Integral University, Lucknow

Department of Computer Science & Engineering

Study and Evaluation Scheme

Program: Diploma in Engineering

**Semester –I**

| S. No. | Course code | Course Title | Type of Paper | Period Per hr/week/sem | | | Evaluation Scheme | | | | Sub. Total | Credit | Total Credits | Attributes | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | CT | TA | Total | ESE | | | | Employability | Entrepreneurship | Skill Development | Gender Equality | Environment & Sustainability | Human Value | Professional Ethics |
| **THEORIES** | | | | | | | | | | | | | | | | | | | | |
| **1** | DMA-101 | Applied Mathametics-1(A) | Core | 03 | 01 | 00 | 40 | 20 | 60 | 40 | 100 | 3:1:0 | 4 | Y | | Y | | | | |
| **2** | DPH-101 | Applied Physics (A) | Core | 03 | 01 | 00 | 40 | 20 | 60 | 40 | 100 | 3:1:0 | 4 | Y | Y | Y | | Y | | |
| **3** | DCH-101 | Applied Chemistry (A) | Core | 03 | 01 | 00 | 40 | 20 | 60 | 40 | 100 | 3:1:0 | 4 | Y | Y | Y | | Y | | |
| **4** | DCS-101 | Fundamentals of Information Technology | Core | 03 | 01 | 00 | 40 | 20 | 60 | 40 | 100 | 3:1:0 | 4 | Y | | Y | | | | |
| **5** | DPC-101 | Professional Communication | Core | 03 | 01 | 00 | 40 | 20 | 60 | 40 | 100 | 3:1:0 | 4 | Y | Y | Y | | | Y | Y |
| **6** | DCS-102 | Basic Electrical Engineering | Core | 03 | 01 | 00 | 40 | 20 | 60 | 40 | 100 | 3:1:0 | 4 | Y | Y | | | | | |
| **PRACTICALS** | | | | | | | | | | | | | | | | | | | | |
| **1** | DCH-151 | Applied Chemistry Lab | Core | 00 | 00 | 02 | 40 | 20 | 60 | 40 | 100 | 0:0:1 | 1 | Y | Y | Y | | Y | | |
| **2** | DPC-151 | Professional Communication Lab. | Core | 00 | 00 | 02 | 40 | 20 | 60 | 40 | 100 | 0:0:1 | 1 | Y | Y | Y | | | Y | Y |
| **3** | DCS-151 | Computer Application Lab. | Core | 01 | 00 | 02 | 40 | 20 | 60 | 40 | 100 | 1:0:1 | 2 | Y | Y | Y | | | | |
| **4** | DCS-152 | Basic Electrical Engineering Lab | Core | 00 | 00 | 02 | 40 | 20 | 60 | 40 | 100 | 0:0:1 | 1 | Y | Y | | | | | |
| **5** | GP-151 | General Proficiency | | - | - | - | - | - | 60 | - | 60 | | | | | | | | | |
| **Total** | | | | **19** | **06** | **08** | **400** | **200** | **660** | **400** | **1060** | | **29** | | | | | | | |

**APPLIED MATHEMATICS-I (A)**

**(DMA-101)**

**(Common to All Diploma Engineering Courses)**

**L T P**

**3 1 0**

**UNIT-1** **[9]**

**Series:**

Arithmetical Progression**:**$n^{th}$ term of AP, Sum of **'n'** terms, Arithmetic Mean.

Geometrical Progression**:**$n^{th}$ term of GP, Sum of **'n'** terms& infinite terms, Geometric Mean.

**Binomial theorem:**

Definition of factorial notation, permutation and combination, Binomial theorem for positive index, negative and fractional index(without proof), Application of Binomial theorem.

**Determinants:**

Definition, expansion and elementary properties of determinant of order 2 and 3. Solution of system of linear equations, Consistency of equations, Cramer's rules.

**UNIT-2** **[8]**

**Trigonometry:**

Trigonometric functions of allied, compound, multiple and submultiple angles.Trigonometric identities.Sine, Cosine, Projection and Tangent rules.

Hyperbolic and Inverse circular functions.

**UNIT-3** **[7]**

**Complex Number:**

Definition of imaginary number, complex number & its conjugate.Algebra of complex number (equality, addition, subtraction, multiplication and division).Geometrical representation of a complex number, modulus and amplitude.Polar form of a complex number, Square root of a complex number.De Moivre's theorem (without proof)& its application.

**UNIT-4** **[8]**

**Coordinate Geometry:**

Standard from of curves.

Parabola:$\mathbf{x^2 = 4ay,\ y^2 = 4ax}$

Ellipse:$\mathbf{\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1}$,Hyperbola:$\mathbf{\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1}$

Distance between two points in space, direction cosine and direction ratio.

**UNIT-5** **[8]**

**Plane and Sphere:**

Finding equation of straight line and shortest distance between two lines, Equation of a plane, Relation between lines and planes, Sphere.

**References:**


1. Applied Mathematics: Kailash Sinha, Meerut publication.
2. Applied Mathematics: P.K Gupta, Asian Publication.
3. Applied Mathematics: H.R Luthra, Bharat Bharti publication.
4. Applied Mathematics: H.K Das, C.B.S Publication.
5. Mathematics for Polytechnic: S.P Deshpande, Pune Vidyarthi Grih

**APPLIED PHYSICS-(A)**
**(DPH-101)**
**[COMMON TO ALL DIPLOMA ENGINEERING COURSES]**

**L T P**
**3 1 0**

**UNIT-1**

**Measurement:**

Units and Dimensions **[6]**

Fundamental and derived units:

S.I. Units and Dimensions of physical quantities, Dimensional formula and dimensional equation, Principal of homogeneity and application of homogeneity principle to:

(i) Checking the correctness of physical equations

(ii) Deriving relations among various physical quantitions,

(iii) Conversion of numerical values of physical quantities form one system of units into another, Limitations of dimensional analysis, Errors in measurement, accuracy and precision, random and systematic errors, estimation of probable errors in the result of measurement (combination of errors in addition, subtraction, multiplication and power). Significant figures and order of accuracy in respect to instruments.

**Vector:** Scaler and vector quantities; Addition, Subtraction, Resolution of vector; Cartesian components of vector, Scaler and vector product of vectors.

**UNIT-II** **[10]**

**Force and Motions:**

Newton's Law of Motion, Circular motion, angular velocity, angular acceleration and centripetal acceleration. Relationship between linear velocity and angular velocity, Relationship between linear acceleration and angular acceleration.

**Fluid mechanics and fiction:**

Surface tension, capillaries, equation of continuity, Bernoulli's theorem, stream line and turbulent flow, Reynold's number. Physical significance of friction, Advantage and disadvantage of friction and its role in every day life, Static and dynamic frictional forces, Coefficients of static and dynamic frictions and their measurement, Viscosity, Coefficients of viscosity and its determination by Stoke's method.

**Work, Power and Energy:**

Work done by force on bodies moving on horizontal and inclined planes in presence of frictional forces, Concept of power and its units, Calculation of power(simple cases). Concept of kinetic and potential energy, various forms of energy, conservation of energy, Force constant of spring, Potential energy of stretched spring.

**Unit-III** **[8]**

**Elasticity:**

Elasticity, Stress and Strain, Hooke's law, Elastic limit, Yielding point and breaking point, Modulus of elasticity, Young's modulus, Bulk modulus and modulus of rigidity, Poisson ratio, Resilience.

Simple Harmonic Motion, Peridic Motion,Characteristics of Simple Harmonic Motion,Equation of Simple Harmonic Motion and determination of Velocity and acceleration, Graphical representation, Spring Mass system, Simple pendulum, Derivation of their periodic time, Energy conservation in Simple Harmonic Motion, Definition of free, Forced, undamped and damped vibrations, Resonance and its sharpness,

Q-factor.

**Unit-IV** **[8]**

**Gas laws and specific heats of gases:**

Boyle's law, Charle's law, Gay Lussac's law, Absolute temperature, Kelvin scale of temperature, General gas equation(without derivation), Molar or universal gas constant, Universal gas equation, Standard or normal temperature and pressure (N.T.P), Specific heat of gases, Relation between two specific heat, Thermodynamics variables, first law of thermodynamics(statement and equation only), Isothermal, Isobaric, Isochoric and adiabatic processes ( Difference among these processes and equation of state).

**Unit-V** **[8]**

**Heat transfer and radiation:**

Modes of heat transfer, Coefficient of thermal conductivity and its determination by

(i) Searle's Method for good conductors.

(ii) Lee's Method for poor conductors.

Conduction of heat through compound media, Conduction and convection, Radial flow of heat,

Blackbody radiation, Stefan's law, Wein's displacement and Rayleigh- Jeans laws, Planck's law.

**References:**


1. Nootan Physics: Kumar & Mittal
2. Applied Physics: P.K. Gupta.
3. Pradeep Fundamental: Gogia & Gomber.
4. Applied Physics: P.S. Kushwaha.

| DCH-101 | Applied Chemistry (A) | | | | |
|---|---|---|---|---|---|
| **Pre-requisite** | **Co-Requisite** | **L** | **T** | **P** | **C** |
| **None** | **None** | **03** | **01** | **00** | **--** |
| Objective | To know the basic concept of Chemistry and their Applications in Engineering | | | | |
| **UNIT I** | **Atomic Structure and Classification of Elements:** | | | | 08 |
| Basic concept of atomic structure, Matter wave concept, Quantum number, Heisenberg's uncertainty principle, Shapes of orbitals.<br><br>Modern classification of elements (s, p, d, and f block elements), periodic properties: ionization potential, electro negativity, electron affinity. | | | | | |
| **UNIT II** | **Chemical Bonding:** | | | | 07 |
| Overview of basic concept of Ionic, Covalent & Co-ordinate bonds, Hydrogen bonding, Valence bond theory, Hybridization, VSEPR theory, Molecular orbital theory. | | | | | |
| **UNIT III** | **Electrochemistry-I and Electrochemistry-II:** | | | | 08 |
| Arrhenius theory of electrolytic dissociation, Transport number, Electrolytic conductance, Ostwald dilution law. Concept of acid and bases: Arrhenius, Bronsted and Lewis theory. Concept of pH and numericals. Buffer solutions, Indicators, Solubility product, Common ion effect with their application.<br><br>Redox reactions, electrode potential (Nernst equation), Electro-chemical cell (Galvanic and Electrolytic). EMF of a cell and free energy change. Standard electrode potential, Electrochemical series and its application. Chemical and electrochemical theory of corrosion, Galvenic Series. Prevention of corrosion by various methods. | | | | | |
| **UNIT IV** | **Chemical Kinetics, Catalysis and Solid State:** | | | | 09 |
| Introduction, Law of mass action, order and molecularity of reaction. Activation energy, rate constants, 1st order reactions and 2nd order reactions.<br><br>Definition, Characteristics of catalytic reactions, Catalytic promoters and poison, autocatalysis and negative catalysis. Theory of catalysis and applications.<br><br>Types of solids (Amorphous and Crystalline), classification (Molecular, Ionic, Covalent and Metallic), Band theory of solids (Conductors, Semiconductors and Insulators), types of crystals, FCC, BCC, Crystal imperfection. | | | | | |

| | | |
|---|---|---|
| | | |
| **UNIT V** | **Water Treatment:** | 08 |
| 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). Disadvantages of hard water in different industries, scale and sludge formation, corrosion, caustic embrittlement, priming and foaming in boilers.<br><br>Disinfection of Water by chloramine-T, Ozone and chlorine. Advantages and disadvantages of chlorination. Industrial waste and sewage, Municipality waste water treatment, Definition of BOD and COD. Numerical problems based on topics. | | |
| **Reference books:** | 1. Applied Chemistry: R. S. Katiyar and J. P. Chaudhary<br>2. Applied Chemistry: Rakesh Kapoor<br>3. Principles of general and inorganic chemistry: O. P. Tandon<br>4. Engineering Chemistry: S. Chandra<br>5. Applied Chemistry: M. Gupta | |

# Fundamentals of Information Technology
# (DCS -101)

**L T P**
**3 1 0**

**UNIT-I** **[ 8 ]**

**Introduction of Information Technology:**

Definition of Information, difference between data and information, need for information, qualities of Information, value of information, categories of information, level of Information. Use of Information Technology in Office Automation, Computers & Its Types.

**UNIT-II** **[ 10 ]**

**Components of Information Technology:**

Types of PC e.g. Desktops, Laptops, Notebooks, Palmtops, Memory System of a PC, Primary Memory, RAM (Random Access Memory), ROM (Read Only Memory), Secondary Memory, Types of Secondary Storage, Access Mechanism of storage Devices, PC setup and ROM-BIOS, Elementary Trouble shooting.

**Hardware & Software**

Components Hardware & its Functioning - Input Unit, Central Processing Unit, Output Unit, Types of Input Units & Output Units, Computer Software - Types of Software, System Software, Application Software.

**UNIT-III** **[ 10 ]**

**Data Representation:**

Binary Number System, Conversion from Decimal to Binary, Conversion from Binary to Decimal, Hexadecimal and Octa-decimal Number System, Memory Addressing and its importance, ASCII and EBCDIC coding System.

**UNIT-IV** **[ 7 ]**

**Emerging Trends in Information Technology:**

Concepts of Networking and Local Area Networking, MAN and WAN, Advanced Input/ Output Devices and their use (MICR, OCR, Scanners, Light pen, Plotters) , Microfilms, Rewritable CD-ROMS, Multimedia,Video Conferencing, Tele Conferencing.

**UNIT-V** **[ 5 ]**

**MOBILE COMPUTING :**

Introduction, Personnel Communication Services (PCS), Global System for Mobile Communication (GSM), GPRS, Mobile Data Communication, WAP, 3G Mobile service.

**Reference:**


1. Computer fundamental- Sinha & Sinha
2. Computer Basics & 'C'- V. Rajaraman

# PROFESSIONAL COMMUNICATION
# (DPC-101)
**[Common to All Engineering Courses]**

**L T P**
**3 1 0**

**UNIT-I**

**Communication in English :**

Concept of communication, importance of effective communication, types of communication, formal and informal, verbal and nonverbal, spoken and written, Techniques of communication, Listening and reading, writting and speaking, Barriers to communication- Modern tools of communication-
Fax, e-mail, Telephone, telegram, etc., Techniques for clear , concise , correct and coherent writing, Difference between technical writing and general writing. **[ 5 ]**

**UNIT-II**

**Letters :**

Kinds of letters: Official, demi-offical, unofficial , enquiry letter, quotation, tender and order giving letters. Application for a job, Resume, complaint letter and adjustment letter. **[ 5 ]**
Report writing, Note making and minutes writing.

**UNIT-III**

**Grammar :**

Transformation of sentences, synthesis, Preposition, Articles, Idioms and Phrases, One word substitution, Abbreviations. Tenses, Active and Passive voice. Composition on narrative, descriptive, imaginative, argumentative, discussion and factual topics. **[ 15 ]**

**UNIT-IV**

**Spoken English:**

Phonemes(Speech sound),Consonant sounds, vowels sounds and dipthongs, Phonetic transcription, IPA,word stress and Intonation.Development of comprehension and knowledge of English through the study of text material and language exercises based on the prescribed text book of English. [ **10 ]**

**UNIT-V.**

**Letter writing in Hindi:**

Kinds of letters: Official, demi-offical, unofficial, enquiry letter, quotation, tender and order giving letters, Application for a job. **[ 5 ]**

**References :**


1. Dr. R.P. Chauhan, : Asian Publishers, Muzaffarnagar.
2. S.V. Singh & M. S. Verma : Bharat Bharat Prakashan, Meerut.
3. R. Thakur & M . Singh, Meerut Publication.

# BASIC ELECTRICAL ENGINEERING
# (DCS-102)

**L T P**

**3 1 0**

**UNIT-I**

Application of Electrical Engineering in different fields.
Basic terminology: Resistor, capacitor, current, voltage and EMF.Series and parallel combination of resistors and capacitors. Concept of constant voltage sources and current source , symbols and graphical representation, characteristics of ideal and practical sources. Conversion of voltage sources into current sources and vice versa. **[ 8 ]**

**UNIT-II**

**D.C. CIRCUIT**
KVL & KCL and simple numerical problems Ohm's law and simple numerical problems based on it. Introduction to Thevenin, Norton and Superposition theorem.
**LIGHTING SCHEMES:** Lux, Candela, Series and parallel connection of wiring.
**LAMPS:** Fluoroscent and Incandescent lamp construction and working. **[ 8 ]**

**UNIT-III**

**ELECTROMAGNETISM:**
Concept of magnetic flux, flux density, magnetic field intensity (formula based numerical problem).
**MAGNETIC CIRCUIT.**
Concept of reluctance and MMF (formula based numerical problem).Analogy between electric and magnetic circuit, B – H curve, Faraday's Law of electromagnetic induction.Lenz's Law, Energy stored in inductor. **[ 8 ]**

**UNIT-IV**

**A.C. CIRCUIT**
**Terminology: I**nstantaneous value, maximum value, cycle, frequency, alternating current and voltage (Simple numerical problem), Difference between A.C. and D.C. Concept of phase and phase difference, Phaser representation of voltage and current for inductor, capacitor and resistor. Introduction to three phase system, Advantage of three phase over single phase system.Star and Delta connection, Relationship between phase and line value of current and voltage. **[8]**

**UNIT-V**

**ELECTRICAL MACHINE**
Types of A.C. and D.C. motor, Basic principle and working of A.C. and D.C. motor.Basic principle and working of A.C. and D.C. generator. Application of A.C. and D.C. motor.Single phase transformer (Brief introduction).Brief idea about stepper motor, reluctance motor and PMDC motor. **[8]**

**Ref. Books :**


1. Fundamental of Electrical Engg. – Ashfaq Husain
2. Electrical Technology Volume-I – B.L. Thereja

| DCH-151/251 | Applied Chemistry Lab | | | | |
|---|---|---|---|---|---|
| **Pre-requisite**<br>**None** | **Co-Requisite**<br>**None** | **L**<br>**00** | **T**<br>**00** | **P**<br>**02** | **C**<br>**----** |
| **Objective** | **To develop the practical knowledge for qualitative analysis of salts and determination of hardness, chloride contents, dissolved oxygen in water** | | | | |
| | **ANY TEN EXPERIMENTS** | | | | |
| **Experiment 1-5** | To analyze inorganic mixture for two acid and basic radicals from following radicals<br>A. Basic Radicals :<br>$NH_4^+$, $Pb^{++}$, $Cu^{++}$, $Bi^{+++}$, $Cd^{++}$, $As^{+++}$, $Sb^{+++}$,<br>$Sn^{++}$, $Al^{+++}$, $Fe^{+++}$, $Cr^{+++}$, $Mn^{++}$, $Zn^{++}$, $Co^{++}$<br>$Ni^{++}$, $Ba^{++}$, $Sr^{++}$, $Ca^{++}$, $Mg^{++}$<br>B. Acid Radicals :<br>$CO_3^{--}$, $S^{--}$, $SO_3^{--}$, $CH_3COO^-$, $NO_2^-$,<br>$NO_3^-$ , $Cl^-$, $Br^-$ , $I^-$ , $SO_4^{--}$ | | | | 10 |
| **Experiment 6** | To determine the total hardness of water sample in terms of $CaCO_3$ by EDTA titration method using E Br indicator. | | | | 02 |
| **Experiment 7** | Determination of temporary hardness of water sample by O-hener's method. | | | | 02 |
| **Experiment 8** | To determine the Chloride content in supplied water sample by using Mohr's methods. | | | | 02 |
| **Experiment 9** | Determination of Dissolved oxygen (DO) in given water sample. | | | | 02 |
| **Experiment 10** | To determine the strength of given HCl solution by NaOH solution using pH meter | | | | 02 |
| **Experiment 11** | To determine the percentage of available Chlorine in the supplied sample of Bleaching powder. | | | | 02 |

# PROFESSIONAL COMMUNICATION LAB
# (DPC-151)

**L T P**
**0 0 2**

**UNIT-I**

Introduction to speech sounds through (IPA) International Phonetic Alphabet.

- Pronunciation practice emphasizing the articulation of vocal sounds & Word stress.
- Pronunciation Practice emphasizing the words with spelling pronunciation Mismatch.

**UNIT-II**

- Techniques of giving focused self description in formal communication Situations.
- Practice in describing objects.

**UNIT-III**

- The basics of group discussion.
- Common pitfalls in group discussion.
- Techniques for making a claim & supporting it in group discussion.
- Techniques for offering polite but firm counter arguments.
- Participating in a Debate.

**UNIT-IV**

- The essentials of Seminar Presentation.
- Techniques for preparing a Seminar Presentation.
- Mock Interview: Preparation, Unfolding of personality and expressing Ideas effectively.
- Role Play/General Conversation, Making polite enquiries at Railway station, Post Office and other Public Places.

**UNIT-V**

**Project:**

At the beginning of the Semester each student in the class will be given topics for one informative & one persuasive speech to be delivered by him/her towards the end of the semester. The students will research for, organize and finalize the speeches under the guidance of the subject teacher. For each speech, the student will submit a one page written outline.

**Software:**

- Learn to Speak English (BPB Multimedia)
- A talking Dictionary.
- CD's of Professional Communication.

**References :**


1. Grant Taylor : English Conversation Practice (T.M.H.)
2. Grathe King :Colloqnial English Routledge London

# BASIC ELECTRICAL ENGINEERING LAB
# (DCS-152)

**L T P**
**0 0 2**

**Perform any 10 experiments**

1. |Use of ammiter, voltmeter and multimeter
2. Measurement of voltage, current, frequency single and three phase system
3. Ohm's law verification
4. To verify the laws of series connections of i.e. to verify:
   The total resistance in series connection.
   R1=R1+R2+R3……
   Where RT is the total resistance and R1, R2, R3 etc. are the resistance connected in series.

5. To verify the laws of parallel connections of resistance i.e. to verify:
   The total resistance in parallel connections
   1/RT=1/R1+1/R2+1/R3……..
   Where RT is the total resistance and R1, R2, R3, etc. are the resistance
   Connected in parallel. Also to conclude that the total resistance value of a parallel circuit is less than the any individual resistance.

6. To verify Kirchoff's first laws: The algebric sum of the currents at a junction is zero.

7. To verify Kirchoff's second laws: The algebric sum e.m.f. in any closed circuit is equal to the algebric sum of IR products (drops) in that circuit.

8 . To measure the resistance an ammeter and a voltmeter and to conclude that ammeter has very low resistance whereas voltmeter has very high resistance.

9. To verify Thevenin's theorems

10. Verification of law of capacitors in series in parallel

11. To verify Norton theorem

12. conversion of voltage source into current source

13. conversion of current source into voltage same

# Computer Application Lab
# (DCS-151)

**L T P**
**1 0 2**

1. Introduction of computer types, generation, Application, characteristic & Memory.
2. Introduction and practice of Ms-Office package (Ms-Word, Ms- Excel, Ms- Power point & Ms-Access).
3. Introduction & Practice of Internet and e-mail.
4. Programming of 'C' history of character set, variables, and keywords, token data types input and output function.
5. Introduction of Decision control statement- if, if- else, nester if statement and switch case.
6. Programming practice of if, if – else, nested if statement and switch case.
7. Loops- while loop, do- while loop, for loop, break and continuous statements.
8. Programming practice of while loop do- while loop, for loop, break and continuous statements.
9. Array Declaration, initialization of one and two dimensional array.
10. Programming practice on array.

**Reference:**


1. Computer fundamental- Sinha & Sinha
2. Computer Basics & 'C'- V. Rajaraman
3. Office 2007 - Ruthosky, Seguim, Ruthosky
4. Programming in ANSI- E Balagurusamy