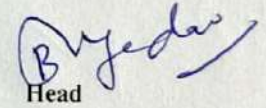


NOTICE

This is to inform to all concerned that the Department of Physics is offering the following 02 (Two) optional papers under Open Elective Course in IInd Semester. Any one of these can be opted by any student under the Choice Based Credit System being followed by the University. Refer to Notice Board of Department of Physics for time table & other details. **Dr. Devendra Singh**, Department of Physics is student's advisor. (devendras193@gmail.com)

The Papers are given as below:

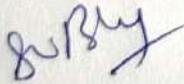
Course Code	Course Title	Maximum Marks			Credit	
		End Semester	Sessional			
			Test-I	Test-II		Presentation
PHM-202	Electromagnetic Theory	70	10	10	10	4
PHM-203	Statistical Physics	70	10	10	10	4

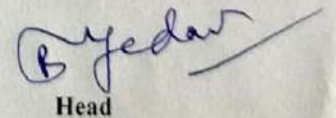

Head

Department of Physics
School of Physical & Decision Sciences

Copy to:

1. A.R. to V.C. officer for kind information of the Hon'ble Vice Chancellor, BBAU, Lucknow
2. Deans (Academic), BBAU, Lucknow
3. All Dean's with a request to give it a wide publicity among the stakeholders of all Departments under their School.
4. Registrar, BBAU, Lucknow
5. COE, BBAU, Lucknow
6. Notice Board, Department Physics, BBAU, Lucknow
- ✓ I/C University Website for its uploading on University Website




Head

Department of Physics
School of Physical & Decision Sciences

विभागाध्यक्ष
Head

भौतिकी विभाग

Deptt. of Physics

बाबा साहेब भीमराव अम्बेडकर विश्वविद्यालय
Baba Saheb Bhimrao Ambedkar University
लखनऊ - 226025 प्र. 0, भारत
Lucknow - 226025, U.P., India

सूचना

भौतिक शास्त्र विभाग के द्वितीय सेमेस्टर के समस्त विद्यार्थियों को सूचित किया जाता है कि अन्य विभाग में सी०बी०सी०एस० पेपर के अंतर्गत चल रहे Open Elective कोर्स के सलाहकार (adviser) डॉ. देवेन्द्र सिंह हैं एवं विश्वविद्यालय के समस्त द्वितीय सेमेस्टर के विद्यार्थियों को सूचित किया जाता है कि भौतिक शास्त्र विभाग में सी०बी०सी०एस० पेपर के अंतर्गत चल रहे Open Elective कोर्स के सलाहकार (adviser) डॉ. ए० के० यादव हैं।

विभागाध्यक्ष

भौतिक शास्त्र विभाग

भौतिकीय एवं निर्णय विज्ञान विद्यापीठ

प्रतिलिपि:

1. अधिष्ठाता (शैक्षणिक), बीबीएयू, लखनऊ ।
2. समस्त संकायाध्यक्ष, बीबीएयू लखनऊ ।
3. समस्त विभागाध्यक्ष, बीबीएयू, लखनऊ ।
4. डॉ. ए०के० यादव, भौतिकी विभाग, बीबीएयू लखनऊ ।
5. डॉ. देवेन्द्र सिंह, भौतिकी विभाग, बीबीएयू लखनऊ ।
6. सूचना पत्र भौतिकी विभाग, बीबीएयू, लखनऊ ।
7. प्रभारी विश्वविद्यालय वेबसाइट, बीबीएयू लखनऊ ।

Subly

Subly
25/03/2021
विभागाध्यक्ष

भौतिक शास्त्र विभाग

भौतिकीय एवं निर्णय विज्ञान विद्यापीठ

विभागाध्यक्ष

Head

भौतिकी विभाग

Deptt. of Physics

बाबा साहेब भीमराव अम्बेडकर विश्वविद्यालय

Baba Saheb Bhimrao Ambedkar University

लखनऊ - 226025-30 प्र०. भारत

Lucknow - 226025, U.P., India

PHM 202: Electromagnetic Theory

UNIT I

(13 hours)

Electrostatics Differential equation for electric field, Poisson and Laplace equations, formal solution for potential with Green's functions, boundary value problems, examples of image method and Green's function method, solutions of Laplace equation in cylindrical and spherical coordinates by orthogonal functions, dielectrics, polarization of a medium, electrostatic energy.

Magnetostatics Biot-Savart law, differential equation for static magnetic field, vector potential, magnetic field from localized current distributions, examples of magnetostatic problems, Faraday's law of induction, magnetic energy of steady current distributions.

UNIT II

(14 hours)

Maxwell's Equations Displacement current, Maxwell's equations, vector and scalar potentials, gauge symmetry, Coulomb and Lorentz gauges, electromagnetic energy and momentum, conservation laws, inhomogeneous wave equation and Green's function solution.

Electromagnetic Waves Plane waves in a dielectric medium, reflection and refraction at dielectric interfaces, frequency dispersion in dielectrics and metals, dielectric constant and anomalous dispersion, wave propagation in one dimension, group velocity, metallic wave guides, boundary conditions at metallic surfaces, propagation modes in wave guides, resonant modes in cavities.

UNIT III

(10 hours)

Radiation Field of a localized oscillating source, fields and radiation in dipole and quadrupole approximations, antenna, radiation by moving charges, Lienard-Wiechert potentials, total power radiated by an accelerated charge, Lorentz formula.

UNIT IV

(7 hours)

Concepts of Plasma Physics Formation of plasma, Debye theory of screening, plasma oscillations, motion of charges in electromagnetic fields, magneto-plasma, plasma confinement, hydromagnetic waves.

References:

1. J.D. Jackson, *Classical Electrodynamics*.
2. D.J. Griffiths, *Introduction to Electrodynamics*.
3. J.R. Reitz, F.J. Milford and R.W. Christy, *Foundations of Electromagnetic Theory*.
4. W.K.H. Panofsky and M. Phillips, *Classical Electricity and Magnetism*.
5. F.F. Chen, *Introduction to Plasma Physics and Controlled Fusion*.

PHM 203: Statistical Physics

Unit-I

(12 hours)

Introduction to statistical physics, phase space and phase space trajectory, concept of a statistical ensemble, distribution function, mean value of a physical quantity, statistical equilibrium, statistical independence and quasi-closed systems. Liouville's theorem (no derivation) and its significance, Entropy and law of increase of entropy. Thermodynamic quantities: temperature, pressure, free energy and thermodynamic potential. Theorem of small increments (no derivation), dependence of thermodynamic quantities on number of particles.

Unit-II

(12 hours)

Microcanonical distribution in classical statistics. Gibb's canonical distribution. Partition function, grand canonical distribution, free energy and equation of state of an ideal gas, chemical potential of a monoatomic ideal gas. Statistical distribution in quantum statistics.

Energy fluctuation in canonical and concentration fluctuation in grand canonical ensembles, Fluctuations and its dependence on number of particles.

Unit-III

(10 hours)

Boltzmann distribution, Fermi-Dirac and Bose-Einstein distribution, F-D and B.E gases of elementary particles.

First-and second-order phase transitions. Ising model. Diffusion equation.

Unit-IV

(10 hours)

The electron gas in metals, Degenerate electron gas-equation of state, degeneracy temperature, specific heat.

Degenerate Bose Gas, Specific heat and pressure, B-E condensation. Black body radiation: Planck's formula and Boltzmann's law.

Reference Books:

1. **F. Reif**, *Fundamentals of Statistical and Thermal Physics*.
2. **K. Huang**, *Statistical Mechanics*.
3. **R.K. Pathria**, *Statistical Mechanics*.
4. **D.A. McQuarrie**, *Statistical Mechanics*.
5. **S.K. Ma**, *Statistical Mechanics*.