GOVT. DIGVIJAY AUTO. PG COLLEGE
RAJNANDGAON (CHHATTISHGARH)

SYLLABUS AND MARKING SCHEME FOR B.Sc. WITH PHYSICS
SESSION 2025-26
SEMESTER - I

- **THEORY PAPER :**

Class	Paper	Course title	Course code	Credit value	Theory marks	Internal marks	Passing marks
Sem.-I	DSC	MECHANICS	PHSC-01T	3	70	30	40
Sem.-I	GE	MECHANICS	PHGE-01T	3	70	30	40

- **PRACTICAL / PROJECT PAPER :**

Class	Paper	Course title	Course code	Credit value	Practical + viva marks+ Sessional	Internal assessment :	Passing marks
Sem.-I	DSC	MECHANICS	PHSC-01P	1	35	15	20
Sem.-I	GE	MECHANICS	PHGE-01P	1	35	15	20

FOUR YEARS UNDERGRADUATE PROGRAM (2024-28)
DEPARTMENT OF PHYSICS
COURSE CURRICULUM

PART – A: INTRODUCTION

Program: Bachelor in Science (Certificate/ Diploma/ Degree/ Honors)		Semester: I	Session: 2024-25
1	Course Code	PHGE-01 T	
2	Course Title	Mechanics	
3	Course Type	Generic Elective Course	
4	Pre-requisite (if any)	As per Program	
5	Course Learning Outcomes (CLO)	*After going through the course, the student should be able to:* ➢ *Analyze and apply the laws of motion to various dynamical situations.* ➢ *Explain and demonstrate the principle of conservation of momentum and energy including their application in real-world scenario such as collision and energy transformation.* ➢ *Evaluate and calculate moment of inertia for objects of different shapes and analyze how these properties affect the motion of rotating bodies.* ➢ *Analyze flow of fluids.* ➢ *Describe special relativistic effects and their effects on the mass and energy of a moving object.*	
6	Credit Value	03 Credits	1 Credit= 15 Hours for Learning & Observation
7	Total Marks	Maximum Marks: 100	Minimum Pass Marks: 40

PART – B: CONTENT OF THE COURSE

Total No. of Teaching–learning Periods (01 Hr. per period) - 45 Periods (45 Hours)

Unit	Topics (Course contents)	No. of Periods
I	**Historical Background:** Contribution of Aryabhatta and Varahmihir to science and society, Brief biography of Vikram Sarabhai with his contribution. **Vectors:** Scalar and vector quantities &fields, Scalar & Vector products of two vectors, Derivatives of a vector, Gradient of scalar field and its physical significance. **Laws of Motion:** Review of Newton's Laws of motion, Dynamics of a system of particles, Concept of Center of Mass, Motion of center of mass, Conservation of linear momentum, Motion of Rocket. **Work and Energy:** Work-Energy theorem for conservative forces, Force as a gradient of Potential Energy, Conservation of energy, Elastic and in-elastic Collisions	12
II	**Rotational Dynamics**: Angular momentum, Torque, Conservation of angular momentum, Moment of Inertia, Theorem of parallel and perpendicular axes (statements only), Calculation of Moment of Inertia of discrete and continuous objects (Rectangular lamina, disc, solid cylinder, solid sphere). **Elasticity:** Stress & Strain, Hooke's law, Elastic constants, Poisson's Ratio, Relationship between various elastic modulii (without derivation), Work done in twisting a cylinder. **Fluid Dynamics**: Flow of fluids, Coefficient of viscosity, Derivation of Poiseulli's formula, Motion of a spherical body falling in a viscous fluid, Stoke's law, Expression for terminal velocity.	12
III	**Gravitation**: Newton's Law of Gravitation, Motion of a particle in a central force field (motion is in a plane, angular momentum is conserved, areal velocity is constant), Kepler's Laws (statements only), Satellite in circular orbit and applications, Geosynchronous orbits. **Oscillations**: Simple harmonic motion, Differential equation of SHM and its solutions, Kinetic and Potential Energy, Total Energy and their time averages, Compound pendulum, Differential equations of damped oscillations and forced oscillations (Conceptual only).	11
IV	**Special Theory of Relativity:** Frame of reference, Galilean Transformations, Inertial and Non-inertial frames, Outcomes of Michelson Morley's Experiment, Postulates of Special Theory of Relativity, Lorentz Transformation, Length contraction, Time dilation, Relativistic transformation of velocity, Relativistic variation of mass, Mass-energy equivalence, Transformation of Energy and Momentum.	10
Keywords:	Aryabhatta, Vectors, Newton's Laws, Angular Momentum, Elasticity, Gravitation, Oscillations, Relativity	

Signature of Convener & Members (CBoS) :

28/6/25 28/06/2025 5/10/6/25

PART – C: LEARNING RESOURCES

Text Books, Reference Books Recommended and Others

Text Books Recommended-

1. Mechanics & Properties of matter, D.C. Tayal & P. Tayal, 2023, Pub. By Authors.
2. Unified Physics I –R.P.Goyal, Shivlal Agrawal Publication
3. Unified Physics I, Navbodh Publication

Reference Books Recommended-

1. Mechanics, Berkeley Physics, vol.1, C.Kittel, W.Knight, et.al. 2007, Tata McGraw-Hill.
2. Physics, Resnick, Halliday and Walker 8/e. 2008, Wiley.
3. Introduction to Special Relativity, R. Resnick, 2005, John Wiley and Sons.

Online Resources (e-books/ learning portals/ other e-resources)

1. All e-books of physics https://www.e-booksdirectory.com/listing.php?category=2
2. Free physics text book in PDF
3. https://www.motionmountain.net/?gclid=CjwKCAjwmq3kBRB_EiwAjkNDp5v8Yy6xK1s0Kma0VR0AWGlichRwFfCC0-vpZK1jrPoEOAnBq8fcqRoCILsQAvD_BwE
4. Cambridge University Books for Physics https://www.cambridgeindia.org/
5. Books for solving physics problems https://bookboon.com/en/physics-ebooks
6. NPTEL Online courses https://nptel.ac.in/courses/115105098; https://archive.nptel.ac.in/courses/115/106/115106123/;
7. BSc Lectures by Prof. H C Verma: https://bsc.hcverma.in/index.php/course/relativity; https://bsc.hcverma.in/index.php/course/cm1

PART – D: ASSESSMENT AND EVALUATION

Suggested Continuous Evaluation Methods:
Maximum Marks: 100Marks
Continuous Internal Assessment (CIA):30 Marks
End Semester Examination (ESE): 70 Marks

Continuous Internal Assessment (CIA): (By course teacher)	Internal Test/ Quiz (2): **20~~/20~~** Assignment/ Seminar (1):**10** Total Marks: **30**	Better marks out of the two Test / Quiz + marks obtained in Assignment shall be considered against **30 Marks**
End Semester Exam (ESE):	**Two section – A & B** Section A: **Q1**. Objective – **10 x1= 10** Mark; **Q2**. Short answer type- **5x4 =20Marks** Section B: Descriptive answer type,**1out of 2** from each unit-**4x10=40 Marks**	

Name and Signature of Convener & Members of CBoS:

FOUR YEARS UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF PHYSICS
COURSE CURRICULUM

PART – A: INTRODUCTION

Program: Bachelor in Science (Certificate/ Diploma/ Degree/ Honors)		Semester: I	Session: 2024-25
1	Course Code	PHGE- 01 P	
2	Course Title	Mechanics	
3	Course Type	Generic Elective Course	
4	Pre-requisite (if any)	As per Program	
5	Course Learning Outcomes (CLO)	After the completion of the course, Students are expected to understand working mechanism and laws of classical mechanics. The Students will be able to ➢ Assemble required parts/devices and arrange them to perform experiments. ➢ Record/ observe data as required by the experimental objectives. ➢ Analyze recorded data and formulate it to get desired results. ➢ Interpret results and check for attainment of proposed objectives related to laws of mechanics and its applications	
6	Credit Value	01 Credit	1 Credit = 30 Hours Laboratory Work
7	Total Marks	Maximum Marks: 50	Minimum Pass Marks: 20

PART – B: CONTENT OF THE COURSE

Total No. of learning-Training/performance Periods- 30 Periods (30 Hours)

Sr. No.	Objects (At least 10 of the following or related Experiments)	No. of Period
1	Measurements of length (or diameter) using vernier caliper, screw gauge and travelling microscope.	30
2	To study the random error in observations.	
3	To study the motion of the spring and calculate (a) Spring constant and, (b) g.	
4	To determine the Moment of Inertia of a Flywheel.	
5	To determine g and velocity for a freely falling body using Digital Timing Technique.	
6	To determine Coefficient of Viscosity of water by Capillary Flow Method (Poiseuille's method).	
7	To determine the Young's Modulus of a Wire by Optical Lever Method.	
8	To determine the Modulus of Rigidity of a Wire by Maxwell's needle.	
9	To determine the elastic constants of a wire by Searle's method	
10	To determine the value of g using Bar Pendulum.	
11	To determine the value of g using Kater's Pendulum.	
12	Study of bending of a beam/ cantilever	
13	To determine Moment of Inertia of an irregular body by Inertia Table	
Keywords	Moment of Inertia, Pendulum, Vernier Callipers, Screw Gauge, Travelling microscope, Elastic Constant, Searle's Method, Stoke's Method, Cappilary Rise Method, Viscosity, Surface Tension	

Signature of Convener & Members (CBoS) :

PART – C: Learning Resources

Text Books, Reference Books and others

Text Books Recommended-

1. Advanced Practical Physics for students, B.L.Flint&H.T.Worsnop, 1971, Asia Publishing House.
2. Engineering Practical Physics, S.Panigrahi& B.Mallick,2015, Cengage Learning India Pvt. Ltd.
3. A Text Book of Practical Physics, Indu Prakash and Ramakrishna, 11th Edition, 2011, Kitab Mahal, New Delhi.
4. Practical Physics B.Sc. I : R P Goyal, Shivlal Publications

Reference Books Recommended-

1. Advanced Practical Physics for Students by B.L. Worsnop and H.T. Flint
2. Practical Physics by G.L. Squires
3. An Introduction to Error Analysis: The Study of Uncertainties in Physical Measurements by John R. Taylor
4. Mechanics and Properties of Matter by J.C. Upadhyaya

Online Resources (e-books/ learning portals/ other e-resources)

1. Link for e-Books for Physics:Physics Practical:
   https://www.uou.ac.in/sites//default/files/slm/BSCPH-104.pdf
2. Virtual Lab :https://vlab.amrita.edu/?sub=1&brch=74
3. https://vlab.amrita.edu/?sub=1&brch=74&sim=571&cnt=1
4. https://www.ae.msstate.edu/vlsm/

PART – D : ASSESSMENT AND EVALUATION

Suggested Continuous Evaluation Methods:
Maximum Marks: 50 Marks
Continuous Internal Assessment(CIA):15 Marks
EndSemester Exam(ESE):35 Marks

Continuous InternalAssessment(CIA): (By Course Teacher)	Internal Test / Quiz - (2): **10 & 10** Assignment/Seminar +Attendance –**05** Total Marks - **15**	Better marks out of the two Test/Quiz **+Marks** obtained in Assignment shall be considered against **15** Marks
End Semester Exam (ESE):	**Laboratory Performance: On spot Assessment** **Performed the Task based on lab. work -20 Marks** **Spotting based on tools & technology (written) – 10 Marks** **Viva-voce (based on principle/technology) - 05 Marks**	**Managed by Course teacher as per lab. status**

Name and Signature of Convener & Members of CBoS:

FOUR YEARS UNDERGRADUATE PROGRAM (2024-28)
DEPARTMENT OF PHYSICS
COURSE CURRICULUM

PART – A: INTRODUCTION

Program: Bachelor in Science (Certificate/ Diploma/ Degree/ Honors)		Semester: I	Session: 2024-25
1	Course Code	PHSC-01T	
2	Course Title	Mechanics	
3	Course Type	Discipline Specific Course	
4	Pre-requisite (if any)	As per Program	
5	Course Learning Outcomes (CLO)	*After going through the course, the student should be able to:* ➢ *Analyze and apply the laws of motion to various dynamical situations.* ➢ *Explain and demonstrate the principle of conservation of momentum and energy including their application in real-world scenario such as collision and energy transformation.* ➢ *Evaluate and calculate moment of inertia for objects of different shapes and analyze how these properties affect the motion of rotating bodies.* ➢ *Analyze flow of fluids.* ➢ *Describe special relativistic effects and their effects on the mass and energy of a moving object.*	
6	Credit Value	03 Credits	1 Credit= 15 Hours for Learning &Observation
7	Total Marks	Maximum Marks: 100	Minimum Pass Marks: 40

PART – B: CONTENT OF THE COURSE

TotalNo.of Teaching–learning Periods (01 Hr. per period) - 45 Periods (45 Hours)

Unit	Topics (Course contents)	No. of Periods
I	**Historical Background:** Contribution of Aryabhatta and Varahmihir to science and society, Brief biography of Vikram Sarabhai with his contribution.**Vectors:** Scalar and vector quantities &fields, Scalar & Vector products of two vectors, Derivatives of a vector, Gradient of scalar field and its physical significance.**Laws of Motion:** Review of Newton's Laws of motion, Dynamics of a system of particles, Concept of Center of Mass, Motion of center of mass, Conservation of linear momentum, Motion of Rocket.**Work and Energy:** Work-Energy theorem for conservative forces, Force as a gradient of Potential Energy, Conservation of energy, Elastic and in-elastic Collisions	12
II	**Rotational Dynamics**: Angular momentum, Torque, Conservation of angular momentum, Moment of Inertia, Theorem of parallel and perpendicular axes(statements only), Calculation of Moment of Inertia of discrete and continuous objects (Rectangular lamina, disc, solid cylinder, solid sphere) **Elasticity:** Stress & Strain, Hooke's law, Elastic constants, Poisson's Ratio,Relationship between various elastic modulii (without derivation), Work done in twisting a cylinder.**Fluid Dynamics**: Flow of fluids, Coefficient of viscosity,Derivation of Poiseulli's formula, Motion of a spherical body falling in a viscous fluid, Stoke's law, Expression for terminal velocity.	12
III	**Gravitation**: Newton's Law of Gravitation, Motion of a particle in a central force field (motion is in a plane, angular momentum is conserved, areal velocity is constant), Kepler's Laws (statements only), Satellite in circular orbit and applications, Geosynchronous orbits. **Oscillations**: Simple harmonic motion, Differential equation of SHM and its solutions, Kinetic and Potential Energy, Total Energy and their time averages, Compound pendulum, Differential equations of damped oscillations and forced oscillations (Conceptual only).	11
IV	**Special Theory of Relativity:** Frame of reference, Galilean Transformations, Inertial and Non-inertial frames, Outcomes of Michelson Morley's Experiment, Postulates of Special Theory of Relativity, Lorentz Transformation, Length contraction, Time dilation, Relativistic transformation of velocity, Relativistic variation of mass, Mass-energy equivalence, Transformation of Energy and Momentum.	10

Keywords. Aryabhatta, Vectors, Newton's Laws, Angular Momentum, Elasticity, Gravitation, Oscillations, Relativity

SignatureofConvener&Members (CBoS) :

PART – C: LEARNING RESOURCES

Text Books, Reference Books Recommended and Others

Text Books Recommended-

1. Mechanics & Properties of matter, D.C. Tayal & P. Tayal, 2023, Pub. By Authors.
2. Unified Physics I –R. P. Goyal, Shivlal Agrawal Publication
3. Unified Physics I, Navbodh Publication

Reference Books Recommended-

1. Mechanics, Berkeley Physics, vol.1, C. Kittel, W. Knight, et.al. 2007, Tata McGraw-Hill.
2. Physics, Resnick, Halliday and Walker 8/e. 2008, Wiley.
3. Introduction to Special Relativity, R. Resnick, 2005, John Wiley and Sons.

Online Resources (e-books/ learning portals/ other e-resources)

1. All e-books of physics https://www.e-booksdirectory.com/listing.php?category=2
2. Free physics text book in PDF
3. https://www.motionmountain.net/?gclid=CjwKCAjwmq3kBRB_EiwAjkNDp5v8Yy6xK1s0Kma0VR0AWGlichRwFfCC0-vpZK1jrPoEOAnBq8fcqRoCILsQAvD_BwE
4. Cambridge University Books for Physics https://www.cambridgeindia.org/
5. Books for solving physics problems https://bookboon.com/en/physics-ebooks
6. NPTEL Online courses https://nptel.ac.in/courses/115105098; https://archive.nptel.ac.in/courses/115/106/115106123/;
7. BSc Lectures by Prof. H C Verma: https://bsc.hcverma.in/index.php/course/relativity; https://bsc.hcverma.in/index.php/course/cm1

PART – D: ASSESSMENT AND EVALUATION

Suggested Continuous Evaluation Methods:

Maximum Marks:	**100 Marks**
Continuous Internal Assessment (CIA):	**30 Marks**
End Semester Examination (ESE):	**70 Marks**

Continuous Internal Assessment (CIA): (By course teacher)	Internal Test/ Quiz (2):	**20 + 20**	Better marks out of the two Test / Quiz **+** marks obtained in Assignment shall be considered against **30 Marks**
	Assignment/ Seminar (1):	**10**	
	Total Marks:	**30**	
End Semester Exam (ESE):	**Two section – A & B** Section A: **Q1**. Objective – **10 x1= 10** Mark; **Q2**. Short answer type- **5x4 = 20 Marks** Section B: Descriptive answer type,**1 out of 2** from each unit-**4 x 10=40 Marks**		

Name and Signature of Convener & Members of CBoS:

10/6/24

FOUR YEARS UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF PHYSICS
COURSE CURRICULUM

PART – A: INTRODUCTION			
Program:Bachelor in Science (Certificate/ Diploma/ Degree/ Honors)		**Semester: I**	**Session: 2024-25**
1	Course Code	**PHSC- 01P**	
2	Course Title	**Mechanics**	
3	Course Type	**Discipline Specific Course**	
4	Pre-requisite (if any)	**As per Program**	
5	Course Learning Outcomes (CLO)	After the completion of the course, Students are expected to understand working mechanism and laws of classical mechanics. The Students will be able to ➢ Assemble required parts/devices and arrange them to perform experiments. ➢ Record/ observe data as required by the experimental objectives. ➢ Analyze recorded data and formulate it to get desired results. ➢ Interpret results and check for attainment of proposed objectives related to laws of mechanics and its applications	
6	Credit Value	**01 Credit**	**1 Credit = 30 HoursLaboratory Work**
7	Total Marks	**Maximum Marks: 50**	**Minimum Pass Marks: 20**

PART – B: CONTENT OF THE COURSE

TotalNo.of learning-Training/performance Periods-30 Periods (30 Hours)

Sr. No.	Objects (At least 10 of the following or related Experiments)	No. of Period
1	Measurements of length (or diameter) using vernier caliper, screw gauge and travelling microscope.	30
2	To study the random error in observations.	
3	To study the motion of the spring and calculate (a) Spring constant and, (b) g.	
4	To determine the Moment of Inertia of a Flywheel.	
5	To determine g and velocity for a freely falling body using Digital Timing Technique.	
6	To determine Coefficient of Viscosity of water by Capillary Flow Method (Poiseuille's method).	
7	To determine the Young's Modulus of a Wire by Optical Lever Method.	
8	To determine the Modulus of Rigidity of a Wire by Maxwell's needle.	
9	To determine the elastic constants of a wire by Searle's method	
10	To determine the value of g using Bar Pendulum.	
11	To determine the value of g using Kater's Pendulum.	
12	Study of bending of a beam/ cantilever	
13	To determine Moment of Inertia of an irregular body by Inertia Table	
Keywords	Moment of Inertia, Pendulum,VernierCallipers, Screw Gauge, Travelling microscope, Elastic Constant, Searle's Method, Stoke's Method, Cappilary Rise Method, Viscosity, Surface Tension	

SignatureofConvener&Members (CBoS) :

PART – C: Learning Resources

Text Books, Reference Books and others

Text Books Recommended-

1. Advanced Practical Physics for students, B.L.Flint&H.T.Worsnop, 1971, Asia Publishing House.
2. Engineering Practical Physics, S.Panigrahi& B.Mallick,2015, Cengage Learning India Pvt. Ltd.
3. A Text Book of Practical Physics, Indu Prakash and Ramakrishna, 11th Edition, 2011, Kitab Mahal, New Delhi.
4. Practical Physics B.Sc. I : R P Goyal, Shivlal Publications

Reference Books Recommended-

1. Advanced Practical Physics for Students by B.L. Worsnop and H.T. Flint
2. Practical Physics by G.L. Squires
3. An Introduction to Error Analysis: The Study of Uncertainties in Physical Measurements by John R. Taylor
4. Mechanics and Properties of Matter by J.C. Upadhyaya

Online Resources (e-books/ learning portals/ other e-resources)

1. Link for e-Books for Physics:Physics Practical:
   https://www.uou.ac.in/sites//default/files/slm/BSCPH-104.pdf
2. Virtual Lab :https://vlab.amrita.edu/?sub=1&brch=74
3. https://vlab.amrita.edu/?sub=1&brch=74&sim=571&cnt=1
4. https://www.ae.msstate.edu/vlsm/

PART – D : ASSESSMENT AND EVALUATION

Suggested Continuous Evaluation Methods:

Maximum Marks:	**50 Marks**
Continuous Internal Assessment (CIA):	**15 Marks**
End Semester Exam (ESE):	**35 Marks**

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz - (2): **10 & 10** Assignment/Seminar +Attendance – **05** Total Marks - **15**	Better marks out of the two Test/Quiz **+Marks** obtained in Assignment shall be considered against **15** Marks
End Semester Exam (ESE):	**Laboratory Performance: On spot Assessment** **Performed the Task based on lab. work -20 Marks** **Spotting based on tools & technology (written) – 10 Marks** **Viva-voce (based on principle/technology) - 05 Marks**	**Managed by Course teacher as per lab. status**

Name and Signature of Convener & Members of CBoS:

10/6/24

GOVT. DIGVIJAY AUTO. PG COLLEGE
RAJNANDGAON (CHHATTISHGARH)

SYLLABUS AND MARKING SCHEME FOR B.Sc. WITH PHYSICS
SESSION 2025-26
SEMESTER - II

- **THEORY PAPER :**

Class	Paper	Course title	Course code	Credit value	Theory marks	Internal marks	Passing marks
Sem.-II	DSC	ELECTRCITY AND MAGNETISM	PHSC-02T	3	70	30	40
Sem.-II	GE	ELECTRCITY AND MAGNETISM	PHGE-02T	3	70	30	40

- **PRACTICAL / PROJECT PAPER :**

Class	Paper	Course title	Course code	Credit value	Practical + viva marks+ Sessional	Internal assessment :	Passing marks
Sem.-II	DSC	ELECTRCITY AND MAGNETISM	PHSC-02P	1	35	15	20
Sem.-II	GE	ELECTRCITY AND MAGNETISM	PHGE-02P	1	35	15	20
Sem.-II	SEC	BASIC ELECTRICAL SKILL	PHSEC -01	3	35	15	20

FOUR YEARS UNDERGRADUATE PROGRAM (2024-28)
DEPARTMENT OF PHYSICS
COURSE CURRICULUM

PART – A: INTRODUCTION

Program: Bachelor in Science (Certificate/ Diploma/ Degree/ Honors)	Semester: II	Session: 2024-25

1	**Course Code**	**PHSC-02T**	
2	**Course Title**	**ELECTRICITY AND MAGNETISM**	
3	**Course Type**	**Discipline Specific Course**	
4	**Pre-requisite (if any)**	**As per Program**	
5	**Course Learning Outcomes (CLO)**	After going through the course, the student should be able to: ➢ State various laws related with electrostatics, dielectric, electric current, magnetism and electromagnetic induction. ➢ Apply vector (electric fields, Coulomb's law) and scalar (electric potential, electric potential energy) formalisms of electrostatics. ➢ Compare rise and decay of current in LR, CR, LCR circuits. ➢ Apply Biot-Savart law for calculation of magnetic field in simple geographic situations. ➢ Derive and analyze Maxwell's equations.	
6	**Credit Value**	**03 Credits**	**1 Credit= 15 Hours for Learning &Observation**
7	**Total Marks**	**Maximum Marks: 100**	**Minimum Pass Marks: 40**

PART – B: CONTENT OF THE COURSE

TotalNo.of Teaching–learning Periods (01 Hr. per period) - 45 Periods (45 Hours)

Unit	Topics (Course contents)	No. of Periods
I	**Power plants in Chhattisgarh:** An overview of thermal and hydroelectric power plants in Chhattisgarh. **Vector Analysis**: Divergence & Curl of Vector fields, Line, surface and volume integrals of Vector fields, Gauss-divergence theorem and Stoke's theorem of vectors and its application in electrostatics and magnetostatics.**Electrostatics field:** Electrostatic Field, electric flux, Gauss's theorem of electrostatics, Applications of Gauss theorem- Electric field due to point charge, infinite line of charge, plane charged sheet, charged conductor.	12
II	**Electrostatic potential:**Electric potential as line integral of electric field, potential due to a point charge, Calculation of electric field from potential, Capacitance of Parallel plate capacitor, Energy per unit volume in electrostatic field. **Dielectric & Electric Currents:** Dielectric medium, Polarisation, Displacement vector, Gauss's theorem in dielectrics, Parallel plate capacitor completely filled with dielectric.Steady current, current density J, non – steady current and Continuity equation, Rise and decay of current in LR, CR, LCR circuits.	13
III	**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 properties of materials: Magnetic intensity, magnetic induction, permeability, magnetic susceptibility, Brief introduction of dia, para and ferro-magnetic materials.	10
IV	**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, Wave equation in free space.	10

Keywords:	Vector calculus, Electrostatics, Dielectrics and Electric Current, Magnetism, Electromagnetic Induction, Maxwell's Equation and Electromagnetic Wave Propagation

SignatureofConvener&Members (CBoS) :

PART – C: LEARNING RESOURCES

Text Books, Reference Books and Others

Text Books

1. Electricity and Magnetism, D C Tayal, 1988, Himalaya Publishing House.
2. Unified Physics – Part II, R. P.Goyal, Shivlal Agrawal and Sons
3. Unified Physics – Navbodh Publications
4. Introduction to Electrodynamics and Electromagnetism, H.C.Verma,

Reference Books

1. Vector analysis – Schaum's Outline, M.R. Spiegel, S. Lipschutz, D. Spellman, 2nd Edn., 2009, McGraw- Hill Education.
2. University Physics, Ronald Lane Reese, 2003, Thomson Brooks/Cole.

Online Resources (e-books/ learning portals/ other e-resources)

1. *All e-books of physics* https://www.e-booksdirectory.com/listing.php?category=2
2. *Free physics text book in PDF* https://www.motionmountain.net/?gclid=CjwKCAjwmq3kBRB_EiwAjkNDp5v8Yy6xK1s0Kma0VR0AWGlichRwFfCC0-vpZK1jrPoEOAnBq8fcqRoCILsQAvD_BwE
3. *Cambridge University Books for Physics* https://www.cambridgeindia.org/
4. *Books for solving physics problems* https://bookboon.com/en/physics-ebooks
5. *NPTEL Online courses:* https://onlinecourses.nptel.ac.in/noc21_ph05/preview
6. https://archive.nptel.ac.in/courses/115/104/115104088/
7. *Classical Electromagnetism - 1 (Electrostatics)* https://bsc.hcverma.in/course/cee1
8. *Classical Electromagnetism - 2 (Electrostatics)* https://bsc.hcverma.in/course/cee2

PART – D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:
Maximum Marks: 100Marks
Continuous Internal Assessment (CIA):30 Marks
End Semester Examination (ESE): 70 Marks

Continuous Internal Assessment (CIA): (By course teacher)	Internal Test/ Quiz (2): **20+20**Assignment/ Seminar (1): **10** Total Marks: **30**	Better marks out of the two Test / Quiz **+** marks obtained in Assignment shall be considered against **30** Marks
End Semester Examination (ESE):	**Two section – A & B** Section A: **Q1**. Objective – **10 x1= 10** Mark; **Q2**. Short answer type- **5x4 =20Marks** Section B: Descriptive answer type,**1out of 2** from each unit-**4x10=40 Marks**	

Name and Signature of Convener & Members of CBoS:

10/6/24

28/6/2023

FOUR YEARS UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF PHYSICS
COURSE CURRICULUM

PART – A: INTRODUCTION

Program: Bachelor in Science (Certificate/ Diploma/ Degree/ Honors)		Semester: II	Session: 2024-25
1	Course Code	PHSC- 02P	
2	Course Title	Electricity & Magnetism	
3	Course Type	Discipline Specific Course	
4	Pre-requisite (if any)	As per program	
5	Course Learning Outcomes (CLO)	*After the completion of the course, Students are expected to understand working laws of Electricity, Magnetism and EMWs. The students will also be able to* ➢ *Verify various circuit laws, network theorems, using simple electric circuits. Assemble required parts/devices and arrange them to perform experiments.* ➢ *Verify various laws in electricity and magnetism such as Lenz's law, Faraday's law and learn about the construction, working of various measuring instruments* ➢ *Record/ observe data as required by the experimental objectives. Analyze recorded data and formulate it to get desired results.* ➢ *Interpret results and check for attainment of proposed objectives related to laws of Electricity, Magnetism and its applications*	
6	Credit Value	01 Credit	1 Credit = 30 Hours Laboratory Work
7	Total Marks	Maximum Marks: 50	Minimum Pass Marks: 20

PART – B: CONTENT OF THE COURSE

TotalNo.of learning-Training/performance Periods -30 Periods (30 Hours)

Sr. No.	Objects (At least 10 of the following or related Experiments)	No. of Periods
1	To use a Multimeter for measuring (a) Resistances, (b) AC and DCVoltages,(c) DC Current, and (d) checking electrical fuses.	30
2	To compare capacitances using De'Sauty's bridge.	
3	Measurement of field strength B and its variation in a Solenoid Determine (dB/dx).	
4	To study the Characteristics of a Series RC Circuit.	
5	To study a series LCR circuit and determine its (a) Resonant Frequency, (b) Quality Factor.	
6	To study a parallel LCR circuit and determine its (a) Anti-resonant frequency and(b) Quality factor Q.	
7	To determine a Low Resistance by Carey Foster's Bridge.	
8	To verify the Thevenin and Norton theorem.	
9	To verify the Superposition, and Maximum Power Transfer Theorem.	
10	To use a vibration magnetometer and study magnetic field.	
11	Study of magnetic field due to a current loop.	
12	Study of magnetic fields using Deflection Magnetometer	
13	Mini Project: Construction and Study of Solenoid and measurement of its magnetic field	

Keywords: Multimeter, Capacitance Comparison, Magnetic Field, RC Circuit, Series LCR Circuit, Parallel LCR Circuit, Low Resistance Measurement, Electrical Theorems

SignatureofConvener&Members (CBoS) :

PART – C: LEARNING RESOURCES

Text Books, Reference Books and Others

Text Books Recommended-

1. Engineering Practical Physics, S.Panigrahi&B.Mallick,2015, Cengage Learning India Pvt. Ltd.
2. A Text Book of Practical Physics, Indu Prakash and Ramakrishna, 11th Edition, 2011, Kitab Mahal, New Delhi.
3. Unified Practical Physics : R P Goyal, Shivlal Agrawal & Sons
4. Unified Practical Physics: YugbodhPrakashan
5. Unified Practical Physics: NavbodhPrakashan

Reference Books Recommended-

1. Basic Electrical and Electronics Engineering by S. K. Bhattacharya
2. A Textbook of Electrical Technology by B.L. Theraja and A.K. Theraja (Volumes 1 and 2)
3. Engineering Circuit Analysis by William H. Hayt, Jack E. Kemmerly, and Steven M. Durbin
4. Practical Physics by G.L. Squires

Online Resources (e-books/ learning portals/ other e-resources)

1. Link for e-Books for Physics: Physics Practical:
   https://www.uou.ac.in/sites//default/files/slm/BSCPH-104.pdf
2. Virtual Lab :https://vlab.amrita.edu/index.php?sub=1&brch=192
3. http://emv-au.vlabs.ac.in/#
4. https://www.ae.msstate.edu/vlsm/
5. https://nationalmaglab.org/magnet-academy/watch-play/interactive-tutorials
6. https://jigyasa-csir.in/cgcri/n12-t4-a3/

PART – D: ASSESSMENT AND EVALUATION

Suggested Continuous Evaluation Methods:
Maximum Marks: 50 Marks
Continuous Internal Assessment(CIA):15 Marks
EndSemester Exam(ESE):35 Marks

Continuous InternalAssessment(CIA): (By Course Teacher)	Internal Test / Quiz-(2): **10 & 10** Assignment/Seminar +Attendance –**05** Total Marks - **15**	Better marks out of the two Test / Quiz **+Marks** obtained in Assignment shall be considered against **15** Marks
End Semester Exam (ESE):	**Laboratory Performance: On spot Assessment** **Performed the Task based on lab. work - 20 Marks** **Spotting based on tools & technology (written) –10 Marks** **Viva-voce (based on principle/technology) - 05 Marks**	**Managed by Course teacher as per lab. status**

Name and Signature of Convener & Members of CBoS:

10/6/24

28/6/2024

FOUR YEARS UNDERGRADUATE PROGRAM (2024-28)
DEPARTMENT OF PHYSICS
COURSE CURRICULUM

PART – A: INTRODUCTION

Program: Bachelor in Science (Certificate/ Diploma/ Degree/ Honors)	Semester: II	Session: 2024-25

1	Course Code	PHGE-02 T	
2	Course Title	ELECTRICITY AND MAGNETISM	
3	Course Type	Generic Elective Course	
4	Pre-requisite (if any)	As per Program	
5	Course Learning Outcomes (CLO)	After going through the course, the student should be able to: ➢ State various laws related with electrostatics, dielectric, electric current, magnetism and electromagnetic induction. ➢ Apply vector (electric fields, Coulomb's law) and scalar (electric potential, electric potential energy) formalisms of electrostatics. ➢ Compare rise and decay of current in LR, CR, LCR circuits. ➢ Apply Biot-Savart law for calculation of magnetic field in simple geographic situations. ➢ Derive and analyze Maxwell's equations.	
6	Credit Value	03 Credits	1 Credit= 15 Hours for Learning & Observation
7	Total Marks	Maximum Marks: 100	Minimum Pass Marks: 40

PART – B: CONTENT OF THE COURSE

Total No. of Teaching–learning Periods (01 Hr. per period) - 45 Periods (45 Hours)

Unit	Topics (Course contents)	No. of Periods
I	**Power plants in Chhattisgarh:** An overview of thermal and hydroelectric power plants in Chhattisgarh. **Vector Analysis**: Divergence & Curl of Vector fields, Line, surface and volume integrals of Vector fields, Gauss-divergence theorem and Stoke's theorem of vectors and its application in electrostatics and magnetostatics. **Electrostatics field:** Electrostatic Field, electric flux, Gauss's theorem of electrostatics, Applications of Gauss theorem- Electric field due to point charge, infinite line of charge, plane charged sheet, charged conductor.	12
II	**Electrostatic potential:** Electric potential as line integral of electric field, potential due to a point charge, Calculation of electric field from potential, Capacitance of Parallel plate capacitor, Energy per unit volume in electrostatic field. **Dielectric & Electric Currents:** Dielectric medium, Polarisation, Displacement vector, Gauss's theorem in dielectrics, Parallel plate capacitor completely filled with dielectric. Steady current, current density J, non – steady current and Continuity equation, Rise and decay of current in LR, CR, LCR circuits.	13
III	**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 properties of materials: Magnetic intensity, magnetic induction, permeability, magnetic susceptibility, Brief introduction of dia, para and ferro-magnetic materials.	10
IV	**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, Wave equation in free space.	10

Keywords:	Vector calculus, Electrostatics, Dielectrics and Electric Current, Magnetism, Electromagnetic Induction, Maxwell's Equation and Electromagnetic Wave Propagation

Signature of Convener & Members (CBoS) :

28/6/2024

PART – C: LEARNING RESOURCES

Text Books, Reference Books and Others

Text Books

1. Electricity and Magnetism, D C Tayal, 1988, Himalaya Publishing House.
2. Unified Physics – Part II, R. P. Goyal, Shivlal Agrawal and Sons
3. Unified Physics – Navbodh Publications
4. Introduction to Electrodynamics and Electromagnetism, H. C. Verma,

Reference Books

1. Vector analysis – Schaum's Outline, M.R. Spiegel, S. Lipschutz, D. Spellman, 2nd Edn., 2009, McGraw- Hill Education.
2. University Physics, Ronald Lane Reese, 2003, Thomson Brooks/Cole.

Online Resources (e-books/ learning portals/ other e-resources)

1. *All e-books of physics* https://www.e-booksdirectory.com/listing.php?category=2
2. *Free physics text book in PDF* https://www.motionmountain.net/?gclid=CjwKCAjwmq3kBRB_EiwAjkNDp5v8Yy6xK1s0Kma0VR0AWGlichRwFfCC0-vpZK1jrPoEOAnBq8fcqRoCILsQAvD_BwE
3. *Cambridge University Books for Physics* https://www.cambridgeindia.org/
4. *Books for solving physics problems* https://bookboon.com/en/physics-ebooks
5. *NPTEL Online courses:* https://onlinecourses.nptel.ac.in/noc21_ph05/preview
6. https://archive.nptel.ac.in/courses/115/104/115104088/
7. *Classical Electromagnetism - 1 (Electrostatics)* https://bsc.hcverma.in/course/cee1
8. *Classical Electromagnetism - 2 (Electrostatics)* https://bsc.hcverma.in/course/cee2

PART – D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:	**100 Marks**
Continuous Internal Assessment (CIA):	**30 Marks**
End Semester Examination (ESE):	**70 Marks**

Continuous Internal Assessment (CIA): (By course teacher)	Internal Test/ Quiz (2):	**20 + 20**	Better marks out of the two Test / Quiz + marks obtained in Assignment shall be considered against **30** Marks
	Assignment/ Seminar (1):	**10**	
	Total Marks:	**30**	
End Semester Examination (ESE):	**Two section – A & B** Section A: **Q1**. Objective – **10 x1= 10** Mark; **Q2**. Short answer type- **5x4 =20 Marks** Section B: Descriptive answer type,**1 out of 2** from each unit- **4 x 10=40 Marks**		

Name and Signature of Convener & Members of CBoS:

10/6/24

28/6/2024

FOUR YEARS UNDERGRADUATE PROGRAM (2024 – 28)

DEPARTMENT OF PHYSICS

COURSE CURRICULUM

PART – A: INTRODUCTION

Program: Bachelor in Science (Certificate/ Diploma/ Degree/ Honors)	Semester: II	Session: 2024-25

1	Course Code	PHGE- 02 P	
2	Course Title	Electricity & Magnetism	
3	Course Type	Generic Elective Course	
4	Pre-requisite (if any)	As per program	
5	Course Learning Outcomes (CLO)	*After the completion of the course, Students are expected to understand working laws of Electricity, Magnetism and EMWs. The students will also be able to* ➢ *Verify various circuit laws, network theorems, using simple electric circuits. Assemble required parts/devices and arrange them to perform experiments.* ➢ *Verify various laws in electricity and magnetism such as Lenz's law, Faraday's law and learn about the construction, working of various measuring instruments* ➢ *Record/ observe data as required by the experimental objectives. Analyze recorded data and formulate it to get desired results.* ➢ *Interpret results and check for attainment of proposed objectives related to laws of Electricity, Magnetism and its applications*	
6	Credit Value	01 Credit	1 Credit = 30 Hours Laboratory Work
7	Total Marks	Maximum Marks: 50	Minimum Pass Marks: 20

PART – B: CONTENT OF THE COURSE

Total No. of learning-Training/performance Periods - 30 Periods (30 Hours)

Sr. No.	Objects (At least 10 of the following or related Experiments)	No. of Periods
1	To use a Multimeter for measuring (a) Resistances, (b) AC and DC Voltages,(c) DC Current, and (d) checking electrical fuses.	30
2	To compare capacitances using De'Sauty's bridge.	
3	Measurement of field strength B and its variation in a Solenoid Determine (dB/dx).	
4	To study the Characteristics of a Series RC Circuit.	
5	To study a series LCR circuit and determine its (a) Resonant Frequency, (b) Quality Factor.	
6	To study a parallel LCR circuit and determine its (a) Anti-resonant frequency and (b) Quality factor Q.	
7	To determine a Low Resistance by Carey Foster's Bridge.	
8	To verify the Thevenin and Norton theorem.	
9	To verify the Superposition, and Maximum Power Transfer Theorem.	
10	To use a vibration magnetometer and study magnetic field.	
11	Study of magnetic field due to a current loop.	
12	Study of magnetic fields using Deflection Magnetometer	
13	Mini Project: Construction and Study of Solenoid and measurement of its magnetic field	

Keywords: Multimeter, Capacitance Comparison, Magnetic Field, RC Circuit, Series LCR Circuit, Parallel LCR Circuit, Low Resistance Measurement, Electrical Theorems

Signature of Convener & Members (CBoS) :

10/6/24

PART – C: LEARNING RESOURCES

Text Books, Reference Books and Others

Text Books Recommended-

1. Engineering Practical Physics, S. Panigrahi & B.Mallick,2015, Cengage Learning India Pvt. Ltd.
2. A Text Book of Practical Physics, Indu Prakash and Ramakrishna, 11th Edition, 2011, Kitab Mahal, New Delhi.
3. Unified Practical Physics : R P Goyal, Shivlal Agrawal & Sons
4. Unified Practical Physics: Yugbodh Prakashan
5. Unified Practical Physics: Navbodh Prakashan

Reference Books Recommended-

1. Basic Electrical and Electronics Engineering by S. K. Bhattacharya
2. A Textbook of Electrical Technology by B.L. Theraja and A.K. Theraja (Volumes 1 and 2)
3. Engineering Circuit Analysis by William H. Hayt, Jack E. Kemmerly, and Steven M. Durbin
4. Practical Physics by G.L. Squires

Online Resources (e-books/ learning portals/ other e-resources)

1. Link for e-Books for Physics: Physics Practical:
   https://www.uou.ac.in/sites//default/files/slm/BSCPH-104.pdf
2. Virtual Lab :https://vlab.amrita.edu/index.php?sub=1&brch=192
3. http://emv-au.vlabs.ac.in/#
4. https://www.ae.msstate.edu/vlsm/
5. https://nationalmaglab.org/magnet-academy/watch-play/interactive-tutorials
6. https://jigyasa-csir.in/cgcri/n12-t4-a3/

PART – D: ASSESSMENT AND EVALUATION

Suggested Continuous Evaluation Methods:

Maximum Marks:	**50 Marks**
Continuous Internal Assessment (CIA):	**15 Marks**
End Semester Exam(ESE):	**35 Marks**

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): **10 & 10** Assignment/Seminar +Attendance – **05** Total Marks - **15**	Better marks out of the two Test / Quiz **+ Marks** obtained in Assignment shall be considered against **15** Marks
End Semester Exam (ESE):	**Laboratory Performance: On spot Assessment** **Performed the Task based on lab. work - 20 Marks** **Spotting based on tools & technology (written) – 10 Marks** **Viva-voce (based on principle/technology) - 05 Marks**	**Managed by Course teacher as per lab. status**

Name and Signature of Convener & Members of CBoS:

10/6/24

28/6/2024

FOUR YEARS UNDERGRADUATE PROGRAM (2024-28)
DEPARTMENT OF PHYSICS
COURSE CURRICULUM

PART – A: INTRODUCTION

Program: Bachelor in Science (Certificate/ Diploma/ Degree/ Honors)		Semester: II/ IV/V/ VI	Session: 2024-25
1	Course Code	PHSEC- 01	
2	Course Title	Basic Electrical Skill	
3	Course Type	Skill Enhancement Course	
4	Pre-requisite (if any)	As per Program	
5	Course Learning Outcomes (CLO)	On successful completion of the course, student is expected to enhance his electrical skill through: ➢ Understanding importance of accuracy in measuring physical quantities. ➢ Using basic mechanical tools. ➢ Using various measuring instruments. ➢ Fault finding and repairing simple domestic appliances	
6	Credit Value	02 Credits (1C+1C)	1 Credit= 15 Hours for Theoretical Learning & = 30 Hours Laboratory or Field learning/ Training
7	Total Marks	Maximum Marks: 50	Minimum Pass Marks: 20

PART – B: CONTENT OF THE COURSE

Total No. of Teaching–learning Periods:
Theory – 15 Periods (15 Hrs) and Lab. or Field learning/Training 30 Periods (30 Hours)

Module	Topic (Course Contents)	No. of Period
I	**Measurement:** Idea about accuracy in measurement, measuring devices for commonly used physical quantities (Length, Mass, Density, Temperature, Power, Current, Voltage, Resistance, capacitance, inductance, frequency etc). **D.C. Circuit:** Ohms law, Series and parallel resistance circuit, Kirchhoff's law& their application, Primary and secondary cells, maintenance of secondary cells. **A.C. Circuits:** Generation of AC voltage, wave shape, frequency, peak, average, instantaneous & RMS values, idea about R, L, C circiuits **Heating & Lighting effects of current:** Joule's law of electric heating and its domestic applications, idea of commonly used lighting bulb, tube, CFL, LED. **Working:** Working principle of Domestic appliances like electric fan, Cooler, Inverters, Mixer, Electric heater etc **Safety measurements-** Safety measurements in working with mechanical and electrical tools, testing and repair of electrical appliances.	15
II	**Laboratory Work:** (i) Use of basic tools: Screwdriver, Pliers, Wrench, Hacksaw, Spanner, Hand and electric drill, Soldering iron etc. (ii) Use of Voltmeter, Current meter, electronic balance. (iii) Use of Multimeter, CRO. (iv) Design & Construction of extension board (v) Fan repairing and its study (vi) Mixer repairing and its study (vii) Electric kettle repairing and its study (viii) Electric press repairing and its study (ix) Cooler repairing and its study (x) Geezer repairing and its study (xi) Invertor repairing and its study	30

Signature of Convener & Members (CBoS) :

10/6/24

PART – C: LEARNING RESOURCES

Text Books, Reference Books and Others

Text Books Recommended-

1. A text book in Electrical Technology - B L Theraja - S Chand and Co.
2. Electrical circuits, - M Nahvi and J Edminister, Schaum's outline series, Tata McGraw 2005
3. Circuit Theory, A Chakraborti, Dhanpat Rai & Co.
4. A Text book of electrical technology, - Vol.I, B L Thereja, S. Chand & Co, Delhi
5. A text book of electrical technology- J B Gupta, SK Kalaria & Sons,
6. Principle of electrical engineering- V K Mehta, Rohit Mehta, S. Chand & Co, Delhi Electronic Devices, 7/e Thomas L. Floyd, 2008, Pearson India

Reference Books Recommended

1. Electrical and Electronic Measurements and Instrumentation by R.K. Rajput
2. Electrical Workshop: Safety, Commissioning, Maintenance & Testing of Electrical Equipment by R.P. Singh
3. Electricity and Magnetism by D.N. Vasudeva

Online Resources (e-books/ learning portals/ other e-resources)

1. National Digital Library- https://ndl.iitkgp.ac.in/
2. https://nptel.ac.in/courses/108/108/108 108076/
3. Basic Instrumentation Skills – Selfstudy Institute
4. physics.iisuniv.ac.in
5. https://www.sathyabama.ac.in/sites/default/files/course-material/2020-10/note_1469078786.PDF

PART – D: ASSESSMENT AND EVALUATION

Suggested Continuous Evaluation Methods:

Maximum Marks: **50 Marks**

Continuous Internal Assessment (CIA): **15 Marks**

End Semester Exam (ESE): **35 Marks**

Continuous Internal Assessment (CIA): (By Course Coordinator)	Internal Test / Quiz-(2): **10 & 10** Assignment/Seminar + Attendance - **05** Total Marks- **15**	Better marks out of the two Test / Quiz + marks obtained in Assignment shall be considered against 15 Marks

End Semester Examination (ESE)	**Laboratory /Skill Performance: On spot Assessment** **A. Performed the Task based on learned skill - 20 Marks** **B. Spotting based on tools (written) – 10 Marks** **C. Viva-voce (based on principle/technology) - 05 Marks**	**Evaluation by Coordinator**

Signature of Convener & Members (CBoS):