

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

SYLLABUS
For
DIPLOMA in ELECTRICAL ENGINEERING
(PART TIME)
(3nd YEAR, 5th 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 (3nd Year, 5th Sem)

S. No.	Subject Code	Subject name	Page No.
1	PTEED 501	ELECTRICAL MACHINES – II	3
2	PTEED 502	ELECTRICAL ENGG. DRAWING	5
3	PTEED 503	GENERATION, TRANSMISSION AND DISTRIBUTION	7
4	PTEED 541	ENTREPRENEURSHIP	9
5	PTEED 542	MARKETING MANAGEMENT	11
6	PTDC 9999	PROFESSIONAL ACTIVITIES	13



**University
Indore**

(...Nurturing Talents to Success)

UNIT-1 Single phase induction motors

Principle, double revolving field theory. Types of motors with their construction, characteristics and applications. Comparison of three phase with single phase induction motors

UNIT-2 Three phase Induction Motor

Production of rotating magnetic field, principle, construction and types of induction motors. Equivalent circuit, torque equation, torque-slip characteristics. Types of starters: DOL, Star-delta, Autotransformer type, rotor resistance type, contactor type starter. Speed control. No load and blocked rotor test, losses and efficiency. Braking and applications. Simple numerical

UNIT-3 Synchronous motor

Principle, construction, phasor diagram, effect of change in excitation, V curves, synchronous condenser, starting of motors, hunting and its prevention, coding of synchronous machines.

UNIT-4 Synchronous generator

Principle, construction, salient and cylindrical rotors, speed-frequency relationship, EMF equation, distribution and pitch factor, equivalent circuit, synchronous impedance, regulation, O.C.C. and S.S.C., load characteristics, phasor diagram, parallel operation. Methods of synchronization, power-angle characteristics.

UNIT-5**AC commutator motors -**

Introduction, series motor, compensated series motor, commutating poles, universal motor, repulsion motor.

Special purpose machines -

Induction motor, stepper motor, PM motor.

References

1. Electrical Technology Vol. II BL Thereja Khanna publisher
2. Electrical Machines Bhattacharya T.T.T.I.
3. Electrical Machines Nagrath & Kothari PHI
4. Electrical Machines Vol. I & II PS Bhimbra Khanna publishers

List of Experiments

- [1] Study of different single phase induction motors (construction).
- [2] Study of three phase induction motor (parts).
- [3] Study of three phase induction motor starters.
- [4] Measurement of slip of three phase induction motor.

- [5] Study of synchronous machine (parts).
- [6] OCC and SCC of synchronous generator and determination of regulation.
- [7] To plot V curves of synchronous motor.
- [8] Study of AC Commutator motors (construction).
- [9] Study of special purpose motors (construction).

(...Nurturing Talents to Success)

UNIT-1 Symbols and Notations

Symbols of practical units, multiples and submultiples, types of supplies, single phase, three phase three wire, three phase four wire, D.C. supply etc. Accessories like main switches, distribution boards, fans, light fixtures, bell, buzzer, lighting arrestor. All types of motor starters, instruments, electronic components etc. Rating plate of machines.

UNIT-2 Domestic Wiring and Power Wiring

All types of light circuits: Fluorescent tube circuits, intermediate switch circuits, fan circuits. Wiring of a residential building. Sodium vapor lamp, mercury vapor lamp.

Power Wiring - Internal wiring diagrams of single phase motor. wiring diagrams of D.C. and A.C. motor starters like three point shunt motor starter, four point compound motor starter, direct on line (D.O.L.) starter, star- delta starter, contactor type and auto transformer starter. Internal connections of D.C. series, shunt and compound motors. Three phase motors: squirrel cage, slip ring, synchronous etc. Plate earthing and Pipe earthing as per I.S.S.

UNIT3 Electrical Machine Drawing and Winding Diagrams

Parts of D.C. machines like, magnetic poles, commutator, armature etc. A.C. machines rotor, slip rings, etc. Various cable sections. Bushing of the transformer. Assembly diagrams of D.C. machine, A.C. machine, and transformer. Simplex type lap and wave diagrams for D. C. Machines. Single phase and three phase motor winding diagrams.

UNIT-4 Instrument Circuits

Connection of meters in circuits. Ammeter, voltmeter, wattmeter, energy meter, Power factor meter, frequency meter, synchroscope etc. Extension of range using shunt, multiplier, current transformer, potential transformers etc.

Simple Electronic Circuits - Battery eliminator, battery charger, single stage transistor amplifier, connections of common emitter, collector and base amplifier circuits.

UNIT-5

Alternator Panel Diagrams - Panel diagram with circuit breaker, isolator, measuring instruments, synchroscope. Over current and earth fault protection, differential protection, voltage regulator etc.

Transmission and Distribution- All types of transmission towers and distribution poles. Arrangement of various types of cross arms, with insulators, jumpers. Electrical layout of 33KV/ 11KV substation, 11KV/415V pole mounted substations with all protective devices etc.

References

- (1) A text book of Electrical Drawing .by S.L. Uppal (Khanna pub.)
- (2) Electrical Drawing by K.L. Narang.
- (3) Electrical Drawing by C.R. bargan .
- (4) विद्युत अभियांत्रिकी ड्राईंग एम. एस. कुरेशी, दीपक प्रकाशन

List of Experiments

- [1] Draw the symbols and notation of various supplies.
- [2] To study of single phase, three phase three wire, D.C. supply
- [3] To study of three phase four wire, D.C. supply.
- [4] Internal wiring diagrams of single phase motor.
- [5]wiring diagrams of D.C. and A.C. motor starters
- [6]Simplex type lap and wave diagrams for D. C. Machines. Single phase and three phase motor winding diagrams.
- [7]switches, distribution boards, fans, light fixtures, bell , buzzer, lighting arrestor
- [8]Connection of meters in circuits. Ammeter, voltmeter, wattmeter, energy meter, Power factor meter, frequency meter,
- [9] To study of CT and PT.

(...Nurturing Talents to Success)

UNIT-1 Non Conventional Sources of Energy -

Concept and need of primary and secondary energy sources, difference between conventional and non-conventional sources of energy, concept of solar , wind, biogas, ocean, tidal, geothermal, fuel cell , MHD and their practical applications.

UNIT-2 Conventional Sources of Energy -

Detailed study of generating stations - thermal, hydro, nuclear, schematic diagram, site selection main components and auxiliaries for above power stations. Study of gas turbines plant and diesel power plant. Advantages, disadvantages of thermal hydro, nuclear, gas turbine plant and diesel power plant.

UNIT-3 Concept of Load -

Types of load, load curve, load duration curve, connected load, demand factor, average load, maximum demand, load factor, diversity factor, plant utilization factor, capacity factor, reserve capacity. Simple numerical on above terms.

Types of Tariff, flat rate, block rate, two part, maximum demand and power factor tariff. Their merits and demerits. Simple problems on above terms.

UNIT-4

Concept of Transmission, single line diagram of complete power system, standard voltages of A.C. Transmission, efficiency (no derivation). H.V.D.C. transmission system, line diagram, advantages and Disadvantages of H.V.D.C.

Sag, causes & effects of sag on transmission line, effect of wind, ice and temperature on sag. Types of line supports, type of joints, looms, earth wires, ground wire and vibration dampers.

Importance of R,L,C in transmission line (no derivation), skin effect, transposition, corona, advantages and disadvantages of corona, methods of reducing corona, types of insulators, string efficiency and voltage distribution, grading ring and Arcing horn.

UNIT-5

Types of Transmission line, T and Π network of medium Transmission line, transmission efficiency, Ferranti effect, simple problems of short and medium Transmission line.

Difference between overhead line and underground cables. Classification and construction of L.T. and H. T. cables, Methods of laying.

Classification of distribution system, ring main, radial and interconnected system. Concept of feeder, distributor and service mains in distribution system. Simple problems.

References

1. Non Conventional energy sources By G.D. Rai, Khanna publisher
2. Electrical Power By S.L.Uppal, Khanna publisher
3. Electrical Power By J.B. Gupta
4. Power System By V.K. Mehta

List of Experiments

- [1] Study of solar cooker.
- [2] Study of solar water heater.
- [3] Study of solar photo-voltaic cells.
- [4] Study of wind mill.
- [5] Study of Bio Gas plant.
- [6] Study of steam power plant, hydro power plant, nuclear power plant.
- [7] Study of line supports and insulators.
- [8] Determination of string efficiency of insulator string.
- [9] Performance of short/ medium transmissions line.
- [10] Study of L.T. and H.T. Cables and over head conductors.
- [11] Voltage distribution in radial and ring main system.
- [12] Visit to a
 - Substation.
 - Generating station.
 - Places where solar, wind, Biogas and tidal power plant are installed.

(...Nurturing Talents to Success)

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

UNIT 3. INSTITUTIONAL ASSISTANCE

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

UNIT 4. INCENTIVES / CONCESSION / FACILITIES AVAILABLE

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

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 5. ACHIEVEMENT MOTIVATION

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

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 Publicaton
2. CEDMAP (Center of Entrepreneurial development Madhya Pradesh)
3. Udyamita Vikas
By Anand Prakashan

PROJECT WORK/ASSIGNMENT (411)

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.

(...Nurturing Talents to Success)

Unit 1 :Marketing & 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-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

(...Nurturing Talents to Success)

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 forecasting ,Methods of sales forecasting

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 & Bone & David L. Kurtz
4. Essential of Management –Koontz
5. Marketing management- S.A. Sherlekar

(...Nurturing Talents to Success)

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

(...Nurturing Talents to Success)

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

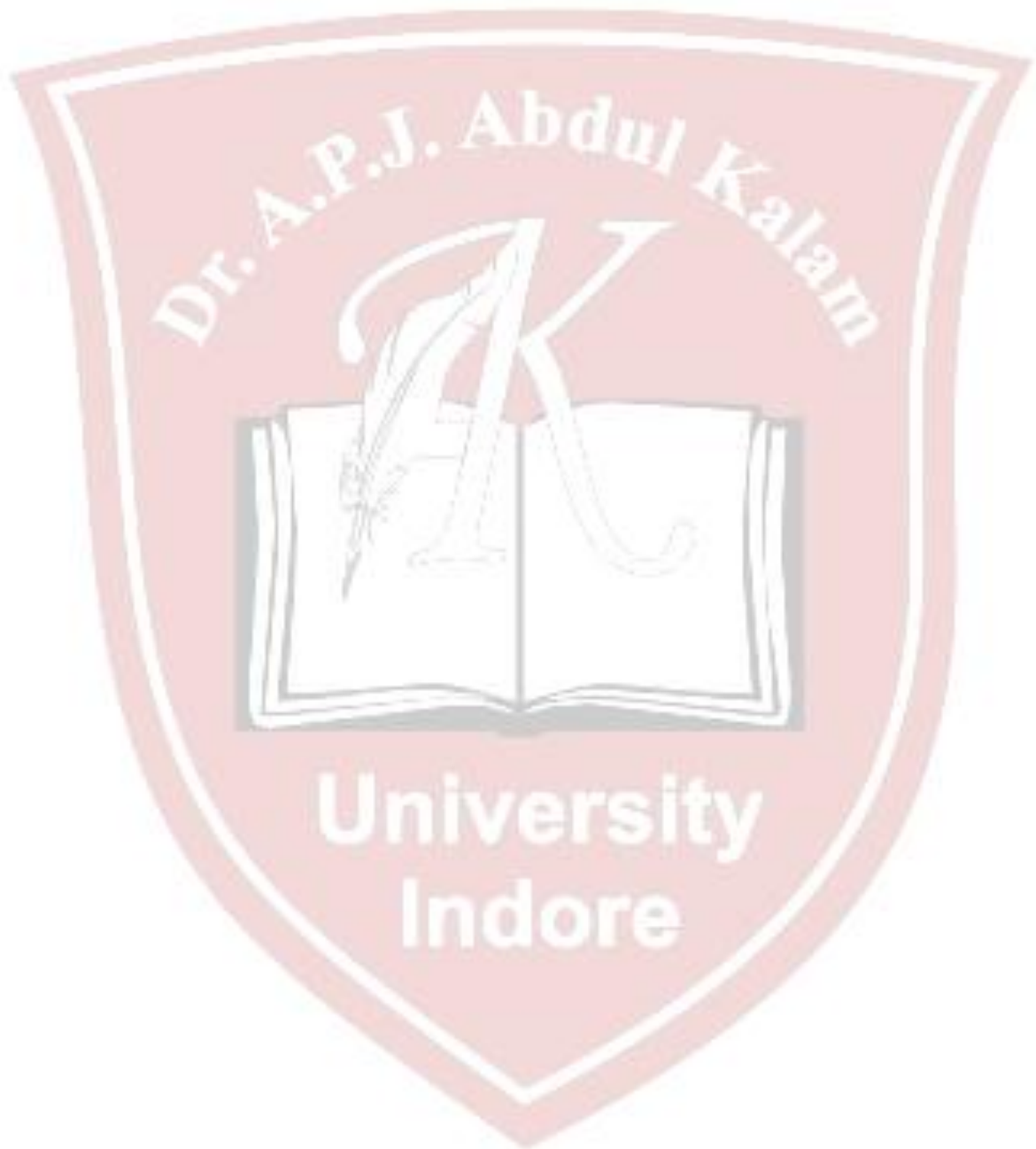
Understand And Work Within The Dynamics of A Groups. Tips to Work Effectively In Teams, Establish Good Rapport, Interest with others and work, Effectively with Them to Meet Common objectives, Tips to Provide and Accept Feedback in A Constructive and Considerate Way, Leadership In Teams, Handling Frustrations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

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

Assignment: (Any Eight Assignments)

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.



(...Nurturing Talents to Success)