



MARATHA VIDYA PRASARAK SAMAJ'S
ARTS, COMMERCE & SCIENCE COLLEGE, DINDORI

Tal.Dindori, Dist. Nashik-422202 (M.S.) INDIA

Department of Chemistry

Program Outcomes, Program Specific Outcomes, and Course Outcomes

Program outcome: B.Sc. (Chemistry)

1. To demonstrate, solve and understanding of major concepts in all disciplines of chemistry.
2. To solve the problem and also think methodically, independently and draw a logical conclusion.
3. Application of critical thinking and the scientific knowledge to design, carry out, record and analyse the results of chemical reactions.
4. To create an awareness of the impact of chemistry on the environment, society, and development in the scientific community.
5. Find out the green routes for chemical reaction for sustainable development.
6. To inculcate the scientific temperament for the students and outside the scientific community by utilizing the modern techniques, latest equipments.

Program Specific outcome: B.Sc. (Chemistry)

1. To gain the knowledge of Chemistry through theory and practical.
2. To explain the nomenclature, stereochemistry, structures, reactivity, and mechanism of the chemical reactions.
3. Identification of chemical formulae and solve various numerical problems.
4. To use modern chemical tools, models, charts and various useful equipments
5. To know the structural-activity relationship.
6. To understand good laboratory practices and safety.
7. To make aware and handle the sophisticated instruments. In addition, development of research oriented skills.

Course Outcomes of BSc (Chemistry)

FYBSc

Semester I

FYBSc (Paper-I): CH-101 Physical chemistry-To learn the thermodynamic principles, calculation of different types of energies such as exergonic and endergonic reaction. Gas equilibrium, concept of PH of different salts, buffer solution, common ion effect.

FYBSc(Paper-II): CH-102 Organic chemistry

To learn the fundamentals principles and developments of organic chemistry. Also learnt the confirmations and configurations. Learnt the differences in alkanes, alkenes and alkynes

FYBSc(PaperIII): CH-103 Chemistry Practical

To learn about chemical safety and lab safety. Determination of thermochemical parameters. Techniques of pH measurements. Preparation of buffer solutions. Elemental analysis of organic compounds. Paper chromatographic technique for separation of constituents of mixtures e.g, separation of amino acids.



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Semester II

FYBSc (Paper-I) CH-201 Inorganic chemistry

Learnt various theories and principles of atomic structure. Origin of quantum mechanics, Schrodinger equation, significance of quantum numbers, shapes of orbitals. To learn periodic table, properties and their trends. To learn chemical bonding of different molecules.

FYBSc(Paper-II) CH-202 Analytical chemistry

Introduction to analytical Chemistry. Relation between molecular formula and empirical formula. Purification techniques for organic compounds. Theoretical knowledge and various basic concepts related to paper and thin Layer chromatography techniques. Also applications of pH meter.

FYBSc(Paper-III) CH-203 Chemistry Practical

Inorganic estimations using volumetric analysis. Synthesis of various Inorganic salts, Analysis of commercial products, Purification of organic compounds. To understand the mechanism of various performed reactions.

SYBSc

Semester I

SYBSc(Paper-I): CH-211 Physical & Analytical Chemistry

Introduction to analytical chemistry, chemical analysis and its applications, sampling, common techniques, Instrumental methods and other techniques, choice of method. Basic principles in qualitative analysis. Meaning of common ion effect, role of common ion effect and solubility product.

SYBSc (Paper-II): CH-212 Organic & Inorganic Chemistry

To learnt about the stereochemistry, chirality, optical activity and polarimetry, enantiomers, absolute configuration, R/S system nomenclature. In addition, Students learnt about Baeyer strain theory and cyclohexane's conformations and geometrical isomerism. Also various popular organic reaction and their mechanism. Substitution and elimination reactions also have been studied. Definition of corrosion. ii) Types of corrosion. iii) Mechanism of corrosion. iv) Factors affecting corrosion. v) Methods of prevention of metal from corrosion. vi) Meaning of passivity. vii) Different theories of passivity. viii) Galvanising, Tinning

Semester II

SYBSc (Paper III): CH-221 Physical & Analytical Chemistry

To understand the concepts of equivalent weight, molecular weight, normality, molality, primary and secondary standards. Different way to express concentrations of the solution, preparation of standard solution. In addition, calibration of various apparatus such as burette, pipette, volumetric flask, barrel pipette etc.

SYBSc (Paper IV): CH-222 Organic & Inorganic Chemistry



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Learnt about oxidation and reduction concept. Catalytic hydrogenation was studied, where Birch reduction, Resenmund's reduction were also studied. To study aromatic character, synthesis, and aromatic electrophilic substitution reaction of variety of heterocycles such as Pyrrole, Furan, Thiophene, Pyridine, quinoline and Isoquinoline. To study the chemistry of d-block elements. To study organometallic chemistry. To understand Homogenous catalysis-Hydroformylation (Oxo Process) and Wacker Process and metal-carbon bond and to define organometallic compounds. To understand the structure and bonding using valence electron count (18-electron rule). To understand the uses of organometallic compounds in the homogenous catalysis.

SYBSc (Paper-III): Practical Course in Chemistry CH – 223

Verify theoretical principles experimentally. Interpret the experimental data. Improve analytical skills. Correlate the theory and experiments and understand their importance.

TYBSc

Semester III

TYBSc (Paper-I): CH-331 Physical Chemistry

To write an expression for the rate constant 'K' for third order reaction. To solve the numerical problems based on rate constant. To know the meaning of specific resistance, specific conductance, cell constant and their units. To understand the drawbacks of Arrhenius theory, Debye-Huckel-Onsager Interionic Attraction theory. To understand the term specific volume, molar volume and molar refraction. To know the meaning and Types of equilibrium such as true or static, metastable and Unstable equilibrium. To know the meaning of phase, component and degree of freedom and derivation of phase rule.

TYBSc (Paper-II): CH-332 Inorganic Chemistry

To understand the concepts related to coordination chemistry. To understand Werner's formulation of complexes and identify the types of valences. To define EAN rule and calculate EAN value of the complexes. To comment on EAN value and stability of complexes. To know the assumptions of CFT. To be able to draw crystal field splitting diagrams of d orbital of metal ion in octahedral, tetrahedral, square planar of tetragonal ligand field. To know the limitations of VBT. To know the shapes of d-orbitals and degeneracy of d-orbitals. To understand and draw the geometrical and optical isomerism of complexes.

TYBSc (Paper-III): CH-333 Organic Chemistry

To understand various definitions of organic acids and bases and their applications. Distinguish between geometrical and optical isomerism. Discussed kinetics, mechanism and stereochemistry of SN^1 and SN^2 reactions. Comparison between $E1$ and $E2$ reactions. To understand the evidences, reactivity and mechanism of various elimination and substitution reactions. To study aromatic electrophilic substitution reactions and their mechanism. To understand the mechanism of benzyne.

TYBSc (Paper IV): CH334 Analytical Chemistry

Know the principles of common ion effect and solubility product. To study the methods of thermogravimetric analysis. To understand the principles of spectrophotometric analysis and properties of



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electromagnetic radiations. To study the voltammetry and polarography as an analytical tool. Measurements of absorbance of atoms by AAS.

TYBSc (Paper-V): CH-335 Industrial Chemistry

To know the importance of chemical industry. Classify various insecticides. To study the nutritive aspects of several food constituents. To understand the characteristics of some food such as starches. To study the manufacture of cement and its properties and theories of setting of cement. Also manufacture and various properties of various glasses and types of glasses.

TYBSc (Paper VI): CH-336 Agriculture Chemistry

To know the role of agriculture chemistry and its potential. To know the basic concept of properties of soil & its classification based on pH. To know the different plant nutrients, their functions and deficiency symptoms. Identification of the problematic soil and recommend a method for their reclamation. To gain the knowledge of various pesticides, insecticides, fungicides and herbicides and their impact.

Semester IV

TYBSc (Paper-I): CH-341 Physical Chemistry

To understand mechanics of system of particles. To know the redox reaction. To study the nuclear chemistry. To solve the cell reaction and calculate EMF. Calculations of inter-planar distance. Understanding the De-Broglie hypothesis and uncertainty principle. To derive Schrodinger's time dependent and independent equations.

TYBSc (Paper-II): CH-342 Inorganic Chemistry

The meaning of term f-block elements, Inner transition elements, lanthanides, actinides. To study the electronic configuration of lanthanides and actinides and their properties. Oxidation states of lanthanides, actinides, and common oxidation states. To gain the knowledge about crystalline solid and crystal lattice. To understand different calculations in stoichiometric. To study the bioinorganic molecules and their uses and effects. To understand the concept of p-type semiconductor and n-type semiconductor. To know the difference between metal, semiconductor and insulator.

TYBSc (Paper-III): CH-343 Organic Chemistry

To study UV, IR and NMR spectroscopy. To understand the concept and mechanism of different types of rearrangement reactions. To determine structures of various compounds by UV, IR and NMR spectroscopic data. To understand concept of carbocation and carbanion. To study alkaloids, ephedrine, citral molecule with their properties and applications.

TYBSc (Paper IV): CH-344 Analytical Chemistry

To understand the different analytical techniques. To understand different types of separation techniques. To study principle, construction and working of GC and HPLC. To gain an extended knowledge about chromatographic techniques used for separation of various amino acids. To discuss the problem based on distribution coefficient and extraction techniques.

TYBSc (Paper-V): CH-345 Industrial Chemistry



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To study the different types of polymers and their synthesis and properties. To know various pharmaceutical useful terms and drugs, and also their application and synthesis. To understand the function of dyes, paints and pigments. To study the various type of surfactants and studied modern techniques of soaps and detergents. To study manufacture of sugars by various processes and studied the terms involved in their manufacture. To study the waste management.

TYBSc (PaperVI): CH-346E Dairy Chemistry

To understand the basic knowledge on aspects of milk protein and to understand the importance of milk protein in the quality of milk products as well as in human health. To impart basic knowledge about the importance of milk protein, carbohydrates, minerals and water soluble vitamins and to study the importance of these milk constituents in human health. To gain the knowledge on different aspects of milk proteins. To know the physicochemical changes and effects of various milk constituents of the milk products during manufacture and storage. To study the different methods for the pasteurization of milk.

TYBSc (Practical Paper CH-347 Physical Chemistry)

To calculate molar and normal solution of various concentrations. To determine specific rotations and percentage of optically active substances by polarimetrically. To study the energy of activation and second order reaction. To study the stability of complex ion and stranded free energy change and equilibrium constant by potentiometry. Find out the acidity, Basicity and PKa Value on pH meter.

TYBSc (Practical Paper CH348 Inorganic chemistry)

To study the gravimetric and volumetric analysis of ores and alloy. Preparation of various inorganic complex and determine its percentage purity. To study binary mixture with removal of borate and phosphate. To understand the chromatographic techniques

TYBSc (Practical Paper CH-349 Organic chemistry)

To perform the binary mixtures. Preparation of organic compounds, their purifications and use of TLC technique. Determination of physical constant: Melting point, Boiling point. Different separation techniques. To perform the determination of molecular weight of organic compounds by volumetrically (acids only). To perform the estimations of organic compounds by volumetrically.



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Department of Botany

Program Outcomes, Program Specific Outcomes, and Course Outcomes

Department of Botany	After successful completion of three-year degree program in Botany a student should be able to;	
Programme Outcomes	PO-1. Demonstrate, solve and an understanding of major concepts in all disciplines of Botany. PO-2. Solve the problem and also think methodically, independently and draw a logical conclusion. PO-3. Employ critical thinking and the scientific knowledge to design, carryout, record and analyse the results of Botany experiments. PO-4. Create an awareness of the impact of Botany on the society, and development outside the scientific community. PO-5. PO-6. To inculcate the scientific temperament in the students and Outside the scientific community. PO-7. Use modern techniques, decent equipment's and soft wares	
Programme Specific Outcomes	PSO-1. Gain the knowledge of Botany through theory and practical. PSO-2. Understand good laboratory practices and safety. PSO-3. Develop research-oriented skills. PSO-4. Make aware and handle the sophisticated instruments/equipments.	
Course Outcomes B.Sc. Botany		
F. Y. B. Sc Botany	111: Plant life and Utilization	To provide thorough knowledge about various lower group organism like algae, fungi, lichen etc
	112: plant morphology and anatomy	To provide knowledge about external features for identification, collection, description, and internal features through section of various plant part like root, stem, leaf.
	Practical	To get practical presentation and study through specimen, samples, equipment's and microscopic handling.
S. Y. B. Sc Botany Semester I	231: Taxonomy of Angiosperms and Plant ecology	To provide knowledge about flowering plants and its reproductive character and vegetative characters To study interaction between Abiotic and Biotic component
	232: Plant Physiology	To study the different metabolic activity in plant bodies photosynthesis, Respiration, Guttation etc .
	233: Practical	To get acquainted with the subject in live form and field visit, identifying weed species.



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T. Y. B. Sc. Botany Semester III	BO. 331 Cryptogamic Botany	To give information regarding lower organism with to its sporophytic and gametophytic study
	II BO. 332 Cell and Molecular Biology	Understand cell structure, organelles, mitosis and meiosis and Transcription DNA, RNA etc.
	III BO. 333 Genetics and Evolution	To provide information about inheritance and variation in organism etc
	IV BO. 334 Spermatophyta and Palaeobotany	Evaluate the performance of various line of evolution with respect to seed bearing plants and forms of fossil
	V BO. 335 Horticulture and Floriculture	To develop the skills to become entrepreneurship for small scale start up.
	VI BO. 336 Computational Botany	Apply optimization, numerical methods, statistical methods to solve problems, hypothesis



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Department of Zoology

Program Outcomes, Program Specific Outcomes, and Course Outcomes

Programme Outcomes -

- 1) Students gain knowledge and skill in the fundamentals of animal sciences. Understands the complex evolutionary processes and behaviour of animals.
- 2) Understanding of environmental conservation processes and its importance, pollution control and biodiversity and protection of endangered species
- 3) Gain knowledge of all animal phylum habit, habitat morphology,
- 4) Gain knowledge of all animal internal system like digestive Reproductive and Respiratory system
- 5) Understands about various concepts of genetics and its importance in human health

Program Specific Outcomes:

- 1) Gains knowledge about research methodologies, effective communication and skills of problem solving methods
- 2) Understand the applications and principal of Zoology.
- 3) Understand the nature and basic concepts of cell biology, genetics, taxonomy, physiology, ecology and applied Zoology.

Course Outcomes:

Invertebrates and vertebrates

- 1) Imparts conceptual knowledge of vertebrates and Invertebrates,
- 2) Describe general taxonomic rules on animal classification.
- 3) Invertebrates Phylum protozoa to Echinodermata with taxonomic keys.
- 4) Animal Diversity study.

Cell Biology, Genetics and Evolution:

- 1) Structural and functional aspects of basic unit of life i.e. cell
- 2) Theories of Evolution.
- 3) Concept behind genetic disorder, gene mutations

Applied Zoology

- 1) Aqua culture systems induced breeding techniques, post-harvesting techniques.
- 2) Understands concepts of fisheries, fishing tools and site selection and catching of fish.
- 3) How to income sources of fishery.
- 4) Understands concepts of fishery culture.

Sericulture:

- 1) Gives knowledge of silkworm rearing.
- 2) Economic sources of Mulberry cultivation

Tools, Techniques:



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- 1) Students gain knowledge about various tools & techniques used in biological systems and give them insight about their use in research.
- 2) Understands concepts of principal, application and theory.



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Department of Physics & Electronics

Program Outcomes, Program Specific Outcomes, and Course Outcomes

Physics (semester III & IV) department of physics	After successful completion of three year degree program in physics a student should be able to;
Program outcomes	PO-1 Demonstrate solves an understanding of major concepts in all disciplines of physics. PO-2 Solve the problem and also think methodically, independently and draw a logical conclusion PO-3 Employ critical thinking and scientific knowledge to design, carryout, record and analyse the result of physics experiments. PO-4 creates an awareness of impact of Physics in the society and development outside the scientific community. PO- 5 To inculcate the scientific temperament in the student and outside the scientific community. PO-6 use modern techniques, decent equipments and C++ software's.
Program specific outcomes	PSO-1 Gain the knowledge of physics through theory and practices. PSO-2 understand good laboratory practices and safety PSO-3 develops research-oriented skills. PSO-4 makes aware and sophisticated instrument/equipments.
Course outcomes B.Sc. Physics (semester III & IV)	
Course	Outcomes After completion of these course student should be able to;
PH-331/341 Mathematical methods in physics II	CO-1 know the Cartesian ,spherical polar and cylindrical co-ordinate systems CO-2 To understand special theory of relativity. CO-3 Discuss the Michelson-Morley experiment. CO-4 To obtain the series solution by Frobenius method CO-5 Study the generating function for Legendre, Hermite polynomials.
PH-332/342 solid state physics	CO-1 Know the principles of structures determination by diffraction CO-2 To understand principles and techniques of X-rays diffraction CO-3 Know the fundamental principles of semiconductors



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	<p>and be able to estimate the charge carrier mobility and density.</p> <p>CO-4 To give an extended knowledge about magnetic properties like diamagnetic paramagnetic, ferromagnetic ferrite and superconductors</p>
PH-333 Classical mechanics	<p>CO-1 Understand Newton's laws of motion and their applications such as projectile and rocket motion</p> <p>CO-2 Gain the knowledge of motion in central force field</p> <p>CO-3 Classify elastic and inelastic scattering</p> <p>CO-4 Know the difference between laboratory and center of mass system</p> <p>CO-5 Understand Lagrangian and Hamiltonian formulation</p> <p>CO-6 Get knowledge of canonical transformation and Poisson's Bracket</p>
PH -334/343 atomic and molecular physics	<p>CO-1 To know Rutherford experiment of atom</p> <p>CO-2 to understand molecular spectra of atom</p> <p>CO-3 To study the Raman effect</p> <p>CO-4 To study the Zeeman effect</p> <p>CO-5 to understand the quantum numbers</p>
PH-335/345 Computational physics	<p>CO-1 Write algorithm and flowchart of c-programming language.</p> <p>CO-2 To use of iterative, decision making and jump statement</p> <p>CO-3 Understand the concepts of arrays and pointers.</p> <p>CO-4 Study of user defined function and program structure.</p> <p>CO-5 Able to use concept graphic in c language</p>
PH-336 B Elements of material science.	<p>CO-1 To study mechanical ,electrical, and thermal properties of materials</p> <p>CO-2 Discuss the type of phase diagram.</p> <p>CO-3 Know the solid solution and types of solid solution</p> <p>CO-4 Understand the point defect line defect with example</p> <p>CO-5 Study the diffusion mechanism,</p> <p>CO-6 Know the difference between elastic and plastic deformation.</p> <p>CO-7 To understand polymer vulcanization of rubber.</p> <p>CO-8 Know the crystal structure –e.g. NaCl, ZnS etc.</p>



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Department of Mathematics

Program Outcomes, Program Specific Outcomes, and Course Outcomes

Program Specific Outcomes

After successful completion of program in Mathematics a student should be able to;

1. Fundamental objects, techniques and theorems in the mathematical sciences, including the fields of analysis, algebra, geometry, and discrete mathematics.
2. The principles of mathematical reasoning and their use in understanding, analysing and developing formal arguments.

Programme Outcomes

1. Demonstrate, solve and an understanding of major concepts in all disciplines of Mathematics.
2. Employ critical thinking and the scientific knowledge to design, carryout, record and analyse the results of Mathematics experiments.
3. Use modern techniques, decent equipments and soft wares.
4. Create an awareness of the impact of Botany on the society and development outside the scientific community.
5. Solve the problem and also think methodically, independently and draw a logical conclusion.
6. To inculcate the scientific temperament in the students and outside the scientific community.

Course Outcomes

FYBSC- ALGEBRA AND GEOMETRY	<ol style="list-style-type: none">1. Find the value of Sets, Relations, Equivalence relations, Equivalence classes and partitions of a Set.2. Examples of Functions, Basic terminology, Types of Functions, Inverse of a Function, Composition of Functions.3. Examples of Mathematical Induction: Well-Ordering Principle.4. The Division Algorithm, The Greatest Common Divisor, Euclid's Lemma, The Least Common Multiple, The Euclidean Algorithm.5. The Fundamental Number of Arithmetic: Prime Numbers, Euclid's Lemma.6. The theory of Congruence: Basic Properties of congruence.7. Examples of Fermat's Theorem.8. Sums and Products, Basic Algebraic Properties, Moduli, Complex Conjugates, Exponential form, Products and Quotients, De-Moivre's theorem..9. Roots of Complex Numbers: The nth roots of unity.10. Regions in Complex Plane.
Analytical Geometry	<ol style="list-style-type: none">1. Find the Change of axes: translation and rotation.2. Examples of Conic Sections: General equation of second degree in two variables.3. Reduction to standard form, center of conic, nature of conic.4. Direction cosines and direction ratios, Equation of plane, Normal form, Transform to the normal form, Plane passing through three non-collinear points, Intercept form, Angle between two planes.



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	<ol style="list-style-type: none">Distance of a point from a plane, Distance between parallel planes, Systems of planes, two sides of planes, Bisector planes.Equations of a line in Symmetric and unsymmetrical forms, Line passing through two points, Angle between a line and a plane.Perpendicular distance of a point from a plane, Condition for two lines to be coplanar.Examples and Find Equation of a sphere in different forms, plane section of a sphere.Find the Equation of a circle, sphere through a given circle.Examples of Intersection of a sphere and a line, Equation of tangent plane to sphere.
Calculus	<ol style="list-style-type: none">The Algebraic and Order Properties of \mathbb{R}: Algebraic properties of \mathbb{R}, Order properties of \mathbb{R}, Well-Ordering Property of \mathbb{N}. Arithmetic mean-Geometric mean inequality, Bernoulli's inequality.Examples of Absolute Value and the Real Line: Absolute value function and its properties, triangle inequality and its consequences, neighborhood of a point on real line.The Completeness Property of \mathbb{R}: Definitions of Upper bound, Lower bound, supremum, infimum of subsets of \mathbb{R}, completeness property of \mathbb{R}.Find Length of the perpendicular from a point to a plane.Sequences and Their Limits: Definition and examples of sequences of real numbers, Definition of limit of sequence and uniqueness of limit, Examples on limit of sequence.Limits Theorems: Definition of bounded sequence, Every convergent sequence is bounded, Algebra of limits.Monotone Sequences: Definition and examples of monotone sequences, Monotone convergence theorem and examples.Subsequences and Bolzano-Weierstrass Theorem: Definition of subsequence and examples, Divergence criteria, Monotone Subsequence theorem Bolzano-Weierstrass theorem.Functions and their Graphs: Functions, domain and range, graphs of functions, representing a function numerically, and Vertical line test, Piecewise defined functions, increasing and decreasing functions, even and odd functions symmetry, common functions.Limits of Functions: Definition of cluster point and examples, definition of limit of a function, sequential criterion for limits, divergence criteria.Limit Theorems: Algebra of limits, Squeeze theorem.Some extension of limit concepts: one-sided limits, infinite limits.Continuous Functions: Definition of continuous function at a point, sequential criterion for continuity, Divergence criterion, combination of continuous functions.



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	<p>14. Continuous Functions on Intervals: Properties of continuous functions on an interval, Boundedness theorem. The minimum-maximum theorem, Location of root theorem, Bolzano's intermediate value theorem. Continuous function maps closed bounded interval to closed bounded interval, Preservation of interval theorem.</p> <p>15. Examples of The chain rule, Derivative of inverse function.</p> <p>16. Examples of Interior extremum theorem, Mean Value theorems and their Consequences, Intervals of increasing and decreasing of a function, first derivative test for extrema.</p> <p>17. Examples of Taylor's theorem and Maclaurin's theorem with Lagrange's form of remainder and The nth derivative and Leibnitz theorem for successive differentiation.</p> <p>18. Find the Linear first order equations, Separable equations, Existence, and Uniqueness of solutions of nonlinear equations.</p> <p>19. Understand Exact differential equations and Integrating factors.</p>
SYBSC- MULTIVARIABLE CALCULUS I	<p>1. Sketch the level curves of functions of two variables.</p> <p>2. Discuss limit and continuity of functions in two and three dimension.</p> <p>3. Understand definition of derivative.</p> <p>4. Find second order partial derivative and partial derivatives of higher order.</p> <p>5. Prove differentiability of a function at a given point.</p> <p>6. Find directional derivative of a scalar function, equations of Tangent planes and normal lines.</p> <p>7. Directional derivatives, gradient vectors, Tangent planes, normal lines and differentials.</p> <p>8. Examples of Extreme values, First derivative test and Second derivative test for local extreme values.</p> <p>9. Notions of limits and continuity.</p> <p>10. Taylor's Formula for two variables.</p> <p>11. Examples Double Integral over rectangles, Fubini's theorem for calculating double integrals.</p> <p>12. Solve the Double integrals in polar form and Triple integrals in rectangular coordinates.</p> <p>13. Examples of Triple integral in cylindrical and spherical coordinates.</p> <p>14. Examples of Substitution in multiple integrals, Application to area and volumes.</p>
Discrete Mathematics Paper- IIA	<p>1. Define Propositional logic, Propositional equivalences.</p> <p>2. Find Predicates and quantifiers.</p> <p>3. Find Nested quantifiers.</p> <p>4. Introduction to proofs and Rules of inference.</p> <p>5. State and Prove The basics of counting.</p> <p>6. Basics of Permutation and combinations.</p> <p>Generalization of permutation and combinations.</p> <p>7. Using Inclusion-Exclusion principle solve some examples.</p>
Linear Algebra	<p>1. Examples of linear dependence, basis and dimension, vector subspace.</p> <p>2. Introduction of Necessary and sufficient condition for subspace, vector space as a direct sum of subspaces.</p>



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	<ol style="list-style-type: none">3. Find the Inner product, norm as length of a vector, distance between two vectors.4. Understand the orthonormal basis, orthonormal projection, Gram Schmidt process of orthogonalization, null space, range space, rank, nullity, Sylvester Inequality.5. Properties of linear transformations, equality of linear transformations, kernel.6. Rank of linear transformations, composite transformations.7. Inverse of a linear transformation.8. Matrix of a linear transformation.9. Change of basis, similar matrices.10. Examples of Linear transformation.
Multivariable Calculus II	<ol style="list-style-type: none">1. Introduction of Vector valued function.2. Concepts of Limit and Continuity of vector function.3. Derivative of vector function and motion.4. Rules of Differentiations.5. Constant vector function and its necessary and sufficient condition.6. Integration of vector function of one scalar variable.7. Examples of Arc length and unit tangent vector T. Curvature and the unit normal vector N.8. Definition and evaluation of line integral.9. Properties of line integrals.10. Examples of Vector fields, work, circulation and flux across smooth curves.11. Find the value of Path independence, Potential functions, and Conservative fields.12. Examples of Green's theorem in plane, evaluating integrals using Green's theorem.13. Surface area and surface integrals.14. Concepts of Surface integral for parameterized surfaces.15. Examples of Stokes theorem.16. Examples of the Gauss divergence theorem.



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Department of Commerce

Program Outcomes, Program Specific Outcomes, and Course Outcomes

Sr. No.	Programme Specific Out Comes (PSO)
1.	B. Com & M. Com programmes could provide well-trained professionals for the Industry Banking Section. Insurance companies, financing companies, transport agencies, warehousing etc. to meet the well-trained manpower requirements. The graduates will get hands on expenses in various aspects acquiring skills for marketing manager, selling manager overall administration abilities of the company.
2.	The students should process the knowledge, skill and attitudes during the end of the B. Com & M. Com degree course by virtue of the training they can become a Manager, accountant. Management Accountant, Cost Accountant, Bank Manager, Auditor of Company, Chartered Accountant, Secretary, Teacher, professor, stock agents, Government Jobs etc.

Programme Outcomes & Course Outcome

Sr. No.	Programme Outcomes & Course Outcome
1.	The program aims to cultivate in students' virtues of commerce professionals to effectively contribute to need of society.
2.	Develop fundamental knowledge of accountancy, Auditing, Taxation, Finance, Marketing & provide innovation solutions to problems in business.
3.	To develop understanding of law & management functions through accounts & finance.
4.	Develop leadership qualities & integrate business systems
5.	Encourage the students for higher studies & research in commerce
6.	Be able to communicate their ideas with industry effectively & efficiently
7.	Develop ability to work at individual level.
8.	Be able to integrate latest technology & apply it.
9.	Develop business models & be responsible global citizens.
10.	Handle information technology & accounting tools in decision-making.
11.	The programme is useful to develop the awareness of business law to start new business after their graduation
12.	The programme boosts the organisational skill of students and further development of overall personality development skills as per the need of society.
13.	Development of bargaining power amongst the students helps them to become good buyer.
14.	To develop numerical abilities of students
15.	To develop language abilities of students.
16.	To inculcate writing skills and Business correspondence
17.	To create awareness of Law and Legislations related to commerce and business
18.	To introduce recent Trends in Business, Organizations and Industries.
19.	To inform about Economics Environment of Country as well as World.
20.	To acquire practical skill related with banking and other business
21.	To provide a platform for overall development of students and develop knowledge level and awareness of students about Recent Trends of the World.



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Department of Economics

Program Outcomes, Program Specific Outcomes, and Course Outcomes

On completion of B.A. (Economics), students are able to:

1. Understand basic concepts of economics
2. To able to analyze economics behavior in practice.
3. Understand the economics way of thinking.
4. The ability to analyze historical and current events from an economics perspective.
5. The ability to write clearly expressing an economics point of view.
6. Be exposed alternative approaches, economics problems through exposure to coursework in allied fields.
7. To create student's ability to suggest of the various economics problems.

COURSE OUTCOMES: B.A. Economics

FYBA-ECO-Indian Economics Environment (G1)

On completion of the course, students are able to

1. Understand nature, Basic Characteristics and Major issues of Indian economy.
2. Understand nature, basic characteristics and major issues of Indian economy.
3. Understand population & economic development.
4. Understand poverty and unemployment concepts and their trends in Indian economy.
5. Understand role of agriculture, industrial sector in economy.
6. Understand salient features of economy of Maharashtra.
7. Understand role of co- operative in economic development of Maharashtra.
8. Understand regional imbalance causes & preventive measures.

SYBA-ECO -2157: MODERN BANKING (G2)

1. Create the awareness among the students of modern banking system.
2. Understand commercial banking system in Indian
3. Understand working & operation of RBI
4. Understand new development in Indian financial system periods
5. Understand cooperative and rural banking in Indian
6. Understand non-banking financial institutions & financial services in Indian
7. Understand the Indian money market
8. Understand the Indian capital market
9. Able to understand international aspects of the Indian financial system

ECO 2158: MICRO ECONOMICS (S1)

On completion of the course, students are able to

1. Student is expected to understand the behavior of an economics agent, namely, a consumer, a producer, a factor owner and the price fluctuation in market



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2. To understand nature and scope of economics, the theory of consumer behavior, analysis of production function and equilibrium of a producer, the price formation in different markets of production function and equilibrium of a producer, the price formation in different markets structures and the equilibrium of a firm and Industry.
3. Understand concept of revenues and cost of production.
4. Understand linear & non – linear functional relationship
5. Understand price determination of factors (Rent, wages, interest and profit)
6. Understand meaning of social welfare function.

ECO – 2159 MACRO ECONOMICS (S2)

On completion of the course, students are able to

1. Understand macro-economic analysis
2. Understand of national income
3. Understand classical & Keynesian theories of output and employment
4. Understand process of credit creation by commercial banks
5. Understand consumption & Investment function
6. Understand Quantity theory of money.
7. Understand various macroeconomics problems
8. Understand various macroeconomics policies.

TYBA

ECO: 3157 – ECONOMICS DEVELOPMENT AND PLANNING (G3)

On completion of the course, students are able to

1. Understand the difference between economic growth and development, Indicators of economics development.
2. Understand characteristics of developing countries.
3. Understand constraints on development countries
4. Understand constraints on Development process.
5. Understand theories and approaches of economic development.
6. Understand some growth models.
7. To understand macroeconomic policies, roll of foreign capital and economic planning etc. in developing countries.

ECO 3158 : international economics (S3)

On completion of the course, student is able to,

1. Understand nature, scope and importance of international economics.
2. Understand theories international trade.
3. Understand gain from international trade and their measurements.



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4. Understand theory of intervention in trade.
5. Understand the theory of regional blocks.
6. Understand trade policies in India.
7. Understand international financial institutions.
8. Understand foreign direct investment.
9. Understand foreign exchange market.

ECO3159 : Public finance(S4)

On completion of course student are able to,

1. Understand functions and role of government b in economy and meaning nature scope and importance of public finance.
2. To understand various approaches about role of government and principal of social advantage-Dr.Dalton
3. Understand concept of public expenditure.
4. Understand concept of public revenue.
5. Understand incidence and approaches of taxation.
6. Understand concept of public depth.
7. Understand concept of budget and deficit finance.
8. Understand taxation and public depth of India.
9. Understand fiscal federalism in India.



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Department of Geography

Program Outcomes, Program Specific Outcomes, and Course Outcomes

Program Specific Out Comes

Geography mainly concerns changes in spatial attributes in a temporal perspective. The Honours program in geography is tailored to meet the students' specific educational and professional goals in mind. It focuses on spatial studies, qualitative as well as quantitative, and emphasizes on human-environment relationship. During the first year of the program, the students are trained on advanced concepts of physical and human geography. The third year allows them to concentrate on specific areas of the subject, on which they complete their field reports. After completing the course, the students will be amply prepared for professional careers in geography like MPSC, UPSC Exams.

Program Outcomes

1. Acquiring Knowledge of Physical Geography
2. Acquiring Knowledge of Human Geography
3. Acquiring Knowledge of Atmosphere and Hydrosphere
4. Acquiring Knowledge of Comparative Study
5. Development of Observation Power
6. Understand Environmental Ethics and Sustainability
7. Acquiring Knowledge of climatology and oceanography
8. Acquiring Knowledge of Population and Settlement Geography

Course Outcomes

FYBA-Gg-110(A) Physical Geography

1. Understand the Nature and scope of physical Geography
2. Understand the earth System
3. Know the Branches of Physical Geography
4. Understand the Interior of the Earth
5. Understand Theory regarding the Origin of Continents.
6. Study the Davis Concept of Cycle of Erosion
7. Understand the Structure of the Atmosphere
8. Study the Heat Balance
9. Understand the Pressure belts and Wind System
10. Understand forms and types of Precipitation
11. Study the Hydrological Cycle
12. Understand General Structure of Ocean Floor



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FYBA- Gg -110 (B) Human Geography

1. Understand the Nature and Scope of Human Geography
2. Study Branches and Importance of Human Geography
3. Understand the Factors affecting on distribution of Population
4. Explain the Theory of Demographic Transition
5. Understand the Composition of Indian Population
6. Study the types and pattern of rural settlements
7. Understand Urbanization in India and Maharashtra
8. Study Types of Agriculture
9. Understand Factors affecting on Agriculture activity
10. Understand the Problems of Indian agriculture

SYBA Gg-210: Elements of Climatology and Oceanography (G2)

1. Understand the importance of Atmosphere
2. Understand heat balance.
3. Understand the types of winds
4. Understand the structure, composition of Atmosphere.
5. Understand weather phenomenon winds, humidity and precipitation.
6. Understand properties of ocean water.
7. Knowledge about effect of ocean Currents.
8. Study about types of tides.
9. Study of costal environment and Ocean Resources

TYBA Gg310: Human Geography (G3)

1. Understand the importance and development of Human Geography
2. Understand the concepts of Determinism, Possibilism, Stop and Go Determinism.
3. Knowledge about Human Evaluation and Races.
4. Explain the Griffith Taylor's Theory of Human Races.
5. Study of the Indian Tribes.
6. Aware the Student about Human Culture.
7. Study of Causes and Effects of Migration.
8. Understand the Effects of Population Growth on Natural Resources.
9. Explain the Malthus Theory of Population Growth.

FYBSc-Gg111: Introduction of physical Geography

1. Understand the Components of Earth system.
2. Knowledge about the Geological Time Scale.
3. Understand the Interior of the Earth.
4. Explain the Theory of Isostasy.
5. Understand the Crustal Movements.
6. Understand the Causes and Effects of Earthquake and volcanoes.



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7. Explain the Davis Theory of Fluvial Cycle of Erosion.
8. Understand the Difference between Rocks and Minerals

Gg112: Introduction of Atmosphere and Hydrosphere

1. Understand the structure and Composition of Atmosphere and Hydrosphere.
2. Understand the Heat budget of the Earth.
3. Understand the Vertical and Horizontal Distribution of Pressure belts.
4. Understand the General Structure of Ocean Currents.
5. Understand the Causes and types of Ocean Currents.

Gg113: Practical in Physical Geography

1. Understand the types of Map Projection.
2. Students understand the Collection of Data and its Representation.
3. Understand the Interpretation of Thematic map.

Gg122: Population and Settlement Geography

1. Understand the Various sources of Population Data.
2. Understand the Distribution of Population Density in the World.
3. Explain the Theory of Demographic Transition.
4. Understand the Demographic Composition.
5. Understand the types and patterns of Settlements.
6. Understand the Trends and Patterns of World Urbanization.

Gg-123 Practical in Human Geography

1. Understand the Data Analysis and Presentation using Computer
2. Students understand the comparative study of different places and Report writing.



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Department of Political Science

Program Outcomes, Program Specific Outcomes, and Course Outcomes

Program Outcomes

1. After completion of BA Political Science (Gen) program students will be able to develop academic proficiency in the subfields of Indian Government and Politics, Political Theory, Philosophy, Thoughts and Political Ideology.
2. After completion of this program students will be become good citizen of India
3. Students enable to analyze political and policy problems and formulate policy options.
4. Students enable to discuss the major theories and concepts of political science and its subfields, and deliver thoughtful and well-articulated presentations of research findings.
5. Students enable to perform task of critical inquiry of political phenomenon.

Program Specific Outcomes

1. Serve as a politician
2. Can admit to MA Politics, LLB, MSW, MBA, etc
3. Preparing for Civil Services and another competitive exam.
4. Work in NGOs.
5. Work as a teacher in colleges, schools and high schools

Course Outcomes

FYBA-Introduction to Indian Constitution(G1)

1. Students enable to appreciate the various phases of Indian national movement.
2. Students enable to create value in young youth regarding the patriotism.
3. Students enable to understand the philosophy of Indian constitutions.
4. Students enable to understand Important Features of Indian Constitution and will know how Indian Govt. works.
5. Students enable to know their fundamental rights and duties, which help them to become good citizen.

SYBA Political Theory & concepts (G2)

1. Students enable to understand the nature and scope of political theory.
2. Students enable to appreciate the procedure of different theoretical ideas in political theory.
3. Students enable to Interpret and assess information regarding a variety of political theory
4. Students enable to understand the various traditional and modern theories of political science
5. Students enable to acquaint with the theories, approaches, concepts and principles of political theory.

TYBA Political Ideologies (G3)

1. Students enable to understand origin of various Political Ideologies.
2. Students will understand historical Perspectives of political Ideologies
3. Students will be able to understand the philosophical nature of political Ideologies.



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4. Students enable to understand the impact of Political Ideologies on global and national Politics
5. Students will be developed critical faculty to analyze various Political Ideologies.



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Department of History

Program Outcomes, Program Specific Outcomes, and Course Outcomes

Program Outcomes

After completion of the BA (History) program,

1. The students should be able evaluate, analyze, and synthesize historical materials (primary and secondary sources).
2. Students enable to recognize and explain the historical development of cultures.
3. Students understand to evaluate and recognize different empires in Indian history.
4. Students identify the role of theory and methodology in the production of historical knowledge.
5. Students identify and analyze basic historical concepts.

Program Specific Outcomes

On completion of the BA (History),

1. Students should be able to find employment with archaeological survey of India or with private firms related to archaeology.
2. For History graduates, the option of public service is always open.
3. Work as a teacher in schools and high schools.
4. Serve as conservator and tourist guide in historical monuments.
5. NGOs and social welfare organizations also employ BA history graduates.
6. Writer/ subject matter expert.



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Department of Marathi

Program Outcomes, Program Specific Outcomes, and Course Outcomes

Use of Marathi language is an important medium for exchanging human thoughts and ideas. Language is used to convey the meaning of a person's mind to others. In short, language is a means of expression. Marathi language is no exception to this; today Marathi language is being used in every sphere of life (schools, colleges, government offices, various occupations etc.). Although the nature of language is different in every place, there is no denying. Many opportunities may be available to the students who have taken Marathi subjects at the undergraduate and postgraduate level from the college e.g. According to the changes in the format of Doordarshan, All India Radio (AIR), those who are fluent in the language have the opportunity to be good commentators. Language is also available in the field of literature. They can also make good money by producing Marathi literature on the strength of their creativity. According to the policy of the government, if any correspondence or any information is to be disseminated from all government offices, it is mandatory to do so in Marathi language. Thus, language is important in all fields. Newly developed What'sApp, Facebook, Twitter etc. Language is being used extensively to convey the message through the medium. Overall, there are many opportunities available through language, so it is safe to say that language is an integral part of human life in various fields.

**The Course Outcome of UG Course,
B.A. in MARATHI**

After Completion of B. A. in Marathi (General), Special Student will be able to

1. Develop Competency in Literary Forms (Marathi Poetry & Fiction)
2. Develop Reading, Writing & Communication Skills in Hindi.
3. Get Information About the History of Ancient, Medieval and Modern Literature.
4. Learn The Literary Works Based on the Founding Laid by The Scholars.
5. Get Information About the Literary Theories.
6. Develop Approach of Marathi Linguistics & Grammar.
7. Get The Jobs for Their Livelihood.
8. Be Motivated for Their Further Education.
9. M. A. MARATHI start -2020-21.



MARATHA VIDYA PRASARAK SAMAJ'S
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Department of English

Program Outcomes, Program Specific Outcomes, and Course Outcomes

Literature courses of English provide an opportunity to study & implement world best literature of all countries along with its history, social, cultural, & political background.

Literature provides imaginative & critical insights into all areas of human life.

Program Outcomes

Developing intellectual, personal & professional abilities through effective communicative skills, ensuring high standard of behavioural attitude through literary subject & shaping the students socially responsible/citizens.

Program Specific Outcomes

Students will be accurate in both oral & written communication as well as Grammar & usage.

They can apply critical frameworks to analyse the linguistic, cultural & historical background of texts written in English.

They will be familiar with the convention of diverse textual genres including fiction, non-fiction, poetry, autobiography, biography, journal film play, editorial etc.

Course Outcome

Literature – To get acquainted with the master – pieces of literature along with their socio – political, history & cultural aspects of life.

Language – To trace out of the history of English – language & varied components of linguistic structure of the language.

Grammar – To know the fundamental principles English grammar including part of speech, types of sentences, its analysis etc.

Indian Writing in English – To learn the native literature with its literary societal, cultural, biographical & historical background of the greatest Indian writers in English.

Translation – To the principles of Translations