w. e. f Academic Year 2011-12

STATE BOARD OF TECHNICAL EDUCATION, JHARKHAND

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

COURSE NAME : ELECTRONICS ENGINEERING GROUP

COURSE CODE : ET/EN/EX/EJ/IU/ED/EI

DURATION OF COURSE : 6 SEMESTERS **WITH EFFECT FROM 2011-12**

SEMESTER : FOURTH **DURATION : 16 WEEKS**

PATTERN : FULL TIME - SEMESTER

SR. NO.	SUBJECT TITLE	Abbreviation	SUB CODE	TEACHING SCHEME			EXAMINATION SCHEME								
				TH	TU	PR	PAPER HRS	TH (01)		PR (04)		OR (08)		TW (09)		SW (16004)
								MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	
1	Applied Electronics	AEL	12106	03	--	02	3	100	40	50#	20	--	--	25@	10	50
2	Linear Integrated Circuits.	LIC	12115	03	--	02	3	100	40	--	--	25@	10	--	--	
3	Digital Techniques & Micro Processor	DTM	12116	03	--	02	3	100	40	50@	20	--	--	--	--	
4	Electronic Instruments & Measurement	EIM	12117	03	--	02	3	100	40	--	--	--	--	25@	10	
5	Analog Communication	ACO	12118	03	--	02	3	100	40	--	--	--	--	25@	10	
6	Visual Basic	VBS	12119	01	--	02	--	--	--	50@	20	--	--	--	--	
7	Development of Life Skills-II	DLS	12041	01	--	02	--	--	--	--	--	25#	10	25@	10	
8	Professional Practices-IV	PPR	12120	--	--	04	--	--	--	--	--	--	--	50@	20	
			TOTAL	**17**	**--**	**18**	--	**500**	**--**	**150**	**--**	**50**	**--**	**150**	**--**	**50**

Student Contact Hours Per Week: **35 Hrs.**

THEORY AND PRACTICAL PERIODS OF 60 MINUTES EACH.

Total Marks **: 900**

@ Internal Assessment, # External Assessment, [ ] No Theory Examination.

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

- Conduct two class tests each of 25 marks for each theory subject. Sum of the total test marks of all subjects is 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 and TW are to be given as suffix 1, 4, 8, 9 respectively to the subject code.

Course Name : Electrical and Electronics Engineering Group

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

Semester : Fourth

Subject Title : Applied Electronics

Subject Code : 12106

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS.	TH	PR	OR	TW	TOTAL
03	--	02	03	100	50#	--	25@	175

Rationale:

As a core technology subject, it intends to teach operating principle and application of electronic circuits and devices like amplifiers, oscillators, switching circuits, wave shaping circuits. The subject knowledge is required in Industrial electronics, Instrumentation and Communication system. Understanding of the subject will provide skill to the students for trouble shooting & testing of some of circuits & devices.

Objectives:

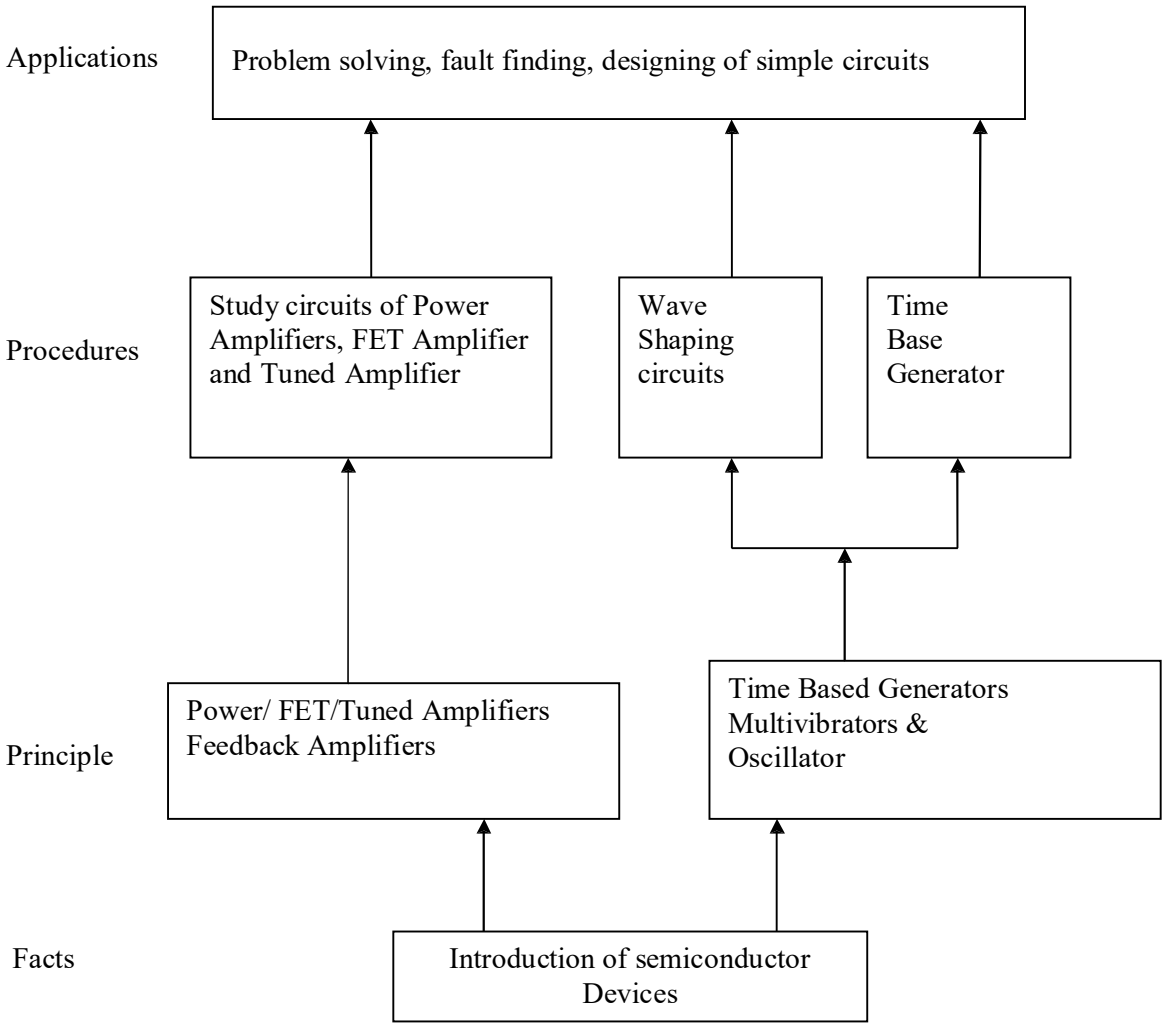
1] Classify various amplifiers & oscillator circuits based on their characteristics.

2] Classify different wave shaping circuits & multivibrators.

3] Configure regulated power supply using IC's.

4] Test and repair various devices.

Learning Structure:



Contents: Theory

Chapter	Name of the Topic	Hours	Marks
01	**AMPLIFIERS** **i) Power Amplifiers** Introduction, Classification – Class A, Class B, Class AB & Class C, efficiency of each. Single stage class A power amplifier: Circuit operation, input & output waveforms , graphical Analysis and efficiency of i] Transformer couple resistive load single stage power amplifier ii] Class A push pull amplifier iii] Class B push pull amplifier iv] Class AB push pull amplifier Concept of cross over distortion Advantages of push pull amplifier, collector power dissipation requirement & specifications of power transistor, need of heat sink. **ii) FET Amplifier** Biasing of FET: Source Self Bias, Drain to source Bias Application of FET as V V R Common Source Amplifier: Working & Applications Introduction to MOSFET:Types, Construction, Working & Applications **iii) Tuned Amplifiers** Introduction & necessity of tuned amplifier. Basic tuned circuits, series & parallel resonance in tuned circuits. Operating principle, circuit working, resonance frequency of single tuned, double tuned amplifiers.	**16**	**26**
02	**Feedback Amplifiers & oscillators** General theory of feedback: Types of feedback – negative & positive feedback. Types of negative feedback – voltage shunt, voltage series, current shunt & current series. Advantages of negative feedback on voltage gain, bandwidth, input impedance, output impedance, stability, noise, distortion in amplifiers. Introduction to oscillator , block diagram of sine wave oscillator , requirement of oscillation – Barkhausen criterion , operating principles of RC & LC oscillators RC oscillators – RC phase shift , Wien bridge LC oscillators – Colpitts , Hartley , Crystal oscillators Circuit diagram, equation for frequency of oscillation & frequency stability.	**10**	**22**

03	**Wave shaping circuits** Necessity of wave shaping circuits. Linear circuits – RC integrator & differentiator – input / output waveforms & frequency response. Non-linear circuits - Clipper, diode series & shunt , positive & negative biased & unbiased & combinational clipper. Clampers – positive & negative clampers	**06**	**16**
04	**Multivibrators** Transistor as switch. Definition & graphical representation of different time periods. Multivibrator classification, circuit working & frequency with specific application. MMV , AMV , BMV & Schmitt trigger	**06**	**16**
05	**Time base generator –** Voltage time base generator, exponential sweep generator UJT Relaxation Oscillator, negative resistance generator. working principle & operation . Current time base generator, bootstrap & miller sweep generator, applications in TV & CRO	**06**	**14**
06	**Trouble shooting & Testing** Need for trouble shooting , Important steps for testing Visible testing – Observing circuits for visible faults like broken component, open contacts etc. Active testing – Voltage analysis, Resistance analysis, signal analysis. Trouble shootings of multivibrators, phase shift oscillators, transistorised sweep generator, clipping & clamping circuits.	**04**	**06**
	Total	**48**	**100**

Practical:

Intellectual Skills:

1. To locate faults in circuits.
2. Interpret the waveforms.

Motor Skill:

1. Ability to Sketch circuit/block diagram.
2. Ability to interpret the circuit.

List of Practical:

1. Plot Frequency response of FET amplifier.
2. Plot Frequency response & bandwidth of negative feedback amplifier.
3. Study function of Colpitt's oscillator.
4. Study function of RC Phase shift oscillator.
5. Study function of RC integrator and differentiator.
6. Study function of Clipping and clamping circuits.
7. Study function of Astable Multivibrators.

8. Study function of Monostable Multivibrator.
9. Study function of Bistable Multivibrator.
10. Study function of UJT relaxation oscillator.

Learning Resources:
Books:

Sr. No	Author	Title	Publication
01	Paul Malvino	Electronic Principles	Tata McGraw-Hill
02	R.S.Sedha	Applied Electronics	S.Chand & Co.
03	Allen Mottershed	Electronics Devices & Circuits	Prantice Hall India LTD.
04	J.Millman and H.Taub	Pulse Digital & Switching Waveforms	Tata McGraw-Hill
05	G.K.Mittal and R.Vanvasai	Pulse & Digital Electronics	Khanna Publication

Course Name : Electronics Engineering Group

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

Semester : Fourth

Subject Title : Linear Integrated Circuits

Subject Code : 12115

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 SBTE.

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:

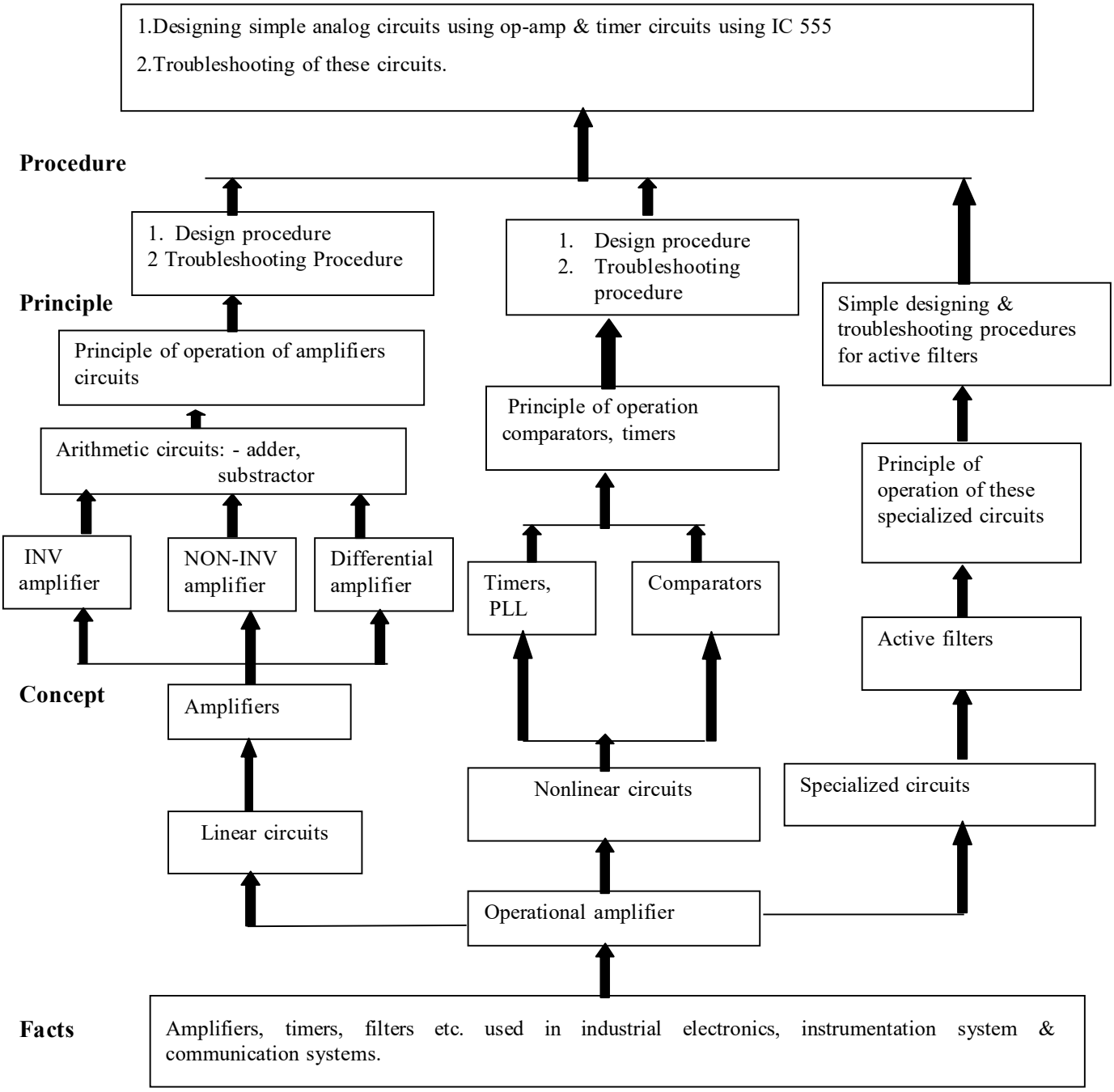
The physical world is inherently analog, indicating that there is always need for analog circuitry. Today the growth of any industry is depend upon electronics to a great extent. Integrated circuit is electronics. This subject acquaints students with general analog principles and design methodologies using practical devices & application.

It focus on process of learning about signal conditioning, signal generation, instrumentation, timing & control using various IC circuitry.

Objectives: the student will be able to:

1. Describe working principle of OPAMP and its application.
2. Define the Op-amp characteristics.
3. State features and advantages of integrated circuits.
4. Design electronic circuit using OPAMP for various mathematical operation.
5. Design electronic circuit using OPAMP for industrial application.
6. Design electronic circuit using timer IC's.
7. Analyze the response of frequency selective circuit such as PLL with respect to the incoming signal.

Learning Structure:



Contents: Theory

Chapter	Name of the Topic	Hours	Marks
01	**Introduction to Operational Amplifier (OPAMP):** 1.1 Importance Of Op-Amp 1.2 Block diagram (all stages) 1.3 Function of all stages (with the circuit such as balanced, unbalanced differential amplifiers with simple current source, level shifter and complementary push pull Amplifier). 1.4 Equivalent Circuit, Circuit Symbols And Terminals. 1.5 OPAMP IC's: 741 pin diagram and pin function. 1.6 Definitions of parameters of op-amp - Input offset voltage, Input offset current, Input bias current, differential input resistance, Input capacitance, Input voltage range, offset voltage adjustment, CMMR, SVRR, large signal voltage gain, supply voltages, supply current, output voltage swing, output resistance, slew rate, gain bandwidth product, output short circuit current. 1.7 Ideal op-amp: electrical characteristics. 1.8 Ideal voltage transfer curve.	**08**	**10**
02	**OPAMP basic circuits:** 2.1 Open loop and closed loop configuration of op-amp, its comparison. 2.2 Virtual ground concept 2.3 Open loop configuration – Inverting , Non-inverting 2.4 Close loop configuration – Inverting, non- inverting, differential amplifier, unity gain amplifier (voltage follower),inverter(sign changer) 2.5 Inverting & non-inverting configuration of Adders (summing amplifier, scaling Amplifier, averaging amplifier) 2.6 Substractor 2.7 Basic and Practical Integrator 2.8 Basic and Practical Differentiator 2.9 Basic concept of frequency compensation of op- amp and offset nulling. 2.10 Numerical based on designing of above circuit.	**08**	**18**

03	**Applications of OPAMP:** 3.1 Need for signal conditioning and signal processing. 3.2 Circuit diagram, operation, derivation of output voltage equation. advantages and applications of Instrumentation amplifier (using one two and three op-amps) 3.3 Pin diagram pin functions and specifications of IC AD 524, LM 324 3.4 Voltage to current converter(with floating load, with grounded load) 3.5 Current to voltage converter 3.6 Sample and hold circuit (IC LF 398 , Pin diagram specification and pin functions) 3.7 Logarithmic and antilogarithmic amplifiers (using Diodes) 3.8 Analog divider and analog multiplier 3.9 Concept of comparator: zero crossing detector, Schmitt trigger, window detector, phase detector, active peak detector, peak to peak detector 3.10 Comparators (IC LM 301, LM 310 ,710 Pin diagram specification and pin functions)	**14**	**30**
04	**Filters:** 4.1 Introduction to filters 4.2 Classification of filters 4.3 Concept of passive & active filters 4.4 Merits & demerits of active filters over passive filters 4.5 Ideal and actual characteristics, terms: - cut off frequency, pass band, stop band, center frequency, roll off rate, BW, Q-factor, first order & second order Butterworth filters 4.6 Low pass filter, high pass filter, band pass filter(wide band pass , narrow band pass filter) Band reject filter(wide band reject, narrow band reject filter), all pass filter 4.7 Numerical based on design of different filters.	**08**	**20**
05	**Timers:** 5.1 Introduction to timer IC 555. 5.2 Block diagram of IC 555 and its pin diagram & function of each pin. 5.3 Monostable multivibrator, astable multivibrator, Bistable multivibrator, Schmitt trigger, voltage controlled oscillator. 5.4 Concepts of different timer circuits used in industries: water level controller, Touch plate switch, frequency divider etc. 5.5 IC 556 pin diagram and specifications. 5.6 Designing of simple circuits and trouble shooting of these circuits 5.7 Numericals based on timers 5.8 Principle of operation, block diagram of PLL. 5.9 Applications of PLL as frequency multiplier, FM demodulator. 5.10 Pin diagram and pin functions of IC 565(PLL) and IC 566(VCO)	**10**	**22**
	Total	**48**	**100**

Practical:

Skills to be developed

Intellectual Skills:

1. Reading.
2. Sourcing of Web sites.

Motor Skill:

1. Testing.
2. Measurement.

List of Practical:

1 Measurement of parameters of IC 741 (such as CMRR , SVRR, offset adjustment)
2 To assemble inverting and non inverting amplifier and draw input output wave forms.
3 To assemble addition and subtraction of analog signal using OPAMP.
4 Observe output of active integrator for different types of input (sine and square)
5 Observe output of active differentiator for different types of input (sine and square)
6 Plot the graph of input and output for V to I converter and I to V converter
7 To assemble logarithmic and antilogarithmic amplifier and verify its output.
8 To assemble zero crossing detector and active peak detector.
9 To assemble and plot the output waveform for astable multivibrator, voltage control oscillator using IC 555.
10 To assemble and plot the output waveform for bistable multivibrator and schmitt trigger using IC 555.
11 Design monostable multivibrator using IC 555 and troublshoot.
12 Plot the frequency response of second order butterworth low pass filter.
13 Plot the frequency response of second order butterworth high pass filter.
14 Plot the frequency response of first order butterworth band pass filter/ band reject filter.

Learning Resources:
Books:

Sr. No.	Author	Title	Publisher
01	Sergio Franco	Design with OPAMP & analog integrated ckts	Tata McGraw-hill New delhi
02	G B Clayton	Operational Amplifiers	British library cataloguing in publication data
03	William d. Stanley	Operational Amplifier with Linear Integrated Circuits	Pearson Education
04	Ramakant A Gaikwad	Op-Amp & Linear Integrated Circuits	Prentice-hall of India New Delhi
05	Coughlin & Dirscoll	Operational amplifier & Linear Integrated circuits	Pearson Education
06	K.R. Botkar	Integrated Circuits	Khanna Publisher, New Delhi

Course Name : Electronics Engineering Group

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

Semester : Fourth

Subject Title : Digital Techniques & Microprocessor

Subject Code : 12116

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
03	--	02	03	100	50 @	--	--	150

NOTE:

Two tests each of 25 marks to be conducted as per the schedule given by SBTE.

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:

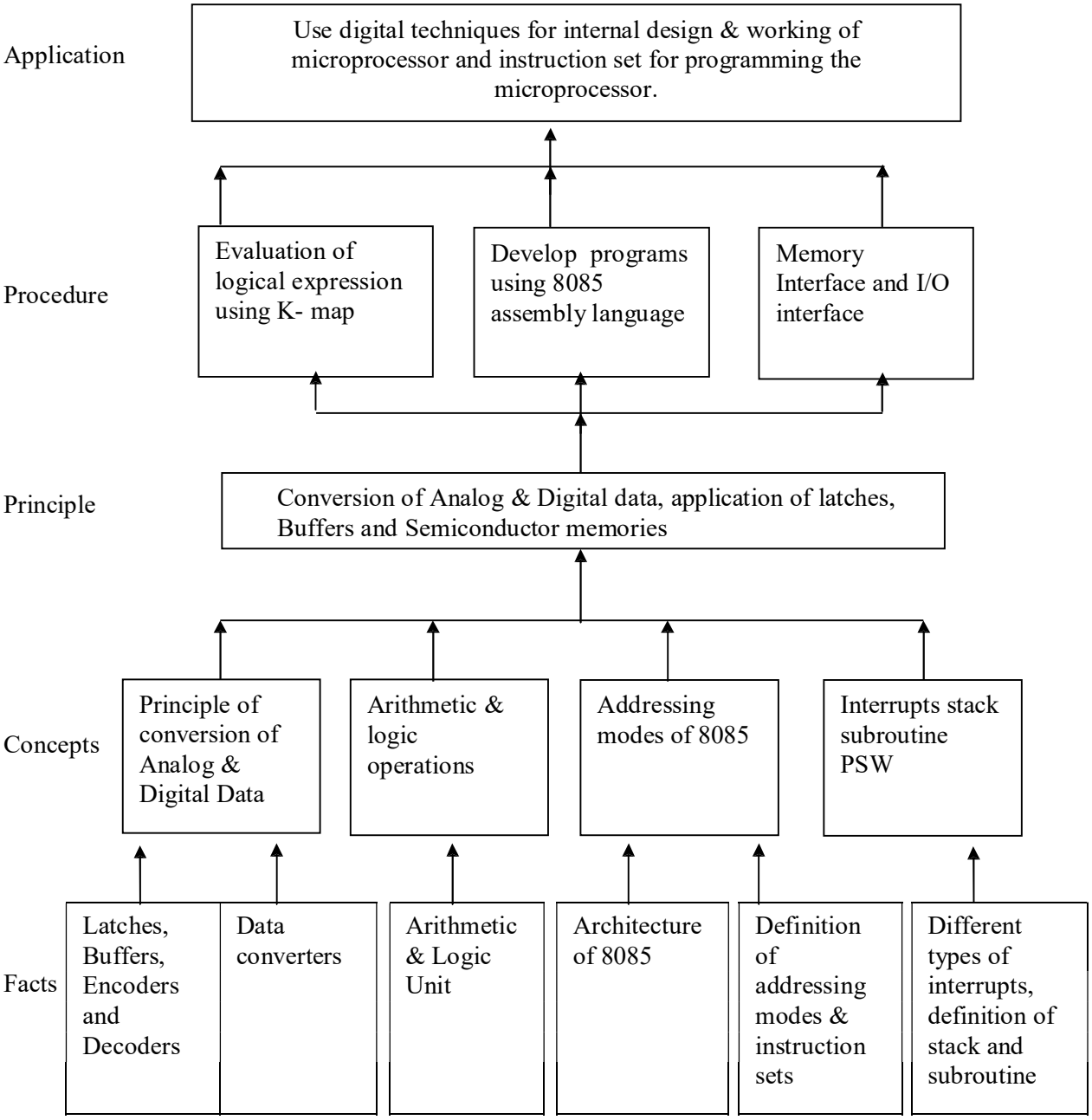
Digital techniques and microprocessor have a wide range of applications in most of the consumer, industrial and computer industries. This course enables the students to use the concept of digital systems and microprocessor for developing systems required for various fields. A thorough understanding of microprocessor is developed using in depth concepts of hardware and programming skills.

Objectives:

The student will be able to:

1. Perform arithmetic operations with help of a standard ALU design.
2. Describe the operational features of A/D and D/A converters.
3. Differentiate between the different types of memories and their applications.
4. Describe the basic architecture of a microprocessors based system.
5. Develop a minimum system with 8085 microprocessors.

Learning Structure:



Contents: Theory

Chapter	Name of the Topic	Hrs.	Marks
1.	**Review of Combinational & Sequential Logic Circuits** 1.1 Encoders – Definition, Decimal to BCD, Octal to Binary, Hexadecimal to Binary, priority encoder. 1.2 Tristate logic, Buffers, Unidirectional buffer – 74244, Bidirectional buffers – 74245. 1.3 Latches – IC 74373. 1.4 Adder: serial / parallel binary adder, Single digit BCD adder using IC 7483. 1.5 Study of ALU Ics: 74181, 74381, Carry look ahead adder.	**08**	**16**
2.	**Data Converters** 2.1 Introduction – Necessity and their types 2.2 Digital to analog converters, 1. Weighted – Resistor D/A converter (Mathematical derivation), 2. R – 2R ladder D/A Converter (Mathematical derivation) 2.3 Specifications of D/A converter, 2.4 Analog to Digital Converter, Principle of A/D conversion 2.5 Block Diagram and working of following ADC: 1. Single slope ADC 2. Dual slope ADC 3. Successive Approximation ADC 2.6 Specifications of ADC 2.7 Study of ICs DAC – 0800, ADC – 0809.	**08**	**20**
3.	**Semiconductor Memories** 3.1 Introduction of memories 3.2 Memory organization & operation, 3.3 Characteristics & classification of memories RAM, ROM, volatile & non- volatile, static & dynamic, Flash memory 3.4 ROM types: PROM, EPROM, EEPROM & mask programmable ROM 3.5 Memory ICs – 2716, 7481, 6116.	**06**	**12**
4.	**Microprocessor – 8085** 4.1 Terminology used in microprocessor- Hardware, software Firmware, Bus, Address Bus, Data Bus, control Bus, Comparison of machine language, assembly language and high-level language. Microprocessor, microcomputer and micro controller comparison and their application areas. 4.2 Evolution of microprocessors. 4.3 Schematic diagram of microcomputer and microprocessor based system , Features of 8085 microprocessor 4.4 Architecture of 8085 microprocessor. 4.5 Pin definition of 8085 microprocessor.	**08**	**16**

	8085 Instructions and programming Instruction Format (one byte, two byte and three byte instruction) opcode format Addressing modes of 8085 8085 Instruction set. Definition of machine cycle, T state and instruction cycle. Different operations of 8085 with respect to the status of IO/M, S_1, S_0, RD, WR signals. Instructions related with interrupt. Timing diagram of opcode fetch cycle or memory read cycle, Memory write, I/O read and I/O write cycle, MVI A, 8 bit data; LXI rp, 16 bit data; STA, 16 bit address. Concept of stack, subroutine and interrupts. Hardware and software interrupts, maskable and non-maskable interrupts, vectored interrupts. Hardware structure of the interrupts of 8085	**10**	**20**
5	**Memory system Design with 8085** 5.1 Demultiplexing of address and data bus by ALE signal. 5.2 Generation of control signals (MERM, MEMWR, IOR, IOW signal) 5.3 Typical 8085 system configuration 5.4 Address decoding techniques : Partial decoding 5.5 Simple example of memory interfacing with RAM /ROM & Memory mapped I/O system 5.6 Comparison of I/O mapped I/O & memory mapped I/O system 5.7 Interfacing with 8085 microprocessor Interfaceing input port & output port to 8085 with I/O mapped. Interfaces of I/O port with memory mapped I/O Transmission & Reception of 8 bit serial data using SID & SOD lines.	**08**	**16**
	Total	**48**	**100**

PRACTICAL:

Skills to be developed:

Intellectual Skills:

Identification of different ICs of buffers, latches, data converters, memories.

1. Ability to design algorithm, flowchart, assembly language program & decode.

Motor Skills:

1. Ability to test the different digital ICs.
2. To load the program in user memory of microprocessor kit.
3. To provide commands to execute the program.
4. To observe the result in specific memory locations and registers.

List of Practical: List from the manuals is to be added as it is.

1. Verify Truth Table of bi directional buffer – IC 74245.
2. Verify function table of ALU 74181.
3. Verify the operational features of ADC – IC 0809, IC 0808 and DAC – IC 0800.
4. Verify the operational features of RAM (use suitable RAM IC).
5. Write assembly language programs for addition and subtraction of two 8 bit & 16 bit numbers.
6. Write assembly language programe to transfer data bytes from memory block to another memory block.
7. Write Assembly Language Programme to multiply two 8 bit numbers using add and shift techniques **OR**
   Arrange the given bytes in ascending & descending order using bubble sort.
8. Find one's and two's complement of a given number.
9. Write Assembly Language Programme to exchange the lower & upper nibble of a byte.
10. To sort odd and even byte from given 10 bytes.
11. Using any hardware interrupt write a program to count the interrupt events.
12. Write Assembly Language Programme to Transmit / Receive a 8 bit serial data using SID & SOD lines.

Mini Project: (ANY ONE)

1. Design a stepper motor interface card using driver IC.
2. Design an interface A/D converter using 8085 microprocessor.
3. Interface D/A converter using 8085 microprocessor.
4. Design 4 bit R-2R D/A converter.

Learning Resources:
Books:

Sr. No.	Author	Title	Publisher
01.	Malvino	Digital Principles	Tata McGrew Hill (TMH)
02.	R. P. Jain	Modern Digital Electronics	TMH
03.	Malvino & Leach	Digital Principles and Applications	TMH
04.	Floyd	Digital Fundamentals	Universal Book Stall New Delhi
05.	M. Morris Mano	Digital Logic and Computer Design	PHI
07.	Ramesh S. Gaonkar	Microprocessor Architecture, Programming and Applications with 8085	Penram International
08.	B. Ram	Fundamentals of Microprocessors and Microcomputers	Dhanpat Rai Publications

Course Name : Electronics Engineering Group

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

Subject Title : Electronic Instruments and Measurements

Semester : Fourth

Subject Code : 12117

Teaching and Examination Scheme:

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

NOTE:

Two tests each of 25 marks to be conducted as per the schedule given by SBTE.

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:

This subject intends to provide the students practical information & technical background. It also provides the students with concepts, principles and procedures of Analog and Digital electronic measuring instruments and the measurement techniques for the measurement of various electronic quantities.

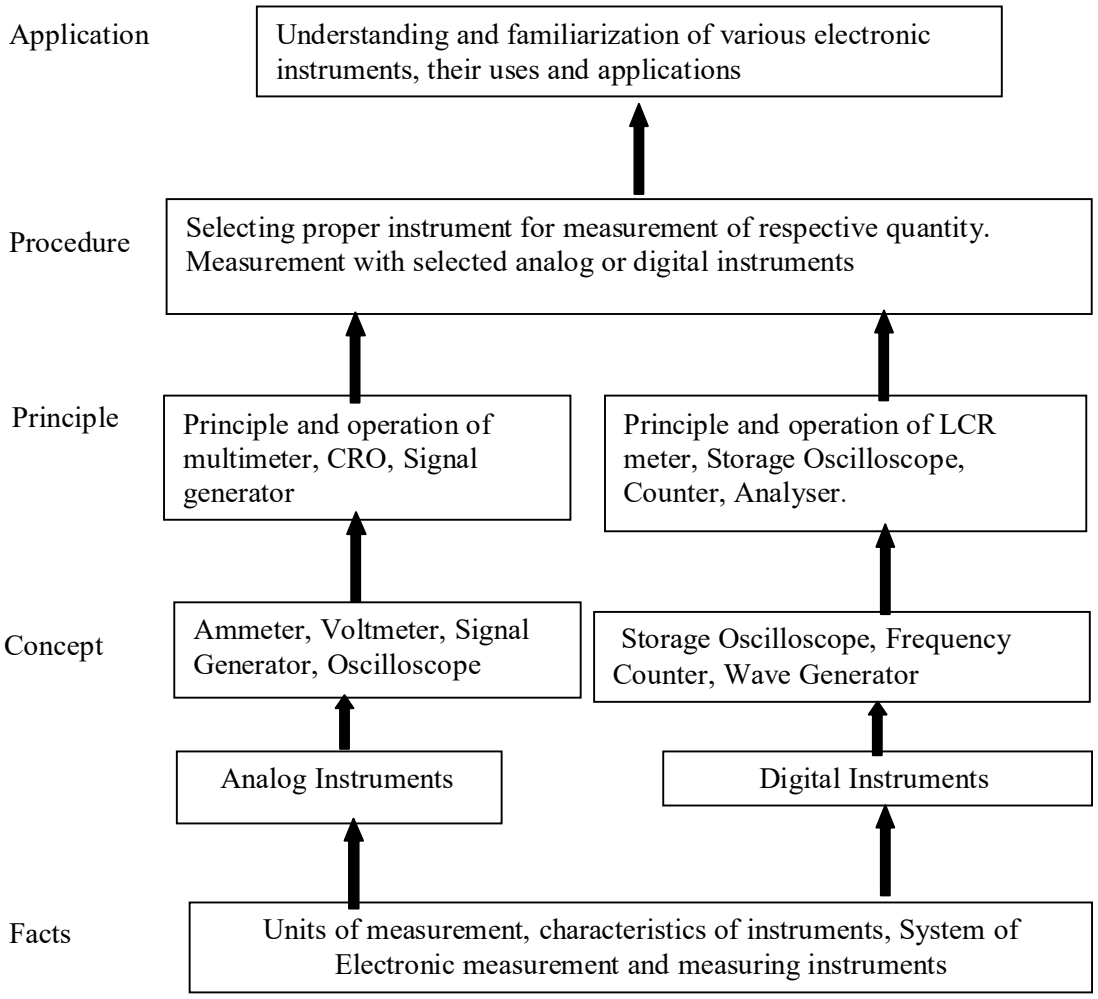
Because of the scope of the subject, students are well exposed to a good and wide area of the various electronic measuring instruments as the subject comprises of those basic equipments of which students should have knowledge.

Objectives:

The students will be able to:

1. Know the construction of the instruments.
2. Understand the principles and operation of different measuring instruments.
3. Selecting the appropriate instrument for measurement.
4. Observing reading and interpreting the values from different meters.
5. Learning the precautions& applications of the instruments.
6. Reading the specifications from datasheets.

Learning Structure:



Content: Theory

Chapter	Name of the Topic	Hours	Marks
01	**Basics of Measurement**: 1.1 Classification of Instruments- Absolute Instruments, Secondary Instruments 1.2 Characteristics of Instruments 1.2.1 Static-Accuracy, Precision, sensitivity, Resolution, Static error, Reproducibility, Drift, Dead zone. 1.2.2 Dynamic- speed of response, Lag, Fidelity, Dynamic error. 1.3 Types of error- Gross, Systematic, Random. 1.4 Units of measurement fundamental. 1.5 Standards and their classification- International, Primary, Secondary, Working. 1.6 Calibration of Instruments. 1.7 Grounds- Importance of ground, Grounding, Equipment of grounding for safety.	06	12
02	**Analog DC and AC Meters** 2.1 Classification of Analog Instruments. 2.2 Definition of Average & RMS value. 2.3 PMMC- Working Principle, Construction, Sources of torque. 2.3.1 Analog DC Ammeters & Voltmeters. 2.3.2 Analog AC Ammeter and Voltmeter-Average Responding (Rectifier type) 2.4 Analog Multimeter- Block Diagram of Analog Multimeter and operation only. 2.5 How to use Basic meters.	10	20
03	**Digital Meters** 3.1 Concepts of ADC & DAC only. 3.2 Resolution, Sensitivity and Accuracy of digital display. 3.3 Digital frequency meter- Block Diagram and operation only. 3.4 Digital Voltmeter-Ramp type DVM, Integrating type DVM, Successive approximation type DVM, Dual slope type DVM. (Block diagram, Operation and waveform if required). 3.5 Digital Multimeter- Block Diagram and operation only. 3.6 LCR, Q meter- Block diagram and operation only. 3.7 Digital phase meter- Block diagram and operation only.	12	24

04	**Oscilloscope** Oscilloscope subsystems- 4.1.1 Display subsystems- CRT, Deflection of electron beam in CRT, Electrostatic and Electromagnetic deflection sensitivity. 4.1.2 Vertical deflection subsystems- Input Coupling selector, Input attenuator, Pre-amplifier, Main vertical amplifier, delay line. 4.1.3 Horizontal deflection subsystems- Trigger circuit, Time base generator, Main Horizontal amplifier. 4.1.4 CRO Probes- General block diagram of CRO probe, passive voltage probe, and their compensation, Active voltage probes, current probes. 4.1.5 Calibration circuits. 4.2 CRO-Block diagram of single beam dual trace and dual beam oscilloscope. 4.3 Block diagram of Digital storage oscilloscope. Uses of CRO- Frequency and phase measurement, Tracing of diode and transistor characteristics.	**12**	**24**
05	**Signal Generator and Analyser** 5.1 Concept of oscillator. 5.2 Signal generator-AF and RF type- Block diagram and operation only. 5.3 Function generator and pulse generator- Block diagram, Simple controls and operation only. 5.4 Specification. 5.5 Concept of time domain and frequency domain instruments. 5.6 Spectrum & Logic analyzer- Block diagram and operation only.	**08**	**20**
	Total	**48**	**100**

Practical:

Skills to be developed:

Intellectual Skills:

1. Selection of instruments based on application.
2. Selection of range of instruments.
3. Interpretation of results.

Motor Skills:

1. Accuracy in measurement.
2. Proper Connections.

List of Practical:

1. Compare the specifications of Analog and Digital multimeter.
2. Measure DC Voltage & DC Current using PMMC instruments.
3. Find the RMS &Average value from the measurement.

4. Measurement of R.L.C & quality factor using LCR, Q meter.
5. Measure phase using Digital phase meter.
6. Study front panel controls of specification of typical CRO.
7. Measure frequency, voltage, phase difference (by time measurement) using CRO.
8. Testing of component using CRO.
9. Using Lissagous pattern find frequency & phase difference of unknown signal.
10. Study & use of DSO.
11. Measurement of parameter of a Signal generator (Impedance, Distortion, Range).
12. Measure frequency & voltage of the different o/p waveforms of function generator.

Learning Resources:
Books:

Sr. No.	Author	Title	Publisher
1.	W.D. Cooper	Modern Electronic Instrumentation & Measurement Techniques	Pearson Education, New Delhi
2.	Kalsi	Electronic Instruments	Tata Mc Grow Hill
3.	A.K. Sawhney	Electrical & Electronic Measurements & Instrumentations	Dhanpat Rai & Co.
4.	Stanley Wolf & Richard Smith	Student Reference Manual for Electronic Instrumentation laboratory.	Prentice Hall

Course Name : Electronics Engineering Group

Course Code : EJ/ET/EX/

Semester : Fourth

Subject Title : Analog Communication

Subject Code : 12118

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 SBTE.

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)

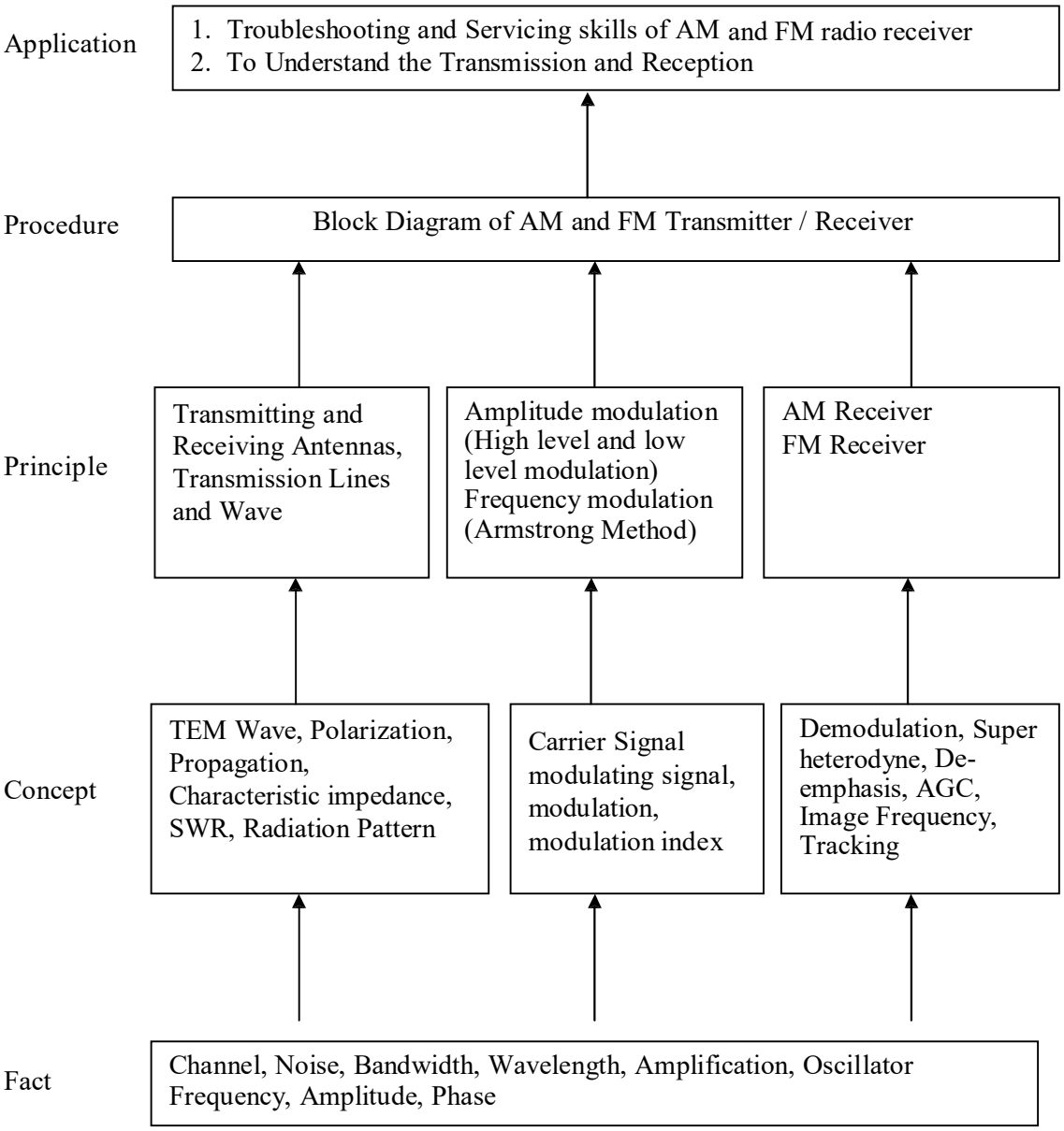
Rationale:

Communication plays vital role in our lives. Development in communication technology have increased its applications in allied fields of electronics including satellite, mobile, RADAR, telephony, telegraphy, industrial controls, etc.
It is the technology subject which expert the student to understand the operation and faultfinding of AM & FM transmitter, AM & FM radio receiver & identifying different antennas.

Objectives: The student should able to

1. Classify different types of communication system.
2. Explain electromagnetic spectrum.
3. Describe amplitude modulation & its types.
4. Identify different section in radio receiver.
5. Troubleshooting AM / FM radio receivers
6. To describe FM.
7. Compare AM & FM.
8. Describe different parameter of transmission line and their radiation pattern.
9. Describe different types of wave propagation and their application.

Learning Structure:



Content: Theory

Chapter	Chapter Name & Content	Hours	Marks
1	**Introduction to electronic communication** 1.1 Importance 1.2 Block diagram of communication system 1.3 Modulation 1.3.1 Need for modulation 1.4 Types of Electronics communications 1.4.1 Simplex 1.4.2 Duplex – Full & Half 1.4.3 Digital 1.4.4 Analog 1.5 Applications of communication 1.6 The electromagnetic spectrum (different bands & their frequencies) 1.7 Concept of Transmission bandwidth.	04	08
2	**Amplitude modulation & Frequency modulation** 2.1 Definition 2.2 Modulation index – definition, its effect on modulated signal, simple numerical. 2.3 Mathematical representation of amplitude modulated wave & its meaning (concept of sidebands) 2.4 Bandwidth requirement 2.5 Representation of AM signal in time & frequency domain. 2.6 Power relation in AM wave, simple numerical. 2.7 Frequency modulation (definition) 2.8 Definition – Deviation ratio, max. Deviation ratio. 2.8 Mathematical representation of frequency modulation and its meaning. 2.9 Representation of frequency modulated signal in time domain and frequency domain. 2.10 Bandwidth requirement – simple numerical 2.11 FM signal generation using reactance modulator circuit (transistorized). 2.12 Concept with graph-pre emphasis and de-emphasis. 2.13 Block diagram of FM transmitter explanation with waveform (Armstrong frequency modulation system)	10	22

3	**Radio receivers (AM & FM)** 3.1 Principle of heterodyne 3.2 Block diagram of super heterodyne receiver and its working with waveforms. 3.3 Characteristics of AM radio receiver- Sensitivity, Selectivity, and Fidelity. 3.4 Demodulation of AM signal. 3.5 Need of AGC and its type – simple, delayed (with graph) 3.6 Block diagram of FM receiver explanation with waveform. 3.7 FM Detector – slope detection, transformer action at above & below resonance ratio detector (diode circuit), PLL (block diagram and operation) explanation with vector diagram.	12	22
4	**Transmission lines** 4.1 Fundamentals of transmission line. 4.2 Equivalent circuit of transmission line 4.2.1 General equivalent circuit 4.2.2 RF equivalent circuit 4.3 Characteristics impedance, methods of calculations & simple numerical. 4.4 Losses in transmission line. 4.5 Standing wave – SWR, VSWR, Reflection coefficient, simple numerical. 4.6 Quarter wave & half wavelength line 4.6.1 Impedance inversion by quarter wavelength line 4.6.2 Quarter wave transformer & impedance matching 4.6.3 Properties of line of various lengths. 4.7 Impedance matching 4.7.1 Stubs – single & double 4.7.2 Baluns	08	16
5	**Antennas** 5.1 Antennas fundamentals. 5.1.1 Radiation mechanism. 5.1.2 Concept & definition of polarization, bandwidth, beam width, antenna resistance, directivity, antenna gain, power density. 5.2 Dipole antenna 5.2.1 Half wave dipole antenna 5.2.2 Radiation pattern 5.3 Folded dipole antenna & its radiation pattern. 5.4 Structure, Radiation pattern & applications of the following antennas. i. Loop antenna ii. Ferrite loop antenna iii. Telescopic antenna iv. Yagi-uda antenna v. Microwave antennas- Dish antenna & Horn antenna.	08	16

6	**Wave Propagation** 6.1 Fundamental of electromagnetic wave. 6.2 Transverse electromagnetic wave, polarization. 6.3 Ground wave 6.4 Ionosphere 6.5 Sky wave propagation 6.6 Concept of actual height and virtual height. 6.7 Definition – critical frequency, max. useable frequency, skip distance, fading 6.8 Space wave propagation. 6.9 Duct propagation 6.10 Troposphere scatter propagation	06	16
	Total	**48**	**100**

Practical:

Intellectual Skills:

1. Reading
2. Sourcing of Web sites

Motor Skill:

1. Testing
2. Measurement

List of Practical: (Any Ten)

1. Observe AM the AM Signal on Spectrum Analyzer
2. Observe FM wave & calculate modulation index.
3. Visit to transmitter station & prepare a report.
4. Draw the circuit diagram & layout of AM radio receiver.
5. Voltage waveform analysis at various points in AM radio receiver.
6. Observe input & output waveforms of AM detector.
7. Plot graph of sensitivity of receiver.
8. Plot graph of selectivity of receiver.
9. Plot graph of fidelity of receiver.
10. Fault finding of AM radio receiver.
11. Create two faults in each section OR fault finding in FM radio receiver, Create two faults in each section
12. Prepare a report on different types of radio receivers available in market. find out their specifications, IC used etc
13. FM detector characteristics.

14. Measure the length of directors, reflectors, dipoles and spacing between them of Yagi uda antenna and compare with the theoretical value.
15. Plot the directional pattern of given antenna.

Prepare any two mini projects:

1. AM/FM Radio Receiver/Transmitter using transistor
2. AM modulator/detector/mixer using diode
3. FM detector

Learning Resources:

Books:

Sr. No.	Author	Title	Publisher
01	George Kennedy	Electronic Communication System	Tata McGraw-Hill
02	Roddy Collen	Electronic Communication	Prentice Hall India
03	Louis E. Frenzel	Communication Electronics	Tata McGraw-Hill
04	Hsu & Mitra	Analog & Digital Communication-	Tata McGraw-Hill

Course Name : Electronics Engineering Group

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

Semester : Fourth

Subject Title : Visual Basic

Subject Code : 12119

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS.	TH	PR	OR	TW	TOTAL
01	--	02	--	--	50@	--	--	50

Rationale:

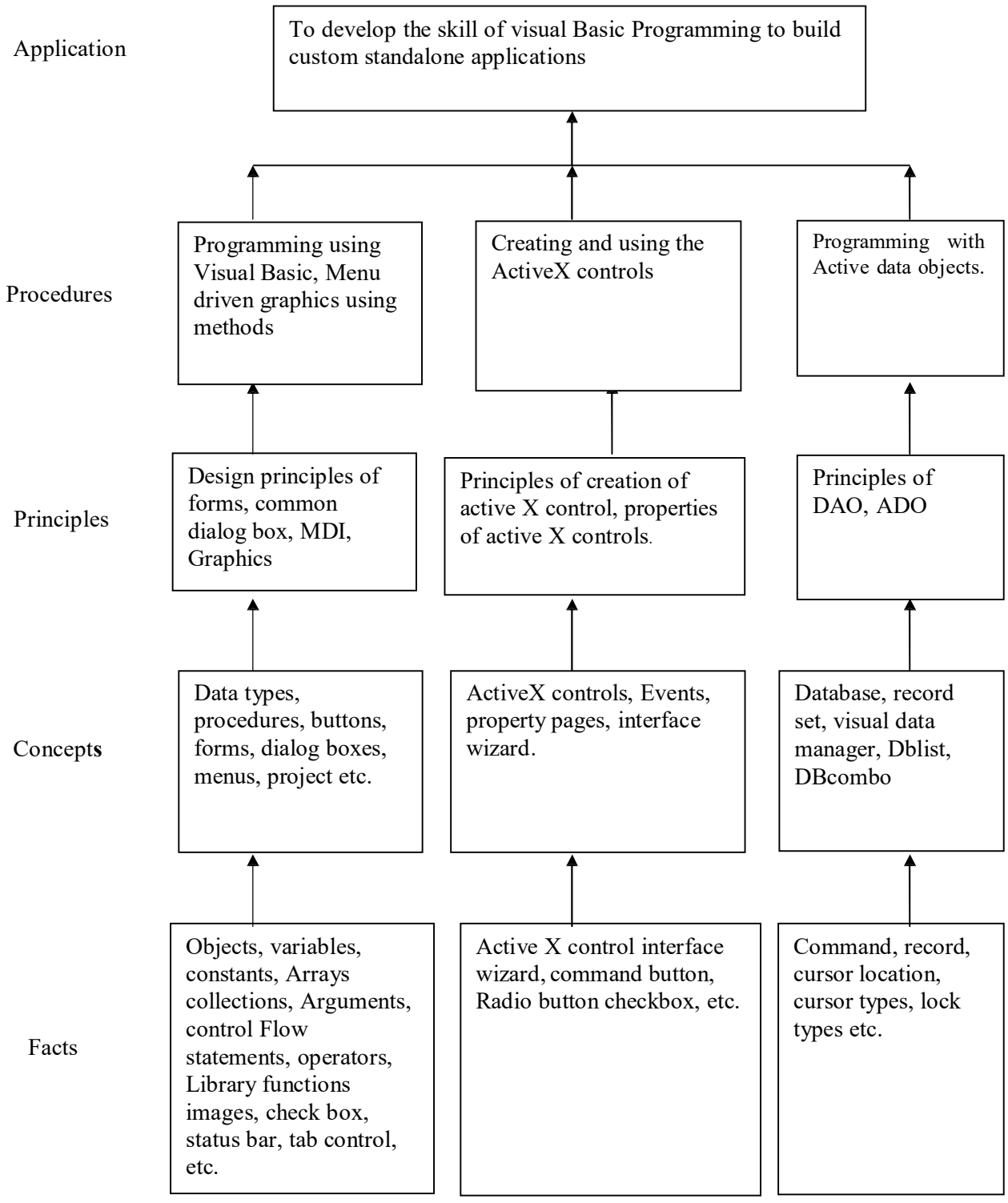
This subject helps to understand the principles and techniques involved in developing applications with Visual Basic. The course content is designed to understand & implement the Event Driven Architecture of Visual Programming. The student would be able to identify and use the different categories of controls, learn working with forms and different data access techniques, establish a data base connection and identify the categories of ActiveX controls and creating them.

Objectives:

The Students will be able to:

1. Use GUI tools of Visual Basic Programming.
2. Use basic and advance VB controls.
3. Interface back-end and front-end.
4. Generate report using Data Report and Crystal Reports.
5. Build Visual Basic applications.

Learning Structure:



Chapter	Contents	Hrs
01	**Introduction To Visual Basic Environment** - Concept of VB program. - Class, object, property, methods, events. - Environment of VB. - Concept of project, forms etc. - Managing with menus. - Drag and Drop operation. - Validating and processing user inputs.	02
02	**Introduction To Visual Basic** - Data types, Variants. - Variables, Constants. - Arrays – REDIM statement, Array related functions. - Collection, procedure, function. - Argument passing and return values. - Input box and message box. - Control flow statement. - Loop statement. - Nested control structure. - Exit statement. - Operators – arithmetic, logical, relational, string. - Functions – String, Maths, Date and Time. - Date and time formats. - Design form to demonstrate. - Control loops (do, for, while) - Control statements (if-then, if-then-else, Selection option) - Using text box, Command button, Label, options, combo box, input and message box.	02
03	**Controls And Events** - Scroll bar. - Slider. - Container – picture box, frame. - Image. - File system controls – drive, file, directory list box. - Timer control. - OLE control. - Basic controls like – line, shape, circle, Pset, RGB, Paint picture, load picture.	02
04	**Module, Class Module MDI, Menu Editor And Graphics** - Concept of module, class module, MDI, DLL's and how to use them. - Creating own menu using menu editor, popup m - **Advanced controls** : Common dialog box, Tree view, List view, rich text box control, windows common controls, status bar, tab control, image list, MS chart. - Concept of class module, module, MDI, DLL and how to use	03

	them. - Using RTF control	
05	**Database, Report Generator** - Concept of database, record, record set, connection.DSN and DSN less connection - Data bound controls – text box, combo box, list box, DBgrid, DBcombo, MSflex grid. - Visual Data Manager. - Programming with ADO, DAO, RDO, - Object, connection, record set, parameter, cursor types, lock types. - Creating report using Data Report. - Creating report using Crystal reports.	**03**
06	**Introduction To Active X Controls** - The user control object- initialize Event, Terminate event, Init properties Event, Paint/Resize Event, Observing the Events in the Data controls, - Exploring the Properties of Active X controls- Debugging the Properties, extend Properties, Ambient Properties, creating Design time only properties, creating a Clock control, Events in Active X control - Using the active X control interface wizard- Adding the wizard to visual basic - Property pages- using the property page wizard, creating property pages without the wizard. Creating a simple active x control	**02**
07	**File Handling In VB** - File commands - file handling functions - Sequential files - Reading information from a file - Adding to an existing file - General sequential files - Sending special characters to sequential files. - Making changes inside a sequential file - The rich text box control & file handling - Random access files - Headers and indexes for random access files. - Binary files - Binary files HANDLING	**02**
	TOTAL	**16**

Practical:

1. Study of VB environment with following details:
   - form and their types.
   - intrinsic components – text box, label, combo, list, heck box, and option button.
   - Design time properties.
   - Different windows and their uses.
2. Design forms to perform mathematical operations like addition, subtraction, multiplication and division using :
   - text box, labels.
   - Options to be selected using option, check box and combo box.
3. Design forms to use Date, Time, and String, Mathematical functions with help of text box, label, radio button, check box, and combo box and command button.
4. Using image control and scroll bar, design form to change height, width of image, movement to image. Using picture box and image list, flip the image on click of command button.
5. Design explorer using Directory, drive, file list box and common dialog controls.
6. Design text editor with menu having copy, cut, paste, select, search, replace the text and load and save the file.
7. Design stop watch with faculty of start, stop, reset using timer control, option, label, text box.
8. Practical including Data bound controls like DBgrid, DBcombo, Textbox, Combo, List, MSFl exgrid and Database control like ADO, DAO, RDO to perform insertion, deletion, updation, display, Search.
9. Design MDI form including Menu bar, Toolbar, Status bar.
10. Design the interface to perform following operation on the file like create , open , read , write , delete , search.
11. Design the active X control for login form and transport it to browser
12. Design the ActiveX control to perform database operation with get and let property
13. Design the experiment using RTF box to create file , load , save search and edit the file.
14. Integrate all above practical to form mini project including login form and splash form.

Learning Resources:

Books:

Sr. No.	Author	Title	Publisher
01	Bradley, Millstaugh	Programming in VB6	Tata McGraw Hill
02	Nel Jerka	The complete reference – VB6	Tata McGraw Hill
03	Evangelos Petront Sos	Mastering VB6	BPB
04	Content Development group	VB6 Programming	Tata McGraw Hill
05	--	VB6 Black book	--

Course Name : Electronics, Electrical & Computer Engineering Group

Course Code : AA/CO/CM/CD/IF/EE/EP/DE/MU/EJ/ET/EX/EN/IE/IS/IC/IU/ED/EV/FC/ ML/SC/TX

Semester : Fourth

Subject Title : Development of Life Skills-II

Subject Code : 12041

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
01	--	02	--	--	--	25#	25@	50

Rationale:

In today's competitive world, the nature of organizations is changing at very rapid speed. In this situation the responsibility of diploma holder is not unique. He will be a part of a team in the organization. As such the individual skills are not sufficient to work at his best.

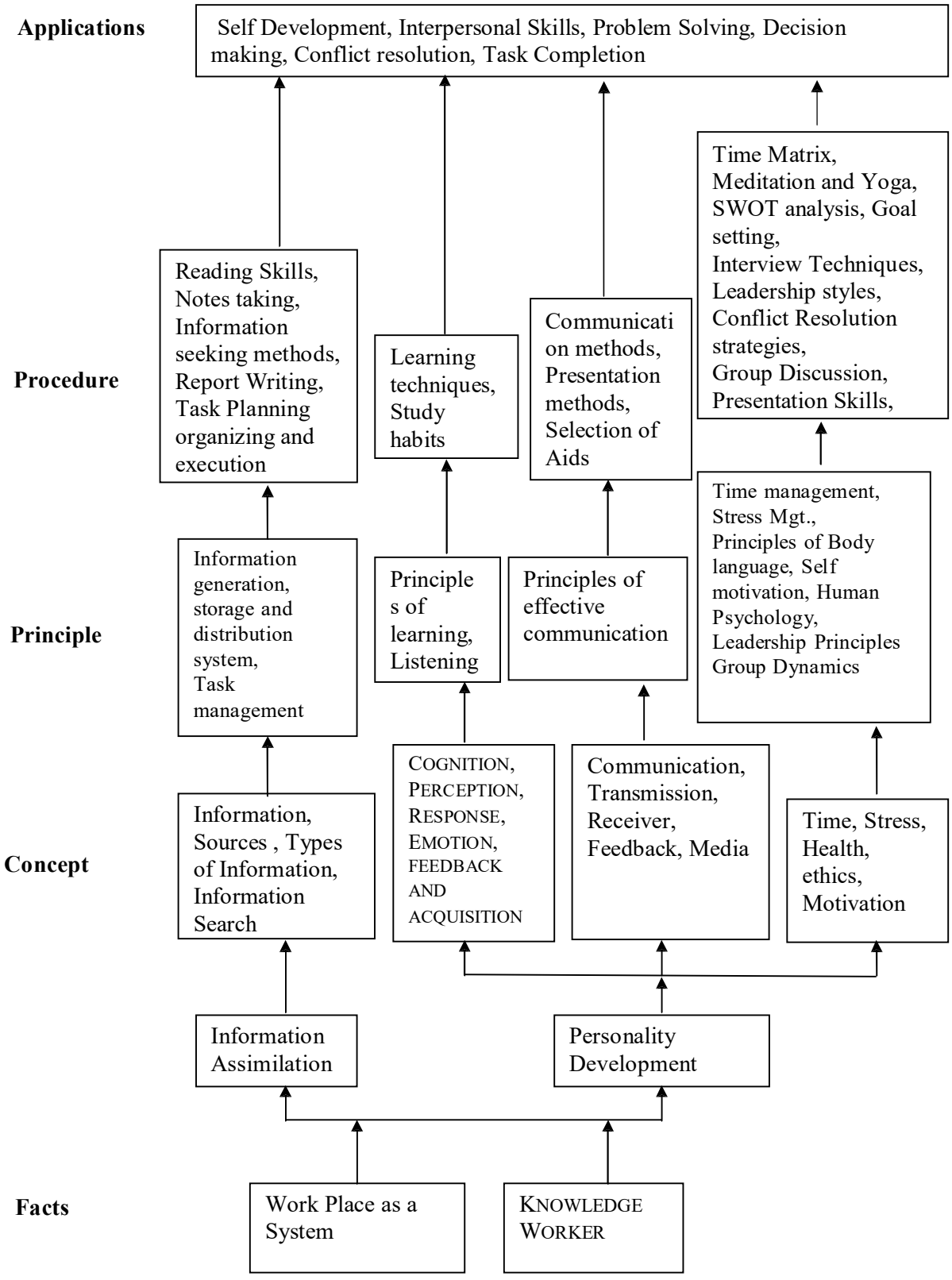
This subject will develop the student as an effective member of the team. It will develop the abilities and skills to perform at highest degree of quality as an individual as well as a member of core group or team. Such skills will enhance his capabilities in the field of searching, assimilating information, managing the given task, handling people effectively, solving challenging problems.

The subject is classified under human science.

Objectives: The students will be able to:

1. Developing working in teams.
2. Apply problem solving skills for a given situation.
3. Use effective presentation techniques.
4. Apply techniques of effective time management.
5. Apply task management techniques for given projects.
6. Enhance leadership traits.
7. Resolve conflict by appropriate method.
8. Survive self in today's competitive world.
9. Face interview without fear.
10. Follow moral and ethics.
11. Convince people to avoid frustration.

LEARNING STRUCTURE:



CONTENTS: Theory

Chapter	Name of the Topic	HOURS
1	**SOCIAL SKILLS** Society, Social Structure, Develop Sympathy And Empathy.	01
2	Swot Analysis – Concept, How to make use of SWOT.	01
3	Inter personal Relation Sources of conflict, Resolution of conflict , Ways to enhance interpersonal relations.	02
4	Problem Solving **I)STEPS IN PROBLEM SOLVING,** 1) Identify and clarify the problem, 2) Information gathering related to problem, 3) Evaluate the evidence, 4) Consider alternative solutions and their implications, 5) Choose and implement the best alternative, 6) Review **II)Problem solving technique**.(any one technique may be considered) 1) Trial and error, 2) Brain storming, 3) Lateral thinking	02
5	**Presentation Skills** Body language -- Dress like the audience Posture, Gestures, Eye contact and facial expression. STAGE FRIGHT, Voice and language – Volume, Pitch, Inflection, Speed, Pause Pronunciation, Articulation, Language, Practice of speech. Use of aids –OHP,LCD projector, white board	03
6	**Group discussion and Interview technique** – Introduction to group discussion, Ways to carry out group discussion, Parameters— Contact, body language, analytical and logical thinking, decision making **INTERVIEW TECHNIQUE** Necessity, Tips for handling common questions.	03
7	**Working in Teams** Understand and work within the dynamics of a groups. Tips to work effectively in teams, Establish good rapport, interest with others and work effectively with them to meet common objectives, Tips to provide and accept feedback in a constructive and considerate way, Leadership in teams, Handling frustrations in group.	02

8	**Task Management** Introduction, Task identification, Task planning ,organizing and execution, Closing the task	**02**
	TOTAL	**16**

Contents: Practical -

List of Assignment: (Any Eight Assignment)

1) SWOT analysis:- Analyse yourself with respect to your strength and weaknesses, opportunities and threats. Following points will be useful for doing SWOT.
   a) Your past experiences,
   b) Achievements,
   c) Failures,
   d) Feedback from others etc.
2) Undergo a test on reading skill/memory skill administered by your teacher.
3) Solve the puzzles.
4) Form a group of 5-10 students and do a work for social cause e.g. tree plantation, blood donation, environment protection, camps on awareness like importance of cleanliness in slump area, social activities like giving cloths to poor etc. (One activity per group)
5) Deliver a seminar for 10-12 minutes using presentation aids on the topic given by your teacher.
6) Watch/listen an informative session on social activities. Make a report on topic of your interest using audio/visual aids. Make a report on the programme.
7) Conduct an interview of a personality and write a report on it.
8) Discuss a topic in a group and prepare minutes of discussion. Write thorough description of the topic discussed
9) Arrange an exhibition, displaying flow-charts, posters, paper cutting, photographs etc on the topic given by your teacher.

Note: - Please note that these are the suggested assignments on given contents/topic. These assignments are the guide lines to the subject teachers. However the subject teachers are free to design any assignment relevant to the topic. The **term work** will consist of any eight assignments.

Mini Project on Task Management: Decide any task to be completed in a stipulated time with the help of teacher. Write a report considering various steps in task management.

LEARNING RESOURCES:
BOOKS:

Sr. No	Title of the book	Author	Publisher
1	Adams Time management	Marshall Cooks	Viva Books
2	Basic Managerial Skills for All	E.H. Mc Grath , S.J.	Prentice Hall of India

3	Body Language	Allen Pease	Sudha Publications Pvt. Ltd.
4	Creativity and problem solving	Lowe and Phil	Kogan Page (I) P Ltd
5	Decision making & Problem Solving	by Adair, J	Orient Longman
6	Develop Your Assertiveness	Bishop , Sue	Kogan Page India
7	Make Every Minute Count	Marion E Haynes	Kogan page India
8	Organizational Behavior	Steven L McShane and Mary Ann Glinow	Tata McGraw Hill
9	Organizational Behavior	Stephen P. Robbins	Pretice Hall of India, Pvt Ltd
10	Presentation Skills	Michael Hatton (Canada – India Project)	ISTE New Delhi
11	Stress Management Through Yoga and Meditation	--	Sterling Publisher Pvt Ltd
12	Target setting and Goal Achievement	Richard Hale ,Peter Whilom	Kogan page India
13	Time management	Chakravarty, Ajanta	Rupa and Company
14	Working in Teams	Harding ham .A	Orient Longman

INTERNET ASSISTANCE

1. http://www.mindtools.com
2. http://www.stress.org
3. http://www.ethics.com
4. http://www.coopcomm.org/workbook.htm
5. http://www.mapfornonprofits.org/
6. http://www.learningmeditition.com http://bbc.co.uk/learning/courses/
7. http://eqi.org/
8. http://www.abacon.com/commstudies/interpersonal/indisclosure.html
9. http://www.mapnp.org/library/ethics/ethxgde.htm
10. http://www.mapnp.org/library/grp_cnfl/grp_cnfl.htm
11. http://members.aol.com/nonverbal2/diction1.htm
12. http://www.thomasarmstron.com/multiple_intelligences.htm
13. http://snow.utoronto.ca/Learn2/modules.html
14. http://www.quickmba.com/strategy/swot/

Course Name : Electronics Engineering Group

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

Semester : Fourth

Subject Title : Professional Practices-IV

Subject Code : 12120

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
--	--	04	--	--	--	--	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.

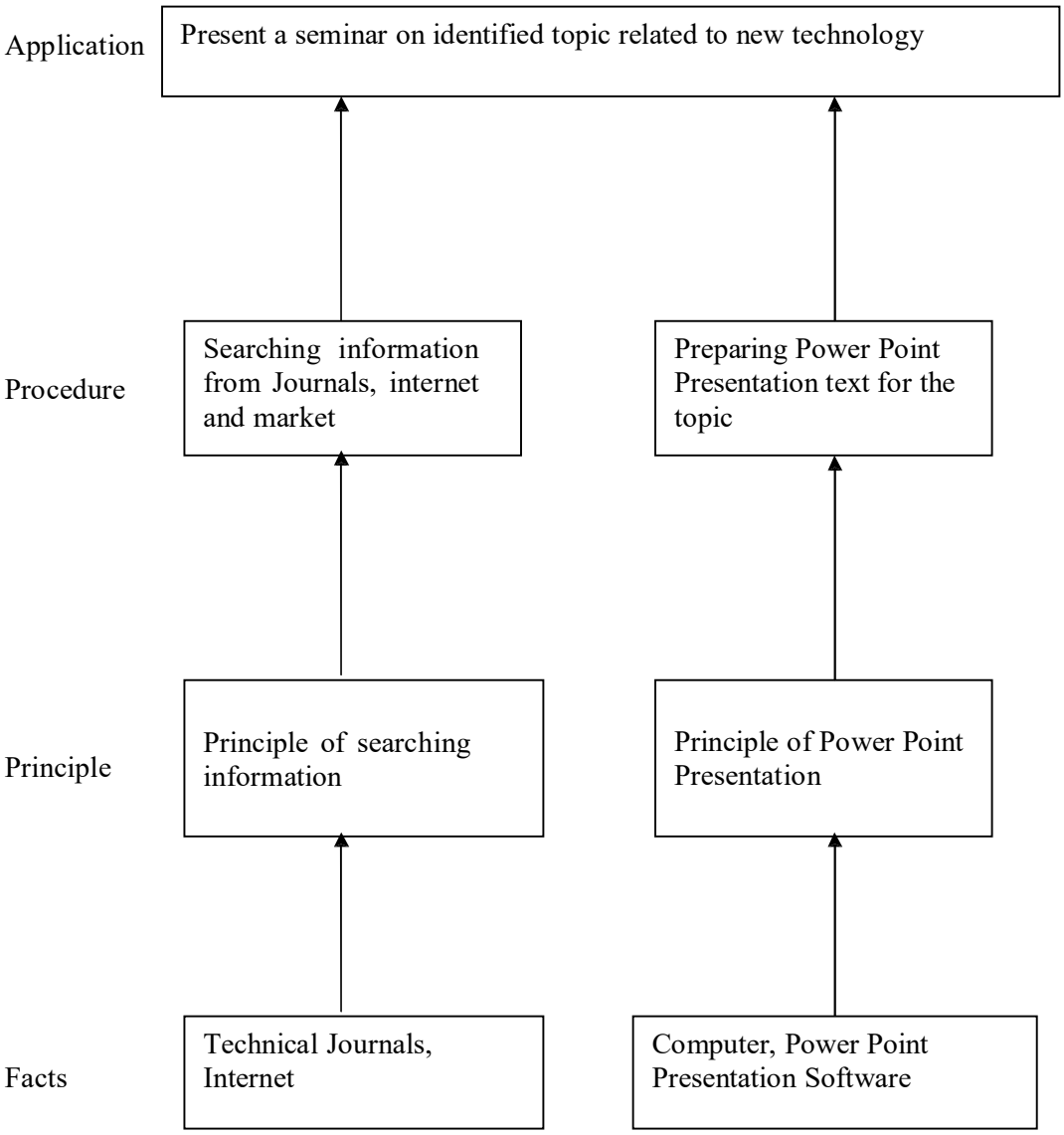
The purpose of introducing professional practices is to provide opportunity to students to undergo activities which will enable them to develop confidence. Industrial visits, expert lectures, seminars on technical topics and group discussion are planned in a semester so that there will be increased participation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

Objectives:

The student will be able to:

1. Acquire information from different sources.
2. Prepare notes for given topic.
3. Present given topic in a seminar.
4. Interact with peers to share thoughts.
5. Prepare a report on industrial visit, expert lecture.

Learning Structure:



Activity	Content
1	**Industrial Visits** Structured industrial visits be arranged and report of the same should be submitted by the individual student, to form a part of the term work. The industrial visits may be arranged in the following areas/ industries : i) Electronic equipment manufacturing unit ii) Resistance Welding unit iii) Industrial automation unit iv) Adarsh Gram v) Shops using electronic billing system vi) Telephone Exchange
2	**Lectures by Professional / Industrial Expert lectures to be organized from any of the following areas:** i) Cyber laws ii) Fiber optics communication system iii) Disaster management iv) Use of single for Telephone, television, internet v) Industrial Safety vi) Computer security systems vii) Any other suitable topic
3	**Information Search :** **Information search can be done through manufacturers, catalogue, internet, magazines; books etc. and submit a report.** **Following topics are suggested :** i) Collection of information about tools used in electronic workshop ii) Market survey for motors used in electronic application iii) Non Conventional Energy Sources with focus on solar energy iv) Elevators installation and maintenance v) Any other suitable areas
4	**Seminar :** Seminar topic should be related to the subjects of fourth semester. Each student shall submit a report of at least 10 pages and deliver a seminar (Presentation time – 10 minutes)
5	**Mini Project / Activities** : a) Design of P.C.B. using software b) Developing small unit of eliminator battery or D.C. power supply c) Study of networking in computer laboratories d) Comparative study of cables