J. S. UNIVERSITY, SHIKOHABAD

DIPLOMA

1st Semester

(Electrical Engineering)

SCHEME & SYLLABUS

[Effective from the session 2015-16]

STUDY AND EVALUATION SCHEME FOR
THREE YEAR DIPLOMA COURSE IN

ELECTRICAL ENGG.

SEMESTER - First

S.No.	Subject Code	Name of Subject	Periods Per Week				Evaluation Scheme			
			L	T	P	D	Sessional	End Exam	Total	Duration
THEORY SUBJECT										
1	DAS-11	Professional Communication	4	1	-	-	20	50	70	2.5
2	DAS-12	Applied Mathematics-I	4	1	-	-	20	50	70	2.5
3	DAS-13	Applied Physics-I	4	1	-	-	20	50	70	2.5
4	DAS-14	Applied Chemistry	4	1	-	-	20	50	70	2.5
5	DEE-11	Electrical & Electronics Engineering Material	4	1	-	-	20	50	70	2.5
PRACTICA/DRAWING SUBJECTS										
5	DWP-11P	Workshop Practice	-	-	10	-	30	60	90	3
6	DAS-11P	Professional Communication	-	-	4	-	10	20	30	3
7	DAS-14P	Applied Chemistry	-	-	4	-	20	40	60	3
Games//Social and Cultural Activities + Discipline (15 + 10)									25	
Grand Total									555	

NOTE:- (1) Each period will be 50 minutes duration.

(2) Each session will be of 16 weeks.

(3) Effective teaching will be at least 14 weeks.

(4) Remaining periods will be utilised for revision etc.

[DAS-11] Professional Communication

1. PART I - COMMUNICATION IN ENGLISH

1.1 Concept of communication, importance of effective communication, types of communication, formal, informal, verbal and nonverbal, spoken and written. Techniques of communication, listening, reading, writing and speaking,

Barriers in communication, Modern tools of communication- Fax, e-mail, Telephone, telegram, etc.

1.2 Technical communication Vs. General Communication: Development of comprehension and knowledge of English through the study of text material and language exercises based on the prescribed text book of English.

1.3 Development of expression through:

1.3.1 Paragraph writing, Essay writing, Proposal writing.

1.3.2 Business and personal correspondence (Letters): Kinds of letters:- Official, demi-official, unofficial , for reply or in reply, quotation, tender and order giving letters. Application for a job, Resume.

1.3.3 Report writing and Note making and minutes writing.

1.4 Functional Grammar: Study of sentences and parts of speech (word class), Preposition, Verb, Articles, Abbreviations.

1.5 Vocabulary Building: Homophones, One word substitution, Idioms and Phrases.

1.6 Composition on narrative, descriptive, imaginative, argumentative, discussion and factual topics.

2. PART II - COMMUNICATION IN HINDI

2.1 Development of comprehension and knowledge of Hindi usage through rapid reading and language exercises based on prescribed text material developed by IRDT.

2.2 Development of expression through ; Letter writing in Hindi: Kinds of letters:- Official, demi-official, unofficial , for reply or in reply, quotation, tender and order giving letters, Application for a job, Press release in Hindi, Report writing.

Note: Paper should be in two parts, part I - English and part II -Hindi.

REFERENCE BOOKS

1. Bookshelf worksheet of Professional Communication, New Delhi: Bookshelf 2008

2. Functional Skills in language and literature by R. P. Singh, New Delhi: Oxford University Press.

3. Oxford English Hindi English Dictionary, New Delhi: Oxford 2008

[DAS-11P] Professional Communication Lab

For the practice/exercise the following is suggested:

1. A. Phonetic transcription

B. Stress and intonation:

(At least 10 word for writing and 10 word for pronunciation)

2. ASSIGNMENT: (Written Communication)

Two assignments of approximately 400 word each decided by the teacher concerned.

THE FOLLOWING MODEL IS PROPOSED:

1. A picture/photograph

2. An opening sentence or phrase

3. A newspaper/magazine clipping or report

4. Factual writing which should be informative or argumentative.

(The students may refer to "Bookshelf worksheet" for technical

communication) 3. Oral Conversation:

1. Short speeches/declamation: Bid farewell, felicitate somebody, celebrate a public event, and Offer condolences

2. Debate on current problems/topics

3. Mock Interview: Preparation, Unfolding of personality and expressing ideas effectively

4. Group discussion on current topics/problems

5. Role Play/ general conversation: Making polite enquiries at Railway Station, Post Office, Banks and other Public places, replying to such enquiries, enquiring about various goods sold in the market and discussing their prices. Complaining about service at Hotel, restaurant, Offering apologies in reply to such complaints, complain to a company about a defective product you have brought, reply to such complaints.

6. Presentation skill, Use of OHP and LCD.

7. through drilling of model words involving different phonetic symbols (Vowels, Consonants, and Diphthongs).

4. Aural : Listening to conversation/talk/reading of short passage and then writing down the relevant or main points in the specified number of words and answering the given questions The assignments/project work are to be evaluated by the internal/ external examiner. The distribution of 30 marks e.g.

10 marks for assignment (Given by subject teacher as sessional marks)

10 marks for conversation and viva-voce

10 marks for phonetic transcription

[DAS-12] APPLIED MATHEMATICS - I

Unit -1: Algebra-I

1. Arithmetic Mean: nth term, sum, Mean
2. Geometric Mean: nth term, sum, Mean
3. Binomial Theorem for positive, negative and fractional index (without proof)
4. Determinants: Elementary properties of determinants of order 2 and 3, system of linear equations and solution, Cramer`s Rule

. Unit -2: Algebra-II

1. Vector Algebra: Dot and cross product, Scalar and vector triplet product
2. Complex Numbers: Representation, Modulus and Amplitude, De-Moivre theorem application in solving algebraic equations.

Unit -3: Trigonometry

1. Relation between sides and angles of a triangle: Statement of various formula showing relationship between sides and angles of a triangle.
2. Inverse Circular Functions

Unit -4: Differential Calculus-I

1. Functions, limits, continuity, elementary methods of finding limit (right and left)
2. Differentiability, method of finding derivatives, functions of a function, Logarithmic Differentiation, Differentiation of Implicit functions.

Unit -5: Differential Calculus-II

1. Higher order derivatives
2. Derivatives of Special Functions (Exponential, Logarithmic, and Inverse circular functions)
3. Application: Finding Tangent, Rate Measure, Velocity and Acceleration

[DAS-13] APPLIED PHYSICS-I

Topic Wise Distribution

S.no.	Topics	Marks Distribution
1	Unit &Dimensions	4
2	Errors & Measurement	4
3	Heat & Thermodynamics	5
4	Friction	4
5	Circular Motion	5
6	Motion of Planets & satellites	5
7	Dynamic of Rigid Body	6
8	Fluid Mechanics	6
9	Harmonic Motion	6
10	Acoustics	5
	Total	**50**

Detailed Contents

1. UNIT AND DIMENSION

Physical quantity and its types, Unit and its types, Definition of SI units, Dimensions of physical quantities, Dimensional formula and dimensional equation, Principle of homogeneity and its applications, Limitations of dimensional analysis

2. ERRORS AND MEASUREMENTS

Errors, Accuracy and Precision, Types of errors in measurement, Combination of errors, Significant figures, Rounding off

3. HEAT AND THERMODYNAMICS

Modes of heat transfer, Coefficient of thermal conductivity, Conduction through compound medium, Isothermal and Adiabatic process, Zeroth and First law of thermodynamics

4. FRICTION

Introduction, Physical significance of friction, Advantage and disadvantage of friction and its role in daily life, Coefficient of static and dynamic friction and their measurement, Angle of friction, Angle of repose, Motion of a body on a inclined plane

5. CIRCULAR MOTION

Uniform circular motion, Angular velocity and acceleration, centripetal acceleration, Relation between linear and angular velocity and acceleration, Centripetal and centrifugal forces, Practical applications of centripetal forces

6. MOTION OF PLANETS AND SATELLITES

Gravitational force, Acceleration due to gravity and its variation with respect to height and depth from earth, Kapler's law, Escape and orbital velocity, Time period of satellite, Geo-stationary satellite

7. DYNAMIC OF RIGID BODY

Rigid body, Rotational motion, Moment of inertia, Theorems (parallel and perpendicular) of moment of inertia, Expression of M.I. of regular bodies (lamina ,disc, sphere, cylindrical), Radius of gyration, Angular momentum, Conservation of angular momentum, Torque, Rotational kinetic energy, Rolling of sphere on the slant plane

8. FLUID MECHANICS

Surface tension, Capillary action and determination of surface tension from capillary rise method, Equation of continuity, Bernoulli's theorem and its application, Stream line and Turbulent flow, Viscosity, Stokes law, Reynold's number

9. HARMONIC MOTION

Periodic function, Characteristics of SMH, Equation of SMH and determination of velocity and acceleration, Simple pendulum and derivation of its periodic time, Spring-mass system, Energy conservation of SHM, Concept of phase, Definition of free, forced, damped and un-damped vibrations, Resonance and its application, Q-factor

10. ACOUSTICS

Definition of pitch, loudness, quality and intensity of Sound waves, Echo, Reverberation and reverberation time, Sabine's formula without derivation, Acoustics of building defects and remedy.

[DAS-14] APPLIED CHEMISTRY

1. ATOMIC STRUCTURE:

Basic concept of atomic structure, Matter wave concept, Quantum number, Heisenberg's Uncertainty Principle, Shapes of orbitals.

2. CHEMICAL BONDING:

Covalent bond, Ionic & Co-ordinate, Hydrogen bonding, Valence bond theory, Hybridisation, VSEPR theory, Molecular orbital theory

3. CLASSIFICATION OF ELEMENTS:

Modern classification of elements (s p d and f block elements), Periodic properties : Ionisation potential electro negativity, Electron affinity.

4. ELECTRO CHEMISTRY-I:

Arrhenius Theory of electrolytic dissociation, Transport number, Electrolytic conductance, Ostwald dilution law. Concept of Acid and base: Bronsted, Arrhenius and Lewis theory. Concept of pH based numerical. Buffer solutions,

Indicators, Solubility product, Common ion effect with their application,

5. ELECTRO CHEMISTRY-II:

Redox reactions, Electrode potential (Nernst Equation), Electro-chemical cell (Galvanic and Electrolytic). EMF of a cell and free energy change, Standard electrode potential, Electro chemical series and its application. Chemical and Electrochemical theory of corrosion, Galvanic Series. Prevention of corrosion by various method.

6. CHEMICAL KINETICS:

Law of mass action, order and molecularity of reaction. Activation energy, rate constants, 1st order reactions and 2nd order reactions.

7. CATALYSIS:

Definition Characteristics of catalytic reactions, Catalytic promotors and poison , Autocatalysis and Negative catalysis, Theory of catalysis, Application.

8. SOLID STATE:

Types of solids (Amorphous and Crystalline), Classification (Molecular, Ionic, Covalent, Metallic), Band theory of solids (Conductors, Semiconductors and Insulators), types of Crystals, FCC, BCC, Crystal imperfection.

9. FUELS:

Definition, its classification, high & low Calorific value. Determination of calorific value of solid and liquid fuels by Bomb calorimeter. Liquid fuel - Petroleum and its refining, distillate of petroleum (Kerosene oil, Disel and Petrol), Benzol and Power alchol. Knocking, Anti-knocking agents, Octane number and Cetane number. Cracking and its type, Gasoling from hydrogenation of coal (Bergius process and Fischer tropsch's process) Gaseous Fuel - Coal gas, Oil gas, Water gas, Producer gas, Bio gas, LPG and CNG. Numerical Problems based on topics

10. WATER TREATMENT:

Hardness of water, Its limits and determination of hardness of water by EDTA method. Softening methods (Only Sods lime, Zeolote and Ion exchange resin process). Disadvantage of hard water in different industries, scale and sludge

formation, Corrosion, Caustic embritlement, primming and foarming in biolers. Disinfecting of Water By Chloramine-T, Ozone and Chlorine. Advantage and disadvantage of chlorinational, Industrial waste and sewage, Municipality waste water treatment, Definition of BOD and COD. Numerical Problems based on topics.

11. COLLOIDAL STATE OF MATTER:

Concept of collidal and its types, Different system of colloids, Dispersed phase and dispersion medium. Methods of preparation of colloidal solutions, Dialysis and electrodialysis. Properties of colloidal solution with special reference to absorption, Brownian Movement, tyndal effect, Electro phoresis and coagulation. relative stability of hydrophillic and hydrophobie colloids. Protection and protective colloids. Emulsion, Types, preparation,properties and uses. Application of colloids chemistry in different industries.

12. LUBRICANTS:

Definition, classification, Necessasity and various kinds of lubricants. Function and mechanism of action of lubricants and examples. Properties of lubricants, Importance of additive compunds in lubricants, Synthetic lubricants and cutting fluids. Industrial application, its function in bearing.

13. HYDROCARBONS:

A. Classification and IUPAC nomeuclature of organic compounds hamologous series (Functional Group)

B. Preparation, properties and uses of Ethane, Ethene, Ethyne (Acetylene), Benzene and Toluene.

14. ORGANIC REACTIONS & MECHANISM:

1. Fundamental auspects -

A. Electrophiles and nucleophiles, Reaction Intermediates, Free radical, Carbocation, Carbanion

B. Inductive effect, Mesomeric effect, Electromeric effect.

2.A. Mechanism of addition reaction (Markonicove's Rule, Cyanohydrin and Peroxide effect),

B. Mechanism of Substitution reactions; (Nucleophillic) hydrolysis of alkyle halide, electrophillic substitution halogenation, Sulphonation, Niration and friedel-Craft reaction.

C. Mechanism of Elimination reaction - Dehydration of primary alcohol, Dehyrohalogenation of primary alkyl halide.

15. POLYMERS :

1. Polymers and their classification. Average degree of polymerisation, Average molecular weight, Free radical polymerisation (Mechanisms)

2. Thermosetting and Thermoplastic resen -

A. Addition polymers and their industrial application-Polystyrene, PVA, PVC, PAN, PMMA, Buna-S, Buna-N, Teflon.

B. Condensation polymer and their industrial application : Nylon 6, Nylon 6,6, Bakelite, Melamine formaldehyde, Urea formaldehyde, Terylene or Decron, Polyurethanes.

3. General concept of Bio polymers, Biodegradable polymers and inorganic polymers (Silicon).

16. SYNETHETIC MATERIALS:

A. Introduction - Fats and Oils

B. Saponification of fats and oils , Manufacturing of soap.

C. Synthetic detergents, types of detergents and its manufacturing.

3. EXPLOSIVES: TNT, RDX, Dynamite.

4. Paint and Varnish

[DAS-14P] CHEMISTRY LAB

1. To analyse inorganic mixture for two acid and basic radicals from following radicals:

A. Basic Radicals : NH_4^{+}, Pb^{++}, Cu^{++}, Bi^{+++}, Cd^{++}, As^{+++}, Sb^{+++}, Sn^{++}, Al^{+++}, Fe^{+++}, Cr^{+++}, Mn^{++}, Zn^{++}, Co^{++} Ni^{++}, Ba^{++}, Sr^{++}, Ca^{++}, Mg^{++}

B. Acid Radicals : CO_3^{--}, S^{--}, SO_3^{--}, CH_3COO^{-}, NO_2^{-}, NO_3^{-}, Cl^{-}, Br^{-}, I^{-}, SO_4^{--}

2. To determine the percentage of available Chlorine in the supplied sample of Bleaching powder.

3. To determine the total hardness of water sample in terms of CaCO3 by EDTA titration method using Eriochroma black-T indicator.

4. To determine the strength of given HCl solution by titration against NaOH solution using Phenolphthalium as indicator.

5. To determine the Chloride content in supplied water sample by using Mohr's methods.

6. Determination of temporary hard ness of water sample by OHener's method.

[DEE-11] ELECTRICAL AND ELECTRONICS ENGG. MATERIALS

1. Classification

Classification of materials with reference to their atomic structure.

2. Conducting Materials

(i) Resistivity and factors affecting resistivity, such as temperature, alloying and mechanical stressing.

(ii) Super conductivity and super conducting material.

(iii) Low resistivity materials e.g. copper, aluminium and steel, their general properties as conductor e.g. resistivity, temperature co-efficient,mechanical properties, corrosion,contact resistance and practical application. Uses of mercury as conducting material.

(iv) Comparison of copper, aluminium and steel for various applications as electrical conductor.

(v) Low resistivity copper alloys: brass, bronze (cadmium and beryllium), their practical application.

(vi) High resistivity materials : manganin, constantan nichrome, carbon, tungsten, their practical applications.

(vii) Electric lamp materials.

(viii) Brush contact materials.

(ix) Soldering materials.

(x) Thermocouple materials, Fuse materials.

3. Insulating Materials

(i) Introduction.

(ii) Properties of insulating material. - Electrical properties: Volume resistivity, Surface resistivity, Dielectric Loss, Dielectric Contant, Dielectric strength. - Mechnical properties:- Mechanical strength - Physical properties :- Hygrscoopcity tensile and compressive strength, Abrasive resistance brittleness. - Thermal properties - Heat resistance, Classification according to high permissible temperature rise, Effect of over loading on the life of an electrical appliances, Increase in rating with the use of insulating materials having higher thermal stability,Thermal conductivity. - Chemical properties - Solubility, Chemical resistance, Weather ability.

(iii) Insulating materials and their application-

- Definition and classification - Thermo setting materials e.g. Phenol Formaldehyde, Resins (i.e. Backelite), Amino resins (Ureca formaldehyde and Malamine formaldehyde), Epoxy resins their properties, Applications and Commerical names. - Thermo Plastic materials e.g. Polyvinyl Chloride (P.V.C.), Poly Ethelene Silicons their properties application and commerical names. Brief description of extrusion and moulding process of using plastic

materials in electrical engineering. - Natural Insutaling Materials- Mica and Mica products, Asbestos and Asbestos products, Ceramic materials (Porcelain and Stealite), Glass and glass products, Cotton, Silk, Jute, Paper (Dry and impregnated), Rubber Butuman, Mineral and insulating oil for transformer, switch gear, capactors, high voltage cables, insulating varnishes for coating and impregnation, Enamels for winding wires, Glass fibre sleeves Gasous Materials e.g. Air, Hydrogen, Nitrogen and SF6.

4. Magnetic Materials :

(i) Classification of magnetic materials into soft and hard magnetic materials.

(ii) Soft magnetic materials - high silicon alloy steel for transformers and low silicon alloy steel, for electric rotating machine cold rolled grain oreinted and non-oriented steel, Nickel iron alloy, soft ferrites, their properties and uses.

(iii) Hard magnetic materials - tungsten steel,chrome steel, cobalt steel, alnico, hard ferrites, their properties and applications.

5. Semiconductor Materials

Introduction, semiconductor and their applications, Different semiconductor materials used in manufacturing various semiconductor (Si & Ge), Material used for electronic components like resister, capactor, diode, transistors and inductors.

6. Special Purpose Materials :

Materials used in transistor and IC manufacturing, PC BS, computer memory devices (name of such materials to be added) Ferrous and non ferrous materials. Thermistor, Sensistor, Varistor and therir practical applications.

[DWS-11P] WORKSHOP PRACTICE

1. Carpentry Shop :

EX-1 Introduction & demonstration of tools used in carpentry shop and different types of joints, types of wood, seasoning and preservation of wood

EX-2 Planing and sawing practice

EX-3 Making of lap joint

EX-4 Making of mortise and tenon joint

Ex-5 Making of any one utility article such as woodenpicture frame, hanger, peg, name plate, etc.

2. Painting and Polishing Shop:

EX-1 Introduction of paints, varnishes, Reason for surface preparation, Advantange of painting, other method of surface coating i.e. electroplating etc.

EX-2 To prepare a wooden surface for painting apply primer on one side and to paint the same side. To prepare

french polish for wooden surface and polish the other side.

Ex-3 To prepare metal surface for painting, apply primer and paint the same.

EX-4 To prepare a metal surface for spray painting,first spray primer and paint the same by spray painting gun and compressor system.

3. Sheet Metal and Soldering Shop :

EX-1 Introduction and Types of sheets, measuring of sheets

EX-2 Study and sketch of various types of stakes/anvil.

EX-3 Introduction & demonstration of tools used in Sheet metal working shop.

EX-4 Cutting, shearing and bending of sheet.

EX-5 To prepare a soap case by the metal sheet.

4. Fitting Shop, Plumbing Shop & Fastening Shop:

EX-1 Study of materials, limits, fits and toterances.

EX-2 Introduction & demonstration of tools used in Fitting Shop.

EX-3 Hacksawing and chipping of M.S. flat. Filing and squaring of chipped M.S. job. Filing on square or rectangular M.S. piece.

EX-4 Making bolt & nut by tap and die set and make its joints

Ex-5 To drill a hole in M.S. Plate and taping the same to creat threads as per need.

5. Foundry Work

Ex-1 Study of metal and non metals

Ex-2 Study & sketch of the foundry tools. Ex-

3 Study & sketch of cupula & pit furnace.

Ex-4 To prepare the green moulding sand and to prepare moulds (single piece and double piece pattern sweep mould)

Ex-5 Casting of non ferous (lead or aluminium) as per exercise 3.

6. Smithy Shop :

EX-1 Study & Sketch of Tools used in smithy shop.

EX-2 To prepare square or rectangular piece by the M.S. rod.

EX-3 To make a ring with hook for wooden doors.

EX-4 Utility article-to preapre a ceiling fan hook.

7. Welding Shop :

EX-1 Introduction to welding, classinfication of welding, types of weld joints.

EX-2 Welding practice-gas and electric.

EX-3 Welding for lap joint after preparing the edge. EX-

4 Welding of Butt joint after preparation of the edge.

EX-5 'T' joint welding after preparation of edge.

8. Machine Shop

EX-1 Study & sketch of lathe machine.

EX-1 Study & sketch of grinders, milling M/c, Drilling M/c and CNC Machines

Ex-2 Plain and step turning & knurling practice.

Ex-3 Study and sketch of planning/Shaping machine and to plane a Ractangle of cast iron.