

Revised Syllabus

DEPARTMENT OF PHYSICS

COURSE CURRICULUM & MARKING SCHEME

B.Sc. I & II Semester PHYSICS

(Based on Choice Based Credit System)

SESSION : 2022-23



ESTD : 1958

GOVT. V.Y.T. PG AUTONOMOUS COLLEGE, DURG, 491001 (C.G.)

(Former Name – Govt. Arts & Science College, Durg)

NAAC Accredited Grade A⁺, College with CPE - Phase III (UGC), STAR COLLEGE (DBT)

Phone : 0788-2212030

Website - www.govtsciencecollegedurg.ac.in, Email – autonomousdurg2013@gmail.com



**Govt. V.Y.T. PG Autonomous College, Durg
(Chhattisgarh)**

(Erstwhile: Govt. Arts & Science College, Durg)

B. Sc. WITH PHYSICS

[B.Sc (PCM), B.SC (PMEI), B.Sc (PMCS), B.Sc (PMIT) B.Sc(PMG)]



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(Chhattisgarh)
(Erstwhile: Govt. Arts & Science College, Durg)**

Appendix-II

Table: A Sample UGCF for Multidisciplinary Courses of Study

Semester	DSC	DSE	GE	AEC	SEC	Internship/ Apprenticeship / Project/ community outreach (2)	VAC	Total Credits
I	DSC A 1-(4)		Choose one from a pool of courses GE-1 (4)	Choose one from a pool of AEC courses (2)	Choose one from a pool of courses (2)		Choose one from a pool of courses (2)	22 Credits
	DSC B 1-(4)							
	DSC C 1-(4)							
II	DSC A 2-(4)		Choose one from a pool of courses GE-2 (4)	Choose one from a pool of AEC courses (2)	Choose one from a pool of courses (2)		Choose one from a pool of courses (2)	22 Credits
	DSC B 2-(4)							
	DSC C 2-(4)							
<i>Students on exit shall be awarded undergraduate certificate (in the Field of Multidisciplinary study) after securing the requisite 44 credits in semester I and II</i>								Total = 44 Credits
III	DSC A 3-(4)	Choose one from a pool of courses DSE A/B/C (4) Or Choose one from a pool of courses GE-3(4)		Choose one from a pool of AEC courses (2)	Choose one SEC (2) OR Internship/Apprenticeship/Project/community outreach (2)		Choose one from a pool of courses (2)	22 Credits
	DSC B 3-(4)							
	DSC C 3-(4)							
IV	DSC A 4-(4)	Choose one from a pool of courses DSE A/B/C (4) Or Choose one from a pool of courses GE-4(4)		Choose one from a pool of AEC courses (2)	Choose one SEC (2)OR Internship/Apprenticeship/Project/community outreach (2)		Choose one from a pool of courses (2)	22 Credits
	DSC B 4-(4)							
	DSC C 4-(4)							
<i>Students on exit shall be awarded undergraduate Diploma (in the Field of Multidisciplinary study) after securing the requisite 88 credits on completion of semester IV</i>								Total = 88 Credits
V	DSC A 5-(4)	Choose one from a pool of courses DSE A/B/C (4)	Choose one from a pool of courses GE-5 (4)		Choose one SEC (2) OR Internship/Apprenticeship/Project/community outreach (2)			22 Credits
	DSC B 5-(4)							
	DSC C 5-(4)							
VI	DSC A 6-(4)	Choose one from a pool of courses DSE A/B/C (4)	Choose one from a pool of courses GE-6 (4)		Choose one SEC (2) OR Internship/Apprenticeship/Project/community outreach (2)			22 Credits
	DSC B 6-(4)							
	DSC C 6-(4)							
<i>Students on exit shall be awarded Bachelor of (in the Field of Multidisciplinary study) after securing the requisite 132 credits on completion of semester VI</i>								Total = 132 Credits
VII	DSC A/B/C-(4)	Choose three DSE(3x4) courses OR Choose two DSE-(2x4) and one GE(4) course OR Choose one DSE and two GE(4) courses OR All three GE 7, 8 & 9(total=12)					Dissertation (6)	22 credits
VIII	DSC A/B/C-(4)	Choose three DSE(3x4)courses OR Choose two DSE-(2x4) and one GE(4) course OR Choose one DSE and two GE(4) courses OR All three GE 10, 11 &12(total=12)					Dissertation (6)	22 credits
<i>students on exit shall be awarded Bachelor of (in the Field of Multidisciplinary study) (Honours or Honours with Academic Project/Entrepreneurship) after securing the requisite 176 credits on completion of Semester VIII</i>								Total = 176 Credits

Note:

1. In 1st semester Hindi Language, 2nd semester English Language and Environmental studies in 3rd and 4th Semester will be offered as AECC.
2. Students are required to take Generic Specific courses (courses from other than A/B/C Disciplines)
3. DSC-1 to DSC-7 shall be core courses of either Discipline A or B or C.
4. If a student wishes to Major in Discipline A, then he/she should earn at least 60 credits from DSCs and DSEs, Research Methodology of Discipline A and dissertation written on a topic of Discipline A.
5. Minor in a Discipline will be awarded to a student if he/she earns 24 credits from GEs (other than B and C) along with major in A.



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6. Completion of core courses from host institute is mandatory.
7. Students may take up SEC, GEC and DSEC of equivalent credits from any other institute/ online platforms/MOOC/ ODL from UGC recognized organizations.

Approved syllabus for Semester and CBCS curriculum of B.Sc. with PHYSICS, by the members of Board of Studies for

Session 2022-23

Semester I	No. of Credits	Semester II	No. of Credits
DSC: BPH101 Mechanics	3	DSC: BPH201 Electricity and Magnetism	3
DSC: BPHL101 Mechanics Lab	1	DSC: BPHL201 Electricity And Magnetism Lab	1
*SEC : BPHSE102 Basic Instrumentation Skills	2	*SEC : BPHSE201 Electrical Circuits And Network Skills	2

*Students may opt for any one SEC in any of the semesters till Semester VI. Successful completion of at least one SEC of the Discipline is mandatory for award of Degree.

Semester III	No. of Credits	Semester IV	No. of Credits
DSC: BPH301 Thermal Physics And Statistical Mechanics	3	DSC: BPH401 Waves And Optics	3
DSC: BPHL301 Thermal Physics And Statistical Mechanics Lab	1	DSC: BPHL401 Waves And Optics Lab	1
*SEC : BPHSE101 Basic Instrumentation Skills	2	*SEC : BPHSE201 Electrical Circuits And Network Skills	2



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Semester V	No. of Credits	Semester VI	No. of Credits
DSC: BPH501 Elements Of Modern Physics	3	DSC: BPH601 Solid State Physics, Solid State Devices And Electronics	3
DSC: BPHL501 Element Of Modern Physics Lab	1	DSC: BPHL601 Digital Electronics Lab	1
*SEC : BPHSE101 Basic Instrumentation Skills	2	*SEC : BPHSE102 Electrical Circuits And Network Skills	2

Semester VII	No. of Credits	Semester VIII	No. of Credits
DSC: BPH701 Mathematical Physics	4	DSC : BPH801 Atomic and Molecular Physics	4
Choose any 2 From Pool Of Courses DSE1 : BPH 702 Classical Mechanics (3Th+1T)	4	Choose any 2 From Pool Of Courses DSE: BPH802 Electronic Devices (3) + BPHL802 Electronics Lab (1)	4
DSE :BPH703 Quantum Mechanics - I (3Th+1T)	4	DSE : BPH803 Quantum Physics II (3Th +1T)	4
DSE : BPH704 Digital, Analog and Instrumentation (3) + BPHL704 Digital, Analog and Instrumentation Lab (1)	4	DSE5 : BPH804: Electrodynamics (3Th +1T)	4



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Marking Scheme

4Yr UG Program B.Sc.(Multidisciplinary) with Physics

CBCS Pattern

Session 2022-23

B.Sc Semester I &II

Course. Type	Course Code	Marks	
		Max	Min
DSC	BPH101	75	30
DSC	BPHL101	25	10
DSC	BPH201	75	30
DSC	BPHL201	25	10
SEC	BPHSC01	75	30
SEC	BPHSC02	25	10

Absolute Grading System (for conversion of marks into grade points)

Letter Grade	Grade point	Phy TH%	Phy Lab %	SEC %
O (Outstanding) 10	10	90-100	95-100	95-100
A+(Excellent) 9	9	80-90	90-95	80-95
A(Very Good) 8	8	70-80	80-90	70-80
B+(Good) 7	7	60-70	70-80	60-70
B(Above Average) 6	6	50-60	60-70	50-60
C(Average) 5	5	40-50	50-60	40-50
P (Pass) 4	4	35-40	40-50	35-40
F(Fail) 0	0	0	0	0
Ab (Absent) 0	0	0	0	0



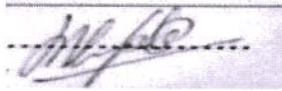

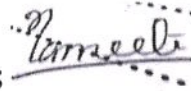

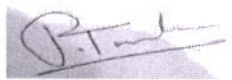




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Sample Grade Sheet

Courses	Credit Ci	Marks ESE	Marks obtained	Internal	% Marks Obtained =80%ESE +Int	Grade Point Gi	CiGi	SGPA
Phy	3	75	70	20	76/80 = 96%	10	30	8.09
Chem	3	75	50	20	60/80 =75%	8	24	
Maths	4	100	80	20	80	7	28	
Phy Lab	1	25	20	-	80	8	8	
Chem Lab	1	25	23	-	92	10	10	
GEC 1 (History eg)	4	100	70	15	71	8	32	
AEC (Hindi)	2	50	30	10	34/50=68%	7	14	
VAC (yoga/sports)	2	50	30	10	68%	7	14	
SEC1	2	50	40	10	84%	9	18	
Total	22	450	280		560	62	178	

CGPA of an Academic Yr = $\frac{SGPA1 + AGPA2}{2}$ or $\frac{(SGPA1 + SGPA2 + \dots + SGPA_n)}{n}$,
n is total number of semesters

Departmental Members	
V.C. Nomine 	1. H.O.D Dr. Jagjeet Kaur Saluja 
Subject Expert ; 	2. Dr. R. S. Singh 
Subject Expert: 	3. Dr. Anita Shukla: 
Alumni (member):	4. Mrs. Siteshwari Chandrakar
Prof. from other Dept. Of Sc. Faculty. 	5. Dr. Abhishek Kumar Misra 
Specialist from Industry	6. Dr Kusumanjali Deshmukh 



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B.Sc. Physical Science

Core papers Physics (Credit: 04 each) :

1. BPH101: Mechanics (3) + Lab (1)
2. BPH201: Electricity and Magnetism (3) + Lab (1)
3. BPH301: Thermal Physics and Statistical Mechanics (3) + Lab (1)
4. BPH401: Waves and Optics (3) + Lab (1)
5. BPH501: Elements of Modern Physics (3) + lab (1)
6. BPH601: Solid State Physics, Solid State Devices and Electronics (3) + Lab (1)
7. BPH701: Mathematical Physics (3) + Tutorial (1)
8. BPH801: Atomic and Molecular Physics (3Th +1T)

Discipline Specific Elective papers (Credit: 04each) :

1. BPH702: Classical Mechanics (3Th+1T)
2. BPH703: Quantum Mechanics I (3Th +1)
3. BPH704: Digital, Analog and Instrumentation (3) + Lab (1)
4. BPH802: Electronic Devices (3) + Lab (1)
5. BPH803: Quantum Physics II (3Th +1T)
6. BPH804: Electrodynamics (3Th +1T)

Skill Enhancement Course (Credit: 02 each)-

1. BPHSE01: Electrical circuits and Network Skills
2. BPHSE02: Basic Instrumentation Skills



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SEMESTER I

PHYSICS-DSC: BPH101 MECHANICS

(Credits: Theory-03)

Theory: 45 Lectures

Course Outcomes:

After completion of the course, Students are expected to:

- CO1 Apply vector algebra and differential calculus to formulate a given physical situation and solve to infer results.
- CO2 Understand basic concept of Newtonian Mechanics and analyze a given physical system.
- CO3 Develop a sense of Center of Mass, Investigate motion of a Rigid Body, Rotation motion and much body Problem in terms of CM.
- CO4 Describe the situations that lead to laws of special theory of relativity and deduce its consequences in various situations.
- CO5 Apply and compare laws of motion to the theory of Elasticity and Viscosity

Unit I

(8 Lectures)

Vectors: Vector algebra. Scalar and vector products. Derivatives of a vector with respect to a parameter.

Ordinary Differential Equations: 1st order homogeneous differential equations. 2nd order homogeneous differential equations with constant coefficients.

Unit II

(9 Lectures)

Laws of Motion: Frames of reference. Newton's Laws of motion. Dynamics of a system of particles. Centre of Mass.

Momentum and Energy: Conservation of momentum. Work and energy. Conservation of energy. Motion of rockets

Unit III

(10 Lectures)

Rotational Motion: Angular velocity and angular momentum. Torque. Conservation of angular momentum.

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 (statement only). Satellite in circular orbit and applications. Geosynchronous orbits. Weightlessness. Basic idea of global positioning system (GPS).

Unit IV

(10 Lectures)

Special Theory of Relativity: Reference systems, inertial frames, Galilean invariance propagation of light, Michelson-Morley experiment, search for ether. Postulates for the special theory of relativity, Lorentz transformations, length contraction, time dilation, velocity addition, variation of mass with velocity, mass-energy equivalence, particle with zero rest mass.



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Unit V

(8 Lectures)

Elasticity: Hooke's law - Stress-strain diagram - Elastic moduli-Relation between elastic constants - Poisson's Ratio-Expression for Poisson's ratio in terms of elastic constants - Work done in

stretching and work done in twisting a wire - Twisting couple on a cylinder - Determination of Rigidity modulus by static torsion - Torsional pendulum-Determination of modulus of Rigidity- γ , η and σ by Searles method

Note: Students are not familiar with vector calculus. Hence all examples involve differentiation either in one dimension or with respect to the radial coordinate.

Reference Books:

- University Physics. FW Sears, MW Zemansky and HD Young 13/e, 1986. Addison-Wesley
- Mechanics Berkeley Physics course, v.1: Charles Kittel, et. Al. 2007, Tata McGraw-Hill.
- Physics – Resnick, Halliday & Walker 9/e, 2010, Wiley
- Engineering Mechanics, Basudeb Bhattacharya, 2nd edn., 2015, Oxford University Press
- University Physics, Ronald Lane Reese, 2003, Thomson Brooks/Cole.

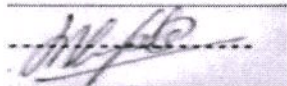
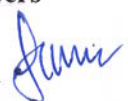
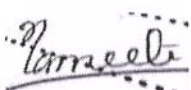







Text Books:

Unified Physics : R P Goyal, Shivalal Agrawal & Sons

Calculus : H K Pathak

Unified Physics: Yugbodh Prakashan

Unified Physics: Navbodh Prakashan

Departmental Members	
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PHYSICS LAB: DSC

PHL101: MECHANICS LAB

CREDITS : 1

Lab Periods : 30

BPHL01: Lab Course

After the completion of the course, Students are expected to understand working mechanism and laws of classical mechanics. The Students will be able to

- CO1 Assemble required parts/devices and arrange them to perform experiments.
- CO2 Record/ observe data as required by the experimental objectives.
- CO3 Analyze recorded data and formulate it to get desired results.
- CO4 Interpret results and check for attainment of proposed objective.

Experiment List

1. Measurements of length (or diameter) using vernier caliper, screw gauge and travelling microscope.
2. To determine the g with the help of Barton's Pendulum.
3. To determine Moment of Inertia of an irregular body by Inertia Table.
4. To determine the Moment of Inertia of a Flywheel.
5. To determine the Young's Modulus of a Wire by Optical Lever Method.
6. To determine the Modulus of Rigidity of a Wire by Maxwell's needle.
7. To determine the Elastic Constants of a Wire by Searle's method.
8. To determine g by Bar Pendulum.
9. To determine g by Kater's Pendulum.
10. Study of bending of a beam/ cantilever.
11. To determine Poisson's ratio with the help of rubber tube.
12. To study the Motion of a Spring and calculate (a) Spring Constant (b) Value of g



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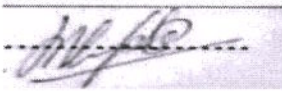

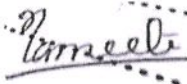







(Erstwhile: Govt. Arts & Science College, Durg)

Reference Books:

- Advanced Practical Physics for students, B.L.Flint and H.T.Worsnop, 1971, Asia Publishing House.
- Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers.
- Engineering Practical Physics, S.Panigrahi & B.Mallick, 2015, Cengage Learning India Pvt. Ltd.
- A Text Book of Practical Physics, Indu Prakash and Ramakrishna, 11th Edition, 2011, Kitab Mahal, New Delhi.

Text Books:

Unified Practical Physics : R P Goyal, Shivalal Agrawal & Sons
Unified Practical Physics: Yugbodh Prakashan
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SEMESTER II

PHYSICS-DSC:

BPH201 ELECTRICITY AND MAGNETISM

(Credits: Theory-03)

Theory: 45 Lectures

After the completion of the course, Students will be able to:

- CO1 Able to formulate equation to address force between charged particles.
- CO2 Calculate energy and intensity of electrostatic field for a given charged particles/ group of charges
- CO3 Understand Gauss's law and its implication in problem solving.
- CO4 Explain various phenomenon like Ferromagnetism, anti-ferromagnetism and differentiate among them
- CO5 Confidently apply mathematical methods to solve electromagnetic problems and appreciate the basic concept of magnetism and Maxwell equations and explain various phenomenon considering Maxwell equations.

Unit I

Vector Analysis: Review of vector algebra (Scalar and Vector product), gradient, divergence, Curl and their significance, Vector Integration, Line, surface and volume integrals of Vector fields, Gauss-divergence theorem and Stoke's theorem of vectors (statement only). **(8 Lectures)**

Unit II

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, plane charged sheet, charged conductor. Electric potential as line integral of electric field, potential due to a point charge, electric dipole, uniformly charged spherical shell and solid sphere. Calculation of electric field from potential, Energy per unit volume in electrostatic field. Dielectric medium, Polarisation, Displacement vector. Gauss's theorem in dielectrics. Parallel plate capacitor completely filled with dielectric.

(12 Lectures)

Unit III

Magnetism:

Magnetostatics: Biot-Savart's law & 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.

(8 Lectures)

Unit 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.

(8 Lectures)



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Unit V

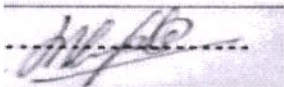

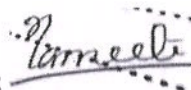






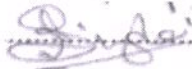

Maxwell's equations and Electromagnetic wave propagation: Equation of continuity of current, Displacement current, Maxwell's equations, Poynting vector, energy density electromagnetic field, electromagnetic wave propagation through vacuum and isotropic dielectric medium, transverse nature of EM waves, polarization. **(9 Lectures)**

Reference Books:

- Electricity and Magnetism, Edward M. Purcell, 1986, McGraw-Hill Education..
- Electricity and Magnetism, J.H. Fewkes & J. Yarwood. Vol. I, 1991, Oxford Univ. Press.
- Electricity and Magnetism, D C Tayal, 1988, Himalaya Publishing House.
- University Physics, Ronald Lane Reese, 2003, Thomson Brooks/Cole.
- D.J. Griffiths, Introduction to Electrodynamics, 3rd Edn, 1998, Benjamin Cummings.

Text Books:

Unified Physics : R P Goyal, Shivalal Agrawal & Sons
Vectors : H K Pathak
Unified Physics: Yugbodh Prakashan
Unified Physics: Navbodh Prakashan

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PHYSICS LAB- DSC LAB:

BPHL201: ELECTRICITY AND MAGNETISM

CREDITS - 1

Lab Periods : 30

BPHL01: Lab Course

After the completion of the course, Students are expected to understand working mechanism and laws of Electricity and Magnetism. The Students will be able to

CO1 Assemble required parts/devices and arrange them to perform experiments.

CO2 Record/ observe data as required by the experimental objectives.

CO3 Analyze recorded data and formulate it to get desired results.

CO4 Interpret results and check for attainment of proposed objective.

1. To use a Multimeter for measuring (a) Resistances, (b) AC and DC Voltages, (c) DC Current, and (d) checking electrical fuses.
2. To study the Characteristics of a Series RC Circuit.
3. To study the a series LCR circuit and determine its (a) Resonant Frequency, (b) Quality Factor
4. To study a parallel LCR circuit and determine its (a) Anti-resonant frequency and (b) Quality factor Q
5. To determine Low Resistance by a Carey Foster's Bridge.
6. To use a vibration magnetometer and study magnetic field.
7. Study of magnetic field due to a current loop.
8. Study of magnetic fields using Deflection Magnetometer.
9. **Mini Project:** Construction and Study of Solenoid and measurement of its magnetic field



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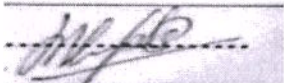

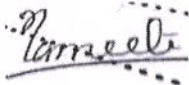



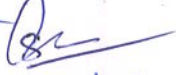


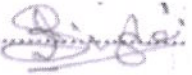
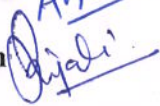
(Erstwhile: Govt. Arts & Science College, Durg)

Reference Books

- Advanced Practical Physics for students, B.L.Flint & H.T.Worsnop, 1971, Asia Publishing House.
- A Text Book of Practical Physics, Indu Prakash and Ramakrishna, 11th Edition, 2011, Kitab Mahal, New Delhi.
- Engineering Practical Physics, S.Panigrahi & B.Mallick, 2015, Cengage Learning India Pvt. Ltd.
- Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers

Text Books:

Unified Practical Physics : R P Goyal, Shivlal Agrawal & Sons
Unified Practical Physics: Yugbodh Prakashan
Unified Practical Physics: Navbodh Prakashan

Departmental Members	
V.C. Nomine 	1. H.O.D Dr. Jagjeet Kaur Saluja 
Subject Expert ; 	2. Dr. R. S. Singh 
Subject Expert: 	3. Dr. Anita Shukla: 
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I Semester
**Govt. V.Y.T. PG Autonomous College, Durg
(Chhattisgarh)**

(Erstwhile: Govt. Arts & Science College, Durg)

SKILL ENHANCEMENT COURSES (CREDIT: 02 EACH)-

BPHSE102

BASIC INSTRUMENTATION SKILLS

(Credits: 02 1Th +1Lab)

Total : 15 Lect + 30 lab

This course is to get exposure with various aspects of instruments and their usage through hands-on mode. Experiments listed below are to be done in continuation of the topics.

Course Outcomes:

After the completion of the course, Students will be able to:

- CO1 Use millimeter to the accuracy required for a stated situation or within the permissible errors.
- CO2 Use digital voltmeter to the accuracy required for a stated situation or within the permissible errors and compare its advantage over analog meters
- CO3 Set a CRO for measurements and use all its function
- CO4 Explain and specify uses of function generators and its block diagram.
- CO5 Compare analog and digital meters, in general

Basic of Measurement: Instruments accuracy, precision, sensitivity, resolution range etc. Errors in measurements and loading effects. **Multimeter:** Principles of measurement of dc voltage and dc current, ac voltage, ac current and resistance. Specifications of a multimeter and their significance. **(2Lectures)**

Electronic Voltmeter: Advantage over conventional multimeter for voltage measurement with respect to input impedance and sensitivity. Principles of voltage, measurement (block diagram only). Specifications of an electronic Voltmeter/ Multimeter and their significance. **AC millivoltmeter:** Type of AC millivoltmeters: Amplifier- rectifier, and rectifier- amplifier. Block diagram ac millivoltmeter, specifications and their significance. **(2Lectures)**

Cathode Ray Oscilloscope: Block diagram of basic CRO. Construction of CRT, Electron gun, electrostatic focusing and acceleration (Explanation only- no mathematical treatment), brief discussion on screen phosphor, visual persistence & chemical composition. Time base operation, synchronization. Front panel controls. Specifications of a CRO and their significance. **(3 Lectures)**



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Use of CRO for the measurement of voltage (dc and ac frequency, time period. Special features of dual trace, introduction to digital oscilloscope, probes. Digital storage Oscilloscope: Block diagram and principle of working. (3 Lectures)

Signal Generators and Analysis Instruments: Block diagram, explanation and specifications of low frequency signal generators. pulse generator, and function generator. Brief idea for testing, specifications. Distortion factor meter, wave analysis. (3 Lectures)

Digital Instruments: Principle and working of digital meters. Comparison of analog & digital instruments. Characteristics of a digital meter. Working principles of digital voltmeter. (2 Lectures)

The test of lab skills will be of the following test items:

1. Use of an oscilloscope.
2. CRO as a versatile measuring device.
3. Circuit tracing of Laboratory electronic equipment,
4. Use of Digital Multimeter/VTVM for measuring voltages
5. Circuit tracing of Laboratory electronic equipment,
6. Winding a coil / transformer.
7. Study the layout of receiver circuit.
8. Trouble shooting a circuit
9. Balancing of bridges

Laboratory Exercises:

1. To observe the loading effect of a multimeter while measuring voltage across a low resistance and high resistance.
2. To observe the limitations of a multimeter for measuring high frequency voltage and currents.
3. To measure Q of a coil and its dependence on frequency, using a Q- meter.
4. Measurement of voltage, frequency, time period and phase angle using CRO.
5. Measurement of time period, frequency, average period using universal counter/frequency counter.
6. Measurement of rise, fall and delay times using a CRO.
7. Measurement of distortion of a RF signal generator using distortion factor meter.
8. Measurement of R, L and C using a LCR bridge/ universal bridge.

Open Ended Experiments:

1. Using a Dual Trace Oscilloscope
2. Converting the range of a given measuring instrument (voltmeter, ammeter)

Reference Books:

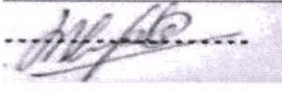
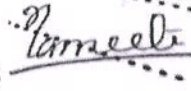









- A text book in Electrical Technology - B L Theraja - S Chand and Co.
- Performance and design of AC machines - M G Say ELBS Edn.
- Digital Circuits and systems, Venugopal, 2011, Tata McGraw Hill.
- Logic circuit design, Shimon P. Vingron, 2012, Springer.
- Digital Electronics, Subrata Ghoshal, 2012, Cengage Learning.
- Electronic Devices and circuits, S. Salivahanan & N. S.Kumar, 3rd Ed., 2012, Tata Mc-Graw Hill



Govt. V.Y.T. PG Autonomous College, Durg (Chhattisgarh)

(Erstwhile: Govt. Arts & Science College, Durg)

- Electronic circuits: Handbook of design and applications, U.Tietze, Ch.Schenk, 2008, Springer
- Electronic Devices, 7/e Thomas L. Floyd, 2008, Pearson India

V.C. Nomine 	Departmental Members
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II Semester
**Govt. V.Y.T. PG Autonomous College, Durg
(Chhattisgarh)**

(Erstwhile: Govt. Arts & Science College, Durg)

BPHSE201

ELECTRICAL CIRCUITS AND NETWORK SKILLS

(Credits: 02)

Theory: 15 Lectures + 30 Lab Periods

The aim of this course is to enable the students to design and trouble shoots the electrical circuits, networks and appliances through hands-on mode

Course Outcomes:

After the completion of the course the student will acquire necessary skills :

- CO1 To understand various types of DC and AC circuits.
- CO2 To make electrical drawings with symbols for various systems.
- CO3 To operate generators, transformers and electric motors.
- CO4 To develop knowledge of solid state devices and their uses.
- CO5 To do electrical wiring with assured electrical protection of devices.

Basic Electricity Principles: Voltage, Current, Resistance, and Power. Ohm's law. Series, parallel, and series-parallel combinations. AC Electricity and DC Electricity. Familiarization with multimeter, voltmeter and ammeter. **(2 Lecture)**

Understanding Electrical Circuits: Main electric circuit elements and their combination. Rules to analyze DC sourced electrical circuits. Current and voltage drop across the DC circuit elements. Single-phase and three-phase alternating current sources. Rules to analyze AC sourced electrical circuits. **(2 Lecture)**

Electrical Drawing and Symbols: Drawing symbols. Blueprints. Reading Schematics. Ladder diagrams. Electrical Schematics. Power circuits. Control circuits. Reading of circuit schematics. Tracking the connections of elements and identify current flow and voltage drop. **(2 Lecture)**

Generators and Transformers: DC Power sources. AC/DC generators. Inductance, capacitance, and impedance. Operation of transformers. **(2 Lecture)**

Electric Motors: Single-phase, three-phase & DC motors. Basic design. Interfacing DC or AC sources to control heaters & motors. Speed & power of ac motor. **(2 Lecture)**

Solid State Devices : Resistors, inductors and capacitors.. Components in Series or in shunt. Response of inductors and capacitors with DC or AC sources, Diode and rectifiers in Regulated Power supply **(2Lecture)**

Electrical Protection: Relays. Fuses and disconnect switches. Circuit breakers.



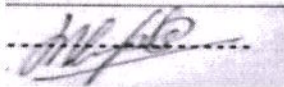

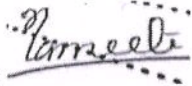
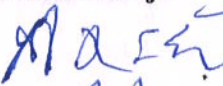




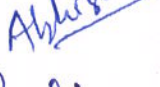
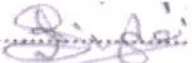
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Overload devices. Ground-fault protection. Grounding and isolating. Phase reversal. Surge protection. Interfacing DC or AC sources to control elements (relay protection device)
(3 Lecture)

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- A text book of Electrical Technology - A K Theraja
- Performance and design of AC machines - M G Say ELBS Edn.

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