MAHARASHTRA STATE BOARD OF TECHNICAL EDUCATION, MUMBAI

TEACHING AND EXAMINATION SCHEME FOR POST S.S.C. DIPLOMA COURSES

COURSE NAME : ELECTRONICS ENGINEERING GROUP

COURSE CODE : EJ/EN/ET/EX/IS/IC/DE/IE/MU/IU/ED/EI

DURATION OF COURSE : 6 SEMESTERS for EJ/EN/ET/EX/IS/IC/DE/IE/MU (8 SEMESTERS for IU/ED/EI) WITH EFFECT FROM 2012-13

SEMESTER : THIRD **DURATION : 16 WEEKS**

FULL TIME / PART TIME : FULL TIME **SCHEME : G**

SR. NO.	SUBJECT TITLE	Abbre viation	SUB CODE	TEACHING SCHEME			EXAMINATION SCHEME										SW (17300)
							PAPER HRS.	TH (1)		PR (4)		OR (8)		TW (9)			
				TH	TU	PR		Max	Min	Max	Min	Max	Min	Max	Min		
1	Applied Mathematics $	AMS	17301	03	--	--	03	100	40	--	--	--	--	--	--		
2	Electronic Instruments & Measurements	EIM	17317	03	--	02	03	100	40	25#	10	--	--	25@	10		
3	Electrical Engineering β	EEN	17318	03	--	02	03	100	40	--	--	--	--	25@	10		
4	Electronics Devices and Circuits β	EDC	17319	04	--	04	03	100	40	25#	10	--	--	25@	10		50
5	Principles of Digital Techniques β	PDT	17320	03	--	02	03	100	40	25#	10	--	--	25@	10		
6	Programming in C β	PIC	17020	01	--	02	--	--	--	--	--	--	--	25@	10		
7	Professional Practices-I β	PPO	17021	--	--	03	--	--	--	--	--	--	--	50@	20		
			Total	**17**	**--**	**15**	**--**	**500**	**--**	**75**	**--**	**--**	**--**	**175**	**--**		**50**

Student Contact Hours Per Week: **32 Hrs.**

THEORY AND PRACTICAL PERIODS OF 60 MINUTES EACH.

Total Marks **: 800**

@ - Internal Assessment, # - External Assessment, No Theory Examination, $ - Common to all branches, β - Common to EV

Abbreviations: TH-Theory, TU- Tutorial, PR-Practical, OR-Oral, TW- Term Work, SW- Sessional Work.

- Conduct two class tests each of 25 marks for each theory subject. Sum of the total test marks of all subject are to be converted out of 50 marks as sessional work (SW).
- Progressive evaluation is to be done by subject teacher as per the prevailing curriculum implementation and assessment norms.
- Code number for TH, PR, OR, TW and SW are to be given as suffix 1, 4, 8, 9 respectively to the subject code.

Course Name : All Branches of Diploma in Engineering & Technology

Course Code : AE/CE/CH/CM/CO/CR/CS/CW/DE/EE/EP/IF/EJ/EN/ET/EV/EX/IC/IE/IS/ ME/MU/PG/PT/PS/CD/CV/ED/EI/FE/IU/MH/MI

Semester : Third

Subject Title : Applied Mathematics

Subject Code : 17301

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
03	--	--	03	100	--	--	--	100

NOTE:

- **Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.**
- **Total of tests marks for all theory subjects are to be converted out of 50 and to be entered in mark sheet under the head Sessional Work (SW).**

Rationale:

Applied mathematics is designed for its applications in engineering and technology. It includes the topics integration, differential equation, probability distribution. The connection between applied mathematics and its applications in real life can be understood and appreciated.

Derivatives are useful to find slope of the curve, maxima and minima of function, radius of curvature. Integral calculus helps in finding the area. In analog to digital converter and modulation system integration is important. Differential equation is used in finding curve. Probability is used in Metrology and quality control.

The fundamentals of this topic are directly useful in understanding engineering applications in various fields.

General Objectives:

Students will be able to:

1. Apply derivatives to find slope, maxima, minima and radius of curvature.
2. Apply integral calculus to solve different engineering problems.
3. Apply the concept of integration for finding area.
4. Apply differential equation for solving problems in different engineering fields.
5. Apply the knowledge of probability to solve the examples related to the production process.

Learning Structure:

Applications

Apply the principles of mathematics to solve examples in all branches of Engineering Diploma.

Procedure

Solving problems of tangent, normal. Finding maxima, minima and radius of curvature	Solving problems on methods of integration and its properties. Finding area.	Solving examples of differential equations of first order and first degree.	Solving different examples on binomial, poisson and normal distribution

Principle

Methods of finding slope, curvature, maxima and minima	Methods of finding integration, definite integration and its properties	Methods of differential equations of first order and first degree	Formulae for binomial, normal, and poisson distribution

Concept

Geometrical meaning of derivatives, increasing and decreasing functions	Integration of standard functions. Rules of integration, integration by parts, partial fractions	Order and degree of differential equation. Formation of differential equation	Probability of repeated trails of random experiments

Facts

First order and second order derivatives	Derivatives, notation of integration, definition of integration	Integration, definition of differential equation	Permutation , Combination, probability of an event

Theory:

Topic and Contents	Hours	Marks
Topic-1 Applications of Derivative **Specific objectives :** ➢ Find slope, curvature, maximum and minimum value of functions related to different engineering applications. • Examples for finding slope , equations of tangent and normal to the curve • Maxima and minima. • Radius of curvature.	06	16
Topic-2 Integral Calculus		
2.1 Integration ---------- 20 **Specific objectives :** ➢ Integrate function using different method. • Definition of integration as anti derivative, rules of integration. • Integration of standard functions • Methods of integration Integration by substitution. Integration by partial fractions. Integration by parts and generalized rule by parts.	14	44
2.2 Definite Integrals ---------- 16 **Specific objectives :** ➢ Solve problems on definite integrals using the properties. • Definite integral- Definition, examples. • Properties of definite integrals without proof and simple examples.	08	
2.3 Application of Definite Integrals ----------08 **Specific objectives :** ➢ Find area. 1. Area under a curve. 2. Area between two curves.	04	
Topic 3 - Differential Equation.		
3.1 Differential equation **Specific objectives :** ➢ Solve the differential equation of first order and first degree ➢ Solve different engineering problems using differential equation • Differential equation- Definition, order and degree of a differential equation. Formation of differential equation containing single constant. • Solution of differential equation of first order and first degree for following types Variable separable form, Equation reducible to variable separable form. Linear differential equation. Homogeneous differential equation. Exact differential equation.	10	20

Topic 4 - Probability		
4.1 Probability **Specific objectives : ---------- 08** ➢ Solve different engineering problems related to probability process. • Definition of random experiment, sample space, event, occurrence of event and types of event (impossible, mutually exclusive, exhaustive, equally likely) • Definition of probability, addition and multiplication theorems of probability.	02	20
4.2 Probability Distribution ---------- 12 • Binomial distribution • Poisson's Distribution • Normal distribution	04	
Total	**48**	**100**

Learning Resources:

1) **Books:**

Sr. No	Title	Authors	Publication
1	Mathematic for Polytechnic	S. P. Deshpande	Pune Vidyarthi Girha Prakashan' Pune
2	Calculus : Single Variable	Robert. T. Smith	Tata McGraw Hill
3	Higher Engineering mathematics	B. V Ramana	Tata McGraw Hill
4	Higher Engineering mathematics	H. K. Dass	S .Chand Publication
5	Higher Engineering Mathematics	B. S. Grewal	Khanna Publication, New Delhi
6	Applied Mathematics	P. N. Wartikar	Pune Vidyarthi Griha Prakashan, pune

2) **Websites :**

i) www.khan academy

Course Name : Electronics Engineering Group.

Course Code : DE/ED/EI/EJ/EN/ET/EX/IC/IE/IS/IU/MU

Semester : Third

Subject Title : Electronics Instruments and Measurements

Subject Code : 17317

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
03	--	02	03	100	25 #	--	25@	150

NOTE:

- **Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.**
- **Total of tests marks for all theory subjects are to be converted out of 50 and to be entered in mark sheet under the head Sessional Work. (SW)**

Rationale:

Instrumentation is an emerging field used in data detection, acquisition, analysis and control in industrial applications. Analog and digital instruments are mainly used to determine different process parameters. These instruments present the desired information in visual indication either in analog or digital form.

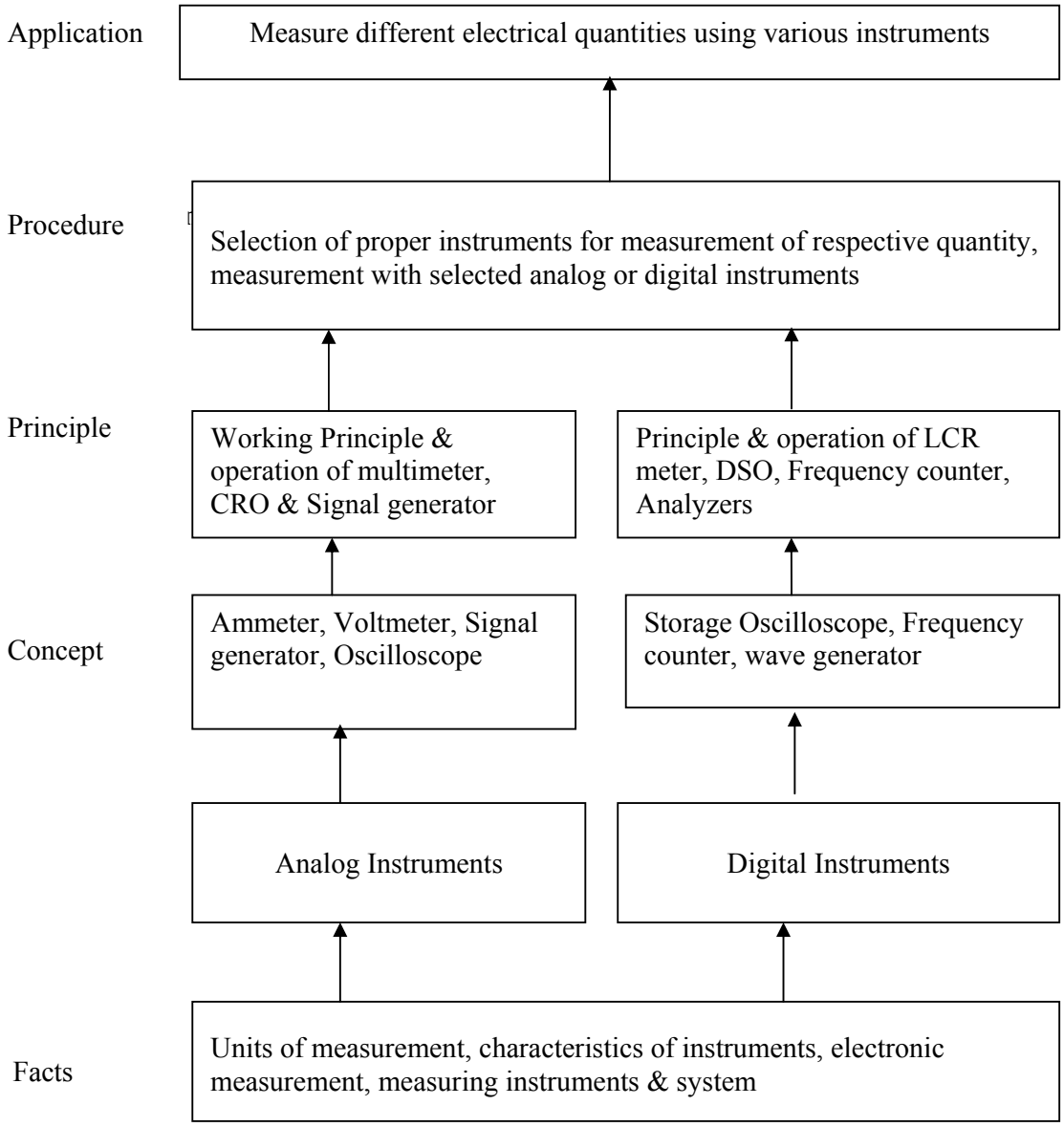
This subject presumes that the students are familiar with basic utilization of measuring instruments. The era of this subject consists of the information about concepts, principles and procedures of analog and digital electronic measuring instruments and measuring techniques.

General Objectives:

The Students will be able to:

1. Understand the principle & operation of different measuring instruments.
2. Select the instrument for the measurement of specific electrical parameter.
3. Understand the procedure for fault finding in electronic systems.

Learning Structure:



Theory:

Topics and Contents	Hours	Marks
Topic 1: Basics of Measurement: **Specific Objectives:** ➢ **Define measurement and instrument.** ➢ **Classify various instruments.** **Contents** • Classification of Instruments: Absolute , Secondary Instruments • Definitions of Static characteristics of Instruments: Accuracy, Precision, Sensitivity, Resolution, Static error, Reproducibility, Drift, Dead Zone • Definitions of dynamic characteristics of Instruments: Speed of response, Lag, fidelity, Dynamic error • Types of Errors- Gross, Systemic, Random • Units of measurement of fundamental quantity • Definition of Standards and their classification: International Primary Secondary • Calibration: Definition, Need of calibration	06	12
Topic 2: Analog DC and AC Meters ➢ **Draw the constructional diagram of PMMC meter.** ➢ **State the working principles of different types of DC/AC Voltmeter/ Ammeter and list their specifications.** ➢ **Describe the working of analog multimeter** **Contents** • Classification of analog ammeter and voltmeter • Working principle and construction of PMMC instruments • Analog DC Ammeter: Shunt resistor type, Ayrton Shunt type • Analog DC Voltmeter: Multiplier voltmeter • Derivations of deflecting torque of PMMC instruments • Derivation for calculation of shunt and series resistance • Multirange voltmeter: Voltmeter sensitivity, loading effect. • Analog AC Voltmeter (No derivation)- Half Wave rectifier type, Full wave rectifier type, Multirange type • Analog AC Ammeter • Analog multimeter: Electrical circuit diagram, operation	10	24
Topic 3: Digital Meters: ➢ **Draw block diagram and describe operation of different digital meters.** ➢ **State the applications of digital meters** **Contents** • Concepts of ADC & DAC (Review) (No marks) • Advantages and Disadvantages of Digital Instruments and comparison with analog instruments • Block diagram, operation and applications of Digital Frequency meter Digital Voltmeter DMM	12	20

LCR –Q meter		
Topic 4 : Oscilloscope: ➢ **Draw the basic block diagram and describe the function of each block of CRO.** ➢ **List and describe different applications of CRO.** ➢ **Draw the basic block diagram and describe the function of each block of DSO.** **Contents** • CRO: Basic Block diagram and function of each block • CRT: Construction and working • Vertical Deflection System –Block diagram and operation • Horizontal deflection system – Block diagram and operation • Function of delay line • Explanation of waveform generation • Applications of CRO: Time & frequency measurement Voltage measurement Lissagous patterns for Phase and Frequency measurement • Concept, block diagram and Operation of: Single beam dual trace & Dual beam Dual Trace CRO • Block diagram, operation and applications of digital storage oscilloscope (DSO)	12	24
Topic 5: Signal generator and Wave Analyzer: ➢ **Draw block diagram of signal generator and waveform analyzer and their working** ➢ **Procedural steps for fault finding and removing in T.V. using pattern generator.** ➢ **Draw block diagram of harmonic distortion analyzer and describe its working.** **Contents** **5.1** Signal generators: 10 Marks • Definition and need of signal generator • Block diagram, operation and applications of : AF and RF type signal generator Function generator Square and Pulse generator Video pattern generator 5.2 Wave analyzers: 10 Marks • Definition and need of waveform analyzer • Block diagram, operation and applications of : Frequency selective wave analyzer Distortion factor meter Logic analyzer Spectrum analyzer	08	20
Total	**48**	**100**

Practical:
Skills to be developed:

Intellectual Skills:

- Selection of instruments based on applications
- Interpretation of results.

Motor Skills:

- Selection of proper instrument with respect to parameter and range
- Proper connections and interfacing
- Testing of basic electronic circuits using these instruments

List of Practicals:

(Attach a separate sheet in the Manual covering the specifications of instrument/ equipment studied)

1. Draw the block diagram of Function generator. Identify the blocks from circuit. Test and verify function outputs as per specifications.
2. Draw and label the front panel controls of Dual trace CRO. Measure frequency, voltage, phase difference, rise and fall time using CRO.
3. Measure frequency and phase difference of unknown signals with the help of Lissagous pattern by using CRO. Test different components and semiconductor devices using CRO.
4. Prepare the fault finding flow chart for Power supply, identify the major components/sections, trace circuit, Measure voltages.
5. Draw the layout of any one section of CRO trainer, check for Continuity and Fault finding.
6. Observe and draw the front panel controls of Digital Storage Oscilloscope and test and verify functionality of controls.
7. Draw different output patterns obtained from Pattern generator and use of these patterns to test the performance of different sections of T.V.
8. Draw front panel of Logic Analyzer and write functions of each.
9. Draw the front panel of Spectrum Analyzer and write functions of each
10. Draw layout of PA system and identify different connectors /sockets on front and rear panel, connect input and output devices and test PA system.

Learning Resources:
User's manuals of various instruments

1. **Books:**

Sr. No.	Author	Title	Publisher
01	A. D. Helfrick W. D. Cooper	Modern Electronic Instrumentation & Measurement Techniques	PHI Learning Pvt. Ltd. New Delhi.
02	Kalsi H.S.	Electronic Instrumentation	Tata McGraw Hill
03	A.K Sawhney	Electrical & Electronic Measurements & Instrumentation	Dhanpat Rai & Sons
04	S K Singh	Industrial Instrumentation and Control	Tata McGraw Hill Education Private Limited, New Delhi

2. **CD/ PPTs Etc:**
   - www.proprofs.com/webschool
   - www.osvn.com

3. Websites
   - http://en.wikipedia.org/wiki/
   - www.youtube.com/ "here type name of instrument"
   - www.controlnet.com

Course Name : Electronics Engineering Group.

Course Code : DE/ED/EI/EJ/EN/ET/EV/EX/IC/IE/IS/IU/MU

Semester : Third

Subject Title : Electrical Engineering

Subject Code : 17318

Teaching and Examination Scheme

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
03	--	02	03	100	--	--	25@	125

NOTE:

- **Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.**
- **Total of tests marks for all theory subjects are to be converted out of 50 and to be entered in mark sheet under the head Sessional Work. (SW)**

Rationale:

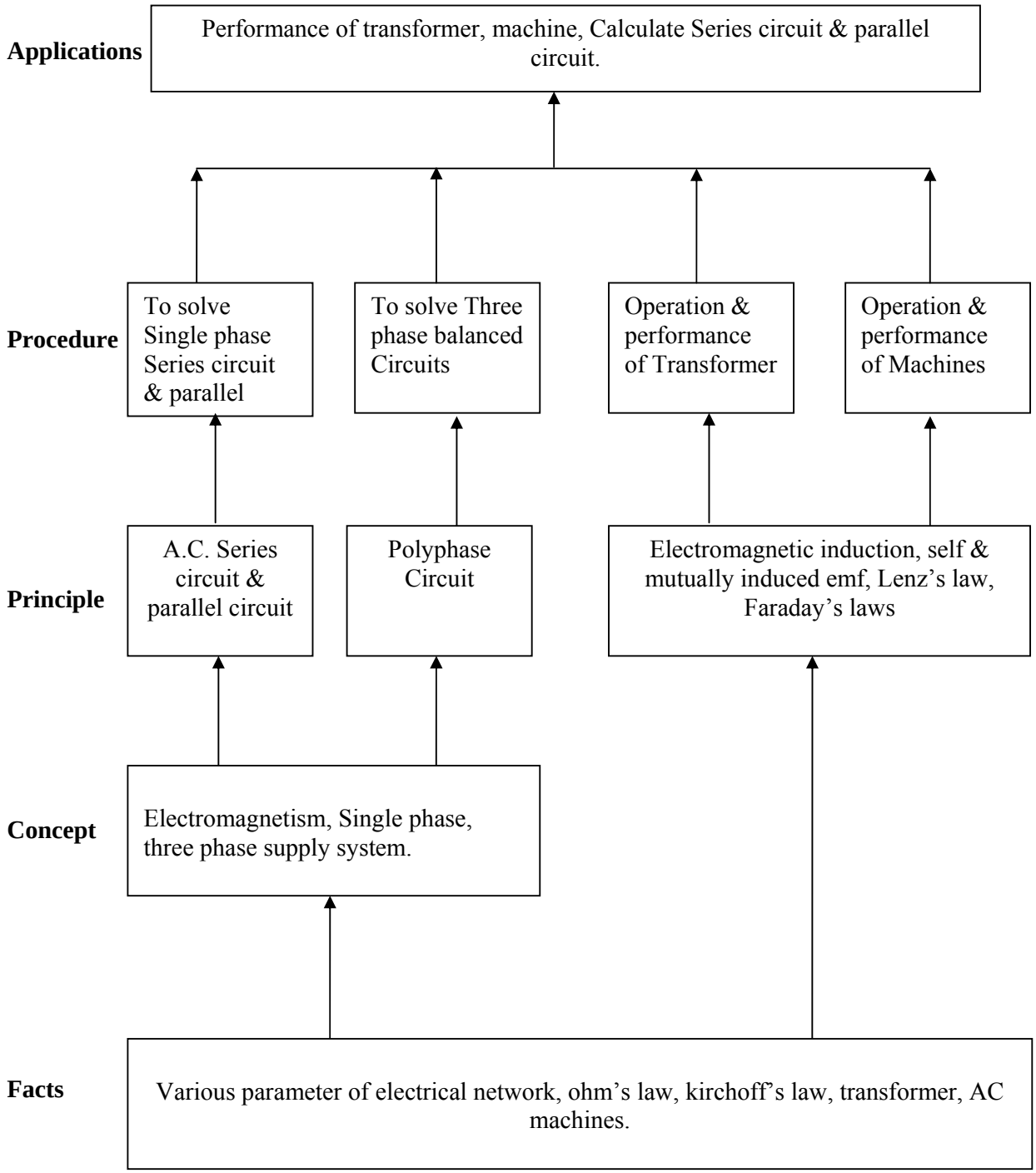
The basic concepts of electrical engineering are covered in the subject Elements of Electronics Engineering in the second semester. Electrical Engineering subject is designed for second year diploma course in Electronics Engineering group. The subject covers analysis of ac networks, working principles and characteristics of various drives. The subject includes various safety rules, methods and equipments used for system and operation. The basic concepts studied in this subject will be very useful for understanding of Power electronics and electronic drives of electronics course.

Objectives:

The students will be able to

1. Understand single phase and three phase AC circuits.
2. Realize concept of electromagnetic induction and apply it to static and rotating machines.
3. Understand characteristics of rotating machines.
4. Know the importance of safety and various safety methods in electrical engineering.

Learning Structure:



Content Theory:

Topic	Hours	Marks
Topic 1 : Electromagnetic Induction **Specific Objective :** ➢ **Realize the concept of self and mutually induced EMF.** ➢ **Interprete Faraday's laws of electromagnetic induction.** **Contents :** • Relation between Magnetism and Electricity. • Production of Induced E.M.F. and Current. • Faraday's Laws of Electromagnetic Induction. • Fleming's Right Hand Rule • Lenz's Law • Induced E.M.F: Self Induced E.M.F., Mutually Induced E.M.F., direction of Induced E.M.F. and Currents. • Energy Stored in Magnetic Field • (No Derivation and No Numerical)	04	08
Topic 2 : AC Fundamentals **Specific Objectives :** ➢ **Compare AC and DC system.** ➢ **Meaning of various terms related to AC system.** ➢ **Distinguish Various AC circuits and Understand rules and procedure to draw vector diagrams for the same.** ➢ **To realize concept of various resonance parameters and plot the graph.** **Contents :** • Difference between A.C. and D.C. quantity • Advantages of A.C. over D.C. • waveform of sinusoidal A.C. cycle • Generation of single phase A.C. by elementary alternator • Definitions: instantaneous value, cycle, amplitude, time period, frequency, angular frequency, R.M.S. value, Average value for sinusoidal waveform, Form factor, Peak factor (no derivation , simple numerical on it) • Phasor representation of sinusoidal A.C. quantity, review of phasor algebra, representation of A.C. quantity in rectangular. • Phase angle, phase difference, concept of lagging and leading by waveforms, mathematical equations and phasors. • Pure resistance, inductance and capacitance in A.C. circuit – waveforms, equations and phasor diagram (no derivation) • Concept of impedance and impedance triangle. • Power – active, reactive and apparent, power triangle. • Power factor and its significance. • R-L, R-C and R-L-C series circuit – phasor diagram, voltage and current equations. • Simple numerical on R-L, R-C and R-L-C series circuit. • Resonance in R-L-C series circuit: Conditions for resonance, graphical representation of resonance curve, resonant frequency, bandwidth and Q factor of series resonant circuit. • Resonance in parallel circuit, resonant frequency and Q factor, nature of resonance curve (No derivation &no numerical)	14	30

Topic 3: Polyphase Circuits **Specific Objectives :** ➢ **Compare three phase and single phase system.** ➢ **Define various terms related to three phase system.** ➢ **Interpret relations between line & phase values of current, voltage, power& power factor of star & delta connected systems.** **Contents :** • Advantages of 3 phase system over 1 phase system • Principle of 3-phase e.m.f. generation and its waveform • Concept of phase sequence • Balanced and unbalanced load • Relation between phase and line current, phase and line voltage in Star connected and Delta connected balanced system. (no derivation) • Calculation of current, power, power factor in a 3 phase balanced system (simple numerical)	06	12
Topic 4: Single Phase Transformer **Specific Objective :** ➢ **Draw construction diagram and explain working principle of single phase transformer.** ➢ **Interprete the relationship between various parameters of transformers.** ➢ **Compare autotransformer & two winding transformer** **Contents :** • Construction and working of transformer, classification , brief description of each part, its function (power transformer, audio frequency transformer, radio frequency transformer, isolating transformer, pulse transformer, intermediate frequency transformer) • Significance of Emf equation (no derivation) • Voltage ratio, current ratio and transformation ratio. • KVA rating of a transformer • Losses in a transformer • % efficiency & % regulation • Auto transformer – comparison with two winding transformer, • Applications • Simple numerical on this topic	06	16
Topic : 5 : Three Phase Induction Motor **Specific Objectives :** ➢ **Realize construction principle of working & types of three phase induction motor.** ➢ **Identify speed torque characteristics.** ➢ **Use of variations in voltage, current and frequency for speed control of motors.** **Contents:** • Construction and principle of working • Types – Squirrel cage and slip ring • Synchronous speed, slip speed, slip and rotor frequency (no numerical) • Torque – speed characteristics • Necessity of starter • Basic concepts of speed control method using thyristor. • Revesal of rotation of 3 phase induction motor.	08	16

i. Voltage time base generator, ii. Current time base generator, iii. Bootstrap time base generator, iv. Miller's sweep generator & its applications.		
Topic 6) Voltage Regulators: Specific Objectives: ➢ Appreciate the need for voltage regulator. ➢ Classify the types of voltage regulators. Contents: 6.1 Regulators: [08] • Need of regulators, • Concept of load & line regulations, • Zener diode as voltage regulator. • Transistorized regulators: series voltage regulator, shunt voltage regulator. 6.2 Linear Regulators: [08] • Block diagram of DC Regulated power supply and functions of each block. • Fixed and variable voltage regulators using IC's, LM 723, 78XX, 79XX,	10	16
Total	**64**	**100**

Intellectual Skills:

1. Interpretation of circuits.
2. Locate faults in circuits.
3. Interpret the waveforms.

Motor Skills:

1. Draw the circuits.
2. Test the components using multimeter and CRO.
3. Sketch circuit/block diagram.

List of Practical

1) Input output characteristics of common base configuration.
2) Input output characteristics of common emitter configuration.
3) Switching characteristics of BJT
4) Drain and gate characteristics of JFET.
5) Switching characteristics of MOSFET
6) V-I characteristics of UJT.
7) Frequency response of single stage common emitter amplifier, determine gain and BW.
8) Frequency response of two stage RC coupled amplifier using BJT.
9) Frequency response of single tuned amplifier of BJT& determine tuned frequency and BW.
10) Frequency response and BW of amplifier without & with negative voltage series feedback
11) Draw input and output wave forms of class B push pull amplifier and determine efficiency.
12) Test and verify oscillation frequency of RC phase shift oscillator.
13) Determine Frequency of saw tooth oscillator using UJT and verify with actual value.
14) Determine T-on, T-off, duty cycle of Miller's sweep generator
15) Test & verify zener as regulator.

16) Determine the line and load regulation of series voltage regulator
17) Draw characteristics (Load and Line regulation) of fixed regulator circuit using IC's78xx.
18) Build dual voltage regulator & test unregulated input & regulated output voltage.
19) Draw characteristics for high voltage regulator using LM IC 723.

Learning Resources:
1. Books:

Sr. No.	Title	Author	Publisher
01	Applied Electronics	R.S. Sedha	
02	Electronics Devices and Circuits	Allen Mottershead	PHI(India), New Delhi
03	Electronics Circuit and Circuit Theory	Robert L.Boylestead Louis Neshelsky	Pearson
04	Electronics Device and Circuit	P.Ramesh Babu	Scitech
05	Electronic Devices and Circuits	David A. Bell	Oxford

2. Websites
1. www.nptel.com

Course Name : Electronics Engineering Group

Course Code : EJ/EN/ET/EX/EV/IC/IE/IS/MU/DE/ED/EI/IU

Semester : Third

Subject Title : Principles of Digital Techniques

Subject Code : 17320

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
03	--	02	03	100	25#	--	25@	150

NOTE:

- **Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.**
- **Total of tests marks for all theory subjects are to be converted out of 50 and to be entered in mark sheet under the head Sessional Work. (SW)**

Rationale:

Digital Electronics plays important role in advancements of microelectronics design, manufacturing, computer technology and information systems that have caused the rapid increase in the use of digital circuits. Hence in every application digital technique is the backbone. Digital electronics requires the background of discrete signaling and logical functions, semiconductor switch theory. Hence this subject is introduced for students to sharpen their skills of digital implementation by learning the concept of number systems, logic gates, combinational and sequential logic circuits, memory, counter and shift register.

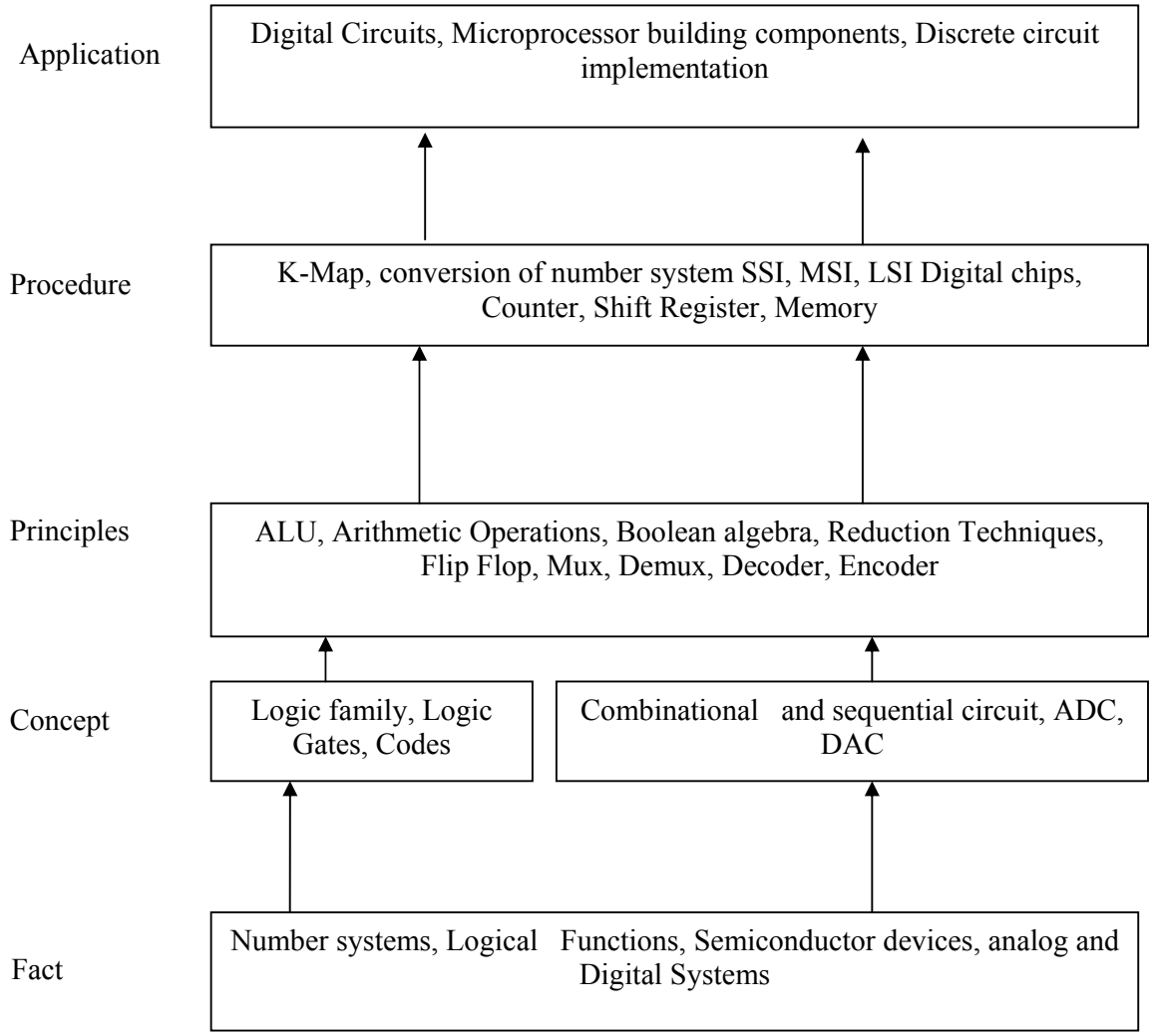
General Objectives:

The student will be able to

The subject student will be able to

1. Understand basic digital circuits.
2. Understand conversion of number systems.
3. Implement combinational and sequential circuits.
4. Understand logic families, data converters

Learning Structure:



Theory:

Topics and Contents	Hours	Marks
Topic 1: Number System **Specific Objectives:** ➢ Make conversion from one Number system to another. ➢ Perform simple arithmetic operations. **Contents :** **1.1 Introduction to digital signal, Advantages of Digital System over analog systems, (8 Marks)** • Number Systems: Different types of number systems(Binary, Octal, Hexadecimal), conversion of number systems, • Binary arithmetic: Addition, Subtraction, Multiplication, Division. • Subtraction using 1's complement and 2's complement **1.2 Codes : (4 Marks)** • Codes -BCD, Gray Code, Excess-3, ASCII code • BCD addition, BCD subtraction using 9's and 10' complement **(Numericals based on above topic)**.	04	12
Topic 2: Logic gates and introduction to logic families ➢ Define Logic gates & logic families. ➢ Develop logic for simple digital circuit **Contents:** **2.1 Logic gates: (8 Marks)** • Basic gates and Derived Gates • NAND and NOR as Universal gates. • Boolean Algebra: Fundamentals of Boolean laws. • Duality Theorem, De Morgan's theorems. (numerical based on simplification of logic equations) **2.2 Logic Families: : (8 Marks)** • Characteristics of logic families & Comparison between different logic families. • Logic families such as TTL, CMOS, ECL. • TTL NAND gate – Totem pole output, open collector. • CMOS Inverter	06	16
Topic 3 : Combinational Logic Circuits • Realize various digital Circuits using K-map. • Realize various combinational logic circuits. • Use peripheral devices like buffer. **Contents:** **3.1 Introduction: (8 Marks)** • Standard representation of canonical forms (SOP & POS), Maxterm & Minterm), conversion between SOP and POS forms. • K-map reduction technique upto 4 variables. (SOP & POS form), Design of half and full Adder, half and Full Subtractor using K-map, • Code Converter using K-map: Gray to Binary, Binary to Gray Code Converter (up to 4-bit), • IC 7447 as BCD to 7 segment decoder – driver	14	22

• IC 7483 as Adder & Subtractor, 1 digit BCD adder. • Block Schematic of ALU IC 74181 and IC 74381. **3.2 Necessity, Applications and realization of following: (14 Marks)** • Multiplexers(MUX): MUX tree • Demultiplexers (DEMUX): Demux tree, Demux as decoder • Study of IC 74151, IC 74155 • Priority Encoder 8:3, Decimal to BCD Encoder • Tristate logic, Unidirectional & bidirectional buffer ICs: IC 74244 and IC 74245		

Topic 4: Sequential Logic Circuit
• Distinguish various Flip flops, counters and shift registers.
• Implement asynchronous counter.
• Apply IC 7490, 7495 to design counter.
Contents:
4.1 Sequential circuits: (12 Marks)
• Comparison between Combinational & Sequential circuits,
• One bit memory cell - RS latch – using NAND & NOR.
• Triggering Methods (Edge and level trigger)
• Flip Flops - S R Flip flop, Clocked SR flip flop with preset and clear, Drawbacks of SR Flip flop
• Clocked JK Flip flop with preset & clear, Race around condition in JK flip flop, Master slave JK flip flop.
• D and T type flip flop.
• Excitation table of flip flops.
• Block schematic and function table of IC-7474, 7475,74373
4.2 Study of Counters : (8 Marks)
• Counter: Modulus of counter, their types as Asynchronous and Synchronous counter.
• Asynchronous counter: (Ripple counter , 4 bit up/down Counter
• Synchronous counter: Excitation table of flip flops, implementation of 3 bit synchronous counter, its truth table and waveforms.
• Block schematic and waveform , IC 7490 as MOD-N Counter
4.3 Shift Register: (4 Marks)
• **logic diagram , Truth Table and waveforms of : 4-bit Shift** registers (SISO,SIPO, PISO,PIPO)
• 4 Bit Universal Shift register.
• Applications of Shift Register (Logic Diagram with waveforms) of:
  • Ring counter
  • Twisted ring counter
	12	24

Topic 5 : Data Convertors ➢ Identify operation of DAC and ADC. ➢ Use of IC 0800, 0809 in practical applications. **Contents:** **5.1 Introduction and Necessity of Code Convertors:** • DAC Types and comparison of Weighted resistor method, (Mathematical derivation) and R-2R Method (Mathematical derivation up to 3 variable), **5.2 ADC Types and their comparison**: Block Diagram and working of	06	16

following ADCs **:** **(08 Marks)** • Single slope ADC, Dual slope ADC, SAR ADC • IC PCF 8591 : 8 BIT ADC-DAC		
Topic 6: Memories ➢ Classify memories. ➢ Apply ICs 2716, 7481, 6116 in practical applications. **Contents:** 6.1 Principle of operation and classification of memory. • Organization of memories • RAM (Static, Dynamic), Volatile and Non-Volatile • ROM (PROM, EPROM, EEPROM) • Flash memory. • Comparison between EPROM and Flash **Study of memory ICs :** • Identification of IC number and their function of following ICs: IC 2716, IC 7481& IC 6116.	06	10
Total	**48**	**100**

Practicals:

Intellectual skills:

1) Identify different ICs of logic gates, combinational and sequential circuits and memories.
2) Distinguish and realize combinational and sequential circuits.
3) Verify standard T.T and test ICs.

Motor skills:

1) Make proper connections as per given circuit diagram.
2) Build, test and debug the digital circuit.
3) Observe result and proper handling of equipments.

List of Experiments:-

Sr. No	Title of Experiment
1	Verify the truth table of Basic logic gates using diode and transistor.
2	Verify De Morgan's Theorem
3	Verify NAND and NOR gate as universal logic gate.
4	Verify Truth Table of bi-directional buffer – IC 74245
5	Realize adder and subtractor.
6	Verify the operational features of ADC – IC 0809/IC 0808 and DAC – IC 0800.
7	Verify the operation of Multiplexer IC 74151 and Demultiplexer IC 74155.
8	Realize and verify RS flip flop using NAND gate and verify master slave JK Flip-Flop using IC 7476.
9	Implement 4 bit ripple counter
10	Implement 4 bit R-2R D/A converter.

Learning Resources:

1. Books:

Sr. No	Title	Author	Publisher
01	Digital Principles	Malvino Leach	Tata McGrew Hill (TMH)
02	Modern Digital Electronics	R.P. Jain	Tata McGrew Hill (TMH)
03			

Experiment No.2

- Demonstrate all possible formatting specifiers with there width and alignment options.
- Prepare salary statement and display on screen with proper formatting and alignments (Input name, basic salary, calculate various allowances such as DA, HRA, Conveyance and deductions such as income tax, Professional tax, provident fund and find net salary.

Experiment No.3 (Any one)

- Find greatest/ smallest of 3 numbers. (use if, if else, nested if)
- Display pass class, second-class, first class, distinction according to the marks entered. (use switch, if else-if else ladder)

Experiment No.4 (Any one)

- Display menu 1. Addition 2. Subtraction 3. Multiplication 4. Division and execute it using switch case.
- Write a program to calculate and print telephone bill or electricity bill.

Experiment No.5 (Any one)

- Display our College name twenty times on screen.
- Display all even numbers from 1-100.
- Perform addition of 1-100 numbers.
- Print ASCII tables of alphabets use continue statements.
- Print prime numbers from 1 to 100 use break statements

Experiment No.6 (Any one)

- Find smallest / largest number from array elements.
- Sort array elements in ascending / descending order.

Experiment No.7 (Any one)

- Enter elements for 3X3 matrix and display them.
- Calculate addition / subtraction of 2 dimensional matrix.
- Calculate multiplication of 2 dimensional matrix.

Experiment No.8 (Any one)

- Demonstrate output of standard library functions Strlen (), strcpy (), strcat (), strcmp ().
- Accept a string and arrange individual characters alphabetical order.
- Accept ten names of students and arrange them in alphabetical order

Experiment No.9 (Any one)

- Calculate area of circle using function.
- Calculate factorial of any given number using recursion.

Experiment No.10 (Any one)

- Demonstrate call by reference, call by value
- Maintain and manipulate student data using structure.

Experiment No.11 (Any one)

- Draw concentric circle with different radius and colors and give appropriate heading using fonts and styles
- Draw different geometric shapes and fill it with different fill patterns and give appropriate heading using fonts and styles

Experiment No.12 (Any one)

- Write a program to write and read text file
- Write a program to read numbers from file and print them in another file in ascending order.

Learning Recourses:

1. **Books:**

Sr. No.	Author	Name of the Book	Publisher
1	Balgurusamy	Programming in 'C'	Tata Mc-Graw Hill
2	Ashok N Kamthane	Programming in 'C'	Pearson
3	Kanetkar	Let's 'C'	BPB
4	Herbert Shildt	Complete reference C	Tata Mc-Graw Hill
5	Arpita Gopal	Magnifying 'C'	PHI Publications

2. **Websites:**
   - http://cplus.about.com/od/beginnerctutoriali/a/blctut.htm
   - http://computer.howstuffworks.com/c.htm
   - http://www.indiastudycenter.com/studyguides/sc/objtest/default.asp

Course Name : Electronics Engineering Group

Course Code : DE/ED/EI/EJ/EN/ET/EV/EX/IC/IE/IS/IU/MU

Semester : Third

Subject Title : Professional Practices - I

Subject Code : 17021

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
--	--	03	--	--	--	--	50@	50

Rationale:

Most of the diploma holders join industries. Due to globalization and competition in the industrial and service sectors the selection for the job is based on campus interviews or competitive tests.

While selecting candidates a normal practice adopted is to see general confidence, ability to communicate and attitude, in addition to basic technological concepts.

The purpose of introducing professional practices is to provide opportunity to students to undergo activities which will enable them to develop confidence. Industrial visits, expert lectures, seminars on technical topics and group discussion are planned in a semester so that there will be increased participation of students in learning process.

Objectives:

To develop the following skills:

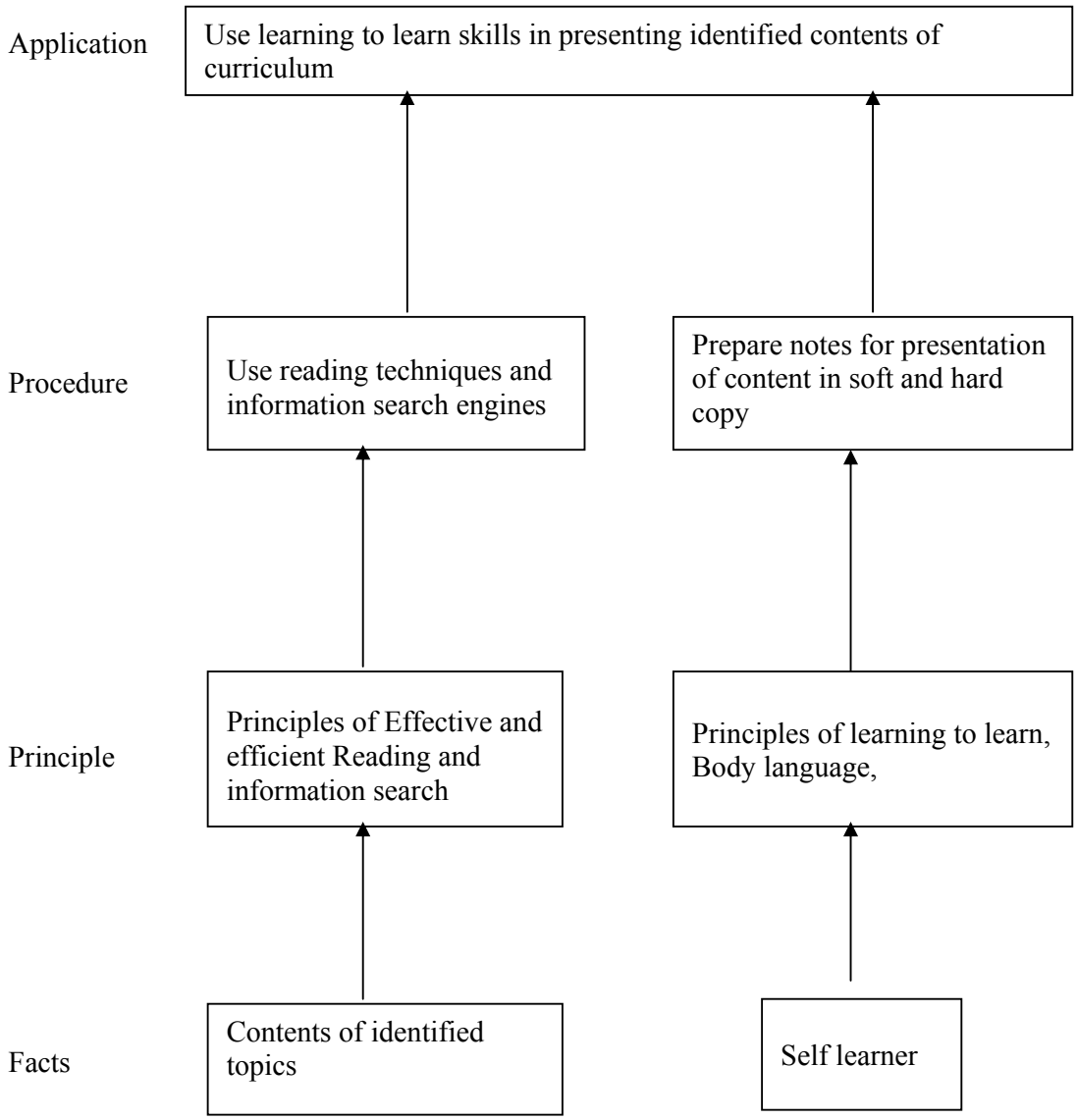
Intellectual Skills:

1) Acquire information from different sources.
2) Interpret the data acquired from different sources.
3) Prepare reports for given topic.

Motor Skills:

1) Present given topic in a seminar.
2) Interact with peers to share thoughts.
3) Prepare a report on industrial visit, expert lecture.

Learning Structure:



Contents:

Activity	Name of the Activity	Hours
1	**Field Visits** Structured field visits (minimum three) be arranged and report of the same should be submitted by the individual student, to form a part of the term work. The field visits may be arranged in the following areas / Industries. i) Power supply/UPS/SMPS/Inverter manufacturing unit ii) Electronics Instruments calibration laboratories iii) Electronic security systems iv) Radio station. v) Other related Industries.	16
2	**Lectures by Professional / Industrial Expert to be organized from the following areas (any four)** i) Alternative energy sources ii) E-learning iii) Management of E-Waste iv) Nanotechnology v) Any topic related to social awareness	08
3	**Seminar :** Any one seminar on the topics suggested below: Students (Group of 4 to 5 students) has to search / collect information about the topic through literature survey, visits and discussions with experts / concerned persons: Students will have to submit a report of about 10 pages and deliver a seminar for 10 minutes. i) Electronic rolling display ii) Electronic systems used in Multiplex iii) Electronic traffic control system iv) Any other suitable topic	16
4	**Market Survey:** A group of four students is expected to collect information from the market regarding specifications and cost of any three manufacturers for various instruments: CRO, Multimeter, UPS, DC Power supply, Function generator, Mobile handset, TV set of brand name, specifications, cost and applications.	08
	Total	**48**

Learning Resource

Sr. No	Content / Software / Books	Source	Remark
1	Printed Circuit Boards	Author - Walter C. Bosshart	Publisher:- Tata McGraw Hill
2	Troubleshooting Electronic Equipment	Author – R.S.Khandpur	Publisher:- Tata McGraw Hill
3	Express PCB	http://www.expresspcb.com/ExpressPCBHtm/Download.htm	Freeware
4	Express PCB, EAGLE, Free PCB, PCB123,	http://www.electronics-lab.com/downloads/pcb/index.html	Freeware
5	Press & Peel Pattern Transfer Technique	http://www.techniks.com/how_to.htm	Freeware
6	Video Clip for PCB Manufacturing	http://www.youtube.com/watch?v=CiduYvjVq70	Freeware
7	Video Clip for PCB Manufacturing	http://www.youtube.com/watch?v=8-WGaAmpfOU	Freeware
8	User Manuals of instruments	Manufacturer of Instruments	Freeware