educational Objectives:

CEO1	To identify and solve the different type of induction motor.
CEO2	Understand the mathematical and physical interpretation of DC machine
CEO3	Apply the properties of single phase induction motor.

Course Outcomes: At the end of the course, the student will be able to:

CO1	Discuss principles of Electromechanical energy system
CO2	Explain the different power supply
CO3	Identify the efficiency and testing of DC machine
CO4	Compare the characterictics of single phase induction motor.
CO5	Describe the three phase induction machine

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UNIT-I

Introduction to Electro-mechanical Conversion System: Principles of Electro-mechanical Energy Conversion - Introduction, Flow of Energy in Electromechanical Devices, determination of mechanical force, mechanical energy, torque equation , Generated EMF in machines; torque in machines with cylindrical air gap.

UNIT-II

Power Supplies: Concept of Power Supplies, Types of Power Supplies, Advantage of 3-Phase System over single Phase system. Star-Delta Connection for 3 Phase system. Power and Power factors for different phase systems.

Single Phase Transformer: Construction, Phasor diagram, efficiency and voltage regulation, all day efficiency. Testing of Transformers: O.C. and S.C. tests, Sumpner's test, polarity test.

Auto Transformer: Single phase and three phase auto transformers, volt-amp, relation, efficiency, merits & demerits and applications.

UNIT-III

D.C. Machines: Construction of DC Machines, Armature winding, Emf and torque equation , Armature Reaction ,Commutation , Interpoles and Compensating Windings, Performance Characteristics of D.C. generators & motors. Starting of D.C. motors, Speed control of D.C. motors: Field Control , armature control and Voltage Control (Ward enonard method); Efficiency and Testing of D.C. machines (Hopkinson's and Swinburn's Test).

UNIT-IV

Single phase Induction Motor: Construction, Characteristics, Equivalent circuit, No load and blocked rotor tests, Starting methods, repulsion motor

UNIT-V

Three phase Induction Machine: Constructional features, Rotating magnetic field, Principle of operation, equivalent circuit, torque and power equations, Torque- slip characteristics, no load & blocked rotor tests, efficiency. Synchronous Machines Introduction to motor and generators.

Text Books:

1. I.J. Nagrath&D.P.Kothari," Electrical Machines", Tata McGraw Hill
2. Husain Ashfaq ," Electrical Machines", DhanpatRai& Sons
3. A.E. Fitggerald, C.KingsleyJr and Umans,"Electric Machinery" 6th Edition
4. McGraw Hill, International Student Edition.
5. B.R. Gupta &VandanaSinghal, "Fundamentals of Electrical Machines, New Age International.

Detailed Syllabus

DEC-451	Communication Engineering Lab	Diploma ECE	0-0-4	2 credits

Pre-requisites: None.

Course Educational Objectives:

CEO1	To develop a skill to generate the modulated waveform
CEO2	TO ACQUIRE SKILLS IN BASIC ENGINEERING PRACTICE
CEO3	To identify the hand tools and instruments.

Course Outcomes: At the end of the course, the student will be able to:

CO1	Study and practice on different modulation factor
CO2	Identify and apply different modulation technique
CO3	Apply basic dipole antenna

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1. To study DSB-FC amplitude modulation & determine its modulation factor & power in side bands.
2. To study demodulationof AM using linear diode detector.
3. To study FM Generation.
4. To study FM demodulator.
5. Study of Sampling and obtaining Pulse Amplitude modulation.
6. To study Pulse Width Modulation and Pulse Position Modulation.
7. Study of ASK, PSK and FSK.
8. Study of Pulse Code Modulation.
9. Study of basic Dipole antenna.
10. Study of Basic Yagi-Uda antenna.

EC-452	INDUSTRIAL INSTRUMENTATION LAB	Diploma ECE	0-0-4	2 credits

Course Educational Objectives:

CEO1	To develop a skill in dignity of labour, precision, safety at work place, team working and development of right attitude
CEO2	TO ACQUIRE SKILLS IN BASIC ENGINEERING PRACTICE
CEO3	To identify the hand tools and instruments

Course Outcomes: At the end of the course, the student will be able to:

CO1	Study and practice on CRO
CO2	Practice on manufacturing of components using CRO
CO3	Identify the basics of ICs

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1. Characteristics of resistance transducer using:
   (i.) Potentiometer
   (ii.) Strain Gauge/ Measurement of Strain using quarter, half and full bridge.
2. Capacitance measurement using variable capacitors.
3. Study of temperature measurement using temperature measurement trainer & Temperature Transducer Trainer.
4. Characteristics of Thermistors and RTD.
5. Study of LVDT.
6. Study of Thermocouples.
7. Study of Angular displacement.
8. Calibration of Instruments for Current, Voltage, impedance, time and frequency measurements.
9. Characteristics of LDR.
10. Study of Pressure Transducers.

DEC-453	ADVANCED ELECTRONICS LAB	Diploma ECE	0-0-4	2 credits

Course Educational Objectives:

CEO1	To develop a skill in dignity of labour, precision, safety at work place, team working and development of right attitude.
CEO2	TO ACQUIRE SKILLS IN BASIC ENGINEERING PRACTICE
CEO3	To identify the hand tools and instruments

Course Outcomes: At the end of the course, the student will be able to:

CO1	Study and practice on machine tools and their operations
CO2	Practice on manufacturing of components using workshop trades including fitting, carpentry, foundry and welding
CO3	Identify and apply suitable tools for machining processes including turning, facing, thread cutting and tapping
CO4	Apply basic electrical engineering knowledge for house wiring practice

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11. Study of small scale analysis using h-parameters.
12. Study of feedback amplifiers.
13. Study of RC coupled Amplifier.
14. Study of RC Phase shift Oscillator.
15. Study of Wein Bridge Oscillator.
16. Study of HarleyOscillator&Colpitts Oscillator.
17. Implementation of IC-741 on Bread Board as an adder and subtractor.
18. Study of 555 Timer IC.
19. Study of Mono-stable multi-vibrator.
20. Study of Astable multi-vibrator

DEC-456	ELECTRONICS WORKSHOP	Diploma ECE	0-0-4	2 credits

Course Educational Objectives:

CEO1	To develop a skill in dignity of labour, precision, safety at work place, team working and development of right attitude.
CEO2	TO ACQUIRE SKILLS IN BASIC ENGINEERING PRACTICE
CEO3	To identify the hand tools and instruments

Course Outcomes: At the end of the course, the student will be able to:

CO1	Study and practice on machine tools and their operations
CO2	Identify and apply suitable tools for machining processes.
CO3	Apply basic electrical engineering knowledge for measurement technique

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1. Winding shop: Step down transformer winding of less than 5VA.

2. Implementation of Clipper, Clamper circuits using breadboard.

3. Implementation of LDR operated switch using breadboard.

4. Implementation and testing of audio amplifier circuit by using regulated power supply using bread board.

5. Implementation and testing of bridge rectifier circuit and regulated power supply using bread board.

6. PCB Fabrication Lab:

   Exercises in making single sided PCB using photo-processing method for developing the PCBs for **exp. No. 3 OR 4 OR 5** (can be divided in batches)**:**

   i. Artwork development

   ii. Dark Room Practice:

   a) Exposure using UV light/daylight
   b) Developing (including dye developing)
   c) Fixing

d) Printing (including contact printing)
e) Enlarging/Reducing

iii. **Techniques of photo-resist coating**
iv. **Baking and cleaning procedures**
v. **Etching procedures**
vi. **Drilling procedures**
vii. **Soldering shop**
viii. **Wiring & fitting shop:** Fitting of power supply along with a meter in cabinet.

STUDY AND EVALUATION SCHEME
Diploma in Electronics & Communication Engineering
(Effective from session 2019-20)
YEAR III, SEMESTER V

L-Lecture, **T-** Tutorial , **P-** Practical , **CT –** Cumulative Test ,**TA –**Teacher Assessment , **AT –** Attendance , **E-Sem. –** End Semester Marks

S.NO.	CODE	SUBJECT	PERIODS			EVALUATION SCHEME					TOTAL	CREDIT
						SESSIONAL				END SEMESTER		
			L	T	P	CT	TA	AT	Sub. Total	E-Sem.		
1	DEC-501	Basics of Microprocessors	3	1	0	20	10	10	40	60	100	4
2	DEC-502	Consumer Electronic Systems	3	1	0	20	10	10	40	60	100	4
3	DEC-503	Optical Engineering	3	1	0	20	10	10	40	60	100	4
4	DEC-504	Concepts of Data Communication Networks	3	1	0	20	10	10	40	60	100	4
5	DEE-503	Control system	3	1	0	20	10	10	40	60	100	4
PRACTICAL/TRAINING/PROJECT												
6	DEC-551	Microprocessor Lab	0	0	4	0	0	0	50	50	100	2
7	DEC-552	Troubleshooting of Consumer Electronic Systems-I	0	0	8	0	0	0	50	50	100	4
8	DEC-556	Industrial Training & Seminar	0	0	2	0	0	0	100	-	100	1
9	DEC-557	Mini Project work	0	0	2	0	0	0	50	50	100	1
10	DGP-501	General Proficiency	-	-	-	-	-	-	50	-	50	1
			15	5	16				450	500	950	29

DEC-501	Basics of Microprocessor	DIPLOMA ECE	3-1-0	4 credits

Pre-requisites:

Course Educational Objectives:

CEO1	To introduce students with the architecture and operation of typical microprocessors
CEO2	To familiarize the students with the programming and interfacing of microprocessors
CEO3	To provide strong foundation for designing real world applications using microprocessors

COURSE OUTCOMES: AT THE END OF THE COURSE, THE STUDENT WILL BE ABLE TO:

CO1	Understand the evolution of processor architectures
CO2	Write simple programs in assembly language for 8085 microprocessor.
CO3	Understand the various addressing modes.

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UNIT-I

Introduction to Digital Computer: Digital Computers: General architecture and brief description of elements, instruction execution, instruction format, and instruction set, addressing modes, programming system, higher level languages. Buses and CPU Timings: Bus size and signals, machine cycle timing diagram, instruction timing, processor timing.

UNIT-II

Microprocessors: Evolution of Microprocessors, its importance and applications.
Memory chips: Types of ROM, RAM, EPROM, PROM. Read/Write inputs, Chip enable/select input. Other control input/output signals- Address latching, Read output, Address strobes.
Power supply inputs. Extension of memory-In terms of word length and depth.

UNIT-III

Architecture of 8085 microprocessor: Pin configuration, Illustration using functional block diagram, Concept of Bus and bus organization, Memory mapping and extension, De-multiplexing of data or and address buses.

UNIT-IV

Addressing Modes: Register addressing, direct addressing; register indirect addressing, immediate addressing, and implicit addressing.
Instruction Set of 8085 microprocessor: Instruction format, op-codes, mnemonics, no. of bytes, RTL, variants, no. of machine cycles and T states, status flags, use of stacks and subordinates. Timing diagrams of instructions.

UNIT-V

Interfacing and Data Transfer Schemes of 8085 microprocessor: Memory mapped Input and input mapped I/O schemes, Interrupts of 8085, Programmable data transfer, Interrupt and DMA data transfer schemes and related applications.

Peripheral Devices: 8255 PPI, 8253 PIT, 8257 DMA Controller, 8259 PIC.

REFERENCE BOOKS:

1. Gaonkar, Ramesh S, "Microprocessor Architecture, programming and applications with the 8085" Pen ram International Publishing 5th Ed.
2. Uffenbeck, John, "Microcomputers and Microprocessors" PHI/ 3rd Edition.
3. Ray, A.K. & Burchandi, K.M., "Advanced Microprocessors and Peripherals: Architecture, Programming and Interfacing" Tata Mc. Graw Hill.
4. Krishna Kant, "Microprocessors and Microcontrollers" PHI Learning

DEC-502	**Consumer Electronic Systems-I**	**DIPLOMA ECE**	**3-1-0**	**4 credits**

Pre-requisites:

Course Educational Objectives:

CEO1	To study various display system and its application.
CEO2	To Analysis and study characteristics of tube Generators and Amplifiers.
CEO3	To study various colour television systems with greater emphasis on television standards

COURSE OUTCOMES: AT THE END OF THE COURSE, THE STUDENT WILL BE ABLE TO:

CO1	Understand different colour television systems used worldwide and its compatibility
CO2	Understand principles of digital video and component video signal.
CO3	Understand the working principles and applications of latest display like LCD, LED, Plasma and large flat panel monitors.
CO4	Understand various parameters of picture tube and use of component as per applications.

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UNIT-I

Audio Systems:

Microphones: Characteristics, Types of microphones: Carbon, Crystal, Moving Coil, Crystal, Tie-Clip and Cordless Microphones.

Loud Speakers: Introduction, Types of loud speakers: Crystal, Electrostatic, Dynamic, Permanent Magnet. Construction of loud speakers: Permanent magnet and Voice Coil. Loudspeaker impedance, acoustic impedance and resonance, woofers.

UNIT-II

TV fundamentals: Simple block diagram of TV transmission and reception, Scanning process, sequential, Horizontal and vertical scanning, flicker and interlaced scanning, Need for synchronization, blanking pulses. Aspect ratio, vertical resolution and video Bandwidth, Relationship among them.

Picture tubes, specification, working principle of monochrome picture tubes, phosphor screen, concept of screen burns.

TV Transmitters and Receivers: Introduction to RF tuner and its types – Block diagram of frequency synthesized Electronic tuner, Requirements of video IF amplifier and AGC, scrambling and descrambling, basic block diagram of descrambler.

UNIT-III

Color TV Fundamentals: Primary colors, tristimulus values, trichromatic coefficients, concepts of additive and subtracting mixing of colors, concepts of luminance, Hue and Saturation, Representation of a color in color triangle, non-spectral color, visibility curve.

Block diagram of color TV transmission, color compatibility, color synchronization, color plexed composite video signal and weighting factor TV transmitter layout, PAL color and NTSC Systems.

Introduction to the different types of Modern Age TV: LCD, PLASMA and LED TVs. (Just the basic principle of operations).

UNIT-IV

Audio & Video Playback and Reception Systems: Principle of video recording on CDs and DVDs.Block diagram of VCD player in play back mode. DVD player block diagram in play black mode.
Remote Control: Ultrasonic Transducers, Frequency Signal Coding, Remote Control Transmitter, Description of Ultrasonic Transmitter Circuit.
Block diagram and working principle of cable TV and DTH, Basic concept of cable TV using internet.

UNIT-V

Power Supplies: Rectifier Circuits, Voltage Regulation, Applications of Zener Diode as Shunt Stabilizer, Practical Power Supplies, How to protect your Equipment from pikes Surges and Blackouts. UPS Systems.
In-Car Computer Systems: Applications, Electronic Ignition, Electronic Ignition Lock System, ABS, Ultrasonic Car Safety Belt System, Air bag Systems, Vehicle Proximity Detection System, Car Navigation System.

REFERENCE BOOKS:

1. TV and video Engg - Arvind M.Dhake
2. Modern TV practice principles of Technology and servicing - R.R. Gulati
3. S.P. Bali, " Consumer Electronics", Pearson Education.
4. S.Y. Liao " Microwave Devices and Circuits", PHI Publications.

DEC 503	**OPTICAL ENGINEERING**	**DIPLOMA ECE**	**3-1-0**	**4 CREDITS**

PRE-REQUISITES:

COURSE OBJCETIVES:

CEO1	**DEMONSTRATE AN ABILITY TO ANALYZE AND DESIGN OPTICAL SYSTEMS.**
CEO2	**TO GET THE ABILITY TO MANIPULATE LIGHT USING ACTIVE AND PASSIVE ELEMENTS.**
CEO3	**TO GET THE ABILITY TO DESIGN AND BUILD USING A VARIETY OF OPTICAL DETECTION SYSTEMS.**

COURSE OUTCOME: AFTER THE COMPLETION OF THE COURSE THE STUDENT WILL BE ABLE TO:

CO1	**IDENTIFY AND CHARACTERIZE DIFFERENT COMPONENTS OF AN OPTICAL FIBER COMMUNICATION LINK**
CO2	**ANALYZE OPTICAL SOURCE, FIBER AND DETECTOR OPERATIONAL PARAMETERS**
CO3	**COMPUTE OPTICAL FIBER LINK DESIGN PARAMETERS**
CO4	**UNDERSTAND WDM, OPTICAL AMPLIFIERS, OPTICAL SWITCHING AND NETWORKING TECHNOLOGY CONCEPTS.**

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UNIT-I

Fundamental of Optics:
Electromagnetic nature of light, Principle of reflection, refractions, polarization. Ray Theory, Concept of Total Internal Reflection, Critical Angle.
Introduction To Optical Fiber: Classification of fiber, Physical structure, Electromagnetic mode theory for optical propagation-Electromagnetic waves, Modes in planar guide, Modes in cylindrical fiber phase and group velocity. Fiber types and its connectors

UNIT-II

Optical Sources: Direct and indirect band gap semiconductors, Internal and external quantum efficiency. Basic Principle, characteristics and construction of LED and its types.
Semiconductor Lasers - Laser action, PN junction laser.

UNIT-III

Optical Detectors: Introduction, Photodiode- Material and types. Avalanche Photo Diode, (APD), PIN diode. Temperature effect on avalanche gain. Introduction to Photo transistors.

UNIT-IV

Connectors, Splicers and Splitters: Need of connectors, Types of connectors, Single and multimode fiber connectors.
Need and splicing, Types of splicing and different splicing techniques.
Introduction of Splitters and its types.

UNIT-V

Optical Couplers: Introduction to Couplers and Cable. Need and types of couplers. Source of fiber couplers, Fiber to Fiber couplers, Fiber to detector couplers.
Elements of cable structure and its characteristics. Cable installation and design consideration, Cable jacketing, cable lying, Transport and handling.

REFERENCE BOOKS:

1. Optical Communicaiton - J. Paulis
2. Fiber Optics & Optoelectronics - Peter K Cheo
3. Optical Communiction- Senior J. M.
4. An Introduction to Optical Fiber - Allen H Cherin.
5. Understanding Fiber Optics - Jeff Hecht.

DEC 504	**CONCEPTS OF DATA COMMUNICATION NETWORKS**	**DIPLOMA ECE**	**3-1-0**	**4 CREDITS**

PRE-REQUISITES:

COURSE EDUCATIONAL OBJCETIVES:

CEO1	**BUILD AN UNDERSTANDING OF THE FUNDAMENTAL CONCEPTS OF COMPUTER NETWORKING.**
CEO2	**FAMILIARIZE THE STUDENT WITH THE BASIC TAXONOMY AND TERMINOLOGY OF THE COMPUTER NETWORKING AREA**
CEO3	**INTRODUCE THE STUDENT TO ADVANCED NETWORKING CONCEPTS, PREPARING THE STUDENT FOR ENTRY ADVANCED COURSES IN COMPUTER NETWORKING.**
CEO4	**ALLOW THE STUDENT TO GAIN EXPERTISE IN SOME SPECIFIC AREAS OF NETWORKING SUCH AS THE DESIGN AND MAINTENANCE OF INDIVIDUAL NETWORKS**

COURSE OUTCOME: AFTER THE COMPLETION OF THE COURSE THE STUDENT WILL BE ABLE TO:

CO1	**INDEPENDENTLY UNDERSTAND BASIC COMPUTER NETWORK TECHNOLOGY.**
CO2	**UNDERSTAND AND EXPLAIN DATA COMMUNICATIONS SYSTEM AND ITS COMPONENTS.**
CO3	**IDENTIFY THE DIFFERENT TYPES OF NETWORK TOPOLOGIES AND PROTOCOLS**
CO4	**ENUMERATE THE LAYERS OF THE OSI MODEL AND TCP/IP. EXPLAIN THE FUNCTION(S) OF EACH LAYER.**
CO5	**IDENTIFY THE DIFFERENT TYPES OF NETWORK DEVICES AND THEIR FUNCTIONS WITHIN A NETWORK**
CO6	**UNDERSTAND AND BUILDING THE SKILLS OF SUB-NETTING AND ROUTING MECHANISMS.**

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UNIT-I

Introduction to Data Communication Systems and Networks: Introduction to Data communication, Fundamental characteristics, Components of Data communication systems, Data Representations, Data Flow. Introduction to Computer Networks (basic concept of distributed networks), Network Criterions, Physical Structure of a Network: Types of Networks and Topologies, their advantages and drawbacks.
Categories of Networks, Concept of internetworks, Services provided by Networks, Network Functions.
The Internet, History of Internet, Internet Standards and Administration.
Basic idea of Protocols and Standards.

UNIT-II

Data and Signals: Difference between Data and Signal, Concept of Analog and Digital Data and Signal, Periodic and Non Periodic Signal.
Fundamental Concepts of Analog Signals: sinusoidal waves, phase, wavelength, Time and frequency domains, Composite signals, Bandwidth.
Fundamental Concepts of Digital Signals: Bit rate, Bit Length and Baud Rate.
Basics of Data Rate Limits: Noiseless and Noisy Channels
Introduction to attenuation, distortion and noise.
Performance Analysis: Bandwidth, Throughput, Latency, Bandwidth-Delay Product and Jitter.

UNIT-III

Data Transmission: Methods of Data Transmission (Analog to Analog, Analog to Digital, Digital to Analog and Digital to Digital). Digital to Digital Conversions: Line Coding, Introduction to Line Coding Schemes: Unipolar (NRZ), Polar (NRZ-L, NRZ-I, RZ), Biphase (Manchester, Differential Manchester) and Bipolar (AMI, B8ZS, HDB3). Analog to Digital Conversion: Basic Concepts of PCM & DM. Transmission Modes.
Bandwidth Utilization: Concept of Multiplexing, FDM, WDM, TDM.

UNIT-IV

Network Models: Introduction, Concept of network Protocols, Key elements of a protocol, Protocol Layering /Layered Tasks, Concept of Layered Architecture.
The OSI Model: Layered Architecture, Peer to Peer Process, Layers in OSI Model.
TCP/IP Protocol Suite: Different layers and their functions.
Addressing

UNIT-V

Transmission Media: Introduction, Guided Media: Twisted-Pair Cable and its connectors, Coaxial Cable and its connectors
Unguided Media: Wireless.
Switching: Concept of switching, Types of Switching: Brief discussion of Circuit and Packet Switching and their types.
Telephone Networks: Major Components, LATA, Services provided by telephone networks.
Basic Concepts of Errors: Introduction to Errors, Types of Errors, Redundancy, Odd/Even Parity Check method
Data Links Layer Design Issues: Services provided to network layer framing: Necessity and techniques. Error control feature and review of techniques.

. **REFERENCE BOOKS:**

1. Behrouz A.Forouzan, "Data Communications and Networking", 4th Edition, Mc Graw Hill Education.
2. Behrouz A.Forouzan, "Data Communications and Networking", 2nd Edition, Mc Graw Hill Education.
3. Behrouz A.Forouzan, " TCP/IP Protocol Suite", 4th Edition, Mc Graw Hill Education

DEE 503	Control system	DIPLOMA ECE	3-1-0	4 credits

Pre-requisites:

Course Educational Objectives:

CEO1	To introduce different types of system and identify a set of algebraic equations to represent and model a complicated system into a more simplified form to interpret different physical and mechanical systems in terms of electrical system to construct equivalent electrical models for analysis
CEO2	To employ time domain analysis to predict and diagnose transient performance parameters of the system for standard input functions and identify the needs of different types of controllers and compensator to ascertain the required dynamic response from the system
CEO3	Formulate different types of analysis in frequency domain to explain the nature of stability of the system

COURSE OUTCOMES: AT THE END OF THE COURSE, THE STUDENT WILL BE ABLE TO:

CO1	Categorize different types of system and identify a set of algebraic equations to represent and model a complicated system into a more simplified form.
CO2	Characterize any system in Laplace domain to illustrate different specification of the system using transfer function concept
CO3	Interpret different physical and mechanical systems in terms of electrical system to construct equivalent electrical models for analysis
CO4	Employ time domain analysis to predict and diagnose transient performance parameters of the system for standard input functions.
CO5	Formulate different types of analysis in frequency domain to explain the nature of stability of the system.

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Unit-1

Systems & Representation: Basic elements in control systems, Open and closed loop systems, Electrical analogy of mechanical and thermal systems, Transfer function, Synchros , AC and DC servomotors, Block diagram reduction techniques , Signal flow graphs.

Unit-2

Time Response: Time response, Time domain specifications, Types of test input, I and II order system response, Error coefficients, Generalized error series, Steady state error, P, PI, PID modes of feedback control

Unit-3

Frequency Response: Bode plot, Polar plot, Determination of closed loop response from open loop response.

Unit-4 & 5

Stability of Control System: Characteristics equation, Location of roots in S plane for stability, Routh Hurwitz criterion, Effect of pole-zero addition, Gain margin and phase margin.

Text Books:

1) I.J. Nagrath and M. Gopal, "Control Systems Engineering", New Age International Publishers, 2003.
2) Benjamin C. Kuo," Automatic Control systems, Pearson Education", New Delhi, 2003.

DEC 551	Microprocessor Lab	DIPLOMA ECE	0-0-4	2

PRE-REQUISITES:

COURSE OBJCETIVES:

CEO1	TO MAKE THE STUDENT WRITE ASSEMBLY LANGUAGE PROGRAMS TO SOLVE DIFFERENT PROBLEMS.
CEO2	TO BECOME FAMILIAR WITH THE ARCHITECTURE AND INSTRUCTION SET OF INTEL 8085 MICROPROCESSOR.
CEO3	TO FAMILIARIZE THE STUDENTS WITH INTERFACING OF VARIOUS PERIPHERAL DEVICES WITH 8085 MICROPROCESSOR.

COURSE OUTCOME: AFTER THE COMPLETION OF THE COURSE THE STUDENT WILL BE ABLE TO:

CO1	WRITE ASSEMBLY LANGUAGE PROGRAMS IN 8085.
CO2	DEMONSTRATE ABILITY TO HANDLE LOGICAL OPERATIONS USING ASSEMBLY LANGUAGE PROGRAMMING.
CO3	DEMONSTRATE ABILITY TO HANDLE STRING INSTRUCTIONS USING ASSEMBLY LANGUAGE PROGRAMMING.

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1. Write a program using 8085 Microprocessor for Decimal, Hexadecimal addition and Subtraction of two numbers.

1. Write a program using 8085 Microprocessor for addition and subtraction of two BCD numbers.

2. To perform multiplication of two 8 bit numbers using 8085.

3. To find the largest number in an array of data using 8085 instruction set.

4. To find the smallest number in an array of data using 8085 instruction set.

5. To write a program to arrange an array of data in ascending order.

6. To write a program to arrange an array of data in descending order.

7. To convert given Hexadecimal number into its equivalent ASCII number and vice versa using 8085 instruction set.

8. Program to transfer one block of memory to another location in Increasing and Decreasing order of the memory.

9. Program to transfer one block of memory to another location in cross manner location of memory.

10. Program for display your name on LCD using M85-07 kit.

DEC 552	**Troubleshooting Of Consumer Electronic Systems-I**	**DIPLOMA ECE**	**0-0-4**	**2**

PRE-REQUISITES:

COURSE OBJECTIVES:

CEO1	TO UNDERSTAND CONCEPTS USED IN CONSUMER ELECTRONICS SYSTEMS.
CEO2	USE DIFFERENT PRODUCT SAFETY, COMPLIANCE STANDARDS AND TECHNIQUES ASSOCIATED WITH ELECTRONIC PRODUCTS
CEO3	FOSTER A DESIRE TO CONTINUE LIFE-LONG LEARNING.

COURSE OUTCOME: AFTER THE COMPLETION OF THE COURSE THE STUDENT WILL BE ABLE TO:

CO1	EVALUATE AND ANALYZE DIFFERENT ELECTRONIC PRODUCTS AND SYSTEMS BASED ON SPECIFICATIONS.
CO2	IDENTIFY THE NEED OF PREVENTIVE MAINTENANCE IN VARIOUS ELECTRONIC APPLIANCES..
CO3	UNDERSTAND ELECTRONICS ENGINEERING CONCEPTS USED IN CONSUMER ELECTRONICS SYSTEMS.

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1. Use of Digital Multi-meters and Component testing using Multi-meter.
2. Testing of Active and passive components with the help of CRO.
3. Study of Function generators and plotting the waveforms of:
    a) Sine Wave of Frequency 100 Hz and 1000 Hz.
    b) Saw-tooth Wave of Frequency 100 Hz and 1000 Hz.

4. Detailed study of CRO and its internal circuitry on CRO Trainer.

5. Study of various types of capacitors and their properties.

6. Property (Inductance, Capacitance & Resistance) measurement using LCR meter.

7. IC testing using IC tester.

8. Troubleshooting and study of different types of power supplies:
   (a) SMPS (b) UPS (c) Portable Power Adapters.

9. Troubleshooting & Assembly of Personal Computer system and study of different peripheral devices.

10. Study of various networking devices and cables. Study of VGA/DE-15 connectors and their pin diagram and practice of their cable connections.

11. Overview of internal structure of Laser printer and Projector.

12. Study of Microphones and visualization of audio signals on CRO.

13. Troubleshooting of TV Audio Systems.

14. Troubleshooting of TV Video Systems and other Internal Circuitry.

15. Troubleshooting of commercial Personal Radio systems.

16. Troubleshooting of miscellaneous consumer equipment like CD player etc.

STUDY AND EVALUATION SCHEME
Diploma in Electronics & Communication Engineering
(Effective from session 2018-19)
YEAR III, SEMESTER VI

L-Lecture, **T-** Tutorial , **P-** Practical , **CT –** Cumulative Test ,**TA –**Teacher Assessment , **AT –** Attendance , **E-Sem. –** End Semester Marks

S.NO.	CODE	SUBJECT	PERIODS			EVALUATION SCHEME					TOTAL	CREDIT
						SESSIONAL				END SEMESTER		
			L	T	P	CT	TA	AT	Sub. Total	E-Sem.		
1	DEC-601	Biomedical Instrumentation & Devices	3	1	0	20	10	10	40	60	100	4
2	DEC-602	Introduction to Modern Communication Systems	3	1	0	20	10	10	40	60	100	4
3	DEC-603	Advanced Communication Networks	3	1	0	20	10	10	40	60	100	4
4	DEC-604	Introduction to Virtual Instrumentation	3	1	0	20	10	10	40	60	100	4
5	DAS-604	Environment & Ecology	2	0	0	10	5	5	20	30	50	2
PRACTICAL/TRAINING/PROJECT												
6	DEC-651	Biomedical Instrumentation Lab	0	0	4	0	0	0	50	50	100	2
7	DEC-654	Virtual Instrumentation Lab Using LABVIEW	0	0	4	0	0	0	50	50	100	2
8	DEC-653	Major Project	0	0	16	0	0	0	100	150	250	6
9	DGP-601	General Proficiency	-	-	-	-	-	-	50	-	50	1
			14	4	20				430	520	950	29

DEC-601	**Biomedical Instrumentation & Devices**	**4 credits**

Pre-requisites: Knowledge of Instrumentation and Measurement

Course Educational Objectives (CEO)

CEO1	To introduce afundamental of transducers as applicable to physiology
CEO2	To explore the human body parameter measurements setups
CEO3	To make the students understand the basic concepts of forensic techniques.
CEO4	To give basic ideas about how multimedia evidences are useful in crime investigation.

COURSE OUTCOMES (CO)

AT THE END OF THE COURSE, THE STUDENT WILL BE ABLE TO:

CO1	Understand the physiology of biomedical system
CO2	Measure biomedical and physiological information
CO3	Understand the Therapeutic and Imaging devices
CO4	Discuss the application of Electronics in diagnostics and therapeutic area
CO5	Understand the patient monitoring system

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UNIT I

Physiology of Systems and Electrodes: Man Instrument system-Physiology systems of the body. Bioelectric potential – Resting and action potential – Bio-Potential electrodes – different types of electrodes – Equivalent circuits for electrodes-Biochemical Transducers.

UNIT II

Cardiovascular and Respiratory System and its Measurements: Cardiovascular system – Blood pressure – characteristics of blood flow – Heart sounds – ECG – Measurement of blood pressure, blood flow, heart sounds and cardiac output Plethysmography. Elements of ICU. Physiology of Respiratory system – Tests and Instrumentation for the mechanics of breathing-Gas Exchange and distribution-Respiratory therapy Equipment.

UNIT III

Nervous System and its Measurements: Nervous system – Neuronal communication organization of the brain – Neuronal receptors – somatic nervous system – spinal reflexes – Autonomic nervous system – Neuronal firing measurements – EEG – EMG – Psychophysiological measurements – Instruments for testing Motor Responses – Instruments for sensory measurements – Instrumentation for the Experimental Analysis of Behavior – Bio feedback instrumentation .

UNIT IV

Therapeutic Devices and Imaging Devices: Pacemaker – Defibrillators – Heart lung machine – Ventilator – Diathermy – Dialyzing Unit. X-ray machine - Radio graphic and fluoroscopic techniques – Computer tomography – MRI – Ultrasonography – Endoscopy – Thermography – Different types of biotelemetry systems and patient monitoring – Electrical safety

UNIT V

Patient Monitoring System: Element of the intensive care monitoring, Patient monitoring, diagnosis, pacemakers and defibrillators.

Reference Books

1. Khandpur R.S., Hand book of Biomedical Instrumentation, Tata McGraw Hill, 2004.
2. Leslie Cromwell, Fred J. Weibell, Erich A. Pfeiffer, Biomedical Instrumentation and Measurements, PHI, 2nd Edition, 2004.
3. L.A. Geddes and L.E. Baker, Principles of Applied Biomedical Instrumentation, John Wiley & Sons Inc.1989.
4. Richard Aston, Principles of Biomedical Instrumentation and Measurement, Merrill Publishing, 1990.
5. Jacobson B. and Webster J.G., Medical Clinical Engineers, Prentice Hall Inc., 1979.

DEC-602	Introduction to Modern Communication Systems	4 credits

Pre-requisites: Basic knowledge of Analog communication theory and Digital communication

Course Educational Objectives (CEO)

CEO1	To introduce a fundamental of transmission lines and their applications
CEO2	To explore the wireless communication system and GSM architecture
CEO3	To make the students understand the basic concepts of satellite communication
CEO4	To give basic ideas about how radar and navigational system works

COURSE OUTCOMES (CO)

AT THE END OF THE COURSE, THE STUDENT WILL BE ABLE TO:

CO1	Describe the concept of transmission lines
CO2	Understand GSM and CDMA Cellular technologies.
CO3	Understand basics of Radar Communication and Satellite Communication
CO4	Understand the orbital and functional principles of satellite communication systems

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UNIT-I & II

Transmission lines and their application: Shapes of different types of transmission lines; including 300 ohm antenna feeder cable, 75 ohm co-axial cable, and optical fiber cable. Distributed (or primary) constants of a transmission line equivalent circuit of infinite line. Definition of characteristic impedance of line, concept of short line termination in Zo currents no voltages long an infinite line; graphical representation; propagation constant, attenuation and phase shift constant of the line.

Concept of reflection and standing waves on a transmission line; definition of reflection coefficient in terms of characteristics impedance and load impedance; Definition of standing wave ratio (SWR), and concept of VSWR and its physical interpretation.

UNIT-III

WIRELESS COMMUNICATION:
Introduction Wireless systems: Evolution, Wireless Communication System Definitions, Paging Systems, Cellular telephone Systems: Overview, Architecture, How to make a call from Cellular telephone.
1st Generation Wireless Systems: AMPS (Overview).
2nd Generation Wireless Systems: GSM (Services, Features, Architecture).

UNIT-IV

SATELLITE COMMUNICATION: Brief ofHistory, Elements of Satellite Communication, Needs of Satellite Communication, Kepler's Law, Introduction to Orbital Parameters, Orbital Mechanics, Introduction to look angle and orbit determination, launches & launch vehicle, orbital effects, Geosynchronous orbits, Geostationary Orbit.

UNIT V

RADAR AND NAVIGATIONAL AIDS

Radar, Fundamentals, Basic Radar System, Radar range equation, factors influencing maximum range, Pulsed systems, Basic Pulsed Radar System: Block Diagram, Brief history of Navigation systems, Introduction to GPS navigation system.

Reference Books

1. R.P.Terman, "Electronic and Radio Engineering", McGraw Hill, 1964
2. Theodore S. Rappaport- "Wireless Communications", Second Edition, Pearson Publication,2009
3. Electronic communication systems - Kennedy - Davis - fourth Edition - Tata McGraw Hill - 1999.
4. Electronics communication - Dennis Roddy and John coolen -Third Edition - PHI - 1988
5. J. P. Ryder-Network Filters & Transmission Line- PHI
6. A. Chakravorty- An Introduction to Network, Filters & Transmission Line- Dhanpat rai & Co.

DEC-603	**ADVANCED COMMUNICATION NETWORKS**	**DIPLOMA ECE**	**3-1-0**	**4 CREDITS**

PRE-REQUISITES: BASICS OF COMMUNICATION AND COMPUTER KNOWLEDGE

COURSE EDUCATIONAL OBJCETIVES:

CEO1	BUILD AN UNDERSTANDING OF THE FUNDAMENTAL CONCEPTS OF COMPUTER NETWORKING.
CEO2	FAMILIARIZE THE STUDENT WITH THE BASIC TAXONOMY AND TERMINOLOGY OF THE COMPUTER NETWORKING AREA
CEO3	INTRODUCE THE STUDENT TO ADVANCED NETWORKING CONCEPTS, PREPARING THE STUDENT FOR ENTRY ADVANCED COURSES IN COMPUTER NETWORKING.
CEO4	ALLOW THE STUDENT TO GAIN EXPERTISE IN SOME SPECIFIC AREAS OF NETWORKING SUCH AS THE DESIGN AND MAINTENANCE OF INDIVIDUAL NETWORKS

COURSE OUTCOME: AFTER THE COMPLETION OF THE COURSE THE STUDENT WILL BE ABLE TO:

CO1	INDEPENDENTLY UNDERSTAND BASIC COMPUTER NETWORK TECHNOLOGY.
CO2	UNDERSTAND AND EXPLAIN DATA COMMUNICATIONS SYSTEM AND ITS COMPONENTS.
CO3	IDENTIFY THE DIFFERENT TYPES OF NETWORK TOPOLOGIES AND PROTOCOLS
CO4	ENUMERATE THE LAYERS OF THE OSI MODEL AND TCP/IP. EXPLAIN THE FUNCTION(S) OF EACH LAYER.
CO5	IDENTIFY THE DIFFERENT TYPES OF NETWORK DEVICES AND THEIR FUNCTIONS WITHIN A NETWORK
CO6	UNDERSTAND AND BUILDING THE SKILLS OF SUBNETTING AND ROUTING MECHANISMS.

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UNIT-I

Review: TCP/IP Model.

Switching: Review of Circuit and Packet Switching. Concept of Connectionless and Connection-Oriented Services. Structure of Switch: Crossbar Switches and Multistage Switches (Clos Criterion)

Data Link Layer: Introduction, Services, Link layer addressing, Example of communication at data link layer.Flow Control.

Error Detection & Correction: Parity, CRC and Hamming Codes.

UNIT-II

Multiple Access Techniques: Random Access: ALOHA, Controlled Access: Reservation, Channelization: FDMA, TDMA and CDMA (Basic idea).

Difference between multiplexing and Multiple Access Techniques.

Ethernet Protocol: Introduction, Introduction to IEEE 802 projects and Naming some popular working groups like: 802.3, 802.11, 802.15 and 802.16.

UNIT-III

Ethernet: Ethernet Evolution, Introduction toStandard Ethernet: Characteristics, Addressing, Access Method (mention of access method only), Brief introduction of Ethernet for Implementation as 10Base5 Cable, 10Base2 Cable, 10BaseT Cable, and 10BaseF Cable.

UNIT-IV

Network Layer: Logical addressing, IPv4 ADDRESSES: Address Space, Notations. Classful Addressing: Classes and Blocks, Netid and Hostid, Mask, Subnetting, Supernetting, Address Depletion. Classless Addressing: Address Blocks, Mask, Network Addresses, Hierarchy, Two-Level Hierarchy: No Subnetting, Three-Level Hierarchy: Subnetting, More Levels of Hierarchy, Address Allocation.IPv6 ADDRESSES: Structure, Address Space.

UNIT-V

Connecting Devices: Passive Hubs, Repeaters, Active Hubs, Bridges, Two-Layer Switches, Routers, Three-Layer Switches, Gateway. **Backbone Networks:** Bus Backbone, Star Backbone.

Modems - Basic working principle of modems and their applications.

Introduction to some networking Protocols: ARP, RARP, ICMP, IGMP, SMTP, POP, and FTP.

REFERENCE BOOKS:

4. Behrouz A.Forouzan, "Data Communications and Networking", 4th Edition, Mc Graw Hill Education.
5. A. S. Tanenbaum, "Computer Networks", PHI.
6. W. Stallings, "Data and Computer Communication", PHI
7. Behrouz A.Forouzan, " TCP/IP Protocol Suite", 4th Edition, Mc Graw Hill Education

DEC-604	Introduction to Virtual Instrumentation	4 credits

Pre-requisites: Basics of C programming

Course Educational Objectives (CEO)

CEO1	To provide knowledge on design of process control by using virtual instrumentation techniques
CEO2	To provide knowledge in process analysis by VI tools.
CEO3	To give basic knowledge in describing function analysis.
CEO4	Get adequate knowledge VI tool sets

COURSE OUTCOMES (CO)

AT THE END OF THE COURSE, THE STUDENT WILL BE ABLE TO:

CO1	To describe about virtual instrumentation.
CO2	Get adequate knowledge VI tool sets
CO3	To describe data acquisition
CO4	To get introduced to VI programming techniques
CO5	To understand VI programming techniques
CO6	To get an adequate knowledge application of virtual instrumentation

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UNIT-I

INTRODUCTION TO Virtual Instrumentation: Historical perspective, Block diagram and Architecture of Virtual Instruments(Sensor Module, Sensor Interface, Medical Information Systems Interface, Processing Module, Database Interface, and User Interface).

UNIT-II

Data-flow Techniques: Graphical programming in data flow, Comparison with conventional programming.

UNIT-III & IV

VI Programming Techniques: VIs and sub-VIs, Loops and Charts, Arrays, Clusters and graphs, Case and sequence structures, Formula nodes, Local and global variables, Strings and file I/O.

UNIT-V

Instrument Control, Development of process database management system, Simulation of systems using VI, Development of Control system, Industrial Communication, Image acquisition and processing, Motion control.

DAS-604	**ENVIRONMENT & ECOLOGY**	**DIPLOMA ECE**	**2-0-0**	**2 CREDITS**

PRE-REQUISITES: NONE

Course Objectives:

CEO1	Develop an appreciation of the modern scope of scientific inquiry in the field of Ecology.
CEO2	Become familiar with the variety of ways that organisms interact with both the physical and the biological environment.
CEO3	Develop an understanding of the differences in the structure and function of different types of ecosystems.

Course outcomes: At the end of the course, the student will be able to:

CO1	Understand environmental problems arising due to developmental activities
CO2	Identify the natural resources and suitable methods for conservation and sustainable development
CO3	Realize the importance of ecosystem and biodiversity for maintaining ecological balance.
CO4	Identify the environmental pollutants and abatement devices.

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Unit-I

Introduction to Environmental Science - Definition and scope and need for public awareness Ecosystems,Concept, structure and functions, restoration of damaged ecosystems
Biodiversity – Definition, description at national and global level, threats and conservation

Unit-II

Natural Resources - Renewable and non-renewable and their equitable use for sustainability, Material cycles – carbon, nitrogen and sulphur cycle. Conventional and Non-conventional Energy Sources – fossil fuel-based, hydroelectric, wind, -nuclear and solar energy, biomass, biodiesel, hydrogen as an alternative fuel.

Unit-III

Transportation and industrial growth Social Issues Related to Environment–Sustainable development, reset lement and rehabilitation Environmental ethics.

Unit-IV

Environmental Changes and Human Health Environmental Pollution–Definition, causes and effects, control measures for water, air, soil, noise, thermal pollution.

Textbook:

Environmental Studies, J Krishna wamy , R J Ranjit Daniels, Wiley India.

Reference Books:

1. Environmental Science, Bernard J. Nebel, Richard T. Right, 9780132854467, Prentice Hall Professional 1993.
2. Environment and Ecology, R K Khandal, 978-81-265-4277-2, Wiley India.
3. Environmental Science, 8th Ed ISV, Botkin and Keller, 9788126534142,Wiley India.
4. Environmental Studies, R Rajagopalan, 978-0195673937, Oxford University Press
5. Textbook of Environmental Science and Technology, M.Anjireddy, BS Publications

DEC-651	**BIOMEDICAL INSTRUMENTATION LAB**	**DIPLOMA ECE**	**2-0-0**	**2 CREDITS**

PRE-REQUISITES: NONE

Course Objectives:

CEO1	Design of biological amplifiers
CEO2	Get exposure to human body parameter measurement
CEO3	Develop understanding of patient monitoring systems

Course outcomes: At the end of the course, the student will be able to:

CO1	Study various transducers
CO2	Analysis of the ECG signal
CO3	Measurement of pH and conductivity.
CO4	Galvanic skin resistance (GSR) measurement.

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1. Design and analysis of biological pre amplifiers.
2. Recording of ECG signal and analysis
3. Recording of EMG-Signal
4. Recording of EEG-Signal
5. Recording of various physiological parameters using patient monitoring system and telemetry units.
6. Measurement of pH and conductivity.
7. Measurement and recording of peripheral blood flow.
8. Measurement of visually evoked potential.
9. Study of characteristics of optical Isolation amplifier.
10. Galvanic skin resistance (GSR) measurement.

DEC-654	**VIRTUAL INSTRUMENTATION LAB USING LABVIEW**	**DIPLOMA ECE**	**2-0-0**	**2 CREDITS**

PRE-REQUISITES: NONE

Course Objectives:

CEO1	To understand the concept of LabVIEW
CEO2	Exposure to programming
CEO3	Develop understanding ofmathematical models

Course outcomes: At the end of the course, the student will be able to:

CO1	Understand the basics and simple operations of LabView.
CO2	Acquire knowledge of different Data Acquisition System
CO3	Learn the basic programming concepts in LabVIEW
CO4	Develop real time applications using LabVIEW

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1. BASIC ARITHMETIC OPERATIONS
2. BOOLEAN OPERATIONS
3. SUM OF ‘n’ NUMBERS USING ‘FOR’ LOOP
4. FACTORIAL OF A GIVEN NUMBER USING FOR LOOP
5. SUM OF ‘n’ NATURAL NUMBERS USING WHILE LOOP
6. FACTORIAL OF A GIVE NUMBER USING WHILE LOOP
7. SORTING EVEN NUMBERS USING WHILE LOOP IN AN ARRAY
8. ARRAY MAXIMUM AND MINIMUM

DEC-653	**MAJOR PROJECT**	**DIPLOMA ECE**		**6 CREDITS**

PRE-REQUISITES: NONE

Course outcomes: At the end of the course, the student will be able to:

CO1	Implement the project requiring individual and teamwork skills.
CO2	Update recent knowledge in the area of project.
CO3	Carry out design calculations and implementations in the area of project.
CO4	Communicate their work effectively through writing and presentation.
CO5	Handle professional responsibilities and respect for ethics