Department of Chemistry

Programme Outcomes	
PO1. CRITICALTHINKING	The curriculum is designed in such way that students should acquire an ability to observe accurately and objectively. They should be able to solve the problems and also think scientifically, independently and draw rational conclusions.
PO2. SCIENCE COMMUNICATION	Curriculum empowers communication skills in science which further enhances easy spread of scientific knowledge in the society.
PO3 SOCIAL INTERACTIONS	Students acquire national integration, community harmony, gender equality and nationalism which inculcate harmonized social interaction. Made aware of environment related issues.
PO4 EFFECTIVE CITIZENSHIP	Students acquire attributes of good citizens with certain ethics, made aware of environmental issues its management and planning.
PO5 ALLROUND PERSONALITY	Students develop as all-round individuals possessing variety of values and skills conferred by extracurricular activities.

Programme Specific Outcomes and Course Outcomes	
Program Specific Outcomes of B.Sc. Chemistry	
Upon completion of B.Sc. Program in Chemistry the students will be able to:	
PSO1	Estimate the chemical composition of any material
PSO2	Describe the set of particle properties
PSO3	Identify suitable pharmaceutical dyestuff intermediate
PSO4	Operate analytical instruments.
PSO5	Examine the physical parameters of substances
PSO6	Infer energy change associate with physical and chemical changes
PSO7	Outline the strength of acids and bases
PSO8	Prepare new substances
PSO9	Analyse ores and alloys
PSO10	Predict behaviour of substances

Courses Outcome

Sr. No	Class	Course Outcomes
1	F.Y.B.Sc. Chemistry	This course enables students to understand basic laws regarding states of matter, surface chemistry, thermodynamics and structure of atom. Students are also made awarw of mole concept, derivations, depictions and problem solving and periodic properties of the elements including the preliminary theories of bonding.
		Students are made aware of fundamental concepts of organic and inorganic chemistry which governs the structure, bonding, properties, structural effects, acid-base theories, preparation methods, reactivity and stereochemistry of organic molecules.
		Chemistry is an experimental subject; practical course is intended to achieve the basic skills required for understanding the concepts and authenticating the basic laws and principles of chemistry &helps in development of practical skills of the students.
2	S.Y.B.Sc. Chemistry Semester I	Students are made aware about kinetics of chemical reactions, photochemical laws , distribution law and extraction process. Students are introduced to analytical chemistry in which they are made aware of inorganic qualitative analysis and analysis of organic compounds (Qualitative & Quantitative). Along with it they also study error in quantitative analysis & ways to minimize them.
		Students are made aware of stereochemistry of different stereoisomers & organic reaction mechanism in which they study different types of reagents, reactions and their mechanisms. Students are introduced to metallurgy to understand chemical reactions and processes occurred in metallurgy. The corrosion & passivity is also included in the syllabus.
3	S.Y.B.Sc. Chemistry Semester II	Students are made aware about concepts of Helmholtz free energy & Gibbs free energy as well as free energy of chemical reactions & physical transformation. Students also study different modes of concentration , distillation of solutions of liquid in liquid , partially immiscible liquids& distillation of immiscible liquids. Students are made to understand volumetric analysis wherein they study non-instrumental volumetric analysis which comprises of study of various titrations, indicators used in it& some theoretical aspects related with titrations.
		Students are introduced to various biomolecules, their role & structural aspects. Students also study different oxidizing and reducing reagents, their selectivity to different substrates, heterocycles, their preparation & reactions. Students are introduced to organometallic chemistry & use of organometallic compounds in synthesis of organic as well as inorganic compounds. They also study chemical toxicology to know adverse effects of chemicals.

4	S. Y. B.Sc. Chemistry Practical	Students are trained to determine the rate constant of chemical reactions, heat of solution , heat of neutralization, critical solution temperature of partially miscible system & distribution coefficient. Students are trained for quantitative analysis of different samples such as Na_2CO_3 in washing soda, Aspirin in APC tablet, Aluminium in Alum, strength of H_2O_2, Copper in Brass & iodimetric methods. Students are trained for organic & inorganic qualitative analysis. They are also trained for preparation of organic compounds & chromatographic techniques like TLC.
5	T. Y. B.Sc. Chemistry	**Semester-V**
	Physical chemistry	Students are introduced basic concept of physical chemistry. They also learn methods to determine order of reaction, Arrhenius equation, and graphical evaluation of energy of activation. Students learn principle and applications of rotational, vibrational, raman and electronic spectroscopy. Students will get familiar with phase rule, phase diagram of one and two component systems.
	Inorganic chemistry	Students are made aware of the principles of various theories of bonding like Sidgwick model, Werner's theory VBT,CFT, MOT. They are also made aware of the principles of isomerism, nomenclature and structures of inorganic complexes .
	Organic chemistry	It is the basic course in organic chemistry. Students are introduced with concepts like acidity, basicity of organic molecules, electrophile, nucleophile and good and bad leaving groups. Students are introduced with stereochemistry of disubstituted cyclohexane. Students are able to understand mechanism of organic reaction. Arrow drawing concept which is important part of reaction mechanism is explained thoroughly in this course. Students are able to identify different types of organic reactions and also they can understand reactivity profile of organic molecules.
	Analytical chemistry	Students are made aware of quantitative chemical analysis using the techniques like gravimetry, polarography, AAS, FES and spectrophotometry at the levels of macro, micro and trace analysis of metals and non-metals from industrial and natural samples.
	Drug and Dyes	This course enables students to understand basic concept of drug, nomenclature of drug,brief idea of pharmacutical terms,routes of drug administration. Students able to understand different pharmacodynamic agents their chemical structure ,chemical class,therapeutic use and side effects. Students able to understand natural and synthetic dyes, types of fibres,classification of dyes based on application and dyeing methods, colour and chemical constitution of dyes,unit process and dye intermediate.
6	**T. Y. B.Sc. Chemistry**	**Semester-VI**
	Physical chemistry	The course aims to give fundamental understanding and applications of electrochemical Cells, Nuclear Chemistry, Crystal structure and Quantum Chemistry. Students get to know thermodynamics and EMF, Chemical cell with and without transfer, application of EMF measurement such as pH determination, determination of solubility and solubility product. Basic elements of quantum chemistry are also introduced.

	Inorganic chemistry	Students are made aware of chemistry of f block elements principles and applications of catalysis, organomettalic chemistry and the principles and the applications of metals, semiconductors and superconductors.
	Organic chemistry	Students are introduced with carbanions and their reactions. Retrosynthetic analysis concepts are explained to students. Rearrangement reactions are introduced with mechanistic approach. Spectroscopic techniques like PMR, U.V. and I.R. are introduced. Students learned to differentiate organic compounds with the help of these spectroscopic techniques.
	Analtical chemistry	The students are trained in the technique of separation, identification of purification using chromatographic techniques like TLC,GC,HPLC, electrophoresis etc . This knowledge enables them to be good analytical of Quality control chemist in various fields.
	Drug and Dyes	Students able to understand drug discovery ,drug design and development.students are introducesd with different pharmacodynamic agents with their chemical structure ,chemical class,therapeutic use and side effects. This course also includes classifiction of dyes based on chemical constitution and synthesis,health and environmental hazards of synthetic dyes and their remediation process.non-textile use of dyes.
	T. Y. B.Sc. Practical Chemistry	Students are trained in the techniques such as pH metry,Conductometry, Potentiometry, Colorimetry,viscometry, Spectrophotometry, Refractometry and G. M. Counter. They learn to use these techniques in order to understand various chemical reactions.
		Students are trained in the IQA of different mixtures of inorganic compounds, and the separation of the metal ions using chromatographic techniques and inorganic quantitative analysis using the techniques of gravimetry, volumetry,colorimetry.
		Students able to separate binary organic mixtures and also undestood the process of separation in industry.
		Students are trained for analysis of commercial samples,ion exchange separation technique.
		Chemistry is an experimental subject; practical course is proposed to achieve the basic skills required for understanding the reactivity of organic molecules and validating the basic principles. It helps in development of practical skills of the students & understanding the importance of chemical safety and also explains the factors affecting reaction outcomes and yields.

Department of Mathematics

Programme Outcomes for B. Sc. Mathematics

It is expected that each mathematics graduate will be able to,

1. Reason mathematically;

2. Develop abstract mathematical thinking;

3. Solve complex problems using mathematics;

4. Communicate mathematical ideas;

5. Evaluate mathematical work;

6. Demonstrate mathematical knowledge commensurate with national norms;

7. To get wide range of mathematical skills to crack various competitive examinations.

Programme Specific Outcome of B.Sc. Mathematics

1. Think in a critical manner.

2. Know when there is a need for information, to be able to identify, locate,

3. Evaluate, and effectively use that information for the issue or problem at hand. Formulate and develop mathematical arguments in a logical manner.

4. Acquire good knowledge and understanding in advanced areas of mathematics

and statistics, chosen by the student from the given courses.

5. Understand, formulate and use quantitative models arising in social science,

Business and other contexts.

Class:- FYBSc

Course Outcomes:-

Subject:-

1. Calculus (Sem I)_USMT101 & USMT201:-

- Gain Knowledge of fundamental concepts of real numbers.
- Verify the value of the limit of a function at a point using the definition of the limit Introduction to sequence and series.

- Learn to check function is continuous understand the consequences of the intermediate value Theorem for continuous functions.

2. Algebra I (Sem I)_ USMT102

- Learn to solve system of linear equation.
- Learn to solve Diophantine equation.
- Learn to find roots of polynomial over rational.
- Learn to find graphs, roots and primes integer using maxima software.

3. Practical Course based on USMT101 and USMT102:-

- Learn Maxima software.
- Problem solve on algebra and calculus by using maxima software.
- Knowledge of application of mathematics

4. Calculus (Sem II)_USMT201

- Student will be to understand differentiation and fundamental theorem in differentiation and various rules.
- Geometrical representation and problem solving on MVT and Rolls theorem.
- Finding extreme values of function.
- Introduction to Ordinary Differential Equation.

5. Discrete Mathematics (Sem II)_USMT202

- To understand logical concepts and to show logical equivalences by using truth tables and rules in logics.
- Learn concept related to counting.
- Introduction to advanced counting.

6. Practical Course based on USMT201 and USMT202:-

- Problem solving on geometry and calculus.
- Introduction to application of mathematics in real life.
- Learn to build logical concept.

Class:- SYBSc

Course outcomes:-

Subject:-

1. Calculus (Sem III)_ USMT301 & Multivariable Calculus I (Sem IV)_ USMT401 :-

- This course gives introduction to basic concepts of Analysis with rigor and prepares students to study further courses in Analysis.
- Formal proofs are given lot of emphasis in this course which also enhances understanding of the subject of Mathematics as a whole.

2. Linear Algebra I (Sem III)_ USMT302 & Linear Algebra II (Sem IV)_ USMT402:

- This course gives expositions to system of linear equations and matrices, Vector spaces, Basis and dimension, Linear Transformation, Inner product space, Eigen values and eigenvectors.

3. Ordinary Differential Equations (Sem III)_ USMT303:-

- Prepares learner to get solutions of so many kinds of problems in all subjects of Science and also prepares learner for further studies of differential equations and related fields.

4. Numerical Methods and Statistical Methods (Sem IV)_ USMT403:-

- Lerner will learn different types of Numerical methods and statistical methods to apply in different fields of Mathematics.

5. Practical Course of Sem III & Sem IV

- To demonstrate used of interpolation method in numerical analysis.
- Use computational techniques and algebraic skills essential for the study of systems of Linear equations, matrix algebra, vector spaces, eigenvalues and eigenvectors, Orthogonality and Diagonalization.
- Problem solving on multivariable calculus.
- Introduction to application of mathematics in real life.
- Learn to build logical concept.

Class:- TYBSc

Course outcomes:-

Subject:-

1. Linear algebra (Sem V)_USMT501:-

On successful completion of the course students should be able to,

1. Vector space: definition of vector space and examples.

2. Linear dependence and linear independence.

3. Linear transformation, the algebra of linear transformation.

4. Rank nullity of matrix, Isomorphism.

5. Inner product space, Cauchy Schwartz inequality.

6. Gram-Schmidt orthogonalization process, orthogonal compliment.

7. Inner product space.

8. Eigen values and Eigen vectors of a linear transform.

2. Complex analysis and vector calculus (Sem VI)_USMT601:-

1. Compute sums, products, quotients, conjugate, modulus, and argument of complex numbers

2. Define and analyze limits and continuity for complex functions as well as consequences of continuity · 3. Conceive the concepts of analytic functions and will be familiar with the elementary complex functions and their properties

4. Determine whether a given function is differentiable, and if so find its derivative.

5. Applies the theory into application of the power series expansion of analytic functions ·

6. Understand the basic methods of complex integration and its application in contour integration. ·

7. Analyze sequences and series of analytic functions and types of convergence, ·

8. Evaluate complex contour integrals directly and by the fundamental theorem, apply the Cauchy integral theorem in its various versions, and the Cauchy integral formula..

3. Group Theory (Sem VI)_USMT602

1. Understand the importance of algebraic properties with regard to working within various number systems.

2. Extend group structure to finite permutation groups (Caley Hamilton Theorem).

3. Generate groups given specific conditions.

4. Symmetry using group theory.

5. Understand the three major concrete models of Boolean algebra: the algebra of sets, the algebra of electrical circuits, and the algebra of logic.

4. Practical Course of Sem V & Sem VI

1. Applies the theory into application of the power series expansion of analytic functions.

2. Understand the basic methods of complex integration and its application in contour integration.

3. To analyze sequences and series of analytic functions and types of convergence.

4. Evaluate complex contour integrals directly and by the fundamental theorem, apply the Cauchy integral theorem in its various versions, and the Cauchy integral formula.

Department of Microbiology

1. Programme outcomes-

Sr.No.	Program	Program Outcomes	Program Specific Outcomes
1	BSc Microbiology	PO1.CriticalThinking: The curriculum made for betterment of the students, enhance the ability and thinking power. PO2. Effective Communication: The complete medium of program is in English so students communicate in the same. PO3.Social Interaction: Due to continuous field visits in the interior regions students interact with the social activities for their study PO4.Effective Citizenship Being the botanist students have to communicate with manypeople, they become morefamiliar as well as interactive PO5.Ethics: The subject teachstudents about the ethicalapproach PO6.Environment and Sustainability: Agriculture Microbial practices are studied for sustainable development PO7.Self-directed and Lifelong Learning: each and every aspect of the module teaches life long learning	PSO1-In pure microbiology, students learn about basic concepts of microbiology PSO2-A course on environmental microbiology has been introduced in order to make students familiar with the biodiversity of microorganisms in different habitats/ecological niches including extreme environments and applications of these microorganisms in bioremediation, pollution control, agriculture, pharmaceuticals & biotechnology. PSO3-Immunology has been combined with epidemiology of infectious diseases plus diagnostic & clinical microbiology in order to make the learners aware about the spread of infection by different routes, sources of infection and functioning of the clinical microbiology laboratory. PSO4-Earlier module of microbial biochemistry has been updated as per the recent developments in molecular biology & enzymology with an objective to raise the student's awareness in interdisciplinary courses such as biophysics, bioinformatics and computational biochemistry. PSO5- It has ensured that there is a continuous flow of information and latest advances in the subject imparted to the students in order to bridge the knowledge gap of the learner PSO6-The syllabus is aimed at equipping the students with basic knowledge in various branches of Microbiology such as Microbial Genetics, Molecular Biology, Virology, Medical Microbiology, Immunology, Microbial Biochemistry and Industrial Microbiology. Additionally, it also makes students aware of interdisciplinary sciences such as Bioinformatics and Bioinstrumentation.

2. Course outcomes

Sr. No.	Course	Course Code	Course Outcome
1	FYBSc Microbiology	USMB101	Study of Different Groups of Microbes and Growth of Microorganisms
		USMB102	Study of Microbial Interactions: Microbes Its Relation to Human Health;

			Advance Techniques in Microbiology & Instrumentation
		USMBP1	The students will acquire skill to perform the laboratory techniques and experiments based on the above courses.
		USMB201	Fundamentals of Microbiology including History, Introduction, Scope of the Subject, Prokaryotic and Eukaryotic Cells & Macromolecules
		USMB202	Fundamentals of Microbiology including History, Introduction, Scope of the Subject, Prokaryotic and Eukaryotic Cells & Macromolecules
		USMBP-2	The students will acquire skill to perform the laboratory techniques and experiments based on the above courses.
2	S.Y.B.Sc Microbiology	USMB301	Microbial Diversity in Extreme Environments, Microbial Taxonomy & Instrumentation in Microbiology
		USMB302	Environmental Microbiology: Air, Fresh Water, Marine Water, Sewage, Soil, Geo Microbiology
		USMB303	Metabolism & Biology of Macromolecules: Study of Enzymes, Principles of Bioenergetics, Estimation of Biomolecules& Basic and advances in Microbiology
		USMBP-3	The students will acquire skill to perform the laboratory techniques and experiments based on the above courses.
		USMB401	Medical Microbiology & Immunology: Study of Immune System, Epidemiology of Infectious Diseases, Diagnostic & Clinical Microbiology
		USMB402	Industrial, Food & Dairy Microbiology:
		USMB403	Molecular Biology & Enzymology Including Nucleic Acids to Transcription and Translation In Prokaryotes.
		USMBP-4	The students will acquire skill to perform the laboratory techniques and experiments based on the above courses.
3	T.Y.B.Sc. Microbiology	USMB501	1.DNA Replication: The learner will understand the sequence of events, mechanism, enzymes and proteins involved in replication of DNA in prokaryotes and eukaryotes.The student will know the central dogma of biology its two-step transcription and translation, maturation of RNA. 2.The learner will know the concept of mutation, its types, causes and their effects. 3.This module will also make them understand types of mutagens, damage to DNA due to mutagenesis, various mechanisms of DNA repair. 4.The student shall understand the various mechanisms of gene transfer in bacteria and genetic recombination.
		USMB502	1.Give details of the virulence factors and other features of the pathogen. 2.Correlate these virulence factors with the pathogenesis and clinical features of the Disease. 3.Comment on the mode of transmission, and therefore modes of prophylaxis of these Diseases. 4.Comment on the methods of diagnosis of the disease. 5.Conceptualize how the adaptive immune responses coordinate to fight invading pathogens and the organs and tissue involved. 6.Discuss the role of antigen in initiating the immune response. 7.Correlate the structure & functions of immunoglobulin. Understand the importance of cytokines, MHC, APCs, Cytokines, and the role in adaptive immunity.8.Understand the various antigen – antibody reactions

		USMB-503	The students should be able to- 1.Understand the architecture of the membrane and how solute is transported inside the cell. 2. Describe and explain the electron transport chains in prokaryotes and mitochondria and understand the mechanism of ATP synthesis. 3. Explain bioluminescence mechanism and its significance 4.Discuss the experimental aspect of studying catabolism and anabolism and the various pathways for the breakdown of carbohydrates along with reactions in amphibolic pathways. 5.Describe various other pathways which produce different end products. 6.Describe anabolic reactions in carbohydrate synthesis. 7.Apply the concepts of energetics and catabolism in biodegradation of various substrates.
		USMB-504	The students should be able to- 1.Describe the applications of microbes and its strain improvement in Industrial Microbiology. 2.Apply kinetic formula to determine growth and productivity parameters of batch continuous, fed batch and solid substrate fermentations 3.Describe the design of bioreactors for different applications and its process parameters 4.Design media, growth conditions and techniques for producing and recovering different types of products of commercial value. 5. Learner will be well –versed with the containment and levels of containment.
		USMBP-5&6	The students will acquire skill to perform the laboratory techniques and experiments based on the above courses.
		USMB-601	1.r DNA technology: This module will make the student understand the methods to construct recombinant DNA molecules, also know the tools required like vectors, restriction enzymes etc. 2. Application of rDNA technology and Bioinformatics: The learner will know about applications of r DNA technology, through bioinformatics the student will understand the use of databases and software tools for understanding biological data. 3. Gene Regulation and Basic Virology: The student will know about gene expression in prokaryotes, operon as a unit of gene regulation, regulation of gene expression in prokaryotes and bacteriophages. The student will also understand about general structure, life cycle and classification of viruses. 4. Advanced Virology: The learner will understand the basic structure and life cycle of different viruses and their cultivation. The student will get basic knowledge on Prions,

			Viroid and viruses causing cancer.
		USMB-602	Give details of the virulence factors and morphological and cultural features of the pathogen 1.Correlate these virulence factors with the pathogenesis and clinical features of the disease 2. Comment on the mode of transmission, and modes of prophylaxis of these diseases 3.Given a few key clinical features, identify the likely causative agent. 4.Comment on the methods of diagnosis of the disease. 5.Understand the structure and role of T and B cells in generating adaptive immunity and thereby study effector responses in both Humoral & Cell Mediated Immunity Acquire an understanding of the role of immune system in disease: 6.Understand the activation of complement system. 7.Apply the concept of immunity to prevention of disease by development of vaccines
		USMB-603	1.Metabolism of Lipids, Fatty acids, Nucleotides and Amino acids 2.Catabolism of Protein and aliphatic hydrocarbons 3. Regulation of metabolic process at various levels 4.Photosynthesis 5.Metabolism of inorganic molecules with special reference to nitrate and sulfate 6.Biological Nitrogen fixation 7.Lithotrophy
		USMB-604	1.Understand the actual process involved in fermentations of important products. 2.To apply the knowledge of applications of animal and plant tissue culture techniques. 3.Learn the applications of immobilized enzymes in various fields. 4.Understand the working of important instruments used in biochemical analysis and bioassay. 5.Learn the salient features of quality management and regulatory procedures
		USMBP 7 & 8	The students will acquire skill to perform the laboratory techniques and experiments based on the above courses.

Department of Physics

POs:

1. Learners will attain an understanding of core knowledge in physics related to the main streams viz mechanics, optics, thermodynamics and electronics. 2. Learners develop the ability of quantitative problem-solving skills. 3. The laboratory practicals make them familiar to various equipment which they can skilfully use to make various working projects. 4. Learners will demonstrate written and oral communication skills in communicating physics-related topics. 5. Learners will demonstrate an understanding of the impact of physics and science on society.

COs: Weblink: https://mu.ac.in/syllabus#1548848029418-4f01e655-210d

FYBSc:

FYBSc SEM 1 Physics 1	On successful completion of this course students will be able to: 1. Understand Newton's laws and apply them in calculations of the motion of simple systems. 2. Use the free body diagrams to analyze the forces on the object. 3. Understand the concepts of friction and the concepts of elasticity, fluid mechanics and be able to perform calculations using them. 4. Understand the concepts of lens system and interference. 5. Apply the laws of thermodynamics to formulate the relations necessary to analyze a thermodynamic process. 6. Demonstrate quantitative problem solving skills in all the topics covered
FYBSc SEM 1 Physics 2	After successful completion of this course students will be able to 1. Understand nuclear properties and nuclear behavior. 2. Understand the type isotopes and their applications. 3. Demonstrate and understand the quantum mechanical concepts. 4. Demonstrate quantitative problem solving skills in all the topics covered.
FYBSc SEM 1 Practicals	On successful completion of this course students will be able to: i) To demonstrate their practical skills. ii) To understand and practice the skills while doing physics practical. iii) To understand the use of apparatus and their use without fear. iv) To correlate their physics theory concepts through practical. v) Understand the concepts of errors and their estimation.
FYBSc SEM 2 Physics 1	On successful completion of this course students will be able to: i) To demonstrate their practical skills. Ii) To understand and practice the skills while doing physics practical. Iii) To understand the use of apparatus and their use without fear. Iv) To correlate their physics theory concepts through practical. V) Understand the concepts of errors and their estimation
FYBSc SEM 2 Physics 2	On successful completion of this course students will be able to: 1. Understand the basic mathematical concepts and applications of them in physical situations. 2. Demonstrate quantitative problem solving skills in all the topics covered.
FYBSc SEM 2Practicals	Leaning Outcome: i) To understand and practice the skills while doing physics practical. ii) To understand the use of apparatus and their use without fear. iii) To correlate their physics theory concepts through practical. iv) Understand the concepts of errors and their estimation.

SYBSc:

SYBSc SEM 3 Physics 1	On successful completion of this course, students will be able to : i) Understand the concepts of mechanics & properties of matter & to apply them to problems. ii) Comprehend the basic concepts of thermodynamics & its applications in physical situation. iii) Learn about situations in low temperature. iv) Demonstrate tentative problem solving skills in all above areas
SYBSc SEM 3 Physics 2	On successful completion of this course students will be able to : 1) Understand the basic concepts of mathematical physics and their applications in physical situations. 2) Understand the basic laws of electrodynamics and be able to perform calculations using them. 3) Understand the basics of transistor biasing, operational amplifiers, their applications 4) Understand the basic concepts of oscillators and be able to perform calculations using them. 5) Demonstrate quantitative problem solving skill in all the topics covered.
SYBSc SEM 3 Physics 3	On completion of this, it is expected that i) Students will be exposed to contextual real life situations. ii) Students will appreciate the role of Physics in 'interdisciplinary areas related to materials and Acoustics etc. iii) The learner will understand the scope of the subject in Industry & Research. iv) Experimental learning opportunities will faster creative thinking & a spirit of inquiry.
SYBSc SEM 3 Practicals	On successful completion of this course students will be able to : i) Understand & practice the skills while performing experiments. ii) Understand the use of apparatus and their use without fear & hesitation. iii) Correlate the physics theory concepts to practical application. iv) Understand the concept of errors and their estimation.
SYBSc SEM 4 Physics 1	On successful completion of this course students will be able to : 1) Understand the diffraction and polarization processes and applications of them in physical situations. 2) Understand the applications of interference in design and working of interferometers. 3) Understand the resolving power of different optical instruments.\ 4) Understand the working of digital circuits 5) Use IC 555 time for various timing applications. 6) Demonstrate quantitative problem solving skills in all the topics covered.
SYBSc SEM 4 Physics 2	On successful completion of this course students will be able to : 1) Understand the postulates of quantum mechanics and to understand its importance in explaining significant phenomena in Physics. 2) Demonstrate quantitative problem solving skills in all the topics covered
SYBSc SEM 4 Physics 3	On successful completion of this course, students will be able to: i) Understand the concepts of mechanics & properties of matter & to apply them to problems. ii) Comprehend the basic concepts of thermodynamics & its applications in physical situation. iii) Learn about situations in low temperature. iv) Demonstrate tentative problem solving skills in all above areas.
SYBSc SEM 4 Practicals	On successful completion of this course students will be able to : i) Understand & practise the skills while performing experiments. ii) Understand the use of apparatus and their use without fear & hesitation. iii) Correlate their physics theory concepts to practical application. iv) Understand the concept of errors and their estimation.

TYBSc:

TYBSc SEM 5 Physics 1	From this course, the students are expected to learn some mathematical techniques required to understand the physical phenomena at the undergraduate level and get exposure to important ideas of statistical mechanics. The students are expected to be able to solve simple problems in probability, understand the concept of independent events and work with standard continuous distributions. The students will have idea of the functions of complex variables; solve non homogeneous differential equations and partial differential equations using simple methods. The units on statistical mechanics would introduce the students to the concept of microstates, Boltzmann distribution and statistical origins of entropy. It is also expected that the student will understand the difference between different statistics, classical as well as quantum.
TYBSc SEM 5 Physics 2	On successful completion of this course students will be able to: 1. Understand the basics of crystallography, Electrical properties of metals, Band Theory of solids, demarcation among the types of materials, Semiconductor Physics and Superconductivity. 2. Understand the basic concepts of Fermi probability distribution function, Density of states, conduction in semiconductors and BCS theory of superconductivity. 3. Demonstrate quantitative problem

	solving skills in all the topics covered.
TYBSc SEM 5 Practicals	i) Understanding relevant concepts. ii) Planning of the experiments iii) Layout and adjustments of the equipments iv) Understanding designing of the experiments v) Attempts to make the experiments open ended vi) Recording of observations and plotting of graphs vii) Calculation of results and estimation of possible errors in the observation of results
TYBSc SEM 6 Physics 1	This course will introduce the students to different aspects of classical mechanics. They would understand the kinds of motions that can occur under a central potential and their applications to planetary orbits. The students should also appreciate the effect of moving coordinate system, rectilinear as well as rotating. The students are expected to learn the concepts needed for the important formalism of Lagrange's equations and derive the equations using D'Alembert's principle. They should also be able to solve simple examples using this formalism. The introduction to simple concepts from fluid mechanics and understanding of the dynamics of rigid bodies is also expected. Finally, they should appreciate the drastic effect of adding nonlinear corrections to usual problems of mechanics and nonlinear mechanics can help understand the irregularity we observe around us in nature
TYBSc SEM 6 Physics 2	On successful completion of this course students will be able to: 1. Understand the basics of semiconductor devices and their applications. 2. Understand the basic concepts of operational amplifier: its prototype and applications as instrumentation amplifier, active filters, comparators and waveform generation. 3. Understand the basic concepts of timing pulse generation and regulated power supplies 4. Understand the basic electronic circuits for universal logic building blocks and basic concepts of digital communication. 5. Develop quantitative problem solving skills in all the topics covered.
TYBSc SEM 6 Practicals	i) Understanding relevant concepts. ii) Planning of the experiments. iii) Layout and adjustments of the equipments iv) Understanding designing of the experiments v) Attempts to make the experiments open ended vi) Recording of observations and plotting of graphs vii) Calculation of results and estimation of possible errors in the observation of results.

DEPARTMENT OF POLITICAL SCIENCE

- ## Programme Specific Outcomes:

1. To introduce the learner to the Constitution of India and Political Process in India.
2. To help to build the theoretical foundation of learners in the subject of political science.
3. To improve the understanding of learners about relationship between citizen and state.
4. To familiarize the learners with theory and practice of International Relations with special emphasis on foreign policy of India.
5. To introduce the learners to political ideas from Western and Indian tradition.

- ## Course Outcomes:

Course Code	Title of the course	Course credit	Course outcome
UAPOL 101 UAPOL 201	FYBA Indian Political System/ Indian Political Process	8 (4 per semester)	1) To help the learners to acquaint with the theory and practice of constitutionalism in India. 2) To help the learners to develop constitutional perspective to understand political system of India. 3) To introduce the learners with the history of the making of Indian Constitution. 4) To orient the learners about rights and duties of citizens underthe constitution. 5) To familiarize and acquaint with the functioning of executive, legislature and judiciary; and their mutual relationship. 6) To help the learners to understand the changing nature of federal system in India. 7) To understand the party politics and electoral process in India. 8) So, explore social dynamics involving caste, religion and gender behind functioning of Political system in India. 9) To understand and analyze the challenges to national security in India with reference to criminalization, Naxalism and global terrorism.
UAPOL 301 UAPOL 401	SYBA-PAPER-II Principles and Concepts of Political Theory / Political Values and ideologies	6 (3 Per Semester)	1) To introduce the learners to traditional and contemporary approaches to political theory. 2) To familiarize the learners with theory of State, Nation, Civil Society, Market. 3) Understand the basic concepts of Power, Authority, Legitimacy, Law, Political Obligation and Right to Resist. 4) Understand the discourse on rights in political science. 5) To introduce to political values of liberty, equality and justice. 6) To develop the theory and practice of democracy. 7) Acquaint the students with the contemporary debates across the ideologies of Marxism, Fascism and Feminism.

UAPOL 302 UAPOL 402	SYBA-PAPER-III Public Administration Indian Administration	6 (3 Per Semester)	1) To introduce the learner to the discipline of publicadministration. 2) To acquaint with theories of administration. 3) To study basic principles of organization. 4) Students acquaint with concept of governance and itsincreasing significance in the era of Globalization 5) To introduce the learner to evolution of Indian administrationsince British rule. 1) To understand the recruitment system of IndianAdministration. 2) To understand the financial administration of India. 3) To understand issues of integrity, corruption and citizenparticipation in Indian administration.
UAPOL 501 UAPOL 601	TYBA-PAPER –IV World Politics India in a World Politics	8 (4 Per Semester)	1) Students help to identify and conceptualize the Major issues inthe International Relations 2) Students help to identify the major national/international actorsengaged in dealing with these issues at various levels in international Politics 3) Understand to the Nature and emerging trends of India'sForeign Policy. 4) Students acquaint with the domestic and international securityconcerns 5) Understand of the relations of India with neighboring countriesand major powers in the world
UAPOL 502 UAPOL 602	TYBA-PAPER –V Western Political Thoutht Indian Political Thoutht	8 (4 Per Semester)	1) To understand the major western philosophical traditions instudy of politics. 2) To study the contribution of Machiavelli, John Locke, J.S. Mill, John Rawls, Karl Marx, Antonio Gramsci, Simon-de-Beauvoir and Will Kymlicka 3) Understand the Political Ideas, views and concerns of leadingIndian thinkers. 4) To familiarize with richness of political ideas within discourseson nationalism, democracy and social transformations in pre and post-independence India, their need for modern society.
UAPOL 502 UAPOL 603	TYBA-PAPER –VI Politics of Modern Maharashtra Determinants of Politics Of Maharashtra	6 (3 Per Semester)	1) Student familiarize with the historical basic information,analytical framework the formation of Maharashtra State 2) Students understand the changes and the new trends inMaharashtra Politics 3) Understand important issues in Current Maharashtra Politics.