Integral University, Lucknow
Department of Polytechnic
Study and Evaluation Scheme

Program: Diploma in Electronics Engineering

Semester II[nd]

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-201	Applied Mathametics-1(B)	Core	03	01	00	40	20	60	40	100	3:1:0	4	Y		Y				
2	DPH-201	Applied Physics (B)	Core	03	01	00	40	20	60	40	100	3:1:0	4	Y	Y	Y		Y		
3	DCH-201	Applied Chemistry (B)	Core	03	01	00	40	20	60	40	100	3:1:0	4	Y	Y	Y		Y		
4	DECE-201	Electrical Engineering-II	Core	03	01	00	40	20	60	40	100	3:1:0	4	Y		Y				
5	DECE-202	Electronic Components & Devices-II	Core	03	01	00	40	20	60	40	100	3:1:0	4	Y	Y	Y				
6	DPC-201	Professional Communication	Core	03	01	00	40	20	60	40	100	3:1:0	4	Y	Y	Y			Y	Y
PRACTICAL																				
1	DCH-251	Applied Chemistry Lab	Core	00	00	02	40	20	60	40	100	0:0:1	1	Y	Y	Y		Y		
2	DECE-252	Electronic Components & Device Lab	Core	00	00	02	40	20	60	40	100	0:0:1	1	Y	Y	Y				
3	DCS-251	Computer Application Lab	Core	01	00	02	40	20	60	40	100	1:0:1	2	Y	Y	Y				
4	DPC-251	Professional Communication Lab	Core	00	00	02	40	20	60	40	100	0:0:1	1	Y	Y	Y			Y	Y
5	GP-251	General Proficiency		-	-	-	-	-	60	-	60									
		Total		18	06	09	400	200	660	**400**	**1060**		**29**							

APPLIED MATHEMATICS-I (B)
(DMA-201)
(Common to All Diploma Engineering Courses)

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UNIT-1 [9]

Differential Calculus-I

Function, Limit, Continuity:

Definitions of variable, constant, intervals (open, closed, semi-open). Definition of function, graph of function, range and domain, value of a function and type of functions. Elementary method for finding limits, continuity& differentiability.

Derivatives:

Definition of derivative and notation,derivativeof standard function, derivative of trigonometric function. Fundamental rules for derivative (without proof), derivatives of sum or difference, scaler multiplication, product of function, quotient of function and function of function.

UNIT-2 [9]

Differential Calculus-II

Differentiation:

Logarithmic differentiation, differentiation of implicit function, differentiation of parametric equation, differentiation of a function with respect to another function.differentiation of special functions (Hyperbolic and Inverse circular functions), higher order differentiation, Leibniz's theorem.

Application: Tangents and Normals, Maxima and Minima, Rate, Velocity and Acceleration.

UNIT-3 [9]

Integral Calculus:

Definition of Integration(anti-derivative), Integration of standard functions. Rule of integration (Integration of sum, difference and scaler multiplication).

Indefinite Integral:

Integration by substitution, Integration by parts, Integration by partial fraction, Integration of special functions(Hyperbolic and Inverse circular functions).

Definite Integral:

Definition of definite integral, properties and evaluation of definite integral.

UNIT-4 [7]

Application of Integral Calculus:

Finding areas bounded by sample curves, length of simple curves, Volume of solids of revolution, mean value, mean square value, root mean square value of function.

UNIT-5 [6]

Numerical Integration & Error:

Introduction, Newton-Cote's Quadrature formula,Trapezoidal rule, Simpson's $1/3^{rd}$ rule and $3/8^{th}$ rule.Concept of error for simple function.

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 Griha.

APPLIED PHYSICS(B)
(DPH-201)
[Common to All Engineering Courses]

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UNIT-I **[6]**

Application of Sound Waves :

Acoustics :

Standing waves, Closed and Open organ pipes, Resonance, End correction.Definition of pitch, loudness, quality and intensity of sound waves. Echo and reverberation and reverberation time. Sabine's formula, Control of reverberation time (problems on reverberation time).Accoustics of buildings, defects and remedy.

Ultrasonics,

Generation, Magnetostriction, Piezoelectric effect, Application in new technology

UNIT-II **[8]**

Quantum nature of light, Coherence (Spatial and temporal), Duality of wave and particle, Concept of Interference, Biprism, Fraunhoffer single slit diffraction,grating, Resolving and dispersive power, Elementary concept of polarization.

Fibre Optics :

Critical angle, Total internal reflection, Principle of fiber optics, Optical fiber, Pulse dispersion in step-index fibers, Graded index fiber, Single mode fiber, Optical sensor

UNIT-III

D.C. Circuits :

Principle of Wheat Stone bridge and application of this principle in measurement of resistance (Meter bridge and Post Office Box); potentiometer, Kirchhoff's Law and their simple application. Principle of Carey-Foster's bridge.

Electric potential, potential energy, Energy of a charged capacitor. Charging and Discharging of capacitors,

Dielectrics :

Electric dipole; effect of electric field on dielectrics, polarization.Magnetic Fields & Materials : Dia, Para and Ferro-magnetism, Ferrites, Hysteresis, Hysteresis curve of a ferro magnetic materials and their uses, Basic idea of super conductivity.

UNIT-IV[**10]**

Semiconductor Physics :

classification of solids into conductors, insulators and semiconductors on the basis of energy band structure. Intrinsic and extrinsic semi conductors, Electrons and holes as charge carriers in semiconductors, Effect of temperature in conduction in semiconductors, P-type and N-type semiconductors, P-N junction formation, barrier voltage, Forward and reverse biasing of a junction diode.

Production of X-rays types of X-rays spectra :

Continuous and characteristics of X-rays,Properties & applications of X-rays.

Nuclear Physics :

Radioactivity, Nuclear stability, Radioactive emission, radiation hazards, Nuclear fission and fusion, Nuclear reactors and their application, Mass-energy relation, Atomic mass unit, Mass defect and binding energy.

UNIT-V **[8]**

Lasers and its Applications :

Absorption and Emission of energy by atom, Spontaneous and Stimulated Emission, Population inversion. Main components of laser and types of laser,Ruby Laser, He-Ne laser and their applications.

Non-conventional energy resources.

Wind energy : Introduction, scope and significance,measurement of wind velocity by anemometer, general principle of wind mill, Indian wind energy programme.

Solar energy: Solar radiation and potentiality of solar radiation in India, unit of solar radiation.

Bio fuel and Gobar gas plants

Uses of solar energy: Solar Cooker, solar water heater, solar photo-voltaic cells, solar energy collector, Modern applications in technology. 5

References :

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

DCH-201	Applied Chemistry (B)				
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	**Fuels:**				07
Definition, its classification, high and low calorific value. Determination of calorific value of solid and liquid fuels by Bomb calorimeter. Liquid fuel- Petroleum and its refining, distillates of petroleum (Kerosene oil, Diesel and Petrol), Benzol and power alcohol. Knocking, Anti-knocking agents, Octane number and Cetane number. Cracking and its type, Gasoline from hydrogenation of coal (Bergius process and Fischer Tropsch's process) Gaseous Fuel- Coal gas, Oil gas, Water gas, Producer gas, Biogas, LPG and CNG. Numerical problems based on topics.					
UNIT II	**Colloidal State of Matter and Lubricants:**				08
Concept of colloidal 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, Electrophoresis and Coagulation. Relative stability of hydrophilic and hydrophobic colloids. Protection and protective colloids. Emulsion, types, preparation, properties and uses. Application of colloids chemistry in different industries. Definition, classification, necessity and various kinds of lubricants. Function and mechanism of action of lubricants and examples. Properties of lubricants, importance of additive compounds in lubricants, Synthetic lubricants and cutting fluids. Industrial application, its function in bearing.					
UNIT III	**Hydrocarbons:**				08

A. Classification and IUPAC nomenclature of organic compounds homologous series (Functional Groups). B. Preparation, properties and uses of Ethane, Ethene, Ethyne (Acetylene), Benzene and Toluene.		
UNIT IV	**Organic Reactions and Mechanism:**	08
Fundamental aspects- A. Electrophiles and nucleophiles, Reaction intermediates, Free radicals, Carbocation, Carbanion. B. Inductive effect, Mesomeric effect, Electromeric effect. Mechanism- A. Mechanism of addition reaction (Markonicove's Rule, Cyanohydrin and Peroxide effect). B. Mechanism of substitution reactions; (Nucleophillic) hydrolysis of alkyl halide, electrophillic substitution halogenations, Sulphonation, Nitration and Friedel- Craft reaction. C. Mechanism of Elimination reaction- Dehydration of primary alcohol, Dehydrohalogenation of primary alkyl halide.		
UNIT V	**Polymers and Synthetic Materials:**	09
Polymers- Polymers and their classification. Average degree of polymerization, Average molecular weight, Free radical polymerisation (Mechanism). Thermosetting and thermoplastic A. Addition polymers and their industrial applications- Polythene, Polystyrene, PVA, PVC, PAN, PMMA, Buna-S, Buna-N, Teflon. B. Condensation polymers and their industrial applications- Nylon 6, Nylon 6,6, Bakelite, Melamine formaldehyde, Urea formaldehyde, Terylene or Dacron, Polyurethanes. General concept of Bio polymers, Biodegradable polymers and Inorganic polymers (Silicon). Synthetic Materials- A. Introduction- Fats and Oils		

	B. Saponification of fats and oils, Manufacturing of soap C. Synthetic detergents, types of detergents and its manufacturing. Explosives: TNT, RDX and Dynamite Paint and Varnish.	
Reference books:	6. Applied Chemistry: R. S. Katiyar and J. P. Chaudhary 7. Applied Chemistry: Rakesh Kapoor 8. Principles of general and inorganic chemistry: O. P. Tandon 9. Engineering Chemistry: S. Chandra 10. Applied Chemistry: M. Gupta	

ELECTRICAL ENGINEERING-II

(DECE-201)

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UNIT-I **[7]**

SEMI CONDUCTOR AND SPECIAL PURPOSE MATERIALS:

N-type and P-type materials, application of semi-conductor materials, materials used in transistor and I.C. manufacture.

MAGNETIC MATERIALS:

(A) Ferromagnetism, domains, Permeability, hysteresis loop-(including coercive force and residual magnetism) and magnetic saturation.

UNIT-II **[11]**

(i) Concept of mmf, flux, reluctance and permeability.

(ii) Energy Stored in a magnetic field and an inductor.

(iii) Solution of problems on magnetic circuits

UNIT-III **[7]**

(i) Faraday's laws of electromagnetic induction, Lenz's law, Physical explanation of self and mutualinductace.

(ii) B-H curve, Hysterises, Eddy currents elementary ideasand significance.

(iii) Growth and decay of current in an inductive circuit.

(iv) Force between two parallel current carrying conductors and its significance.

(v) Current carrying conductor in a magnetic field and its significance.

UNIT-IV **[7]**

A.C. THEORY:

(i) Concept of alternating voltage and current, difference between A.C and D.C..

(ii) Generation of alternating voltage, equation of sinusoidal waveform.

(iii) Defination and concept of cycle, frequency, Time period, amplitude, instantaneous value, average value, RMS value, peak value, form factor, Peak factor.

(iv) Phase and phase difference, representation of alternating quantities by phasor, addition and subtraction of alternating quantities.

UNIT-V **[8]**

TRANSIENTS & HARMONICS:

Intriduction, Types of transients, Important differential equations, First and second order equation, Transients in R-L series circuits(D.C), Short circuit current, timeconstant, Transients in R-L series circuits(A.C), Transients in R-C series circuits(D.C), Transients in R-C series circuits (A.C), Double energy transients.

Fundamental wave and harmonics, Different complex waveforms, General equation of complex wave, R.M.S. Value of a complexwave, Power upplied by complex wave, Harmonics in singlephase a.c. circuits, selective resonance due to harmonics, Effect of harmonics of measurement of inductance and capacitance.

References:

1. Fundamentas of Electrical Engg- Ashfaq Husain

2. Electrical Technology Volume-1- B.L. Theraja

3. K.B. Raina and S.K. Bhattacharya- Pubs: S.K. Kataria & Son

ELECTRONICS COMPONENT & DEVICES-II

(DECE-202)

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UNIT-1

TRANSISTOR BIASING AND STABILIZATION OF OPERATION POINT:

1. Different transistor biasing circuit for fixing the operation points ,of temperature on operation point .Need and method for stabilization of operation point .Effect of fixing operation point in cut – off or saturation region on performance of amplifier .

2. Calculation of operation point for different biasing circuits, use of thevenin's theorem in analyzing potential divider biasing circuit.

3. Simple design problems on potential divider biasing circuit. 9

UNIT-II

SINGLE STAGE TRANSISTOR AMPLIFIER:

1. Analysis of Single Stage CE,BE, and CC amplifier .
2. Single stage CE amplifier circuits with proper biasing component
3. AC load line and its use in:

(a) Calculation of current and voltage gain of a single stage amplifier circuit.

(b) Explanation of phase reversal of the output voltage with respect to input voltage .

9

UNIT-III

FIELD EFFECT TRANSISTOR (FET)

1. Construction, operation, characteristics and Biasing of Junction FET .
2. Analysis of Single Stage CS, CG and CD amplifiers. (Only brief idea) 8

UNIT-IV

MOSFET

1. Constructions, operation, Characteristics and Biasing of MOSFET in both depletion and enhancement modes.

2. Analysis of single stage CS, CG and CD amplifiers (Only Brief Idea)

CMOS:

1. Construction ,operation and characteristics of CMOS in both depletion and enhancement modes
2. Use of CMOS as Inverter , Different application of CMOS
3. Comparison of JEET ,MOSFET and Bipolar transistor. 8

UNIT-V

INTEGRATED ELECTRONICS

1. Introduction to IC and its importance in modern electronics, types of IC's some examples of popular IC's (74& 40 series i.e. 741,714,555,810,4046etc.)
2. Fabrication of transistor by planer process. A typical fabrication process for Ics (brief explanation)
3. Difference between SSI , MSI. LSI.VLSI. 7

References:

1. Principles of Electronics – V.K.Mehta
2. Fundamental of Electrical Engg- Ashfaq Husain
3. Bhargava,kulshereshtha & Gupta –"Basic Electronics & Linear Circuits " – Tata Mcgraw -hill

PROFESSIONAL COMMUNICATION
(DPC-201)
[Common to All Engineering Courses]

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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. 15

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

UNIT-IV

Spoken English:

Phonemes(Speech sound),Consonant sounds, vowels sounds and dipthongs, Phonetic transcription, IPA,word stress and Intonation. 10

Development of comprehension and knowledge of English through the study of text material and language exercises based on the prescribed text book of English.

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.

DCH-151/251	Applied Chemistry Lab				
Pre-requisite **None**	**Co-Requisite** **None**	**L** **0** **0**	**T** **0** **0**	**P** **0** **2**	**C** **----**
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 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^{--}				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

ELECTRONICS COMPONENTS & DEVICES LAB

(DECE-252)

LTP

002

PERFORM ANY 10 EXPERIMENTS:

1. Semiconductor diode characteristics:

(i) Identifications of types of packages, terminals and noting different ratings using data books for various types of semiconductor diodes (Germanium, point, contact; silicon low power and high power and switching diode).

(ii) Plotting of forward V-1 characteristics for a point, contact and junction P-N diode (silicon & Germanium diode).

2. Rectifier circuits using semiconductor diode, measurement of input and output voltage and plotting of input and output wave shapes

(i) Half wave rectifier.

(ii) Full wave rectifier (centre tapped and bridge rectifier circuits)

3. To plot forward and reverse V-1 characteristics for a zener diode.

4. To plot wave shapes of a full wave rectifier with shunt capacitor, series inductor and n filter circuit.

5. To plot the input and output characteristics and calculation of parameters of a transistor in common base configuration.

6. To plot the input and output characteristics and calculation of parameters of a transistor in common emitter

configuration.

7. Transistor Biasing circuits

(i) Measurement of operating point (Ic & Vce) for a fixed bias circuit.

(ii) Potential divider biasing circuits.

Measurement can be made by changing the transistor in the circuits by another of a same type number.

8. Plot the FET characteristics and determination of its parameters from these characteristics.

9. Measurement of voltage gain and plotting of the frequency response curve of a JFET & MOSFET amplifier circuits.

10. Single stage common emitter amplifier circuits.

(i) Measurement of voltage gain at 1 KHZ for different load resistance.

(ii)Plotting of frequency response of a single stage amplifier circuit.

(iii) Measurement of input and output impedance of the amplifier circuit.

11. Single stage common base amplifier circuit

(i) Measurement of voltage gain at 1 KHZ for different load resistance.

(ii)Plotting of frequency response of a single stage amplifier circuit.

(iii) Measurement of input and output impedance of the amplifier circuit.

12. Identification of some popular IC of 74 and 40 series with Pin Number and other details.

Computer Application Lab

(DCS-151/251)

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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

PROFESSIONAL COMMUNICATION LAB
(DPC-251)

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UNIT-I

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

- Pronounciation practice emphasizing the articulation of vocal sounds & Word stress.
- Pronounciation Practice emphasizing the words with spelling pronounciation 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