EKLAVYA UNIVERSITY, DAMOH (M.P.)

Scheme of Examination B.Sc II Year

/For batch admitted in Academic Session 2020-21/

Subject wise distribution of marks and corresponding credits

S. No.	Subject Name	Subject Code	Paper Name	Maximum Marks Allotted											Total Marks	Contact Periods Per week			Total Credits
				Theory Slot									Practical Slot						
				Final Yearly				Half Yearly				Quiz/ Assignment/ Attendence	End Sem	Lab Work/ Sessional		L	T	P	
				P1	P2	P3	P4	P1	P2	P3	P4								
1	Common	BPIND20Y201	Summer Project/Industrial Training												150	0	0	0	11
		BSECA20Y201	Skill Enhancement Course (SEC-1)	60				30				10			100	2	0	0	2
		BSECB20Y202	Skill Enhancement Course (SEC-2)	60				30				10			100	4	0	0	4
		BYOGA20Y201	Yoga- 2 (University Core)	–	–	–		–	–	–		–	60	40	100	2	0	0	2
2	Physics	BPHYS20Y201	Optics, Paper - I (Core Course - 3A)	30				15				5			50	3	1	0	4
		BPHYS20Y202	Electrostatics, Magnetostatistics and Electrodynamics, Paper - II (Core Course - 3B)		30				15						50	3	1	0	4
		BPHYS20Y203	Paper- I & Paper- II, Practical (Practical 3A & 3 B Core Course 3C)										30	20	50	0	0	2	2
		BPHYS20Y204	Solid State Electronics Paper- III (Core Course - 3D for Honors)			30				15		5			50	3	1	0	4
		BPHYS20Y205	Paper- III, Practical (Practical 3D for Honours, Core Course 3E)										30	20	50	0	0	1	1
3	Common	BASPR20Y201	Assingment Presentation for 3 Core Courses											50	50	0	3	0	3

Induction programme of three weeks (MC): Physical activity, Creative Arts, Universal Human Values, Literary, Proficiencey Modules, Lectures by Eminent People, Visits to local Areas, Familiarization to Dept./Branch & Innovations.

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ज्ञान प्राप्तये लक्ष्य संधानम्
Estd. by Madhya Pradesh Niji Vishwavidyalaya (Sthapna Avam Sanchalan) Adhyadesh, 2020

School of Basic and Applied Sciences

Class			**B.Sc. Physics**
Semester/Year			**II Year**
Subject & Subject Code			**Physics - BPHYS20Y202**
Paper			**Electrostatics, Magnetostatistics and Electrodynamics, Paper - II**
Max. Marks			**30 (ETE) + 20 (IA) = 50**
Credit			**Total Credits**
L	**T**	**P**	**4**
3	1	0	

Course Objectives:

- Is to make student study and understand the various phenomenon of light, viz. reflection, refraction, interference, diffraction and polarization.
- It to study and understand the working, construction and applications of Laser.
- Is to develop the ability to apply the knowledge acquired in the classroom and laboratories to specific problems in theoretical and experimental Physics.
- Is to make students understand, learn,and perform experiments in the labs to demonstrate the concepts, principles and theories learned in the classrooms.

Course Outcomes:

The students are expected to acquire the knowledge of the following:

- Gauss law, Coulomb's law for the electric field, and its applications.
- Vector and scalar potential, electric potential energy, formalisms of electrostatics.
- Working of capacitors.
- Magnetic field produced by magnetic dipoles and electric currents.
- Faraday-Lenz and Maxwell laws , relationship between electric and magnetic fields.
- Dielectric and magnetic properties of materials, electromagnetic induction.
- Kirchhoff's law and its application to various AC circuits.
- Growth and decay of current in LR,CR and LCR circuits, complex numbers and their applications in solving AC circuits problems.
- Origin of bioelectricity.

Student learning outcomes:

Student will able to -

1. Demonstrate a rigorous understanding of the fundamentals of Electrostatics, Magnetostatics, Current Electricity and Bio Electricity involved in theories & principles of physics.
2. Understand motion of charge particle in electric and magnetic fields and Knowledge of electrodynamics
3. Sharpen his skill and knowledge and utilize/apply his knowledge in further research and science.

Shama Mehra Megha

Unit	Syllabus	Periods
Unit - I	**Electrostatics**: Coulombs law in vacuum expressed in vector forms, calculations of electric field E for simple distributions of charge at rest, dipole and quadruple fields. Work done on a charge in an electrostatic field expressed as a line integral, conservative nature of the electrostatic field. Relation between electric field & electric potential ($E = -\nabla V$), torque on a dipole in a uniform electric field and its energy, flux of the electric field, Gauss's law and its application for finding E for symmetric charge distributions Capacitors, conducting sphere in a uniform electric field, point charge in front of a grounded infinite conductor. Dielectrics, parallel plate capacitor with a dielectric, dielectric constant, polarisation and polarisation vector P, relation between displacement vector D, E and P. Molecular interpretation of Claussius-Mossotti equation.	15
Unit - II	**Magnetostatics**: Force on a moving charge, Lorentz force equation and definition of B, force on a straight conductor carrying current in a uniform magnetic field, torque on a current loop, magnetic dipole moment, angular momentum and gyromagnetic ratio, Biot and Savart's law, calculation of H for simple geometrical situations such as Solenoid, Anchor ring. Ampere's Law, $\nabla \times B = \mu 0J$, , $\nabla.B = 0$. Field due to a magnetic dipole, free and bound currents, magnetization vector (M), relationship between B, H and M. Derivation of the relation, $\nabla \times M = J$ for nonuniform magnetization.	15
Unit - III	**Current Electricity and Bio electricity:** Current Electricity: Steady current, current density J, non-steady currents and continuity equation, Kirchoff's laws and analysis of multiloop circuits, growth and decay of current in LR and CR circuits, decay constants, LCR circuits. AC circuits, complex numbers and their applications in solving AC circuits problems, complex impedance and reactance, series and parallel resonance. Q-factor, power consumed by an A.C. circuit, power factor, Y and Δ networks and transmission of electric power, Electricity observed in living systems, Origin of bioelectricity.	15
Unit - IV	**Motion of Charged Particles in Electric and Magnetic Fields** (Note: The emphasis here should be on the mechanical aspects and not on the details of the apparatus mentioned which are indicated as applications of principles involved.) E as an accelerating field, electron gun, discharge tube, linear accelerator. E as deflecting field - CRO, Sensitivity of CRO. Transverse B field; 180° deflection, Mass spectrograph and velocity selector, Curvatures of tracks for energy determination for nuclear particles; Principle and working of Cyclotron. Mutually perpendicular and parallel E & B fields; Positive ray parabolas, Discovery of isotopes, Elements of Mass Spectrographs, Principle of magnetic focusing (lenses).	14

Unit	Syllabus	Periods
Unit - V	**Electrodynamics** Electromagnetic induction, Faraday's Laws, Electromotive force, Integral and differential forms of Faraday's laws, Self and mutual inductance, Transformers, Energy in a static magnetic field, Maxwell's displacement current, Derivations of Maxwell's equations, Electromagnetic field energy density, Poynting vector, Electromagnetic wave equation, Plane electromagnetic waves in vacuum and dielectric media, Reflection at a plane boundary of dielectrics, Fresnel's Laws, Polarisation by reflection and total internal reflection, Waves in a conducting medium, Reflection and refraction by the ionosphere.	16

Reference Books

1 Berkley Physics Course : Electricity and Magnetism edision , E.M. Purcell ,McGraw Hill

2 Physics Vol 2, D.Halliday and R Resnick,

3 Introduction to electrodynamics, D.J. Griffths ,Printice Hall

4 Electricity and Magnetism , S.S.Atwood ,Dover Publication

5 Electrodynamics:Emi Cossor and Bassin Lorrraine , Asahi Shimbunsha PublishingLtd

6 From Neuron to Brain Kuffler and Nicholas , Sinauer Associates

7 Schaums outline of begning Physics-2,: Electricity and Magnetism

8 Physics For Degree Students C.L. Arora and P.S. Hemne, S.Chand Publications.

9 Electrodynamics : Gupta, Kumar and Singh,Pragati Prakashan

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School of Basic and Applied Sciences

Class				**B.Sc. Physics**
Semester/Year				**II Year**
Subject & Subject Code				**Practical Physics - BPHYS20Y203**
Paper				**Paper- I & Paper- II, Practical**
Max. Marks				**50=(30+20)** (ETE+IA)
Credit			**Total Credits**	
L	**T**	**P**		
0	0	2	**2**	

PRACTICALS

1. To determine the dispersive power of the material of prism using spectrometer.
2. To plot the i-δ curve for a given prism using spectrometer and then determine the refractive index of the material of the prism.
3. To determine the wavelength of main spectral lines of mercury light with the help of plane transmission grating.
4. To determine the wavelength of monochromatic light source with the help of Newton's ring method.
5. To determine the wavelength of monochromatic light source using Fabry Perot Etalon.
6. To determine the dispersive power of plane transmission grating.
7. To determine the resolving power of grating.
8. To determine the resolving power of telescope.
9. To determine the polarising angle of the prism and to determine the refractive index of the material of prism using Brewster's law.
10. To determine the specific rotation of a given sugar solution by bi-quartz polarimeter.
11. To determine the refractive indices of O-ray and E-ray for calcite prism using spectrometer.
12. To determine the refractive indices of O-ray and E-ray for quartz prism using spectrometer.
13. To study the frequency response curve of series LCR Circuit.
14. To study the charging and discharging of a capacitor through high resistance.
15. To determine the frequency of A.C. Mains with the help of wire vibrating under Lorentz force.
16. To Plot Graph showing variation of magnetic field with distance along axis of a circular coil carrying current.

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School of Basic and Applied Sciences

Class				**B.Sc. Physics (Honours)**
Semester/Year				**II Year**
Subject & Subject Code				**Physics Honours - BPHYS20Y204**
Paper				**Solid State Electronics Paper- III**
Max. Marks				30 (ETE) + 20 (IA) = 50
Credit			**Total Credits**	
L	**T**	**P**		
3	1	0	4	

Course Objectives:
To understand of fundamentals of Solid state electronics

Course Outcomes:
The students are expected to acquire the knowledge of the following:
1. Semiconductor Physics
2. Poly crystalline and Amorphous Semiconductors
3. Semiconductor Diodes
4. Bipolar Transistors and Thyristors & JFETS, MESFETS and MOSFETS
5. Interaction of electrons with acoustic and optical phonons, polarons, Superconductivity

Student learning outcomes:
Student will able to -
1. Demonstrate an understanding of Solid state Electronics.
2. Sharpen his skill and knowledge and utilize/apply his knowledge in further research and science.

Unit	Syllabus	Periods
Unit - I	**Semiconductor Physics:** Energy band diagrams of actual semiconductors likes Si, Ge and GaAs, impurity doping and impurity energy levels, Calculation of Fermi level and conductivity of semiconductors, Injection of carriers, diffusion, Drift and continuity equation (band to band), trap assisted and Auger recombination, low injection and high injection, quasi Fermi levels.	15
Unit - II	**Poly crystalline and Amorphous Semiconductors:** Semiconductor surfaces, surface charge and surface barrier, poly crystalline semiconductor, properties of grain boundaries, poly silicon as gate material, electrical conduction in amorphous semiconductors, mobility edge band, details and dangling band States.	15
Unit - III	**Semiconductor Diodes:** PN junction, Depletion region capacitance, current voltage relation, recombination in space charge region and diode ideality factor, junction breakdown and avalanche multiplication, a-c response, diffusion capacitance, switching properties, reverse recovery, PINB diode hetro junctions, metal semiconductor barrier, Schottky thermionic and diffusion currents and measurement of barrier height.	15

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Unit	Syllabus	Periods
Unit - IV	**Bipolar Transistors and Thyristors**: General characteristics of Bipolar junction transistors, voltage rating, factors controlling current gain, frequency performance, power transistors, switching of bipolar transistor, basic concept of PNPN structures, thyristor's turn on, turn off and power consideration triacs. **JFETS, MESFETS and MOSFETS**: JFET modeling including saturation velocity effects, GaAs MESEFT, MOS diodes, surface space charge regions, suface states, MOSEFT, surface space charge region under no equilibrium condition channel conductance, basic characteristics, current voltage and device parameters.	15
Unit - V	Interaction of electrons with acoustic and optical phonons, polarons, Superconductivity : Manifestations of energy gap, Cooper pairing due to phonons, BCS theory of superconductivity, Ginzsburg –Landau theory and application to Josephson effect : d-c-Josephson effect, a-c Josephson effect, macroscopic quantum interference. Vortices and type II superconductors, high temperature superconductivity (elementary).	15

Reference Books

1 Introduction to Atomic Spectra : H.E. White

2 Fundamentals of molecular spectroscopy : C.B. Banwell

3 Atomic & Molecular Spectroscopy : Rajkumar

4 Spectroscopy vol. I, II & III : Walker and Stanghen

5 Introduction to molecular spectroscopy : G.M. Barrow

6 Spectra of diatomic molecules : Herzberg.

7 Molecular spectroscopy : Jeanne L. Mc Hale

8 Molecular spectroscopy : J.M.Brown

9 Spectra of atoms and molecules : P.F.Bemath.

10 Modern spectroscopy : J.M. Halian

11 Spectroscopy : Gour

12 Atomic & Molecular Physics : Rajkumar

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School of Basic and Applied Sciences

Class				**B.Sc. Physics (Honours)**
Semester/Year				**II Year**
Subject & Subject Code				**Practical Physics Honours - BPHYS20Y205**
Paper				**Paper- III, Practical**
Max. Marks				**50=(30+20)** (ETE+IA)
Credit			**Total Credits**	
L	**T**	**P**		
0	0	1	**1**	

PRACTICALS

1 To plot the characteristic curve of J-FET.

2 To study the basic logic gates using IC's.

3 To study the transistorized power supply.

4 To study the Operational Amplifier in Inverting and Non-inverting mode.

5 To study and plot the V -I characteristic of UJT.

6 Study of op-amp as an adder.

7 To determine e/k using transistor characteristics.

8 To study dark and illumination characteristics of p-n junction solar cell and to determine
(i) its internal series resistance (ii) Diode ideality factor.

9 To study the characteristics of following semiconductor devices.
(i) VDR (ii) Photo transistor (iii) Thermistor (iv) IED

10 To study the characteristics of MOSTET and MOSFET amplifier.

11 To study dark and illumination characteristics of p-n junction solar cell and to determine its.
(i) Maximum power available (ii) Fill factor.

12 Study the wave from characteristics of transistorized a stable symmetrical multivibrator using CRO & determines its frequency by various C & R.

13 Any other experiments of the equivalent standard can be set.

Sharma Mehrotra Megha