



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

SYLLABUS

For

**DIPLOMA ELECTRICAL ENGINEERING
(SECOND YEAR, 3RD and 4TH SEMESTER)**

Dr. A P J Abdul Kalam University, Indore

DR. A P J ABDUL KALAM UNIVERSITY, INDORE

Syllabus for Diploma Electrical Engineering

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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. प्रारम्भिक 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.

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 Π 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

UNIT 1 - Energy Conversion Principle

Law of conservation of energy, electromechanical energy conversion, classification of machines.

UNIT 2- D. C. Generator

Principle, construction, armature winding, types of winding, EMF equation, armature reaction and commutation, interpoles and compensating winding. Types of generators, characteristics and applications, losses and efficiency. Simple numericals.

UNIT 3- D. C. Motors

Principle, production of back EMF, torque equation. Classification, characteristics of D. C. motors, starters, speed control, losses and efficiency, applications of motors. Brake test, Swinburn test. Simple numericals.

UNIT 4- Single phase transformers

Principle, construction, classification. EMF equation, turns ratio, name plate rating, phasor diagram, no load and on load equivalent circuit. Voltage regulation, polarity ratio, open and short circuit tests, losses and efficiency, condition of maximum efficiency. All day efficiency and its numerical. Auto transformer. Parallel operation of single phase transformer.

UNIT 5- Three phase transformer

Connections, groups, Scott and open delta connection. Comparison of three phase transformer with bank of three single phase transformers. Parallel operation.

References

1. Electrical Technology Vol. II by B. L. Thareja Khanna Publisher
2. Electrical Machines by Bhattacharya, T.T.T.I.
3. Electrical Machines by Nagrath & Kothari, PHI Publication
4. Electrical Machines Vol. I & II by P.S. Bhimbra, Khanna publishers
5. विद्युत मशीनें एम.के.डियोडिया हिन्दी ग्रंथ अकादमी
6. वैद्युत मशीनें एच.एस.राय दीपक प्रकाशन

List of Experiments

- [1] Study of D. C. Machines (Parts)
- [2] Speed control of D. C. Motor (armature and field control method)
- [3] To perform Swinburn test of DC Motor.
- [4] Study of transformer (Parts) (single and three phase)
- [5] To perform polarity test of single phase transformer.
- [6] To perform ratio test of single phase transformer.
- [7] To perform open circuit test of single phase transformer.
- [8] To perform short circuit test of single phase transformer.
- [9] Parallel operation of single phase transformer.

UNIT 1 - Electrical measuring instruments

Classification of measuring instruments, Indicating, recording and integrating types of meters. Errors and types of errors, accuracy, precision and sensitivity. Electrical measuring instruments

Construction, operation. Deflecting, controlling and damping forces, supporting systems, moving coil, electro-dynamometer, moving iron and induction type instruments, simple numerical. Hot wire type instruments, vibration galvanometer, shunt and multipliers, CT & PT.

UNIT 2 - Wattmeter and Energy meters

Dynamometer and induction type wattmeter, Induction type energy meters. measurement of 1-phase and 3-phase power in balanced and unbalanced load condition, 3 phase wattmeter.

UNIT – 3

Measurement of resistance- Classification of resistance, measurement of low, medium, and high resistance. Kelvin's double bridge, wheat-stone bridge, Ammeter, voltmeter method and ohmmeter, multimeter, megger. Importance of earth resistance, Earth tester.

Magnetic measurement- Balastic galvanometer, measurement of flux by B.G. Gressort flux meter, determination of hysteresis loop for ring and bar specimen.

Dielectric measurement- Meaning of dielectric loss, its importance, methods of measurement of dielectric loss by Wattmeter, Schering Bridge.

UNIT -4 A. C. Bridges and Cathode Ray Oscilloscope

Measurement of inductance and capacitance by A.C. bridges. Maxwell, Anderson, Hays, Desauty and Wien's bridge. (no phasor diagram).

Cathode Ray Oscilloscope CRT, Electrostatic and magnetic deflection, time base X and Y amplifiers, controls on the C.R.O. Dual beam oscilloscope. Digital storage and multi-channel CRO .

UNIT- 5 Electronic Instruments and Digital instruments

Electronic Instruments: Transistor volt meter, FETVM, balanced bridge, specification of electronic voltmeter. Single and three phase electronic energy meters, mili-voltmeter and micro-volt meters.

Digital instruments: Digital voltmeters- types, specifications. Digital multimeters. Counter / timers. Universal indicators for voltage, current, frequency, power, power factor, temperature, humidity etc. Digital tachometers (Contact & non Contact type). Digital controllers.

Reference

[1]A.K. Sawhney; 'A course in Electrical & Electronic Measurements & Instrumentation'; Dhanpat Rai & co(p) Ltd ,New Delhi.

[2]G. K. Banerjee,' Electrical and Electronic Measurements'. PHI Learning Pvt.Ltd.

[3] R. B. Northrop,' Introduction to Instrumentation and Measurement'; CRC press Taylor & Francis

[4] Vijay Singh,' Fundamentals of Electrical & Electronic Measurements', New Age International Publishers. <http://www.rgpvonline.com> D

List of Experiments

- [1] Measurement of low resistance by Kelvinn Double bridge.
- [2] Measurement of medium resistance by wheat stone bridge.
- [3] Measurement of insulation resistance by Megger.
- [4] Measurement of inductance by Maxwell's bridge.
- [5] Calibration of Voltmeter, Ammeter, Wattmeter, Energy meter.
- [6] Measurement of P.F. by ammeter, voltmeter and wattmeter method.
- [7] Plot B.H. curve by method of reversal using B.G.
- [8] Use of CRO for measurement of voltage, current, phase and frequency etc.
- [9] Measurement of 3-phase power by two wattmeter method.
- [10] Study and use of digital instruments, e.g. digital multi meter, frequency meter, electronic timers and counters.
- [11] Study and use of various electrical instruments e.g. phase sequence meter, wave meter. M.D. meter, tong tester.
- [12] Study and use of C.T. & P.T. for extension of instrument range.
- [13] Use of multi meter in a circuit for measurement of voltage, current and resistance.

UNIT-1 Semiconductor Devices

Concept of electronic emission – Different methods of electronic emission and their applications. Diodes - Formation of PN junction, forward biasing and reverse biasing of PN junction, construction, characteristics and application of different types of diodes, Zener diode .

Transistor - PNP/ NPN Junction Transistors, different configurations: CB, CE, CC. Transistors Characteristics, and applications. Special Semiconductor devices – Construction, symbol and application of Tunnel diode, photo diode, varactor, FET, MOSFET, UJT.

UNIT-2 Regulated Power Supply and Rectifiers

Regulated Power Supply - Difference between linear and switch mode power supply, regulated power supply and its limitations, series and shunt power supply using transistors, SMPS (Block diagram only), IC regulated power supply (78XX and 79XX series).

Rectifiers- Single phase, half wave, full wave and bridge types of rectifiers. calculation of output voltage, average and RMS values, ripple factor and rectification efficiency. Filter, and types of filters.

UNIT-3. Amplifiers - Principal of amplification, types of transistor amplifiers, biasing techniques, RC coupled, transformer coupled, and direct coupled amplifiers, push pull Amplifier, advantages and disadvantages, detailed study of circuit diagram, working principle and applications of above amplifiers, use of operational amplifier as comparator, multiplier, summer, integrator and differentiator.

UNIT-4 Oscillators

Principal of oscillation, Types of oscillators such as Hartley, Colpitts, tuned oscillator, Weign bridge oscillator: circuit diagram, principle, working & applications. Non-sinusoidal Generator - Astable, monostable and bistable

UNIT-5 Digital Techniques and Integrated circuits

Number system, binary, decimal number system. Addition, subtraction, multiplication & division of binary numbers. Logic gates- their symbols, truth table and applications.

Concepts of IC's classification, types and their advantages, applications of common IC's such as 741, 555, 810 and digital IC's.

Reference

1. Basic Electronics & Linear Circuits - : By Bhargawa , T.T.T.I. Chandigarh .
2. Basic Electronics -: By V.K. Mehta
3. Electronics Principle - : By mahta.
4. Digital Electronics -: By Mahino & Leach .
5. Electronics Devices & Circuits -: By G.K. Mithal

List of Experiments

- [1] Study of C.R.O. & multimeter.
- [2] Study of electrical and electronic components.
- [3] Colour coding of Resistors.
- [4] Testing of Diode and Transistor.
- [5] Study of half wave rectifier, full wave rectifier, bridge rectifier with and without filter.
- [6] Study of Zener regulated power supply.
- [7] Study of IC Regulated power supply (78XX and 79XX)
- [8] Study of transistor characteristics.
- [9] To plot the characteristics of diode.
- [10] To plot the characteristics of Zener diode.
- [11] Study of transistor amplifier.
- [12] Study of oscillator.
- [13] Study of astable and monostable multivibrators using transistors and IC 555
- [14] Study of inverting and non-inverting amplifiers using IC 741 and calculation of its gain.

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:

I. Record of written quiz.

II. Report/write up of seminar presented

III. Abstract of the guest lectures arranged in the Institution.

IV. Topic and outcome of the group discussion held.

V. Report on the problems solved through case studies.

VI. Report on social awareness camps (organized for social and environmental prevention).

VII. 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.

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).

UNIT-1 Engineering Materials

Introduction of Materials, Need and classification of engineering materials. Metals and alloys-**Ferrous Metals**- Cast Iron, Wrought Iron, Steel, Alloy Steel. **Non Ferrous Metals**- Aluminum, Copper, Lead, Tin, Copper tin-antimony alloy, Bearing Metals, Copper tin alloy, Zinc, Copper Zinc alloy.

UNIT-2 Mechanical Properties and Tests

Properties of Materials- Stiffness, Strength, Ductility, Malleability, Elasticity, Plasticity, Toughness, Brittleness, Hardness and Harden ability, Fatigue

Material Test- Tensile Test, Impact Test (Izod and Charpy), Hardness Test (Brinell, Rockwell and Vickers)

Heat Treatment- Definition and objectives of Heat treatment, Effect of different factors in heat treatments, Heat treatment Process -Annealing, Normalizing, Hardening by Quenching, Tempering, Case hardening, Carburizing

UNIT-3 Thermodynamics

Introduction, Work, Heat & Power, Various thermodynamics properties, Thermodynamic system Thermodynamic State of the System, Process on the system, Statement of 1st and 2nd law of thermodynamics, Law of Ideal gases-Boyle's Law, Charles Law, Gas equation Properties of steam- Enthalpy of Dry and wet steam, Specific volume of dry and wet steam, Internal Energy of Dry and Wet Steam. Boilers- Classification of boilers.

UNIT-4 I.C. Engine

Define Heat Engine, Differentiate I.C. Engine and E.C. Engine, Classification of I.C. Engines. Explain the working of two strokes and four stroke petrol engine with line diagram. Explain the working of two stroke and four stroke diesel engine with line diagram. Indicated Horse Power (IHP), Brake Horse Power (BHP), Mechanical Efficiency.

UNIT-5 Air Compressor and Fluid Mechanics

Introduction of Air Compressor and their classification, Working principle of reciprocating Air-compressor. Industrial uses of Air-compressor. Multistage reciprocating compressor & their merit & Demerit. Rotary compressor. Definition of various fluid properties. Fluid pressure and its measurement. Pascal's Law. Static Pressure- Intensity of pressure at a point in fluid at rest, Pressure head, Absolute and gauge pressure. Simple and differential U type manometers. Total and center of pressure on the plate surface immersed in water Horizontally and vertically.

UNIT-5 Hydrodynamics

Energies in fluid- Pressure energy, Kinetic energy, Potential energy, Total energy. Bernoulli's theorem, its assumption and application. Pitot tube. Venturimeter. Orifice meter. Working principle of Hydraulic Pumps- Reciprocating pump, Centrifugal pump. Working Principles of water turbine, Impulse turbine, Reaction turbine.

UNIT-6 Power Transmission :

Methods of Power transmission. Belt drive -Open and cross belt drive. Application and advantages of belt drive. Velocity ratio of pulleys. Compound belt drive. Effect of slip in the belt drive. Gear drive- simple gear drive. Compound gear drive. Worm and wheel. Bevel gear. Velocity ratio in gear drive. Merit and demerits of gear drive. Simple problems of gear drive.

References

1. General Mechanical Engineering by S.B. Mathur
2. Elements of Mechanical Engineering by Mathur, Mehta & Tiwari
3. Elements of Mechanical Engineering by Raw & Choudhary
4. Fluid Mechanics by R.S. Khurmi.

List of Experiments

- [1] Perform Tensile Test of standard mild steel and C.I. specimen
- [2] Perform Hardness Test Brinell and Rockwell
- [3] Impact Test Izod and Charpy on mild steel specimen
- [4] Study of Boilers- Fire tube ,Water tube ,Bab cock & Wilcox Boiler .Boiler mountings ,Boiler accessories
- [5] Study of steam engine
- [6] Study of I.C. Engine -Two stroke and four stroke Petrol & Diesel Engine.
- [7] Study of Air Compressor, Single stage and multistage compressor their construction and their uses.

- [8] Pressure measurement by manometer

- [9] Determination of coefficients of discharge of the following devices -
 - Venturi meter
 - Rota meter
 - Orifice Meter
 - Pitot tube
- [10] Study of Centrifugal & reciprocating pumps.
- [11] Study of simple gear & compound train in power transmission system

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.

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.

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. ACHIVEMENT 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.

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

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

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

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

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, shear 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 malnutrition, 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 slum 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.