Faculty of Engineering and Technology

P.K. University

Shivpuri (MP)

Evaluation Scheme & Syllabus

Diploma in Production Engineering

(II Semester)

(Effective from session 2025-26)

EVALUATION SCHEME

DIPLOMA –PRODUCTION ENGINEERING (2nd SEM)

STUDY AND EVALUATION SCHEME FOR DIPLOMA AUTOMOBILE 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	
DAPPLPE201	Applied Mathematics-II	3	1	0	4	30	-	30	70	-	70	100
DAPPLPE202	Applied Physics-II	2	1	0	3	30	-	30	70	-	70	100
DAPPLPE203	Applied Mechanics	3	1	0	4	30	-	30	70	-	70	100
DFUNDPE204	Fundamentals of Electrical & Electronics Engg	3	0	0	3	30	-	30	70	-	70	100
DINTRPE205	Introduction to IT Systems	3	0	0	3	-	25	25	-	25	25	50
DAPPLPE206	Applied Mechanics Lab	0	0	2	1	-	25	25	-	25	25	50
DAPPLPE207	Applied Physics–II Lab	0	0	2	1	-	25	25	-	25	25	50
DINTRPE208	Introduction to IT Systems Lab	0	0	2	1							
Total		11	3	6	20	120	75	195	280	75	355	550

Department Of Production Engineering
(Faculty of Engineering & Technology)
P.K. University, Shivpuri (MP)
I Year II Semester

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3	1	0

DAPPLPE201: APPLIED MATHEMATICS II

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, center of mean of plane areas.

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

3. CO-ORDINATE GEOMETRY (2 DIMENSIONS):

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 $x^2/a^2 + y^2/b^2=1$

Hyperbola $x^2/a^2 - y^2/b^2=1$

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).

Department Of Production Engineering
(Faculty of Engineering & Technology)
P.K. University, Shivpuri (MP)
I Year II Semester

L	T	P
2	1	0

DAPPLPE202: APPLIED PHYSICS II

1. Oscillations and Wave motion (**06 periods)**

1.1 Harmonic Motion, Oscillation, Definition of Simple Harmonic Motion (SHM)

1.2 Displacement equation y = a sin wt (without derivation), velocity, acceleration, time period, frequency in S.H.M., Energy of a body executing S. H. M.

1.3 Wave motion, transverse and longitudinal wave motion with examples.

1.4 Wave equation, phase, phase difference, wave length, wave velocity.

1.5 Ultrasonic – Introduction, properties and applications in engineering and medical applications.

2. Optics (**06 periods**)

2.1 Basic optical laws - Reflection and Refraction, Refractive Index

. **2.2** Critical angle, Total internal reflection (TIR) and conditions for total internal reflection,

2.3 Application of total internal reflection (List Only)

2.4 Dual nature of light (concept only): Wave and particle nature of light

2.5 Examples of Wave and particle nature of light (List Only).

3. Electrostatics (**06 periods**)

3.1 Concept of charge, Quantization of charge, Coulombs law, Electric field of point charges.

3.2 Electric lines of force and their properties, Electric flux, Gauss law of electrostatics (without derivation).

3.3 Electric potential and potential difference.

3.4 Capacitance and its units, Parallel plate Capacitor: Working principle and its Capacitance, Effect of Dielectric on capacitance.

3.5 Series and parallel combination of capacitors (numerical).

4. Current Electricity (**06 periods**)

4.1 Electric Current and its unit, Ohm's law, Resistance and its units,

4.2 Factors affecting Resistance of a wire, Specific Resistance, Conductance, Specific Conductance.

4.3 Series and Parallel combination of Resistances.

4.4 Kirchhoff's laws (KCL and KVL), Wheatstone bridge: Construction and its balanced condition,

4.5 Measurement of an unknown resistance using Meter Bridge.

5. Electromagnetism (**06 periods**)

5.1 Biot-Savart law for current carrying wire and Concept of Magnetic field (B) and its units.

5.2 Lorentz force (Force on moving charge in magnetic field), Force on current carrying conductor (Formula only).

5.3 Magnetic lines of forces and their properties, magnetic flux and its units.

5.4 Concept of electromagnetic induction, Faraday's Laws and Lenz's law.

5.5 Conversion of galvanometer into ammeter and voltmeter.

6. Semiconductor physics (**06 periods**)

6.1 Classification of solids on the basis of Energy bands (Definition only): Insulator, Semi-conductor and Conductor.

6.2 Intrinsic and extrinsic semiconductors, P-type and N-type semiconductors.

6.3 PN junction diode and its biasing (Forward and Reverse Biasing).

6.4 Some application of semiconductor diodes (list only) 6.5Construction of PNP and NPN transistors and some electronic applications (list only)

7. Modern Physics (**06 Periods**)

7.1 Ground, Excited and Metastable energy levels of atom,

7.2 Spontaneous and stimulated emission, population inversion, pumping, Laser and its characteristics

7.3 Ruby laser and He- Ne laser, Engineering and medical applications of lasers

7.4 Introduction to optical fibers, light propagation, acceptance angle and numerical aperture (without derivation).

7.5 Applications of optical fibers in telecommunication, medical and sensors.

RECOMMENDED BOOKS:

1. Text Book of Physics (Part-I, Part-II); N.C.E.R.T., Delhi
2. Concepts in Physics by HC Verma, Vol. I & II, Bharti Bhawan Ltd. New Delhi
3. A Text Book of Optics, Subramanian and Brij Lal, S Chand & Co., New Delhi
4. Practical Physics, by C. L. Arora, S Chand publications
5. Engineering Physics by PV Naik, Pearson Education Pvt. Ltd, New Delhi
6. Modern Engineering Physics by SL Gupta, Sanjeev Gupta, Dhanpat Rai Publications.
7. Physics Volume 2, 5th edition, Haliday Resnick and Krane, Wiley publication
8. Fundamentals of Physics by Haliday, Resnick & Walker 7th edition, Wiley publication

Department Of Production Engineering
(Faculty of Engineering & Technology)
P.K. University, Shivpuri (MP)
I Year II Semester

L	T	P
3	1	0

DAPPLPE203: APPLIED MECHANICS

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.A. System of Forces :

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 praticle, conditions of equilibrium of coplanar concurrent force system.

B. General Condition of Equilibrium:

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

3. Moment & couple:

Concept of Varignon's theorem. Generalized theorem of moments. Application to simple problems on levers-Bell crank lever, compound lever, steel yard, beams and wheels, lever safety valve, wireless mast, moment of a couple; Properties Of a couple ; Simple applied problems such as pulley and shaft.

4. Friction:

Types of friction: statically, limiting and dynamical friction, statement of laws of sliding friction, Coefficient of friction, angle of friction; problems on equilibrium of a body resting on a rough inclined plane, simple problems on friction. Conditions of sliding and toppling.

5. Machines:

Definition of a machine. Mechanical advantage, velocity ratio, input, output, mechanical efficiency and relation between them for ideal and actual machines. Law of a machine Lifting machines such as levers, single pulley, three system of pulleys. Weston differential pulley, simple wheel and axle, differential wheel and axle. Simple screw jack, differential screw jack, simple worm and worm wheel.

6. Centre of Gravity:

Concept, definition of centroid of plain figures and center of gravity of symmetrical solid bodies. Determination of centroid of plain and composite lamina using moment method only, Centroid of bodies with removed portion. Determination of center of 'gravity' of solid bodies - cone, cylinder, hemisphere and sphere, composite bodies and bodies with portion removed.

7. Moment of Inertia:

Concept of moment of inertia and second moment of area and radius of gyration, theorems of parallel and perpendicular axis, second moment of area of common geometrical section : rectangle, triangle, circle (without derivations). Second moment of area for L, T, I and channel section, section of modulus.

8. Beams & Trusses:

Definition of statically determinate and indeterminate trusses. Types of supports. Concept of tie & strut, Bow's notation, space diagram, polar diagram, funicular polygon; calculation of reaction at the support of cantilever and simply supported beams and trusses graphically and analytically; graphical solution of simple determinate trusses with reference to force diagram for determining the magnitude and nature of forces in its various members. Analytical methods: method of joints and method of sections.(simple problems only)

Department Of Production Engineering
(Faculty of Engineering & Technology)
P.K. University, Shivpuri (MP)
I Year II Semester

L	T	P
3	0	0

DFUNDPE204:FUNDAMENTALS OF ELECTRICAL & ELECTRONICS ENGG.

UNIT- I

Overview of electronic components: (**09 Periods**)

Active and Passive components, Resistor, Capacitor, Inductor and their types. Introduction to semiconductor, Intrinsic and Extrinsic semi-conductors, P-N Junction diode - forward and reverse bias; introduction of Bipolar Junction Transistor; FET and MOSFET (brief idea only).

UNIT- II

Basic measuring instruments: (**05 Periods**)

Basic concept of Ideal and non-ideal voltage and current sources, ammeter, voltmeter, wattmeter and digital multimeter, CRO (Block diagram, working and its uses).

UNIT –III Overview of Digital Electronics: **(7 Periods**)

Analog and digital signal, advantages of digital system. number system and its conversion (Decimal, binary ,octal ,hexadecimal) , Boolean Algebra, Logic Gates-Truth Table and Symbol of AND, OR, NOT, NAND, NOR, ExOR, ExNOR Gates.

Unit -IV Electric and Magnetic Circuits: (**7 Periods**)

Definitions of basic terms, such as Current, Resistance, EMF, Potential Difference, Power and Energy, Ohm's Law and its limitation, Kirchhoff's laws; M.M.F, magnetic force, flux, permeability, reluctance, BH curve, hysteresis loop; Electromagnetic induction, Faraday's laws of electromagnetic induction, Lenz's law; Dynamically and Statically induced emf; concept of self and mutual inductance

Unit -V A.C. Circuits: (**7 Periods**)

Cycle, Frequency, Periodic time, Amplitude, Angular velocity, RMS value, Average value, Form Factor Peak Factor, impedance, phase angle, and power factor; Mathematical and phasor representation of alternating emf and current; A.C in pure resistors, pure inductors and pure capacitors; Power in A.C. Circuit, power triangle; Introduction of poly phase system and comparison with single phase system.

Unit -VI Transformers and Machines: (**7 Periods)**

Single phase transformer: General construction, working principle, types, EMF equation, transformation ratio; Brief idea of Auto transformer. DC machines: Types, EMF equation of motor. Single Phase Induction Motor: Principle of operation and introduction to methods of starting. Three Phase Induction Motor: Principle of operation.

REFERENCE BOOKS –

1. Ritu Sahdev, Basic Electrical Engineering, Khanna Publishing House.

2. Mittle and Mittal, Basic Electrical Engineering, McGraw Education, New Delhi, 2015, ISBN: 978- 0-07-0088572-5.

3. Saxena, S. B. Lal, Fundamentals of Electrical Engineering, Cambridge University Press, latest edition, ISBN: 9781107464353.

4. Theraja, B. L., Electrical Technology Vol – I, S. Chand Publications, New Delhi, 2015, ISBN: 9788121924405.

5. Theraja, B. L., Electrical Technology Vol – II, S. Chand Publications, New Delhi, 2015, ISBN: 9788121924375

. 6. Jegathesan, V., Basic Electrical and Electronics Engineering, Wiley India, New Delhi, 2015, ISBN: 97881236529513.

7. Sedha, R.S., A Textbook of Applied Electronics, S. Chand, New Delhi, 2008, ISBN-13: 978-8121927833.

8. Malvino, Albert Paul, David, Electronics Principles, McGraw Hill Education, New Delhi, 2015, ISBN-13: 0070634244-978.

9. Mehta, V.K., Mehta, Rohit, Principles of Electronics, S. Chand and Company, New Delhi, 2014, ISBN-13: 9788121924504.

10. Bell, David, Fundamentals of Electronic Devices and Circuits, Oxford University Press, New Delhi, 2015, ISBN: 9780195425239.

Department Of Production Engineering
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P.K. University, Shivpuri (MP)
I Year II Semester

L	T	P
3	0	0

DINTRPE205: INTROUCTION TO IT SYSTEMS

UNIT 1. Introduction to Computers and Peripherals. **(05 Periods)**

Introduction, Computer Generations, Components of Computer, Types of Computer, CPU, RAM, ROM, Hard disk, USB, Flash drive, Keyboard, Mouse, display devices, Printer, Scanner, Modem, Sound Cards, Speakers, CMOS battery, Sharing of Printers.

UNIT 2.. Operating System and Application Software (**06 Periods**)

System Software, Application Software, Virtualization Software, Utility Software, MS Office/Open Office/LibreOffice, Working with windows OS, Desktop components, Menu bars, creating shortcut of program. Installation of Application software's, Antivirus and Drivers.

UNIT 3. Office Tools: MS Office/Open Office/ Libre Office (**06 Periods**)

Creation of document, spreadsheets and presentation, Google Suits (Google drive, google sheet, google doc, google presentation)

UNIT 4. Internet (**06 Periods**)

Network topologies, Basics of Networking,– LAN,MAN, WAN, Connecting Devices(Bridge, Switch, Router, Gateway),Wi-Fi technologies, Concept of IP Address, DNS, Search Engines, email, Web Browsing

UNIT 5. Basics of Information Security (**05 Periods)**

Introduction to security, Security threats: detection and prevention, Indian Cyber laws.

RECOMMENDED BOOKS :

1. Fundamentals of Computer by V Rajaraman; Prentice Hall of India Pvt. Ltd., New Delhi

2. Information Technology for Management by Henery Lucas, Tata McGraw Hills, New Delhi

3. Computers Fundamentals Architecture and Organisation by B Ram, revised Edition, New Age International Publishers, New Delhi

4. Computers Today by SK Basandara, Galgotia publication Pvt Ltd. Daryaganj, New Delhi.

5. Internet for Every One by Alexis Leon and Mathews Leon; Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi.

6. A First Course in Computer by Sanjay Saxena; Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi

7. Computer Fundamentals by PK Sinha; BPB Publication, New Delhi

8. Fundamentals of Information Technology by Leon and Leon; Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi 9. On Your Marks - Net…Set…Go… Surviving in an e-world by Anushka Wirasinha, Prentice Hall of India Pvt. Ltd., New Delhi

10. Fundamentals of Information Technology by Vipin Arora, Eagle Parkashan, Jalandhar.

Reference websites :

1. www. tutorialspoint..com
2. www.sf.net
3. Gsuite.google.com
4. Spoken-tutorial.org
5. Swayam.gov.in

Department Of Production Engineering
(Faculty of Engineering & Technology)
P.K. University, Shivpuri (MP)
I Year II Semester

L	T	P
0	0	2

DAPPLPE206: APPLIED MECHANICS LAB

Practicals:

1. To verify the law of Polygon of forces.
2. To verify the law of parallelogram and triangle of forces.
3. To verify the law of principle of moments.
4. To find the coefficient of friction between wood, steel, copper and glass.
5. To find the reaction at supports of a simply supported beam carrying point loads only.
6. To find the forces in the jib & tie of a jib crane
7. To find the forces in the members of a loaded roof truss. (King / Queen post truss)
8. To find the mechanical advantage, velocity ratio and Efficiency of any three of the following machines:
   (i) Simple wheel & axle
   (ii) Differential wheel & axle
9. To find out center of gravity of regular lamina.
10. To find out center of gravity of irregular lamina.

Department Of Production Engineering
(Faculty of Engineering & Technology)
P.K. University, Shivpuri (MP)
I Year II Semester

L	T	P
0	0	2

DAPPLPE207: APPLIED PHYSICS-II LAB

Note: Any 4 experiments are to be performed.

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.

Department Of Production Engineering
(Faculty of Engineering & Technology)
P.K. University, Shivpuri (MP)
I Year II Semester

L	T	P
0	0	2

DINTRPE208: INTRODUCTION TO IT SYSTEMS LAB

• Identify Computer Hardware Components, Network Components and Peripherals

. • Explain the role of an Operating System

. • Install System and Application Software

. • Explain the function of the system components including Processor, Motherboard and Input-output devices

. • Use Word Processing Software to prepare document.

• Use Spreadsheet Software to create workbooks and automate calculation

. • Use Presentation Software to create interactive presentation.

• Perform fundamental tasks common to most application software including print, scan, save, edit, cut, copy, paste, format, spell and grammar check

. • Find and evaluate information on the Web

. • Install Antivirus

. • Safeguard against Online Frauds, threats and crimes.

• Use online office tools (Google suits)