ತರಮಾ

ಗುಲಬರ್ಗಾ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಕಲಬುರಗಿ.

ಜ್ಞಾನ ಗಂಗಾ, ಕಲಬುರಗಿ–585 106, ಕರ್ನಾಟಕ, ಭಾರತ

(ಕರ್ನಾಟಕ ರಾಜ್ಯ ವಿಶ್ವವಿದ್ಯಾಲಯಗಳ ಅಧಿನಿಯಮ 1976ರಸ್ವಯ 10–09–1980 ರಂದು ಸ್ಥಾಪಿಸಲಾದ ವಿಶ್ವವಿದ್ಯಾಲಯ ಮತ್ತು 2000ರ ಅಧಿನಿಯಮದ ಅಡಿಯಲ್ಲಿ ಬದಲಾಯಿಸಿದಂತೆ)

ದೂರವಾಣಿ ಸಂ. 08472-263202 ಫ್ಯಾಕ್ಸ್: 08472-263206, ಇ–ಮೇಲ್: registrargug@rediffmail.com

ವಿದ್ಯಾಮಂಡಲ

ಕ್ರ.ಸಂ.ಗುವಿಕ/ವಿಮವಿ/ಬಿಓಎಸ್/2024–25/177 ದಿನಾಂಕ: 23/07/24

ಅಧಿಸೂಚನೆ

ವಿಷಯ: ಸ್ನಾತಕ ಪದವಿ ಕೋರ್ಸಿನ **ಭೌತಶಾಸ್ತ್ರ ವಿಷಯದ** ಪಠ್ಯಕ್ರಮ ಅನುಮೋದಿಸಿ 2024–25ನೇ ಶೈಕ್ಷಣಿಕ ಸಾಲಿನಿಂದ ಜಾರಿಗೊಳಿಸಿದ ಬಗ್ಗೆ.

ಉಲ್ಲೇಖ:1. ಸರ್ಕಾರದ ಆದೇಶ ಸಂಖ್ಯೆ. ಇಡಿ 166 ಯುಎನ್ಇ 2023 ಬೆಂಗಳೂರು, ದಿನಾಂಕ: 08.05.2024
2. ಭೌತಶಾಸ್ತ್ರ ವಿಷಯದ ಸ್ನಾತಕ ಅಧ್ಯಯನ ಮಂಡಳಿಯ ನಿರ್ಣಯ ದಿನಾಂಕ: 19.06.2024
3. ವಿಜ್ಞಾನ ನಿಕಾಯಗಳ ಸಮಿತಿ ಸಭೆಯ ನಿರ್ಣಯ ದಿನಾಂಕ: 11.07.2024
4. ವಿದ್ಯಾವಿಷಯಕ ಪರಿಷತ್ ಸಭೆಯ ಅನುಮೋದನೆ ದಿನಾಂಕ: 15.07.2024
5. ಮಾನ್ಯ ಕುಲಪತಿಗಳ ಅನುಮೋದನೆ ದಿನಾಂಕ:

******

ಸರ್ಕಾರದ ನಿರ್ದೇಶನದಂತೆ, 2024–25ನೇ ಶೈಕ್ಷಣಿಕ ಸಾಲಿನಿಂದ ಜಾರಿಗೊಳಿಸಿರುವ ಸ್ನಾತಕ ಪದವಿ ಪಠ್ಯಕ್ರಮವನ್ನು ಜಾರಿಗೊಳಿಸಬೇಕಾಗಿರುವ ಪ್ರಯುಕ್ತ **ಭೌತಶಾಸ್ತ್ರ ವಿಷಯದ** ಅಧ್ಯಯನ ಮಂಡಳಿಯು ಪಠ್ಯಕ್ರಮವನ್ನು ಪರಿಷ್ಕರಿಸಿ ಶಿಫಾರಸ್ಸು ಮಾಡಿರುವುದರಿಂದ ಸದರಿ ಪಠ್ಯಕ್ರಮವನ್ನು ವಿಜ್ಞಾನ ನಿಕಾಯದ ಸಭೆಯಲ್ಲಿ ಒಪ್ಪಗೆ ಪಡೆದಿರುವಂತೆ, ವಿದ್ಯಾವಿಷಯಕ ಪರಿಷತ್ ಸಭೆಯ ಅನುಮೋದನೆಯಂತೆ ಪದವಿ ಕೋರ್ಸಿನ **ಭೌತಶಾಸ್ತ್ರ ವಿಷಯದ** ಸ್ನಾತಕ ಪಠ್ಯಕ್ರಮವನ್ನು 2024–25ನೇ ಶೈಕ್ಷಣಿಕ ಸಾಲಿನಿಂದ ಅನ್ವಯವಾಗುವಂತೆ ಜಾರಿಗೊಳಿಸಲಾಗಿದೆ.

ಈ ಮಾಹಿತಿಯನ್ನು ಸಂಬಂಧಪಟ್ಟ ಶಿಕ್ಷಕರ ಹಾಗೂ ವಿದ್ಯಾರ್ಥಿಗಳ ಗಮನಕ್ಕೆ ತರಲು ಸೂಚಿಸಲಾಗಿದೆ. ಪಠ್ಯಕ್ರಮದ ವಿವರಗಳನ್ನು ಗುಲಬರ್ಗ ವಿಶ್ವವಿದ್ಯಾಲಯದ ವೆಬ್‌ಸೈಟ್ www.gug.ac.in ದಿಂದ ಪಡೆಯಬಹುದಾಗಿದೆ.

ಕುಲಸಚಿವರು
ಗುಲಬರ್ಗಾ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಕಲಬುರಗಿ

ಗೆ,

1. ಮುಖ್ಯಸ್ಥರು, **ಭೌತಶಾಸ್ತ್ರ ವಿಷಯದ** ವಿಭಾಗ, ಗುಲಬರ್ಗಾ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಕಲಬುರಗಿ.
2. ಎಲ್ಲಾ ಪದವಿ ಕಾಲೇಜುಗಳ ಪ್ರಾಂಶುಪಾಲರುಗಳಿಗೆ.

ಪ್ರತಿಗಳು:

1. ಡೀನ್‌ರು, ಕಲಾ ನಿಕಾಯ, ಗುಲಬರ್ಗಾ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಕಲಬುರಗಿ ರವರ ಮಾಹಿತಿಗಾಗಿ.
2. ಕುಲಸಚಿವರು (ಮೌಲ್ಯಮಾಪನ) ಗುಲಬರ್ಗಾ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಕಲಬುರಗಿ
3. ನಿರ್ದೇಶಕರು, ಪಿಎಂಇಬಿ ಗುಲಬರ್ಗಾ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಕಲಬುರಗಿ ರವರ ಮಾಹಿತಿಗಾಗಿ.
4. ಗ್ರಂಥಪಾಲಕರು, ಗುಲಬರ್ಗಾ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಕಲಬುರಗಿ ರವರ ಮಾಹಿತಿಗಾಗಿ.
5. ವಿಜ್ಞಾನ ನಿಕಾಯದ ಎಲ್ಲಾ ಅಧ್ಯಯನ ವಿಭಾಗಗಳ ಮುಖ್ಯಸ್ಥರಿಗೆ ಗು.ವಿ. ಕಲಬುರಗಿ
6. ಸಂಯೋಜಕರು, ಟಾಸ್ಕ್‌ಫೋರ್ಸ್ ಸಮಿತಿ, ಗುಲಬರ್ಗಾ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಕಲಬುರಗಿ ರವರ ಮಾಹಿತಿಗಾಗಿ.
7. ವಿಶೇಷಾಧಿಕಾರಿಗಳು, ಆಡಳಿತ, ವಿದ್ಯಾಮಂಡಲ, ಪರೀಕ್ಷಾ, ಅಭಿವೃದ್ಧಿ ಗು.ವಿ. ಕಲಬುರಗಿ ರವರ ಮಾಹಿತಿಗಾಗಿ.
8. ಮುಖ್ಯಸ್ಥರು, ಗಣಕ ಕೇಂದ್ರ, ಗು.ವಿ. ಕಲಬುರಗಿ ರವರಿಗೆ ವೆಬ್‌ಸೈಟ್‌ನಲ್ಲಿ ಪ್ರತ್ಯೇಕ ಪೋರ್ಟಲ್‌ನಲ್ಲಿ ಪ್ರಕಟಿಸಲು ಸೂಚಿಸಲಾಗಿದೆ.
9. ನೋಡಲ್ ಅಧಿಕಾರಿಗಳು, UUCMS, ಗು.ವಿ.ಕಲಬುರಗಿ ಇವರ ಮಾಹಿತಿಗಾಗಿ
10. ಕುಲಪತಿಗಳ ಆಪ್ತ ಕಾರ್ಯದರ್ಶಿ/ಕುಲಸಚಿವರ ಆಪ್ತ ಸಹಾಯಕರ ಗು.ವಿ. ಕಲಬುರಗಿ ರವರ ಮಾಹಿತಿಗಾಗಿ.

I SEMESTER : PHYSICS

DSC1-PHY104T: MECHANICS AND PROPERTIES OF MATTER

(Credits: Theory-04) 48 Hours

Course learning Objectives

a. To grasp the concept of relative motion and how different observers perceive the motion of objects differently depending on their frame of reference.
b. To grasp the fundamental properties of rigid bodies, including mass distribution, centre of mass, and moments of inertia.
c. Understand the laws of gravitation and their applications to planetary motion and celestial mechanics.
d. Investigate mechanical properties such as elasticity, plasticity, hardness, and toughness.
e. Understand how surface tension and adhesive forces interact in capillary tubes.

Course Outcomes

a. Insight into the nature of inertial and non-inertial frames and their implications for physical laws.
b. Insight into the interactions between forces, torques, and the resulting motions of rigid bodies.
c. Gain a deep understanding of Newton's universal law of gravitation and its applications in predicting the gravitational force between two masses.
d. Ability to analyze and solve complex problems involving surface tension.

UNIT-1: FRAME OF REFERENCE (12 hrs)

Inertial frames, Galilean transformation equation(derivations), Invariance of Newton's laws under Galilean transformations, Invariance of the laws of conservation of momentum and energy under Galilean transformation, non-inertial Frames and Fictitious Force (In Brief), Rotating Frame of Reference, Concept of the Coriolis force and mention of its expression its expression.

DYNAMICS OF SYSTEM OF PARTICLES

Center of mass – General expression; Newton's law for a System of particles; Linear momentum for a particle and a system of particles. Conservation of linear momentum-system with varying mass, Motion of rockets; velocity and acceleration of single-stage rocket and multi-stage rockets (qualitative), contribution and achievements of India in rocket technology (qualitative), Elastic and Inelastic collisions (only 2D) Problems.

UNIT-2: RIGID BODIES (12 hrs)

Rotational motion about an axis, Angular momentum, Relation between torque and angular momentum, Rotational energy. Theorem on moment of inertia: Perpendicular and parallel axis. Examples of moment of inertia: Moment of inertia of lamina, MI of Disc and MI of circular ring, Fly wheel, Theory of compound pendulum and determination of '**g**' by compound pendulum. Problems

UNIT-3: GRAVITATION AND ELASTICITY (12 hrs)

Newton's laws of gravitation, Motion of a particles in a central force field (motion is in a plane, angular momentum is conserved, areal velocity is constant). Kepler's laws (statement only).Satellites in a circular orbit and applications. Geosynchronous orbits, weightlessness. Basic ideas of global positioning system (GPS).

Hooks law-Stress-strain diagram-elastic moduli-relation between elastic constants-poisons ratio-expression for poisons ratio in terms of elastic constants-work done in stretching and work done in twisting a wire-twisting couple on cylinder-Determination of rigidity modulus by static torsion-Torsional pendulum.

UNIT-4: SURFACE TENSION AND VISCOSITY (12 hrs)

Surface tension: Review of basics of surface tension. Pressure difference across a liquid surface: Excess pressure inside a spherical liquid drop and excess pressure inside a soap bubble. Derivation of the relation between radius of curvature, Pressure and surface tension. Angle of contact: Case of two liquids in contact with each other and with air, Case of solids, liquid, and air in contact. Theory of rise of liquid in capillary tube.

Viscosity: Viscosity of a liquid, Expression for co-efficient of viscosity, Expression for critical velocity, Significance of Reynolds's number. Derivation of Poiseuille's equation. Experimental determination of co-efficient of viscosity for a liquid by Poiseuille's method, Motion of a spherical body in a viscous medium: Expression for co-efficient of Viscosity from stokes law.

References:

1. Mechanics by D S Mathur.
2. Mechanics by J C Upadhyay.
3. Properties of matter by D S Mathur.
4. Properties of matter by Brijilal and Subramanyam.
5. Physics: Resnick, Halliday & Walter, 9th edition, 2010, Wiley.

DSC-PHY104P: MEACHANICS AND PROPERTIES OF MATTER PRACTICAL-I

(Credits: Practicals-02) 24 Hours

Note : Each experiment is of 2 hrs duration.

- **Two practical sessions per week.**
- **Minimum of 10 experiments are to be carried out.**

Lab experiments

1. Measurements of length (or diameter) using Vernier calipers, Screw gauge and travelling microscope.
2. Determine the height of a building using sextant.
3. Determine the moment of inertia of flywheel.
4. Determine the young's modulus by uniform bending method.
5. Determine the modulus of rigidity of a wire by Maxwell's needle.
6. Determine the elastic constants of a wire by Searl's method.
7. Determine g by bar pendulum (L VS T and).
8. Determine g by bar pendulum (L2 VS LT2).
9. To determine g by Kater's pendulum.
10. Verification of parallel axis theorem.
11. Study the motion of spring and calculate, a) spring constant, b) value of g.
12. Verification of perpendicular axis theorem.
13. Moment of inertia of an irregular body.
14. Young's modulus by cantilever – load Vs depression graph.
15. Interfacial surface tension.
16. Co-efficient of viscosity by Stoke's method.
17. Surface tension by capillary rise method.
18. Co-efficient of Viscosity by Poiseuille's method.
19. Assignment 1
20. Assignment 2

REFERENCES:

1. Experimental Physics- M A Hippargi.
2. Experimental Physics- Gadad and Hiregoudar.
3. Practical Physics- C L Arora.
4. Advanced Practical Physics- Worsnop and flint.
5. Practical Physics- Gupta and Kumar vol.1 and vol.2.

II-SEMESTER : PHYSICS
DSC2-PHY204T: ELECTRICITY AND MAGNETISM
(Credits: Theory-04) 48 Hours

Course learning objectives

a. To grasp the basic concepts of vectors and vector operations: such as addition, subtraction, scalar multiplication, dot product, and cross product.
b. To grasp the nature of the electric charge, Coulomb's law, and the electric field concept.
c. Learn about the origin and properties of magnetic fields.
d. Understand Faraday's law and how a changing magnetic field can induce an electromotive force (EMF).
e. Maxwell's equations unify the concepts of electricity and magnetism into a single framework, showing that they are two aspects of the same phenomenon: electromagnetism.

Course outcome

a. Understand the behavior and properties of vector fields in various physical contexts.
b. Achieve a deep understanding of electrostatic principles and their applications in real-world scenarios.
c. Achieve a deep understanding of the properties and behavior of magnetic fields.
d. To know the principles and applications of electromagnetic induction in various contexts.
e. To understand the nature of EM waves and propagation.

UNIT-1: **(12 hrs)**

Vector Analysis: Review of vector algebra (Scalar and Vector product), gradient, divergence, Curl and their significance, Qualitative approach on Vector Integration, Line, surface and volume integrals of Vector fields, Gauss-divergence theorem and Stoke's theorem of vectors (statement only).

Electrostatics: Electrostatic Field, electric flux, Gauss's theorem of electrostatics. Applications of Gauss theorem- Electric field due to point charge, infinite line of charge, uniformly charged spherical shell and solid sphere. Electric potential as line integral of electric field, potential due to a point charge, Capacitance of an isolated spherical conductor. Parallel plate and spherical condenser. Energy per unit volume in electrostatic field. Dielectric medium. Polarization, Displacement vector, Gauss's theorem in dielectrics, Parallel plate capacitor completely filled with dielectric.

UNIT-2 **(12 hrs)**

Magnetic properties of Materials: Brief Introduction of dia-para-ferro magnetic materials, Magnetic intensity, magnetic induction, and permeability, and magnetic susceptibility, explanation of magnetic materials, paramagnetic susceptibility-Curie law, and Hysteresis loss of energy.

Magnetism: Magnetostatics: Biot-Savart's law and its applications-straight conductor, circular coil, solenoid carrying current, Divergence and curl of magnetic field, Magnetic vector potential, Ampere's circuital law.

Magnetic field and Force: Magnetic force on a current carrying conductor, Hall Effect and expression for Hall Effect.

UNIT-3 **(12 hrs)**

Electromagnetic Induction: Faraday's laws of electromagnetic induction, Lenz's law, self and mutual inductance, L of single coil, M of two coils. Energy stored in magnetic field.

Maxwell's equations and Electromagnetic wave propagation: Equation of continuity of current, Displacement current, Maxwell's equations, Poynting vector, energy density in electromagnetic field, electromagnetic wave propagation through vacuum, transverse nature of EM waves, polarization.

UNIT-4 **(12 hrs)**

DC Circuit analysis: Concept of current and voltage sources, Kirchoff's Current and Voltage law, Principle of Duality (voltage and Current sources equivalents), Thevenin's theorem, Superposition theorem, Reciprocity theorem and Maximum Power transfer theorem.

Transient Currents: Growth and decay of charge in RC circuit, Growth and decay of current in series LR circuit, decay of charge in series LCR circuit.

Alternating Currents: Review of basic definitions. LCR Series circuit to sinusoidal voltages, impedance by using only j operators – series resonance, Q factor and bandwidth – qualitative explanation of LCR parallel circuit.

Reference:

1. Electricity and Magnetism, D.C. Tayal, 1988, Himalaya Publishing House.
2. Introduction to Electrodynamics, D.J Griffiths, 3rd Edn, 1998. Benjamin Cummings.
3. Electric networks by B.L. Theraja
4. Electricity and Magnetism, K.K. Tiwari
5. Electricity and Magnetism, by Brij Lal and N Subrahmanyam.
6. Electricity and Magnetism, by Khare and Srivastava.

DSC2-PHY204P: ELECTRICITY AND MAGNETISM-PRACTICAL-II
(Credits: Practical -2) 24 Hours

Note

- **Each experiment is of 2 hrs duration.**
- **Two practical sessions per week.**
- **Minimum of 10 experiments are to be carried out.**

1. To use a Multi-meter for measuring (a) Resistances, (b) AC and DC Voltages, (c) DC Currents.
2. Ballistic Galvanometer: Pointer galvanometer/Spot galvanometer
   i) Measurement of charge and current sensitivity
   ii) Measurement of CDR
   iii) Determine a high resistance by Leakage Method
   iv) To determine Self Inductance of a coil by Rayleigh's Method.
3. To compare capacitances using De'Sauty's bridge

4. Measurement of field strength B and its variation in a Solenoid (Determine dB/dx).
5. To study the Characteristics of a Series RC Circuit.
6. To study the series LCR circuit and determine its (a) Resonant Frequency (b) Quality Factor.
7. To study a parallel LCR circuit and determine its (a) Anti-resonant frequency and (b) Quality factor.
8. To determine a Low Resistance by –potentiometer
9. To verify the Thevenin's and Norton's theorem.
10. To verify the Superposition, and Maximum Power Transfer Theorem.
11. To determine Self-inductance of a given coil by using Anderson's bridge
12. To determine L for two different values by equal voltage method.
13. To determine C for two different values by equal voltage method.
14. Verification of Faraday's laws.
15. Assignment-I
16. Assignment –II
17. Assignment – III
18. Assignment – IV
19. Assignment – V
20. Assignment – VI

References:

1. Advanced Practical Physics for students, B. L. Flint & H. T. Workshop. 1971. Asia Publishing House.
2. Engineering Practical Physics, S. Panigrahi & B. Mallick, 2015, Cengage, Learning India Pvt. Ltd.
3. Advanced level Physics Practical, Michael Nelson and Jon M. Ogborn, 4th Edition. Reprinted 1985. Heinemann Educational Publishers.
4. Practical Physics- C. L. Arora, Harnam and Singh.