



Lonavala Education Trust's Dr. B.N. Purandare Arts, Smt. S.G. Gupta Commerce and  
Smt. Shardaben Amrutlal Mithaiwala Science College, Lonavala-410403.

## **DEPARTMENT OF CHEMISTRY**

### **Three Year B.Sc. Chemistry undergraduate programmes**

B.Sc. Chemistry is three year Degree Programmes i.e. F.Y.B.Sc, S.Y.B.Sc & T.Y.B.Sc Chemistry. The systematic and planned curricula from first year to the third year shall motivate and encourage the students for pursuing higher studies in various disciplines of Chemistry such as Physical, Inorganic, Organic, Analytical, Industrial, Agricultural, Dairy, Environmental and Biochemistry. This curriculum also enable student to shoulder the responsibility as Chemist in chemical industry through a well designed Laboratory or practical course.

### **Programme Outcomes (POs):-**

1. To achieve the basic skills required for understanding the fundamental concepts and authenticating the basic laws and principles of Science domain.
2. To develop scientific, analytical and problem solving skills and attitude.
3. To develop discipline specific interest of students by understanding the nature and role of sciences in practical world.
4. To understand the applications of sciences in medicines, food, agriculture, industry, etc. and in everyday life.
5. To build the background for applicative and advanced studies of natural sciences such as Physics, Chemistry, Biology, Geology, etc
6. To become entrepreneur by starting the small scale business related to water analysis, soil analysis, Sericulture, etc.
7. To apply for discipline specific competitive exams conducted by MPSc, UPSc and other service commissions.

### **Programme Specific Outcomes (PSOs):-**

1. To make students aware and assure that Chemistry is the central science and its role in bridging the gap of all other natural sciences.
2. To make aware students the role of Chemistry in everyday life

3. To develop scientific, analytical and problem solving skills.
4. To pursue Post Graduate programme in various branches of Chemistry such as Organic, Inorganic, Physical, Analytical, Industrial, Medicinal, etc and also other related PG programmes.
5. To offers massive job opportunities at all level of chemical, pharmaceutical, food products and life oriented material industries and also in academics as Laboratory Assistant.
6. To provide specific placements in Chemical Laboratory, Chemical Industries, R & D laboratory & almost all other allied Division as Chemist or Assistant Chemist.
7. To be comfortable with the up-and-coming areas of Chemistry and their applications in various fields of Chemical sciences.
8. To communicate the students importance of Chemistry in future studies such as Research, Industry oriented and even in academics.
9. To improve skills in the proper handling of laboratory glassware's, equipment, apparatus and chemicals.
10. To impart the different processes used in industries and their applications.

### **Course Outcomes (COs):-**

#### **F.Y.B.Sc Chemistry**

**(To be implemented from Academic Year 2013-2014 to 2018-2019)**

#### **C-1: Physical and Inorganic Chemistry (Annual Pattern)**

After completing the course students must understand the States of Matter, Surface Chemistry, Chemical Mathematics, Mole Concept, Stoichiometric and Numerical, Oxidation- reduction, Atomic Structure, Chemical Thermodynamics, Chemical Bonding.

#### **C-2: Organic and Inorganic Chemistry (Annual Pattern)**

Students will learn Chemical Bonding in Organic Molecules, Chemistry of Hydrocarbons, Chemistry of s-block elements, Chemistry of Functional Groups, Stereochemistry and Chemistry of p-block elements.

### **C-3: Practical/Lab Course (Annual Pattern)**

1. The design of practical course is in relevance to the theory courses which helps to improve the Understanding of the basic concepts.
2. It will be helpful help in development of practical skills of the students.
3. It is to be expected that use of micro scale techniques as per requirements and needs.

### **F.Y.B.Sc Chemistry**

#### **Choice Based Credit System [CBCS] Syllabus**

#### **(To be implemented from Academic Year 2019-2020)**

#### **CH- 101: Physical Chemistry (Sem-I)**

After completing the course work learner will be acquired with knowledge of chemical energetics, Chemical equilibrium and ionic equilibria.

#### **CH- 102: Organic Chemistry (Sem-I)**

Will learn Fundamentals of organic chemistry, stereochemistry (Conformations, configurations and nomenclatures) and functional group approach for aliphatic hydrocarbons

#### **CH- 201: Inorganic Chemistry (Sem-II)**

Students will learn quantum mechanical approach to atomic structure, Periodicity of elements, various theories for chemical bonding and calculations used in analytical chemistry

#### **CH-202: Organic Chemistry (Sem-II)**

Students will learn Functional group approach for the various reactions (preparations & reactions) in context to their structure

#### **CH 103 + 203: Lab Course (Sem-I +II)**

1. The practical course is in relevance to the theory courses to improve the Understanding of the concepts.
2. It would help in development of practical skills of the students.
3. Use of micro scale techniques wherever required.

# **S.Y.B.Sc Chemistry**

**(To be implemented from Academic Year 2009-2010 to 2013-2014)**

## **CH-211 Physical Chemistry (Sem-I)**

Students will learn Thermodynamics, Free Energy and Equilibrium, Colligative Properties of Solutions, Solutions of liquids in liquids and Nernst distribution law.

## **CH-212 Organic Chemistry (Sem-I)**

1. To learn Stereoisomerism: (Three dimensional aspects of  $sp^3$  hybridized carbon)
2. To understand the Chemistry of Aldehyde and ketones
3. To learn Chemistry of Natural and Unnatural carboxylic acids and their derivatives.
4. To study Aliphatic and Aromatic amines
5. To prepare Functional group Inter conversion
6. To study Chemistry of Homocyclic and Heterocyclic compounds
7. To learn Introduction to Biomolecules

## **CH-221 Inorganic Chemistry (Sem-II)**

1. To study principles and process of metallurgy.
2. To study metallurgy of Aluminium.
3. To study metallurgy of Iron.
4. To know the chemistry of p-block elements
5. To know the chemistry of p-block elements
6. To learn the chemical toxicology
7. To study different solvents and the different theories of acids and bases.
8. To know the corrosion and passivity.

## **CH-222 Analytical Chemistry (Sem-II)**

Student should know Introduction to Analytical chemistry, Inorganic Qualitative Analysis, Analysis of organic compounds, Errors in Quantitative Analysis Volumetric Analysis: a. Acid- base b. Oxidation-Reduction c. Complexometric d. Indrometry, Iodimetry e. Argentimetry, Solvent Extraction.

## **CH-223 Practical/Lab Course (Sem-I+II)**

1. To equip students to correlate theoretical and experimental knowledge.
2. To learn Organic qualitative analysis of Binary Mixtures without ether separation.
3. Acquire skill of crystallisation, record correct m. p. / b. p.
4. To learn the Analytical estimations.

# **S.Y.B.Sc Chemistry**

**(To be implemented from Academic Year 2014-2015 to 2019-20)**

## **CH-211 Physical & Analytical Chemistry (Sem-I)**

1. To introduce concept of kinetics at undergraduate level.
2. To impart basic knowledge of photochemistry and its applications
3. To understand Nernst Distribution Law and its applications
4. To introduce basics of analytical chemistry
5. To understand errors and its interpretation
6. To study the theory underlying Inorganic Qualitative analysis
7. To disseminate knowledge of qualitative & quantitative analysis of organic compounds.

## **CH-212 Organic & Inorganic Chemistry (Sem-I)**

1. Students should be able to understand the Stereoisomerism in terms of following points
2. To know the basic concepts of organic reaction mechanism
3. To study principles and process of metallurgy
4. To study metallurgy of Aluminium.
5. To study metallurgy of Iron.
6. To understand Corrosion and Passivity.

## **CH-221 Physical & Analytical Chemistry (Sem-II)**

1. To conceptualize phenomenon of free energy and equilibria.
2. To distinguish behavior of liquid phase solutions.
3. To provide basic knowledge essential for volumetric analysis.
4. To learn and equip with non instrumental volumetric techniques.

## **CH-222 Organic & Inorganic Chemistry (Sem-II)**

1. Students should understand the concepts of reagents in organic synthesis.
2. To learn the Chemistry of heterocyclic compounds with one hetero atom.
3. To understand the introductory part of Biomolecules such as carbohydrates, proteins, vitamins, hormones, amino acids, etc.
4. To know the chemistry of d-block elements.
5. To study the metal carbonyl complexes and their uses in the homogenous catalysis.

6. To study different solvents and to know the different theories of acids and bases.
7. To know chemical toxicology and toxic chemical in the environment.

**CH-223 Practical/Laboratory Course (Sem-I+II)**

1. To equip students to correlate theoretical and experimental knowledge.
2. To learn Organic qualitative analysis of Binary Mixtures without ether separation.
3. To learn the Analytical estimations.
4. To verify theoretical principles experimentally.

# **T.Y.B.Sc Chemistry**

**(To be implemented from Academic Year 2015-2016)**

## **CH-331: Physical Chemistry (Sem-I)**

After studying this course, student is expected

1. To know Chemical Kinetics
2. To learn Electrolytic Conductance
3. To know Investigation of Molecular Structure
4. To know Phase Rule

## **CH-332: Inorganic Chemistry (Sem-I)**

1. Student should know Molecular Orbital Theory
2. Know the theories of covalent bond formation
3. Know the assumptions and limitations of VBT
4. Understand the need of concept of MOT
5. Know LCAO principal and its approximation
6. Understand and show the formation of bonding and antibonding MO's
7. Draw the MO energy level diagrams for homonuclear diatomic molecules
8. Draw the shapes of molecular orbitals.
9. Give the calculations of bond order, energy and explanation on stability of the above molecule
10. Introductory Part to Coordination Chemistry
11. Isomerism In Coordination Complexes
12. Sidgwick Theory
13. Pauling's Valence Bond Theory
14. Crystal Field Theory
15. Molecular Orbital Theory Of Coordination Complex

## **CH-333: Organic Chemistry (Sem-I)**

After completing this syllabus student should know

1. Definition and types of aromatic substitution reactions
2. Classification of directing groups
3. What is an arenium ion and Ipso substitution?
4. The evidences, reactivity and mechanism of these reactions
5. Whether a given reaction follows addition-Elimination or Elimination-addition mechanism?
6. To predict product/s or supply the reagent/s for these reactions



### **CH-334: Analytical Chemistry (Sem-I)**

Student learn

1. Gravimetric Analysis
2. Thermal methods of analysis
3. Spectrophotometry
4. Polarography
5. Atomic Absorption Spectroscopy
6. Flame Emission Spectroscopy

### **CH-335: Industrial Chemistry (Sem-I)**

1. Modern Approach to Chemical Industry 08
2. Agrochemicals 08
3. Manufacture of Basic Chemicals 08
4. Petrochemicals and eco-friendly fuels 08
5. Food and Starch Industry 08
6. Cement and Glass industry

### **CH-336-E Agriculture Chemistry (Sem-I)**

After studying this course, student is expected to

1. Know the role of agriculture chemistry and its potential
2. Understand basic concept of soil, properties of soil & its classification on the basis of pH
3. Know the different plant nutrients, Their functions and deficiency symptoms
4. Understand importance of manures as compared to chemical fertilizers'
5. Understand the importance of green manuring
6. Have the knowledge of the use of proper the plants
7. Know various techniques to protect the plants
8. Have the knowledge of various pesticides, insecticides, fungicides and herbicides
9. Identify the problematic soil and recommend method for their reclamation
10. Have the knowledge of quality irrigation water, water quality standard and analysis of irrigation water

### **CH-341: Physical Chemistry (Sem-II)**

Students are expected to understand

1. Electrochemical Cells
2. Nuclear Chemistry
3. Crystal Structure
4. Quantum Chemistry

### **CH-342: Inorganic Chemistry (Sem-II)**

A student should know:

The meaning of term f-block elements, Inner transition elements, lanthanides, actinides. The meaning of metal & semiconductor, The difference between metal, semiconductor and insulator. Know the nature of solids, Know the crystal structures of solids. Homogeneous and Heterogeneous Catalysis Bioinorganic Chemistry

### **CH-343: Organic Chemistry (Sem-II)**

Students should learn–

1. What are terpenoids and alkaloids?
2. Various methods of isolation/extraction of these natural products.
3. Synthesis of Citral and Ephedrin by Barbier- Bouveault and Nagi methods, respectively.
4. To determine the structure of above compounds by chemical methods.

### **CH-344: Analytical Chemistry (Sem-II)**

1. Solvent Extraction
2. Chromatography
3. Gas Chromatography
4. High Performance Liquid Chromatography
5. Electrophoresis
6. Nephelometry and Turbidimetry

### **CH-345: Industrial Chemistry (Sem-II)**

1. Polymer chemistry
2. Sugar and Fermentation Industry
3. Soap, detergents and Cosmetics
4. Dyes and paints
5. Chemistry of pharmaceutical industries
6. Pollution prevention and waste management

### **CH-346-E Dairy Chemistry (Sem-II)**

The students are expected to study “Dairy Chemistry” in view of-

1. Knowing importance of the subject from the point of rural economy.
2. Knowing the composition of milk, its food & nutritive value
3. Understanding the Microbiology of the milk
4. Understanding various preservation and adulterants, various milk proteins and their role for the human body.
5. Knowing various milk products, their composition, manufacture and uses.

### **CH-347: Physical Chemistry Practicals**

Students will perform the experiments on Chemical Kinetics, Viscosity, Adsorption, Phenol-water system, Transport number, Refractometry, Colorometry, Potentiometry, Conductometry, pH meter, Radioactivity.

### **CH-348: Inorganic Chemistry Practicals**

It is expected that students should understand and learn Qualitative Analysis, Separation of binary mixture by Column chromatography, volumetric estimations, Calorimetric estimations, Gravimetric Estimations, Inorganic Preparations, etc

### **CH-349: Organic Chemistry Practicals**

Separation of Binary Mixtures and Qualitative Analysis, Organic Preparations, Preparation of Derivatives,

## **T.Y.B.Sc Chemistry**

**(To be implemented from Academic Year 2009-2010 To 2014-15)**

### **CH-331: Physical Chemistry (Sem-I)**

Students must learn the Kinetics of Homogeneous Reactions, Adsorption, Crystal Structure, Investigations of molecular structure.

### **CH-332: Inorganic Chemistry (Sem-I)**

The student should:

1. Know the various types of Ligands
2. Know the meaning of the terms used in co-ordination chemistry
3. Be able to name the co-ordination compound when the structure is given to them.
4. Know the application of co- ordination compounds in biology and chemistry.
5. Be able to draw the geometrical and optical isomerism of complexes.
6. Be able to explain various types of isomerism.
7. Know the merits and the demerits of Sidwick's theory
8. Know the assumptions of VBT and explain the VBT / and explain the VBT of different
9. complexes.
10. Know the limitations of VBT.
11. Know outer and inner orbital complexes, electro neutrality principle, multiple bonding
12. Be able to draw crystal field splitting of d orbital of metal ion in octahedral, tetrahedral
13. square planer of tetragonal ligand field.
14. Know the assumptions of CFT.
15. Be able to explain the terms Strong field and weak field splitting.
16. Be able to explain magnetic property CFT spectra.
17. Be able to give evidences of CFSE.
18. Be able to explain Charge transfer Spectra.
19. Be able to explain John- Teller distortion of octahedral complex and its effect on
20. Spectra.
21. Be able to compare the different approaches to bonding in Co-ordination compounds.

### **CH-333: Organic Chemistry (Sem-I)**

The student should know Organic Structures, nomenclatures, Properties and Reactivities, Stereochemistry of disubstituted cyclohexane, Nucleophilic substitution at aliphatic Carbon, Reactions of Carbon –Carbon double bond & triple bond, Reactions of Carbon –Oxygen double bond, Oxidation & Reduction reactions, Elimination Reaction.

### **CH-334: Analytical Chemistry (Sem-I)**

Student must able to learn

1. Gravimetric Analysis
2. Electrogravimetry
3. Spectrophotometry
4. Atomic Absorption Spectroscopy
5. 5 Flame Emission Spectroscopy
6. Nephelometry and Turbidometry

### **CH-335: Industrial Chemistry (Sem-I)**

Student should focus on

#### **1 General Aspects of Chemical Industry**

The students are expected to learn; Importance of chemical industry, meaning of the

terms involved, comparison between batch and continuous process, knowledge of various industrial acts.

#### **2 Manufacture of basic chemicals**

The students are expected to learn physico-chemical principles involved in the manufacturing process, manufacture of basic chemicals with the help of flow sheet diagram, they should know the applications of these chemicals.

#### **3 Fertilizer Industry**

The students are expected to learn importance of synthetic and natural fertilizers and NPK ratios, the various manufacturing processes with flow sheet diagram,

#### **4 Sugar Industry**

The students are expected to learn importance of sugar industry, manufacture of direct

consumption (plantation white) sugar with flow diagram. Cane juice extraction by various methods, clarification by processes like carbonation, sulphitation, phosphotation

etc. Concentration of juice by using multiple effect evaporator system, Crystallization

of sucrose by using vacuum pan.

#### **5 Fermentation Industry**

The students are expected to learn importance of fermentation industry

Various methods of manufactures, manufacture of wine from grapes,

## **6 Pollution prevention and waste management**

The students are expected to learn all the problems of pollution and disposal of waste of various industries.

### **CH-336-E Agriculture Chemistry (Sem-I)**

After studying this course, student is expected to

1. Know the role of agriculture chemistry and its potential
2. Understand basic concept of soil, properties of soil & its classification on the basis of pH
3. Know the different plant nutrients, Their functions and deficiency symptoms
4. Understand importance of manures as compared to chemical fertilizers'
5. Understand the importance of green manuring
6. Have the knowledge of the use of proper the plants
7. Know various techniques to protect the plants
8. Have the knowledge of various pesticides, insecticides, fungicides and herbicides
9. Identify the problematic soil and recommend method for their reclamation
10. Have the knowledge of quality irrigation water, water quality standard and analysis of irrigation water

### **CH-341: Physical Chemistry (Sem-II)**

Electrolytic conductance, Electrochemical cells, Nuclear Chemistry, Elements of Quantum Chemistry.

### **CH-342: Inorganic Chemistry (Sem-II)**

Student should know

1. Chemistry of f-block element
2. Bioinorganic Chemistry
3. Organometallic Chemistry
4. Metals Semiconductors and Superconductors
5. Ionic Solids
6. Thermodynamic properties of Co-ordination Complexes

### **CH-343: Organic Chemistry (Sem-II)**

Aromatic Electrophilic and Nucleophilic Reactions, Carbanions and their reactions, Retrosynthetic analysis and applications, Spectroscopic methods in structure determination of Organic compounds, Natural Products

### **CH-344: Analytical Chemistry (Sem-II)**

Students can understand

1. Paleography
2. pH-Metry
3. Chromatographic Analysis
4. Electrophoresis
5. Gas Chromatography
6. High Performance Liquid Chromatography
7. Mass Spectrometry

### **CH-345: Industrial Chemistry (Sem-II)**

Student should learn

#### **1 Cement and ceramic industries:**

The students are expected to learn importance of these industries, manufacture of cement by modern methods, various ceramic products, different procedure involved and technical ceramics

#### **2 Glass industry**

The students are expected to learn about making of glass by different methods, various operations involved in the manufacture and compositions, properties and uses of special glasses.

#### **3 Dyes**

The students are expected to learn about the various theories of color and chemical constitution, difference between dyes and pigments,

Uses of pigments.

#### **4 Soaps and detergents :**

The students are expected to learn various soap products, their manufacture, special soap products, importance of detergents, meaning of the terms involved in washing action of the soap and detergents.

#### **5 Pharmaceutical Industry**

The students are expected to learn importance of this industry, meanings of the terms involved in diagnosis, prevention and curing of the diseases

#### **6 Fuels**

The students are expected to learn importance of fuels, types of fuels, properties of fuels, preparation of bio-diesel

### **CH-346-E Dairy Chemistry (Sem-II)**

The students are expected to study "Dairy Chemistry" in view of-

1. Knowing importance of the subject from the point of rural economy.
2. Knowing the composition of milk, its food & nutritive value
3. Understanding the Microbiology of the milk
4. Understanding various preservation and adulterants, various milk proteins and their role for the human body.
5. Knowing various milk products, their composition, manufacture and uses.

**CH-347: Physical Chemistry Practicals**

Students will perform the experiments on Chemical Kinetics, Viscosity, Adsorption, Phenol-water system, Transport number, Refractometry, Colorometry, Potentiometry, Conductometry, pH meter, Radioactivity.

**CH-348: Inorganic Chemistry Practicals**

It is expected that students should understand and learn Qualitative Analysis, Separation of binary mixture by Column chromatography, volumetric estimations, Calorimetric estimations, Gravimetric Estimations, Inorganic Preparations, etc

**CH-349: Organic Chemistry Practicals**

Separation of Binary Mixtures and Qualitative Analysis, Organic Preparations, Preparation of Derivatives,

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## Department of Mathematics

### Programme Specific Outcomes and Course outcomes

#### Programme Specific Outcomes (PSO):

The completion of the B.Sc. Programme will help students to:

- i) Communicate mathematics strongly by written, computational and graphic means.
- ii) Create mathematical ideas from basic axioms.
- iv) Use mathematics to solve problems by analysing and understanding
- v) Identify applications of mathematics to the real-world problems

#### Course Outcomes (CO)

##### 1. Algebra

This course will help students to

- Identify injective, surjective and bijective functions.
- Find inverse of function.
- Apply Euclid's algorithm to find GCD of integers.
- Apply Fermat's theorem to compute remainders
- Apply De-Moivre's theorem to find nth roots of a complex number.

##### 2. Calculus I

This course will help students to

- Determine real numbers satisfying inequations.
- Apply density theorem to find rational number between two irrationals.
- Determine convergence and divergence of sequences.
- Study  $\varepsilon - \delta$  definition of limit of a function.
- Study continuity of function on an interval.
- Locate intervals in which root of equation occur.

##### 3. Analytical Geometry

This course will help students to

- Study translation and rotation of axes
- Identify, classify conics and reducing general second degree term to standard form.
- Find equation of plane in normal form
- Find angle between planes, distance between parallel planes.
- Find equation of line in symmetric form.
- Find angle between line and plane, condition of Coplanarity of lines.
- Find equation of spheres in different forms.
- Find plane section of sphere.
- Find equation of tangent plane to the sphere.

##### 4. Calculus II

This course will help students to

- Study mean value theorems
- Find limit using L'Hospital Rule.

- Find nth derivatives using Leibnitz theorem
- Find Taylor's and Maclaurin's series
- Solve linear ordinary differential equations
- Solve exact differential equations
- Solve non exact differential equations using integrating factors

## 5. Multivariable Calculus I

This course will help students to

- Sketch level curves and graph of a function
- Discuss limit continuity of functions of several variables.
- Find approximate values using differentials.
- Find extreme values of functions of several variables.
- Study Taylor's theorem for function of two variables.
- Find double and triple integrations.
- To change order of double integrals.

## 6. Laplace transforms and Fourier Series

This course will help students to

- Find Laplace and inverse Laplace transforms of basic functions.
- Study Properties of LT and ILT
- Study convolution of functions and their application in finding ILT
- Apply theory of LT and ILT to solve ordinary differential equations.
- Find Fourier series of functions.

## 7. Linear Algebra

This course will help students to

- Study Vector spaces, subspaces, basis, dimension, linear dependence, independence of vectors and functions.
- Study linear transformation, kernel and range of linear transformations.
- Study rank-nullity theorem of linear transformation.
- Find matrix of linear transformation
- Study inner product spaces, Cauchy-Schwartz inequality.
- Find orthogonal basis using Gram-Schmidt process.

## 8. Numerical Methods

This course will help students to

- Find significant figure, errors.
- Round of given numbers to significant figures
- Find numerical solutions of algebraic and transcendental equations.
- Find derivatives from the tabular data.
- Find solutions of ordinary differential equations using Taylor's series, Euler's method, Runge-Kutta method.

**Lonavla Education Trust's  
Dr. B. N. Purandare Arts and Smt. S. G. Gupta Commerce and Smt.S.A.Mithaiwala Science  
College, Lonavla**

**Department of Physics  
Three year B.Sc. Physics Undergraduate programme**

F.Y.BSc., S.Y.B.Sc. and T.Y.B.Sc. is three year B.Sc. Physics undergraduate programme. The aim and objectives of this programme is to introduce the pursuit of **Physics**, its historical discoveries and inventions and recent development in modern Physics. The course also **aims** at emphasizing the importance of measurement which is central to **physics**. The three year course includes various disciplines in Physics such as Electronics, Classical Mechanics, Quantum mechanics, Material Science, Nuclear Physics, Atomic and Molecular Physics etc. To get awareness related to basic software programs computational Physics (C-Programming) is also included in the course.

**Programme Outcomes:**

- 1) To introduce basic Physics in relation with day today examples.
- 2) To provide in depth knowledge of scientific and technological aspects of Physics
- 3) To enrich knowledge through problem solving, hand on activities, study visits, projects etc.
- 4) To train students in skills related to research, education, industry, and market.

**Programme Specific Ourcomes (PSO's)**

- 1) To create foundation for research and development in Electronics
- 2)To develop analytical abilities towards real world problems
- 3)To help students build-up a progressive and successful career in Physics

**Course Outcomes (COs)**

Student are expected to learn the following courses

Classical Mechanics, Quantum Mechanics, Solid state Physics, Nuclear Physics.

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