No Nameof University	**UniversityofRajasthan,Jaipur**
Nameof Faculty	**SocialScience**
Nameof Discipline	**PHYSICS**
TypeofDiscipline	**MDC**
ListofProgrammewere offeredasMinorDiscipline	**Non-ScienceandNon-MathsStudents.Onlythose Who has not studied Physics in Secondary and SeniorSecondary?**
OfferedtoNon-Collegiate Students	**Yes**

SEMESTER-WISEPAPERTITLESWITHDETAILS

				PHYSICS	**Credits**			
#	**Level**	**Semester**	**Type**	**Title**	**L**	**T**	**P**	**Total**
1.	5	I/II	MDC	**MDM-PHY-51T-101-BASICPHYSICS–I**	4	0	0	4
2.	6	III/IV	MJR	**MDM-PHY-63T-201-BASICPHYSICS–II**	4	0	0	4
3.	7	V/VI	MJR	**MDM-PHY-75T-301-BASICPHYSICS–III**	4	0	0	4

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ExaminationScheme

1. 1credit=25marksfor examination/evaluation
2. For Regular Students there will be Continuous assessment, in which sessional work and the terminal examination will contribute to the final grade. Each course in Semester Grade Point Average (SGPA) has two components- Continuous assessment (20% weightage) and (End of end-semester examination) EoSE (80% weightage).
3. ForRegularStudents,75%Attendanceismandatoryfor appearinginthe EoSE.
4. ToappearintheEoSEexaminationofacourse/subjectaregularstudentmustappearinthemid- semester examination and obtain at least a C grade in the course/subject.
5. CreditpointsinaCourse/Subjectwillbeassignedonlyif,theregularstudentobtainsatleastaC grade in the CA and EoSE examination of a Course/Subject.
6. InthecaseofNon-CollegiateStudentstherewillbeno Continuousassessmentandcredit points in acourse/subject will beassigned only if,the non-collegiatestudent obtains at least aC grade in the EoSE examination of a Course/Subject.

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ExaminationScheme forContinuousAssessment(CA)

DISTRIBUTIONOFCONTINUOUSASSESSMENT(CA)MARKS

S. No.	CATEGORY	Weightage (outoftotalinternal marks)		THEORY					PRACTICAL		
				CORE (Only Theory)	CORE (Theory + Practical)	AEC	SEC	VAC	CORE (Theory +Practical)	SEC	VAC
	MaxInternal Marks			**30**	**20**	**20**	**10**	**10**	**10**	**10**	**10**
1	**Mid-term Exam**	***50%***		**15**	**10**	**10**	**5**	**5**	**5**	**5**	**5**
2	**Assignment**	***25%***		**7.5**	**5**	**5**	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**
3	**Attendance**	***25%***		**7.5**	**5**	**5**	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**
		RegularClass Attendance	= 75%	3	2	2	1	1	1	1	1
			75-80%	4	3	3	1.5	1.5	1.5	1.5	1.5
			80-85%	5	4	4	2	2	2	2	2
			>85%	7.5	5	5	2.5	2.5	2.5	2.5	2.5

Note:

1. Continuousassessmentwillbethesoleresponsibilityoftheteacherconcerned.
2. Forcontinuousassessmentnoremunerationwillbepaidforpapersetting,Evaluation, Invigilation etc.
3. ForcontinuousassessmentPapersettingandEvaluationresponsibilitywillbeof teacher concern.
4. ForcontinuousassessmentnoAnswersheets/questionpapersetc.willbeprovidedby the University.
5. Collegesareadvisedtokeeprecordsofcontinuousassessment,attendanceetc.

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ExaminationSchemeforEoSE-

CA – ContinuousAssessment
EoSE– EndofSemesterExamination

RegularStudents–

Type of Examination	CourseCodeand Nomenclature	Duration of Examination		MaximumMarks		MinimumMarks	
Theory	**MDM-PHY-51T-101-BASIC PHYSICS – I**	**CA**	**2 Hrs**	**CA**	**20 Marks**	**CA**	**8 Marks**
		EoSE	**3 Hrs**	**EoSE**	**80 Marks**	**EoSE**	**32 Marks**

Thequestionpaper consistsof**two**partsA&B.

PART-A:20Marks

PartAwillbecompulsoryhaving10veryshortanswer-typequestions(withalimitof20words)of two marks each.

PART-B:60Marks

PartBofthepapershallconsistof4questionsselectingonequestionfromeachunitandthestudent shall attempt any 2 questions (with a limit of 100 words) that carry 20 marks each.

Non-CollegiateStudents–

Type	CourseCodeand Nomenclature	Duration of Examination	MaximumMarks (EoSE)	MinimumMarks (EoSE)
Theory	**MDM-PHY-51T-101-BASIC PHYSICS – I**	**3 Hrs**	**100 Marks**	**40 Marks**

Thequestionpaperwillconsistof**two**parts**A**&**B**.

PART-A: 20 Marks

PartAwillbecompulsoryhaving10veryshortanswer-typequestions(withalimitof20words)of two marks each.

PART-B:80Marks
Part B of the question paper shall be divided into four units comprising question numbers 2-5. Therewillbeonequestionfromeachunitwithinternalchoice.Eachquestionwillcarry20marks.

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Syllabus

MDM-PHY-51T-101
I/II-Semester

Semester	Codeofthe Course	TitleoftheCourse/Paper				NHEQF Level	Credits
I/II	MDC-PHY-51T-101	BASICPHYSICS–I				5	4
Levelof Course	Typeofthe Course	CreditDistribution			Offered to NC Student	CourseDelivery Method	
		Theory	Practical	Total			
	MDC	4	-	4	Yes	Lecture	
List of Programme Codes in which Offered as Minor Discipline		None					
Prerequisites		XIIPass,Anon-scienceStudentwhohasnotstudiedphysicsin Secondary and Senior Secondary					
Objectivesofthe Course:		Theprimaryobjectiveofthiscourseistoprovidestudentswith a thorough understanding of the fundamental principles governing classicalmechanicsandgravitationalphenomena.Thecourseaimsto instil a robust conceptual framework that encompasses laws of motion, friction, work, energy, power, rigid body dynamics, oscillatory motion, and gravitation. By integrating theoretical knowledgewithpractical examplesandproblem-solvingtechniques, students will develop the ability to analyze and interpret physical systems,preparingthemformoreadvancedstudiesinphysicsand relatedfields.					

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Detailed Syllabus

MDM-PHY-51T-101–BasicPhysics-I

Unit– I

Laws of Motion and Friction: Force and Inertia, Newton's first, second and third laws of motion, Linear Momentum, Law of Conservation of Momentum, Static and Kinetic Friction, Laws of Friction, Rolling Friction, Methods of reducing Friction, Inertial and Non-inertial frames of reference.

(15Lectures)

Unit-II

Work,EnergyandPower: Work,EnergyandTypeofEnergy,MechanicalEnergy, Work-Energytheorem,ConservationofMechanicalEnergy,PotentialEnergy,Power, Collision, Type of collision, Mass-Energy Relation.

Dynamics of Rigid Body: Concept of Centre of Mass, Centre of Mass of a Two Particle system, Two Particle system in Nature, Reduced mass of a Two Particle System, Example of Two Particle system.

(15Lectures)

Unit-III

Oscillatory Motion: Periodic Motion, Oscillatory Motion, Simple Harmonic Motion, Characteristics and Equation of SHM, Expression and Graphical RepresentationofDisplacement,VelocityandAccelerationinSHM,EnergiinSHM, Examples of SHM (Simple Pendulum, Compound Pendulum)

(15Lectures)

Unit-IV

Gravitation: UniversallawofGravitation**,**Accelerationduetogravity(g),Relation between acceleration due to gravity (g) and Universal Gravitational constant (G), VariationofaccelerationduetoGravityduetoHeight,Depth,LatitudeandRotation ofEarth.Valueof AccelerationduetogravityontheMoon. Gravitational Potential Energy, Velocity of Projection.

(15Lectures)

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SuggestedBooksandReferences–

1. ConceptofPhysics Vol.I& Vol.IIbyH.C.Verma(HCV),BhartiBhawan Publishers.
2. FundamentalofPhysicsbyHalliday,ResnickandWalker,JohnWiely&Sons.
3. MechanicsbyD.S.Mathur,P.S.Hemne,S.ChandandCompanyLimited.
4. Mechanics,BerkeleyPhysics,Vol.I,byKittel,Knightetal2007,Tata McGraw-Hill

CourseLearningOutcomes:

Uponsuccessfulcompletionofthiscourse,studentswill beableto:

1. UnderstandLaws ofMotion and Friction
2. Analyzethe conceptsofinertia,force,andmomentum.
3. Explaintheconceptsof work, energy,andpower,andtheirdifferentforms.
4. UnderstandOscillatory Motion
5. Understandandapplytheuniversallawofgravitation.
6. Describethevariationingravitationalaccelerationduetoheight,depth,latitude,andthe Earth's rotation
7. Calculategravitationalpotentialenergy andthevelocityof projection.
8. Understandthegravitationalforces andpotentialonthe Moon.

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ExaminationSchemeforEoSE-

CA – ContinuousAssessment
EoSE– EndofSemesterExamination

RegularStudents–

Type of Examination	CourseCodeand Nomenclature	Duration of Examination		MaximumMarks		MinimumMarks	
Theory	**MDM-PHY-63T-201-BASIC PHYSICS – II**	**CA**	**2 Hrs**	**CA**	**20 Marks**	**CA**	**8 Marks**
		EoSE	**3 Hrs**	**EoSE**	**80 Marks**	**EoSE**	**32 Marks**

Thequestionpaper consistsof**two**partsA&B.

PART-A:20Marks

PartAwillbecompulsoryhaving10veryshortanswer-typequestions(withalimitof20words)of two marks each.

PART-B:60Marks

PartBofthepapershallconsistof4questionsselectingonequestionfromeachunitandthestudent shall attempt any 2 questions (with a limit of 100 words) that carry 20 marks each.

Non-CollegiateStudents–

Type	CourseCodeand Nomenclature	Duration of Examination	MaximumMarks (EoSE)	MinimumMarks (EoSE)
Theory	**MDM-PHY-63T-201-BASIC PHYSICS – II**	**3 Hrs**	**100 Marks**	**40 Marks**

Thequestionpaperwillconsistof**two**parts**A**&**B**.

PART-A: 20 Marks

PartAwillbecompulsoryhaving10veryshortanswer-typequestions(withalimitof20words)of two marks each.

PART-B:80Marks
Part B of the question paper shall be divided into four units comprising question numbers 2-5. Therewillbeonequestionfromeachunitwithinternalchoice.Eachquestionwillcarry20marks.

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Syllabus

MDM-PHY-63T-201
III/IV-Semester

Semester	Codeofthe Course	TitleoftheCourse/Paper				NHEQF Level	Credits
III/IV	MDC-PHY-63T-201	BASICPHYSICS–II				5	4
Levelof Course	Typeofthe Course	CreditDistribution			Offered to NC Student	CourseDelivery Method	
		Theory	Practical	Total			
	MDC	4	-	4	Yes	Lecture	
List of Programme Codes in which Offered as Minor Discipline		None					
Prerequisites		BasicPhysics–IinISemesterorIISemester					
Objectivesofthe Course:		The objective of this course is to provide students with a comprehensive understanding of key principles in physics, encompassingthemechanicalpropertiesofmatter,thermodynamics, rayoptics,andelectricity.Throughthiscourse,studentswilldevelop theabilitytoapplyfundamentallawsandtheoriestosolvereal-world problems, enhancing their critical thinking and analytical skills. The courseaimstodevelopadeepcomprehensionofphysicalphenomena and their practical applications in technology and industry.					

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Detailed Syllabus

MDC-PHY-63T-201–BasicPhysics-II

Unit-I

Mechanical Propertiesof Matter: Elasticity, Elastic Limit, Stress, Strain, Hooke's Law and Modulus of Elasticity, Poisson's Ratio, PracticalApplication of Elasticity, ConceptofSurfaceTension,DefinitionofSurfaceTension,SurfaceEnergy,Cohesive and Adhesive Forces. Flow of Liquids, Streamline and Turbulent Flow, Viscosity, Critical Velocity and Reynold's Number, Newton's Formula, and Coefficient of Viscosity.

(15Lectures)

Unit-II

Thermodynamics: Concept of Heat and Temperature, zeroth law of thermodynamics, Scale of Temperature, Thermal Expansion, Heat and Mechanical Work,IndicatorDiagram,firstlawofthermodynamics,Workdoneduringisothermal and adiabatic processes, Reversible and Irreversible Process, Heat engine: Carnot's cycle, Carnot's Ideal heat engine and Efficiency (No Derivation).

(15Lectures)

Unit–III

Ray Optics: Reflection of Light, Law of Reflection, Formation of image in a plane Mirror, Spherical Mirror,Terms andTheirDefinitions Related to Spherical Mirrors, Sign Convention, Relation between Focal Length and Radius of Curvature, Formation of Image in Spherical Mirror and Nature of Images, Mirror Formula, Linear Magnification, Nature and Position of Image for Various Positions of the object in Spherical Mirrors, Use of Spherical Mirrors.

(15Lectures)

Unit-IV

Electricity: Electric Current, Charge carriers in different materials, Ohm's law, resistivity and conductivity, Resistors, types of resistors, Classification of materials basedonresistivity,temperaturedependenceofresistivity,Capacitanceand

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Inductance. Impedance, Reactance, Conductance, Cell and Battery, The electromotiveforceofacell,theinternalresistanceofacell,Measurementofelectric current, electric energy, electric power, and electric fuse. Choke Coil, Transformer (only Introduction).

(15Lectures)

SuggestedBooksandReferences–

1. ConceptofPhysics Vol.I& Vol.IIbyH.C.Verma(HCV),BhartiBhawan Publishers.
2. FundamentalofPhysicsbyHalliday,ResnickandWalker,JohnWiely&Sons.
3. MechanicsbyD.S.Mathur,P.S.Hemne,S.ChandandCompanyLimited.
4. HeatThermodynamicsandStatisticalPhysicsbyBrijLal,Subrahmanyamand Hemne, S. Chand and Company Limited.

CourseLearningOutcomes:

Bytheendofthiscourse,studentswillbeableto:

1. UnderstandandApplyMechanicalPropertiesofMatter
2. ComprehendFundamentalPrinciplesofThermodynamics.
3. AnalyzeRayOpticsandImageFormation
4. UnderstandElectricalConceptsandTheirApplications

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ExaminationSchemeforEoSE-

CA – ContinuousAssessment
EoSE– EndofSemesterExamination

RegularStudents–

Type of Examination	CourseCodeand Nomenclature	Duration of Examination		MaximumMarks		MinimumMarks	
Theory	**MDM-PHY-75T-301-BASIC PHYSICS – III**	**CA**	**2 Hrs**	**CA**	**20 Marks**	**CA**	**8 Marks**
		EoSE	**3 Hrs**	**EoSE**	**80 Marks**	**EoSE**	**32 Marks**

Thequestionpaper consistsof**two**partsA&B.

PART-A:20Marks

PartAwillbecompulsoryhaving10veryshortanswer-typequestions(withalimitof20words)of two marks each.

PART-B:60Marks

PartBofthepapershallconsistof4questionsselectingonequestionfromeachunitandthestudent shall attempt any 2 questions (with a limit of 100 words) that carry 20 marks each.

Non-CollegiateStudents–

Type	CourseCodeand Nomenclature	Duration of Examination	MaximumMarks (EoSE)	MinimumMarks (EoSE)
Theory	**MDM-PHY-75T-301-BASIC PHYSICS – III**	**3 Hrs**	**100 Marks**	**40 Marks**

Thequestionpaperwillconsistof**two**parts**A**&**B**.

PART-A: 20 Marks

PartAwillbecompulsoryhaving10veryshortanswer-typequestions(withalimitof20words)of two marks each.

PART-B:80Marks
Part B of the question paper shall be divided into four units comprising question numbers 2-5. Therewillbeonequestionfromeachunitwithinternalchoice.Eachquestionwillcarry20marks.

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Syllabus

MDM-PHY-75T-301
V/VI-Semester

Semester	Codeofthe Course	TitleoftheCourse/Paper				NHEQF Level	Credits
V/VI	MDC-PHY-75T-301	BASICPHYSICS–III				5	4
Levelof Course	Typeofthe Course	CreditDistribution			Offered to NC Student	CourseDelivery Method	
		Theory	Practical	Total			
	MDC	4	-	4	Yes	Lecture	
List of Programme Codes in which Offered as Minor Discipline		None					
Prerequisites		BasicPhysics–IIinIII SemesterorIVSemester					
Objectivesofthe Course:		The primary objective of this course is to provide a comprehensive understanding of the fundamental principles and concepts in classical and modern physics, particularly focusing on electric charge, magnetism, semiconductors, radioactivity, nuclear structure,andquantummechanics.Bydelvingintothesecoreareas, studentswillgainarobustfoundationnecessaryforadvancedstudies and applications in physics and related fields.					

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Detailed Syllabus

MDC-PHY-75T-301–BasicPhysics-III

Unit-I

Electriccharge: Propertiesofcharge,comparisonofchargeandmass,conservation of charge, Quantization of charge, Coulomb's law, Force on a point charge due to multiplecharges.ConceptofElectricFieldanditsPhysicalImportance,Electricfield intensity, Dielectric Medium and Dielectric Constant, Electric dipole and dipole moment. Magnetism: Natural Magnets, Artificial Magnets, Properties of a Bar Magnet, Magnetic Lines of force, Coulomb's Law, Intensity of Magnetic Field.

(15Lectures)

Unit–II

Semi-Conductors: Distinctionbetweenmetals,insulatorsandsemiconductors.Pand N-type Semiconductors, Electrons and Holes in an Intrinsic Semiconductor, Semiconductor-diode and its Characteristics, Static and Dynamic Resistance. DC power supply: Half wave rectifier, Full wave rectifier.

Bipolar Junction Transistor: Review of the characteristics of transistor in CE and CBconfigurations,Regionsofoperation(active,cutoffandsaturation),Currentgains α and β. Relations between α and β. dc load line and Q point.

(15Lectures)

Unit–III

Radioactivity: Nature of Radioactive Radiations, Theory of Radioactive Decay, Half-Life,UnitsofRadioactivity,RadioactiveSeries,DiscoveryofNeutron,Massof Neutron, Fast and Thermal Neutrons, Properties of Neutrons.

NuclearStructure: NuclearComposition,SomeNuclearProperties,StableNuclei, Binding Energy, Electron Orbit,Atomic Spectra, The BohrAtom.

Elementary particles: Introduction, Classification of elementary particles, Particle interactions,Conservationlaws(linear&angularmomentum,energy,charge,baryon number & lepton number), particles and antiparticles (Electrons and positrons, Protons and anti-protons, Neutrons and antineutrons, Neutrinos and anti-neutrinos), Photons, Mesons.

(15Lectures)

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Unit-IV

QuantumMechanics:OriginofQuantumtheory,Blackbody(definition),BlackBody Spectrum, Photoelectric effect, Wien's displacement law, Compton Effect Matter waves: De Broglie waves, Concept of wave packet, phase velocity, group velocity andtherelationbetweenthem,Wave-particleduality,Davisson-Germerexperiment, Heisenberg's uncertainty Principle.

(15Lectures)

SuggestedBooksandReferences–

1. PrinciplesofElectronics:V.K.MehtaandRohitMehta.S.Chand Publications. (11th Ed.)
2. HandBookofElectronics:GuptaandKumar
3. ConceptsofModernPhysics:ArthurBeiser,ShobhitMahajan,SRai Choudhury (6th Ed.) (TMH).
4. AtomicPhysicsbySNGhosal,SChand&Co.\
5. Atomic & Nuclear Physics: N Subrahmanyam, Brij Lal. (Revised by Jivan Seshan.) S. Chand & Co.
6. NuclearPhysics,D.C.Tayal(HimalayanPublishingHouse)5thed.
7. Quantum Mechanics by S. P. Singh, M. K. Badge and K. Singh, S. Chandand Company Ltd.
8. IntroductiontoQuantumMechanics:P.T.Mathews(TMH).
9. QuantumMechanicsTheoryandApplication:AKGhatakandSLoknathan

CourseLearningOutcomes:

Bytheendofthiscourse,studentswillbeableto:

1. UnderstandtheFundamentalsofElectricChargeandMagnetism
2. AnalyzetheBehaviorofSemi-Conductors
3. ComprehendRadioactivityandNuclearStructure
4. GrasptheConceptsofQuantumMechanics

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