

## 2.6.1. TEACHERS AND STUDENTS ARE AWARE OF THE STATED PROGRAMME AND COURSE OUTCOMES OF THE PROGRAMMES OFFERED BY THE INSTITUTION (15)



### ADDITIONAL INFORMATION

#### DEPARTMENT OF EDUCATION

##### PROGRAMME SPECIFIC OUTCOME:

The Bachelor of Arts Degree Course in Education includes a wide variety of topics. The learning and understanding of this variety of topics will help the students to develop certain knowledge, skills and experience which will further help them in their better adjustment to life. The PSO may be listed as below: -

- ✚ Build and understand the basic concepts, theories, ideas and practices.
- ✚ To develop critical thinking among the students on philosophical, social and psychological perspectives so that they can build a future with a critical and scientific mind.
- ✚ Understand that one has to learn all throughout one's life, that is, education is a life-long process.
- ✚ Develop social awareness and skills for better adjustment to life.
- ✚ Develop the knowledge on the importance of education and how it is the most important factor for social change and transformation of the society.
- ✚ Develop humanitarian values and ethics and can shape future generations with competencies.
- ✚ Build skills and abilities of communication, self-expressions and reflection.
- ✚ Develop understanding about pedagogy, school management and community involvement.
- ✚

**COURSE OUTCOME: - The course outcome for all the semesters of the Bachelor Degree in Education may be as follows: -**

#### **BA 1st SEMESTER :101 (PHILOSOPHICAL AND SOCIOLOGICAL FOUNDATION OF EDUCATION): -**

CO 1: To provide a golden opportunity to the students to know the relationship between Education-Philosophy and Education-Sociology.

CO 2: Develop an ability to comprehend the importance and possibility which the study of Philosophy of Education has in understanding Education.

CO 3: Understand Education as a science, social process and human resource development.

CO 4: Understand the contribution of various schools of Philosophy to the present day Education.

CO 5: Understand the need for Sociological approach in Education.

CO 6: Learn the importance of mass media as a social means.

CO 7: Understand social groups, culture and social problems.

#### **BA 2nd SEMESTER: ES: 201 (EDUCATIONAL PSYCHOLOGY AND PEDAGOGY): -**

CO 1: Understanding the meaning and definition of Psychology.

CO 2: Learn the relationship between Psychology and Education.

CO 3: Learn the ability for application of Educational Psychology in teaching-learning.

CO 4: Understand personality, its types and traits.

CO 5: Learn the relationship between teaching-learning.

CO 6: Learn the factors affecting the teaching-learning process.

CO 7: Understand classroom behavior.

CO 8: Learn the functions of a teacher.

#### **BA 3rd SEMESTER: ES:301 (DEVELOPMENT OF EDUCATION IN INDIA)**

- CO 1: Understand about education in Ancient India. Like Buddhist education.
- CO 2: Gain knowledge about education Medieval India (Islamic Education).
- CO 3: Have knowledge and understanding about education in British India (Pre-independence).
- CO 4: Development of education in India in the Post Independence period.
- CO 5: Study and learn the history of education in Manipur during the Pre and Post Independence period.

**BA 4<sup>th</sup> SEMESTER: ES: 401 (ISSUES AND TRENDS IN CONTEMPORARY INDIAN EDUCATION): -**

- CO 1: Understand the functions of different bodies like DIET, SCERT AND NCERT in the field of education.
- CO 2: Gain knowledge about the new trends and programs in Elementary Education.
- CO 3: Understand the presence and importance of Alternative Schooling.
- CO 4: Gain knowledge on Population education.
- CO 5: Understand the importance of sex education.
- CO 6: Knowledge on fundamental life skills.

**BA 5<sup>th</sup> SEMESTER PAPER-ES: (HONOURS) 505: EDUCATIONAL EVALUATION AND STATISTICS IN EDUCATION: -**

- CO 1: To understand the need for measurement in Education and understand the relation between measurement and evaluation.
- CO 2: To understand the principles and techniques of continuous and comprehensive evaluation.
- CO 3: Learn about measuring instruments and their classifications.
- CO 4: Learn about the meaning, nature and scope of educational statistics.
- CO 5: Learn about graphic representation of data.

**PAPER-ES (HONOURS) 506: EDUCATIONAL MANAGEMENT AND EDUCATIONAL TECHNOLOGY:-**

- CO 1: Understanding the concept of educational management, need, scope and types.
- CO 2: Learn about the factors affecting managerial behaviours.
- CO 3: Understand the significance and types of educational planning.
- CO 4: Learn about the communication process and types in order to enhance the ability to listen, converse, speak and present ideas.
- CO 5: Learn about the different innovations in educational technology.

**PAPER –ES (HONOURS) 507: EDUCATIONAL GUIDANCE AND CURRICULUM CONSTRUCTION:-**

- CO 1: understand the need and importance of Educational guidance.
- CO 2: Learn about the purpose and function of vocational guidance and the relationship between Vocational - Educational guidance and Vocational guidance and Work education.
- CO 3: Understand the concept, steps and techniques of counselling.
- CO 4: Learn about curriculum construction.
- CO 5: Learn about the role of the Local, State and National level agencies in curriculum development.

**PAPER-ES (HONOURS) 608: EDUCATIONAL THOUGHT AND PRACTICE:-**

- CO 1: Learn about Rousseau's contribution to the field of education
- . CO 2: Learn about the philosophy and aims of John Dewey and his contribution to the field of education.
- CO 3: Learn about Rabindranath Tagore's philosophy of education and about his Shantineketan and Vishwa Bharati.
- CO 4: Learn about the evaluation of the philosophy of education of Swami Vivekananda.
- CO 5: Learn about Mahatma Gandhi's philosophy and aims of education.

**PAPER-ES(HONOURS) 609: CHILD PSYCHOLOGY: -**

- CO 1: Understand the relevance of child development to educational practice.  
CO 2: Learn about the importance of early childhood years.  
CO 3: Understand the general nature of growth and development.  
CO 4: Learn about development up to pre-adolescence.  
CO 5: Understand the value of Play in child development.  
CO 6: Understand the role of family, school and peers in the development of self and personality.

**PAPER-ES (HONOURS) 610: EXPERIMENTAL EDUCATION AND STATISTICS (Practical Paper): -**

- CO 1: Provides opportunity to the students to do psychological experiments using different Methods and Tests.  
CO 2: Learns from experiments that one learns a motor skill by Trial-and-Error method, immediate memory span of an individual can be tested by visual stimuli by using numbers & non-sense Whole learning method etc.  
CO 3: Provides opportunity to the students to do statistical experiments using statistical measures and calculation like Norms and their computation, determination of association among two variables-Rank difference method, Product Moment and Coefficient of correlation.

**Department of Political Science**

**Programme Outcome:**

The expected outcome of the course is to equip students with the concepts, principles, theories and processes studied in Political Science, so as to facilitate their career choices and employment. The course aims at shaping the students' perception and outlook on social, economic and political environment of India and beyond. The course also seeks to develop the analytical abilities, observational skills and decision-making aptitudes of the students so that they will be able to face different challenges of life.

**Programme Specific Outcome:**

Students of Political Science understand the basic concepts, principles, approach of political theories, familiarize with western political thoughts, understand the processes and dynamics of Indian government and politics with the vital contemporary emerging issues of centre-state relation, political parties, emergence of new leadership at different levels, demand for autonomy movement, ethnic conflicts etc. Acquaint with the different social, cultural and economic processes that influence politics in North East India. Understand the basic principle and dynamic of public administration and familiarize with the nature and developments in national and international politics.

Course Outcome: Course Name Course Outcomes

**Paper-I Political Theory**

Students will be familiarized with the different dimensions and the contemporary relevance of different concepts and theories, which would be applied in studying other papers.

**Paper-II Western Political Thought:**

Students will be equipped with the fundamental understanding of political theory to shape the philosophical and ideological foundations of the students, as theorized by different thinkers. Students are expected to be able to study the different theories and concepts which will enable it to compare with the contemporary social, economic and political realities.

**Paper-III Indian Government and Politics:**

Students will be shaped as citizens who are aware of the ideals and philosophies of the Indian Constitution, Constitutional rights and duties, governmental institutions, centre - state relations and electoral politics in India. Students will also be made conscious of the social, cultural, economic and political environment that affects politics in India, at the national as well as regional level.

**Paper-IV Comparative Government and Politics:**

The paper studies the legal provisions, ideology, institutional arrangements and the socio - economic background of five of the most prominent states in the world. The paper aims at equipping students with the knowledge and critical understanding of different political systems and institutions in the world. Students are expected to become better citizens who are well aware of the different political systems of the world and who have a different outlook of life.

**Paper-V International Politics**

Students will be familiarized with different theories on International Politics, and to make them aware of the different units and actors that operate in the International system which determine the domestic and foreign policies of a nation state. The students are also expected to be able to grasp the operation of various international organizations, and how the national interests of nation states are attained and defended. Students are also expected to understand power politics and relations among states, while also making them aware of the different characteristics and parameters of national power.

**Paper-VI Socialist Thought:**

Students will be equipped with the knowledge of various thoughts on socialism including Utopianism and Communism. They will also get acquaintance with the nature and characteristic of the various state influenced by the Socialist Thought.

**Paper-VII Public Administration**

The paper aims at familiarizing the students with the processes and the institutional arrangement of the government or administration. The expected outcome is to make students aware of different administrative principles and the paradigm shift in Public Administration, methods of recruitment processes for public administrative personnel, parliamentary control over the administrative machinery and to understand how public institutions are managed.

**Paper-VIII Government and Politics of North-east India:**

The expected outcome of the paper is to enable students to understand the political developments in the North - Eastern Region, and to facilitate their understanding of the different social, cultural and economic processes that influence politics in North - East and the significance of the same. The paper seeks to familiarize students with the dynamics involved in the interaction between the North - Eastern states and the Indian Union.

**Department of Economics**

**Program outcomes, program specific outcomes, course outcomes Program outcomes:**

Graduated students of Economics will be well equipped with adequate knowledge and understanding, to deal with intricate economic problems. By understanding the past and the present economic condition, they will be able to forecast future course of change and development. Graduate course contains the field like statistics and mathematics, which helps the economists able to measure/assess the real situation of the economy such as population, national income, rate of development with pattern of investment and saving. Economics students will be equipped with all the relevant tool/ knowledge based on economic principle to

formulate economic policies and planning. Economics students will be able to build up a professional career as economists, economic planner, policy maker etc. Graduate students, besides their expertise in their respective field, will realize human values, become responsible and dutiful citizen and developing creative ability catering to development.

**Program Specific Outcomes:**

Economics students understand the basic concept in economics and can apply them in the real life. They have acquired and possess the requisite expertise to face intriguing social and economic problems. They are also updated with the latest trends in the subject. The students also build a sound base for various post graduate courses in economics and related field. They are competent and prepare for professional job in all relevant fields.

**Course Outcomes: B.A. Economics Semester – I Course code: 101:**

Indian Economic Problems On completion of the course, students are able to

CO 1: Understand the nature, Changes taking place in the Indian economy, meaning and technique of measurement of national income

CO 2: Understand the relationship and interdependence of Natural resource, human population and economic development.

CO 3: Understand the important role and development trends of agriculture.

CO 4: Understand the industrial policies, problems of industrialization, the important role played by MSME in industrialization of Indian economy.

CO 5: Understand India's foreign trade policy, economic planning strategy, problems and issues in unemployment, poverty, economic reform and structural transformation in Indian economy.

**Semester – II Course code: 22: Microeconomics –I**

On completion of the course, students are able to

CO 1: Understand various concepts of microeconomics, markets, theories and models, competitive and non-competitive markets, demand curve and supply curve etc.

Co 2: Understand theory of demand like cardinal utility, indifference curve, revealed preference theory etc. consumer surplus, elasticity of demand, and the various concept of revenue.

CO 3: Understand theory of production, the equilibrium of the firm, theory of cost and economies of scales.

CO 4: Understand the condition of equilibrium of firms under perfect competition and monopoly.

CO 5: understand the condition under which price discrimination can be practice and its effect

**Semester – III Course code: 303: Microeconomics –II**

On completion of the course, students are able to

CO 1: Understand the mechanism of factor price determination and its employment under different market condition.

CO 2: Understand the General Equilibrium theory, economic efficiency,

CO 3: Understand meaning and criteria of welfare such as Pareto- optimality criterion, Kaldor- Hicks compensation criterion, Bergson Criterion 'social welfare function', welfare maximization and perfect competition.

CO 4: understand why the study of externalities is important in welfare economics, and the way to correct market failures, externalities and property right, public goods and efficiency.

CO 5: Have clear concept of the meaning of asymmetric information, its implication in the market and the problems associated with making correct decision in the real world situation, due to asymmetric formation

**Semester – IV Course code: 44: Macroeconomics.**

On completion of the course, students are able to

CO 1: Understand Classical theory of income and employment, say's law of market and its relevance in modern economy, relationship between money wages, price and real wage, classical dichotomy.

CO 2: Explain Keynesian model of income and employment, consumption function, investment function, multiplier process, interest rate and acceleration principle.

CO 3: Understand neo-classical synthesis, the general equilibrium by equality of IS and LM curve, fiscal and monetary policy.

CO 4: explain the cause and effect of inflation, relation between inflation and unemployment, various concepts of money supply.

CO 5: Understand and explain growth models such as Harrod- Domar growth model, Solow's model etc.

**Semester – V Course Code: 505: Public Finance**

On completion of the course, students are able to

CO 1: Understand the nature and scope of public finance, the source of public fund and fiscal function in developing economy.

CO 2: Understand the need for and technique of budgeting, and related terms like Revenue account, Capital account, Public account and performance budgeting

CO 3: Understand the good principle of taxation, the burden of taxation, taxable capacity and features of VAT, GST and DTC.

CO 4: Understand the importance of Public expenditure, factors affecting public expenditure, Wagner's law, Peacock Wiseman hypothesis, Effect of public expenditure on Production, distribution and economic stability. Also, the need of public borrowing to finance development program.

CO 5: Understand Centre-State financial relations, formulae for devolution of shareable tax, role of finance commission, Fiscal policy in India.

**Semester – V Course code: 506: Political Economy of Development**

On completion of the course, students are able to

CO 1: Understand the historically changing nature of political and economic ideas, Marxian concept of political economy, and method of political economy.

CO 2: Understand the intricate relationship of society and different mode of production, the concept of primitive accumulation, the role of foreign trade and merchant capital in Industrial Revolution.

CO 3: Understand Capitalism as mode of production, the growth of Monopoly capital, Effect of the emergence of Multinational Corporation developing economy.

CO 4: Understand Global capitalist system, features of New Political Economy, globalization and structural adjustment program, global capital mobility.

CO 5: Understand Political economy of Indian economic development, Feudalism in India, post-independence agrarian relation in India, Post liberalization political economy.

**Semester – V Course code: 507: Quantitative Method for Economic Analysis.**

On completion of the course, students are able to

CO 1: Understand the importance of Statistics and Mathematics, Mathematical and nonmathematical economics, function and types of functions, Matrix algebra and basic statistics which are applied in economic analysis

CO 2: Understand and apply derivative function, differentiation, elasticity of substitution, constrained optimization etc. in economics.

CO 3: Understand the concept of probability, the addition and multiplication theorems, Bayer's Rule, concept of random variable, probability distribution, binomial and normal distribution.

CO 4: Understand the basic concept of correlation analysis, derivation of normal equation, time series analysis and apply it for predicting the future economic activity.

CO 5: Understand the concept of Index number, method of calculating index number and its use, in economics.

#### **Semester – VI Course code: 608: Development Economics**

On completion of the course, students are able to

CO 1: Explain the concept of growth and development, the classical and neo-classical growth theories, relationship of natural resources and population.

CO 2: Understand different Development strategies such as Low-level equilibrium trap, the big push, Balance and Unbalance growth, choice of technique.

CO 3: understand and explain Fiscal and Monetary policy, Importance and limitations of Deficit financing, the role of price policy and Capital formation in economic development.

CO 4: Understand the need and the problems of technology transfer, Export promotion and Import substitution trade policy. Importance of W.T.O. and Foreign trade for developing countries.

CO 5: Understand the role of state and market in economic development, need for planning and types of planning

#### **Semester – VI Course code: 609: Environmental Economics**

On completion of the course, students are able to

CO 1: Understand the concept of Environmental and Natural resource economics, interdependence of economy and environment, various issues, the law of thermodynamics.

CO 2: Understand environmental problem, climate change, economic and non-economic policy solution.

CO 3: Understand the concept of market failure, externalities, public goods, common property and property rights.

CO 4: Understand the concept of Renewable and Non-renewable resource, environmental consequence of resource extraction under different market.

CO 5: Understand the implication of Kuznets curve and the economics of sustainable development.

#### **Semester – VI Course code: 610: International Economics.**

On completion of the course, students are able to

CO 1: Understand significance of international trade, and the various classical theories of international trade, theory of absolute advantage, theory of comparative advantage.

CO 2: Understand Modern theories of trade such as Heckscher-Ohlin theorem, Leontiff paradox, and Factor-Price equalization.

CO 3: Understand the importance of balance of payment accounting, various concepts in balance of payment, exchange rate determination theory.

CO 4: Understand trade related policies such as Free trade Vs Protection, tariffs, Quotas, theory of custom union, globalization.

CO 5: Understand the objective and function of IMF; GATT/WTO and developing countries.

## DEPARTMENT OF PHYSICS

### B.SC PHYSICS COURSE OUTCOMES:

#### 1<sup>st</sup> Semester:

Title of Paper	MECHANICS
Course Code	PHY-101
Credits	4
Total Hours	72

On successful completion of the course, the students would have:

CO1: Learn conservation laws of energy, linear and angular momentum and apply them to solve problems.

CO2: Learn the basics of potential fields, conservative and non-conservative forces.

CO3: Learn the basics of oscillatory motion, damped harmonic oscillator, resonance in lightly damped systems.

CO4: Grasped the fundamentals of different types of frames of references and transformation laws both Galilean and Lorentz.

CO5: Fundamental ideas of Special Theory of Relativity such as length contraction and time dilation and mass energy invariance.

#### 2<sup>nd</sup> Semester:

Title of Paper	THERMAL PHYSICS AND OPTICS
Course Code	PHY-202
Credits	4
Total Hours	72

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

CO1: Became familiar with various thermodynamics processes and the work done during each of these processes.

CO2: Understand about reversible and irreversible processes and also working of a Carnot Engine, and knowledge of calculating change of entropy for various thermodynamics processes.

CO3: Realize the importance of thermodynamical functions and applications of Maxwell's relations. CO4: Familiar about statistical distributions and hence have basic ideas about Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac statistics and their applications.

CO5: Use the principles of wave motion and superposition to explain the physics of polarization, interference and diffraction. CO6: Understand the basics of modern optics i.e., fiber optics and holography.

CO7: Understand the concept of spontaneous and stimulated emission, population inversion.

#### 3<sup>rd</sup> Semester:

Title of Paper	ELECTRICITY AND MAGNETISM
Course Code	PHY-303
Credits	4
Total Hours	72

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

CO1: Have a clear knowledge about vectors, vector field and scalar fields, flux, gradient, divergence and curl.

CO2: Gain knowledge on Del operator, Laplacian Operator.

CO3: Have gain knowledge of electrostatics and laws governing charge distribution. CO4: Have gain ability to apply Laplace equation for calculating potentials.

CO5: Have learned about polarization, boundary conditions on E & D.

CO6: Learned the relevance of magnetization and boundary conditions on B & H.

C07: Be able to solve a variety of problems relative to electromagnetic induction and Maxwell's equations  
 C08: Learn transient current, response of CR, LC, LR and LCR circuits which is essential in designing and understanding of the working of electronic circuits.

**4th Semester:**

Title of Paper	ATOMIC AND NUCLEAR PHYSICS
Course Code	PHY-4
Credits	404
Total Hours	72

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

- C01: Have a clear picture of mass spectrograph, Bragg's Law.
- C02: Became familiar atomic and molecular spectroscopy, selection rules, L-S and j-j coupling schemes.
- C03: Have a clear picture of radioactive decay, artificial radioactivity, radio-isotopes and their uses. C04: Gain a clear picture of nuclear composition and various nuclear models.
- C05: Have a clear knowledge about nuclear fission and nuclear fusion and relevant nuclear transformations.
- C05: Understand the working of nuclear detectors and counters.
- C06: Became familiar with nuclear particles and different particle accelerators.

**5th Semester:**

Title of Paper	
Course Code	PHY-505
Credits	4
Total Hours	72

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

- C01: Have a clear knowledge of semiconductor physics.
- C02: Learn how to construct transistor amplifier and also learn how its gain varies with frequency. C03: Learn the constructional details of junction field effect transistor and its biasing.
- C04: Have a clear knowledge of oscillators and digital circuits.

Title of Paper	
Course Code	PHY-506
Credits	4
Total Hours	72

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

- C01: Have a clear knowledge of function of a complex variable, Cauchy-Reimann conditions, Cauchy's Theorem and integral formula.
- C02: Understand the expansion an analytic function in Taylor's series, Laurent series.
- C03: Understand the usefulness if residue theorem in the evaluation of definite integrals.
- C04: Learn the usefulness of Beta and Gamma functions in evaluation definite integrals.
- C05: Understand the usefulness of special functions in Mathematical Physics.
- C06: Understand wave equation and Laplace equation and their applications to stretched String and heat conduction with various initial condition.
- C07: Understand how to expand a function in a Fourier Series and conditions under which such an expansion is valid.

Title of Paper	LABORATORY
Course Code	PHY-507
Credits	4
Total Hours	72

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

CO1: Be able to construct logic gates using p-n junction transistors.

CO2: Understand transistor characteristics and be able to measure various gains.

CO3: Learn how semi-conductor diode rectifies an input AC signal.

CO4: Understand how a Zener diode is used as a voltage regulator.

#### 6th Semester:

Title of Paper	QUANTUM MECHANICS
Course Code	PHY-608
Credits	4
Total Hours	72

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

CO1: Understand black body radiation, photoelectric effect and Compton Effect.

CO2: Have a clear knowledge about the wave propagation of particles, De Broglie Waves and its implication on uncertainty principle.

CO3: Understand the idea of wave mechanics and gain the concept of eigenvalues, eigenfunctions and basic postulates of quantum mechanics.

CO4: To find solution to Schrodinger's equation for many systems such as particle in a box, harmonic oscillator and hydrogen atoms.

Title of Paper	PHYSICS OF MATERIALS
Course Code	PHY-609
Credits	4
Total Hours	72

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

CO1: Understand X-Ray diffraction, Bragg's Law.

CO2: Gain knowledge of superconductivity, its underlying principle and its applications in various fields.

CO3: Understand classical theory of diamagnetism and para-magnetism and quantum mechanical treatment of para-magnetism.

CO4: Understand the knowledge of Lattice vibrations in monoatomic and diatomic molecules.

CO5: Understand the usefulness of Nano science in modern world.

Title of Paper	LABORATORY
Course Code	PHY-PHY-610
Credits	4
Total Hours	72

After successful completion of the course, the student is expected to: CO1: Learn the determination of wavelength of monochromatic light source. CO2: Learn to draw  $\mu$ -  $\lambda$  curve for the material of a prism using spectrometer and determine the wavelength of the given source. CO3: Learn to determine the grating constant by using sodium light and hence to determine the wavelength of the unknown radiation. CO4: Learn to measure electronic charge by Millikan's experiment. CO5: Learn to determine e/m of electron by Thomson's method. CO6: Be able to determine Plank's constant using a photocell.

#### B.SC PHYSICS COURSE PROGRAMME OUTCOMES:

PHY-101: MECHANICS The student would learn about the behaviour of physical bodies providing basic concepts of motion of different kinds of objects that we encounter in our daily life. The Course builds a foundation of various applied fields in science and technology. The course contains laws of motions, momentum, energy, rotational motion, gravitation and special theory of relativity.

PHY-101: LAB The student would perform basic experiments related to mechanic and also get familiar with various measuring instruments and would learn the importance of accuracy of measurements.

### **PHY-202: THERMAL PHYSICS AND OPTICS**

The course makes the students able to understand the basic physics of heat and temperature and their relation with work, energy, radiation and matter. The student also learn how the laws of thermodynamics are used in heat engine to transform heat into work. The course contains the study of the laws of thermodynamics, thermodynamic description of systems, thermodynamic potentials, kinetic theory of gases, theory of radiations and statistical mechanics. The course of optics comprises of the study of interference, diffraction and polarization. The student will understand the working of a laser and its applications.

#### **PHY-202: LAB**

The students would gain practical knowledge about heat, radiation and thermodynamics. The student would also learn optical phenomena like interference, diffraction and dispersion and experiments related to optical devices like prism, grating, spectrometers.

### **PHY-303: ELECTRICITY AND MAGNETISM**

The student would learn about the fundamentals of interactions of electricity and magnetism separately and also as a singular electromagnetic force. The course contains vector analysis, electrostatics, magnetism, electromagnetic induction and Maxwell's equation. The course will find its usefulness in almost every branch of science and engineering. PHY-303: LAB The student would gain practical knowledge about electricity and magnetism and measurements such as magnetic field, frequency of AC, capacitance, refractive index of materials, RCE of copper, etc.

### **PHY-404: ATOMIC AND NUCLEAR PHYSICS**

The student would know the basic principles in the field of atomic and nuclear physics. The course contains basic foundations of undergraduate physics such as nuclear physics, particle physics and also contain the study of nuclear models, nuclear reactions, particle accelerator, radioactivity, mass spectrograph and atomic spectra.

#### **PHY-404: LAB**

In this course the student would learn the measurements of radius of curvature of a convex lens, measurement of dispersive power of a prism for sodium light using spectrometer. They would measure wavelength of sodium light using a plain transmission grating and also measure the internal resistance of a cell using a potentiometer. PHY-505: ELECTRONICS The students would gain knowledge of basic electronic circuit, network theorem. They would know about semi-conductor diodes and transistors. The topic includes field effect transistor (FET), amplifiers, oscillators and digital circuits.

### **PHY-506: MATHEMATICAL PHYSICS**

The students would learn mathematical methods to solve various problems in physics. The course includes analysis of complex variables, special functions, Fourier Series, partial differential equation, Beta and Gamma function, etc.

PHY-507: LAB In this course the student would learn how to construct two input OR and AND logic gates. The course includes measurements like band gap of a p-n junction diode, frequency response of an RC-coupled amplifier without and with feedback. It also includes drawing of characteristic curves of a transistor in CE and CB configurations and study of Zener diodes as a voltage regulator.

### **PHY-608: QUANTUM MECHANICS**

Quantum mechanics can successfully describe the behaviour of matter and energy at atomic and sub-atomic level. The course plays a fundamental role in explaining physical phenomena which are beyond our normal observations. The course includes the study of the origin of quantum theory, Schrodinger's equation, particle in one- and three-dimensional potential, quantum theory of H and H like atoms, one- and three-dimensional harmonic oscillator, etc.

**PHY-609: PHYSICS OF MATERIAL**

The student would learn various types of crystal structures and symmetries. The course include free electron model, band theory, Kronig-Penney model. The student would understand diamagnetism and paramagnetism, Curie law, Lattice dynamics and superconductivity. The student would learn to understand Nano science and its applications in science and technology.

**PHY-610: LAB**

In this course, the student would be able to understand basic experiments such as determination of Plank's constant,  $e/m$ , determination of electronic charge. It also includes the study of hydrogen spectrum and determination of Rydberg's constant, determination of wavelength of monochromatic light source, etc.

**B.SC PHYSICS COURSE PROGRAMME SPECIFIC OUTCOMES:**

This undergraduate course in Physics would provide the opportunity to the students:

- To understand basic laws and fundamental concepts of physics.
- To understand the significance of the various physical phenomena.
- To perform experiments for understanding laws and concepts of physics.
- To apply the knowledge learnt from theory to solve physical problems.
- To enhance the academic abilities of the student, personal qualities and will give them an opportunity to develop as a responsible citizen.
- To produce graduates who excelled in values required for leadership to serve the rapidly evolving global community.
- To motivate the students to pursue PG courses in reputed institutions.
- The course introduces the students to the method of experimental physics.
- The course would empower the students to acquire scientific skills and the required practical knowledge by performing experiments in different areas of physics.

**DEPARTMENT OF ZOOLOGY Course Outcome of BSc. Zoology**

CO 1. Describe general taxonomic scales on animal classification

CO 2. Learn the concepts and approaches of taxonomy

CO 3. Distribution of animals in different realm interactions

CO 4. Tracing the fossils to understand the development of animals and the significance of fossils

CO 5. Identify protozoa and porifera by examining their characters and classifications.

- CO 6. Understand the origin of Metazoan.
- CO 7. Learn about the distinguishing characters and classification of Nematelminths.
- CO 8. Knowledge of structural organisation in Coelenterate and Platyhelminthes.
- CO 9. Describe the life cycles of Taenia solium, Fasciola hepatica and Ascaris lumbricoides.
- CO 10. Explain the structural organisation in Annelida, Echinodermata and Arthropoda
- CO 11. Describe the distinguishing characters and classification in Annelida.
- CO 12. Able to state the general characters, structural organisation and classification of chordate.
- CO 13. Study the external features, respiratory systems of Petromyzon and scoliodon.
- CO 14. Examine the respiratory organs of fishes and general characters of lung fishes.
- CO 15. Comparing the distinguish characters and classification of Amphibia and Reptilia.
- CO 16. Tracing the origin, general characters and classification of Aves and Mammals.
- CO 17. Comparing the Integumentary system, digestive system, circulatory system, skeletal system, nervous system, urogenital system and endocrine glands.
- CO 17. Explain the concept of biodiversity and wildlife.
- CO 18. Differentiate types of ecosystem and environmental pollution.
- CO 19. Applied knowledge of Apiculture, Sericulture and Fisheries.
- CO 20. Computer applications in biological sciences. CO 21. Assessing evidences of evolution and various theories of evolution.
- CO 22. Understand the concepts of adaptation of animals.
- CO 23. Analysing the different types of animal behaviour.
- CO 24. Application of biotechnology.
- CO 25. Knowing the structural and functional aspects of cells.
- CO 26. Identify and describe the cell organelles.
- CO 27. Detailed study of the nucleus.
- CO 28. Understand the cell regulatory mechanisms. CO 29. Differentiate the different types of inheritance, gene interactions and mutation.
- CO 30. Developed skill and application of RFLP, RAPD, AFLP and PCR.
- CO 31. Discuss different structure and types of Ig, brief idea of HIV and AIDS.
- CO 32. Examine the process of gametogenesis, fertilization and parthenogenesis.
- CO 33. Developmental stages of eggs.
- CO 34. Tracing the development of organs and types of metamorphosis.
- CO 35. Understand the basic concept of histological techniques and microscopics anatomy of various organs.
- CO 36. Explain the mechanisms of metabolism and chemistry of nutrients.
- CO 37. Analyse the functions and secretions of neurosecretory cells, hormones of endocrine glands.
- CO 38. Describe the functions of muscles, nerve and sense organs.
- CO 39. Discuss the mechanisms of excretions.
- CO 40. State the mechanisms of respiration, heart beat, blood and circulation.
- CO 41. Introducing the nutrient requirement. Explain digestive and absorption.

#### PROGRAM OUTCOME OF BSC ZOOLOGY

- PO 1. Students gained knowledge of Zoology, it broadens their outlook towards importance of study of animals at undergraduate levels.
- PO 2. It provides students a launch pad to enroll themselves in post graduate study in zoology.
- PO 3. It helps in applying the knowledge and understanding of Zoology in life and work.
- PO 4. Understanding of environmental issues and conservative processes.
- PO 5. Practical work make the students skillful which could be applied to solving common daily problems. PO 6. Project works, field survey and short trips develop their talents and sharpen their

brain.

PO 7. Develop empathy towards animals and care them better

PROGRAM SPECIFIC OUTCOME OF BSC ZOOLOGY

PSO 1. Students acquires knowledge and understand the basic concepts of Animal physiology, Endocrinology, Developmental biology, Cell biology, Genetics, Evolution, Biotechnology, Environmental biology, Computer application, Applied zoology, Zoogeography and Anatomy.

PSO 2. Ability to apply knowledge of biological sciences in Apiculture, Sericulture and Fisheries.

PSO 3. Understanding the relationships between animals, plants and microbes.

PSO 4. Acquiring more skill in conserving biodiversity in everyday life.

PSO 5. Developing first hand knowledge by performing practicals.