CURRICULUM

FOR

DIPLOMA IN ELECTRONICS AND TELECOMMUNICATION ENGINEERING

(THIRD SEMESTER)

Scheme: Jul.08

Implemented from session: 2009-10

Under semester system

FEBRUARY 2009

CURRICULUM DEVELOPMENT CENTRE,
DEPARTMENT OF ELECTRONICS AND OPTO-ELECTRONICS
(SHRI VAISHNAV POLYTECHNIC COLLEGE, INDORE)

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

DIPLOMA IN ELECTRONICS AND TELECOMMUNICATION ENGINEERING

SEMESTER: **THIRD** SCHEME: **Jul.08**
COURSE CODE: **301** COMMON WITH PROGRAM (S):**O01**
NAME OF COURSE: **ELECTRONIC COMPONENTS AND MATERIALS** PAPER CODE:

RATIONALE

An Electronics technician has to deal with different types of electrical and electronics materials, components and therefore a basic knowledge of this subject is conceded a necessity. This course is intended for students to understand the properties of various electrical and electronic components.
This subject involves an introduction to the engineering Materials which has assumed great significance in recent times. As such it deals with the composition, characteristics, properties and stability of engineering materials used in industry. The content is chosen to the required knowledge and also to enable the technician to make the right choice of the materials for various applications in the field of electronics.

Upon successful completion of this course, the student will be able to:
- Understand the band structure of solids
- Draw the energy band diagram of insulators, Conductors and semiconductors
- Understand the construction of primary and secondary batteries.
- Know types ,operations and applications of switches and relays
- Choose appropriate connectors for applications

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SEMESTER: **THIRD** SCHEME: **Jul.08**
COURSE CODE: **301** COMMON WITH PROGRAM (S):**O01**
NAME OF COURSE: **ELECTRONIC COMPONENTS AND MATERIALS** PAPER CODE:

Lectures: **4** Hrs. per week

SCHEME OF STUDIES

Sr.	TOPICS	THEORY (HRS.)
1.	CONDUCTORS AND INSULATORS	20
2.	MAGNETIC MATERIALS	10
3.	JOINTING AND CLEANING MATERIALS:	10
4.	CELLS AND BATTERIES	10
5.	RELAYS AND SWITCHES	05
6.	CONNECTORS & PACKAGES	05
	TOTAL	60

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NAME OF COURSE: **ELECTRONIC COMPONENTS AND MATERIALS**

SCHEME: **Jul.08**
COMMON WITH PROGRAM (S):**O01**
PAPER CODE:

Lectures: **4** Hrs. per week

COURSE CONTENTS

Sr.	Course Contents
01.	**Conductors and Insulators** – introduction – Atomic Structure – band structure of solids – energy band diagram of Conductors, semiconductors and insulators – reliability specifications for electronic components stability, drift , catastrophic failure, MTBF, MTTF – resistivity of conductivity as a basic material property , – conductivity / resistivity of different types of materials , – effect of temperature on conductivity, – low, medium & high resistivity materials , their electrical and mechanical properties and applications. – electrical , thermal and other physical & chemical properties of insulating materials – Classification of insulating materials. – properties & applications of Insulating materials – Difference among conductor, Insulator and semiconductors based on: atomic structure, band theory. Role of semiconductors in making semiconductor devices. – fluid and Solidifying Dielectric materials and solid dielectric materials, – Different types of fuses and their applications. – Different types of cables and their applications.
02.	**Magnetic Materials** - Introduction - Properties of magnetic materials - Permeability - B-H curve and hysterisis effect - curies temperature - Residual magnetism

Sr.	Course Contents
	- Factor affecting the properties of magnetic materials such as: over temperature, mechanical damage, and direction of current - Classification of magnetic materials such as: hard and soft magnetic materials, Dai, para, ferro & ferri magnetic materials, and ferrite materials.
03.	**Jointing and Cleaning Materials** - Jointing techniques - Screw jointing, - Soldering and welding, - Types of screw heads, - screw shafts, - Soldering: Types of solders (soft & hard), - soldering process, - Different soldering materials used in electronics, - Adhesives. - Cleaning Materials: IPA (Isopropyl alcohol), CT(Carbon tetra chloride), Acetone Etc.
04.	**Cells and Batteries** – Principle of a cell , theory of operation , – Concept of Ideal voltage and current source. – internal resistance , – Ampere hour rating , – Primary and secondary cells and batteries. – Types of primary cells: carbon - zinc , mercury oxide, silver oxide , lithium. – Types of secondary cells; Lead storage battery – Solar cells. – Primary and Secondary cells & batteries. – maintenance requirements for various batteries ; – Choice of Batteries for different applications.
05.	**Relays and Switches** – relay Characteristics ; – relay performance ; – Contact types; Specifications and applications of different types of relays. – Switches: Types of manually operated switches , – their features and applications – Manually operated Selector Switches , Keyboards and sensing switches ; – Their principle of operation and applications. – Types, Operation, and applications of electrically operated switches.
06.	**Connectors and Packages** – level of connections , – generic types and specifications of connecting devices for connection levels 2,3 and 4 – ratings and specifications of connectors , – types of Connectors , Factors affecting choice of connectors ; – choice of connectors for different applications.

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SEMESTER: **THIRD**
COURSE CODE: **301**
NAME OF COURSE: **ELECTRONIC COMPONENTS AND MATERIAL**

SCHEME: **Jul.08**
COMMON WITH PROGRAM (S):**O01**
PAPER CODE:

1. Electronic Component by Padmanaban
2. Electronic Component by Ramachander
3. Electronic Components & Materials - LM Prepared at IIT, Delhi under Project IMPACT
4. Electrical Engineering Materials by TTTI , Madras
5. Electrical Engineering Materials by Indulkar and Tiruvenkadam
6. Electrical Engineering Materials by M. L . Guptha.
7. Electrical Engineering by P.L.Kapoor

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DIPLOMA IN ELECTRONICS AND TELECOMMUNICATION ENGINEERING

SEMESTER: **THIRD** SCHEME: **Jul.08**
COURSE CODE: **302** COMMON WITH PROGRAM (S):**O01**
NAME OF COURSE: **ELECTRONIC DEVICES AND CIRCUITS** PAPER CODE:

RATIONALE

Any electronic trade has its basis on a certain number of components and some basic standard circuits. These common circuits are applied in all sections of the Electronics Technology. A good understanding of the basic functioning of all these components and circuits will be a solid platform to enter into the more complex portion and specialized field of Electronics Engineering.

Emphasis has been given on the characteristics and application of semiconductor devices/ components. In the case of basic standard circuits, the focus has been made on the interaction of active and passive components and overall performance according to the stated requirements.

The laboratory course fundamentally aims at familiarizing the students with various semiconductor devices and their specific application in shaping, switching, rectification, amplification and oscillation. In addition to this the students will also be trained in electronic measurement techniques by operating measuring instruments.

Upon successful completion of this unit, the trainee will be able to:

- Describe the operation of some of the most basic electronic devices
- Practice proper laboratory procedures
- Use basic instruments in the performance of specific tasks
- Describe and understand the basic building blocks of a practical power supply

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DIPLOMA IN ELECTRONICS AND TELECOMMUNICATION ENGINEERING

SEMESTER: **THIRD**
COURSE CODE: **302**
NAME OF COURSE: **ELECTRONIC DEVICES AND CIRCUITS**

SCHEME: **Jul.08**
COMMON WITH PROGRAM (S):**O01**
PAPER CODE:

Lectures: **4** Hrs. per week
Practical: **4** Hrs. per week

SCHEME OF STUDIES

Sr.	TOPICS	THEORY (HRS.)	PRACTICAL (HRS.)	TOTAL (HRS)
1.	PN JUNCTION DIODES	10	10	20
2.	DIODE CIRCUITS	10	10	20
3.	JUNCTION TRANSISTORS	15	15	30
4.	AMPLIFIERS	10	10	20
5.	OSCILLATOR	10	10	20
6.	MULTIVIBRATORS	05	05	10
	TOTAL	60	60	120

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COURSE CODE: **302** COMMON WITH PROGRAM (S):**O01**
NAME OF COURSE: **ELECTRONIC DEVICES AND CIRCUITS** PAPER CODE:

Lectures: **4** Hrs. per week

COURSE CONTENTS

Sr.	Course Contents
01	**PN Junction Diodes** - Basic Structure and symbol - Forward & Reverse Biasing - V-I Characteristic - Various application of Junction Diode - Special purpose Diodes: Constructional features, symbol and applications of – Zener Diode, Tunnel Diode, Schottky Diode, Varactor Diode, Photo Diode, LED, Switching (Step – recovery) Diode. - Specifications
02.	**Diode Circuits** - Need of rectification - Types of rectifier: Half Wave, Full Wave and Bridge rectifier - Comparison - Average, Peak and rms Values - Filter Circuits: - Need of Filter Circuits - Types of filter circuits: capacitor, L- type and pie type - Ripple factor - Bleeder Resistance - Rectifier with filter - Basics of Voltage multiplier, Clipping Circuit, Clamping circuit
03.	**Junction Transistors** - Bipolar Junction Transistor (BJT) - Basic Structure - Types: PNP & NPN transistors - Transistor action - Check and identify the transistor leads - transistor as a three terminal network - Transistor Configuration: CE, CC and CB mode

Sr.	Course Contents
	- V -I characteristics: Input and Output Characteristics - Regions of Transistor operation, active, saturation & cutoff - Expression for currents: Alpha (α) and Beta (β), relation between alpha & beta - Transistor as a Switch - Transistor Biasing : fixed bias, Base Bias, Emitter feedback Bias, Collector feedback Bias, Voltage devider Bias, Emitter Bias - transistor specifications - FET (Field Effect Transistor) - Types of FET - Compare FET with BJT - FET operation - V -I characteristics - FET applications - MOSFET and CMOS - Introduction to MESFET - UJT (Unijunction Transistor) - Structural diagram of UJT - working of UJT - Applications of UJT in relaxation oscillator and blocking oscillator
04.	**Amplifiers** - Transistor as an Amplifier - CE Amplifier - Cascading of Amplifier - Meaning & necessity of cascade amplifier - Circuit Diagram of cascade amplifier with transistor coupling: RC coupling, Direct Coupling, Transformer coupling. - Classification of Amplifiers: Class A, class B, class AB & class C amplifier. - Distortion in amplifiers - Amplitude or Non linear distortion - Frequency Distortion - Phase shift distortion - Frequency response of amplifier - Feed Back Amplifier - Importance & concept of Feed Back - Advantage of negative feedback, block diagram of a feedback amplifier - Darlington Pair - Power Amplifiers - Audio Power Amplifier - Push pull Amplifier - Phase Splitter

Sr.	Course Contents

05.	**OSCILLATOR**
	- Principle of Oscillator
	- Barkhausen circuit criteria for oscillation
	- Types of Oscillators:
	  - Phase shift oscillator
	  - Resonance – Circuit LC oscillator
	  - Wein Bridge oscillator
	  - Colpits Oscillator
	  - Hartley Oscillator
	  - Crystal Oscillator

06.	**Multivibrators** - Basic form of operation - Astable (free running) multivibrator - Monostable (Single shot) multivibrator - Bistable (Trigger) Multivibrator

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SEMESTER: **THIRD** SCHEME: **Jul.08**
COURSE CODE: **302** COMMON WITH PROGRAM (S):**O01**
NAME OF COURSE: **ELECTRONIC DEVICES AND CIRCUITS** PAPER CODE:

Practical: **4** Hrs. per week

LIST OF EXPERIMENTS

1. To plot the V-I characteristics of a –
   (a) Silicon Diode (b) Germanium Diode
2. To verify the action of diode as a positive clipper and negative clipper.
3. To verify the action of diode as a positive clamper and negative clamper.
4. To verify the V-I characteristics of Zener Diode.
5. To obtain the input and output Transistor Characteristics for CB configuration.
6. To obtain the input and output Transistor Characteristics for CE configuration.
7. To obtain the input and output Transistor Characteristics for CC configuration.
8. To verify the operation of FET as a switch.
9. To verify the V-I Characteristics of UJT.
10. To setup the circuit and verify the waveforms of (I) HW rectifier (ii) FW (centre tapped) rectifier (iii) Bridge rectifier
11. To observe the output waveform of a rectifier circuit with (I) capacitor filter (ii) L-inductive filter
12. To observe the performance (frequency response) of a CE amplifier.
13. To observe the performance (frequency response) of an emitter follower amplifier.
14. To determine the overall voltage gain and frequency response of two stage cascade amplifier.
15. To analyze the performance of a class A amplifier.
16. To observe the characteristics of (I) current series feedback amplifier (ii) voltage series feedback amplifier.
17. To setup a RC phase shift oscillator and analyze its operation.
18. To verify the action of UJT as a relaxation Oscillator.
19. To setup the circuit and observe the action of astable, monostable and bistable multivibrator

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COURSE CODE: **302** COMMON WITH PROGRAM (S):**O01**
NAME OF COURSE: **ELECTRONIC DEVICES AND CIRCUITS** PAPER CODE:

REFERENCES

1. Electronics Principles by Malvino
2. Electronic Devices & CKTs by Mottershead
3. Integrated Electronics by Millian & Halikyas
4. Electronic Devices & Circuits By Robert Boylestad
5. Electronic Devices and Circuits by Millman & Halkias
6. Electronic Devices and Circuits by Mathur & Chadha
7. Solid State Devices by Streetman
8. Basic Electronics by V.K. Mehta

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DIPLOMA IN ELECTRONICS AND TELECOMMUNICATION ENGINEERING

SEMESTER: **THIRD** SCHEME: **Jul.08**
COURSE CODE: **303** COMMON WITH PROGRAM (S):**O01**
NAME OF COURSE: **BASIC ELECTRICAL ENGINEERING** PAPER CODE:

RATIONALE

This course presents the basic electrical principles used to analyze electric circuits and devices. Topics include current, voltage, resistance, work, power, energy, volt-amp characteristics, types of circuit configurations, magnetic principles, inductance, capacitance, and analog circuit measurements, characteristics of alternating current circuits. Good working habits and problem - solving procedures are stressed throughout the course. Special attention is given to phasor diagrams, impedance triangles, power triangles and transformers.

Upon completion of this course, the student will be able to:

- explain the basis of direct current circuit theory
- apply the techniques of circuit analysis to basis electric circuits
- use proper laboratory procedures
- use basic instruments correctly
- explain and utilize AC circuit theory
- follow proper laboratory procedures
- use basic instruments in the performance of specific tasks

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DIPLOMA IN ELECTRONICS AND TELECOMMUNICATION ENGINEERING

SEMESTER: **THIRD**
COURSE CODE: **303**
NAME OF COURSE: **BASIC ELECTRICAL ENGINEERING**

SCHEME: **Jul.08**
COMMON WITH PROGRAM (S) **O01**
PAPER CODE:

Lectures: **4** Hrs. per week
Practical: **2** Hrs. per week

SCHEME OF STUDIES

Sr.	TOPICS	THEORY (HRS.)	PRACTICAL (HRS.)	TOTAL (HRS)
1.	LAWS OF BASIC ELECTRICITY	10	05	15
2.	MAGNETIC FUNDAMENTALS	10	05	15
3.	AC FUNDAMENTALS	10	05	15
4.	TRANSFORMERS	10	05	15
5.	DC MACHINE	08	04	12
6.	AC MACHINES	08	04	12
7.	ELECTRICAL SAFETY MEASURES	04	02	06
	TOTAL	60	30	90

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SEMESTER: **THIRD**
COURSE CODE: **303**
NAME OF COURSE: **BASIC ELECTRICAL ENGINEERING**

SCHEME: **Jul.08**
COMMON WITH PROGRAM (S):**O01**
PAPER CODE:

Lectures: **4** Hrs. per week

COURSE CONTENTS

Sr.	Course Contents
01.	**Laws of Basic Electricity** – energy – nature of electricity – electric circuits and diagrams – the international system of units – scientific notation and engineering prefixes – current and Voltage – the coulomb – the ampere – potential difference – conventional current – Ohm's law of constant proportionality – Define resistance, types of resistance – Factors governing resistance – Dependence of resistance upon temperature, voltage, magnetic field, light, pressure and their typical applications – non linear resistors – series and parallel combination of resistance, equivalent resistance – work and Power – energy and work – efficiency – kilowatt-hour – interrelationship of basic electrical units

Sr.	Course Contents
02.	**Magnetic Fundamentals** – magneto motive force – reluctance – permeability – flux density – magnetic field intensity – magnetic materials – magnetization curves – Hysteresis – magnetic effect of electric current – electro magnetic induction – eddy current – magnetic shielding
03.	**AC Fundamentals** – Concepts of alternating voltage and current – Difference between AC and DC voltage – Concepts of Cycle, Frequency, Period, Amplitude , Instantaneous value, average value, RMS value, Peak value and form factor . – the radian – Graphical presentation of different periodic waves (signals) – instantaneous current in an ideal inductor – inductive reactance – instantaneous current in an ideal capacitor – capacitive reactance – impedance – Phasors and relation of V& I Phasors in RL, RC and RLC series circuit. – representation of sine waves on Phasors diagrams – Phasors algebra related to RL, RC, and LC circuits with sin wave input. – Impedance and admittance, impedance triangle. – Concepts of real (Watt), reactive (VARs) and apparent power (VA) and power triangle.
04.	**Transformers** - use of transformer (Electronics & Electrical) - definition of transformer - Principle of working of transformer - construction of transformer - Classification based on core construction - elementary theory of an ideal transformer - EMF equation of a transformer - Voltage transformation ratio(K) And Impedance ratio - Elementary Knowledge of Special Types of transformers- Auto transformer, Ferrite core type, Potential Transformer (PT) and Current transformer (CT).

Sr.	Course Contents
05.	**DC Machine** - Basic Working Principles of D.C. Generator and Motors - comparison of generator and motor action - significance of Generated emf and Back emf and their voltage equations - Different types DC motor. - Basic methods of speed control of a DC motor - Basic motor characteristics- Torque Vs Armature current , Speed Vs Armature current, Speed Vs Torque - Application of DC motor in electronics and electricals
06.	**AC Machine** - Types of ac machines. - construction of motor - Basic working principle of operation - production of rotating magnetic field - Basic knowledge of slip in induction motors - Torque-slip characteristic of inducton motor - Basic methods of speed control of induction motor - construction of a single phase induction motor - Elementary Knowledge of different types of single phase induction motor. Their applications in industries & house holds
07.	**Electrical Safety Measure** - Need of earthing - Protection against electric shocks.

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COURSE CODE: **303** COMMON WITH PROGRAM (S):**O01**
NAME OF COURSE: **BASIC ELECTRICAL ENGINEERING** PAPER CODE:

Practical: **4** Hrs. per week

LIST OF EXPERIMENTS

01. Identify various resistances and understand their specifications
02. Identify various capacitors and understand their specifications
03. Familiarization of Digital Multimeters and Analog Multimeters
04. Measure hot and cold resistance of filament of electric bulb
05. Verification of Ohms law
06. Series and parallel combination of resistance
07. Measurement of single phase power by using Wattmeter, Ammeter and Voltmeter
08. Series resistive-capacitive (R-C) circuits
09. Series resistive -inductive (R-L) circuits
10. Series resistive inductive and capacitive (R-L-C) circuits
11. Demonstrate various transformer and understand their specifications
12. Extending the range of basic meter movement:
    a) Meter Multipliers
    b) Meter shunts
13. Study of fan regulator circuit (Resistive & Electronic)
14. Study of tube light circuit
15. Speed control of DC shunt motor.
    (a) By varying field current-armature voltage kept constant.
    (b) By varying armature voltage – field current constant.

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SEMESTER: **THIRD** SCHEME: **Jul.08**
COURSE CODE: **303** COMMON WITH PROGRAM (S):**O01**
NAME OF COURSE: **BASIC ELECTRICAL ENGINEERING** PAPER CODE:

REFERENCES

1. Electrical technology – Volume I & II by B.L.Theraja
2. Fundamentals of Electrical Engineering Technology by V. Deltero.
3. Electric Circuits by Schaum Series
4. Basic Electricity by Van Valkenberg
5. Electricity by Richard J. Fowler
6. Grob Basic Electronics by Bernard Grob

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DIPLOMA IN ELECTRONICS AND TELECOMMUNICATION ENGINEERING

SEMESTER: **THIRD**
COURSE CODE: **304**
NAME OF COURSE: **NETWORK ANALYSIS**

SCHEME: **Jul.08**
COMMON WITH PROGRAM (S):**O01**
PAPER CODE:

RATIONALE

It is the most basic and practical course for electronic communication students. It puts the basics of electric circuits like Network Theorem, frequency response and Laplace Transformation.

The utility of learning outcome of the subject increases many a times when the applications of the circuits are discussed in detail.

Upon completion of this course student will be able to:

1. Analyze passive electric circuits
2. Understand outputs of Electric circuits for different inputs
3. Logically design a required Network
4. Understand frequency domain characteristics

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DIPLOMA IN ELECTRONICS AND TELECOMMUNICATION ENGINEERING

SEMESTER: **THIRD**
COURSE CODE: **304**
NAME OF COURSE: **NETWORK ANALYSIS**

SCHEME: **Jul.08**
COMMON WITH PROGRAM (S):**O01**
PAPER CODE:

Lectures: **4** Hrs. per week
Practical: **4** Hrs. per week

SCHEME OF STUDIES

Sr.	TOPICS	THEORY (HRS.)	PRACTICAL (HRS.)	TOTAL (HRS)
1.	NETWORK TRANSFORMATION	15	20	35
2.	RESONANCE	10	10	20
3.	STUDY STATE AND TRANSIENT RESPONSE	05	10	15
4.	FILTERS	10	10	20
5.	TWO PORT NETWORK	10	10	20
6.	LAPLACE TRANSFORMATION	10	-	10
	TOTAL	60	60	120

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DIPLOMA IN ELECTRONICS AND TELECOMMUNICATION ENGINEERING

SEMESTER: **THIRD**
COURSE CODE: **304**
NAME OF COURSE: **NETWORK ANALYSIS**

SCHEME: **Jul.08**
COMMON WITH PROGRAM (S):**O01**
PAPER CODE:

Lectures: **4** Hrs. per week

COURSE CONTENTS

Sr.	Course Contents
01.	**Network Transformation** - Introduction - Topology-Definitions, - Nodes, - Branches, - Tree, Co-Tree, Twigs - Tie-Set, Cut-set - Indices Matrix, Reduced Indices Matrix - KVL analysis - KCL analysis - Mesh and node circuit analysis - Principle of duality - Reduction of complicated network - Conversion between T and π (pie) Section - Superposition Theorem - Reciprocity Theorem - Thevenin's Theorem - Norton's Theorem - Millman Theorem - Maximum Power transfer theorem - Mutual Impedance and their dot conversion - Delta and Wye (Y) Transformation
02.	**Resonance** - Quality Factor or Q- Factor - Series Resonance - Resonance frequency, Bandwidth and Selectivity of Series resonance circuit - Parallel Resonance or Anti Resonance - Resonance frequency, Band Width and Selectivity of Parallel Resonance circuit - Phasor diagrams for L-C, R-L,R-C and R-L-C Circuits

Sr.	Course Contents
03.	**Steady State & Transient Response** - Analysis of step and sinusoidal inputs - Steady state & transient response for - RL Circuit - RC Circuit - forced and unforced response
04.	**Filters** - Introduction - Decibel & Neper- Definitions - Classification of Filters according to Pass & Stop Bands - Constant K Low pass filter - Constant K High pass filter - Band pass and band elimination filter - Elementary m-Derived filter - Elementary Composite Filters
05.	**Two Port Network & Their Parameters** - Short Circuit. Admittance parameters - Open circuit Impedance parameters - Z parameters, Y Parameters - Hybrid Parameters - Transmission Parameters - Inverse transmission Parameters - Introduction to Image impedance - Symmetric Network - Ladder network - Bridge 'T' network - Parallel 'T' network - Lattice network - Attenuators - types of attenuators - Basics of Equalizers and types
06.	**Laplace Transformation** - Initial condition in elements - A procedure for evaluating initial condition - The Laplace transformation - Laplace transform of elementary function - Application of Laplace transform for transient and steady state behavior of RL ,RC and RLC circuits.

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DIPLOMA IN ELECTRONICS AND TELECOMMUNICATION ENGINEERING

SEMESTER: **THIRD**
COURSE CODE: **304**
NAME OF COURSE: **NETWORK ANALYSIS**

SCHEME: **Jul.08**
COMMON WITH PROGRAM (S):**O01**
PAPER CODE:

Practical: **4** Hrs. per week

LIST OF EXPERIMENTS

1. Familiarization of CRO
2. Familiarization of Function Generator
3. Pass band check of low pass, high pass, band pass, band stop filters
4. To study and Verify Super position theorem
5. To study and Verify Reciprocity theorem
6. To study and Verify Thevenin theorem
7. To study and Verify Norton theorem
8. To study and Verify KCL AND KVL
9. Series resonance circuit
10. Parallel resonance circuit

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COURSE CODE: **304** COMMON WITH PROGRAM (S):**O01**
NAME OF COURSE: **NETWORK ANALYSIS** PAPER CODE:

REFERENCES

1. Networks Lines by Umesh Sinha
2. Networks, Lines and Fields by Ryder
3. Network Analysis by G. K. Mithal
4. Network Analysis by Van Volkenberg
5. Electric circuits by E Administer

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DIPLOMA IN ELECTRONICS AND TELECOMMUNICATION ENGINEERING

SEMESTER: **THIRD**
COURSE CODE: **305**
NAME OF COURSE: **DIGITAL ELECTRONICS**

SCHEME: **Jul.08**
COMMON WITH PROGRAM (S):**O01**
PAPER CODE:

RATIONALE

The rapidity with which digital technology has provided our daily life is more astounding and therefore the need for today's electronics students and older engineers to gain familiarity with digital circuits failed very strongly.

This subject forms the foundation of digital electronics to the students of electronics as the basic requirement to understand the concepts of the numerical machines and computer systems.

With the above objectives the contents of this subject are designed to provide beginning course to the student of the junior level. After mastering the material in this subject the student will posses all necessary tools and concepts for pursuing advanced studies in the areas of switching theories and finite automaton theory of logical machines.

The sequence of the topics in this curriculum has been chosen logically and sufficient amount of new material is added.

Upon successful of this course, the student will be able to:

- Use digital integrated circuit logic family chips;
- Perform computational and measuring activities related to digital technology;
- Analyze, explain and connect both sequential and combinational logic circuits.

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DIPLOMA IN ELECTRONICS AND TELECOMMUNICATION ENGINEERING

SEMESTER: **THIRD**
COURSE CODE: **305**
NAME OF COURSE: **DIGITAL ELECTRONICS**

SCHEME: **Jul.08**
COMMON WITH PROGRAM (S):**O01**
PAPER CODE:

Lectures: **4** Hrs. per week
Practical: **4** Hrs. per week

SCHEME OF STUDIES

Sr.	TOPICS	THEORY (HRS.)	PRACTICAL (HRS.)	TOTAL (HRS)
1.	NUMBER SYSTEM & BINARY CODES	10	2	12
2.	BOOLEAN ALGEBRA & LOGIC GATES	10	10	20
3.	LOGIC FAMILIES	6	6	12
4.	COMBINATIONAL LOGIC	6	12	18
5.	SEQUENTIAL LOGIC CIRCUITS	10	10	20
6.	A/D &D/A CONVERTER	4	10	14
7.	PROGRAMMING LOGIC DEVICES	6	4	10
8.	MEMORIES	8	6	14
	TOTAL	60	60	120

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

DIPLOMA IN ELECTRONICS AND TELECOMMUNICATION ENGINEERING

SEMESTER: **THIRD** SCHEME: **Jul.08**
COURSE CODE: **305** COMMON WITH PROGRAM (S):**O01**
NAME OF COURSE: **DIGITAL ELECTRONICS** PAPER CODE:

Lectures: **4** Hrs. per week

COURSE CONTENTS

Sr.	Course Contents
01.	**Number System and Binary Codes** - Binary, Hexadecimal, Octal, Decimal and their inter conversion - I's complement, 2's complement numbers, 9's complement & 10's complement - Introduction to Binary codes, Weighted, Non Weighted codes, Excess 3 code, Grey code, BCD code, Hamming code
02	**Boolean Algebra & Logic Gates** - Introduction to Boolean Algebra - Law of Boolean Algebra, - De Morgan's theorem, - Simplification of Boolean functions with Boolean laws, - Karnaugh Map method - simplification of Boolean equation using K-Map(up to four variables)
03.	**Logic Families** - Introduction to logic families - DTL, ECL,TTL, C-MOS and their comparison on the basic of their characteristics. - Familiarization of ICs related to digital circuits like 74 series,50 series
04.	**Combination Logic** - Half adder, - Full Adder, - Half Subtractor, - Full Substractor, - Binary Adder, - Binary Substractor, - Encoder, - Decoder, - Multiplexer, - Demultiplexer

Sr.	Course Contents
05.	**Sequential Logic Circuits** - Definition of Sequential circuits, - Definition of Latch & Flip-Flop and their differences. - RS Flip-Flop, JK Flip-Flop, D Flip-Flop, JK Master-Slave Flip-Flop with their timing diagrams and truth tables. - Definition of Register, Shift Register, Buffer Register with their timing diagrams and truth tables. - Definition of Counters, Synchronous, Asynchronous, Up-Down Counter, Ring Counter.
06.	**A/D & D/A Converter** - Introduction to A to D and D to A converter, - Successive Approximation method and Ladder N/W method for A/D & D/A conversion.
07.	**Programming Logic Devices** Description of programming logic devices: PAL,PLA, GALs, FPLA, PLD, CPLD, FPGA.
08.	**Memories** - Introduction to memories. - Types of memories: Primary & Secondary. - Primary memories : RAM and their types, ROM and their types. - Flash memories - Secondary memories : Floppy disk, Hard disk, CD-ROM, Blue Ray Disc.

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SEMESTER: **THIRD** SCHEME: **Jul.08**
COURSE CODE: **305** COMMON WITH PROGRAM (S):**O01**
NAME OF COURSE: **DIGITAL ELECTRONICS** PAPER CODE:

Practical: **4** Hrs. per week

LIST OF EXPERIMENTS

01. Study of Logic Gates- AND, OR, NOT, X-OR, X-NOR.
02. Study of Universal Gates-NAND, NOR.
03. Implementation of Basic Gates with the help of Universal gates
04. Study of BCD to Grey code Conversion.
05. Implementation of De Morgan's Theorem.
06. Study of combinational Logic. Half Adder, Full Adder, Half Substractor, Full Substractor, Encoder, Decoder, Multiplexer, Demultiplexer.
07. Study of Comparator.
08. Study of latch & RS flip flop.
09. Study of of D flip flop, JK-flip flop, JK master slave flip flop.
10. Study of digital troubleshooting with:
    a. Logic Prob
    b. Current Tracer,
    c. Logic Pulsar
    d. Logic Chip
    e. Logic Comparator
    f. Logic Analyzer

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SEMESTER: **THIRD**
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NAME OF COURSE: **DIGITAL ELECTRONICS**

SCHEME: **Jul.08**
COMMON WITH PROGRAM (S):**O01**
PAPER CODE:

REFERENCES

1. Digital Systems by Ronald Tocci
2. Digital Electronics by Malvino-Leach
3. Digital Fundamentals by Thomas L.Floyd
4. LM on Digital Electronics by NTTF Electronics Centre, Bangalore
5. Digital Electronics by Gothman
6. Digital Electronics by Malvino-Brown
7. Digital circuits by Ananth Kumar
8. Digital Design by Morris Mano

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SEMESTER: **THIRD** SCHEME: **Jul.08**
COURSE CODE: **306** COMMON WITH PROGRAM (S):**O01**
NAME OF COURSE: **PROFESSIONAL ACTIVITIES**

Practical: **2** Hrs. per week

RATIONALE

Professional Activities is not a descriptive course, as per conventional norms; therefore specific content for this course cannot be prescribed. It is a group of open-ended activities; where in variety of tasks are to be performed, to achieve objectives. However general guidelines for achieving the target and procedure for its assessment are given under the course content.

As the student has to practice this course in all the six semesters, the guidelines given therein are common and applicable to each semester.

OBJECTIVES:

To allow for professional development of students as per the demand of engineering profession.
To provide time for organization of student chapter activities of professional bodies) i.e. Institute of engineers, ISTE or Computer Society of India etc.)
TO allow for development of abilities in students for leadership and public speaking through organization of student's seminar etc.
To provide time for organization of guest lectures by expert engineers/eminent professionals of industry.
To provide time for organization of technical quiz or group discussion or any other group activity.
To provide time for visiting library or using Internet.
To provide time for group discussion or solving case studies.
To provide time for personality development of students.
To provide time for working for social cause like awareness for environmental and ecology etc.

DETAILED INSTRUCTIONS TO CONDUCT PROFESSIONAL ACTIVITIES:

A. Study hours, if possible should be given greater time slot with a minimum of two hrs/week to a maximum of four hrs/week.
B. This course should be evaluated on the basis of grades and mark sheet of students, should have a separate mention of the grade awarded. There will be no pass/fail in professional activities (PA).
C. Following grade scale of evaluation of performance in PA has been established.

Grades	Level of performance
A	Excellent
B	Good
C	Fair
D	Average
E	Below Expectations

D. Grades once obtained in a particular examination shall become final and no chance of improvement in grades will be given to the students.
E. Assessment of performance in PA is to be done internally by the Institution, twice in a Semester/Term through a simultaneous evaluation of the candidate by a group of three teachers, of the deptt. Concerned. Group of teachers will jointly award the grade to candidate in the assessment. Best of the grades obtained by the student in these two assessments shall be finally taken on the mark sheet of the respective Semester/Term.

   Candidate abstaining from the prescribed course work and/or assessment planned at the Institute shall be marked ABSENT in the mark sheet, instead of any grade.
F. While awarding the grades for performance in PA, examining teacher should reach the final consensus based on the attendance, punctuality, interest, presentation skills in seminar on the topic assigned (collection of relevant data, observations, analysis, findings/conclusion) and its written report, awareness of latest developments in the chosen programme of study.
G. Institution shall maintain the record of grades awarded to all the students in PA for a period of 1 year.
H. It shall be mandatory for students to submit a compendium for his PA in the form of a Journal.
I. Compendium shall contain following:
   1. Record of written quiz.
   2. Report/write up of seminar presented
   3. Abstract of the guest lectures arranged in the Institution.
   4. Topic and outcome of the group discussion held.
   5. Report on the problems solved through case studies.

6. Report on social awareness camps(organized for social and environmental prevention).
7. Report on student chapter activities of professional bodies like ISTE, IE (India), CSI etc.

J. PA is not a descriptive course to be taught in the classroom by a particular teacher. Various activities involved in the achievement of objectives of this course should be distributed to a number of teachers so that the talent and creativity of group of teacher's benefit the treatment of the course content.

These activities should preferably be conducted in English language to maintain continuity and provide reinforcement to skill development.

Small groups shall be formed like in tutorials, group discussion, case studies, seminar, project methods, roll play and simulation to make the development of personality affective.

Treatment of PA demands special efforts, attention, close co-operation and creative instinct on the part of teachers of department concerned. Since this course is totally learner centered, many of the activities planned under this course shall come out from the useful interaction of student, among themselves and with the teachers. The guide teacher/s shall best act as a facilitator of these creative hunts/ exercises, which unfold many of the hidden talents of the students or bring out greater amount of confidence in them, to execute certain activity.