



Nutan Mahavidyalaya Sailu, Dist. Parbhani

PROGRAM OUTCOMES OF B.SC.

A) COMPULSORY ENGLISH

Compulsory English- First Year

Semester I

1. The Department introduced the students with short stories and essays on a variety of topics.
2. The teachers in the department encouraged the students to understand and appreciate prose writings of well-known writers
3. We tried to make students understand the importance of prose and how it differs from that of poetry.
4. We teach the students the grammar items such as antonyms and synonyms.
5. We encouraged them to write grammatically accurate imaginative prose passages, letters, short reports etc.

Compulsory English- First Year

Semester II

1. The teachers in the department encouraged the students to understand and appreciate short lyrical poems.
2. Motivated them to understand and enjoy the inherent rhythmic beauty of lyrical poetry.
3. Introduced the students to famous world poets such as Shakespeare, Blake and Tagore.
4. We, the teachers in the department, taught various grammar items and general language skills.
5. The students were taught the difference between verbal and non-verbal communication.

Compulsory English- Second Year

Semester III

1. We, the teachers in the department, introduced the students with short stories, essays on a variety of important topics.
2. Encouraged them to understand and appreciate prose writings of well known writers.
3. We helped our students to learn grammar items such as idioms, phrases, and reported speech.
4. We tried to quip them with grammatical knowledge to enable them to write grammatically correct sentences.
5. We took special care to enable them to prepare them for competitive examinations.

Compulsory English- Second Year

Semester IV

1. We encouraged our students to understand the brief history of poetry and its peculiarities.
2. Encouraged our students to understand and appreciate short lyrical poems.
3. We made an attempt to acquaint them with world famous poets such as Wordsworth, Blake, Keats, Byron, Browning and Tagore.
4. We developed in the students communicative competence by encouraging them to learn to read and write and listen good English.
5. The teachers also tried to make the students understand as to what is non-verbal communication and its importance.

B) SL

1) HINDI(SL)

1. Develop competency in Literary Forms(Hindi Poetry & Fiction).
2. Develop Reading ,Writing, & Communication Skill in Hindi.
3. Get information about the History of Ancient, Medieval and modern Hindi Literature.
4. Learn the Literary works on the basis of foundation laid by the scholars.
5. Get Information about the Literary Theory.
6. Develop Approach of Hindi Linguistics & Grammar.
7. Get the jobs for their livelihood.
8. Be Motivated for their further education.

2)MARATHI(SL)

BSC FY I SEM

1. Students can understand types of literature prose and poetry
2. Students have introduced Medium and Modern prose literature.
3. Students have partly introduced of Medieval and modern Marathi poetry literature.
4. Students have gained how to use language to develop the personality.
5. Students acknowledgement/learned today English words alternative Marathi words.
6. Students introduced values like 'Truth', 'Freedom' and eagerness knowledge through Marathi stories and poems.

II SEM

1. Students understand language different of prose and poetry between medieval and modern.
2. Students learned values of character to learned and mutual understanding through prose study.
3. Students introduced medieval and modern Eris type of poetry and its different aspects.
4. Students introduced with letter writing skill and introduced with official letter writing.
5. Students can conduct a program as well as Anchoring.

3) SANSKRIT(SL)

BSC FY

FIRST SEMESTER

Nitishatakam

Aims :

1. students learnt how to judge fool people from society.
2. Students learnt to know good people.
3. Students learnt that "We can't satisfy fool people".
4. Students learnt that "Laziness is the biggest enemy of human being".
Hence don't be lazy.
5. Students learnt that you should be consistent in your work.

2. Students are capable to identify good books as well as judge the ideal teacher.
3. student tried to become a good student.

C)SCIENCE GROUP

1)BOTONY

B. Sc. First year

1- Students acquired knowledge of the importance and scope of the discipline and to provide mobility to students from one university or state to other.

2- Students introduced recent advances in the subject and enable to face Net, SET, UPSC and other competitive examination successfully.

3-Students acquired knowledge of plant science as the basic objective of education

4- students developed a scientific attitude so become open minded, critical and curious, got ability to work on their own and to make them fit for the society.

5- Students are able to expose themselves to the diversity amongst life forms and developed skill in practical work, experiments, equipments and laboratory use along with collection and interpretation of plant materials and data.

6- students are aware of natural resources and environmental and the importance of conserving the same, and developed ability for the application of the acquired knowledge in the fields of life so as to make our country self reliant and self sufficient as well as appreciate and apply ethical principles to plant science research and studies.

B. Sc. Second year

- 1- To provide an updated education to the students at large in order to know the importance and scope of the discipline and to provide mobility to students from one university or state to other.
- 2- To update curriculum by introducing recent advances in the subject and enable the students to face Net, SET, UPSC and other competitive examination successfully.
- 3- To impart knowledge of plant science as the basic objective of education
- 4- To develop a scientific attitude to make students open minded, critical and curious.
- 5- To develop an ability to work on their own and to make them fit for the society.
- 6- To expose themselves to the diversity amongst life forms
- 7- To develop skill in practical work, experiments, equipments and laboratory use along with collection and interpretation of plant materials and data.
- 8- To make aware of natural resources and environmental and the importance of conserving the same.
- 9- To develop ability for the application of the acquired knowledge in the fields of life so as to make our country self reliant and self sufficient.
- 10- To appreciate and apply ethical principles to plant science research and studies

B. Sc. Third Year

- 1- To provide an updated education to the students at large and to provide mobility to
Students from one university or state to other
- 2- To update curriculum by introducing recent advances in the subject and enable the
Students to face NET, SET, UPSC and other competitive examinations successfully.
- 3- To create awareness among the students about the botany and train them in the Subject.
- 4- To improve the quality of laboratory and field work, for which study tours and

excursions have been made compulsory so that the students can become familiar with the flora and ecosystems of that area.

5- To prepare such a dynamic curriculum by incorporating innovative concepts and a multidisciplinary approach which can attract and develop interest among the students for selecting plant science as their career.

PROGRAMME SPECIFIC OUTCOME (Theory)

B.Sc. First Year

Semester –I

Paper Name- Diversity of Microbes

Biology Paper No.-I

- 1) students are able to understand diversity amongst the microbes, salient features of microbes like bacteria and fungi.
- 2) Students acquired knowledge about the role of Lichens in soil formation and also their economic importance for various purposes
- 3) Students got knowledge about the mode of nutrition in fungi and bacteria, the various diseases caused by fungi, bacteria and viruses, and the life cycle pattern in fungi and bacteria.

B.Sc. First Year

Semester –I

Paper Name- Cell and Molecular

Biology Paper No.-II

- 1) students are able to Understand structure of Prokaryotic and Eukaryotic cell, the role of cell organelles in cell, the karyotype and ideogram of human being
- 2) students understand the difference between normal and giant chromosome, structure, replication and function of DNA, the gene and related diseases like AKU and PKU.

B.Sc. First Year

Semester –II

Paper Name- Diversity of Cryptogams

Biology Paper No.-III

- 1) students are able to Understand about the diversity of algae, bryophytes, and Pteridophytes.
- 2) Students Know the lifecycle pattern and alternation of generation in algae, bryophytes and pteridophytes and about the economic importance of algae.
- 3) Students got knowledge about the habit, habitat and mode of nutrition in higher cryptogams, the mode of reproduction in higher cryptogams.

B.Sc. First Year

Semester –II

Paper Name- Genetics and plant Breeding

Biology Paper

No.-IV

- 1) students are able to Know the sex determination in different animals, about the gene interaction and epistasis.
- 2) Students can Understand the sex linked inheritance and its types, and the X-linked disorder in Human Drosophilla
- 3) Students can Understand the different methods of plant breeding, mutational breeding and its application, and various steps in hybridiazation.

B.Sc. Second Year

Semester –III

Paper Name-Morphology and Taxonomy of Angiosperms Paper No.-VI

- 1) students are able to understand the morphological characteristic of angiospermic plants which helps in their identification and classification, the diversity of angiospermic plants, the distinguishing characters of angiospermic plants.
- 2) Students acquired knowledge about the economic importance of the angiospermic plants, the binomial nomenclature system of angiospermic

plants, different methods of classification of flowering plants with their merits and demerits.

B.Sc. Second Year

Semester –III

**Paper Name-Histology Anatomy and Embryology of Angiosperms Biology Paper
No.-VII**

- 1) students are able to Understand simple and complex permanent tissue, normal and anomalous secondary growth in plants, the role of secretory tissues.
- 2) Students can Understand the structure and development in microsporangium and megasporangium, the development of male and female gametophyte, the development of endosperm, and the structure of dicot and monocot embryo.

B.Sc. Second Year

Semester –IV

Paper Name-Gymnosperms and Paleobotany Paper No.-VIII

- 1) students are able to understand the morphological and anatomical characters and reproductive characters of gymnosperm plants, the evolutionary trends, affinities and relationship of gymnosperms with angiosperms
- 2) Students Know the economic importance of gymnospermic plants, importance fossil plants, and the application of paleobotany, the types of fossilization.

B.Sc. Second Year

Semester –IV

Paper Name-Ecology and Environmental Biology

Paper

No.- IX

- 1) Students are able to understand scope of ecology, the different ecological factors and its role, the soil components and soil profile.
- 2) Students acquired the knowledge about morphological and anatomical adaptation in Hydrophytes and Xerophytes, the impact of human activities on environment, biogeochemical cycle and its role in nature,
- 3) Students can understand deforestation and its effect, and the global issues concerned with environment.

B.Sc. Third Year

Semester –V

Paper Name-Plant Physiology

Paper No.- XII

- 1) students are able to understand different biophysico-chemical phenomenon, mechanism of ascent of sap.
- 2) Students are able to learn about paratonic and nastic movement, the role of macro and micro elements in plants.
- 3) Students can define the translocation of organic solutes in plants, application of plant growth hormones, biological functions of secondary metabolites.

B.Sc. Third Year

Semester –V

Paper Name-Plant Patholoty-I

Paper No.- XIII

- 1) students are able to Know scope, importance and advancement of plant pathology, classification of plant diseases on the basis of causal organisms and symptoms, Field and laboratory diagnosis of plant pathogens.

- 2) Students are clear about the Kochs postulates for pathogenicity, different modes of entry of plant pathogens, different factors affecting diseases development, dispersal of plant pathogens, diseases in detail of various important crops along with the control measures.

B.Sc. Third Year

Semester –VI

Paper Name-Plant Metabolism, Biochemistry and Biotechnology Paper No.- XIV

- 1) students are able to Understand the mechanism of photosynthesis and respiration, fermentation, concept of holoenzyme, and the symbiotic and asymbiotic nitrogen fixation .
- 2) Students can understand the mechanism of enzyme activity, technique of recombinant DNA technology, about cloning vectors and agrobacterium mediated gene transfer, basic aspects of tissue culture, and application of tissue culture and transgenic plants.

B.Sc. Third Year

Semester –VI

Paper Name-Plant Pathology-II Paper No.- XVI

- 1) students are able to understand the aerobiology, its scope and importance, seed-borne pathogens, their isolation and seed certification, defense mechanism of host plants and plant disease management.
- 2) Students are clear about the diseases cycle, symptoms and control measures of diseases of important crops, the loss in yield of host crop plants due to the diseases.

PROGRAMME SPECIFIC OUTCOME (Practical)

B.Sc. First Year

Biology Paper No.-V

- 1) students are able to Observe the morphological features of algae, the salient features of Bryophytes and Pteridophytes.
- 2) Students can understand the structure of Polytene and Lampbrush chromosome, the preparation of slides of Mitosis and Meiosis, Interaction of allelic gene and its ratio, the human syndromes.
- 3) Students can Identify symptoms of Yellow vein mosaic of Bhendi and Little leaf of Brinjal, Study the morphology of various types of lichens, the symptoms of plants diseases caused by fungi and bacteria.
- 4) Students can Understand the structure of thallus of algae and bryophytes, visited the damp, rivers, hilly places for the collection of samples.

B.Sc. Second Year

Biology Paper No.-X

- 1) students are able to understand the morphological characters of angiospermic plants, Identify and classify the flowering plants, anatomical characters of plants by preparation of double stained permanent slides.
- 2) Students can understand fossil plants with the help of specimens and slides, flowering plants through short and long botanical excursion.

B.Sc. Second Year

Biology Paper No.-XI

- 1) students are able to understand different tissue system in plants, double stained preparation of slide, the morphological and anatomical features of Hydrilla stem, Casuarina stem and Nerium leaf.
- 2) Students Visited nearby locality to observe Hydrophytes and Xerophytes, the forest to observe biodiversity, the plant biomass above the ground in forest.

B.Sc. Third Year

Biology Paper No.-XVI

- 1) students are able to understand the water potential of potato tube and osmotic potential of vacuolar sap by plasmolysis, the methods of separation of photosynthetic pigments in plants, Arc indicator, Clinostat and Kuhns fermentation.
- 2) Students can Understand qualitative analysis of protein and carbohydrates, the amount of glucose and protein in plant, the osmosis by potato osmoscope, the micro chemical test for organic acids.

B.Sc. Third Year Biology Paper No.-XVII

- 1) students are able to know the laboratory equipments, Prepare the media for the isolation of plant pathogens.
- 2) Students can study Kochs Postulates, symptoms of fungal diseases and the morphology of the pathogens, Calibrate the microscope to study the fungal pathogens, the plant diseases through short and long excursion.

2)Computer Science

1. Serve as the Programmers or the Software Engineers with the sound knowledge of practical and theoretical concepts for developing software.
2. Serve as the Computer Engineers with enhanced knowledge of computers and its building blocks.
3. Work as the Hardware Designers/Engineers with the knowledge of Networking Concepts.
4. Work as the System Engineers and System integrators
5. Serve as the System Administrators with thorough knowledge of DBMS.

6. To Give Technical Support for the various systems.
7. Work as the Support Engineers and the Technical Writers
8. Work as Consultant and Management officers for system management.
9. Work as IT Sales and Marketing person.
10. Serve as the IT Officers in Banks and cooperative societies.
11. Work as DTP Operator in small-scale industries.
12. Serve as the Web Designers with latest web development technologies.

Programming in C

- 1) Students are clear about the basic concepts of program development statements and its syntax, the various types of arrays and its structure, various types of Functions and String handling mechanisms.
- 2) Students can understand the Concepts of structures and Unions, the various operations performed on different types of files.

Object Oriented Programming with C++

- 1) Students are able to understand the top-down and bottom-up programming approach and apply bottom up approach to solve real World problems, the difference between static and dynamic binding. Apply both techniques to solve problems.
- 2) Students are clear about the concept of inheritance and apply real world problems, generic data type for the data type independent programming which relates it to reusability, design of handling large data set using File I/O.

JAVA PROGRAMMING

- 1) Students are clear about basic Java language syntax and semantics to write Java programs, the concepts of variables, conditional and iterative execution methods etc, the fundamentals of object-oriented programming in Java, including defining classes, objects, invoking methods.

- 2) Students can understand various methodologies to handle the exception mechanisms and the principles of inheritance, packages and interfaces, Demonstrate the programming concepts for applet and graphics.

WEB DESIGN TECHNOLOGY

- 1) Students can understand the concepts of markup languages, un order list, table, formatting, linking and frames, creation of cascading style sheets, backgrounds, media types and building a dropdown menu.
- 2) Students know the JavaScript, control structure, if structure, switch, do-while and logical operators, javascript functions, javascript arrays and javascript objects, the DOM, javascript events and XML.

OPERATING SYSTEM

- 1) Students can describe the basic components of an operating system and their role in implementations for general purpose, real-time and embedded applications, the concepts of processes, threads, asynchronous signals and competitive system resource allocation.
- 2) Students are able to understand multi-tasking and outline standard scheduling algorithms for Multi-tasking, mutual exclusion principles and their use in concurrent programming including semaphore construction and resource allocation, details of major operating system concepts, overview of system memory management and the implementation of file systems.

VISUAL BASIC

- 1) Students are clear about the basic Concepts of Program building block control statements and the basic concepts of function and procedure, the functionality and properties of GUI based ActiveX Control with example programs, about graphics handling related control and properties.
- 2) Students know about the fundamental functions and properties of Advanced ActiveX Control, concepts of database handling using DAO, ADO and RDO control with data report concept.

Database Management System

- 1) students are able to understand the fundamentals of File processing and database processing system, various data model and its application, various normal forms and its role in DBMS.
- 2) Students can understand the fundamental concepts of SQL programs, function, procedure, package, trigger and exception handling.

COMPUTER NETWORK

- 1) Students can explain the local, metropolitan and wide area networks using the Standard OSI reference model, various networking technologies, protocols, network interfaces and design of performance issues in local area networks and wide area networks.
- 2) Students are clear about wireless networking concepts, contemporary issues in networking technologies, network tools and network programming, analysis of different types of protocol and the comparison of number of data link, network and transport layer protocols.

SOFTWARE ENGINEERING

- 1) Students can define the fundamental knowledge in science, mathematics, fundamentals of computer science, software engineering and multidisciplinary engineering to begin in practice as software engineer, design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, manufacturability, sustainability, ethical, health and safety.
- 2) Students can describe the techniques, skills, and modern engineering tools necessary for engineering practice, the early careers will be capable of team and organizational leadership in computing project settings, and have a broad understanding of ethical application of computing-based solutions to societal and organizational problems.
- 3) Students are clear about analyze, design and manage the development of a computing based system, component or process to meet desired needs within realistic constraints in one or more application domains.

Programming in C LAB

- 1) Students can understand design and algorithmic solution for a given problem, Construction of flowchart for the computer programs, using Control Statements, using Arrays and Functions, using file handling with structure.

Programming In C++ Lab

- 1) Students can explain the features of C++ using object oriented programming, relative merits of C++ as an object oriented programming language, major object-oriented concepts to implement object oriented programs in C++ Using encapsulation and inheritance.
- 2) Students can describe the major object-oriented concepts to implement object oriented programs in C++ Using polymorphism, the advanced features of C++ specifically stream I/O, templates and operator overloading

JAVA PROGRAMMING LAB

- 1) Students can understand the programming language design, syntax and semantics, critical thinking skills through solving programming problems, standard syntax for java programs and other programs Tools.
- 2) Students can define animation and events based advanced java program concepts (Applet), java programs using object oriented class with parameters, constructors, utility, calculations, and methods including inheritance, test classes and exception handling.

WEB DESIGN TECHNOLOGY LAB

- 1) Students can explain the fundamental tags used in HTML,
- 2) Students can develop the web page in various applications, the web page using various ordered and unordered listing commands.
- 3) Students can understand the web page using frame concepts with multi-media handling, web page using java script.

VISUAL BASIC and ORACLE LAB

- 1) Students can explain the simple programs using basic control statement, GUI based program using Basic ActiveX Control, different advanced ActiveX control with example application programs, various types of data base handling with MS-Access and Oracle, concepts of data report for an organization.

3)MATHEMATICS

1. Introduction:

The courses for the UG Program are framed using time tested and internationally popular text books The idea is to make learning mathematics meaningful and an enjoyable activity rather than acquiring manipulative skills and reducing the whole thing an exercise in using thumb rules. As learning Mathematics is doing Mathematics, to this end, some activities are prescribed to increase student's participation in learning. Duration of the degree programme shall be six semesters distributed in a period of three academic years.

2. Course Objectives:

- Successful Mathematic students of this institute will gain lifelong skills, including following:
- To develop their mathematical knowledge and oral, written and practical skills in a way which encourages confidence and provides satisfaction and enjoyment.
The development of their mathematical knowledge.
- Confidence by developing a feel for numbers, patterns and relationships.
- An ability to consider and solve problems and present and interpret results.
- Communication and reason using mathematical concepts.
- To develop an understanding of mathematical principles.
- To develop the abilities to reason logically, to classify, to generalize and to prove.
- To acquire a foundation appropriate to their further study of mathematics and of other disciplines.

3. Advantages of the Course:

- Student will be getting highly motivated for higher studies in reputed institutes like IIT's , NIIT's,IISc's,CMI,HRI etc...

B. Sc. – I [Mathematics]

Differential Calculus-I :

- It is used in almost all branches of engineering, deals with rate of change, the concept of differentiation, concept of Integration, applications of differentiation include measuring velocity, acceleration, etc. Applications of Integration include estimating areas, volumes, etc.

Algebra and trigonometry-II:

- Understanding of operations on matrices
- Understanding the concept of inverse of a matrix
- Matrices are used in solving linear equations.
- Linear equations are vital for solving any differential equations
- Many areas of Numerical analysis depend upon linear equations.
- Specific fields of applications are computer graphics, Cryptography etc.

Integral Calculus-III

- Different types of bounded integrable functions.
- Fundamental Theorem of Integral Calculus
- To solve Improper Integral with finite and unbounded range.
- Beta and Gamma functions as a application of Improper Integral.
- learn integration through infinite sum.
- They can solve improper integral of any kind using the known methods
- Applications of fundamental theorem of calculus
- Solving beta and gamma functions

Geometry-IV:

- Understanding the concept of distance between two points
- Understanding the concept of slope
- Understanding the change of origin and change of scale.
- Learn various forms of straight lines.
- Learn about various conic sections. • It is used in Mechanics and Astronomy.

Mathematics Practical Using Matlab -V

- Introduction of Matlab
- Plotting of Graphs
- Students can learn basic matlab commands.

- Students can plot 2D /3D graphics

B. Sc. – II [Mathematics]

Real AnalysisI -VI :

- Definition of Sequence and it's properties
- Algebra of limit of a sequence
- Bolzano-Weierstrass theorem and Cauchy's criterion for convergence
- Infinite Series and Absolute Convergence
- Know the definition of the limit of a sequence, evaluate the limits of a wide class of real sequences;
- Decide on convergence or divergence of a wide class of series;
- determine whether or not real series are convergent by comparison with standard series or using the Ratio Test;
- Understand the concept of Absolute convergence and be familiar with the statements and
- Some proofs of the standard results about Absolute convergence;

Group Theory-VII ;

- Definition and examples of groups
- Subgroups, Normal Subgroup, Quotient Group, Homomorphism, Isomorphism
- Cayley and Lagrange theorem
- To understand the concept of groups.
- To learn homomorphism and isomorphism.
- To learn group codes and how to uncode.
- Categorize group structures
- Find quotient group, subgroups of a given group
- Analyze group structure from its order

Ordinary Differential Equations-VIII;

- Concepts of ODE And PDE
- Linear equations with constant coefficients
- Rules for finding Complementary function and Particular integral
- Linear equations with variable coefficients

- Obtain general solutions to first-order, second-order, and higher-order homogeneous and non-homogeneous differential equations by manual and technology-based methods.
- Identify and apply initial and boundary values to find particular solutions to first-order, second-order, and higher order homogeneous and non-homogeneous differential equations by manual and technology-based methods, and analyze and interpret the results.
- Select and apply appropriate methods to solve differential equations; these methods will include, but are not limited to, undetermined coefficients, variation of parameters.

Real AnalysisII-IX:

- It is a branch of pure mathematics.
- It is useful and Statistics, Probability, Operations Research, etc.
- To study sequences.
- To study series of real functions.
- To know the Fourier series.
- To study half range series.

Ring Theory-X :

- Definition and some classes of Rings
- Ideals ,Quotient ring.
- Euclidean rings and their properties.
- Reducibility and irreducibility of polynomial
- Students are able to Analyze classes of rings
- Find quotient structure of quotient ring .
- Learn Euclidean ring and examples

Partial Differential Equations-XI :

- Differential equations are used in Mathematical Modeling.
- Useful for solving many engineering problems.
- To learn about second order differential equations.
- To learn about linear partial differential equations of order one.
- To understand non-linear partial differential equations of order one
- To under partial differential equations with constant coefficients

SKILLS FOR B.Sc. (Mathematics) II YEAR -XII

- To Solve problems from Calculus like Differential equations, Ordinary as well as Partial, Graphically to realize their. geometrical Interpretations.
- To handle higher order Matrices.
- To provide with the opportunity to acquire Mathematics to reach it to at least Key Stage UG Level
- To enable us to start the postgraduate basic training of mathematics as it is a requirement of the training of Basic applications of Mathematics
- To improve Students chances of employment.
- Plotting of graphs Overview of graph plotting 2D plots labeling functions for title, axis, legends
- Exporting graphs to different file formats.

B. Sc. –III [Mathematics]

Metric Space-XIII:

- Metric, Neighborhood, Limit Point, Open Set, Closed Set.
- Cauchy Sequence, Complete Metric spaces Compactness & Connectedness.
- Weierstrass theorem, Lebesgue Covering lemma ,Continuity and Uniform Continuity.
- Deal with various examples of metric spaces;
- have some familiarity with continuous maps;
- work with compact sets in Euclidean space;
- work with completeness and connectedness;
- apply the ideas of metric spaces to other areas of mathematics

Linear Algebra-XIV :

- It is a branch of Algebra.
- It is used in Computer Science, Electrical engineering, etc.
- To learn about vector spaces.
- To understand theorems on basis and dimension.
- To know about eigen values and eigen vectors.
- To study linear transformations.

Mechanics I-XV

- Determination of magnitude and direction
- To understand Triangle law of forces theorem
- To understand Lami's theorem

- To study the conditions of equilibrium of coplanar forces acting on a rigid body
- The sum of the vector moments of two like parallel forces

Numerical Analysis-XVI:

- It is a branch of numerical analysis
- It is used for solving a system of equations and used in all branches of engineering.
- To solve a system of linear equations.
- To learn numerical differentiation and integration.
- To learn about interpolation polynomials.
- To apply numerical methods for differential equations.

Laplace Transforms-XVII:

- To know Method of changing equations from one form to another easier form
- It is used to solve both ordinary and partial differential equations.
- Applications are in all branches of engineering.
- To learn properties of Laplace transforms.
- To learn properties of inverse Laplace transforms.
- To learn about integral equations
- To learn about Fourier transforms.

Mechanics –II (Dynamics)-XVIII

- To learn kinematics and Dynamics of a particle in two dimension
- Introduction of Newtons law of motion
- To study Kinetics of a particle
- To learn motion of a projectile and motion in resisting medium
- To study impact of two bodies

4)MICROBIOLOGY

B.SC FY

CCMB- paper I: Introductory Microbiology

Through out this course, considerable emphasis is laid on the medical and general aspects of

Microbiology including:

1. Identification of bacteria, viruses & fungi
2. Morphology.
3. Cultural characters.
4. Biochemical activities.

Get an brief description about the historical events in microbiology

- Students can understand the microbial diversity in microbiology, future scope of Microbiology, taxonomic classification of microorganisms

CCMB-I: PAPER II Microbiological Technique

- students are able to Know parts of microscope, type and its principa, Get the theoretical concepts of related stain.
- Students can Understand different methods of staining techniques, sterilization techniques, bacterial cultivation and maintenance

CCMB-II: PAPER III Basic Microbiology and Biomolecules

- students are able to Study the ultra structure of bacterial cell, bacterial and viral pathogens, classification of various biomolecules, biological significance of various biomolecules, detail about informational and functional biomolecules

CCMB-II: PAPER IV Microbial Physiology

- students are able to understand concepts of growth and reproduction of bacteria, nutritional classification of bacteria on basis of carbon and energy source, structural detail of bacterial sporulation, various types of permeation

B.SC SY

CCMB-III: PAPER VI Applied Microbiology

- students are able to Know the composition of air, pollution of air by microorganisms, Control of microorganisms in air.
- Students can Understand the water microbiology and water borne diseases, microbiology of sewage and its treatment, milk microbiology and application of microorganisms in dairy industries

CCMB III: PAPER VII Immunology

- students are able to study types and sources of infection and aggressive factors of pathogens, antigens, antibodies
- students can understand mechanism and application of agglutination, precipitation, complement fixation and ELISA test, classification of hypersensitivity on the basis of time.

CCMB: IV PAPER VIII Food, soil and microbial ecology

- students are able to know the composition of food and its contamination, factors affecting the type and no. of microorganisms in food contamination
- students can Understand the composition and significance of microorganisms in soil, nitrogen, sulphur, phosphorus cycle, associations like symbiosis, mutualism and parasitism

CCMB: IV PAPER IX Medical Microbiology

- students are able to know about bacterial diseases like cholera, typhoid ,diphtheria and pulmonary tuberculosis, viral diseases AIDS, Hepatitis A and B, the parasitic diseases like malaria, the fungal disease candidos

B.SC TY

SEMESTER V: PAPER XII Microbial Genetics

- students are able to understand Concept of central dogma of molecular biology, Process of DNA replication transcription, translation, genes and chromosome, Various method used for genetic recombination

SEMESTER V: PAPER XIII Microbial Metabolism

- students are able to understand Concept of bioenergetics, Anabolism and catabolism with examples, Laws of thermodynamics, various pathways of microbial fermentation

SEMESTER VI: PAPER XIV Molecular Biology

- students are able to understand Concept of gene regulation, Principals and applications of various molecular techniques, Concept, methods and application of r-DNA technology, Gene library and gene mapping

SEMESTER VI: PAPER XV Industrial Microbiology

- students are able to understand Principals in upstream process in fermentation industries, Design and application of bioreactor, Downstream processing and recovery, Production of few microbial products

COURSE OUTCOME OF PRACTICAL COURSE IN MICROBIOLOGY

CCMBP-I: Practical paper (P-V)

(B.SC FY)

- students are Aware of screening of bacteria and sterilization techniques
- students can Understand principle of microbiology laboratory equipments, Implement various staining techniques, various techniques for isolation of bacteria from mixed culture

CCMBP: II Practical paper X (based on CCMB III AND IV) (B.SC SY)

- students are able to Bacteriological examination of air, water and foods, Differentiation between fecal and non fecal coliforms by IMVIC test, Isolation and study of rhizobium species from root nodules of leguminous plants, Bacteriological study of food by DMC metho

CCMBP: III Practical paper XI (based on CCMB III AND IV) (B.SC SY)

- students learnt about Isolate and identify microorganism form laboratory sample, Perform MIC of antibiotics, ELISA test for disease diagnosi, Immuno-diffusion techniques, Blood grouping, RBC,WBC, WIDAL AND RPR TEST

PAPER NO: XVI Practical paper XI (based on XII and XIV) (B.SC TY)

- 1) students can understand about Techniques used in industries –Citric acid fermentation, UV-survival curve, Enzyme production and determination of its activity, Validation techniques of instruments and immobilization process

PAPER NO: XVII Practical paper XI (based on XII and XIV)

(B.SC TY)

- students can define Techniques used in industrial production of alcohol, Phenol coefficient test, Evaluation of sterilization techniques, Primary screening of antibiotic, amylase, organic acid producers

5)PHYSICS

The semester and CGPA pattern has been adopted in 2014. Now the university is going one step ahead to adopt and implement the Choice Based Credit System (CBCS) semester pattern to Undergraduate program run by various colleges affiliated SRTM University, Nanded. As per the initiatives led by University the syllabi of B. Sc. Physics (CBCS Semester Pattern) has been finalized and effectively implemented from academic year June, 2016. The Syllabi is framed as per the guidelines given in the UGC and SRTMU CBCS Semester pattern.

First Year

Semester I

Paper I: Mechanics and Properties of Matter

1. students are able to understand some basic concept of Laws of Motions, Newton's Laws of Gravitation, Kepler's laws of Planetary Motion, Determination of surface tension by Jaeger's Method, Ferguson Method, Coefficient of Viscosity, Poiseuille's equation for the flow of liquid through a tube, Bulk Modulus, Modulus of Rigidity and Young's modulus. Determination of Y by bending of beam.

Paper II: Mathematical Methods in Physics

1. students are able to Understand theoretical and mathematical knowledge essential for Physics, Finding solutions of various equations in Physical phenomenon, Understand complex algebra and graphical representation of it.
2. Students are able to Solve the fourier series and Fourier series analysis for Square wave, Half wave Rectifier.

Semester II

Paper III: Heat and Thermodynamics

1. students are able to Understand Transport Phenomena, Viscosity of Gases, Thermal Conductivity of Gases, Low Temperature Physics, properties of matter near critical point, Laws of thermodynamics and its relation between them.
2. Students can define the laws of radiation such as Planck's law, Wien's law, Rayleigh- Jeans Law and Stefan Boltzmann law

Paper IV: Electricity and Magnetism

1. students are able to Understand basic concepts of Current, Voltage, Resistance, Electricity. LCR circuits and their uses, Determination of self inductance and mutual inductance in a solenoid.
2. Students are clear about Plotting the I-H curve magnetometer method and apply damping correction in ballistic Galvnometer, Biot and savart's law and its applications.

Paper V: Practical's based on SEM I and SEM II

1. The lab work included theory based practical to develop the skill and create interest of the students in the subject physics.
2. Students can verify some physics laws in the Lab.
3. The introduction of Sci Lab is introduced in the practical course work to upgrade the computer knowledge
4. It develops the skill to solve the various mathematical problems using Sci Lab.

COURSE OUTCOME OF B.SC SY

Semester III

Paper VI: Waves and Oscillations

1. students are able to understand waves and its differential equation, Analytical treatment of stationary waves and energy
2. students are clear in concepts of Free Vibrations, Forced Vibrations, Derivation of Sabine's formula for Acoustics and Ultrasonics

Paper VII: Statistical physics, Electromagnetic Theory and Relativity

1. students are able to understand Basic concepts of probability , probability and frequency, Micro and Macro states, Thermodynamic probability, Entropy, Derivation and application of M. B., B.E. and F. D

Distribution law, Derivation of Maxwell's Equations and wave equation, Theory of Relativity and derivation of $E=mc^2$

SEC I

1. students are able to Handle voltmeter, Ammeter and Multimeter, Working principles of basic voltmeter, Ammeter and Multimeter.
2. Students can construct voltmeter, Ammeter, take Measurement of resistance using colour code and analogue multimeter and digital Multimeter.

Semester IV

Paper VIII: Optics and Lasers

1. students are able to understand the Geometrical Optics, Determination of wavelength of Sodium light using Newton's Ring, Michelson Interferometer. Fraunhofer's diffraction, Polarization and Laurent's half shade polarimeter, Laser properties and He-Ne laser and diode laser.

Paper IX: Basic Electronics

1. students are able to Construct and work Regulated Power supply and short circuit protection, Characteristics of CB,CE,CC Connections and analysis of CE amplifier using h parameters, Operational Amplifier and its ideal characteristics, Construction and working of Sinusoidal Oscillators

SEC II

1. students are able to Study of full wave rectifier, Zener diode voltage regulator, performance of single stage CE amplifier.

Practical Paper P-X: *Practical's based on P-VI & P-VIII*

1. The lab work included theory based practical to develop the skill of practical
2. Develops interest in the subject physics.
3. Students can verify the theoretical Knowledge of physics in the Lab.

Practical Paper P-XI: *Practical's based on P-VII & P-IX*

1. The lab work included theory based practical to develop the skill of practical
2. Develops transistorized CE amplifier.
3. Students can make regulated power supply using different components .

COURSE OUTCOME OF B.SC Ty

Semester V

Paper XII: Quantum Mechanics

1. students are able to Understand photoelectric, Compton effect and Heisenberg's Uncertainty principle, Derivation of time dependent and Time independent Schrodinger's equation.
2. Students know the Application of quantum mechanics when particle in 1-D and 3-D box, Schrodinger's equation to Hydrogen atom.

Paper XIII: Solid state Physics

students are able to explain concepts of different types crystal structures, different types bonding in solids, Thermal Properties of solids using Einstein's and Debye's theory, Free electron theory of metal using Drude- Lorentz theory.

Semester VI

Paper XIV: Atomic Molecular and Nuclear Physics

1. students are able to derive and understand Zeeman and Anomalous Zeeman effect, Theoretical Explanation of rotational and vibration – rotation spectra, Nuclear fission reaction and their kinematics, Nuclear reactions will act as a source of energy.

Paper XV: Digital and Communication Electronics

1. students are able to understand different types number systems and their algebra, Different types logic gates constructions and working, Working of modulation and demodulation, Description of communication electronics.

Paper XVI:

1. Students are able to do work included theory based practical to develop the skill of practical.
2. Students can verify the theoretical Knowledge of physics in the Lab.

Paper XVII-A:

1. students are able to do The lab work included theory based practical to develop the skill of practical, develop interest in the subject physics.
2. Students can verify the theoretical Knowledge of Digital electronics in the Lab.
3. Students can construct the universal gate properties.

6)ZOOLOGY

B.Sc. 1st Semester

Subject :Life and diversity of Animals -I (Non Chordate) -I

Learning objectives

1. students are able to understand the animal kingdom, the taxonomic position of protozoa to helminthes, the general characteristics of animals belonging to protozoa to Echinodermata, the body organization of phylum from protozoa to Echinodermata, origin and evolutionary relationship of different phylum from protozoa to Echinodermata.
2. Students can understand the various internal systems like Digestive system, nervous system with the help of charts, functions of Gemmules and spicules, economical importance of Molluscan shells, classification of whole phyla includes in Non chordates with the help of charts/models/pictures, evolutionary history of Non chordates.

Learning outcomes

1. Student should be able to describe unique characters of protozoa to Echinodermata , recognize life functions of protozoa to Echinodermata, recognize the ecological role of phylum protozoa to Echinodermata, recognize the diversity from protozoa to Echinodermata.

B.Sc 1st Semester

Subject : Cell Biology -II

Learning Objectives

1. students are able to understand the structures and purposes of basic components of prokaryotic and eukaryotic cells, especially macromolecules, membranes, and organelles
2. students can understand how these cellular components are used to generate and utilize energy in cells, cellular components underlying mitotic cell division, responses to environmental or physiological changes, or alterations of cell function brought about by mutation, process of cell division in both somatic and germ cell.

Learning Outcomes

1. students are able to Describe the function and the composition of the plasma membrane, principles of the cell theory, Difference between prokaryotes and eukaryotes.
2. students can understand the importance of the nucleus and its components, the endoplasmic reticulum and Golgi apparatus interact with one another and know with which other organelles they are associated, Identify the three primary components of the cell's cytoskeleton and how they affect cell shape, function, and movement.

B.Sc FY Semester _II

Subject : Life and diversity of Animals II (Chordate) -III

Learning Objectives

1. students can understand the chordates, different categories of chordates, general characters of chordates, level of organization in chordate subphylum.
2. Students are able to understand the origin and evolutionary relationship in different subphylum of chordates, Systematic position and external morphology of *Rattus rattus*.
3. Students can study the various systems like Digestive systems, Scales, Fins, Arial adaptation and Dental formula, Classification various classes of phylum Chordate i.e.Pisces, Reptiles, Aves and Mammals.

Learning outcomes

1. Student should be able to describe unique characters of urochordates, cephalochordates and fishes.
2. Student should be able to recognize life functions of urochordates to fishes, ecological role of different groups of chordates, diversity of chordates.

B.Sc FY Semester _II

Subject : Developmental Biology -IV

Learning objectives

1. students are able to understand how organisms maintain gametic population, fertilization process, way of cleavage and different patterns to form zygote, fundamental embryonic development, complete process of formation of germ layers.

Learning outcomes

- 1) students are able to list the types of characteristics that make an organism ideal for the study of developmental biology, familiar with the events that lead up to fertilization.
- 2) Students can describe the first four rounds of cell division in different groups, stages and cellular mechanisms for gastrulation, difference between specification and determination.

B.Sc.S.Y. III^{ed} Semester

Subject: Genetics -VI

Learning objectives

1. Students can understand the behavior of chromosomes during meiosis can explain mendal law, inheritance patterns are affected by position on chromosomes, the similarities and differences between how genetic information is passed on in prokaryotes and eukaryotes, gene interactions, chemical nature of heredity.

Learning outcomes

1. students have Comprehensive and detailed understanding of the chemical basis of heredity.

2. Students have understanding about the role of genetics in evolution, evaluate conclusions that are based on genetic data, understand results of genetic experimentation in animals.

B.Sc.S.Y. III^{ed} Semester

Subject : Comparative Anatomy and Physiology-VII

Learning objectives

1. students can understand the metabolic activities in mammalian body, various biomolecules in body, structural chemistry of proteins, carbohydrates, fats, functions of biomolecules in body. Secretion, process of digestion.

Learning outcomes

1. Students are able to understand the physiology at cellular and system levels .
2. Students are able to describe the role and functions of different biomolecules, describe the physiology of digestion, mammalian body get nutrition from different biomolecules.

B.Sc.S.Y. IV Semester

Subject : Genetic Engineering and Evolution-VIII

- 1) students are able to understand the cell biology and molecular biology, various cell types and cell divisions, structure and function of the cells, cell signaling.
- 2) Students are aware for Cancer.
- 3) Students are able to understand the Tools and Techniques in Molecular Biology, the term ELISA technique and DNA finger printing, various Applications of Biotechnology, the Hybridoma technology as well as Enzyme biotechnology, DNA Recombinant technology.
- 4) Students are clear about the concept of the industrial and environmental biotechnology, Stem cell biotechnology, Scope and Significance of Biotechnology.
- 5) Students can understand the principles and methods of taxonomy, Levels of structural organization, the Outline classification of Animals :Classification of animals, and the Natural history of Indian subcontinent.

B.Sc.S.Y. IV Semester

Subject : Endocrinology ,Histology and Biochemistry –IX

- 3) students are able to understand the reproductive system, Endocrine system and Mechanism of hormone action, Integumentary system i.e. Structure of skin.
- 4) Students can understand the Sensory physiology i.e.sensory coding, chemoreception, Mechano reception, Mechano transduction, mechanoreceptors, support and location means their properties, the skeleton joints, physiology of movements.
- 5) Students are able to understand the respiratory system and Respiratory pigments, the process of Temperature regulation, the terms Histology and Physiology, cell, tissue, organ, system and organisms, derivatives of skin- horns, nails, hairs.
- 6) Students can understand the Basics of Biochemistry and Chemistry of biomolecules and their significance, Protein structure i.e. Primary, Secondary, Tertiary and Quaternary, chemistry of hormones, structure and properties of the enzymes as well as its activity.
- 7) Students can understand the structure and function of carbohydrate, amino acids, proteins, and lipids, concept of Enzymes and also Vitamins and minerals, Principle role of Vitamins in metabolism and Deficiency diseases

B.Sc.T.Y. V Semester

Subject : ECOLOGY AND ZOOGEOGRAPHY –XII

Learning objectives

1. students can describe the interaction between organisms and environment, theory of natural selection, species evolve,
2. students can understand the exchange of nutrients within the ecosystem, population dynamics, Aquatic environment like Lotic habitat and Lentic habitat, Physical conditions of water: Depth, Viscosity, Density, Buoyancy.

3. Students can understand the chemical conditions of water: dissolved oxygen and carbon-di-oxide, hardness etc., Geological time scale, aware about the Palaeontology ie. Fossils and its significance, Zoogeographical realm.

Learning outcomes

1. Students are able to describe the relation between abiotic and biotic factors.
2. Students are able to describe various biological interactions.
3. Students are able to understand how change in population affect the ecosystem, evolutionary history of man, origin of species on earth.

B.Sc.T.Y. V Semester

Subject : Aquaculture –XIII(A)

Learning objectives

Aquaculture and mentioned some of the reasons which have contributed to imparting a fillip to aquaculture in recent times, it is proper to state the objectives of aquaculture. These are:

1. Production of protein rich, nutritive, palatable and easily digestible human food benefiting the whole society through plentiful food supplies at low or reasonable cost.
2. Providing new species and strengthening stocks of existing fish in natural and man-made water-bodies through artificial recruitment and transplantation.
3. Production of sportfish and support to recreational fishing.
4. Production of bait-fish for commercial and sport fishery.
5. Production of ornamental fish for aesthetic appeal.
6. Recycling of organic waste of human and livestock origin.

7. Land and aquatic resource utilization: this constitutes the macro-economic point of view benefiting the whole society. It involves (a) maximum resource allocation to aquaculture and its optimal utilization; (b) increasing standard of living by maximising profitability; and (c) creation of production surplus for export (earning foreign exchange especially important to most developing countries).
8. Providing means of sustenance and earning livelihood and monetary profit through commercial and industrial aquaculture. This constitutes the micro-economic point of view benefiting the producer. In the case of small-scale producer, the objective is to maximise income by greatest possible difference between income and production cost and, in the case of large scale producer, by maximising return on investment.
9. Production of industrial fish.

Learning outcomes

1. Students learnt about the role of the Fisheries Management Authority, importance of sustainable fishing and protecting the marine environment, freshwater or saltwater fish species, fish adapt or change to better survive their environment , culture, mollusk culture.

B.Sc.T.Y. VI Semester

Subject : ETHOLOGY, BIOMETRY AND BIOINFORMATICS –XIV

Learning objectives

1. Principles of ethology
2. Domestication: the process and its effects on behaviour
3. Ethology of domestic companion animals, including perceptual abilities, communication, maintenance and social behaviour

4. Behavioural ontogeny; to include sensitive periods, socialisation and attachment
5. The interactions between biological and evolutionary influences and the domestic environment, and their role in behavioural disorders
6. Interactions between animals and man, to include the role of animals in human society and artificial selection

Learning outcomes

1. Skills in the objective observation and recording of animal behaviour
2. Skills in management and use of information

Environment study

- Student became well aware about the environment and surrounding geography.
- Students got the knowledge of natural sources, its limitation.
- Students have started to take care of natural resources properly.
- Students got knowledge about various types of pollutions and remedies to overcome the problems of pollutions.
- Students are made aware on the global warming and its impact on the lives of planet earth.