

J. S. UNIVERSITY, SHIKOHABAD



# DIPLOMA

1<sup>st</sup> Semester  
(Civil Engineering)

## *SCHEME* & *SYLLABUS*

[ Effective from the session 2015-16 ]

**STUDY AND EVALUATION SCHEME FOR  
THREE YEAR DIPLOMA COURSE IN  
CIVIL 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	DDW-11	Engineering Drawing	-	-	-	12	20	50	70	3	
PRACTICA/DRAWING SUBJECTS											
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									465		

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, semi-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, semi-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 assignment 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, 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, 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 Funtions

### **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
<b>1</b>	Unit & Dimensions	4
<b>2</b>	Errors & Measurement	4
<b>3</b>	Heat & Thermodynamics	5
<b>4</b>	Friction	4
<b>5</b>	Circular Motion	5
<b>6</b>	Motion of Planets & satellites	5
<b>7</b>	Dynamic of Rigid Body	6
<b>8</b>	Fluid Mechanics	6
<b>9</b>	Harmonic Motion	6
<b>10</b>	Acoustics	5
	<b>Total</b>	<b>50</b>

### Detailed Contents

#### **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

#### **ERRORS AND MEASUREMENTS**

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

#### **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

#### **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

#### **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

#### **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

#### **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

#### **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

## **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 undamped vibrations, Resonance and its application, Q-factor

## **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

## 1. ATOMIC STRUCTURE :

Basic concept of atomic structure, Matter wave concept, Quantum number, Haiseberg'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, electronegativity, Electron affinity.

## 4. ELECTRO CHEMISTRY-I:

Arrhenius Theory of electrolytic dissociation, Transport number, Electrolytic conductance, Ostwald dilution law. Concept of Acid and bases : Bronsted, Arrhenius and Lewis theory. Concept of pH and numericals. 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 methods.

## 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 promoters and poisons, 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 imperfections.

## 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, Diesel and Petrol), Benzol and Power alcohol. Knocking, Anti-knocking agents, Octane number and Cetane number. Cracking and its type, Gasol 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 Soda lime, Zeolite and Ion exchange resin process). Disadvantage of hard water in different industries, scale and sludge



formation, Corrosion, Caustic embrittlement, 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 LIST OF PRACTICALS

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

A. Basic Radicals :  $\text{NH}_4^+$ ,  $\text{Pb}^{++}$ ,  $\text{Cu}^{++}$ ,  $\text{Bi}^{+++}$ ,  $\text{Cd}^{++}$ ,  $\text{As}^{+++}$ ,  $\text{Sb}^{+++}$ ,  $\text{Sn}^{++}$ ,  $\text{Al}^{+++}$ ,  $\text{Fe}^{+++}$ ,  $\text{Cr}^{+++}$ ,  $\text{Mn}^{++}$ ,  $\text{Zn}^{++}$ ,  $\text{Co}^{++}$ ,  $\text{Ni}^{++}$ ,  $\text{Ba}^{++}$ ,  $\text{Sr}^{++}$ ,  $\text{Ca}^{++}$ ,  $\text{Mg}^{++}$

B. Acid Radicals :  $\text{CO}_3^{--}$ ,  $\text{S}^{--}$ ,  $\text{SO}_3^{--}$ ,  $\text{CH}_3\text{COO}^-$ ,  $\text{NO}_2^-$ ,  $\text{NO}_3^-$ ,  $\text{Cl}^-$ ,  $\text{Br}^-$ ,  $\text{I}^-$ ,  $\text{SO}_4^{--}$

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  $\text{CaCO}_3$  by EDTA titration method using Eriochroma black-T indicator.

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

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

6. Determination of temporary hardness of water sample by O'Hene's method.

## **DDW-11     ENGINEERING DRAWING**

### **1. Drawing, instruments and their uses.**

1.1 Introduction to various drawing, instruments.

1.2 Correct use and care of Instruments.

1.3 Sizes of drawing sheets and their layouts.

### **2. (a) Lettering Techniques**

1 Sheet

Printing of vertical and inclined, normal single stroke capital letters. Printing of vertical and inclined normal single stroke numbers. Stencils and their use.

### **(b) Introduction to Scales**

2 Sheet

Necessity and use, R F Types of scales used in general engineering drawing. Plane, diagonal and chord scales. 3. Conventional Presentation: 2 Sheet

Types of lines, Conventional representation of materials, Thread (Internal and External), Conventional representation of machine parts, Welded joint.

### **4. (a) Principles of Projection**

1 Sheet

Orthographic, Pictorial and perspective. Concept of horizontal and vertical planes. Difference between I and III angle projections. Dimensioning techniques.

### **(b) Projections of points, lines and planes.**

2 Sheet

### **5 (a) Orthographic Projections of Simple Geometrical Solids**

3 Sheet

Edge and axis making given angles with the reference planes. Face making given angles with reference planes. Face and its edge making given angles with reference planes.

### **(b) Orthographic views of simple composite solids from their isometric views.**

### **(c) Exercises on missing surfaces and views**

### **6. Section of Solids**

2 Sheet

Concept of sectioning Cases involving cutting plane parallel to one of the reference planes and perpendicular to the others. Cases involving cutting plane perpendicular to one of the reference planes and inclined to the others plane, true shape of the section

### **7. Isometric Projection.**

1 Sheet

Isometric scale Isometric projection of solids.

### **8. Free hand sketching**

1 Sheet

Use of squared paper Orthographic views of simple solids Isometric views of simple job like carpentry joints 9. Development of Surfaces 2 Sheet

Parallel line and radial line methods of developments. Development of simple and truncated surfaces (Cube, prism, cylinder, cone and pyramid).

### **10. ORTHOGRAPHIC PROJECTION OF MACHINE PARTS:**

3 Sheet

Nut and Bolt, Locking device, Bush Bearing

### **11. PRACTICE ON AUTO CAD :**

2 Sheet

Concept of AutoCAD, Tool bars in AutoCAD, Coordinate System, Snap, Grid and Ortho mode. Drawing Command - Point, Line, Arc, Circle, Ellipse. Editing Commands - Scale, Erase, Copy, Stretch, Lengthen and Explode. Dimensioning and Placing text in drawing area. Sectioning and hatching. Inquiry for different parameters of drawing.

**NOTE :**

A. The drawing should include dimension with tolerance wherever necessary, material list according to I.S. code.

25% of the drawing sheet should be drawn in first angle projection and rest 75% drawing sheet should be in third angle figure

B. Practice on AutoCAD latest software is to be done in AutoCAD lab of Mechanical Engineering Department of the Institute.