Faculty of Engineering & Technology

P.K.University

Shivpuri (MP)

Evaluation Scheme & Syllabus for

Department of Electrical Engg.

Diploma-(Electrical Engg.)

(II Semester)

(Effective from session 2025-26)

DIPLOMA – ELECTRICAL ENGINEERING

STUDY AND EVALUATION SCHEME

YEAR-1st /SEMESTER -2nd

SUBJECTCODE	SUBJECTS NAME	STUDY SCHEME Periods/Week			Credits	MARKS IN EVALUATION SCHEME						Total Marks of Internal & External
						INTERNAL ASSESSMENT			EXTERNAL ASSESSMENT			
		L	T	P		Th	Pr	Tot	Th	Pr	Tot	
DAPPLEE201	Applied Mathematics –II	3	1	-	4	30	-	30	70	-	70	100
DAPPLEE202	Applied Physics –II	2	1	-	3	30	-	30	70	-	70	100
DBASIEE203	Basic Electrical Engineering	3	1	-	4	30	-	30	70	-	70	100
DELECEE204	Electronics-I	2	1	-	3	30	-	30	70	-	70	100
DENGIEE205	Engineering Drawing	3	0		3	30	-	30	70	-	70	100
DAPPLEE206	Applied Physics- II Lab	0	0	2	1	-	25	25	-	25	25	50
DELECEE207	Electronics-I Lab	0	0	2	1	-	25	25	-	25	25	50
DBASIEE208	Basic Electrical Engineering	0	0	2	1	-	25	25	-	25	25	50
		13	4	6	20	150	75	225	350	75	425	650

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I Year II Semester

DAPPLEE201
APPLIED MATHEMATICS -II
(Common to all branch of Diploma engineering)

L	T	P
3	1	0

1. INTEGRAL CALCULUS - I : Methods of Indefinite Integration :-1.1 Integration by substitution.

1.2 Integration by rational function.

1.3 Integration by partial fraction.

1.4 Integration by parts.

2. INTEGRAL CALCULUS -II :

2.1 Meaning and properties of definite integrals, Evaluation definite integrals. Integration of special function.

2.2 Application : Finding areas bounded by simple curves, Length of simple curves, Volume of solids of revolution, centre of mean of plane areas.

2.3 Simposns 1/3rd and Simposns3/8th rule and Trapezoidal Rule : their application in simple cases.

3. CO-ORDINATE GEOMETRY (2 DIMENSION):

3.1 CIRCLE: Equation of circle in standard form. Centre - Radius form, Diameter form, Two intercept form.

3.2 Standard form and simple properties

Parabola $x^2=4ay$, $y^2= 4ax$,

Ellipse $\frac{x^2}{} + \frac{y^2}{} = 1$

Hyperbola $\frac{x^2}{} - \frac{y^2}{} = 1$

4. CO-ORDINATE GEOMETRY (3 DIMENSION):

4.1 Straight lines and planes in space - Distance between two points in space, direction cosine and direction ratios, Finding equation of a straight line and Plane (Different Forms),

4.2 Sphere $x2 + y2 + z2 + 2gx + 2fy + 2wz=d$ (Radius, Centre and General Equation)

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L	T	P
2	1	0

DAPPLEE202
APPLIED PHYSICS-II

(Common to all branch of Diploma engineering)

1. Optics :

Nature of light, Laws of Reflection and Refraction, Snell's Law, Interference (Constructive and Destructive), Diffraction and Polarization (Concept Only), Law of Mallus and Polaroid's.

2. Introduction To 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.

3. Lasers and its Applications :

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

4. Electrostatics :

Coulomb's Law, Electric field, Electric potential, Potential energy, Capacitor Energy of a charged capacitor, Effect of dielectric on capacitors.

5. D.C. Circuits :

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

6. Magnetic Materials and Their Properties:

Dia, Para and Ferro-magnetism, Ferrites, Magnetic Hysteresis Curve and its utility. Basic idea of super conductivity, Meissner's effect.

7. Semiconductor Physics :

Concept of Energy bands in solids, 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, P-type and N-type semiconductors.

8. Junction Diode and Transister :

Majority and Minority charge carriers P-N junction reverse biasing of ajunction diode,P-N junction transistor, transistor-action, Base, emitter and collector currents and their relationship LED's. formation, barrier voltage, Forward and device characteristics, Formation of

9. Introduction To Digital Electronics :

Concept of binary numbers, Inter conversion from binary to decimal and decimal to binary. Concepts of Gates (AND, NOT, OR).

10. Non-conventional energy sources:

(a) Wind energy : Introduction, scope and significance, measurement of wind velocity by anemometer, general principle of wind mill.

(b) Solar energy: Solar radiation and potentiality of solar radiation in India, uses of solar energy: Solar Cooker, solar water heater, solar photovoltaic cells, solar energy collector.

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DBASIEE203
BASIC ELECTRICAL ENGINEERING

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3	1	0

1. Overview of DC Circuits (08 periods)

1.1 Definition of basic terms, such as current, EMF, Potential Difference (PD); Ohm's Law and its limitations; Factors affecting resistors and capacitors; simple problems on series and parallel combinations of resistors with their wattage considerations.

1.2 Application of Kirchhoff's current law and Kirchhoff's voltage law to simple circuits. Star – Delta connections and their conversion.

2. DC Circuit Theorems (06 periods)

Superposition principle, Maximum Power Transfer Theorem, Thevenin's theorem, Norton's theorem, application of network theorems in solving D.C. circuit problems.

3. Voltage and Current Sources (04 periods)

3.1 Concept of voltage source, symbol and graphical representation characteristics of ideal and practical sources.

3.2 Concept of current sources, symbol, characteristics and graphical representation of ideal and practical current sources.

3.3 Inter Conversion of Voltage-Source and Current Source.

4. Electro Magnetic Induction (10 periods)

4.1 Concept of electro-magnetic field produced by flow of electric current, magnetic circuit, concept of magneto-motive force (MMF), flux, reluctance, permeability, analogy between electric and magnetic circuit.\

4.2 Faraday's laws of electro-magnetic induction, principles of self and mutual induction, self and mutually induced e.m.f, simple numerical problems.

4.3 Concept of current growth, decay and time constant in an inductive (RL) circuit.

4.4 Energy stored in an inductor, series and parallel combination of inductors.

5. Batteries (08 periods)

5.1 Basic idea of primary and secondary cells

5.2 Construction, working principle and applications of Lead-Acid, Nickel-Cadmium and Silver-Oxide batteries

5.3 Charging methods used for lead-acid battery (accumulator)

5.4 Care and maintenance of lead-acid battery

5.5 Series and parallel connections of batteries
5.6 General idea of solar cells, solar panels and their applications
5.7 Introduction to maintenance free batteries.

6. AC Fundamentals (10 periods)

6.1 Concept of alternating quantities
6.2 Difference between ac and dc
6.3 Concepts of: cycle, frequency, time period, amplitude, instantaneous value, average value, r.m.s. value, maximum value, form factor and peak factor.
6.4 Representation of sinusoidal quantities by phasor diagrams.
6.5 Equation of sinusoidal wave form for an alternating quantity and its derivation
6.6 Effect of alternating voltage applied to a pure resistance, pure inductance and pure capacitance.

7. AC Circuits (18 periods)

7.1 Concept of inductive and capacitive reactance
7.2 Alternating voltage applied to resistance and inductance in series.
7.3 Alternating voltage applied to resistance and capacitance in series.
7.4 Introduction to series and parallel resonance and its conditions
7.5 Power in pure resistance, inductance and capacitance, power in combined RLC circuits. Power factor, active and reactive power and their significance, definition and significance of power factor.
7.6 Definition of conductance, susceptance, admittance, impedance and their units
7.7 Introduction to polyphase a.c. systems, advantages of polyphase system over single phase system. Relations between line and phase value of voltages and currents for star and delta connections and their phasor diagram, power in polyphase circuits.

8. Various Types of Power Plants (06 periods)

8.1 Brief explanation of principle of power generation practices in thermal, hydro and nuclear power stations and their comparative study. A Visit to a nearby Power Station(s) may be organized for better understanding and exposure.
8.2 Elementary block diagram of above mentioned power stations

RECOMMENDED BOOKS

1. Basic Electrical Engineering by PS Dhogal, Tata Mc Graw-Hill Education Pvt Ltd., New Delhi.
2. Experiments in Basic Electrical Engineering by SK Bhattacharya, KM Rastogi; New Age International (P) Ltd.; Publishers New Delhi.
3. Electrical Technology by BL Theraja, S Chand and Co, New Delhi.
4. Basic Electrical Engineering by JB Gupta; SK Kataria and Sons, New Delhi.
5. Basic Electrical Engineering by Asfaque Husain, Jain Book Depot, New Delhi

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I Year II Semester

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2	1	0

DELECEE204
ELECTRONICS – I

1. Semiconductor Diodes (12 periods) Semiconductor materials N type and P Type P.N. junction its forward and reversed biasing; junction diode characteristics, static and dynamic resistances and their calculation from diode characteristics.

Diode (P-N junction) as , half wave, full wave rectifier including bridge rectifier, relationship between D.C. output voltage
e and A.C. input voltage, rectification efficiency and ripple factor for rectifier circuits, filter circuits, shunt capacitor, series inductor, capacitor input filter. Different types of diodes, brief idea of characteristics and typical applications of power diodes, zener diodes, varactor diodes, point contact diode, tunnel diodes, LEDs and photo diodes. Important specifications of rectifier diode and zener diode.

2. Bipolar Junction Transistor: (06 periods)

Concept of bipolar junction transistor as a two junction three terminal device having two kinds of charge carriers, PNP and NPN transistors their symbols and mechanisms of current flow, explanation fundamental current relations. Concept of leakage current (Icbo) effect of temperature on leakage current.
Standard notation for current and voltage polarity; CB, CE, and CC configurations.
Transistor input and output characteristics, concept of active, cut off and saturation region.
Common emitter configuration: current relations in CE configuration, collector current in terms of base current and leakage current (Iceo),relationship between the leakage current in CB and CE configuration, input and output characteristics, determination of dynamic input and output resistances and current amplification factor from the characteristics.

3. Single Stage Transistor Amplifier (10 periods)

Single stage CE amplifier with proper biasing circuit and its working as voltage amplifier. AC load line and its use.

(a) Explanation of phase reversal of the output voltage with respect to input voltage. Introduction to tuned voltage amplifier.

4. FIELD EFFECT TRANSISTOR (FET), MOSFET & CMOS (10 periods)

A. FET:

- Construction, operation, characteristics and Biasing of Junction FET.
- Analysis of Single stage CB, CG and CD amplifier. (Only Brief Idea)

B. MOSFET:

- Construction, operation, characteristics and Biasing of MOSFET in both depletion and enhancement modes.
- Analysis of Single stage CB, CG and CD amplifier.(Only Brief Idea)

C. CMOS:

- Construction, operation, characteristics of CMOS in both depletion and enhancement modes.
- Use of CMOS as Inverter, Different Application of CMOS, CMOS IC.
- Comparisons of JEET, MOSFET and Bipolar transistor.
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5. MULTISTAGE & POWER AMPLIFIERS: **(5 periods)**

5.1 Need of multistage amplifier, different coupling schemes and their working, brief mention of application of each of the type of coupling.

5.2 Working of R.C. coupled and transformer coupled multistage amplifier, approximate calculation of voltage gain and frequency response for a two stage R-C coupled amplifier. Working principles of push pull amplifier circuits its advantages over single ended power amplifier.

6. Feedback in Amplifiers **(04 periods)**

Basic principles and types of feedback, derivation of expression for the gain of an amplifier employing feedback. Effect of negative feedback on gain. Stability, distortion, and band width. (Only physical explanation) typical feedback circuits:

(a) RC coupled amplifiers with emitter by-pass capacitor removed.
(b) Emitter follower, complementary symmetry power amplifier and its applications.

7. Regulated Power Supply **(04 periods)**

7.1 Concept of regulation.
7.2 Basic regulator circuits (using zener diode).
7.3 Concept of series and shunt regulator circuits.
7.4 Three terminal voltage regulator Ics (positive negative and variable) application. Block diagram, Pin configuration and working of popular regulator IC.

8. OSCILLATORS: **(04 periods)**

8.1 Application of oscillators.
8.2 Use of positive feedback/negative resistance for generation of oscillation, barkhawn's criterion for Oscillations.

LIST OF BOOKS

1. Bhargava, Kulshreshtha & Gupta - "Baisc Electronics & Linear Circuits" - Tata Mcgraw-Hill.
2. Malvino, A. P. - "Electrinics Principles" - Tata Mcgraw- Hill.
3 J.B. Gupta - Electronic Devices & Circuits - Katson Publication

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I Year II Semester

DENGIEE205
ENGINEERING DRAWING

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1. Introduction to Engineering Drawing **(03 sheets)**

1.1 Introduction to drawing instruments, materials, layout and sizes of drawing Sheets and drawing boards.

1.2 Different types of lines in engineering drawing as per BIS specifications

1.3 Practice of vertical, horizontal and inclined lines, geometrical figures such as triangles, rectangles, Circles, ellipses and curves, hexagonal, pentagon with the help of drawing instruments.

1.4 Free hand and instrumental lettering (Alphabet and numerals) – upper case (Capital Letter), single Stroke, vertical and inclined at 75 degree, series of 5,8,12 mm of free hand and instrumental Lettering of height 25 to 35 mm in the ratio of 7:4

2. Dimensioning Technique **(01 sheet)**

2.1 Necessity of dimensioning, method and principles of dimensioning (mainly theoretical Instructions)

2.2 Dimensioning of overall sizes, circles, threaded holes, chamfered surfaces, angles, tapered Surfaces, holes, equally spaced on P.C.D., counter sunk holes, counter bored holes, cylindrical parts, narrow spaces and gaps, radii, curves and arches.

3. Scales **(02 sheets)**

3.1 Scales –their needs and importance (theoretical instructions), type of scales, Definition of R.F. and length of scale

3.2 Drawing of plain and diagonal scales

4. Orthographic Projections **(06 sheets)**

4.1 Theory of orthographic projections (Elaborate theoretical instructions)

4.2 Projection of Points in different quadrant 4.3 Projection of Straight Line (1st and 3rd angle)

4.3.1. Line parallel to both the planes

4.3.2. Line perpendicular to any one of the reference plane

4.3.3. Line inclined to any one of the reference plane.

4.4 Projection of Plane – Different lamina like square, rectangular, triangular and circle inclined to one Plane, parallel and perpendicular to another plane in 1st angle only

4.5 Three views of orthographic projection of different objects. (At least one sheet in 3rd angle) Identification of surfaces.

5. Projection of Solid **(02 sheets)**

5.1. Definition and salient features of Solid

5.2. Types of Solid (Polyhedron and Solid of revolution)

5.3 To make projections, sources, Top view, Front view and Side view of various types of Solid.

6. Sections **(02 sheets)**

6.1 Importance and salient features

6.2 Drawing of full section, half section, partial or broken out sections, Offset sections, revolved Sections and removed sections.

6.3 Convention sectional representation of various materials, conventional breaks for shafts, pipes, Rectangular, square, angle, channel, rolled sections 6.4 Orthographic sectional views of different Objects

6.4 Orthographic sectional views of different objects.

7. Isometric Views **(02 sheets)**

7.1 Fundamentals of isometric projections and isometric scale.

7.2 Isometric views of combination of regular solids like cylinder, cone, cube and prism.

8. Common Symbols and Conventions used in Engineering **(02 sheets)**

8.1 Civil Engineering sanitary fitting symbols

8.2 Electrical fitting symbols for domestic interior installations

9.. Introduction to AutoCAD **(02 sheets)**

Basic introduction and operational instructions of various commands in AutoCAD. At least two sheets on AutoCAD of cube, cuboid, cone, pyramid, truncated cone and pyramid, sphere and combination of above solids.

*** Auto CAD drawing will be evaluated internally by sessional marks and not by final theory paper.**

RECOMMENDED BOOKS

1. A Text Book of Engineering Drawing by Surjit Singh; Dhanpat Rai & Co., Delhi
2. Engineering Drawing by PS Gill; SK Kataria & Sons, New Delhi
3. Elementary Engineering Drawing in First Angle Projection by ND Bhatt; Charotar Publishing House Pvt. Ltd., Anand
4. Engineering Drawing I & II by JS Layall; Eagle Parkashan, Jalandhar
5. Engineering Drawing I by DK Goel, GBD Publication.

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I Year II Semester

DAPPLEE206

APPLIED PHYSICS-II LAB

(Common to all branch of Diploma engineering)

L	T	P
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LIST OF EXPRIMENTS:-

1. Determination of coefficient of friction on a horizontal plane.

2. Determination of 'g' by plotting a graph T2 verses l and using the formula g=4n2/Slope of the graph line

3. Determine the force constant of combination of springs incase of -1. Series 2. Parallel.

4. To verify the series and parallel combination of Resistances with the help of meter bridge.

5. To determine the velocity of sound with the help of resonance tube.

6. Determination of viscosity coefficient of a lubricant by Stoke's law.

7. Determination of E1/E2 of cells by potentiometer.

8. Determination of specific resistance by Carry Foster Bridge.

9. Determination of resistivity by P.O.Box.

10. Verification of Kirchhoff's Law.

11. To draw Characteristics of p-n Junction diode.

12. To measure instantaneous and average wind velocity by indicating cup type anemometer/hand held anemometer.

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DELECEE207
ELECTRONICS-I LAB

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LIST OF EXPRIMENTS:-

1. Semiconductor diode: identification 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).
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. Plot the wave shapes of a full wave rectifier with shunt capacitor, series inductor, and filter circuit
4. Single stage common emitter amplifier circuit
   i) Measurement of voltage gain at 1 KHZ for different load resistances.
   ii) Plotting of frequency response of a single stage amplifier circuit.
   iii) Measurement of input and output impedance of the amplifier circuit.
5. To measure the overall gain of two stage R.C coupled amplifier at 1 KHZ and note the effect of loading of second stage on the first stage.
6. (a)Toplot the load Vs output power characteristic to determine the maximum signal input for undistorted signal output.
   (b) The above experiment is to be performed with single ended power amplifier, transistorized push pull amplifier. Complementary symmetry power amplifier.
7. To observe the effect of a bye-pass capacitor by measuring voltage gain and plotting frequency response for a single stage amplifier.
8. To measure input and output impedance of a feedback amplifier with and without by-pass capacitor.
9. Measurement of voltage gain, input and output impedance and plotting of frequency response of an emitter follower circuit.
10. Plot the FET characteristics and determination of its parameters from these characteristics.
11. To test adjustable IC regulator and current regulator.
12. Identification of Some Popular IC of 74 and 40 series with Pin Number and other details.

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1st Year / 2nd Semester

DBASIEE208
BASIC ELECTRICAL ENGINEERING LAB

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LIST OF PRACTICALS

1. Operation and use of measuring instruments viz voltmeter, ammeter, CRO, Wattmeter, multi-meter and other accessories
2. Determination of voltage-current relationship in a dc circuit under specific physical conditions and to draw conclusions.
3. Measurement of resistance of an ammeter and a voltmeter
4. Verification of dc circuits:
   a. Thevenin's theorem,
   b. Norton's theorem,
5. Observation of change in resistance of a bulb in hot and cold conditions, using voltmeter and ammeter.
6. Verification of Kirchhoff's Current and Voltage Laws in a dc circuit
7. To find the ratio of inductance of a coil having air-core and iron-core respectively and to observe the effect of introduction of a magnetic core on coil inductance
8. Charging and testing of a lead - acid storage battery.
9. Measurement of power and power factor in a single phase R-.L-.C. Circuit and calculation of active and reactive powers in the circuit.