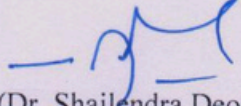# University of Mumbai

CIRCULAR:-

Attention of the Principals of the Affiliated Colleges and Directors of the Recognized Institutions in Faculty of Science & Technology is invited to this office circular No.UG/69 of 2016-17 dated 21st September, 2016 relating to the revised syllabus F.Y.B.Sc.(Physics) (Sem I & II) (CBCS).

They are hereby informed that the recommendations made by the Board of Studies in **Physics** at its meeting held on 10th May, 2022 and subsequently passed in the Faculty and then by the Board of Deans at its meeting held on 5th July, 2022 **vide** item No. 6.15(R) have been accepted by the Academic Council at its meeting held on 11th July, 2022 **vide** item No. 6.15 (R) and that in accordance therewith, the revised syllabus of F.Y.B.Sc.(Physics) (Sem.- I & II) (CBCS), has been brought into force with effect from the academic year 2022-23. (The circular is available on the University's website www.mu.ac.in).

MUMBAI – 400 032
14th November, 2022

(Dr. Shailendra Deolankar)
I/c Registrar

To

The Principals of the Affiliated Colleges and Directors of the Recognized Institutions in Faculty of Science & Technology.

A.C/6.15(R)/11/07/2022

Copy forwarded with Compliments for information to:-
1) The Dean, Faculty of Science & Technology,
2) The Chairman, Board of Studies Physics,
3) The Director, Board of Examinations and Evaluation,
4) The Director, Board of Students Development,
5) The Director, Department of Information & Communication Technology,
6) The Co-ordinator, MKCL.

Copy to :-
1. The Deputy Registrar, Academic Authorities Meetings and Services (AAMS),
2. The Deputy Registrar, College Affiliations & Development Department (CAD),
3. The Deputy Registrar, (Admissions, Enrolment, Eligibility and Migration Department (AEM),
4. The Deputy Registrar, Research Administration & Promotion Cell (RAPC),
5. The Deputy Registrar, Executive Authorities Section (EA),
6. The Deputy Registrar, PRO, Fort, (Publication Section),
7. The Deputy Registrar, (Special Cell),
8. The Deputy Registrar, Fort/ Vidyanagari Administration Department (FAD) (VAD), Record Section,
9. The Director, Institute of Distance and Open Learning (IDOL Admin), Vidyanagari,

They are requested to treat this as action taken report on the concerned resolution adopted by the Academic Council referred to in the above circular and that on separate Action Taken Report will be sent in this connection.

1. P.A to Hon'ble Vice-Chancellor,
2. P.A Pro-Vice-Chancellor,
3. P.A to Registrar,
4. All Deans of all Faculties,
5. P.A to Finance & Account Officers, (F.& A.O),
6. P.A to Director, Board of Examinations and Evaluation,
7. P.A to Director, Innovation, Incubation and Linkages,
8. P.A to Director, Board of Lifelong Learning and Extension (BLLE),
9. The Director, Dept. of Information and Communication Technology (DICT) (CCF & UCC), Vidyanagari,
10. The Director of Board of Student Development,
11. The Director, Department of Students Walfare (DSD),
12. All Deputy Registrar, Examination House,
13. The Deputy Registrars, Finance & Accounts Section,
14. The Assistant Registrar, Administrative sub-Campus Thane,
15. The Assistant Registrar, School of Engg. & Applied Sciences, Kalyan,
16. The Assistant Registrar, Ratnagiri sub-centre, Ratnagiri,
17. The Assistant Registrar, Constituent Colleges Unit,
18. BUCTU,
19. The Receptionist,
20. The Telephone Operator,
21. The Secretary MUASA

for information.

UNIVERSITYOFMUMBAI

Revised Syllabus for

F.Y.B.Sc.
(Physics)

Semester:I&II (CBCS)

(With effect from the academic year 2022-23)

UNIVERSITY OF MUMBAI

Syllabus for Approval

Sr. No.	Heading	Particulars
1	Title of the Course	F.Y.B.Sc. (Physics)
2	Eligibility for Admission	—
3	Passing Marks	—
4	Ordinances / Regulations (if any)	
5	No. of Years / Semesters	06 Semesters
6	Level	UG
7	Pattern	Semester
8	Status	Revised
9	To be implemented from Academic Year	From Academic Year: 2022-2023

Date:

Signature:

Name

Chairman of BOS of Physics
Professor & Head
Department of Physics
University of Mumbai

Dr. Anuradha Majumdar
Dean, Science and Technology

Syllabus for B.Sc.Physics (Theory & Practical)

As per Choice Based and Credit System

First Year B.Sc2022-2023

The revised syllabus in Physics as per Choice Based and Credit System for the First Year B.Sc Course will be implemented from the academic year 2022-2023.

Preamble:

The systematic and planned curricula from these courses shall motivate and encourage learners tounderstandbasicconceptsofPhysics.

Objectives:

  Todevelopanalyticalabilitiestowardsrealworldproblems

  Tofamiliarizewithcurrent andrecentscientificandtechnologicaldevelopments

  Toenrichknowledgethroughproblem-solving,hands-onactivities,studyvisits,projectsetc

Course Code	Title	Credits
	SemesterI	
USPH101	ClassicalPhysics	02
USPH102	ModernPhysics	02
USPHPI	PracticalI	02
		Total=06
	SemesterII	
USPH201	OpticsI	02
USPH202	ElectricityandElectronics	02
USPHPII	PracticalII	02
		Total=06

SchemeofExamination:

  Each theory paper of each semester will have 25% Internal Assessment (IA) and 75% ExternalAssessment (EA). All external examinations will be held at the end of each semester and willbeconductedbytheUniversityasperexisting norms

  Therewillbenointernalassessmentforpractical.Acandidatewillbeallowedtoappearforthesemester end practical examination only if the candidate submits a certified journal at the timeofpracticalexaminationofthesemesteroracertificatefromtheHeadoftheDepartment/Institutet otheeffectthatthecandidatehascompletedthepracticalcourseofthat

semester of F.Y.B.Sc Physics as per the minimum requirement. The duration of the practicalexamination will be two hours per experiment. There will be two experiments (one from eachgroup) through which the candidate will be examined in practical. The questions on slips forthe same should be framed in such a way that candidate will be able to complete the task andshouldbeevaluatedforitsskilland understanding of physics.

Name of the Programme	Duration	Semester	Subject
B.Sc.in Physics	Sixsemesters	I	Physics
CourseCode	Title	Credits	
USPH101	**ClassicalPhysics**	2	

LearningObjectives:
1. UnderstandNewton'slawsandapplications indailylife.
2. Understandtheconceptsoffriction
3. UnderstandWorkandEnergyEquivalence
4. UnderstandtheconceptsofElasticity,ViscosityandFluiddynamics
5. Understandbehaviorofrealgasesinrelationtotheirthermodynamicalresponse.

LearningOutcomes:
Onsuccessfulcompletionofthiscoursestudentswillbeableto:
1. ApplyNewton's lawsforthecalculationsofthemotionofsimplesystems.
2. UseWorkandEnergyequivalenceanditsapplicationsthroughsuitablenumerical.
3. UseElasticity,ViscosityandFluiddynamicsindailylife.
4. UnderstandRealgases andvalidityofthelawsofthermodynamics.
5. Demonstratequantitativeproblemsolvingskillsinallthetopicscovered

UnitI   **15Lectures**

1. Newton'sLawsofMotion:Newton'sfirst,secondandthirdlawsofmotion,interpretationandapplications,pseudoforces,inertialandnon-inertialframesofreference
Workedoutexamples(withfrictionpresent)H
CV:5.1to 5.5

2. Friction: Advantages & disadvantages of friction in daily life, Friction as the component ofContact force, Kinetic Friction, Static friction, laws of friction, Understanding friction at Atomiclevel.
HCV:6.1to 6.5

3. Work and Energy: Kinetic Energy,Work andWork-energy theorem,Potential Energy,Conservative andNonConservativeForces,DifferentformsofEnergy:MassEnergyEquivalenceWorkedoutExamples
HCV**:** 8.1,8.2,8.5,8.6,8.11

UnitII   **15Lectures**

1. Elasticity: AnintroductiontoElasticity,Stress,Strain,Hooke'sLawandModuliofElasticityandrelatio
nbetweenthem
HCV**:**14.2,14.3, 14.4,14.5

2. Viscosity: An introduction to Viscosity, Flow through a Narrow Tube: Poiseuille's

Equation,Stokes' Law, Terminal velocity, Measuring Coefficient of Viscosity by Stokes' method,
CriticalvelocityandReynoldsnumber.Worked outExamples
HCV:14.15, 14.16, 14.17,14.18,14.19,14.20

3. Fluid Mechanics: Streamline and Turbulent flow, Equation of Continuity, Bernoulli's

equation,ApplicationsofBernoulli's equation.Worked outExamples
HCV:13.8, 13.10,13.11, 13.12

Unit III   **15lectures**

1. Behaviorofrealgases:Anintroduction,VanderWaals
 equationofstateBSH:2.8

2. LawsofThermodynamics:ThermodynamicSystems,Zerothlawofthermodynamics,Concept   of
heat, Thermodynamic Equilibrium, Work: A Path dependent function, Internal
energy,FirstlawofThermodynamics,InternalEnergyasastatefunction,Specificheatofgases,Applicatio
nsofFirstLawofthermodynamics,Theindicatordiagram,WorkdoneduringIsothermalandAdiabaticpro
cesses
BSH:4.1to 4.13

3. Heat engine: [Definition of Efficiency of heat engine, Carnot's Ideal heat engine, and
Numericalexamples](Qualitative)
BSH:4.21,4.22,4.23

Note:Agoodnumberofnumericalexamplesareexpectedtobecoveredduringtheprescribedlectures.

MainReferences:

1. HCV:H.C.Verma,ConceptsofPhysics–
   PartI,(SecondReprintof2020)BharatiBhavanPublishersand Distributers
2. BSH:BrijLal,SubrahmanyamandHemne,HeatThermodynamicsandStatisticalPhysics,S.Chand,R
   evised,Multi-coloured, (Reprint2019)

AdditionalReferences:

1. Halliday, Resnick and Walker, Fundamental of Physics (extended) – (6th Ed.), John Wiley
   &Sons.
2. D.SMathur, P.SHemne,Mechanics,2012,S.Chand
3. M.WZemanskyandR.HDittman,Heat andThermodynamics,McGrawHill.
4. ThorntonandMarion,ClassicalDynamics (5thEd.)
5. D.SMathur,ElementofPropertiesofMatter,S.Chand&Co.
6. R.MurugeshanandK.Shivprasath,PropertiesofMatterandAcoustics,S.Chand.
7. D.KChakrabarti,TheoryandExperiments onThermalPhysics,(2006Ed.),Centralbooks.
8. HansandPuri,Mechanics,(2ndEd.)TataMcGrawHill

Nameofthe Programme	Duration	Semester	Subject
B.Sc.inPhysics	Sixsemesters	I	Physics
CourseCode	Title	Credits	
USPH102	**ModernPhysics**	2	

LearningObjectives:

1.Tograspandunderstandthebasicconcepts ofModernPhysics

LearningOutcomes:

Onsuccessfulcompletionofthiscoursestudentswillbeableto:
1. Understandnuclearproperties,nuclearbehaviorandvarioustypesofnuclearreactions
2. Understandtheconceptofradioactivity,itsapplicationsanddifferenttypesofequilibriainradio activeelements
3. Understandvarioustypesofnucleardetectorsandtheirapplications
4. Demonstrateandunderstandthequantummechanicalconcepts.
5. Demonstratequantitativeproblemsolvingskillsinallthetopicscovered.

UnitI   **15Lectures**

1. Basic properties of nuclei: Composition, Charge, Size, density, Spin and Magnetic

dipolemoment, Rutherford'sexperiment and estimation of nuclear size , massdefectand bindingenergy,BE/AvsAplotanditsinterpretation,stabilityofnuclei(Nvs Zplot)
Problems
AB:11.1,11.2,11.3, 11.4
SBP:4.1.2

2. Radioactivity:Review ofpropertiesofα,β andγ-rays.

Law of Radioactive decay, half-life and mean life (derivation required), units of radioactivity,statisticalnature of radioactivity, successive radioactive disintegration- A to B to C (stable)type, natural radioactiveseries, radioactive equilibriums, artificial radioactivity,determinationoftheageoftheEarth,Carbondating,radioisotopesandits applications, radiationhazards.
Problems
SBP:2.3, 2.4,2.6, 2.7,2.8,2.9,2.11,2.12,2.13
DCT:2.13PageNo.86and87
AB:12.1PageNo. 422,423
AdditionalReference:https://dae.gov.in/node/191

Unit II **15Lectures**

1. Radiation Detectors: Interaction between particles and matter, plot of variation of ionizationcurrent with applied voltage, Gas filled radiation detectors- Ionization chamber (qualitative),ProportionalCounterandGMCounter
Problems
SBP:1.I.1,1.I.2,1.I.3(i,ii)
SNG:Figure:7.3(excludemodeofoperation),7.4

2. Nuclear Reactions: Introduction, types of nuclear reactions, conservation laws (mass, energyand charge), concept of compound and direct reaction, Q value equation and solution of the Qequation,thresholdenergy
Problems
SBP:3.1, 3.2,3.3,3.4, 3.5

Unit III **15Lectures**
Review(Photoelectriceffect,Blackbody,BlackBodyspectrum, Wien'sdisplacementlaw)
1. Origin of Quantum theory: Matter waves: De Broglie waves, Concept of wave packet, phasevelocity, group velocity and relation between them, wave particle duality, Davisson-Germerexperiment,Heisenberg'sUncertaintyPrinciple
AB:3.1, 3.2, 3.3,3.4, 3.5,3.7,3.8, 3.9

2.X-Rays: Productionandproperties,X-Rayspectra,X-RayDiffraction,Bragg'sLaw,ComptonEffect,Pair production,Photonsand Gravity,GravitationalRedShift,Blackholes
AB:2.5, 2.6,2.7,2.8, 2.9

Note:Agoodnumberofnumericalexamplesareexpectedtobecoveredduringtheprescribed lectures

MainReferences:
1. thAB:ArthurBeiser, ConceptsofModernPhysics,6Edition
2.SBP:S.B.Patel,NuclearPhysics:AnIntroduction,NewAgeInternationalPublishers,2ndEdition
3. SNG:S.N,Ghoshal,NuclearPhysics
4.DCT:D.C.Tayal,Nuclear Physics,HimalayaPublishingHouse,5thEdition

AdditionalReferences:
1.S.LKakaniandShubhraKakani,Nuclear andParticlePhysics,VivaBooks,2ndEdition
2. KennethS.Krane,ModernPhysics,4thEdition,Wiley.
4. RonaldGautreau,Schaum'sOutlineofModernPhysics,SecondEdition,McGrawHillBesid esreferencebooks,Standardwebsitesareexpectedtobereferred

Nameofthe Programme	Duration	Semester	Subject
B.Sc.inPhysics	Sixsemesters	**I**	**Physics**
CourseCode	Title	Credits	
USPHP1	**PracticalI**	2	

Instructions:

1. AllthemeasurementsandreadingsshouldbewrittenwithproperunitsinSIsystemonly.

2. Aftercompletingalltherequirednumberofexperimentsinthesemesterandrecording them andin journal, student will have to get their journal certified producethecertifiedjournalatthetimeofpracticalexamination.

3. Whileevaluatingpractical,weightageshouldbegiventocircuit/raydiagram,observations,tabularrepresentation,experimentalskillsandprocedure,graph,calculationandresult.

4. Skill of doing the experiment and understanding physics concepts should be moreimportantthan theaccuracyof finalresult.

LearningOutcome:

1. Onsuccessfulcompletionofthiscoursestudents willbeableto:

2. Understand&practicetheskillswhileperformingexperiments.

3. Understandtheuseofapparatusandtheirusewithoutfear&hesitation.

4. Correlatethephysicstheoryconceptstopracticalapplication.

5. Understandtheconceptoferrorsandtheirestimation**.**

Note:ExemptionoftwoexperimentsfromsectionAand/orBand/orCmaybegivenifstudent carriesoutany oneof thefollowingactivity.

 Collect theinformationofatleastfivePhysicists withtheirworkoranythreeeventsonphysics,reportthatinjournal.

 Executeaminiprojecttothesatisfactionofteacherin-chargeofpractical.

 Participateinastudytourorvisit&submitastudytourreport.

 Forpracticalexaminations,thelearnerwillbeexaminedintwoexperiments(one fromeachgroup).

 Eachexperimentwillbeofthreelecturehours'duration.

A Minimum 4 from each group and in all minimum 8 experiments must be reported injournal.

 All the skill experiments are requiredto becompletedcompulsorily. Students arerequired to report all these experiments in the journal. Evaluation in viva voce will bebasedonregularexperiments andskillexperiments.

A learner will be allowed to appear for the semester and practical examination only if hesubmits a certified journal of Physics or a certificate that the learner has completed thepracticalcourseofPhysics SemesterIaspertheminimumrequirements.

A.RegularExperiment:

SrNo	NameoftheExperiment
	GROUPA
1	TorsionalOscillation:TodeterminemodulusofrigidityηofamaterialofwirebyTorsionaloscillations
2	BifilarPendulum:Determinationofmomentofinertiaofrectangularandcylindricalbaraboutan axispassingthrough itscentreofgravity
3	MomentofinertialofFlywheel
4	Constantvolumeairthermometer
5	FrequencyofACMains:TodeterminefrequencyofACmains(Sonometerwire)
6	LDRCharacteristics:TostudythedependenceofLDRresistanceonintensityoflight
	GROUPB
7	StudyofLogicgates &ToverifyDeMorgan's Theorems
8	TostudyEX-ORGateand verify itstruthtable
9	TostudyhalfadderandfulladderandverifytheirtruthtableEx-ORGate
10	TostudyloadregulationofaBridgeRectifier
11	TostudyZenerDiodeas Regulator
12	StudyofLASERBeamDivergence

GROUPC:SkillExperiment	
1	UseofVernierCallipers,Micrometer ScrewGaugeandTravellingMicroscope
2	Graphplotting(PlotBE/Averses Agraphfor30atoms,PlotPackingFractiongraphfor30 atoms)
3	Spectrometer:Schuster'sMethod
4	TodeterminetheResistance&CapacitanceusingColorcode/Number&verifyusingMultimeter(Analog/Digital)
5	Useofdigitalmultimeter
6	Absoluteandrelativeerrorcalculation

Note: Minimum **8** experiments (Four From each group) and **4** Skill experiments should becompleted and reported in the journal, in the first semester. **Certified Journal is a must,** to beeligibletoappearforthesemesterendpracticalexamination.

Name of theProgramme	Duration	Semester	Subject
B.Sc.inPhysics	Sixsemesters	II	Physics
CourseCode	Title	Credits	
USPH201	**OpticsI**	2	

LearningObjectives:

Toacquireknowledgeoffundamentaloptics

LearningOutcomes:

Aftersuccessfulcompletionof thecourse, thestudentwillbeableto:
1. Understandtheconceptoflens,lens defectsandtheirminimization.
2. Significanceofcombinationoflensesimpliedtoeyepieceofopticalinstrument.
3. Understandinterferenceoflightwithfewwellknowndailylifeexamples.
4. UnderstandLasersandOpticalfibers,theirapplicationsindaytodaylife.

UIGeometricalOptics   **(15lectures)**

1. LensesandLensMaker'sEquation: Introductiontolenses,Terminologyandsignconventions, Introduction to Thin lenses and Lens equation for single convex lens, Lens maker'sequation:PositionsofthePrincipalFociand Newton'sLensequation.
SBA:4.1, 4.2, 4.3, 4.7, 4.8,4.9, 4.10, 4.10.1, 4.11

2. Magnificationbyalensandpoweroflens:Lateral,LongitudinalandAngularmagnification,Deviationbyathinlens anditspower,Necessitytocombinethelenses&equivalentfocallength&poweroftwothinlenses,Conceptofcardinalpointsandtheirsignificance
SBA:4.12, 4.12.1, 4.12.2, 4.12.3, 4.15, 4.16,4.17,4.17.1, 4.17.2, 4.17.3, 4.17.4, 5.2

3. Introduction to Aberration in lenses: [Spherical aberration & reduction, chromatic aberration&reduction] (Qualitative)
SBA:9.2, 9.5,9.5.1, 9.10
Suitablenumericalwithappropriatedifficultylevel.

U2 Introduction to Optical Instruments and Interference in Thin Films   (15 lectures)

1. **Optical Instruments and Eyepieces**: Human Eye & Compound Microscope, Concept of eyepiece & its significance: Huygens Eyepiece and Ramsden Eyepiece (Principle, Construction, Expression for Equivalent Focal Length, Merits and Demerits), Comparison of Huygens Eyepiece and Ramsden Eyepiece

[Gauss Eyepiece, Refracting Astronomical Telescope (Construction and Working), Reflecting Telescope] (Qualitative)
SBA: 10.2, 10.3, 10.3.1, 10.5, 10.8, 10.10, 10.11, 10.12, 10.13, 10.14, 10.15, 10.15.1, 10.16

2. **Interference in Thin Films**: Interference due to reflected and transmitted light in plane thin films, Conditions for Maxima and Minima, Interference pattern in wedge-shaped film & Newton's rings
SBA: 15.1, 15.2, 15.2.1, 15.2.2, 15.5, 15.6
Suitable numerical with appropriate difficulty level.

U3 Lasers and Fiber Optics   (15 lectures)
1. **An Introduction to LASERS**: Absorption and Emission, Spontaneous and Stimulated Emission, Components of laser, Ruby laser (Qualitative), He-Ne Laser, Laser Beam Characteristics, Applications of Laser
SBA: 22.1, 22.4.1, 22.4.2, 22.8, 22.8.1, 22.8.2, 22.8.3, 22.14.1, 22.14.3, 22.16, 22.19

2. **An Introduction to Optical Fiber**: Total Internal Reflection, Propagation of light through an Optical fiber, Numerical Aperture, Classification of Optical fibers, Single Mode Step Index Fiber, Multimode Step Index Fiber, Graded Index Fiber
[Optical Fiber applications: Optical fiber based communication system & Optical Fiber based Temperature sensor] (Qualitative)
SBA: 24.2, 24.3, 24.4, 24.6, 24.10, 24.11.1, 24.11.2, 24.11.3, 24.21, 24.23.1
Main Reference:

SBA: Dr. N. Subrahmanyam, Brijlal, and Dr. M.N. Avadhanulu, A Textbook of Optics, 25 Revised[th] Edition 2012 (Reprint 2016), S. Chand and Company Pvt. Ltd.

Additional References:

1. Jenkins and White, Fundamentals of Optics by (4th Ed.), McGraw Hill International

2. Ajoy Ghatak, Optics, 6th Edition, McGraw Hill Education (India) Private Limited

Nameofthe Programme	Duration	Semester	Subject
B.Sc.inPhysics	Sixsemesters	II	Physics
CourseCode	Title	Credits	
USPH202	**Electricity andElectroni cs**	2	

LearningOutcomes:

Onsuccessfulcompletionofthiscoursestudentswillbeableto:

1. UnderstandthebasicconceptsofAlternatingcurrenttheory,ACbridgesandCircuitT heorems
2. UnderstandthebasicsofAnalogandDigitalElectronicsandapplytheminreallifesituations
3. Demonstratequantitativeproblemsolvingskillsinallthetopicscovered

UnitI:Electricity   **15lectures**

1. **Alternatingcurrenttheory**:(Review:ConceptofL,R,andC)

AC circuit containing pure R, pure L and pure C, representation of sinusoids by complexnumbers, Series L-R, C-R and LCR circuits, Resonance in LCR circuit (both series andparallel),Powerinaccircuit.Q-Factor.

TT:11.29,11.30,11.32,12.5,12.6,13.1,13.7,13.9,13.10,13.11,13.12,13.13,13.14, 13.17, 13.19,14.2

2. **ACbridges**:GeneralACBridge,Maxwell'sInductanceBridge,Maxwell'sL/CBridge,DeSauty Bridge,WienBridge.

(Bridgediagram,balancingconditionderivation,applications)

TT:16.1, 16.2,16.3,16.9, 16.11

UnitII:AnalogElectronics

1.**CircuitTheorems**:(Review:Ohm'slaw,Kirchhoff'slaws)IdealCurrentandVoltag Sources Thevenin's Theorem, Norton's Theorem, Maximum Power Transfer Theorem.Problems relatedtocircuitanalysisusingtheabovetheorems.
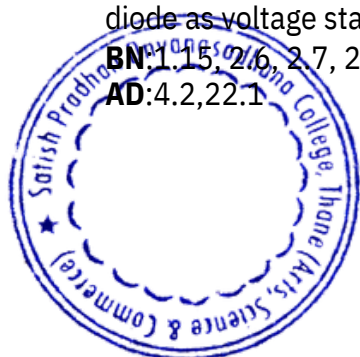
TT:2.15, 2.16,2.18,2.25, 2.30

                                                15 lectures

2. **DCPowerSupply**:Blockdiagramofadcpowersupply– conceptofatransformer,(Review:Halfwaverectifier,Fullwaverectifier)Bridgerectifier,PIV,Effic iencyandRipplefactoroffullwaverectifier,CapacitorFilter,Needforvoltageregulation - Zener diode as voltage stabilizer, Clipper and Clampers (Basic diode basedcircuitsonly).

BN:1.15, 2.6, 2.7, 2.8, 2.9, 2.10,15.2,15.3

AD:4.2,22.1

UnitIII:DigitalElectronics   **15lectures**

1. **Number Systems** – Binary number system: Binary to decimal and Decimal to binaryconversion, Hexadecimal number system: Hexadecimal to decimal Conversion, Decimal tohexadecimalconversion,Hexadecimaltobinaryconversion,Binarytohexadecimalconversion.
LMS:5.1to**5.5**

2. **DerivedGates**(Review:Basic Logicgates),NANDandNORas Universal Buildingblocks,

Ex-OR gate: logic expression, logic symbol, truth table, Implementation using basicgates andits applications–Paritygeneratorandchecker,HalfadderandFulladder.
LMS:2.1, 2.2
Tokheim:3.6,3.8,10.2,10.3

References:

1. TT: B.L.TherajaandA.K.Theraja,A
TextbookofElectricalTechnologyVol.I,S.ChandPublication
2. BN:R.L.BoylestadandL.Nashelsky,ElectronicdevicesandCircuitTheory-
10thEdition,Pearson
3. LMS:Leach,Malvino,Saha,DigitalPrinciplesandApplications–
6thEdition.TataMcGraw Hill
5. Tokheim:DigitalElectronics,Principles
andApplications,6thEdition,McGrawHillEdition.
6.AD:AlbertMalvino,DavidBates,ElectronicPrinciples,8Edition,TataMcGrawHill

Nameofthe Programme	Duration	Semester	Subject
B.Sc.inPhysics	Sixsemesters	**II**	**Physics**
CourseCode	Title	Credits	
USPHP2	**PracticalII**	2	

Instructions:

1. AllthemeasurementsandreadingsshouldbewrittenwithproperunitsinSIsystemonly.

2. Aftercompletingalltherequirednumberofexperimentsinthesemesterandrecording them andin journal, student will have to get their journal certified producethecertifiedjournalatthetimeofpracticalexamination.

3. Whileevaluatingpractical,weightageshouldbegiventocircuit/raydiagram,observations, tabularrepresentation,experimentalskillsandprocedure,graph,calculationandresult.

4. Skill of doing the experiment and understanding physics concepts should be moreimportantthan theaccuracyof finalresult.

LearningOutcome:

Onsuccessfulcompletionofthiscoursestudents willbeableto:

1. Understand&practicetheskillswhileperformingexperiments.

2. Understandtheuseofapparatusandtheirusewithoutfear&hesitation.

3. Correlatethephysicstheoryconceptstopracticalapplication.

4. Understandtheconceptoferrors andtheirestimation.

Note:ExemptionoftwoexperimentsfromsectionAand/orBand/orCmaybegivenif studentcarriesout any oneofthefollowingactivity.

 CollecttheinformationofatleastfivePhysicistswiththeirworkoranythreeeventsonphysics,reportthatinjournal.

 Executeaminiprojecttothesatisfactionofteacherin-chargeofpractical.

 Participateinastudytourorvisit&submitastudytourreport.

 Forpracticalexaminations,thelearnerwillbeexaminedintwoexperiments(onefromeach group).

- ☐ Eachexperimentwillbeofthreelecturehours'duration.
- ⬜ A Minimum 4 from each group and in all minimum 8 experiments must be reportedinjournal.
- ☐ All the skill experiments are required to be completed compulsorily. Students arerequired to report all these experiments in the journal. Evaluation in vivavoce willbebasedonregularexperimentsandskillexperiments.

A learner will be allowed to appear for the semester and practical examination only if hesubmits a certified journal of Physicsor a certificatethatthe learner hascompleted thepracticalcourseofPhysicsSemesterIIas per theminimumrequirements.

A.RegularExperiment:

SrNo	NameoftheExperiments
	GROUPA
1	Young's Modulusofawirematerialbymethodofvibrations
2	Spectrometer:TodetermineofangleofPrism
3	Spectrometer:Todeterminerefractive indexofprismmaterial
4	CombinationofLenses:Todetermineequivalentfocallengthofalenssystembymagnification method
5	Newton's Rings: To determine radius of curvature of a given convex lens using Newton'srings.
6	DeterminationofdiameterofthinwireusingWedgeShapedFilm
	GROUPB
7	TostudyNAND/NORgatesasUniversalBuildingBlocks
8	LRCircuit:Todeterminethevalueofgiveninductanceandphaseangle
9	CRCircuit:TodeterminevalueofgivencapacitorandPhaseangle
10	Transistorconfigurations:CB/CE/CC(studyofinput-outputcharacteristics)

11	LCRseriesResonance:TodetermineresonancefrequencyofLCRseriescircuit
12	TostudyThermistorcharacteristics:Resistancevs.Temperature
GROUPC: DEMONSTRATIONEXPERIMENT	
1	Radiusofballbearings(singlepanbalance)
2	UseofOscilloscope:Waveformsatoutputofhalfwave,bridgerectifierswithandwithoutCapacitorfilter,Ripple
3	UseofPC forgraphplotting
4	I-VCharacteristicsofLED
5	Testingofcomponents(Resistors,Diode,Transistor,capacitor)
6	StudyofI-Vcharacteristicsofsolarcell

Note: Minimum **8** experiments (Four From each group) and **4** Demo experiments should becompleted and reported in the journal, in the first semester. **Certified Journal is a must,** to beeligibletoappearforthesemesterend practicalexamination.