



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

SYLLABUS
For
DIPLOMA in ELECTRICAL ENGINEERING
(PART TIME)
(2nd YEAR, 3rd SEM)

College of Polytechnic Engineering

Dr. A P J Abdul Kalam University, Indore

DR. A P J ABDUL KALAM UNIVERSITY, INDORE

Syllabus for Diploma in Electrical Engineering (Part Time)

List of Subject (2nd Year, 3rd Sem)

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Unit 1: Introduction to Computers:

1.1 Basic Concepts: Generations of Computers, Overview of computer Systems, Classifications of Computers, Characteristics of Computers, Applications of Computers.

1.2 Numbers System & Codes: Decimal, Binary, Octal, Hexadecimal, Conversions from one system to other, Binary Coded Decimal & ASCII Code.

1.3 Computer Hardware: Input Devices, Keyboard, Mouse, Trackball, Joystick, Scanner, OMR OCR Bar-Code Reader, MICR, Digitizer, Card Reader, Voice Recognition, Web Cam, Video Cameras, Etc. Output Devices, Monitors, Printers : Dot matrix, Inkjet & Laser, Plotters, Computer, Output Micro Film (COM), Multimedia Projector, Speech Synthesizer, Dumb, Smart & Intelligent Terminal. Storage Devices Primary and Secondary Storage, Characteristics and Limitation, Floppy, Hard disk, CD ROM DVD, Disk Cartridge. Microprocessor Registers, Arithmetic Unit, Control Unit, Buses, Instruction Set, Processor Speed. Memory Concepts Concept of Memory, Unit of Memory, Types of Memory, RAM, ROM, PROM, EPROM, EEPROM, and Cache Memory.

1.4 Computer Software: Computer Software, System Software V/s Application Software, Operating System Programs, Language Processor, Assembler, Compiler & Interpreter, Application Software, Types of Application Software and their examples. High Level Language, Low Level Language, Assembly Language.

1.5 Multimedia: Basics of Multimedia Components- Text, Graphics, Animation, Audio, Images & Video. Multimedia Applications.

Unit 2: Operating System:

2.1 Overview of DOS: Internal Commands, External Commands

2.2 Windows Operating System: Overview of different versions of Windows, Characteristics and Facilities of Windows, Terminologies of Windows – Desktop, Icon, Menu etc. Components of Desktop. Working with Files and Folders. Windows Utilities and Accessories Notepad, WordPad, Paintbrush, Windows Explorer, Calculator.

2.3 Introduction to Linux: An overview of Linux, Basic Linux elements System, Features Software, Features File structure, Linux H/W & S/W requirements.

Unit 3: Word Processing:

Saving, Closing, Opening of documents, Selecting text, Editing text, Finding and replacing text, Printing documents, Merge Documents, Character and paragraph Formatting Page Design and layout Spell Check Creating Tables and Charts. Handling Graphics

Unit 4: Spreadsheet Package:

Spreadsheet concept: Need, advantage, Terminology like cell, row, column etc. Working with Spreadsheet – Creating, Saving, Editing and printing Entering data, Entering number, text, date, time etc. Selecting cells – Cut, copy, paste date, Editing Worksheet data, Formatting Text and Cells, Applying border shading, background patterns, conditional formats, positioning cells, formatting numbers, text, Date, time. Creating formulas Entering, Editing, Using Functions controlling calculations. Working with Charts- Creating charts, adding & changing text, changing the view and display, types of charts.

Unit 5: Presentation Software:

Introduction, Presentation design tools, Presentation terminologies, Creating, Opening and Saving Presentation, Working with different views, Creating and Organizing slides, Adding and Formatting text in slides, Formatting paragraphs, Adding drawings and objects, Creating special effects, Working with table and charts, Printing Presentation

Unit 6: Database:

Introduction – need, Characteristics and terminologies of database, Types of database – relational, Hierarchical and Network, Basic entities – Tables, records, Data types, Data Validation and constraints, keys relation between tables. Query – Select, Insert, Update, Delete. Forms – Creating forms, Forms controls Report Designer- Customize formats, grouping reports

Unit 7: Computer Communication & Networks:

7.1 Information Networks The Technology of Workgroup Computing Types of network Network topology, Network components.

7.2 Data Communication, Introduction to Data Communication Types of Data Transmission media.

7.3 Internet and E-mail, Internet Basics, Websites- Applications, terminologies, naming conventions. Web Browsers- Types, Navigation and tools.

E-mail – concept, terminologies, mailing services provider, advantages comparison with Conventional mailing

Search engine – concept, search engine websites, searching methods.

REFERENCES

1. A First Course in Computers - S . Jaiswal Golgotha Publication
2. Computers & Application, - Slotnick, Butterfield, Colantonio and Kopetzky C.C. Health & Company
3. Computers Today, Suresh K. Basandra Galgotia Publication
4. The Complete Guide to Microsoft Office Professional, Ron Mansfield Sybex /BPB Asian Edition
5. inside IBM PC Norton Peter
6. Hardware Bible BPB Publication
7. Computer Hardware Osborne Series
8. DOS & Utilities BPB Publication
9. Learning Windows in 24 Hours Sam Techmedia
10. Multimedia making it work Tay Vaughan Tata McGrawHill
11. Understanding windows BP Chapman B Publication

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List of Experiments

1. Study of various components of computer like CPU, keyboard, mouse, monitor, printer, CVT and storage devices.
 2. Internal and external commands of DOS.
 3. Using Windows operating system, study of desktop, control panel, accessories and settings. File management in windows explorer, Study of WordPad, Notepad, Paint Brush, Calculator etc.
 4. Study of Linux operating system.
 5. Study of MS-word – opening and saving of documents, formatting, editing and spell check, find and replace, printing, merging. Creating Table, Charts and Graphics.
 6. Study of Spreadsheet – creating, saving, editing and printing. Entering data, selecting cells, formatting text, applying border shades and backgrounds, creating formulas, creating charts.
 7. Study of Power Point – creating, opening, editing and saving of slides. Adding and formatting text, creating animations, working with images and special effects. Printing presentation.
 8. Study of MS Access– creating, saving, editing and printing of tables. Managing relationships, writing queries e.g. SELECT UPDATE, DELETE, and INSERT. Forms designing and report printing.
- Study of Web Browser and mailing programs.



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Unit 1: Introduction to Drawing Instruments:

Introduction of drawing instruments, materials and their uses, Applications of minidrafter, Applications of compass and divider, Applications of French curves and spline, Pencils grades and their uses, Designation and sizes of drawing sheet and drawing board.

Unit 2: Planning and Lay- Out Of Drawing Sheet:

Planning of drawing sheet as per I.S.: 696-1972 (SP 46: 1988), This should include Margin. Title Block, Zoning, Revision panel, folding marks, Numbering of sheet.

Unit 3: Conventional Representation:

Conventional representation of the following as per BIS practice, Common Engineering materials, Electrical installations and fittings, Main switches, (lighting and power), socket outlets (3 pin 5AMP, 3pin15AMP), bell, buzzer, loud speaker, Aerial, ceiling fan, exhaust fan, Bracket fan, fan regulator, battery and earth point.

Electronics components-Diode: Zener, varactor, Scotty, step recovery, light emitting diode (LED), PNP and NPN transistors, resistance, capacitor, Inductors (fixed and variable both), IC (8pin and 14pin) SCR, TRIAC, DIAC, UJT, FET, MOSFET, LOGIC GATES.

Sanitary fittings- showerhead, wall lavatory basin, corner, Lavatory basin, urinal stall, kitchen sink, Indian type WC, Water closets (Asian pan, urissapan, Anglo-Indian, European)

Building -single and double swing doors and windows.

Mechanical components- Internal and external threads, slotted head, Square end and flat, radial arms and ribs, serrated shaft, splined shaft, Chain wheel, bearing, straight and diamond knurling, Compression and tension spring, leaf spring (with and without eye), Spur and helical gear.

Unit 4: Lines, Lettering and Dimensioning:

Introduction of type of lines and their applications, Single stroke vertical, inclined letters (capital and lowercase) and numerals. Dimensioning: Elements of dimensioning- dimension line, extension line, arrowhead And leader line, Dimensioning system – Aligned and unidirectional. Dimensioning of Arcs and Circles, Angular Dimensioning, Dimension of counter sunk and counter bore.

Unit 5: Geometrical Constructions and Engineering Curves:

Divide a line into any number of equal parts by parallel line method, Bisecting of line and angle, Construction of triangles and polygons, Introduction of conic sections (curves), Construction of Ellipse by Eccentricity and Concentric circles methods, Construction of Parabola by Eccentricity and Rectangle methods, Construction of Hyperbola by Eccentricity method, Construction of Cycloid, Construction of Involute of circle and polygon, Construction of Archimedean Spiral of any number of convolutions.

Unit 6: Scales:

Introduction of scales and their applications, Concept of reducing, enlarging and full size scale, Classification of scales – plain, diagonal, vernier, Scale of chord and comparative scales, Definition of R.F, Construction of plain and diagonal scales.

Unit 7: Theory of Projection and Projection of Points, Lines and Planes:

Definition of various term associated with theory of projection, Planes of projection, Quadrants, first & third angle projection method, Projection of points in all the four quadrants, Projection of lines **1.** Parallel to HP and VP both. **2.** Perpendicular to one plane and parallel to other **3.** Inclined to one plane and parallel to other **4.** Knowledge of projection of line inclined to both the planes (No practice required). Projection of planes. **1.** Perpendicular to HP and VP both **2.** Perpendicular to one plane and parallel to other. **3.** Inclined to one plane and perpendicular to other. **4.** Knowledge of projection of plane inclined to both the planes (No practice required).

Unit 8: Projections of Solids:

Projection of cylinder, cone, prism and pyramid. Under the following conditions:

1 Axis parallel to HP and VP , 2 Axis perpendicular to HP and parallel to VP, 3 Axis perpendicular to VP and parallel to HP, 4 Axis inclined to HP and parallel to VP, 5 Axis inclined to VP and parallel to HP, 6 Axis inclined to both HP and VP (No Practice required)

Unit 9: Section of Solids and Development of Surfaces:

Section of cone, cylinder, prism and pyramid (Solid resting on its base in the HP i.e. the Axis perpendicular to HP and parallel to VP) in the following cases: 1 Section plane parallel to HP and perpendicular to VP, 2 Section plane parallel to VP and perpendicular to HP, 3 Section plane inclined to HP and perpendicular to VP, 4 Section plane inclined to VP and perpendicular to HP, Drawing True shape of section, Introduction to development of lateral surface of solids Cone, Cylinder, Prism and Pyramids (Simple and truncated), Under the condition – solid resting on its base in the HP and axis Perpendicular to HP and parallel to VP, Development of funnel and elbow

Unit 10: Intersection of Surfaces:

Intersection of following cases Cylinder to cylinder and Prism to prism (With their axis intersecting and perpendicular to each other.)

Unit 11: Orthographic Projections & Free Hand Sketching:

Principles of orthographic projections, Identification of necessary views and superfluous view, Selection of front view, Preparation of necessary orthographic views of simple objects, From given pictorial views, Dimensioning of orthographic views as per standard practice, Free hand sketches of simple objects (Using Pencil, Eraser & Paper only).

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Unit 12: Isometric Views:

Concept of isometric projection and isometric view (Isometric Drawing), Construction of isometric scale, Construction of isometric view of polygon and circle, Construction of isometric view of cone, cylinder, prism and pyramids, Construction of isometric view of simple objects from given orthographic views.

REFERENCES

1. ENGINEERING DRAWING– N.D. Bhatt
2. ENGINEERING DRAWING– R.K. Dhawan
3. ENGINEERING DRAWING– P.S.Gill
4. FIRST YEAR ENGINEERING DRAWING– A.C.Parkinson
5. SP: 46-1988 Bureau of Indian standard
6. PRINCIPLES OF ELECTRONICS - Malvino
7. ABHIYANTRIK AAREKHAN -SHIVDATT UPADHYAY

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UNIT 1 - D.C. Circuits

Concept of charge, current, voltage, EMF, resistance, resistivity. Ohm's law, KCL, KVL. Series and parallel combination of resistances, star-delta connection, star to delta and delta to star transformation.

UNIT 2- A.C. Fundamentals

Concept of inductance, capacitance, reactance, impedance, admittance, phasor diagram of pure resistive, inductive and capacitive circuit. Difference between AC and DC quantities, sinusoidal waveform, frequency, time period. Instantaneous, maximum, average and RMS value, form factor.

UNIT 3- Magnetic effect of electric current

Concept of lines of force, flux, MMF, reluctance, permeability, magnetic flux density, magnetic field intensity. Analogy of electric and magnetic circuit, units. Faraday's laws of electromagnetic induction, self and mutual induction. Lenz's laws, Fleming's left and right hand rule.

UNIT 4- Electrical Engineering materials

Definition of conductors, insulators and semiconductors. Intrinsic and extrinsic semiconductor materials. Properties and applications of conducting, semi-conducting and insulating materials, classification of insulating materials on the basis of temperature. B-H curve, soft and hard magnetic materials. Different magnetic materials, properties and applications.

UNIT 5- Heating and Chemical effect of electric current


Heat produced. Work, power and energy, units. Faradays laws of electrolysis. Primary and secondary cells.

References

1. Basic Electrical Engineering By Nagrath Kathari
2. Electrical Engineering Materials By TTTI Madras.
3. Basic Electrical Engineering By Jain & Jain
4. Basic Electrical Engineering By V.K. Mehta
5. प्रारंभिक वैद्युत अभियांत्रिकी ठल एम.एफ.कुरैशी, दीपक प्रकाशन
6. विद्युत सामग्री एवं परिपथ ठल एम.के.डियोडिया, म.प्र.हिन्दी ग्रन्थ अकादमी

List of Experiments:

- [1] Study of different types of meters/indicators, Ammeter, voltmeter, wattmeter etc.
- [2] Measurement of current and voltage in single phase and three phase circuit series and parallel circuit.
- [3] Measurement of current, voltage and power in single phase circuit.
- [4] Study of different types of loads i.e. resistive, inductive and capacitive load.
- [5] Study of multimeter.
- [6] Verification of ohms law.
- [7] Study of different types of conducting, insulating, and magnetic materials.
- [8] Study of different types of primary and secondary cells and batteries.

A large, semi-transparent watermark of the university logo is centered on the page. It features a shield with a quill pen and an open book, with the text 'Dr. A.P.J. Abdul Kalam' arched above and 'University Indore' below.

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UNIT 1 - Circuit Analysis

Active and passive elements, ideal current source and voltage source. Unilateral and bilateral elements. Number of loops, nodes, branches of a network. Analysis of networks by "Mesh" and "Node" methods. T and II terminal networks, input and output impedance and admittance.

UNIT 2- Network Theorems

Maxwell's loop theorem, Nodal analysis, Superposition, Thevenin's, Nortons' and maximum power theorems with numerical problems.

UNIT 3-Single Phase A.C. Circuits

Representation of A.C. quantity by phasor methods, rectangular and polar co-ordinates. RLC series and parallel combinations. Impedance, power in single phase circuits. Concept of power factor, conductance, admittance and susceptance. Series and parallel circuits, resonance in series circuit.

UNIT 4- Polyphase Circuits

Concept of poly phase A.C. circuits, advantages over single phase. Generation of three phase voltage system. Three phase circuits, phase sequence, vector and wave diagrams. Star and delta connections, phase and line values of current and voltage, power in three phase circuits. Balanced and unbalanced systems

UNIT 5- Transients

Concept of transient, variation of current when connected to D.C. or A.C. series circuit (R.L. combination and R.C. combination). Time constant.

References

1. Basic Electrical Engineering By Nagrath Kathari
2. Mittal GK; Network Analysis; Khanna Publisher
3. Chakraborti :Circuit theory: Dhanpat Rai.

List of Experiments

- [1] Verification of Superposition theorem
- [2] Verification of Norton's and Thevenin's theorem
- [3] Verification of Maximum power transfer theorem
- [4] Performance of R-L-C- series circuit
- [5] Performance of R-L-C- parallel circuit
- [6] Study of electrical resonance in series circuit
- [7] Verification of relation between line and phase voltage and current in 3-phase circuit
- [8] Study of transients

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

1 SOCIAL SKILLS

SOCIETY, SOCIAL STRUCTURE, DEVELOP SYMPATHY AND EMPATHY

2 Swot Analysis – Concept, How to make use of SWOT

3 Inter personal Relation- Sources of conflict, Resolution of conflict , Ways to enhance interpersonal relations.

4 Problem Solving

I) STEPS IN PROBLEM SOLVING- identify and clarify the problem, information gathering related to problem, evaluate the evidence, consider alternative solutions and their implications, choose and implement the best alternative, review

II) Problem solving technique.(any one technique may be considered)

- 1) Trial and error, 2) Brain storming, 3) Lateral thinking

5 Presentation Skills

Body language -- Dress like the audience, Posture, Gestures, Eye contact and facial expression.

Presentation Skill- Stage Fright, Voice and language – Volume, Pitch, Inflection, Speed, Pause Pronunciation, Articulation, Language, Practice of speech. Use of aids –OHP,LCD projector, white board

6 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. **TWO** industrial visits may be arranged in the following areas / industries :

- i) Manufacturing organizations for observing various manufacturing processes including heat treatment ii) Material testing laboratories in industries or reputed organizations iii) Auto workshop / Garage iv) Plastic material processing unit v) ST workshop / City transport workshop
- ii)

7 Lectures by Professional / Industrial Expert be organized from Any

Three **of the following areas** : i) Use of a plastics in automobiles. ii) Nonferrous Metals and alloys for engineering applications iii) Surface Treatment Processes like electroplating, powder coating etc. iv) Selection of electric motors. v) Computer aided drafting. vi) Industrial hygiene. vii) Composite Materials. viii) Heat treatment processes. ix) Ceramics

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8 Individual Assignments :

Any two from the list suggested

a) Process sequence of any two machine components. b) Write material specifications for any two composite jobs. c) Collection of samples of different plastic material or cutting tools with properties , specifications and applications. d) Preparing models using development of surfaces. e) Assignments on bending moment , sheer forces , deflection of beams and torsion chapters of strength of material. f) Select different materials with specifications for at least 10 different machine components and list the important material properties desirable. g) Select 5 different carbon steels and alloy steels used in mechanical engineering applications and specify heat treatment processes employed for improving the properties. Also give brief description of the heat treatment processes. h) List the various properties and applications of following materials – a.Ceramics b. fiber reinforcement plastics c. thermo plastic plastics d. thermo setting plastics e. rubbers.

OR

Conduct **ANY ONE** of the following activities through active participation of students and write report

- i) Rally for energy conservation / tree plantation. ii) Survey for local social problems such as mal nutrition, unemployment, cleanliness, illiteracy etc. iii) Conduct aptitude , general knowledge test , IQ test iv) Arrange **any one** training in the following areas : a) Yoga. B) Use of fire fighting equipment and First aid Maintenance of Domestic appliances.

9 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 The students should discuss in a group of six to eight students and write a brief report on the same as a part of term work. Two topics for group discussions may be selected by the faculty members. Some of the suggested topics are - i) Sports ii) Current news items iii) Discipline and House Keeping iv) Current topics related to Electrical engineering field.

Interview Technique Necessity, Tips for Handling Common Questions

10 Working in Teams

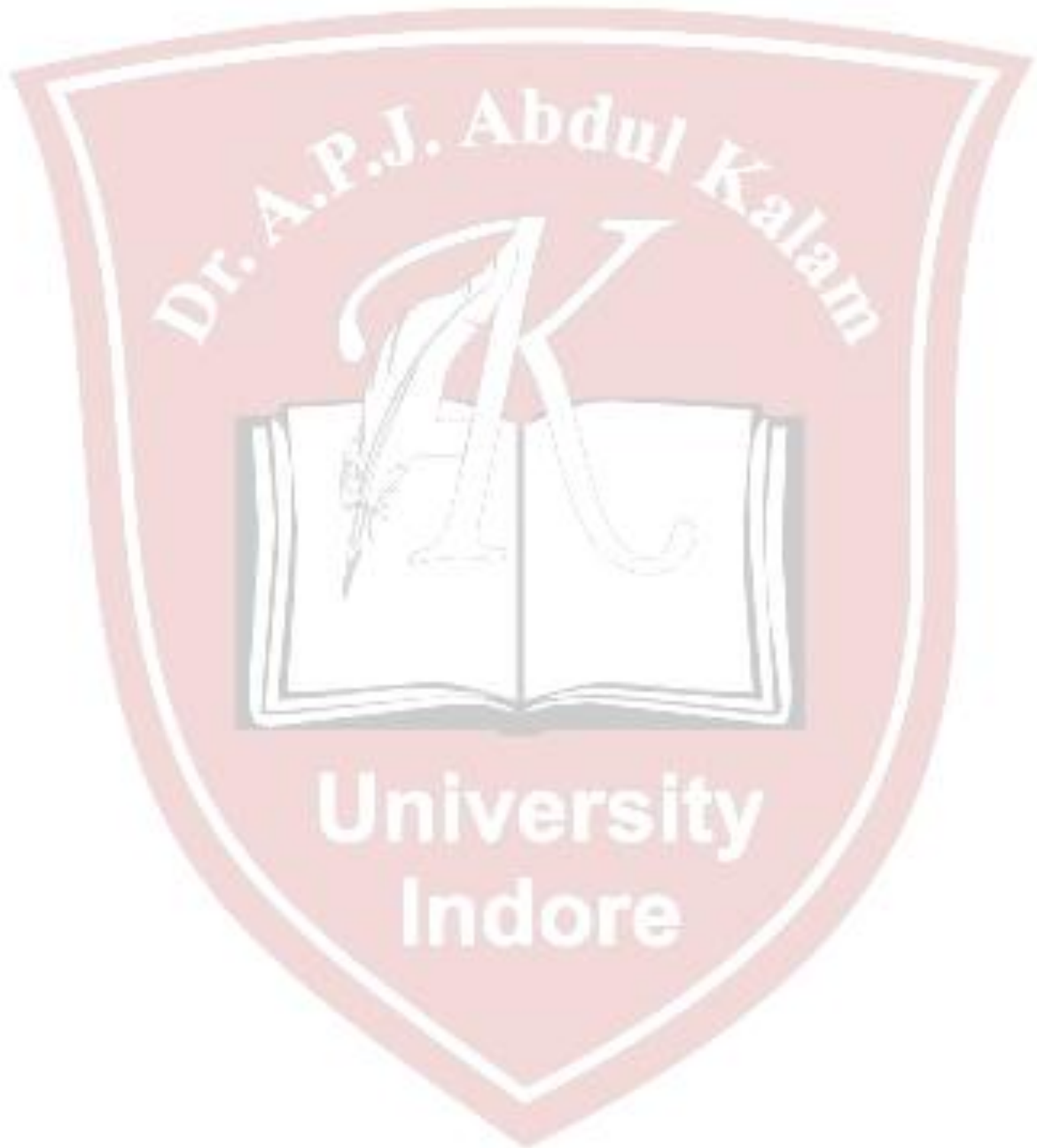
Understand And Work Within The Dynamics of A Groups. Tips to Work Effectively In Teams, Establish Good Rapport, Interest with others and work, Effectively with Them to Meet Common objectives, Tips to Provide and Accept Feedback in A Constructive and Considerate Way, Leadership In Teams, Handling Frustrations in Group.

11 Task Management -Introduction, Task identification, Task planning, organizing and execution, Closing the task

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 complete Stipulated time with the help of teacher. Write a report considering various steps in Task management.



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