

Faculty of Engineering & Technology

P.K.University

Shivpuri (MP)



Evaluation Scheme & Syllabus for

Department of

Electronics & Communication Engg.

(II Semester)

(Effective from session 2025-26)

DIPLOMA –ELECTRONICS & COMMUNICATION ENGINEERING

Study And Evaluation Scheme For Diploma Electronics & Communication Engineering

YEAR-1st /SEMESTER-2nd

SUBJECT CODE	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	
DAPPLEC201	Applied Mathematics-II	3	1	0	4	30	-	30	70	-	70	100
DAPPLEC202	Applied Physics-II	2	1	0	3	30	-	30	70	-	70	100
DENGIEC203	Engineering Mechanics & Material	3	0	0	3	30	-	30	70	-	70	100
DELECEC204	Electrical Engineering-I	3	1	0	4	30	-	30	70	-	70	100
DELECEC205	Electrical Engineering-I Lab	0	0	2	1	-	25	25	-	25	25	50
DAPPLEC206	Applied Physics-II Lab	0	0	2	1	-	25	25	-	25	25	50
DINTREC207	Introduction To Computer Lab	0	0	2	1	-	25	25	-	25	25	50
DINTREC208	Elementary Workshop Practice Lab	0	0	2	1	-	25	25	-	25	25	50
DENGIEC209	Engineering Mechanics & Material Lab	0	0	2	1	-	25	25	-	25	25	50
Total		11	3	8	18	120	100	220	280	100	380	600

Department of Electronics & Communication Engineering
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P.K. University, Shivpuri (MP)
I Year II Semester
DAPPLEC201:APPLIED MATHEMATICS II

L	T	P
3	1	0

DETAILED CONTENTS:

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 of 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 $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$
 Hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$

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 $x^2 + y^2 + z^2 + 2gx + 2fy + 2wz = d$ (Radius, Centre and General Equation)

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I Year II Semester
DAPPLEC202
APPLIED PHYSICS-II

L	T	P
2	1	0

1. Optics :

Nature of light, Laws of Reflection and Refraction, Snell's Law, Interference (Constructive and Destructive), Diffraction and Polarization (Concept Only), Law of Malus 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, Kirchhoff'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 semiconductors, Electrons and holes as charge carriers in semiconductors, P-type and N-type semiconductors.

8. Junction Diode and Transistor :

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

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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I Year II Semester

DENGIEC203

ENGINEERING MECHANICS AND MATERIALS

L	T	P
3	0	0

DETAILED CONTENTS

1. Introduction:

Mechanics and its utility. Concept of scalar and vector quantities. Effect of a force. Tension & compression. Rigid body. Principle of physical independence of force. Principle of transmissibility of a force.

2. Forces Analysis:

Concept of coplanar and non-coplanar forces including parallel forces. Concurrent and non-concurrent forces. Resultant force. Equilibrium of forces. Law of parallelogram of forces. Law of triangle of forces and its converse. Law of polygon of forces. Solution of simple engineering problems by analytical and graphical methods such as simple wall crane, jib crane and other structures. Determination of resultant of any number of forces in one plane acting upon a particle, conditions of equilibrium of coplanar concurrent force system.

3. General Condition of Equilibrium:

General condition of equilibrium of a rigid body under the action of coplanar forces, statement of force law of equilibrium, moment law of equilibrium, application of above on body.

4. Stresses and strains:

Concept of stress and strain. Concept of various types of stresses and strains. Definitions of tension, compression shear, bending, torsion. Concept of volumetric and lateral strains, Poisson's ratio. Mechanical properties of MS, SS, CI Al and etc.

5. Beams & Trusses:

Definition of statically determinate and indeterminate trusses. Types of supports. Concept of tie & strut, calculation of reaction at the support of cantilever and simply supported beams and trusses. (simple problems only)

6.A. MATERIALS & CONCEPT USED IN ELECTRONICS :

Soldering materials - Type, chemical composition and properties, Soldering alloys - Tin lead, Tin antimony, Tin silver, Lead silver, Tin zinc, Different types of flux and their properties, Properties of plastics materials, Epoxy materials for PCB (Single and multi layer board), Emulsion parameters, Film emulsion, Type of laminates (Phenolic, Epoxy, Polyester, Silicon, Melamine, Polyimide), Properties of copper clad laminates, Material (Filler, Resin, Copper Foil) Photo printing basic for double side PCB, Photo resin materials coating process materials, Screen printing and its materials Etching agent, Film processing and used materials.

(B) Soldering & Brazing:

For black Galvanised and Tincoated Iron sheet, brass and copper sheets only.

- (1) Its concept, comparison with welding as joining method and classification, electric soldering and forge soldering.
- (2) Soldering operation- edge preparation of joints, Pickling and degreasing, Fluxing, Tinning and Soldering. Wave soldering, solder mask, Dip soldering, Drag soldering,
- (3) Materials Used-Common fluxes, soft and hard solder, solder wire (Plain and Resin core) and sticks, spelters and their specifications and discription (For Identification Only), forge soldering bits.
- (4) Electric soldering iron, other soldering tools.
- (5) Common defects likely to occurs during and after soldering.
- (6) Safety of Personnel, Equipment & Tools to be observed.

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DELECEC204

ELECTRICAL ENGINEERING-I

L	T	P
3	1	0

DETAILED CONTENTS

1. CLASSIFICATION:

Classification of materials into Conducting materials, Insulating materials, Semi-conducting materials with reference to their atomic structure.

2. CONDUCTING MATERIALS:

- A. Resistivity and factors affecting resistivity such as temperature, alloying and mechanical stressing.**
- B. Classification of conducting materials into low resistivity & high resistivity materials. Some examples of each and their typical applications.**

3. INSULATING MATERIALS:

A. Electrical Properties:

Volume resistivity, Surface resistance, Dielectric loss, Dielectric strength (Break down voltage) and Dielectric constant.

B. Chemical Properties:

Solubility, Chemical resistance, Weather ability.

C. Physical Properties:

Hygroscopicity, tensile & Compressive strength, Abrasive resistance, Brittleness.

D. Thermal Properties:

Heat resistance, classification according to permissible temperature rise, Effect of electrical overloading on the life of an electrical appliance.

E. Plastic Insulating Materials:

Classification into thermoplastic and thermosetting categories, examples of each and their typical applications.

4. MAGNETIC MATERIALS:

- A. Ferromagnetism, domains, permeability, hysteresis loop- (including coercive force and residual magnetism) and magnetic saturation.**
- B. Soft and Hard magnetic materials, their example & typical applications.**

5. 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.

6. D.C. CIRCUITS:

- (i) Ohm's law, resistivity, effect of temperature on resistances, heating effect of**

electric current, conversion of mechanical units into electrical units.

- (ii) Kirchoff's laws, application of Kirchoff's laws to solve, simple d.c. circuits.
- (iii) Thevenin's theorem, maximum power transfer theorem, Norton's theorem and superposition theorem, simple numerical problems.

7. ELECTROSTATICS:

- (i) Capacitance and capacitor, definition, various types.
- (ii) Charging and discharging of a capacitor, growth and decay of current in a capacitive circuit.
- (iii) Energy stored in a capacitor.
- (iv) Capacitance in terms of dimensions of parallel plate capacitor.
- (v) Dielectric constant of material, Break down voltage of a capacitor.
- (vi) Series and parallel connection of capacitors.

8. ELECTRO MAGNETISM:

- (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.
- (iv) Faraday's laws of electromagnetic induction, Lenz's law, Physical explanation of self and mutual inductance.
- (v) B-H curve, Hysteresis, Eddy currents elementary ideas & significance.
- (vi) Growth and decay of current in an inductive circuit.
- (vii) Force between two parallel current carrying conductors & its significance.
- (viii) Current carrying conductor in a magnetic field and its significance.

9. 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) Definition 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.

10. BATTERIES:

- (i) Construction of lead acid and nickel cadmium batteries.
- (ii) Charging and maintenance of batteries.
- (iii) Rating of batteries.
- (iv) Backup batteries (Lithium & Silver Oxide batteries)
- (v) Shelf life of batteries.

11. TRANSIENTS & HARMONICS:

Introduction, Types of transients, Important differential equations, First and Second order equations, Transients in R-L series circuits (D.C.), Short circuit current, Time constant, 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 complex wave, Power supplied by complex wave, Harmonics in single phase a.c. circuits, Selective resonance due to harmonics, Effect of harmonics on measurement of inductance and capacitance

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I Year II Semester

DELECEC205
ELECTRICAL ENGINEERING-I-LAB

L	T	P
0	0	2

LIST OF PRACTICALS:

1. Ohm's law verification.
2. To verify the laws of series and parallel connections of resistances i.e. to verify:-
 - (i) The total resistance in series connections.
 $R_T = R_1 + R_2 + R_3 + \dots$
Where R_T is the total resistance and R_1, R_2, R_3 etc. Are the resistances connected in series.
 - (ii) The total resistance in parallel connections.
 $1/R_T = 1/R_1 + 1/R_2 + 1/R_3 + \dots$
Where R_T is the total resistance and R_1, R_2, R_3 etc. are the resistances connected in parallel. Also to conclude that the total resistance value of a parallel circuit is less than the any individual resistance.
3. To verify Kirchoff's following laws:-
 - (i) The algebraic sum of the currents at a junction is zero.
 - (ii) The algebraic sum of the e.m.f. in any closed circuit is equal to the algebraic sum of IR products (drops) in that circuit.
4. To measure the resistance of an ammeter and a voltmeter and to conclude that ammeter has very low resistance whereas voltmeter has very high resistance.
5. To verify Thevenin's and maximum power transfer theorems.
6. To find the ratio of inductance values of a coil having air core and iron core respectively and thus see that by the introduction of a magnetic material inside the coil, the inductance value of the coil is substantially increased.
7. To verify the relation:-
 $C_T = (C_1 * C_2) / (C_1 + C_2)$ and $C_T = C_1 + C_2$
For two capacitors, connected in series and parallel respectively.
8. To test a battery for charged and discharged conditions and to make connections for its charging.
9. To show that the range of an ammeter (d.c. and a.c.) and a voltmeter (d.c. and a.c.) can be extended with the use of shunts and multiplier.
10. To convert the given galvanometer into a voltmeter and an ammeter.

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I Year II Semester
DAPPLEEC206
APPLIED PHYSICS-II LAB

L	T	P
0	0	2

Note: Any 4 experiments are to be performed.

2. Determination of coefficient of friction on a horizontal plane.
3. Determination of 'g' by plotting a graph T^2 versus l and using the formula $g = 4\pi^2 / \text{Slope}$ of the graph line
4. Determine the force constant of combination of springs in case of 1. Series 2. Parallel.
5. To verify the series and parallel combination of Resistances with the help of meter bridge.
6. To determine the velocity of sound with the help of resonance tube.
7. Determination of viscosity coefficient of a lubricant by Stoke's law.
8. Determination of E_1/E_2 of cells by potentiometer.
9. Determination of specific resistance by Carry Foster bridge.
10. Determination of resistivity by P.O.Box.
11. Verification of Kirchhoff's Law.
12. To draw Characteristics of p-n Junction diode.

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

NOTE :

Students should be asked to plot a graph in experiments (where possible) and graph should be used for calculation of results. Results should be given in significant figures only.

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L	T	P
0	0	2

DINTREC206: INTRODUCTION TO COMPUTER LAB

List of Practical

- 1 . Practice on utility commands in DOS.
- 2 . Composing, Correcting, Formatting and Article (Letter/Essay/ Report) on Word Processing tool Word and taking its print out.
- 3 . Creating, editing, and modifying tables in Database tool.

4. Creating labels, report, and generation of simple forms in Database tool.
5. Creating simple spread sheet, using in built functions in Worksheet tool.
6. Creating simple presentation.
7. Creating mail ID, Checking mailbox, sending/replying e- mails.
8. Surfing web sites, using search engines.

Department of Electronics & Communication Engineering
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I Year II Semester
DELEMEC208
ELEMENTARY WORKSHOP PRACTICE LAB

L	T	P
0	0	2

I- FITTING SHOP

Topic	Knowledge/Skill
1. Types and use of making	Select and use correct tools

and measuring tools including micrometer, slide callipers, vernier gauge, feeler gauge, spherometer.

2. Types and use of vice, Clamps Chisel, Hammer, Punch for metal work.

3. Types and use of files for Soft and Hard metal/Alloys, Sheets.

4. Types and use of Grinding Machine, Grinding polishing Machine on Metals/Laminates.

5. Types and use of Hacksaw Power saw and Blades on soft and hard metals / Alloys / Laminates/Sheets.

6. Types and use of Drilling Machine, Drill Bits, Drill Speeds, Including counter sinking on Metals, Alloys, Sheet Metal.

7. Types and use of Tapes and Dies for internal and external threading.

8. Types and use of fastening tools and accessories such as nuts, bolts, washers, self tapping, screws drivers, allen key, riveting tools and rivet for metal and sheet metal.

9. Techniques of Binding and Folding Aluminium pipes upto 12 mm. diameter.
(Example Practice Antenna marking)

to and measure as needed, Ability to measure wire and Sheet gauge, diameter, Radius dimension.

Select and made correct use of appropriate tool for specified job.

Select and made correct use of files on specified materials.

Select and made correct use of appropriate machines and tools for specified grinding, buffing polishing operations.

Select and made correct use of appropriate saw and blade for specified job.

Select and made correct use of appropriate Drilling machine tools for Drilling and counter on specified job.

Select and made correct use of appropriate tools to cut specified job.

Select and made correct use of appropriate tools and fastening materials to carry out a fastening operation on specified job.

Ability to bend aluminium pipes of a given size to a specified job shape.

Jobs to be Made :

1. Hacksawing and Chipping of M.S.
2. Filling Chipped M.S job.
3. Fitting on rectangular or square M.S. job.

4. Making triangular square or Hexagonal figure inside of M.S. job.
5. Utility article to prepare calliper, screw driver or try square.

II-SHEET METAL SHOP

Topic	Knowledge/Skill
1. Types and use hand tools for sheet metal work cross pein, straight pein, ball pein mallet selection.	Select and make correct use of appropriate materials and tool for specified sheet metal job.
2. Types and use of hand shear quilltiness for sheet cutting.	Select and make correct use of appropriate tools/machine for cutting sheet metal specified dimensions.
3. Techniques of grooving creasing, folding, corner making, bending, circle cutting.	Ability to perform the specified operation on sheet metal to a given tolerance.
4. Types and use of engraving tools and machines or sheet	Ability to engrave simple words on sheet metal.

Jobs to be Made :

1. (a) Cutting shearing & bending.
(b) Brazing practice on small pieces.
2. Making a soap case with M.S. sheet.
3. Making a funnel with tin sheet & soldering the same.
4. Making a cylinder & soldering the same.
5. Preparation of different types of joints such as Lap joint-single seam, Double seam & Cap joint & Hemp & Wired edge.

III-PAINTING SHOP

Topic	Knowledge/Skill
1. Techniques of sheet metal cleaning and surface treatment for spray painting.	Ability to prepare and treat surface appropriate before spray painting.
2. Types of paints, solvents, thinners, removers, brushes, use and care of brushes, paint preparation.	Ability to select and correctly use of appropriate paint remover, solvent, brush, ability to prepare paint and take care brushes.
3. Technique of spray painting and use of stencils on paint letters and figures on sheet	Ability to spray paint on Sheet metal to a specified finish.

metal.

Job to be Made :

1. Preparation of wooden surface for paper basket or paper tray & painting & polishing the same.
2. To prepare a metal surface

IV-WOOD AND LAMINATE SHOP

Topic	Knowledge/Skill
1. Types important properties comparative costs of wood, plywood various particle board, veneers, formica, Bakelite, perspex and common amenities used for making Cabinets, Frames, consoles in the electronics field.	Identify commonly used materials state important properties, estimate cost. Select correct materials(s) for a given assignment.
2. Types important properties comparative cost use of covering materials such as artificial leather, Felt, Cloth, Frames, various types of Trims such as Aluminium strips channels corners grills.	Identify commonly used state important properties estimate cost, select correct materials (s) for the given assignment.
3. Types and use of planner, big saw, band saw, circular saw, various blades, Gullotine for Laminate and wood cutting, Necessary precautions.	Select and correctly use of appropriate Saw / Machine for wood, Laminate paring, cutting to specified shape and size.
4. Types and uses of hand saw, wood chisel, Wood files, Auger, Drill Counter, Sinking, sanding for woods and Laminates.	Select and correct use of appropriate tools for carrying out specified operation to a finish.
5. Techniques of fastening wood and laminates with nails, screws, adhesives.	Ability to fasten wood and laminates as specified.
6. Techniques of working on perspex-cutting shaping, Drilling, hole cutting joining with chloroform	Ability to cut, Join, Drill shape perspex to a given specification.
7. Techniques of fixing	Ability to perform given fast-

formica, venner, felt, artificial leather, rexin, foam, grills, trims on wood, chip board and laminates using adhesives, nails as required.

-ening operation to given specification.

8. Techniques of engraving simple pattern, letters on bakelite, perspex, formica and similar.

Ability to engrave simple patterns and letters on laminates.

Jobs to be Made :

1. Plaining & Sawing Practice.
3. Motric & Tenon joint.

2. Lap joint.
4. Dovetial joing.

NOTES :

1. Each three period pratical session is to be precebed by one period tutorial session for demonstration/theory lessons.