



(...Nurturing Talents to Success)

**DR. A P J ABDUL KALAM UNIVERSITY,
INDORE**

SYLLABUS

For

DIPLOMA ELECTRONICS & TELECOMMUNICATION

(SECOND YEAR, IVth SEM)

Dr. A P J Abdul Kalam University, Indore

DR. A P J ABDUL KALAM UNIVERSITY, INDORE

Syllabus for Diploma Electronics & Telecommunication

List of Subject (Second Year, IVth Semester)

S. No.	Subject Code	Subject name	Page No.
1	ECD 401	LINEAR INTEGRATED CIRCUITS	3
2	ECD 402	MICROPROCESSOR AND MICROCONTROLLER	5
3	ECD 403	ELECTRONIC MEASUREMENTS	7
4	ECD 404	COMMUNICATION ENGINEERING	9
5	DE 411	ENTERPRENUERSHIP	11
6	DE 412	MARKETING MANAGEMENT	13
7	DE 9999	PROFESSIONAL ACTIVITIES	15

Unit 1

Introduction to Operational Amplifier: Differential amplifier: Principle, differential and common mode of operation, concept of inverting and non- inverting input, The Op-Amp: Block Diagram, IC Packages, Ideal characteristics, Electrical parameters: Input offset voltage: Input resistance, CMRR, Slew rate, Gain, Bandwidth , 741 OP- Amp characteristics, pin out and power supply requirements , Interpreting and comparison of data (as per data sheet) of 741, op07, 351, 311, TL082, LM 324.

Unit 2

Linear Application: Inverting amplifier, non-inverting amplifier, Voltage follower, Adder and Subtractor, Differentiator, integrator, Scaling Amplifier, AC and DC Amplifier, Instrumentation amplifier, Active filters: low pass, high pass and band pass, Voltage to Current converter, Current to Voltage converter.

Unit 3

Nonlinear applications: Comparators: functions of a comparator, modes of operation of comparator, Open loop- zero crossing detector, Schmitt trigger, Threshold levels, Inverting and non-inverting, Hysteresis curve, Converters: Voltage to Frequency Conversion, Frequency to Voltage Conversion, Sample / Hold circuit, Precision Rectifier, Oscillators: Wein Bridge Oscillator, Phase shift Oscillator, Relaxation Oscillator, Logarithmic amplifier and antilogarithmic amplifier, Basics of analog multiplier and dividers.

Unit 4

Voltage Regulators: Need of Regulators, Series Regulator, Shunt Regulator, Pass Transistor Regulator, Switching Regulator, Basics of Regulator ICs like 723, LM317,78XX , 79XX and SMPS TEA1507, TEA152X series .

Unit 5

Timers: Introduction, functional block diagram of a timer, 555 timer: operation modes of 555: mono and astable, Pin configuration of 555, 555 as wave generators: square wave, Saw tooth wave and Tri-angular Wave. **Phase Lock Loop (PLL):** functional block diagram, Lock & Capture range, transfer characteristics, Basic Applications of PLL 567, PLL 565, Applications of PLL

References

1. Operational Amplifiers and Linear Integrated Circuits by R.F. Coughlin- F.F Driscall (PHI).
2. Op-Amps and Linear Integrated Circuits by R.A. Gayakwad
3. Electronic Devices & Circuits by Robert boylestad
4. Electronic Devices & Circuits by Allen Mottershead
5. Integrated Electronic by Millman Halkias
6. Art of Electronics by Horowitz Winfield Hill
7. Operational Amplifiers and Integrated Circuits by Denton Daily
8. WBLM on Electronics circuits and design by IIT, Delhi.

List of Experiments

1. Measurement of Different characteristics of an Op-Amp in open loop configuration. (a) Output Resistance (b) Different Input Resistance.
2. Measurement of Differential characteristics of an Op-Amp in open loop configuration. (a) Voltage Gain (b) Unity Gain Bandwidth.
3. Inverting Amplifier : (a) AC analysis (b) DC analysis (c) Unity Gain Buffer
4. Non –Inverting Amplifier: (a) AC analysis (b) DC analysis (c) Unity Gain Buffer
5. Op-Amp as: (a) Adder (b) Subtractor (c) Multiplier (d) divider.
6. Op-Amp as: (a) Integrator (b) Differentiator (c) Inverter (d) Buffer
7. Op-Amp as active Filter : (a) Low pass filter (b) High pass filter (c) Band pass filter
8. Signal Generator using Op-Amp and Timer IC (a) Triangular wave generator (b) Schmitt Trigger
9. Signal Generator using Op-Amp and Timer IC (a) Saw tooth wave generator (b) Ramp generation
10. Oscillator using Op-Amp (a) Wein Bridge Oscillator (b) R.C. Phase Shift Oscillator
11. Sample & hold circuit operation
12. Precision Rectifier using an Op-Amp and Voltage regulations.
13. Phase lock loop as frequency multiplier
14. 4 bit D/A converter addition experiments
15. A/D Converter

Unit 1

Introduction to Microprocessor: How does microprocessor works, Microprocessor architecture & its operation, Introduction to Intel family of microprocessor, Description of interfacing with address latches, Memory Mapped I/O & I/O mapped I/O **8085 Microprocessor:** 8085 Architecture, Pin assignments, Block Diagram and its detail description, Machine cycle & BUS Timing, Memory Interfacing, Address and data BUS descriptions, Interrupts and its types.

Unit 2

8085 Instructions Set: Data Transfer operation, Arithmetic Operation, Logic operation, Branch Operation, Stack, Subroutine and related instruction **Assembly Language Programming:** How to write, assemble and execute a simple program, 8085 Programming Model, Instruction format, Assembler directives, Addressing modes of 8085.

Unit 3

Peripherals and Other Microprocessors: Peripherals: 8255 programmable peripheral interface, 8279 programmable key board interface, 8254/8253 programmable interval timer, 8259 programmable interrupt controllers, 8257 DMA controller, Other Microprocessors: Block diagram, addressing modes, Registers, Flags, data and address bus structure of: Z-80, MC 6800, 8088/8086

Unit 4

Microcontroller: 8031/8051/89c51 Architecture, I/O port their structure, Addressing modes, SFRs and RAM, Use of all SFRs, Bit addressable locations, Memory organization, Internal memory, external memory, Introductions to other microcontrollers like 89c52, 89c2051 and 89c535, Interfacing of Microcontroller with: 7-segment display, LCD display, Key pad, A/D and D/A Converters

Unit 5

Applications of Microprocessors and Microcontrollers: Block diagram, flow diagram and their interfacing of the followings: Temperature control and monitoring system, Speed control of DC motor, Traffic Signal control system, Elevator control system, Basics of Embedded system, Data Acquisition System

References

1. Microprocessor architecture programming and application with 8085/8080A by Ramesh S. Gaonkar
2. Introduction to Microprocessor by Aditya P. Mathur
3. Microprocessor & Interfacing Douglas V. Hall
4. Microprocessors & Fundamentals by B. Ram
5. 8051 Microcontroller by Kenneth Ayala
6. 8051 Microcontroller and assembly language programming by Mazidi
7. Solid state circuit design with Microcontrollers by C.K. Dwivedi (Das Publisher)

List of Experiments

1. Study of Assembler, Compiler, cross compiler, emulator, simulator.
2. Write a program in 8085 Assembly language for addition of two 8 bit numbers.
3. Write a program in 8085 Assembly language for subtraction of two 8 bit numbers.
4. Write a program in 8085 Assembly language for multiplication of two 8 bit numbers.
5. Write a program in 8085 Assembly language for division of two 8 bit numbers.
6. Write a program to perform AND, OR, Ex-OR logic operation in 8085.
7. Write a program which can move data from one memory location to another.
8. Write a program to exchange two numbers.
9. Write a program in 8051 (microcontroller) assembly language programming for addition of two 8 bit numbers.
10. Write a program in 8051 assembly language programming for subtraction of two 8 bit numbers
11. Write a program in 8051 assembly language programming for multiplication of two 8 bit numbers
12. Write a program in 8051 assembly language programming for division of two 8 bit numbers
13. Embedded system development kit for designing using keilvision software.

Unit 1

Measuring System: Basic elements of measuring devices Sensing Element suitability, Signal Conditioning Element, Output Element. Basic Parameters of Measuring devices: Accuracy, Precision, Error (Gross, Systematic & Random), Linearity, Hysteresis, Resolution, Threshold, Repeatability, Reliability or Maintainability, Span (Range), Calibration. Standard & Units of Measurement: Primary Standard, Secondary Standard, International Standard, Working Standard, Electrical Standard: Current Standard, Resistance Standard, Capacitance Standard, Inductance Standard, Voltage Standard, IEEE Standard. Basic Measuring Instrument: (Construction, working, application), PMMC Instrument, Moving iron instrument, Multimeter-Analog, Digital (Block Diagram).

Unit 2

Basics principles of Measurement: Introduction, Resistance Measurement: Low Resistance Method: Potentiometer method, Kelvin's double bridge - Medium Resistance Measurement: Wheatstone bridge, Ammeter, Voltmeter method, substitution method. High Resistance Measurement: Loss of charge method, Meggar method. Inductance Measurement: (i) 1. Approximation Method: V-I method, 2. ammeter method, 3. voltmeter method. (ii) Alternating Current Bridge Method : Maxwell's Bridge, Anderson's bridge, Hay's Bridge (iii) Mutual Inductance Measurement : Fellies Method. Capacitance Measurement: De Sauty's Bridge, Schering Bridge

Unit 3

Range Extension Methods: Needs of range extension, Range Extension of Ammeter, Range Extension of Voltmeter, Need of Instrument Transformer, Advantages of Instrument Transformer, Current Transformer & Potential

Unit 4

Cathode Ray Oscilloscope: Introduction to C.R.O, Construction, Block Diagram of a general Purpose C.R.O., Cathode Ray Tube (C.R.T.), Time Base Generator , Applications of C.R.O., Use of C.R.O. to Measure: Voltage, Current, Frequency, Phase Difference, Lissajou's Pattern, 4.6 Special Purpose C.R.O.: Dual Beam Oscilloscope, Dual Trace Oscilloscope, Digital Storage Oscilloscope.

Unit 5

Transducers: Introduction and Classification of Transducers, Selecting a Transducer. Sensors: diaphragm bionet pattern, allic' strip, bourden tube, bellows, LVDT, variable capacitance. Level measurement: Capacitance sensors, Ultrasonic transducers. Pressure Measurement: Potentiometric pressure transducer, Straingauge, piezoelectric load cell. Temperature Measurement: Resistance Transducers, Thermocouple, Thermistor, Photoconductive Cells, Photo Voltaic Cell, Optical Pyrometer.

References

1. Electronic Instrumentation and measurement techniques by Cooper
2. Instrumentation Devices & Systems by Rangan
3. Electrical Measurements & Measuring instruments by Golding & Widdis
4. A course in Electrical & electronic measurement & instrumentation by A.K. sawhney.

List of Experiments

1. Self Inductance measurement by Ammeter and voltmeter method.
2. Self Inductance measurement by 3 voltmeter method.
3. Self Inductance measurement by 3 Ammeter method.
4. Self Inductance measurement by general 4 arm bridge network method.
5. Self Inductance measurement by (a) Maxwell Bridge method (b) Hays Bridge Method (c) Anderson Bridge Method.
6. Mutual Inductance measurement by Felicis Method.
7. Capacitance measurement by Wein Bridge Method.
8. Capacitance measurement by Schering Bridge Method.
9. Low Resistance Measurement by (a) Ammeter Voltmeter Method (b) Potentiometer method (c) Kelvin Double Bridge Method
10. Medium Resistance measurement by – a) Substitution method (b) Wheat Stone Bridge Method.
11. High Resistance Measurement by – (a) Ohm meter (b) Meggar
12. Ammeter range extension using shunts.
13. Voltmeter range extension using voltage multiplier circuit.
14. Study of C.R.O.
15. Measurement on CRO (a) Voltage measurement on C.R.O (b) Current measurement on C.R.O (c) Frequency measurement on C.R.O.(d) Phase Difference measurement on C.R.O
16. Study of various transducers available in the laboratory.

Unit 1

Introduction to communication: Meaning of communication, Kinds of communication: Verbal & Non verbal, Machine communication, Purpose of communication: Information, persuasion, entertainment, education, control, Concept of communication system: Information, transmission, channel, reception, basic block diagram. Allocation of frequency spectrum for communication, Define: Attenuation (in dB), bandwidth, Noise, source and types, signal to noise ratio, noise figure (**definitions only**), Analog signal, Digital signal, Comparison between Analog and Digital communication, Advantages of digital communication systems.

Unit 2

Modulation techniques: Need of modulation, Analog Modulation, Amplitude Modulation (AM): basics, modulation index, bandwidth and signal power, DSB, SSB and VSB, AM features and Drawbacks. Frequency Modulation (FM): basics, modulation index, FM spectrum and Bandwidth, FM features, comparison with AM. Pulse Modulation: Graphically explanations of pulse amplitude modulation (PAM), pulse width modulation (PWM), pulse position modulation (PPM). Pulse Code Modulation (PCM): sampling, Quantization and encoding, data rate for digital voice channel. Digital Modulation techniques: Graphically explanations of NRZ, RZ, Manchester, binary ASK, FSK, PSK, Quadrature Modulation.

Unit 3

Multiplexing Techniques: Need of multiplexing, frequency division multiplexing (FDM), time division multiplexing (TDM), comparison between FDM and TDM, Digital hierarchy in India
Fundamentals of wire telephone: Frequency range used for technology. Voice/Audio signal parameters: Sound pressure level, Sound intensity, loudness, loudness level, pitch & frequency, sound distortion. Electronic Telephone Instrument, Subscriber's loop, DTMF dialing, Signaling tones, Telephone Lines. Telephone switching techniques: Electro-mechanical switching, analog switching, digital switching techniques, Digital Time Switch, Digital Space Switch, single stage, two stage, three stage, space switch, Telephone traffic calculation.

Unit 4

Fundamentals of electronic exchange: An overview of manual exchange, Introduction of electronic exchange. Chronological development of electronic exchanges, Basic principles of SPC exchange, Block diagram of SPC exchange, Working of SPC exchange: Terminal equipment, switching processor, switching peripheral, signaling interfaces, data processing peripheral. Telephone signaling: Telephone signals, addressing modes, call connection, subscriber's line signaling, calling subscriber's line signals, called subscriber's line signals. PBX/PABX/EPABX.

Unit 5

Facsimile Communication: Introduction, Types, Facilities of fax machine: General, copying, pooling, report status etc, advance, memory, time program, Setting fax to receive document and telephone automatically, changing the enquiry, self diagnosis features, Precautions during FAX operation and troubleshoot.

References

1. Electronic Communication systems by Dennis Roddy & John coolen
2. Electronics communication systems by Kennedy
3. Telephony by Das & Biswas.
4. Introduction to Telephony & telegraphy by E.H. Jolly(wheeler)
5. Electronic Communication System by Willium Schwber
6. Electronic Communication System by Wayne Tomasi
7. Telecommunication switching systems and Networks by Vishwanathan

List of Experiments

1. Study of Amplitude Modulation
2. Study of Frequency Modulation
3. Determine the percentage of modulation
4. PAM, PWM, PPM Circuits for Modulation and Demodulation
5. Study of ASK, FSK, PSK, QAM Signals.
6. Study of PCM - Pulse Code Modulation
7. Study of FDM and TDM
8. Study of operation of fax machine and its control.
9. Study various components of handset telephone instrument.

Unit 1.**INTRODUCTION TO ENTREPRENEURSHIP**

Definition of Entrepreneur / Entrepreneur, Difference between Entrepreneurship / Entrepreneurship, Need for Entrepreneurship, qualities of successful entrepreneur, Myths about Entrepreneurship, Classification of entrepreneurs on the basis of different criteria, Reasons for the failure of entrepreneurs

Unit 2.**INDUSTRIES AND BUSINESS ORGANIZATIONS**

Concept of Industry or Enterprise, Classification of Industries (a) On the basis of capital investment -Tiny (Micro) Industry,- Small Scale, - Medium Scale, - Large Scale (b) Others - Rural Industry, - Cottage Industry (c) Forms of Business Organization – Proprietorship, - Board & Co-operative, - Partnership, - Public Ltd., - Private Ltd., - IT Sector, - Government Co-operative / Undertakings (d) Tiny small scale Industry- Definition, - Its significance in National Development, - Govt. policies for SSI promotions, - Sector / Product for SSI.

Unit 3.**INSTITUTIONAL ASSISTANCE**

(a) Types of Institutional assistance - Infra - structural assistance, -Technical Assistance, - Financial assistance, - Marketing Assistance (b) Information / guidance & Training - SISI – ASK, - MPCON – CSIR, - CED- MA - NRDC (c) Infrastructure- D/C - AVN/AKVN (e) Finance - SIDBI - KVIB MPFC, - NABARD - MPWDC NSIC, M.P.A.V.V.N. (d) Marketing - MP- AGRO, - NSIC, - PM.LUN, - EXPORT COPPORATION,- KVIP, - MPHSVN MPLDC (e) Quality Control – BIS, - FPO, - MPLUN F.D.A.

Unit 4.**INCENTIVES / CONCESSION / FACITLITIES AVAILABLE**

Seed money, Incentive / subsidies, Others (Phones, Lands etc)

Unit 5.**PLANNING OF AN INDUSTRIAL UNIT (SSI)**

Pre- Planning Stage, Scanning the environment, Market survey, Seeking information, product / project selection, Implementation Stage- PPR Preparation, - DIC registration, - Arrangement of Land, - Arrangement of Power, - Obtaining NOC / Licenses from various departments, - DPR Preparation, - Seeking financial assistance, - Commercial Production, • Post Implementation stage - Permanent registration from D.I.C., - Availing Subsidies, - Diversification / Modification, - Setting up of marketing channel / Distribution.

Unit 6.**ACHIVEMENT MOTIVATION**

Historical perspective, Concept of achievement motivation, Significance of achievement motivation, Development of achievement motivation

Unit 7.

FINANCIAL MANAGEMENT OF AN INDUSTRIAL UNIT (SSI)

Tools of financial analysis, Ratio analysis, Fund Flow / Cash flow analysis, Working capital and concepts, Financial accounting

REFERENCES

1. Entrepreneurial Development Vol. I,II,III By Vasant desai Himalaya Publication
2. CEDMAP (Center of Entrepreneurial development Madhya Pradesh)
3. Udyamita Vikas By Anand Prakashan

PROJECT WORK/ASSIGNMENT

1. To prepare chart to showing various factors affecting entrepreneurship.
2. To collect details related to various schemes run by the Govt. for Self-Employment and Entrepreneurship.
3. To identify and select a project and conduct Market-Survey thereof.
4. To collect various formats used in industries & departments/institutions working in the field of entrepreneurship.
5. Visit few small scale industries situated in city, nearby industrial area.
6. Discuss the problems related to SSI (Small Scale Industries) with an entrepreneur.
7. Collect information about market rates quality and quantity of goods for their choice.
8. Develop logical and analytical approach to purchase the raw material / finished goods
9. To prepare case study of successful entrepreneurs.
10. Preparation of Project report for the industry/ Business they are willing to start.

Unit 1

Marketing and Concept: Evolution of marketing-a historical background, The stage of barter, The stage of money economy, The stage of industrial revolution, The stage of competition, The emergence of marketing, Selected definitions of marketing, Different concept of marketing, The exchange concept, The production concept, The product concept, The sales concept, The marketing concept, Difference between selling & marketing, Benefits & significance of marketing, Helps to remove causes for under development, Improve productivity & efficiency, Canalize country's economic resources properly, Insure better deal for consumer, Make economic planning meaningful & relevant etc.

Unit 2

Marketing environment: Internal & external factors, Demographic environment, Economic environment, Political environment, Physical environment, Technological environment, Competitive environment, Social & cultural environment, Micro & macro environment

Unit 3

Marketing planning & organization: Scope & importance of planning, Steps in marketing planning process, Purpose & principle of organization, Models of marketing organization, Line & staff type, Product based organization, Territory oriented organization, Complex organization, Task of chief marketing executive, Decentralization

Unit 4

Market segmentation: Types of market, Definitions & benefits of segmentation, Methods of segmentation, Geographic segmentation, Demographic segmentation, Psychographic segmentation, Buyer behavior Segmentation, Volume segmentation, Steps in market segmentation, Market targeting

Unit 5

Market mix: Definition of market mix, Elements of marketing mix (4 P'S)-Product, Place, Price, Promotion, Environmental variable (uncontrollable variables), Customer variable, Competition variable, Trade variable, Environmental variable, Product management, Components of product, The core or basic constituent, The associated features, The brand names, package, label, Types of product, The generic product, The branded product, The differentiated product, The customized product, The augmented & potential product, The product line & product mix, New product development (NPD), Significance & classification of new product, Stages in NPD, Estimating the demand for new product, Test marketing, Product life cycle (PLC), Concepts & benefits of PLC, Different stages in PLC, Strategies used in different stages, Place management, Physical distribution, Definitions & importance of physical distribution, Designing the physical distribution system, The distribution channel, The role & importance of distribution channel, Planning & designing of distribution channel, Types of distribution intermediaries. Price management: The meaning & importance of pricing, Objectives of pricing, Factors affecting pricing –Internal & external, Pricing methods, Cost based pricing. Break even pricing: Demand based pricing, Competition based pricing,

Product line pricing, Tender pricing, Affordability pricing, Differentiated pricing, Pricing policies & setting the price. Promotion management: Sales promotion, Importance & objectives of sales promotion, Tools & techniques of sales promotion. Advertising: Role & importance of advertising, Types of advertising, Deciding on the advertising budget, Evaluating advertising effectiveness, Difference between sales promotion & advertising

Unit 6

Understanding consumer: Factor influencing buyer behavior, Information from variety of sources, Socio-cultural environment of buyer, Group influence, Religion & language, Concern about status, Buying motives –Product & patronage motive Buying habits – Convenience, shopping and spatiality goods.

Unit 7

Marketing research & sales forecasting: Definition & importance of marketing research, Steps in marketing research, Defining problem, Problem analysis, Developing research design, Developing research procedure, Data collection –Primary & secondary, Analyzing & interpretation, Summarizing & preparing the research report, Method of market research, Necessity & purpose of sales.

Unit 8

Sales management: Designing the sales force, Managing the sales force, Recruitment & selection, Training, compensation, control, Supervision & direction, Motivation of salesman, Fixing sales quota, Duties & responsibilities of sales manager

References

1. Marketing management - Analysis, Planning & Control - Philip Kotler
2. Principles & practice of Marketing in India - C.B.Memoria & R.L.Joshi
3. Contemporary Marketing – Louis & Boone & David L. Kurtz
4. Essential of Management –Koontz
5. Marketing management- S.A. Sherlekar

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 openended 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.