COURSE STRUCTURE & SYLLABUS OF DIPLOMA ENGINEERING

Electronics & Telecommunication Engineering

Course Structure

Second Year

Third Semester

Paper Code	Subject
DSET1	Engg. Mathematics III
DSET2	Applied Mechanics
DSET3	Electrical Technology
DSET4	Engg. Graphics
DSET5	Applied Electronics

SYLLABUS

DSET1 : ENGINEERING MATHEMATICS - III

1 : COMPLEX NUMBER

1.1 Definition of complex number and geometrical representation of complex number
1.2 Properties [AI
1.3 Algebra of complex number
1.3.1 Sum and difference of complex number
1.3.2 Product and division of complex number
1.3.3 Polar form of complex number [modules & amplitude form]
1.4 DE - MOIVRE'S theorem and its applications'
1.5 Exponential, circular and hyperbolic function of complex number.
[Definitions and their relation]

2: APPLICATIONS OF DERIVATIVES

2.1 Geometrical meaning of derivatives.
2.2 Equations of tangent and normal
2.3 Rates and motions
2.4 Maxima & minima"[Problems related to electronics engineering.]
2.5 Application of derivative to solve problems related to electronics engineering.

3 : INTEGRATION

3.1 Definition of integration as anti-derivative
3.2 Integration of standard functions [without proof]
3.3 Integration of sum & difference of two or more functions
3.4 Methods of Integration [simple examples]
3.4.1 Integration by substitution
3.4.2 Integration by partial fraction
3.4.3 Integration by trigonometric transformation
3.4.4 Integration by parts
3.5 Definite Integration

3.5.1 Definition
3.5.2 Properties [without proof]

Applications of definite integration [mean value, RM.5, value, Area under curve].

4: DIFFERENTIAL EQUATION

4.1 Definition of differential equation.
4.2 Order degree of differential equation
4.3 Formation of differential equation.
4.4 Solution of Differential equation of first order & first degree
4.4.1 Variable separable form
4.4.2 Equations reducible to variable separable form
4.4.3 Homogeneous differential equation
4.4.4 Equations reducible to homogenous form
4.4.5 Exact differential equation
4.4.6 Linear differential equation
4.4.7 Equations reducible to linear form.
4.5 Applications of differential equation to Electronics engineering Problems.

5 : FOURIER SERIES

5.1 Definition & Euler's formula
5.2 Functions having points of discontinuity
5.3 Change of Interval
5.4 Expansions of odd or even periodic functions
5.5 Half range series

6 : LAPLACE TRANSFORM

6.1 Definition
6.2 Laplace transformation of elementary functions
6.3 Theorems and. important properties [linearity, first shifting, Multiplication by t^n, division by t]
6.4 Inverse of lap lace transform
6.5 Inverse lap lace transform using partial fractions
6.6 Convolution theorem
6.7 Laplace transform of derivatives Application of laplace transform for solving differential equation

DSET2 : APPLIED MECHANICS

1 : FUNDAMENTAL CONCEPTS

1.1 Mechanics, statics, dynamics, kinetics, kinematics.
1.2 Space, time, particle, body, rigid body.
1.3 Scalar, vector, fundamental units, derived units

2 : FORCE SYSTEM

2.1 Concept of force, definition, unit, graphical representation of force.
2.2 Concept of system of forces, non-coplanar, coplanar, concurrent, parallel, non-concurrent & non-parallel forces.
2.3 Resolution of a force into two components along any directions.
2.4 Resolution of a force into two components at right angles to each other by analytical method:.

3 : COMPOSITION OF FORCES

3.1 Composition, Resultant of forces
3.2 Law of parallelogram of forces,
3.3 Moment of force, couples lever arm.

3.4 Varignon's theorem
3.5 Resultant of coplanar concurrent, parallel, and non-concurrent, non-parallel forces

4: EQUILIBRIUM

4.1 Definition of equilibrium, relation between resultant and Equilibrium of coplanar concurrent forces, Lami's theorem.
4.2 Equilibrium of coplanar parallel forces & coplanar non-concurrent forces. .
4.3 Analytical conditions of equilibrium for coplanar concurrent & non-concurrent Forces.
4.4 Principle of virtual work & Reactions of simply supported beam by using principle of virtual work.

5 : GRAPHIC STATICS

5.1 Space diagram, Bow's notation, force diagram, polar diagram, funicular polygon.
5.2 Resolution of a force into two rectangular components.
5.3 Composition of coplanar concurrent forces.
5.4 Composition of coplanar parallel forces.
5.5 Composition of coplanar non-concurrent non parallel forces.
5.6 Reaction of beams for simply supported beam with hinged & roller supports.

6 : FRICTION

6.1 Introduction, Rough & Smooth surfaces, Definition of friction.
6.2 Friction as a self adjusting force.
6.3 Different types of Friction, Laws of Friction, co-efficient of Friction, Angle of Friction and Angle of Repose.
6.4 Equilibrium of forces on level & inclined planes.
6.5 Equilibrium in friction with coefficient of friction for one plane only.

7 : CENTROID & CENTRE OF GRAVITY

7.1 Definition: Centroid, Centre of gravity
7.2 Centroid of regular plane areas & compound areas consisting of regular plains areas.
7.3 Centre of gravity of simple solids: Cylinder, cone, sphere, Centre of gravity of solid objects made up of simple solids.
7.4 Centre of gravity of hollow bodies.

8 : RECTILINEAR MOTION

8.1 Definition of kinematics, rectilinear velocity, acceleration.
8.2 Equation of rectilinear motion with uniform acceleration.
8.3 Velocity - rime diagrams, motion under gravity.

9 : ANGULAR MOTION

9.1 Angular velocity & angular displacement, angular motion with uniform angular acceleration.
9.2 Equations of circular motion with constant angular acceleration. Relation between rectilinear & circular motions.

10 : KINETICS

10.1 Concept of momentum & impulse.
10.2 Newton's laws of motion,
10.3 Conservation of momentum.

11 : WORK, ENERGY AND POWER

11.1 Definitions & unit of work done.
11.2 Graphical representation of work, work done by torque.
11.3 Power - definition & unit, energy - definition & unit.
11.4 Forms of energy, potential energy & kinetic energy. Principle of conservation of energy, work -energy theorem.

12 : SIMPLE LIFTING MACHINES

12.1 Definition: Mechanical Advantage, Velocity Ratio, Efficiency, Relation between them.
12.2 Reversibility of Lifting Machine, Law of Machine, Maximum M.A., Maximum Efficiency.
12.3 Study of machines - Differential Wheel & Axle, Weston differential, pulley block, simple screw jack, Worm & Worm Wheel, gear train, single & double purchase winch, system of pulleys, gear train,
12.4. Worm & worm wheel
12.5. Single purchase crab
12.6. Geared pulley block
12.7. Double purchase crab
12.8. Sheave pulley block

DSET3 : ELECTRICAL TECHNOLOGY

1. BASIC CONCEPTS OF ELECTRICAL ENGINEERING

Introduction, nature of electricity, unit of charge, free electrons, electric current, electric potential, potential difference, concept of e.m.f. And potential difference , resistance, factors upon which resistance depends, specific resistance or resistively, conductance, carbon resistance, depending on conductivity of material we divide the material into three types, summary

2. SOURCES OF ELECTRICAL ENERGY

Introduction, cell , types of cells, construction of a lead – acid battery, characteristics of a lead-acid cell, charging of lead-acid batteries, application of lead-acid batteries, construction of nickel –iron cell, nickel – cadmium cell, solar cells, fuel cells, Application of lead-acid batteries, summary

3. UNITS – WORK, POWER AND ENERGY

Introduction, International System Of Units, Important Physical Quantities, Unit Of Work Or Energy, Electrical Energy, Thermal Energy, Units Of Power, Efficiency, Heating Effect Of Electric Current, Summary

4. TYPES OF ELECTRIC CIRCUIT

Dc Circuit, Series Circuit, Parallel Circuit, Advantages Of Parallel Circuits, Series Parallel Circuit, Internal Resistance Of A Supply, Electric Current, Resistance, Effect Of Temperature On Resistance, Temperature coefficient of resistance, electric power, ohm's law, resistances in series, resistances in parallel, Network analysis, delta/ star transformation, now take star connection, star/delta transformation, summary

5. ELECTROSTATICS & CAPACITANCE

Electrostatics, Unit Of Charge, Electric Field, Lines Of Force, Properties Of Lines Of Force, Electric Flux, Electric Potential Difference And Potential, Potential At A Point Due To A Point Charge, Equipotential Surfaces, Potential Gradient, Breakdown Voltage & Dielectric Strength, Capacitance, Special Cases Of A Parallel Plate Capacitor, Spherical Capacitor, Capacitors In Parallel, Energy Stored In A Capacitor, Charging Of A Capacitor, Discharging Of Capacitor

6. MAGNETIC CIRCUIT

Magnetic Field, Magnetic Flux, Magnetic Flux Density, Magnetic Intensity Of Magnetizing Force (H), Absolute And Relative Permeability, Relation Between B And H, Electromagnetism, Magnetic Circuit, Comparison Between Magnetic And Electric Circuits, Series Magnetic Circuit, Air Gap In Magnetic Circuit, Parallel Magnetic Circuit, Summary

7. ELECTROMAGNETISM

Electromagnetism, Magnetic Effects Of Electric Current, Magnetic Field Due To Currents In Two Parallel Conductors, Magnetic Field Due To A Circular Loop, Magnetic Field Due To A Solenoid, Right Hand Rule, Shape Of The Magnetic Field, Toroid, B – H Curve, Magnetic Hysterisis, Hysterisis Loss, Importance Of Hysteresis Loop, Summary

8. ELECTROMAGNETIC INDUCTION

Force On A Current Carrying Conductor Placed In A Magnetic Field, Fleming's Left Hand Rule, Electromagnetic Induction, Fleming Right Hand Rule , Faraday's Laws Of Electromagnetic Induction, Lenz' Law, Induced E.M.F, Statically Induced E.M.F, Self Inductance , Magnitude Of Self Induced E.M.F, Magnitude Of Mutuall Induced E.M.F., Expression For Mutual Inductance , Co-Efficient Of Coupling, Lifting Power Of A Magnet

9. INDUCTORS

Introduction, Inductor, Inductance, Mutual, Inductance, Current Carrying Capacity , Coefficient Of Coupling, Inductive Reactance, Dc Resistance, Impendence, Types Of Inductor, Fixed Inductor, Air Core Inductor , Iron Core Inductor , Ferrite Core Inductors, Variable Inductors, Resistance In Parallel, Resistors In Series, Capacitors, Inductive Reactance , Capacitance, Impedance, Power In A.C. , Circuit With Resistance Only

DSET4 : ENGINEERING GRAPHICS

1. **FUNDAMENTAL OF ENGINEERING DRAWING**:
   Introduction, Use of Different Drawing Instruments , Dimensioning, Scales, Geometrical constructions.

2. **ENGINEERING CURVES**:
   Introduction, Conic sections, Different methods of constructions of Cycloidal Curves, Cycloid , Epicycloid, Hypocycloid, Involute, Spiral , Helix.

3. **ORTHOGRAPHIC PROJECTIONS**:
   Introduction, First Angle Method of Projections, Third angle method of projections.

4. **ORHTOGRAPHIC SECTIONAL VIEWS:**
   Introduction, Full Screen , Sectional side view, Horizontal Section, Offset section, Ribs in section, cutting planes/section planes.

5. **ISOMETRIC PROJECTIONS**:
   Isometric projection and Isometric Axes, Isometic scale, None – Isometric Lines, Angles, Curves and Circles in Isometric.

6. **PROJECTIONS OF STRAIGHT LINES:**
   Introduction, Line parallel to two principle planes and perpendicular to the third , Line parallel to one principle plane and inclined to the other , oblique line, Traces of Lines.

7. **PROJECTION OF PLANES:**
   Types of planes, various positions of planes, Traces o f planes, planes parallel to one reference plane, planes perpendicular to one reference plane and inclined to the other oblique planes, projections on Auxiliary planes.

8. **PROJECTION OF SOLIDS:**
   Types of Solids, Frustums and truncated solids, Various positions of Solids, Axis of Solid is perpendicular to one reference plane, Axis of the solid is parallel to one reference plane and inclined to the other, Oblique solid axis inclined to both the H.P and V.P.

9. SECTIONS OF SOLIDS:

Introduction , section plane, portion of solid assumed to be removed ,section, section lines, Apparent section, True shape of section, sectional view.

10. DEVELOPMENT OF SURFACES:

Introduction, Application of Development of surfaces in Engineering products, method of Development concepts of points and lines, Development of prisms , Development of cylinder, Development of pyramid, Development of cone.

11. FREE –HAND SKETCHES:

Introduction, Terminology used in the screw threads, V or triangular threads, ISO –metric screw threads, screw fastenings, Hexagonal Nut, Square nut, Flanged nut capnut, Domenut, capstan nut, Ring nut, wing nut, washers, Bolts, Hexagonal Headed bolts, Square headed bolt, cheese or cylindrical headed bolt, cup headed bolt , cheese or cylindrical headed bolt, cup headed or round headed bolt, T-headed bolt, counter sunk headed bolt, Hook bolt, Eye bolt, different types of studs, screws, Locking arrangement for nut , foundation bolts, Rivets and Rivetted Joints.

DSET5 : APPLIED ELECTRONICS

1. INTRODUCTION TO ELECTRONIC DEVICES :

Semiconductors, Intrinsic Extrinsic, Diode : P-N Junction diode, symbol, working and characteristics, Zener diode : symbol, working characteristics, Transistor Bipolar; Junction transistor (BJT) Field Effect Transistor (FET), Unijunction Transistor (UJT) : symbol, working and characteristics, Power device : Silicon Control Rectifier (SCR), DIAC and TRIAC : symbol, working and characteristics, photo devices : Photo diode, Photo transistor : symbol, Working and characteristics.

2. RECTIFIERS AND FILTER CIRCUITS

Rectifier : Half wave, full wave and Bridge type (single phase and three phase)
Filters : L, C, L-C and II type, Series and shunt regulator, Zener voltage regulator

3. AMPLIFIERS

Single stage transistor amplifier in CE – configuration, frequency response, Two stage transistor amplifiers : R-C coupled, transformer coupled and direct coupled and frequency response, introduction of Power amplifiers, classification, single ended class A amplifier.

4. OSCILLATOR

Type of feedback Positive and Negative, Barkhausch criteria.
R-C oscillator; Phase shift oscillator
L-C oscillator; Colpitts and Hartley oscillator Transistorized
Multivibrators : Astable, Monostable and Bistable

5. POWER CONTROL CIRCUITS

Transducers : Temperature, Pressure, displacement, Electronic timers, Level and temperature control circuits, Speed control circuits.

6. LINEAR INTEGRATED CIRCUITS

The operational amplifier and its block diagram, Configuration of op-amp and simple application as adder, subtractor, inv. And non amplifiers, Op-Amp application, voltage regulator, voltage compactor, oscillator.

7. DIGITAL CIRCUITS

Study of logic gates (AND, OR, NOT, NOR, NAND, EX-OR, EX-NOR) Symbols and truth table, Study of Flip – Flops : (S-R and J-K) symbol and working principle, truth table, Study the working principle of the following with the help of block diagram. Encoder, Decoder, Multiplexer, Demultiplexer, Shift Register and counters, Study of display: LED, LCD Seven segment display.

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