Sr. No.	Course Code	Course Title	Course Objective	Expected Outcome
1	PHY-101	Vector Analysis , Waves , Optics , LASERS	The course enable students to acquire fundamental understanding of vector algebra . Production technique , characterestics and applications of mechanical waves, sound waves and ultra sonic waves . Basic concepts of optics and LASER , types of different LASERS and their applications are also covered.	• The course work covered here forms the basic understanding require for foundation of all the branches in physics. • The students have hands on training of use of spectrometer , study of laws of wave motion, LASER light propagation and their energy. Basic characterestics of different electronic components used in designing of anolog and digital circuits , understanding of basic rectifier and digital circuits having vast applications in electronics.
2	PHY- 103	Electric and electronic circuits , elecrostatics , plasma physics and nuclear physics.	The objective of the course work is development of basic concepts in elctromagnetism , electronics , plasma physics and Nuclear physics	• Students learn about A.C. and D.C. circuits , L-C-R circuits , bridge and diod circuits • Gauss law, Poison and Laplace equations ,

				determination of electrostatic potentials and fields in different cases, Electric dipole in plane polar, spherical polar and cartesian coordinate system. All these topics are foundations for electrodynamics.
				• Ambipolar Diffusion, Viscosity in plasma , Conductivity, combmation, Ohm's law, Gas Discharge, Comparision of various natural & man-made plasma, Plasma diagnostics, plasma waves & Instabilities confinement of plasma,space plasma give preliminary understanding for plasma physics.
				• Transient equilibrium and secular equilibrium, Radio active series, Radioactive isotopes of lighter elements, Artificial radioactivity, Age of

				earth, Carbon dating (Archaeological time scale) Types of Nuclear Reactions, The balance of mass and Energy in Nuclear reactions, The Q Equation, Measurment of Nuclear radius, Constituents of the nucleus and their properties, Nuclear spin moments and statistics. All the topics covered here are essential to study nuclear physics.
				• Students learn techniques for theoretical calculations of nuclear radioactive decay . The concepts of different bridge circuits , analog and digital circuits learn over here are important for study in modern electronic Instrumentations and

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				Measurement Techniques .
3	PHY- 201	Solid State Physics , Electronics , Modern Physics and Elementary Quantum Mechanics , Wave Optics .	The course designed over here involves most basic concepts required in respective branches of physics.	● Students know the fundamentals of crystal structure , Brag's law , experimental diffraction methods , Fundamentals of transistors , amplifiers , solid state electronic devices and their applications. ● They also learn basic course of Quantum mechanics. The topics included in optics impart their knowledge to understand principles of optical instruments having large applications in experimental astrophysics , atomic spectroscoppy and molecular spectroscopy . ● Experiments involving optics , electronics , solid state physics and general physics give very much clarity in concepts of their

				theory course work of the syllabus. Physics problems are also solved by numerical study. Numerical technique is a powerful tool in the study of theoretical physics research.
4	PHY- 202	Mathematical Physics , Classical mechanics , Nuclear Physics , dielectrics and magnetostatics.	This course is designed to acquire considerable basic understanding of mathematical physics , classical mechanics electrostatics and magnetostatics. Many nuclear physics instruments are included in the course.	• Students acquire more genneral understanding of periodic functions by studying forier series in mathematical physics . Applications of forier series are wide in physics , chemistry and electronics. In classical mechanics , basic understanding in laws of planetary physics and collision theory are developed. • Many nuclear physics experiment instruments are taught in detail and undestanding of electrostatics and magnetostatics are taught . Apart from electrodynamics

				elctrostatics and magnetostatics concepts have wide applications in some types of scientific instruments and engineering.
5	PHY-204	Solid state physics , heat and thermo dynamics , electronics and atomic spectroscopy.	This course is designed to acquire more knowledge of solid state physics and electronics. Heat and thermodynemics and atomic spectroscopy is also introduced.	• Hands on training they get to understand Priciples of optical instruments , numerical calculations in lattice dynamics, experiments on atomic spectra . Characterestics of solid state electronic devices and fundamental experiments in electronics they learn are very much usful for designing elctronic circuits.
6	PHY- 205	Sound and optics , statistical mechanics , relativity and quantum mechanics.	The course gives more knowledge of sound and optics . Statistical mechanics and relativity are also introduced here. The course of quantum mechanics introduced here is the core study for understanding quantum mechaics .	• Study on the optical phenomena of polarization is covered in detail. The course of statistical mechanics introduced here gives preliminary understanding for study in statistical mechanics branch of physics. Students are

				capable to grasp understanding of atomic stucture , atomic spectoscopy, molecular structure , molecular spectroscopy, nuclear physics and many modern branches of physics by understanding of fundamentals of quantum mechanics taught over here.
7	PHY-301	Mathematical Physics , Classical Mechanics and Quantum Mechanics	Mathematics forms the tools of modern workers in theoretical physics , chemistry and different branches of engineering. Here Helmholt's equation , Laplase's equation in various coordinate systems are considered . separability of a partial differential equation invarious coordinate systems , linear and nonlinear first order differential equations and related examples are taught. Langrangian formulation in classical mechanics and exactly solveble eigen value problems in quantum mechanics are also covered.	• The Students Gain knowledge regarding basic frame work of mathematical physics , classical mechanics and quantum mechanics . • The concept of angular momentum and spherical harmonics anable students to undestand electronic stucture of atoms and molecules and the concepts are also hepful for study of light scattering in astronomy and astrophysics.

8	PHY- 302	Molecular Spectra , Statistical Mechanics and Solidstate Physics .	A detail study of Molecular rotational spectra , rotational vibrational spectra ,Raman effect, molecular electronic states and Luminescence are covered. Formulation of Quantum Statistics , Bose Einstein and Fermi Dirac Distributions , Elastic constants and elastic waves and Free electron Fermi gas are studied in detail.	● Students can calculate bond length , force constant , moment of inertia, rotational frequency and vibrational frequency , Raman shift of diatomic molecules . They also know to find out absorption and emission frequencies of molecular radiation . Students know all different types of partition functions of statistical mechanics and in material science , they get knowledge about different mechanical , thermodynamic and electronic properties of material.
9	PHY- 303	Electromagnetic induction, Electromagnetic waves , Electromagnetic Radiation , Alpha , Beta and Gamma Rays and liquid drop model of the nucleus.	The objective of course is to lay foundations of electrodynamics and nuclear physics .	● Students understand fundamentals of elctrodynamics namely Maxwell's equations , Lorentz gauge , Polarizations, Energy flux Radiation, pressure and Momentum of Plane waves in conducting medium and

				Skin effect. Detail understanding about radiation by charge particle . Students understand fundamentals of alpha beta and gamma rays spectra , nuclear fission and nuclear model.
10	PHY- 304	Linear and non linear electronic circuits	The course imparts introduction of basic concepts of general amplifier characteristics , frequency response of a transistor amplifier , digital electronics and network transformations .	● Students get knowledge of basics of amplifier , current gain , voltage gain and power gain,distortion and low frequency and high frequency response of transistor amplifier . Students also get clerity in fundamentals of digital principles and applications and get considerable understanding in network lines and field
11	PHY- 305	Nanoscience and nanotechnology	As an elective course this aims to introduce basic understanding and introduction to nanomaterials , methods of synthesis of	● Useful knowledge of the study in nanotechnology will update and support their understanding of

			nanomaterials and characterization technique.	requirements of various research labs and applications in electronics, biotechnology and medical, automobiles, space, defense, sports, cosmetics, cloth industry. ● Students are also given experimental work on general physics , nuclear physics instrument and optical instruments . The fundamentals they develop have applications in experimental astrophysics , the principles involved in fibre optics communication . Basic experiments of analog and digital electronics are very useful to understand designing of advance electronic circuits and integrated circuits.
12	PHY 307	Mathematical Physics , classical mechanics and quantum mechanics.	The course is in continuation with the paper 301 with extention of study in some special functions of mathematical physics , Lagrange's	● Mathematical physics , classical mechenis and quantum mechenics courses introduced here

			and Hamiltons equations, exactly soluble eigen value problems and representations, transformations and symmetries in quantum mechanics. The course work will prepare students for understanding advanced level physics and research.	are building blocks for understanding advance technologies and research in any branch of theoretical physics.
13	PHY- 308	Electronic Spectra, Statistical Mechanics & Solid State Physics	The extension of the course work of paper 302 is continued over here with study of molecular electronic spectra , transport phenomena , theory of dielectrics , diamagnetism and para magnetism.	Comprehensive information of diatonic moleular spectra are completed here with the electronic spectra. Completing the study work of statistical mechanics , students have understanding of all basic concepts of statistical mechanics . The scope of statistical mechanics is very wide. It is applicable to all phenomena of macroscopic bodies whose behaviour can not be completly described by classical or quantum mechanics. It is

				applicable to physics ,chemistry,material science , astronomy and biology. Detail study of dielectrics make students knowledgeble about the dielectric property of materials. Understanding of Dielectric character of the material plays very important role for many applications for example , designing drugs in pharmasuitical industry. Concepts of diamagnetism and paramagnetism study are important for study of superconductivity and material science.

| 14 | PHY- 309 | Plasma Physics and Nuclear Physics. | With the course of plasma physics over here , students get very important fundamental understanding in plasma physics , the subject has wide applications . In nuclear physics , basic concepts of nuclear structure , nuclear fission and nuclear . reactors , prelimnary understanding of elementary particles are also included. | ● Students are capable to understant the subject of plasma physics.Study in plasma physics has fantastic applications .

 ● Apart from applications range from energy production by thermonuclear fusion to laboratory astrophysics , plasma physics has many industrial applications such as , blood coagulation,skin treatment,dental cleaning, treatment of certain types of cancer,hair treatment,sterilization of |

				hands,vegitables,seeds,bio films .To increase germanism rate of seeds , increase surface energy of polymer films,surface hardening of metals , nano particle production by plasma.
				• Students get fundamental understaning in nuclear fission .The understanding is essential for designing purpose of nuclear reactors . Nuclear science also have many applications in medical science .

15	PHY- 310	Linear & Non-Linear Electronics circuits	The objective of the paper is to give them detail knowledge of feedback amplifiers , transistor oscillators, FET amplifiers and Operational amplifiers , digital electronics , regulated power supplies and electronic instruments .	• These topics make students capable to understand working and designing of any electronic circuit may have any application. They also understand Preliminary concepts required for microprocessor study. Students also get detail understanding of many electronic instruments which are used for precise scientific measurements.
16	PHY- 311	Transducers , Electronic Instruments , Signal Generators .	Defining transducer , many different transducers having different applications are studied in detail . Studies of most basic electronic instruments and signal generators are also coverd.	Students become knowledgeble to principles behind different types of transdusers . Transdusers are widely used in automation , measurement and control system . Students understand mechanism of working and designing of electronics instruments which are frequently required for scientiific measurements of different physical quantities. Considerable knowledge of

				signal generators is also aquired . There are many different types of signal generators with different purpose and applications. Signals generated by signal generators are used as a stimulus for electronic measurements , typically in designing , testing, troubleshooting and repairing electronic or electroacoustic devices.