હેમચંદ્રાચાર્ય ઉત્તર ગુજરાત યુનિવર્સિટી

NAAC A (3.02) State University

પો.બો.નં.-૨૧, યુનિવર્સિટી રોડ, પાટણ (ઉ.ગુ.) ૩૮૪૨૬૫

ફોનઃ(૦૨૭૬૬) ૨૩૭૦૦૦ ફેક્સ : (૦૨૭૬૬) ૨૩૧૯૧૭

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રાષ્ટ્રીય શિક્ષણ નીતિ-૨૦૨૦

પરિપત્ર નં.- ૨૦૦/૨૦૨૩

વિષયઃ વિજ્ઞાન વિદ્યાશાખા હેઠળના સ્નાતક કક્ષાના સેમેસ્ટર-૧ અને ૨ના જૂન ૨૦૨૩-૨૪ થી ક્રમશઃ અમલમાં આવતા અભ્યાસક્રમ / પરિક્ષા સ્કીમ અંગે.

આ યુનિવર્સિટીના વિજ્ઞાન વિદ્યાશાખા અંતર્ગત વિષયોના સ્નાતક વિભાગો તથા સંલગ્ન વિજ્ઞાન વિદ્યાશાખાની તમામ કોલેજોના આચાર્યશ્રીઓને જણાવવાનું કે, એકેડેમિક કાઉન્સિલની તારીખઃ ૧૪/૦૮/૨૦૨૩ની મળેલ સભાના નિર્દિષ્ટ ઠરાવોથી રાષ્ટ્રીય શિક્ષણ નીતિ-૨૦૨૦ અંતર્ગત UGCની Guideline તથા રાજય સરકારશ્રીના શિક્ષણ વિભાગના તારીખઃ ૧૧/૦૭/૨૦૨૩ના ઠરાવ નં.કે.સી.જી./એડમીન/૨૦૨૩-૨૪/૦૬૦૭/ખ-૧ થી પ્રકાશિત કરેલ કોમન કરિકયુલમ એન્ડ ક્રેડિટ ફ્રેમવર્ક હેઠળ ક્રેડિટ માળખું તથા પ્રકાશિત કરેલ સ્ટાન્ડર્ડ ઓપરેટીંગ પ્રોસિજર (S.O.P.) મુજબ વિજ્ઞાન વિદ્યાશાખા હેઠળના નીચેના સ્નાતક કક્ષાના સામેલ પરિશિષ્ટ પ્રમાણેના નવા અભ્યાસક્રમો શૈક્ષણિક વર્ષઃ ૨૦૨૩-૨૪ થી ક્રમશઃ અમલમાં આવે તે રીતે મંજુર કરેલ છે, જેનો અમલ કરવા સારૂ સબંધિતોને આ સાથે મોકલવામાં આવે છે.

ક્રમ નં	અભ્યાસક્રમ	ઠરાવ ક્રમાંક	સેમેસ્ટર
૧	બી.એસ.સી. (ગણિતશાસ્ત્ર)	૧૯	સેમેસ્ટર ૧ અને ૨
૨	બી.એસ.સી. (વનસ્પતિશાસ્ત્ર)	૨૦	સેમેસ્ટર ૧ અને ૨
૩	બી.એસ.સી. (બાયોટેકનોલોજી)	૨૧	સેમેસ્ટર ૧ અને ૨
૪	બી.એસ.સી. (ભૌતિકશાસ્ત્ર)	૨૨	સેમેસ્ટર ૧ અને ૨
૫	બી.એસ.સી. (ઝુલોજી)	૨૩	સેમેસ્ટર ૧ અને ૨
૬	બી.એસ.સી. (રસાયણશાસ્ત્ર)	૩૨	સેમેસ્ટર ૧ અને ૨

સદર બાબતની જાણ આપના સ્તરેથી અધ્યાપકશ્રીઓ તથા વિદ્યાર્થીઓને કરવા વિનંતી છે.

નોંધઃ

(૧) વિદ્યાર્થીઓની જરૂરીયાત માટે પરિપત્રની એક નકલ કોલેજના / ડિપાર્ટમેન્ટના ગ્રંથાલયમાં મૂકવાની રહેશે.

(૨) આ પરિપત્ર યુનિવર્સિટીની વેબસાઇટ www.ngu.ac.in પર પણ ઉપલબ્ધ કરવામાં આવેલ છે. આથી સંબંધિત કોલેજોને ડાઉનલોડ કરી ઉપયોગ કરવા સારૂ જણાવવામાં આવે છે.

(૩) <u>વિજ્ઞાન વિદ્યાશાખા</u> વિદ્યાશાખા હેઠળના સ્નાતક કક્ષાના પ્રોગ્રામ્સના અભ્યાસક્રમોનો પરિપત્ર નં.૧૩૦/૨૦૨૩, તારીખઃ૨૩/૦૬/૨૦૨૩ રદ કરવામાં આવે છે.

કા. કુલસચિવ

બિડાણઃ ઉપરમુજબ

નં-એકે/અ×સ/૩૬૪/૨૦૨૩
તારીખઃ૩૧/૦૮/૨૦૨૩

પ્રતિ,

૧. ડીનશ્રી, વિજ્ઞાન વિદ્યાશાખા તરફ.
૨. વિજ્ઞાન વિદ્યાશાખા હેઠળની કોલેજોના આચાર્યશ્રીઓ તરફ
૩. પરીક્ષા નિયામકશ્રી, હેમચંદ્રાચાર્ય ઉત્તર ગુજરાત યુનિવર્સિટી પાટણ.
૪. ગ્રંથપાલશ્રી, હેમચંદ્રાચાર્ય ઉત્તર ગુજરાત યુનિવર્સિટી પાટણ.
૫. માન.કુલપતિશ્રી/કુલસચિવશ્રીનું કાર્યાલય હેમચંદ્રાચાર્ય ઉત્તર ગુજરાત યુનિવર્સિટી પાટણ.
૬. સિસ્ટમ એનાલીસ્ટશ્રી, કોમ્પ્યુટર (રીઝલ્ટ સેન્ટર) હેમ.ઉ.ગુ.યુનિવર્સિટી, પાટણ.(વેબસાઇટ પર મુકવા સારૂ)
૭. પ્રવેશ પ્ર-શાખા, હેમ.ઉ.ગુ.યુનિવર્સિટી, પાટણ
૮. મહેકમ શાખા, હેમ.ઉ.ગુ.યુનિવર્સિટી, પાટણ (૨ નકલ)

Principal
The H.N.S.B.Ltd Science College
Himatnagar-383 001.

Curriculum and Credit Framework For SEM I and II

Asper UGC Guideline

(According to NATIONAL EDUCATION POLICY (NEP) – 2020)

Submittedon21st July 2023

Principal
The H.N.S.B Ltd Science College
Himatnagar-383 001.

HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY,PATAN
B.Sc.PHYSICS-SEMESTER–I
TYPEOFCOURSE:MAJORDISCIPLINESPECIFICCOURSE

PROGRAMMECODE:SCIUG101 **COURSECODE:SC23MJDSCPHY101**

COURSENAME:Mathematical,Thermodynamics, Waves-Sound and Electronics

(EffectivefromJune2023UnderNEP–2020)

TotalCredits:04 TeachingHoursperWeek:04TeachingHoursperSemester: 60	Theory	ExternalMarks-50 InternalMarks-50

CourseObjective:

1. ToUnderstandtheconceptsandsignificanceofScalarandVectorFields,operationswithoperator∇andGauss'sTheorem,Stoke'sTheorem
2. ToUnderstandtheapplicationsoflawsofThermodynamics&theconceptsofentropy.
3. ToteachhowtocalculatechangesinvariousThermodynamicprocesses.
4. Todevelopknowledgeabouttheoryofresonatoranditsapplication,ultrasonicwaves,its production and application
5. Todevelpoeknowledgeabout basic concepts, working of various rectifier and Filter circuits.

CourseOutcome:

Afterthesuccessfulcompletionofthecoursestudentswillbe ableto

1. Understands the concepts and significance of Scalar and Vector Fields as well as operations of operator ∇,Gauss'sTheoremandStoke'sTheorem.
2. UnderstandstheThermodynamics,Carnot'stheoremandconceptsofentropy.
3. LearnsaboutUltrasonics, productionanditsapplications.
4. WillGetsufficientknowledgeofsoundandtheoryofresonator.
5. Learns sufficient knowledge of various rectifier, Filter circuits and applications of them.

Syllabus

Unit No.	Content	Credit	Lect. Hrs60
Unit-1	**MathematicalPhysics:** **VectorAlgebraandVectorAnalysis:** Dyadic(1.10),ScalarTripleproduct(1.11),Reciprocalvectors(1.12),VectorTripleproduct(1.13),PseudovectorsandPseudoScalars(1.16), SomeImportant DefinitionaboutVectors,Integrationofvector:LineIntegration,SurfaceIntegrationandVolume Integration(2.3a,b), Partial differentiation(2.4), Gradient of a scalarpoint function(2.5), Divergence of vector(2.6), Curl of a vector(2.8), MoreabouttheVectordifferentialOperator*A*(2.9),MultipleDelOperations(2.11),Someusefulidentities(2.13),Gauss'Theorem(2.14),StokesTheorem(2.17). (*RelatedExamples&Problems*) **BasicReference:***IntroductiontoClassicalMechanicsbyR.G.Takwale & P.S.Puranik*(TataMcGraw-HillPublishingCompanyLtd.)	1	15

Unit-2	**Thermodynamics:** **Thermodynamics of Refrigerator:** Second Law of Thermodynamics (2.8),Carnot'sTheorem(2.9),ThermodynamicabsoluteScaleoftemperature(2.10),ThermodynamicsofRefrigeration (4.2) **Entropy:**IntroductionofEntropy (2.13),ChangeofEntropyinaReversibleProcess (2.14),changeofentropyinanIrreversibleprocess(2.15), Principle of Increase of Entropy of Degradation of Energy (2.16),FormulationoftheSecondlawintermofEntropy(2.17),Entropyandsecondlaw(2.18),ThirdlawofThermodynamics(Nernst'sHeat Theorem)(2.19)*(RelatedExamples&Problem)* **BasicReference:***ThermodynamicsandStatisticalPhysicsbyDr.J.P.AgarwalandSatyaPrakash(PragatiPrakashan)*	1	15
Unit-3	**WavesandSound:** **Wave:**TheoryofResonator(6.16),DependenceoftheFrequencyofresonator on the size and shape of the mouth (6.17), Velocity of Transversewavesalongastretchedstring(7.1),law'sofTransverseVibrationofStrings(7.3),Melde'sExperiment(7.5),Kundt'sTube(7.13)(*RelatedExamples&Problem)* **Ultrasonicwaves:**Ultrasonics (11.23),ProductionofUltrasonics(11.24),Magneto-StrictionEffect (11.24.2),Piezo-ElectricEffectMethod-Oscillator(11.24.3),Detectionof UltrasonicWaves(11.25),ApplicationsofUltrasonicwaves(11.27)(*RelatedExamples&Problem)* **BasicReference:***WavesAndOscillationsbyN.Subhramanyam&Brijlal (VikasPublshingHousePvt.Ltd,–2nd RevisedEdition.*	1	15
Unit-4	**Electronics:** **RectifierandPowerSupply:**TheHalfWaveRectifier(4.1)-[AverageorD.C.outputVoltage,AverageorD.C.outputcurrent,RMSvalueofoutputcurrent,Rectifierefficiency(RatioofRectification),Ripplefactor,VoltageRegulation,Peak inverse voltage(PIV),Transformer Utilization Factor(TUF)], TheFullWaveRectifier(4.2)-[AverageorD.C.outputcurrent,RMSvalueofoutputcurrent,,AverageorD.C.outputVoltage,Rectifierefficiency(RatioofRectification),Ripplefactor, VoltageRegulation,PeakInverseVoltage(PIV),TransformerUtilizationFactor(TUF)],ComparisonofHalfandFullWaveRectifiersCircuit(4.3),TheBridgeRectifier(4.4), **Filter Circuits:**The Half Wave Rectifier with Series InductorFilter(4.7.1)andwithcapacitor filter(4.7.2),TheFull WaveRectifierwithSeriesInductorFilter(4.7.3),ChokeInputFilteror L-section Filter(L-C Filter)(4.7.4), Capacitor Input Filter(C-L-C Filter or π-Filter),[Comparison of L and π-section filtercircuits] **BasicReference:***HandbookofElectronicsbyGuptaandKumar*	1	15

	: Further Reading – Other References : 1) MathematicalMethodinphysicalsciencesbyM.L.Boas(johnWilley&Sons) 2) MathematicalPhysicsbyBDGupta(4th Edition) 3)MathematicalPhysicsbyH KDas 4) VectoranalysisbyProf.RNDesaiUni.GranthNirmanBoard,Gujarat 5) HeatandThermodynamicsbyZeemansky 6) UniversityPhysicsbySears,Zeemankkyandyoung(NarosaPublishingHouse) 7) HeatandThermodynamicsbyRichardH.Dittmon&MarkW.Zemansky(TMH) 8) HeatandThermodynamicsbyA.B.GuptaandH.P.Roy(NewCentralBook) 9) ElectronicDevice&CircuitsbyAllenMottershead,(PHIPvt.LTD) 10) ElectronicsandRadioEngineeringbyM.L.Gupta. 11) BasicElectronisandLinearcircuitsbyBhargvaKulshreshth&GuptaTMHEdition **12)** ElementsofElectronicsbyBagde&Singh

HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY,PATAN
B.Sc.PHYSICS-SEMESTER–I
TYPEOFCOURSE:MINOR DISCIPLINE SPECIFIC COURSE

PROGRAMMECODE:SCIUG101 **COURSECODE:SC23MIDSCPHY102**

COURSENAME:Mathematical Physics and Heat-Thermodynamics

(EffectivefromJune2023UnderNEP–2020)

TotalCredits:02 TeachingHoursperWeek:02 Teaching Hours per Semester: 30	Theory	ExternalMarks-25 InternalMarks-25

CourseObjective:

- ToUnderstandtheconceptsandsignificanceofScalarandVectorFields,operationswithoperator∇andGauss'sTheorem,Stoke'sTheorem
- ToUnderstandtheapplicationsoflawsofThermodynamics&theconceptsofentropy.
- ToteachhowtocalculatechangesinvariousThermodynamicprocesses.

CourseOutcome:

Afterthesuccessfulcompletionofthecoursestudentswillbe ableto

- Understands the concepts and significance of Scalar and Vector Fields as well as operations of operator ∇,Gauss'sTheoremandStoke'sTheorem.
- UnderstandstheThermodynamics,Carnot'stheoremandconceptsofentropy.
- CalculatechangesinvariousThermodynamicprocesses.

Syllabus

Unit No.	Content	Credit	Lect.Hrs60
Unit-1	**MathematicalPhysics:** **VectorAlgebraandVectorAnalysis:**Dyadic(1.10),ScalarTripleproduct(1.11),Reciprocalvectors(1.12),VectorTripleproduct(1.13),PseudovectorsandPseudoScalars(1.16), SomeImportant DefinitionaboutVectors,Integrationofvector:LineIntegration,SurfaceIntegrationandVolume Integration(2.3a,b), Partial differentiation(2.4), Gradient of a scalarpoint function(2.5), Divergence of vector(2.6), Curl of a vector(2.8), MoreabouttheVectordifferentialOperator*A*(2.9),MultipleDelOperations(2.11),Someusefulidentities(2.13),Gauss'Theorem(2.14),StokesTheorem(2.17).(*RelatedExamples&Problems*) **BasicReference:***IntroductiontoClassicalMechanicsbyR.G.Takwale & P.S.Puranik*(TataMcGraw-HillPublishingCompanyLtd.)	1	15

Unit-2	**Thermodynamics:** **Thermodynamics of Refrigerator:** Second Law of Thermodynamics (2.8),Carnot'sTheorem(2.9),ThermodynamicabsoluteScaleoftemperature(2.10),ThermodynamicsofRefrigeration (4.2) **Entropy:**IntroductionofEntropy (2.13),ChangeofEntropyinaReversibleProcess (2.14),changeofentropyinanIrreversibleprocess(2.15), Principle of Increase of Entropy of Degradation of Energy (2.16),FormulationoftheSecondlawintermofEntropy(2.17),Entropyandsecondlaw(2.18),ThirdlawofThermodynamics(Nernst'sHeat Theorem)(2.19)*(RelatedExamples&Problem)* **BasicReference:***ThermodynamicsandStatisticalPhysicsbyDr.J.P.AgarwalandSatyaPrakash(PragatiPrakashan)*	1	15
	: Further Reading – Other References : 3) MathematicalMethodinphysicalsciencesbyM.L.Boas(johnWilley&Sons) 4) MathematicalPhysicsbyBDGupta(4th Edition) 3)MathematicalPhysicsbyH KDas 5) VectoranalysisbyProf.RNDesaiUni.GranthNirmanBoard,Gujarat 5) HeatandThermodynamicsbyZeemansky 6) UniversityPhysicsbySears,Zeemankkyandyoung(NarosaPublishingHouse) 7) HeatandThermodynamicsbyRichardH.Dittmon&MarkW.Zemansky(TMH) 8) HeatandThermodynamicsbyA.B.GuptaandH.P.Roy(NewCentralBook)		

HEMCHANDRACHARYANORTHGUJARATUNIVERSITY,PATAN

B.Sc.PHYSICS-SEMESTER–I

TYPEOFCOURSE:INTER/MULTIDISCIPLINESPECIFICCOURSE

PROGRAMMECODE:SCIUG101 **COURSECODE:SC23MDSCPHY103**

COURSENAME: Waves-Sound and Electronics

(EffectivefromJune2023UnderNEP–2020)

TotalCredits:02 TeachingHoursperWeek:2 TeachingHoursperSemester: 30	Theory	ExternalMarks-25 InternalMarks-25

CourseObjective:

- Todevelopknowledgeabouttheoryofresonatoranditsapplication,ultrasonicwaves,its production and application
- Todevelpoeknowledgeabout basic concepts, working of various rectifier and Filter circuits.

CourseOutcome:

Afterthesuccessfulcompletionofthecoursestudentswillbe ableto

- LearnsaboutUltrasonics, productionanditsapplications.
- WillGetsufficientknowledgeofsoundandtheoryofresonator.
- Learns sufficient knowledge of various rectifier, Filter circuits and applications of them

Unit-1	**WavesandSound:** **Wave:**TheoryofResonator(6.16),DependenceoftheFrequencyofresonator on the size and shape of the mouth (6.17), Velocity of Transversewavesalongastretchedstring(7.1),law'sofTransverseVibrationofStrings(7.3),Melde'sExperiment (7.5),Kundt'sTube(7.13)(*RelatedExamples&Problem)* **Ultrasonicwaves:**Ultrasonics (11.23),ProductionofUltrasonics(11.24),Magneto-StrictionEffect (11.24.2),Piezo-ElectricEffectMethod-Oscillator(11.24.3),Detectionof UltrasonicWaves(11.25),ApplicationsofUltrasonicwaves(11.27)(*RelatedExamples&Problem)* **BasicReference:***WavesAndOscillationsbyN.Subhramanyam&Brijlal (VikasPublshingHousePvt.Ltd,–2nd RevisedEdition.*	1	15

Unit-2	**Electronics:** **RectifierandPowerSupply:**TheHalfWaveRectifier(4.1)-[AverageorD.C.outputVoltage,AverageorD.C.outputcurrent,RMSvalueofoutputcurrent,Rectifierefficiency(RatioofRectification),Ripplefactor,VoltageRegulation,Peak inverse voltage(PIV),Transformer Utilization Factor(TUF)], TheFullWaveRectifier(4.2)-[AverageorD.C.outputcurrent,RMSvalueofoutputcurrent,AverageorD.C.outputVoltage,Rectifierefficiency(RatioofRectification),Ripplefactor,VoltageRegulation,PeakInverseVoltage(PIV),TransformerUtilizationFactor(TUF)],ComparisonofHalfandFullWaveRectifiersCircuit(4.3),***TheBridgeRectifier***(4.4), **Filter Circuits:** The Half Wave Rectifier with Series InductorFilter(4.7.1)andwithcapacitor filter(4.7.2),TheFull WaveRectifierwithSeriesInductorFilter(4.7.3),ChokeInputFilteror L-section Filter(L-C Filter)(4.7.4), Capacitor Input Filter(C-L-C Filter or π-Filter),[Comparison of L and π-section filtercircuits] **BasicReference:***HandbookofElectronicsbyGuptaandKumar*	1	15

: Further Reading – Other References :

- UniversityPhysicsbySears,Zeemansky andYoung(NorosaPublishingHouse)
- ATextBookOnOscillations,WaveandAcousticsbyM.Ghosh&D.Bhattacharya(S.Chand Co)
- Vibration, Waves & Heat by Sears and Zeemansky
- ElectronicDevice&CircuitsbyAllenMottershead,(PHIPvt.LTD)
- ElectronicsandRadioEngineeringbyM.L.Gupta.
- BasicElectronisandLinearcircuitsbyBhargvaKulshreshth&GuptaTMHEdition
- ElementsofElectronicsbyBagde&Singh

HEMCHANDRACHARYANORTHGUJARATUNIVERSITY,PATAN

B.Sc.PHYSICS-SEMESTER –I (PRACTICALCOURSE)

PROGRAMMECODE:SCIUG101

(EffectivefromJune2023UnderNEP–2020)

TYPE OFCOURSE	CREDIT	COURSECODE
MajorDisciplineCoreCourse(MJDSCP)	2 (Group A)	SC23MJDSC P PHY101(A)
MajorDisciplineCoreCourse(MJDSCP)	2 (Group B)	SC23MJDSC P PHY101(B)
MinorDisciplineCoreCourse(MIDSCP)	2	SC23MIDSC P PHY102
Inter-DisciplineCoreCourse(MDCP)	2	SC23MDSC P PHY103

TeachingHours

TeachingHoursperWeek:08 Hours for 4 Credit practical (120 Hours per Semester)
TeachingHoursperWeek:04 Hours for 2 Credit practical (60 Hours per Semester)

CourseObjectives:

- Togainpracticalknowledgebyapplyingtheexperimentalmethodtocorrelatewiththe Physicstheory.
- Toprovidehandsonexperiencewithequipmentsuchas,spectrometer,Pendulum,Flywheelandelectroniccircuits.
- Tolearntheusageofelectricalandopticalsystemsofvariousmeasurements.
- Toimpartpracticalknowledgebyperformingexperimentsbasedontheprinciplesoftheorycourses.
- Toprovidetraininghow toanalyzetheexperimentaldataandgraphicalanalysis.
- Todevelopintellectualcommunicationskillsanddiscussthebasicprinciplesofscientificconceptsinthegroup.

LABORATORY

EXPERIMENTS
FOR MAJOR COURSE 2 Credit for Group A
COURSECODE: SC23MJDSC P PHY101(A)

1. Determine aDampingcoefficient,Relaxationandqualityfactorinthedampedmotionofa simplePendulum.
2. StudyofResonator:Verificationofrelation$n^2(V+kv)$=constantanddeterminethe frequencyofunknownfork.
3. Determinationof angular acceleration (α) and find MI ofaFlywheel using plot α verses Tourqe
4. ArrangementofSpectrometerforparallelraysusingSchustermethod and to find Angle of Prizm
5. Calibrationofthe Spectrometeranddeterminesthewavelengthofunknownlineof Hg-spectrum.
6. To Find Refractiveindexofliquidusingconvexlens.
7. Analysisoferror.
8. VerificationofStefanBoltzmann'sfourthpowerlawusingA.C./D.C.Source
9. Melde's Experiment: (i) To prove P/L constant and (ii) P^2Tconstant
10. Least square Method
11. Study of Travelling Microscope, To determine Gauz eliment, Diameter of tube, width of auxiliary slit
12. To find the Young's Modulus of the material of a Rectangular Bar by Bending. (Y by cantilever)

LABORATORY EXPERIMENTS
For
MAJOR COURSE (2 Credit for Group B)
COURSECODE: SC23MJDSC P PHY101(B)

1. V-IcharacteristicsofZenerdiode
2. Study of Zener Diode as a voltage Regulator.
3. StudyoftheSeriesResonancewithFrequencyVariation. (**C** constant)
4. Determinationofthecapacitance'C'ofacondenser.
5. P-NJunctiondiodeasHalfWaveRectifierWithoutfilter. CalculationofPercentageofRegulation.
6. P-NJunctiondiodeasHalf WaveRectifier(i) WithSeriesInductorFilter (ii)WithShuntCapacitorFilter.CalculationofPercentageofRegulation.
7. VerificationofThevenin'sTheorem.
8. StudyofLogicGates:AND,ORandNOT. Verification of Truth table and giving understanding of voltage level for "0" and "1" level.
9. ExperimentalMeasurementsofPowerSupply,Resistor,Diode,Transistorby Multimeter
10. Study of Step Up Transformer. To determine Turn Ratio, % of Efficiency, Energy loss due to copper loss for a given transformer.
11. Study of Bridge Rectifier(i)Withoutfilter(ii)WithSeriesInductorFilter (iii)WithShuntCapacitorFilter.CalculationofPercentageofRegulation.
12. Study of Maximum Power transfer Theorem

CourseOutcome:LearningOutcomes

Bytheendofthecourse,thestudentswillbeabletounderstand.

- ThebasicprinciplesofPhysicsrelatedtotheircoursesinthepracticalway.
- Theoperationaldetailsofspectrometer,electroniccircuitsetc.
- Theexperimentaldesign aspectstodeterminevariouspropertiesoflikegravity,qualifactor, Refractiveindex,determinationofCauchy'sConstants,analysisofspectra,Analysisof error,determinevalueofunknownfrequencyetc.
- Theprocesstoanalyzetheobservationsandinfertheoutcomeoftheexperiments.
- Howtoanalyzetheexperimentaldataandgraphicalanalysis.

HEMCHANDRACHARYANORTHGUJARATUNIVERSITY,PATAN

B.Sc.PHYSICS-SEMESTER –I (PRACTICALCOURSE)

PROGRAMMECODE: SCIUG101

(EffectivefromJune2023UnderNEP–2020)

TYPE OFCOURSE	CREDIT	COURSECODE
MinorDisciplineCoreCourse(MIDSCP)	2	SC23MIDSC P PHY102

TeachingHoursperWeek:04 Hours for 2 Credit practical and TeachingHoursperSemester: 60 Hours

Minor Discipline Core Course(MIDSCP) Practical

1. Melde's Experiment: (i) To prove P/L constant and (ii) P^2Tconstant
2. StudyofResonator:Verificationofrelation$n^2(V+kv)$=constantanddeterminethe frequencyofunknownfork.
3. Determinationof angular acceleration (α) and find MI ofaFlywheel using plot α verses Torque.
4. Least square Method
5. ArrangementofSpectrometerforparallelraysusingSchustermethod
6. StudyoftheSeriesResonancewithFrequencyVariation, Fix Capacitor.
7. Determinationofthecapacitance'C'ofacondenser.
8. Study of Maximum Power transfer Theorem
9. Study of Step Up Transformer: To determine Turn Ratio, % of Efficiency, energy loss due to copper loss for a given transformer.
10. P-NJunctiondiodeasHalfWaveRectifierWithoutfilter. CalculationofPercentageofRegulation.
11. VerificationofThevenin'sTheorem.
12. Calibrationofthe Spectrometeranddeterminesthewavelengthofunknownlineof Hg-spectrum.

HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY,PATAN

B.Sc.PHYSICS-SEMESTER –I (PRACTICALCOURSE)

PROGRAMMECODE:SCIUG101

(EffectivefromJune2023UnderNEP–2020)

TYPE OFCOURSE	CREDIT	COURSECODE
Multidisciplinary CoreCourse(MDSCP)	2	SC23MIDSC P PHY103

TeachingHoursperWeek:04 Hours for 2 Credit practical and TeachingHoursperSemester: 60 Hours

Multi DisciplineCoreCourse(MIDSCP) Practical

1. Determine aDampingcoefficient,Relaxationandqualityfactorinthedampedmotionofa simplePendulum.
2. StudyofResonator:Verificationofrelation$n^2(V+kv)$=constantanddeterminethe frequencyofunknownfork.
3. Determinationof angular acceleration (α) and find MI ofaFlywheel using plot α verses Tourqe
4. To Find Refractiveindexofliquidusingconvexlens.
5. VerificationofStefanBoltzmann'sfourthpowerlawusingA.C./D.C.Source
6. Study of Travelling Microscope, To determine Gauz eliment, Diameter of tube, width of auxiliary slit
7. V-ICharacteristicsofZenerdiode and Determine Breakdown voltage
8. Study of Zener Diode as a voltage Regulator.
9. P-NJunctiondiodeasHalfWaveRectifier(i)Withoutfilter.CalculationofPercentageofRegulation.
10. P-NJunctiondiodeasFull WaveRectifier(i)WithSeriesInductorFilter (ii)WithShuntCapacitorFilter.CalculationofPercentageofRegulation
11. StudyofLogicGates:AND,ORandNOT. Verification of Truth table and giving understanding of voltage level for "0" and "1" level.
12. Study of Bridge RectifierWithoutfilter. CalculationofPercentageofRegulation.

HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY,PATAN

B.Sc.PHYSICS- SEMESTER–I

TYPE OF COURSE: SKILL ENHANCEMENT COURSE

PROGRAMME CODE: SCIUG101

COURSECODE:SC23SECPHY106

COURSENAME: INSTRUMENTATIONMEASUREMENTANDANALYSIS

(EffectivefromJune2023UnderNEP–2020)

TotalCredits:02 TeachingHoursperWeek:02 TeachingHoursperSemester: 30	Theory	ExternalMarks–25 InternalMarks-25

Course Objective:

- To understand the principles of various instruments and its application.
- To Learn the concepts Vernier calipers, Micrometer screw, spherometer, spectrometer etc.
- To Understands working function of Galvanometer and determine merit of figure.
- Learns about construction, working and use of various measuring instruments.

Course outcome:

At the end of the course students will able to

- Understand the basic knowledge of working of various instruments and its application.
- Learns the construction, working process and use of various measuring instruments.
- Will get sufficient knowledge of Galvanometer and determine various scientific parameters.

:: Syllabus ::

Unit No.	Content	Credit	Hrs 30
Unit-1	**Vernier Calipers:** Introduction, Theory, Figure, Description of theinstrument, Detail study of Least count, Errors, Positive error, negativeerror,Determinationofmagnitudeofpositiveandnegativeerrors. **MicrometerScrew:**Introduction,Theory,Figure,Description ofthe instrument, Definition of pitch and its determination, study of leastcount, Meaning of the error and explanation of positive and negativeerrors.Determinationofpositiveandnegativeerrors.Method oftaking observationwith thehelpofMicrometerScrew. **Spherometer:**Introduction,Theory,Figure,Descriptionoftheinstrument, To determine the pitch of the screw, To determine the leastcount of the spherometer, Zero error, Derivation of the formula for theradiusofcurvatureofacurvedsurface.	1	15

Unit-2	**WheatstoneBridge:** Introduction,Theory with figure, the figureofmeterbridgeusedinlaboratory,constructionofMeterbridge. Post-Office box: Introduction, Theory, Circuit Diagram, TheoreticalCircuitdiagram,explanationofworkingwithnecessaryformula. **Galvanometer:** Introduction,Theory,SensitivityandFigureofMeritofGalvanometer. **Spectrometer:** Introduction,Constructionandexplanationofthree main parts of Spectrometer,Mercury Discharge lamp,Sodium Dischargelamp,theadjustment,levelingandthemethodofrecordingtheobservationofSpectrometer.	1	15
Reference: BookforStudy:ExperimentalBookforPhysics			

HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY,PATAN
B.Sc.PHYSICS-SEMESTER–I
TYPEOF COURSE:SKILL ENHANCEMENTCOURSE (SEC)
PROGRAMMECODE:SCIUG101 COURSECODE:SC23SECPHY106 (A)

COURSENAME: INTRODUCTIONTONANOTECHNOLOGY
(EffectivefromJune2023UnderNEP–2020)

TotalCredits:02 TeachingHoursperWeek:02T eachingHoursperSemester:30	Theory	ExternalMarks–25 InternalMarks-25

Sr. No	Contain	Credit	Lec. Hrs 30
Unit 1	**ConceptofNanotechnology:** Nanotechnology,NanotechGeneration,Nanoscience,Newformof Carbon,Nanocomposites,PolymerNanocomposites,Nanomaterials,Propertiesofnanomaterials-, One-, two- and three-dimensionalnanomaterials,Molecular nanotechnology,Nanostructuredmaterialsbyself-assembly,Nanocrystals,What nanodevicescan do inthemedicalfield? Nanopores,nanoionics,nano mechanics, Nanorobotics. **Tools to Make and measure a nano structure:** ToolsandTechniques,microscopy,Metrology,Simulation,Carbon Nanotube(CNT)–fabrication,PurificationofCNTs,Dispersion,ScanningProbeMicroscopes(SPM),AtomicForceMicroscopy(AFM),SingleMoleculeTechniques,MicrolithographyandMEMs,Electronbeamlithographyandfocusedionbombardment	1	15
Unit 2	**ApplicationsofNanotechnology:** Identifiedpotentialapplications Expectedbenefitsfromnanotechnologies,cannanotechnologyhelpinaddressingvariouschallenges,Energy andEnergyEfficiency,newenergyproducers,Medicine,security,OtherApplications,Constructions. **Impactof Nanotechnology:** Societalimpactofnanotechnology,Socialandethicalimpact,Health andenvironmentalimpact,Risks withnanotechnology,IndianScenarioinnanotechnology	1	15
Reference Book: Nanotechnology:technologyRevolutionof21stCenturyRakeshRathi(S.Chand&Company,NewDelhi)			
Further Reading: IntroductiontoNanoscience,S.M.Lindsay(OxfordPress)Nano:TheEssentials, T.Pradeep(TataMcGrawHill)			

HEMCHANDRACHARYANORTHGUJARATUNIVERSITY,PATAN

B.Sc.PHYSICS-SEMESTER–II

TYPEOFCOURSE: MAJORDISCIPLINESPECIFICCOURSE

PROGRAMMECODE:SCIUG101 COURSECODE:SC23MJDSCPHY201

COURSENAME: Electrostatics, Classical Mechanics, Electricity and Optics

EffectivefromJune2023UnderNEP–2020

TotalCredits:04 TeachingHoursperWeek:04TeachingHoursperSemester: 60	Theory	ExternalMarks-50 InternalMarks-50

Course Objective:

- To Learns the basics concepts and the law of electrostatics and electrostatic energy.
- ToLearntheconceptsofSimpleHarmonicOscillationsandcombinationofSHM.
- ToUnderstandtheconceptsofDamped&ForcedOscillationsanditsapplications
- To understands and recalls the basic concepts of DC Circuits and its functioning. Network
- theorems and principles of Network analysis.
- To develop foundation in optics. To learn the the knowledge of refraction through Lenses, Aberration and Interference
- To provide sufficient knowledge of Newton'S ring experiments and determine wavelength

Course Outcome:

After the successful completion of the course students will be able to

- Understands basics concepts of electrostatics. Learns how to determine the charge of an electron.
- LearnstheconceptsofSimpleHarmonicOscillationsandcombinationofSHM.
- UnderstandstheconceptsofDamped&ForcedOscillationsanditsapplications
- Learns basic concepts of DC Circuits, its functioning and principles of Network analysis. Also apply theorems to construct and solve electrical circuits.
- Learns the the knowledge of various type of Aberration and Interference
- Get sufficient knowledge of Newton'S ring experiments and determine wavelength

: Syllabus :

Unit No.	Content	Credit	Lect.Hrs60
Unit-1	**Electrostatics:** Gauss'slaw (4.21),Gauss'slaw inDifferential form (4.22),Gauss'slawandCoulomb'slaw(4.23),ImportantExamplesonGauss'sLaw (onlyList): when do Gauss's Law apply? (4.24) Force on the Surface of a chargedConductor(4.25),ElectrostaticsEnergyinthemediumsurroundingthecharged conductor (4.26), Millikan's Oil Drop Method for Determination ofElectronicCharge(4.29)(***RelatedExamples &Problems***) **SteadyCurrent:** MetalElectrodeinanElectrolyte (8.1),Batteryonopencircuit (8.2),Definition of EMF (8.3), Definition of Potential difference (8.4), Current andCurrent density (8.6), Conservation of chargei.e.,ContinuityEquation(8.8), Ohm's Law at a point (8.11), Wiedmann and franz law (8.13), TheRelaxationTime(8.14)(***RelatedExamples&Problems***) **BasicReference:** *ElectricityandMagnetismByK.K.Tewari(S.Chand&CompanyLtd)*	1	15
Unit-2	**Classical Mechanics:** **SimpleHarmonicOscillations**:CompositionoftwosimpleHarmonicMotions along the same direction of the same frequency(2.8), Two simpleHarmonicMotionsactuponaparticlesimultaneouslyhavingnophasedifferencebuttheydifferinfrequencybyverysmallamount(2.9), CompositionoftwosimpleHarmonicMotionsactinguponaparticlesimultaneouslyatrightanglestoeachother,sametimeperiodbutdifferentinphase(2.10),Lissajousfigures(2.11),Experimentaldeterminationof LissajousFigures(2.12b&c). (*RelatedExamples&Problems*) **Damped and Forced Oscillations:** Motion Due to a constant force (3.2), TheForceactsforshorttimeandtofinditseffect (3.3),A Particleexecuting S.H.M. is acted upon by a harmonic force Fsinpt of frequency $P/2\pi$ (3.4), Motioninaresistingmedium (3.5) (*Related Examples&Problems*) **Pendulum:**CompoundPendulumandOscillations,Barpendulum **BasicReference:** *ATextBookonOscillations,WaveandAcousticsbyM.Ghosh& D. Bhattacharya(S.Chand&CompanyLTD.)*	1	15

Unit-3	**Electricity:** **D.C.Circuits:**SimpleR-LCircuit-GrowthanddecayofcurrentHelmholtzequitation (11.24),R-C Circuit (11.25), Measurement of HighResistancebymethod ofleakage (11.26),ComparisonofcapacitiesbyDe- Sauty 'sMethod(11.27),IdealL-C.Circuit (11.28),SeriesL-C-RCircuit (changecaseonly)(11.29)(*RelatedExamples&Problems*) **Network Theorems:**Thevenin's Theorem (18.6), MaximumPowerTheorem(18.8) **A.C.Bridges**.:ACBridges (17.5)A.C.Bridgesforthemeasurementofinductances (17.6)(1)MaxwellBridge (2) AndersonBridgeA.C.Bridgeforthemeasurementof*capacitance*(17.7) (1)De Sauty'sA.CBridge(2)ScheringBridge(*RelatedExamples&Problems*) **Basic Reference:** *Electricity and Magnetism by K.K.Tewari(S. Chand&CompanyLtd)*	1	15
Unit-4	**Optics:** **RefractionThroughLenses:**IntroductionofvariousshapeofLenses,Lenses(4.2),Lensequation(4.9),Smallestseparationofobjectandrealimageina ConvexLens(4.13),DeviationbyathinLenses(4.15),PowerofLens(4.15) ,EquivalentFocalLengthoftwothinlensesSeparatedbyafinitedistance (4.17), FocalLength(4.17.1),Cardinal points(5.2) **Aberrations:** Introduction (5.1), The Achromatic Doublet (5.2.1), Monochromatic aberration (5.3), Sphericalaberration(5.3.1) (*RelatedExamples&Problems*) **Interference:** InterferenceinThinFilms (8.15),InterferenceduetoReflected light (8.16), Interference due to Transmitted light (8.17), Newton'sRings (8.23),DeterminationoftheWavelengthofSodiumLightusingNewton's Rings (8.24), Refractive index of a liquid using Newton's Rings,RefractiveindexusingGraph(8.25)(*RelatedExamples&Problems*) **BasicReference**:1)*ATextbookofOPTICSByN.Subhramanyam&Brijlal (S.ChandCo. Ltd.)* *2) Optics by Ajay Ghatak (THM Edition)* ***(For Aberration)***	1	15

Other References – Further Readings

- Electricity and Magnetism by Mahajan and Rangavala
- Electricity and Magnetism by Berkley Physics Course Voll 2
- WavesandOscillationsByN.Subhramanyam&Brijlal(VikasPubl.HouseLtd,NewDelhi)
- IntroductiontoClassicalMechanicsbyR.G.Takwale&P.S.Puranik (TataMcGraw-HillPublishingCompanyLtd.)
- ElectricalCircuitAnalysisbySonyandGupta
- NetworkAnalysisbyG.K.Mittal.(KhannaPublications)
- ElectricityandMagnetismbyD.C.Tayal
- PrincipalofOpticsbyB.KMathur(S.Chand&CompanyLtd)
- OpticsandAtomicsPhysicsbyD.P.Khandelval(HimalayaPublishinghouse)
- A Text book of Optics by N Subhramanyan and Brijalal

HEMCHEMCHANDRACHARYANORTH GUJARATUNIVERSITY,PATAN

B.Sc.PHYSICS-SEMESTER–II

TYPEOFCOURSE: MINOR DISCIPLINE SPECIFIC COURSE

PROGRAMMECODE: SCIUG101 COURSECODE: SC23MIDSCPHY202

COURSENAME: ELECTROSTATICS, CLASSICAL MECHANICS

EffectivefromJune2023UnderNEP–2020

TotalCredits: 02 TeachingHoursperWeek: 02TeachingHoursperSemester: 30	Theory	ExternalMarks-25 InternalMarks-25

Course Objective:

- To Learns the basics concepts and the law of electrostatics and electrostatic energy.
- ToLearntheconceptsofSimpleHarmonicOscillationsandcombinationofSHM.
- ToUnderstandtheconceptsofDamped&ForcedOscillationsanditsapplications.

Course Outcome:

After the successful completion of the course students will be able to

- Understands basics concepts of electrostatics. Learns how to determine the charge of an electron.
- LearnstheconceptsofSimpleHarmonicOscillationsandcombinationofSHM.
- UnderstandstheconceptsofDamped&ForcedOscillationsanditsapplications.

:: Syllabus ::

Unit No.	Content	Credit	Lect.Hrs30
Unit-1	**Electrostatics:** Gauss'slaw (4.21),Gauss'slaw inDifferential form (4.22),Gauss'slawandCoulomb'slaw(4.23),ImportantExamplesonGauss'sLaw (onlyList): when do Gauss's Law apply? (4.24) Force on the Surface of a chargedConductor(4.25),ElectrostaticsEnergyinthemediumsurroundingthecharged conductor (4.26), Millikan's Oil Drop Method for Determination ofElectronicCharge(4.29)(***RelatedExamples &Problems***) **SteadyCurrent:** MetalElectrodeinanElectrolyte (8.1),Batteryonopencircuit (8.2),Definition of EMF (8.3), Definition of Potential difference (8.4), Current andCurrent density (8.6), Conservation of chargei.e.,ContinuityEquation(8.8), Ohm's Law at a point (8.11), Wiedmann and franz law (8.13), TheRelaxationTime(8.14)(***RelatedExamples&Problems***) **BasicReference:** *ElectricityandMagnetismByK.K.Tewari(S.Chand&CompanyLtd)*	1	15

	Classical Mechanics: **SimpleHarmonicOscillations**:CompositionoftwosimpleHarmonicMotions along the same direction of the same frequency(2.8), Two simpleHarmonicMotionsactuponaparticlesimultaneouslyhavingnophasedifferencebuttheydifferinfrequencybyverysmallamount(2.9), CompositionoftwosimpleHarmonicMotionsactinguponaparticlesimultaneouslyatrightanglestoeachother,sametimeperiodbutdifferentinphase(2.10),Lissajousfigures(2.11),Experimentaldeterminationof LissajousFigures(2.12b&c). (*RelatedExamples&Problems*) **Damped and Forced Oscillations:** Motion Due to a constant force (3.2), TheForceactsforshorttimeandtofinditseffect (3.3),A Particleexecuting S.H.M. is acted upon by a harmonic force Fsinpt of frequency $P/2\pi$ (3.4), Motioninaresistingmedium (3.5) (*Related Examples&Problems*) **Pendulum:**CompoundPendulumandOscillations,Barpendulum **BasicReference:** *ATextBookonOscillations,WaveandAcousticsbyM.Ghosh& D. Bhattacharya(S.Chand&CompanyLTD.)*	1	15

Other References – Further Readings

- Electricity and Magnetism by Mahajan and Rangavala
- Electricity and Magnetism by Berkley Physics Course Voll 2
- WavesandOscillationsByN.Subhramanyam&Brijlal(VikasPubl.HouseLtd,NewDelhi)
- IntroductiontoClassicalMechanicsbyR.G.Takwale&P.S.Puranik (TataMcGraw-HillPublishingCompanyLtd.)

HEMCHEMCHANDRACHARYANORTH GUJARATUNIVERSITY,PATAN

B.Sc.PHYSICS-SEMESTER–II

TYPEOFCOURSE: INTER/ MULTI DISCIPLINESPECIFICCOURSE

PROGRAMMECODE:SCIUG101 COURSECODE:SC23MDCPHY203

COURSENAME:ELECTRICITY AND OPTICS

EffectivefromJune2023UnderNEP–2020

TotalCredits:02 TeachingHoursperWeek:02TeachingHoursperSemester: 30	Theory	ExternalMarks-25 InternalMarks-25

:: Syllabus ::

Unit No.	Content	Credit	Lect.Hrs 30
Unit-1	**Electricity:** **D.C.Circuits:**SimpleR-LCircuit-GrowthanddecayofcurrentHelmholtzequitation (11.24),R-C Circuit (11.25), Measurement of HighResistancebymethod ofleakage (11.26),ComparisonofcapacitiesbyDe- Sauty 'sMethod(11.27),IdealL-C.Circuit (11.28),SeriesL-C-RCircuit (changecaseonly)(11.29)(*RelatedExamples&Problems*) **Network Theorems:**Thevenin's Theorem (18.6), MaximumPowerTheorem(18.8) **A.C.Bridges**.:ACBridges (17.5)A.C.Bridgesforthemeasurementofinductances (17.6)(1)MaxwellBridge (2) AndersonBridgeA.C.Bridgeforthemeasurementof*capacitance*(17.7) (1)De Sauty'sA.CBridge(2)ScheringBridge(*RelatedExamples&Problems*) **Basic Reference:** *Electricity and Magnetism by K.K.Tewari(S. Chand&CompanyLtd)*	1	15
Unit-2	**Optics:** **RefractionThroughLenses:**IntroductionofvariousshapeofLenses,Lenses(4.2),Lensequation(4.9),Smallestseparationofobjectandrealimageina ConvexLens(4.13),DeviationbyathinLenses(4.15),PowerofLens(4.15),EquivalentFocalLengthoftwothinlensesSeparatedbyafinitedistance (4.17), FocalLength(4.17.1),Cardinal points(5.2) **Aberrations:** Introduction (5.1), The Achromatic Doublet (5.2.1), Monochromatic aberration (5.3), Sphericalaberration(5.3.1)(*RelatedExamples&Problems*) **Interference:** InterferenceinThinFilms (8.15),InterferenceduetoReflected light (8.16), Interference due to Transmitted light (8.17), Newton'sRings (8.23),DeterminationoftheWavelengthofSodiumLightusingNewton's Rings (8.24), Refractive index of a liquid using Newton's Rings,RefractiveindexusingGraph(8.25)(*RelatedExamples&Problems*) **BasicReference:** 1)*ATextbookofOPTICSByN.Subhramanyam&Brijlal (S.ChandCo. Ltd.)* *2) Optics by Ajay Ghatak (THM Edition)* ***(For Aberration)***	1	15

Other References – Further Readings

- ElectricalCircuitAnalysisbySonyandGupta
- NetworkAnalysisbyG.K.Mittal.(KhannaPublications)
- ElectricityandMagnetismbyD.C.Tayal
- PrincipalofOpticsbyB.KMathur(S.Chand&CompanyLtd)
- OpticsandAtomicsPhysicsbyD.P.Khandelval(HimalayaPublishinghouse)
- A Text book of Optics by N Subhramanyan and Brijalal

HEMCHANDRACHARYANORTHGUJARATUNIVERSITY,PATAN

B.Sc.PHYSICS-SEMESTER– II (PRACTICALCOURSE)

PROGRAMMECODE:SCIUG101

(EffectivefromJune2023UnderNEP–2020)

TYPE OFCOURSE	CREDIT	COURSECODE
MajorDisciplineCoreCourse(MJDSCP)	2(Group A)	SC23PMJDSC PHY201
MajorDisciplineCoreCourse(MJDSCP)	2 (Group B)	SC23PMJDSC PHY202
MinorDisciplineCoreCourse(MIDSCP)	2	SC23PMIDSC PHY203
Inter-DisciplineCoreCourse(MDSCP)	2	SC23PMDSC PHY204

TeachingHours

TeachingHoursperWeek:08 Hours for 4 Credit practical (120 Hours per Semester)
TeachingHoursperWeek:04 Hours for 2 Credit practical (60 Hours per Semester)

CourseObjectives:

- TogainpracticalknowledgebyapplyingtheexperimentalmethodtocorrelatewiththePhysicstheory.
- Toprovidehandsonexperiencewithequipmentsuchas,spectrometer,Pendulum,Flywheelandelectroniccircuits.
- Tolearntheusageofelectricalandopticalsystemsofvariousmeasurements.
- Toimpartpracticalknowledgebyperformingexperimentsbasedontheprinciplesoftheorycourses.
- Toprovidetraininghow toanalyzetheexperimentaldataandgraphicalanalysis.
- Todevelopintellectualcommunicationskillsanddiscussthebasicprinciplesofscientificconceptsinthegroup.

LABORATORYEXPERIMENTS Group A

MAJOR COURSE (2 Credit)

COURSECODE: SC23PMJDSC PHY201(A)

1. BarPendulum:Determinationof‘K’and‘g’
2. Melde’sExperiment. T/L^2 constant
3. FindoutRefractiveindexoftheprismusingspectrometer.
4. To determinetheratioofmagneticmomentsoftwomagnetsbyusingVibrational Magnetometer.
5. To determinethemagneticmomentofagivenBarmagnetusingDeflection MagnetometerinGaussAandBposition.
6. DeterminewavelengthofLASERLight.
7. NumericalAnalysis:JacobiinteractionMethod.
8. Plotting of a Graph and Error estimation on graphical plot. Linear and nonlinear graph, Logarithmic Graph Polar Graph
9. To Find the vertical distance between two points using Sextant.
10. Determine Modulus of Rigidity (Moment of Inertia) of Disk using Torsional pendulum
11. Numerical: Gauss Backward Interpolation Formula
12. Determinationof angular acceleration (α) and find MI ofaFlywheel using Formula
13. ToDeterminethevalueofCauchy’sConstantsof materialofPrism

LABORATORYEXPERIMENTS Group B

MAJOR COURSE (2 Credit)
COURSECODE: SC23PMJDSC PHY201(B)

1. Determinationofself-inductance'L'ofInductor.
2. StudyofParallelResonancewithvariable frequency and Fix capacity
3. P-NJunctiondiodeasFullWaveRectifierWithoutfilter. CalculationofPercentageofRegulation.
4. P-NJunctiondiodeasFullWaveRectifier(i)WithSeriesInductorFilter, (iii)WithShuntCapacitorFilter. CalculationofPercentageofRegulation.
5. Study of Characteristics of Tunnel Diode.
6. Studyof Series ResonancewithCapacitor variation and Fix Frequency
7. Studyof Parallel Resonancewithvariable capacitor and Fix Frequency
8. Decay of Potential across Condenser
9. LDRCharacteristics:obtainIVCharacteristicsofgivenLDRandcalculateitsresistor. (Forthreedifferentlightlevel)
10. To find the value of an unknown Inductor by using Owen's Bridge circuits
11. Measurement of Boltzmann constant using Diode.
12. PN Junction IV characteristics and Load Line analysis.
13. Study of Step Down Transformer. To determine Turn Ratio, % of Efficiency, Energy loss due to copper loss for a given transformer.

Course Outcome

Bytheendofthecourse,thestudentswillbeabletounderstand.

- ThebasicprinciplesofPhysicsrelatedtotheircoursesinthepracticalway.
- Theoperationaldetailsofspectrometer,electroniccircuitsetc.
- Theexperimentaldesignaspectstodeterminevariouspropertiesoflikegravity,qualityfactor, Refractiveindex,determinationofCauchy'sConstants,analysisofspectra,Analysisof error,determinevalueofunknownfrequencyetc.
- Theprocesstoanalyzetheobservationsandinfertheoutcomeoftheexperiments.
- Howtoanalyzetheexperimentaldataandgraphicalanalysis.

HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY,PATAN

B.Sc.PHYSICS-SEMESTER – II (PRACTICAL COURSE)

PROGRAMMECODE: SCIUG101

(EffectivefromJune2023UnderNEP–2020)

TYPE OFCOURSE	CREDIT	COURSECODE
MinorDisciplineCoreCourse(MIDSCP)	2	SC23PMIDSC PHY202

Teaching Hours per Week:04 Hours for 2 Credit practical and TeachingHoursperSemester: 60 Hours

LABORATORYEXPERIMENTS

MinorDisciplineCoreCourse(MIDSCP) Practical

1. BarPendulum:Determinationof'K'and'g'
2. Melde'sExperiment. T/L^2 constant
3. FindoutRefractive Indexoftheprismusingspectrometer.
4. To determinetheratioofmagneticmomentsoftwomagnetsbyusingVibrational Magnetometer.
5. To determinethemagneticmomentofagivenBarmagnetusingDeflection MagnetometerinGaussAandBposition.
6. Numerical: Gauss Backward Interpolation Formula
7. Determinationofself-inductance'L'ofInductor.
8. StudyofparallelResonancewithvariable frequency and Fix capacity
9. P-NJunctiondiodeasFullWaveRectifier (i)Withoutfilter. (ii)WithSeriesInductorFilter, (iii)WithShuntCapacitorFilter. CalculationofPercentageofRegulation.
10. Studyof Parallel Resonancewithvariable capacitor and Fix Frequency
11. Decay of Potential across Condenser
12. Study of Step Down Transformer. To determine Turn Ratio, % of Efficiency, Energy loss due to copper loss for a given transformer.

HEMCHANDRACHARYANORTHGUJARATUNIVERSITY,PATAN

B.Sc.PHYSICS-SEMESTER – II (PRACTICALCOURSE)

PROGRAMMECODE:SCIUG101

(EffectivefromJune2023UnderNEP–2020)

TYPE OFCOURSE	CREDIT	COURSECODE
Multi Discipline CoreCourse(MDSCP)	2	SC23PMDC PHY203

TeachingHoursperWeek:04 Hours for 2 Credit practical and TeachingHoursperSemester: 60 Hours

LABORATORYEXPERIMENTS

MultiDisciplineCoreCourse(MDSCP) Practical

1. NumericalAnalysis:JacobiinteractionMethod.
2. Plotting of a Graph and Error estimation on graphical plot. Linear and nonlinear graph, Logarithmic Graph , Polar Graph
3. To Find the vertical distance between two points using Sextant.
4. Determine Modulus of Rigidity (Moment of Inertia) of Disk using Torsional pendulum
5. Numerical: Gauss Backward Interpolation Formula
6. Determinationof angular acceleration (α) and find MI ofaFlywheel using Formula
7. ToDeterminethevalueofCauchy'sConstantsof materialofPrism
8. Studyof Parallel Resonancewithvariable capacitor and Fix Frequency
9. Decay of Potential across Condenser
10. Measurement of Boltzmann constant using Diode.
11. PN Junction IV characteristics and Load Line analysis.
12. Study of Step Down Transformer. To determine Turn Ratio, % of Efficiency, Energy loss due to copper loss for a given transformer

HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY,PATAN
B.Sc.PHYSICS-SEMESTER–II

Type Of Course:Skill enhancement Course
Programme Code:SCIUG101
COURSE CODE:SC23SECPHY206

COURSENAME:ElectronicCircuitElementsand EnergySources
(EffectivefromJune2023UnderNEP–2020)

TotalCredits:02 TeachingHoursperWeek:02T eachingHoursperSemester:30	Theor y	ExternalMarks–25 InternalMarks – 25

Unit No.	Content	Credit	Lect Hrs 30
Unit-1	**RESISTOR:**Generals (6.1),Resistortype,Wirewoundresistor,Carboncompositionresistor, Carbonfilmresistor,Cermetefilmresistor,Metalfilmresistor,Powerresistor,Valuetolerance,Variableresistor,PotentiometerandRheostats,Fusibleresistor.,Resistorcolor,resistor,Colorband,Resistorundertenohm, Resistor.Troubles,Checkingresistorwithohmmeter. **CAPACITOR:**Capacitors,Capacitorconnecttobattery,Capacitance,Factorscontrollingcapacitance,TypeofCapacitors,FixedCapacitor,Variablecapacitors,Voltageratingofcapacitors, Straycircuitcap.Leakageresistance,TroublesCapacitor,Checking capacitorwithohmmeter. **INDUCTOR:**Inductor,Comparison ofdifferent coils,Inductanceofaninductance,Anotherdefinitionofinductance,Mutualinductance, Coefficient of coupling, Variables inductors, Inductor inseriesandparallelwithoutM,Seriescombinationwithm, Strayinductance,Energystoragemagneticfield,DCResistanceofcoils.	1	15
Unit-2	**CELLS AND BATTERY:** Primary and Secondary cells and Battery's, Voltage and current of cell, Cell life, Different type of dry cells, Carbon zinc cell, Alkaline cell, Manganese alkaline cell, Nickel cadmium cell, Mercury cell, Silver oxide cell, Lead acid cell, Battery rating, Testing dry cell, Photo electric cell, Solar cell **TRANSFORMER:** Introduction, Type of Transformer, Constructionof Transformer,Transformerworking, Transformer impedance,CanaTransformerOperateonDCRFShielding,AutoTransformer	1	15
BasicReference:*BasicElectronicsbyB.L.Theraja,Pub.S.Chand&Company3rd Edition*			

HEMCHANDRACHARYANORTHGUJARATUNIVERSITY,PATAN

B.Sc.PHYSICS-SEMESTER–II

TYPE OF COURSE:SKILLENHANCEMENTCOURSE

PROGRAMMECODE:SCIUG201 COURSECODE:SC23SECPHY206(A)

COURSENAME: MEASUREMENT SYSTEMS

(EffectivefromJune2023UnderNEP–2020)

TotalCredits:02 TeachingHoursperWeek:02TeachingHoursperSemester: 30	Theory	ExternalMarks–25 InternalMarks-25

:: Syllabus ::

Sr. No	Content	Credit	Lec. Hrs 30
Unit 1	**Instrumentation;** Measurement, Significance of measurement, Types of measurement: direct, indirect, analog, digital; Null and Detection Method; Functional block diagram of measurement system; Examples, Rudimentary Pressure Gauge; Bourdon Tube thermometer; Input-Output configuration; Desired interfacing and modifying input; General scheme; Examples; Method of corrections; Method of higher gain feedback; Signal filtering; Opposing inputs; computed correction and inherent sensitivity.	1	15
Unit 2	**Statics Characteristics:** Static calibration; Static characteristics; Accuracy & Precision; bias; Combination of Component error in overall system; Accuracy; Calculation; Addition; Subtraction; Multiplication; & Division Errors: Errors, Absolute and Relative; Types of error; Gross error; Systematic and Random error; Method of correction; Statistical analysis curve; Probable error limiting error.	1	15

Reference Book:

1) E.O. Dobelin, Measurement Systems, Mc Graw Hill,
2) A.K. Sawhney, Instrumentation,
3) Gopal Krishna Banerjee, Electrical and Electronic Measurement, PHI, New Delhi,
4) Introduction to Measurement and Instrumentation, 3" Ed, Arun K Ghose, PHI, New Delhi

HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY,PATAN
B.Sc.PHYSICS-SEMESTER–I&II

SemesterEndExamination (SEE)

(EffectivefromJune2023UnderNEP–2020)

FORMATFORQUESTIONPAPER4
CREDITCOURSEINPHYSICS(MAJORDISCIPLINESPECIFICCOURSE)

PROGRAMMECODE: SCIUG101

COURSECODE:SC23MJDSCPHY101or**SC23MJDSCPHY201**

Theuniversityexaminationpaperconsistsoffourquestions.

- Firstquestionisof12MarksandwillbefromUnit–I.
- SecondquestionisofMarksandwillbefromUnit –II.
- ThirdquestionisofMarksandwillbefromUnit–III.
- FourthquestionisofMarksandwillbefrom Unit-IV.

(1) Thisquestionpapercontainsfourquestions.Allquestionsarecompulsory. (2) Figuresatrightside indicate themarksofquestion. (3) Illustrateyouranswerwithproperfiguresanddiagram.		Marks
Que–1	(A) AttemptanyTwooutofThree.(TheoryLongQuestions) (B) AttemptanyOneoutofTwo(Application/Example/ShortNote)	08 04
Que–2	(A)AttemptanyTwooutofThree.(TheoryLongQuestions)(B)AttemptanyOneoutofTwo(Application/Example/ShortNote)	10 03
Que–3	(A) AttemptanyTwooutofThree.(TheoryLongQuestions) (B) AttemptanyOneoutofTwo.(Application/Example/ShortNote)	08 04
Que-4	(A) AttemptanyTwooutofThree.(TheoryLongQuestions) (B) AttemptanyOneoutofTwo(Application/Example/ShortNote)	10 03
	Total	50

HEMCHANDRACHARYANORTHGUJARATUNIVERSITY,PATAN
B.Sc.PHYSICS-SEMESTER–I&II

SemesterEndExamination (SEE)
(EffectivefromJune2023UnderNEP–2020)

FORMATFORQUESTIONPAPER2CREDITCOURSEINPHYSICS(MINO R AND INTERDISCIPLINERYSPECIFICCOURSE)

PROGRAMMECODE:SCIUG101

COURSE CODE:SC23MIDSCPHY103 (MINOR) or SC23MDCPHY104 (Inter/Multi)
SC23MIDSCPHY203 **(MINOR)** or SC23MDCPHY204 (Inter/Multi)

Theuniversityexaminationpaperconsistsoffourquestions.
Firstquestionisof12marksandwillbefromUnit–I.
Secondquestionisof13marksandwillbefromUnit–II.

1. Thisquestion papercontainsthree questions.Allquestionsarecompulsory. 2. Figuresatrightsideindicatethemarksofquestion. 3. Illustrateyouranswerwithproperdiagram/figure		Marks
Que–1	(A) AttemptanyTwooutofThree.(TheoryLongQuestions) (B) AttemptanyOneoutofTwo.(Example/Shortnote)	08 04
Que – 2	(A) AttemptanyTwooutofThree.(TheoryLongQuestions) (B) AttemptanyOneoutofTwo.(Example/Shortnote)	10 03
	Total	25

HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN

B. Sc. - SEMESTER – I & II PHYSICS

(CBCS-Semester-Grading pattern) Semester End Examination

(Effective from June 2023 Under NEP – 2020)

FORMAT FOR QUESTION PAPER 2 CREDIT COURSE IN PHYSICS

(VALUE ADDED COURSE)

PROGRAMME CODE : SCIUG101 :: COURSE CODE: SC23VACPHY105
SC23VACPHY206

The university examination paper consists of four questions.

- First question is of 25 Marks and will be from Unit – I.
- Second question is of 25 Marks and will be from Unit – II.

Instructions:	(1) This question paper contains 2 Questions. (2) All questions are compulsory. (3) Figures at right side indicate the marks of Question.	
Que.1	(A) Attempt any Two out of Three (Long Question)	10Marks
	(B) Attempt any Two out of Three (Short Note)	08 Marks
	(C) Attempt any one out of Two (SQ)	02 Marks
Que.2	(A) Attempt any Two out of Three (Long Question)	10 Marks
	(B) Attempt any Two out of Three (Short Note)	08 Marks
	(C) Attempt any Five out of Seven (SQ)	02 Marks
Que.3	(A) Attempt any Two out of Three (Long Question)	06 Marks
	(B) Attempt any Four out of Six (MCQ/SQ)	04 Marks

Arise, Awake and Stop Not till your GOAL is Reached.

– SWAMI VIVEKANAND

S/d : Principal
The H.N.S.B.Ltd Science College
Himatnagar-383 001.