Department of Physics

Program outcome and Program Specific Outcome

For Bachelor of Science in Physics

The college is permanently affiliated to Manipur University, Canchipur and follows the curriculum prescribed by the University.

PROGRAMME OUTCOMES: B.Sc. Physics

After completion of three year degree programme in Physics a student should be able to

P01:- Acquire adequate knowledge of the subject to solve, demonstrate and apply in all disciplines of physics.
P02:- Develop good communication skill to explain complicated technical terminology of physics in simple way.
P03:- Become conscious of environment and take responsibility of preserving our environment.
P04:- Practice critical checking and the scientific knowledge to design, record and analyse the results of Physics experiments.
P05:- Learn to tolerate diverse ideas and difference points of view.
P06:- Empower to face the challenges of the changing Universe using modern techniques, equipment and computer software.

PROGRAMME SPECIFIC OUTCOMES:

PSO_1:Get knowledge about Physics through theory and practical.
PSO_2: Acquire analytical and logical skill for higher education.
PSO_3: Develop confident to take up competitive exams.
PSO_4: Impart the knowledge to others, explain the different phenomenon of our day to day Life.

B.Sc. 1st Semester

Course Outcome: PHY – 101 : Mechanics

After completing the course the student will be able to

1. Explain the phenomenon related to the different types of motion in daily life.
2. Elaborate the laws of conservation in many physical phenomenon.
3. Formulate the mathematical relations based on physical phenomenon and laws of Gravitation.
4. Demonstrate oscillatory motion and develop proficiency in the analysis of complicated problems.

5. Explain the concept of special theory of relativity, mass- energy equivalence and Doppler Effect.
6. Develop scientific method to demonstrate types of motion

B.Sc. 2nd Semester

Course Outcome PHY –202:Thermal Physics & Optics

After completing the course the student will be able to

1. Design simple apparatus on Mechanics based on thermal energy.
2. Explain the applications of thermodynamics.
3. Understand the behaviour of gases and visualise the microscopic world of matter.
4. Understand blackbody radiation & Plank's quantum hypothesis.
5. Explain the natural phenomenon due to interference & diffraction.
6. Develop many instruments based on optics.
7. Understand about Quantum Optics and its application in telecommunications and others.
8. Formulate many theory based on heat and light.

B.Sc. 3rd Semester

Course Outcome PHY – 303 : Electricity & Magnitism

After completing the course the student will be able to

1. Understand the concepts of vector and scalar fields and its important mathematical theorems in Physics.
2. Importance of electric and magnetic field and its effects in daily life. Explain dielectric properties of matter.
3. Understand basic concept of Maxwell's equations and electromagnetic waves.
4. Understand electromagnetic induction and its related phenomenon. Design different AC Circuits using L, C and R and their combinations.
5. Develop experiment based on electricity and magnetism.
6. Understand the working of electric machine and design electric circuits used for many purposes of daily life.

B.Sc. 4th Semester

Course Outcome PHY – 404 : Atomic and Nuclear Physics

After completing the course the student will be able to

1. Understand X-rays and its application in medical sciences.
2. Explain about the structure of atom and its relevant theories.
3. Explain the applications of radioactivity in medical science, Geology and Archeology.
4. Understand the hazards of the radiations emitted by radioactive elements.

5. Understand nuclear detectors and its utility.
6. Gain knowledge about different nuclear models and semi empirical mass formula.
7. Understand nuclear reactions & its application.
8. Formulate the simple equations regarding nuclear reactions.
9. Gain knowledge about Nuclear reactions as energy source.

B.Sc. 5th Semester

Course Outcome PHY – 505 : Electronics

After completing the course the student will be able to

1. Understand knowledge about Basic circuit network theorems.
2. Explain about semiconductor devices and its operations in the electronic machine and associated circuits.
3. Understand about amplifiers and its applications in different fields, oscillators and digital circuits.
4. Develop the advance experimental techniques based on electronics.
5. Assist, assemble, modify and test electronic circuit in accordance with job recruitment.
6. Apply troubleshooting to electronic circuit/system and perform test procedure.
7. Apply the mathematical tools to explain the electronics and allied phenomenon.

Course Outcome PHY – 506 : Mathematical Physics

After completing the course the student will be able to

1. Understand about complex variables and functions of a complex variables.
2. Understand special functions like Gamma function, Beta function, Legendre, Hermite, Laguerre polynomial and Bessel function.
3. Understand Partial differential Equations its solutions in Physical Phenomena.
4. Understand about periodic functions and Fourier series.
5. Apply mathematical ideas and models to problems.
6. Apply mathematical problems and solutions in science & technology.
7. Create hypothesis and appreciate how Physics relates to other theorem.

Course Outcome PHY – 507 : Laboratory

After completing the course the student will be able to

1. To draw the characteristics of a transistor in the CE and CB configurations.
2. To draw the resonance curve of series and parallel LCR circuit and to determine the Q-Factor.
3. Determination of the constant of a ballistic galvanometer by using a standard capacitor.
4. To construct two input OR and AND logic gates using p-n- junction/transistor and to verify

their truth tables.
5. To study the performance of NOT circuit using transistor.
6. To draw the characteristic of a Zener diode and to study its use as a voltage regulator.
7. To study solid state half-wave and full-wave rectifiers and to determine the ripple factor andp,c, of regulation and different types of filters.
8. To plot the frequency response of an R.C. –coupled amplifier (i) without feedback and (ii) with negative feedback and to determine the bandwith in each case.
9. Detetermination of self inductance by Anderson's method.
10.Determination mutual inductance by using a ballistic galvanometer and to draw the M.O. Curve.
11. Determination of the band gap of a p-n junction diode (germanium).

B.Sc. 6th Semester

Course Outcome : PHY - 608 : Quantum Mechanics

After completing the course the student will be able to

1. Understand evolution of quantum theory in 20th century.
2. Understand the Schrodinger Wave equation and importance ofwave function in Quantum Mechanics.
3. Gain knowledge about energy eigen value and eigenstate for particle in a one dimensional box, linear harmonic oscillator, one dimensional potential barrier and Hydrogen atom.
4. Solve problems for both micro and macro world.
5. Explain the beauty of physics for society.
6. Understand every phenomenon in the universe is governed by Quantum Mechanics.
7. Create hypothesis and appreciate how mathematics relates to Quantum theory.

Course Outcome : PHY - 609 : Physics of Materials

After completing the course the student will be able to

1. Understand about crystal structure.
2. Understand about Lattice dynamics and superconductivity.
3. Explain about nanoscience& its application
4. Understand the properties of all materials in our daily life.
5. Generalize the theory & experiment of different materials.
6. Apply to different fields of material science, medical science and engineering.
7. Explore the exact theory of nanomaterials and nanotechnology.
8. Understand the materials about human necessity.

Course Outcome : PHY – 610 : Laboratory

After the completion of the course the student will be able to

1. Determination of wavelength of monochromatic light source by using Fresnel's biprism.

2. To draw the (μ-λ) curve for the material of a prism by using spectrometer and verification of dispersion formula.
3. To draw the (μ-λ) curve for the material of a prism by using spectrometer and to determine the wavelength of the given source.
4. To draw the (D-λ) curve for a given spectrometer and hence to determine the wavelength of the unknown source.
5. Determination of the grating constant by using sodium light and hence to determine the wavelength of the unknown radiation.
6. To calibrate a polarimeter and to determine the concentration of a given solution.
7. Determination of electronic charge by Milikan's experiment.
8. To study the hydrogen spectrum and to determine the Rydberg's constant with the given grating and spectrometer.
9. Determination of e/m of electron by Thomson's method.
10.To study the B-H curve and hysteresis loss by anchor ring method.
11.To determine Plank's constant using a photocell.

OUTCOMES OF B.SC. PHYSICS (Pass Course), MANIPUR UNIVERSITY

PROGRAM OUTCOMES:	
PO1	Proficient in mathematics, demonstrate knowledge in mechanics, thermal and optics, modern physics, electronics, material science and quantum mechanics; apply in solving real time problems, both analytical and technical
PO2	Demonstrate laboratory skills in different techniques by explaining theory behind formula used, accurate and repeated measurements, tabulation to obtain reliable results, identify errors and minimising it in the physics laboratory
PO3	Ability for oral and written scientific communication individually as well as team

E-505: Mathematical Physics and Electronics (Pass Course)

COURSE OUTCOMES:

After successful completion of the course, the student is expected to

CO1	Learn Fourier analysis of periodic functions, its expansion and applications to continuous time signals and systems Apply special functions on polynomials to solve physical problems and identify mathematical concepts related to physics to generate solutions
CO2	To understand thoroughly the basic analysis of dc circuits(capacitor and inductor excluded) , convert complex circuits into simpler ones; basic idea of two port network; Working of different diodes, concept of regulated power supply, rectifier and filters
CO3	Recall basic knowledge of semiconductors, different configurations of BJT and its characteristics(load line included)
CO4	Study working of a RC coupled amplifier; understanding of both negative and positive feedback concepts
CO5	Study working of different oscillators using BJTs and operational amplifiers; Understand binary number system, logic concepts of Boolean algebra and gates

LABORATORY COURSE	
COURSE OUTCOMES: After successful completion of the course, the student is expected to	
CO1	To draw the static characteristics of a pn junction diode and determine its internal resistance (forward biased case only)
CO2	To draw the static characteristics of a triode and determine its amplification factor
CO3	To determine the resistance of a galvanometer by half deflection method
CO4	To draw the characteristics of a Zener diode and determine breakdown voltage
CO5	To draw the characteristics of a transistor in the CE- and CB- configurations
CO6	To plot the frequency response of an RC-coupled amplifier(a) without feedback and (b) with negative feedback and to determine the bandwidth in each case
CO7	To determine self inductance by Anderson's method
CO8	To compare the capacitances of two given condensers with the help of a ballistic galvanometer
CO9	To compare two given low resistances using a potentiometer
CO10	To construct a two input OR and AND logic gates using p-n junction diodes and to verify truth tables

E 606: Quantum Physics and Solid State Physics (Pass Course)	
COURSE OUTCOMES: After successful completion of the course, the student is expected to	
CO1	Attain clear knowledge of wave particle, De Broglie wave and its implications on uncertainty principle; Formulate and solve Schrodinger equation; probability interpretation in 1D; grasp idea of basic postulates of wave mechanics such as state of system, operators, measurements and time evolution of states.
CO2	

	Differentiate crystalline and amorphous materials, study space lattice, unit cell and its types; understand crystal symmetry, Bravias lattice, Miller indices and list crystal structures
CO3	Study and understand classical theories of thermal and magnetic properties of solids to their respective quantum approaches
CO4	Study and understand free electron theories of metal , density of states and fermi energy; Get familiar with the band theories of solids, describe origin of energy bands and learn about their electronic behaviour, Energy levels of free electrons in one and three dimensions;

LABORATORY COURSE	
COURSE OUTCOMES: After successful completion of the course, the student is expected to	
CO1	To draw the $(D-\lambda)$ curve for the material of a prism by using spectrometer and verification of dispersion formula
CO2	To draw the dynamic characteristic curve of a triode and determine μ
CO3	Determination of the wavelength of a monochromatic light source by Newton's ring method
CO4	To determine Planck constant h by using a photocell
CO5	To determine electronic charge from the rectifier equation after drawing characteristic curve of a p-n junction diode
CO6	To determine the constant of a ballistic galvanometer by using a standard capacitor
CO7	To determine the dip of a place using an earth inductor
CO8	To determine the specific charge(e/m) of electron by Thompson method
CO9	To study Fourier spectrum analysis of a given signal using CRO
CO10	To calibrate a polarimeter and to determine the concentration of a given solution