Sem I

F.Y.B.SC.

Botany

Prabhakar Patil Education Society's
Arts, Commerce and Science College,
Veshvi, Alibag.
Affiliated To University of Mumbai (AFF/RECOG/3838 of 2003)

Semester	I		
Name of the subject teacher			
Course code	**USBO101**		
Course category	F.Y.B.Sc.		
Course title	**PLANT DIVERSITY-I**		
Teaching scheme and credits weekly workload in hours	**Lectures**	**Practical's**	**Credits**
	3	3	2

PROGRAM OUTCOMES :

Plant Diversity is an undergraduate F.Y.B.Sc. Botany course that deals with both conceptual and practical tools for identifying, classifying & studying the life cycles of Algae, Fungi & Bryophytes. It develops knowledge of the ecological status, economic importance & outline of their classification in general. It also gives students hands-on competence of studying them in nature & identifying them based on their morphological & anatomical features. This course will help students to build on the basic information regarding classification of plant kingdom groups like algae, fungi & bryophytes.

Course outcomes:

After completion of the course, learners would be able to:

CO1: Understand Chlorophyta among algae along with the life-cycles, range of thallus and economic importance of algae.

CO2: Understand how to identify and classify Phycomycetes from Fungi based on general characters & life cycles.

CO3: Understand basic concepts of economic importance of fungi & their modes of nutrition & significance innature.

CO4: Understand Hepaticeae from Bryophytes along with life cycles.

PROGRAMME SPECIFIC OUTCOMES (PSO'S)

On completion of the B.Sc Botany, the learners should be enriched with knowledge and be able to-

PSO1: Identify different groups of Botany and appreciate Plant Biodiversity.

PSO2: Understand the current developments in the different areas of Botany.

PSO3: Analyze and apply the methodologies and techniques learnt during the course of studying Botany.

PSO4: Integrate the knowledge acquired in botany to solve problem, take real time decisions and innovate, while working with plants.

PSO5: Share social and environmental consciousness with their fellow citizens.

PSO6: To develop better understanding of good laboratory practices and safety.

PSO7: Synthesize the scientific character of observation, reasoning and apply the knowledge in designing experiments.

PSO8: Develop skills to pursue career in the arena related to plant sciences namely Medicinal Botany, forestry and floristic pursuits

PSO9: To Acquire technological and analytical skills needed for industrial supportservices.

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Semester	I		
Name of the subject teacher			
Course code	**USBO102**		
Course category	F.Y.B.Sc.		
Course title	**FORM AND FUNCTION-I**		
Teaching scheme and credits weekly workload in hours	**Lectures**	**Practical's**	**Credits**
	3	3	2

PROGRAM OUTCOMES :
Form and Function is an undergraduate F.Y. B. Sc. Botany course that deals with both conceptual and practical tools for identifying, classifying & studying the Cell Biology, Ecology & Genetics. It develops knowledge of the cell as a unit of life & as a tool to study plants, ecology & role of genetics in everyday life & its importance. It also gives students an insight into ecological features in plants. This course will help students to build on the basic information regarding cells, environmental biology & importance of genetics.

Course Outcomes:
After completion of the course, learners would be able to:
CO1: Understand the basic components of cells, the structure, function & importance of cell components
CO2: Understand basic concepts of importance of producers & consumers, energy flow in ecosystem & productivity of an ecosystem
CO3: Understand Basics of genetics, genetic variations, Mendelian genetics and its modified ratios
CO4: Importance of plants in breeding experiments & their importance in agriculture

PROGRAMME SPECIFIC OUTCOMES (PSO'S)
On completion of the B.Sc Botany, the learners should be enriched with knowledge and be able to-
PSO1: Identify different groups of Botany and appreciate Plant Biodiversity.
PSO2: Understand the current developments in the different areas of Botany.
PSO3: Analyze and apply the methodologies and techniques learnt during the course of studying Botany.
PSO4: Integrate the knowledge acquired in botany to solve problem, take real time decisions and innovate, while working with plants.
PSO5: Share social and environmental consciousness with their fellow citizens.
PSO6: To develop better understanding of good laboratory practices and safety.
PSO7: Synthesize the scientific character of observation, reasoning and apply the knowledge in designing experiments.
PSO8: Develop skills to pursue career in the arena related to plant sciences namely Medicinal Botany, forestry and floristic pursuits
PSO9: To Acquire technological and analytical skills needed for industrial supportservices.

Sem II

F.Y.B.SC.

Botany

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Semester	II		
Name of the subject teacher			
Course code	**USBO201**		
Course category	F.Y.B.Sc.		
Course title	**PLANT DIVERSITY - II**		
Teaching scheme and credits weekly workload in hours	**Lectures**	**Practical's**	**Credits**
	3	3	2

PROGRAM OUTCOMES :

Plant Diversity is an undergraduate F.Y.B.Sc. Botany course that deals with both conceptual and practical tools for identifying, classifying & studying the life cycles of Pteridophytes, Gymnosperms & Angiosperms. It develops knowledge of the ecological status, economic importance & outline of their classification in general. It also gives students hands-on competence of studying them in nature & identifying them based on their morphological & anatomical features. This course will help students to build on the basic information regarding classification of plant kingdom groups like Pteridophytes, Gymnosperms & Angiosperms.

Course Outcomes:

After completion of the course, learners would be able to:

CO1: Understand stelar evolution among Pteridophytes along with the life-cycles of & economic importance of Pteridophytes.

CO2: Understand how to identify and classify fossil Pteridophytes from the remains that are available as study material.

CO3: Understand basic concepts of economic importance of Gymnosperms & the modes of nutrition & significance in nature.

CO4: Understand Angiosperm classification.

CO5: To understand the diversity of plants & their parts and be able to describe & identify them in the field along with their economic importance

PROGRAMME SPECIFIC OUTCOMES (PSO'S)

On completion of the B.Sc Botany, the learners should be enriched with knowledge and be able to

PSO1: Identify different groups of Botany and appreciate Plant Biodiversity.

PSO2: Understand the current developments in the different areas of Botany.

PSO3: Analyse and apply the methodologies and techniques learnt during the course of studying Botany.

PSO4: Integrate the knowledge acquired in botany to solve problem, take real time decisions and innovate, while working with plants.

PSO5: Share social and environmental consciousness with their fellow citizens.

PSO6: To develop better understanding of good laboratory practices and safety.

PSO7: Synthesize the scientific character of observation, reasoning and apply the knowledge in designing experiments.

PSO8: Develop skills to pursue career in the arena related to plant sciences namely Medicinal Botany, forestry and floristic pursuits

PSO9: To Acquire technological and analytical skills needed for industrial support services.

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Semester	II		
Name of the subject teacher			
Course code	**USBO202**		
Course category	F.Y.B.Sc.		
Course title	**FORM AND FUNCTION-II**		
Teaching scheme and credits weekly workload in hours	**Lectures**	**Practical's**	**Credits**
	3	3	2

PROGRAM OUTCOMES :
Form and Function is an undergraduate F.Y. B. Sc. Botany course that deals with both conceptual and practical tools for identifying, classifying & studying the Plant Anatomy, Plant physiology & Medicinal Botany. It develops knowledge of anatomy as a tool to study plants, to understand the physiological mechanisms in plants & importance of medicinal plants in everyday life. It also gives students an insight into anatomical & physiological features in plants. This course will help students to build on the basic information regarding anatomy, physiology & importance of plants as medicine

Course Outcomes:
Course Outcomes: After completion of the course, learners would be able to:
CO1: Understand the basic anatomical features of plants and identify them based on these features.
CO2: To be able to understand the physiology of plants & its importance & implications to human life.
CO3: Importance of enzymes, their functions & mode of action in plants.
CO4: Understand basic concepts of importance of secondary metabolites produced by plants.
CO5: Importance of medicinal plants to humans & their usage in everyday life

PROGRAMME SPECIFIC OUTCOMES (PSO'S)
On completion of the B.Sc Botany, the learners should be enriched with knowledge and be able to
PSO1: Identify different groups of Botany and appreciate Plant Biodiversity.
PSO2: Understand the current developments in the different areas of Botany.
PSO3: Analyse and apply the methodologies and techniques learnt during the course of studying Botany.
PSO4: Integrate the knowledge acquired in botany to solve problem, take real time decisions and innovate, while working with plants.
PSO5: Share social and environmental consciousness with their fellow citizens.
PSO6: To develop better understanding of good laboratory practices and safety.
PSO7: Synthesize the scientific character of observation, reasoning and apply the knowledge in designing experiments.
PSO8: Develop skills to pursue career in the arena related to plant sciences namely Medicinal Botany, forestry and floristic pursuits
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Sem III

S.Y.B.SC.

Botany

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Semester	III		
Name of the subject teacher			
Course code	**USBO301**		
Course category	S.Y.B.Sc.		
Course title	**PLANT DIVERSITY-III**		
Teaching scheme and credits weekly workload in hours	**Lectures**	**Practical's**	**Credits**
	3	3	2

PROGRAM OUTCOMES :

Plant diversity is an undergraduate S .Y. B.Sc. Botany course that deals with both conceptual and practical tools for identifying, classifying & studying the life cycles of algae and bryophyta . It develops knowledge of life cycle, economic importance & outline of their classification in general. Knowledge of Bentham & Hooker's classification deals with imparting knowledge about angiosperm families. The lessons also give students hands-on competence for studying families like Cruciferae, Tiliaceae, Asteraceae, Solanaceae, Apocynaceae, Amaranthaceae and Palmae in nature & identifying them based on their morphological features. This course will also help students to build on the basic skills regarding modern techniques to study plant diversity which includes microscopy, preservation methods, Chromatography and gel electrophoresis.

Course Outcomes:

After completion of the course, learners would be able to:

CO1: Understand the life-cycles of Sargassum and Dictyota

CO2: Understand Anthocerotae among Bryophyta along with life-cycle of Anthoceros

CO3: Understand how to identify and classify plants based on Bentham & Hooker's classification.

CO4: Understand basic concepts of preservation methods, microscopy, and chromatography and gel electrophoresis.

PROGRAMME SPECIFIC OUTCOMES (PSO'S)

On completion of the B.Sc Botany programe, the learners should be enriched with knowledge and be able to-

PSO1: Identify different groups of Botany and appreciate Plant Biodiversity.

PSO2: Understand the current developments in the different areas of Botany.

PSO3: Analyze and apply the methodologies and techniques learnt during the course of studying Botany.

PSO4: Integrate the knowledge acquired in botany to solve problem, take real time decisions and innovate, while working with plants.

PSO5: Share social and environmental consciousness with their fellow citizens.

PSO6: To develop better understanding of good laboratory practices and safety.

PSO7: Synthesize the scientific character of observation, reasoning and apply the knowledge in designing experiments.

PSO8: Develop skills to pursue career in the arena related to plant sciences namely Medicinal Botany, forestry and floristic pursuits

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Semester	III		
Name of the subject teacher			
Course code	**USBO302**		
Course category	S.Y.B.Sc.		
Course title	**FORM AND FUNCTION-III**		
Teaching scheme and credits weekly workload in hours	**Lectures**	**Practical's**	**Credits**
	3	3	2

PROGRAM OUTCOMES

Form & Function is an undergraduate S .Y. B.Sc. Botany course that deals with both conceptual and practical tools for studying the cell organelles, mitosis and meiosis. Knowledge of cytogenetics renders learning about plastid inheritance and chromosomal aberrations. Students are expected to grasp the idea of nucleic acid, DNA, RNA and mechanism of replication in prokaryotes and eukaryotes. Students will also be able to learn the concept of inheritance of sex linked diseases, genic balance theory in Drosophila and Lyon's hypothesis.

Course Outcomes:

Course Outcomes: After completion of the course, learners would be able to:
CO1: Understand the life-cycles of Sargassum and Dictyota
CO2: Understand Anthocerotae among Bryophyta along with life-cycle of Anthoceros
CO3: Understand how to identify and classify plants based on Bentham & Hooker's classification.
CO4: Understand basic concepts of preservation methods, microscopy, chromatography and gel electrophoresis.

PROGRAMME SPECIFIC OUTCOMES (PSO'S)

On completion of the B.Sc Botany programe, the learners should be enriched with knowledge and be able to-

PSO1: Identify different groups of Botany and appreciate Plant Biodiversity.

PSO2: Understand the current developments in the different areas of Botany.

PSO3: Analyze and apply the methodologies and techniques learnt during the course of studying Botany.

PSO4: Integrate the knowledge acquired in botany to solve problem, take real time decisions and innovate, while working with plants.

PSO5: Share social and environmental consciousness with their fellow citizens.

PSO6: To develop better understanding of good laboratory practices and safety .

PSO7: Synthesize the scientific character of observation, reasoning and apply the knowledge in designing experiments.

PSO8: Develop skills to pursue career in the arena related to plant sciences namely Medicinal Botany, forestry and floristic pursuits

PSO9: To Acquire technological and analytical skills needed for industrial support services.

Semester	III		
Name of the subject teacher			
Course code	**USBO303**		
Course category	S.Y.B.Sc.		
Course title	**CURRENT TRENDS IN PLANT SCIENCES-I**		
Teaching scheme and credits weekly workload in hours	**Lectures**	**Practical's**	**Credits**
	3	3	2

PROGRAM OUTCOMES :

"Current trends in plant sciences" is an undergraduate S .Y. B.Sc. Botany course that deals with both conceptual and practical tools for studying pharmacognosy and phytochemistry. The learners will be able to understand about pharmacopoeia both Indian herbal and Ayurvedic. They will also learn monograph study of a few plants. Learners will be able to study adulterants based on the knowledge of macroscopic features, microscopy, and chemical tests. Students will also learn about forestry in terms of agro-forestry and urban forestry, organic farming, silviculture, plant based fibres, spices and paper. They will also learn the concept of aromatherapy, nuetraceuticals and biofuels and will learn Vitamin C and protein estimation techniques.

Course Outcomes:

After completion of the course, learners would be able to:
CO1: Understand monograph study from pharmacopoeia
CO2: Understand study of detection of adulterants
CO3: Understand plant product sources pertaining to fibers, spices, condiments and paper
CO4: Understand the concept of aromatherapy, nuetraceuticals, plant enzyme industry and biofuels
CO5: Understand the technique of Vitamin C and Protein estimation

PROGRAMME SPECIFIC OUTCOMES (PSO'S)

On completion of the B.Sc Botany programe, the learners should be enriched with knowledge and be able to-

PSO1: Identify different groups of Botany and appreciate Plant Biodiversity.

PSO2: Understand the current developments in the different areas of Botany.

PSO3: Analyze and apply the methodologies and techniques learnt during the course of studying Botany.

PSO4: Integrate the knowledge acquired in botany to solve problem, take real time decisions and innovate, while working with plants.

PSO5: Share social and environmental consciousness with their fellow citizens.

PSO6: To develop better understanding of good laboratory practices and safety.

PSO7: Synthesize the scientific character of observation, reasoning and apply the knowledge in designing experiments.

PSO8: Develop skills to pursue career in the arena related to plant sciences namely Medicinal Botany, forestry and floristic pursuits

PSO9: To Acquire technological and analytical skills needed for industrial support services.

Sem IV

S.Y.B.SC.

Botany

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Semester	IV		
Name of the subject teacher			
Course code	**USBO401**		
Course category	S.Y.B.Sc.		
Course title	**PLANT DIVERSITY-III**		
Teaching scheme and credits weekly workload in hours	**Lectures**	**Practical's**	**Credits**
	3	3	2

PROGRAM OUTCOMES

Plant diversity is an undergraduate S .Y. B.Sc. Botany course that deals with both conceptual and practical tools for identifying, classifying & studying the life cycles of fungi, lichens, pteridophytes and gymnosperms. It develops knowledge of the plant pathology, economic importance & outline of their classification in general. Knowledge of paleobotany renders information about ancient ecological systems and climate. The lessons also give students hands-on competence for studying fungi, lichens, pteridophytes and gymnosperms in nature & identifying them based on their morphological & anatomical features. This course will help students to build on the basic information regarding classification of plant kingdom groups and render information about paleobotany.

Course Outcomes:

After completion of the course, learners would be able to:

CO1: Understand Ascomycetae among fungi along with the life-cycles of Erysiphe and Xylaria

CO2: Understand how to identify and classify Lichens based on general characters.

CO3: Understand basic concepts of plant pathology & their modes of nutrition & significance in nature.

CO4: Understand the concept of Geological time-scale and fossil formation process

CO5: Understand Coniferophyta among Gymnosperms along with life cycles and their economic importance.

PROGRAMME SPECIFIC OUTCOMES (PSO'S)

On completion of the B.Sc Botany programe, the learners should be enriched with knowledge and be able to-

PSO1: Identify different groups of Botany and appreciate Plant Biodiversity.

PSO2: Understand the current developments in the different areas of Botany.

PSO3: Analyze and apply the methodologies and techniques learnt during the course of studying Botany.

PSO4: Integrate the knowledge acquired in botany to solve problem, take real time decisions and innovate, while working with plants.

PSO5: Share social and environmental consciousness with their fellow citizens.

PSO6: To develop better understanding of good laboratory practices and safety.

PSO7: Synthesize the scientific character of observation, reasoning and apply the knowledge in designing experiments.

PSO8: Develop skills to pursue career in the arena related to plant sciences namely Medicinal Botany, forestry and floristic pursuits

PSO9: To Acquire technological and analytical skills needed for industrial support services.

Semester	IV		
Name of the subject teacher			
Course code	**USBO402**		
Course category	S.Y.B.Sc.		
Course title	**FORM & FUNCTION IV**		
Teaching scheme and credits weekly workload in hours	**Lectures**	**Practical's**	**Credits**
	3	3	2

PROGRAM OUTCOMES

Form & Function is an undergraduate S .Y. B.Sc. Botany course that deals with both conceptual and practical tools for studying anatomical characters of stem and root. Students will learn about growth rings and their significance. Also the chapter broadens the students' understanding on types of plant tissues and vascular bundles. They also learn about basic physiological pathways occurring in plant ranging from respiration to photoperiodism and vernalization mechanisms. Another objective is to make the students understand the consepts of ecology such as biogeochemical cycles, concepts of environmental factors and community ecology.

Course Outcomes:

Course Outcomes: After completion of the course, learners would be able to:
CO1: Understand the different types of plant tissues and their role in plant body
CO2: Understand various physiological processes in plant body
CO3: Understand the concept of long-day and short-day plants
CO4: Understand the application of chromatography for separation of sugars and fermentation exercises
CO5: Understand biogeochemical cycles and their importance and study of community ecology both on the basis of qualitative and quantitative characters.
CO6: Learn soil organic matter analysis and quadrat study in field

PROGRAMME SPECIFIC OUTCOMES (PSO'S)

On completion of the B.Sc Botany programe, the learners should be enriched with knowledge and be able to-

PSO1: Identify different groups of Botany and appreciate Plant Biodiversity.

PSO2: Understand the current developments in the different areas of Botany.

PSO3: Analyze and apply the methodologies and techniques learnt during the course of studying Botany.

PSO4: Integrate the knowledge acquired in botany to solve problem, take real time decisions and innovate, while working with plants.

PSO5: Share social and environmental consciousness with their fellow citizens.

PSO6: To develop better understanding of good laboratory practices and safety.

PSO7: Synthesize the scientific character of observation, reasoning and apply the knowledge in designing experiments.

PSO8: Develop skills to pursue career in the arena related to plant sciences namely Medicinal Botany, forestry and floristic pursuits

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Semester	IV		
Name of the subject teacher			
Course code	**USBO403**		
Course category	S.Y.B.Sc.		
Course title	**CURRENT TRENDS IN PLANT SCIENCES II**		
Teaching scheme and credits weekly workload in hours	**Lectures**	**Practical's**	**Credits**
	3	3	2

PROGRAM OUTCOMES

"Current trends in plant sciences" is an undergraduate S .Y. B.Sc. Botany course that deals with both conceptual and practical tools for studying Biotechnology, Horticulture, biostatistics and bioinformatics. Students are expected to learn about the concept of types of garden and garden locations. They are exposed to the art, science, technology of garden planning. The learners get to know about the concept of national parks and botanical garden. The students learn about plant tissue culture laboratory techniques and get familiarized with the concept of gene cloning and organ culture. Solving problems of biostatistics and getting hand- on training related to bioinformatics tools is also the prime objective of the course.

Course Outcomes:

After completion of the course, learners would be able to:

•Understand and plan the garden designs both formal and informal.

•Understand the technique of bottle garden and dish garden preparations.

•Understand various sterilization techniques, seed sterilization, callus induction

•Understand through the problems of biostatistics, the technique of extrapolating the knowledge to biological problems.

• Understand the application of bioinformatics tools.

PROGRAMME SPECIFIC OUTCOMES (PSO'S)

On completion of the B.Sc Botany programe, the learners should be enriched with knowledge and be able to-

PSO1: Identify different groups of Botany and appreciate Plant Biodiversity.

PSO2: Understand the current developments in the different areas of Botany.

PSO3: Analyze and apply the methodologies and techniques learnt during the course of studying Botany.

PSO4: Integrate the knowledge acquired in botany to solve problem, take real time decisions and innovate, while working with plants.

PSO5: Share social and environmental consciousness with their fellow citizens.

PSO6: To develop better understanding of good laboratory practices and safety.

PSO7: Synthesize the scientific character of observation, reasoning and apply the knowledge in designing experiments.

PSO8: Develop skills to pursue career in the arena related to plant sciences namely Medicinal Botany, forestry and floristic pursuits

PSO9: To Acquire technological and analytical skills needed for industrial support services.

Sem V

T.Y.B.SC.

Botany

Semester	V		
Name of the subject teacher			
Course code	**USBO501**		
Course category	T.Y.B.Sc.		
Course title	**Plant Diversity III**		
Teaching scheme and credits weekly workload in hours	**Lectures**	**Practical's**	**Credits**
	4	4	2.5

Program Outcome :

Specific core discipline knowledge

- Students can recall details and information about the evolution, anatomy, morphology, systematics, genetics, physiology, ecology, and conservation of plants and all other forms of life.
- Students can recall details of the unique ecological and evolutionary features of the local and Indian flora. Communication skills
- Students can communicate effectively using oral and written communication skills Problem solving and research skills
- Students can generate and test hypotheses, make observations, collect data, analyze and interpret results, derive conclusions, and evaluate their significance within a broad scientific context

Course Outcomes:

After completion of the course, learners would be able to:

- To gain knowledge about microbial diversity and techniques for culturing and visualization.
- To understand the salient features of three major groups of algae, their life cycle patterns with a suitable example; to be able to identify them.
- To learn the general characteristics and classification of two major groups of fungi along with life cycles of each group; to be able to identify them.
- To understand the scope and importance of Plant Pathology and apply the concepts of various control measures of commonly widespread plant diseases.

PROGRAMME SPECIFIC OUTCOMES (PSO'S)

To recognize and identify major groups of non-vascular and vascular plants and their phylogenetic relationships.

- To understand the phylogeny of plants and study various systems of classification.
- To explore the morphological, anatomical, embryological details as well as economic importance of algae, fungi, bryophytes, pteridophytes, gymnosperms and angiosperms.
- To understand physiological processes and adaptations of plants.
- To provide knowledge about environmental factors and natural resources and their importance in sustainable development
- To be able to carry out phytochemical analysis of plant extracts and application of the isolated compounds for treatment of diseases.
- To be able to deal with all microbes and the technologies for their effective uses in industry and mitigation of environmental concerns
- To explain how current medicinal practices are often based on indigenous plant knowledge and to get introduced to different perspectives on treating ailments according to ethnomedicinal principles.
- To understand patterns of heredity and variation among individuals, species and populations and apply principles for improvement of quality and yield.
- To be able to apply statistical tools to gain insights into significantly different data from different sources.
- To acquire recently published knowledge in molecular biology, such as rDNA technology; PTC and bioinformatics and their applications.

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Semester	V		
Name of the subject teacher			
Course code	**USBO502**		
Course category	T.Y.B.Sc.		
Course title	**PLANT DIVERSITY – IV**		
Teaching scheme and credits weekly workload in hours	**Lectures**	**Practical's**	**Credits**
	4	4	2.5

PROGRAM OUTCOMES

Specific core discipline knowledge

- Students can recall details and information about the evolution, anatomy, morphology, systematics, genetics, physiology, ecology, and conservation of plants and all other forms of life

.• Students can recall details of the unique ecological and evolutionary features of the local and Indian flora.

Communication skills

- Students can communicate effectively using oral and written communication skills

Problem solving and research skills

- Students can generate and test hypotheses, make observations, collect data, analyze and interpret results, derive conclusions, and evaluate their significance within a broad scientific context

Course Outcomes:

After completion of the course, learners would be able to:

- To acquire knowledge of different fossil forms and understand their role in evolution.
- To provide plant description, describe the morphological and reproductive structures of seven families and also identify and classify according to Bentham and Hooker's system.
- To gain proficiency in the use of keys and identification manuals for identifying any unknown plants to species level.
- To relate anomalies in internal stem structure with function and appreciate the salient features of the root stem transition zone.
- To get exposure to pollen study and learn to apply it in various fields.

PROGRAMME SPECIFIC OUTCOMES (PSO'S)

On completion of the B.Sc Botany programe, the learners should be enriched with knowledge and be able to-

To recognize and identify major groups of non-vascular and vascular plants and their phylogenetic relationships.

- To understand the phylogeny of plants and study various systems of classification.
- To explore the morphological, anatomical, embryological details as well as economic importance of algae, fungi, bryophytes, pteridophytes, gymnosperms and angiosperms.
- To understand physiological processes and adaptations of plants.
- To provide knowledge about environmental factors and natural resources and their importance in sustainable development.
- To be able to carry out phytochemical analysis of plant extracts and application of the isolated compounds for treatment of diseases.
- To be able to deal with all microbes and the technologies for their effective uses in industry and mitigation of environmental concerns.
- To explain how current medicinal practices are often based on indigenous plant knowledge and to get introduced to different perspectives on treating ailments according to ethnomedicinal principles.
- To understand patterns of heredity and variation among individuals, species and populations and apply principles for improvement of quality and yield.
- To be able to apply statistical tools to gain insights into significantly different data from different sources.
- To acquire recently published knowledge in molecular biology, such as rDNA technology; PTC and bioinformatics and their applications.

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Semester	V		
Name of the subject teacher			
Course code	**USACBT503**		
Course category	T.Y.B.Sc.		
Course title	**FORM AND FUNCTIONS- II**		
Teaching scheme and credits weekly workload in hours	**Lectures**	**Practical's**	**Credits**
	4	4	2.5

PROGRAM OUTCOMES

Specific core discipline knowledge

• Students can recall details and information about the evolution, anatomy, morphology, systematics, genetics, physiology, ecology, and conservation of plants and all other forms of life

.• Students can recall details of the unique ecological and evolutionary features of the local and Indian flora.

Communication skills

• Students can communicate effectively using oral and written communication skills

Problem solving and research skills

• Students can generate and test hypotheses, make observations, collect data, analyze and interpret results, derive conclusions, and evaluate their significance within a broad scientific context

Course Outcomes:

After completion of the course, learners would be able to:

To acquire knowledge about two important organelles and molecular mechanisms of translation

• To understand water relations of plants, inorganic and organic solute transport, and apply the knowledge to manage mineral nutrition and survival in challenging abiotic stresses.

• To understand succession in plant communities and study remediation technologies in order to apply knowledge acquired for cleanup of polluted sites.

• To get exposure to principles and techniques of plant tissue culture and apply these studies for improving agriculture and horticulture and to become an entrepreneur.

PROGRAMME SPECIFIC OUTCOMES (PSO'S)

On completion of the B.Sc Botany programe, the learners should be enriched with knowledge and be able to-

To recognize and identify major groups of non-vascular and vascular plants and their phylogenetic relationships.

• To understand the phylogeny of plants and study various systems of classification.

• To explore the morphological, anatomical, embryological details as well as economic importance of algae, fungi, bryophytes, pteridophytes, gymnosperms and angiosperms.

• To understand physiological processes and adaptations of plants.

• To provide knowledge about environmental factors and natural resources and their importance in sustainable development.

• To be able to carry out phytochemical analysis of plant extracts and application of the isolated compounds for treatment of diseases.

• To be able to deal with all microbes and the technologies for their effective uses in industry and mitigation of environmental concerns.

• To explain how current medicinal practices are often based on indigenous plant knowledge and to get introduced to different perspectives on treating ailments according to ethnomedicinal principles.

• To understand patterns of heredity and variation among individuals, species and populations and apply principles for improvement of quality and yield.

• To be able to apply statistical tools to gain insights into significantly different data from different sources. • To acquire recently published knowledge in molecular biology, such as rDNA technology; PTC and bioinformatics and their applications.

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Semester	V		
Name of the subject teacher			
Course code	**USACBT504**		
Course category	T.Y.B.Sc.		
Course title	**CURRENT TRENDS IN PLANT SCIENCES – II**		
Teaching scheme and credits weekly workload in hours	**Lectures**	**Practical's**	**Credits**
	4	4	2.5

PROGRAM OUTCOMES

Specific core discipline knowledge

• Students can recall details and information about the evolution, anatomy, morphology, systematics, genetics, physiology, ecology, and conservation of plants and all other forms of life

.• Students can recall details of the unique ecological and evolutionary features of the local and Indian flora.

Communication skills

• Students can communicate effectively using oral and written communication skills

Problem solving and research skills

• Students can generate and test hypotheses, make observations, collect data, analyze and interpret results, derive conclusions, and evaluate their significance within a broad scientific context

Course Outcomes:

After completion of the course, learners would be able to:

To get exposure to the technique of mushroom cultivation and explore the possibility of entrepreneurship in the same.

• To learn ethnobotanical principles, applications and utilize indigenous plant knowledge for the cure of common human diseases and improvement of agriculture.

• To gain knowledge about the latest molecular biology techniques for isolation and characterization of genes.

• To learn principles and application of commonly used techniques in instrumentation.

• To gain proficiency in the monograph study and pharmacognostic analysis of six medicinal plants.

PROGRAMME SPECIFIC OUTCOMES (PSO'S)

On completion of the B.Sc Botany programe, the learners should be enriched with knowledge and be able to-

To recognize and identify major groups of non-vascular and vascular plants and their phylogenetic relationships.

• To understand the phylogeny of plants and study various systems of classification.

• To explore the morphological, anatomical, embryological details as well as economic importance of algae, fungi, bryophytes, pteridophytes, gymnosperms and angiosperms.

• To understand physiological processes and adaptations of plants.

• To provide knowledge about environmental factors and natural resources and their importance in sustainable development.

• To be able to carry out phytochemical analysis of plant extracts and application of the isolated compounds for treatment of diseases.

• To be able to deal with all microbes and the technologies for their effective uses in industry and mitigation of environmental concerns.

• To explain how current medicinal practices are often based on indigenous plant knowledge and to get introduced to different perspectives on treating ailments according to ethnomedicinal principles.

• To understand patterns of heredity and variation among individuals, species and populations and apply principles for improvement of quality and yield.

• To be able to apply statistical tools to gain insights into significantly different data from different sources. • To acquire recently published knowledge in molecular biology, such as rDNA technology; PTC and bioinformatics and their applications.

Sem VI

T.Y.B.SC.

Botany

Sem VI

T.Y.B.SC.

Botany

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Semester	VI		
Name of the subject teacher			
Course code	**USACBT601**		
Course category	T.Y.B.Sc.		
Course title	PLANT DIVERSITY – III		
Teaching scheme and credits weekly workload in hours	**Lectures**	**Practical's**	**Credits**
	4	4	2.5

PROGRAM OUTCOMES

Specific core discipline knowledge

• Students can recall details and information about the evolution, anatomy, morphology, systematics, genetics, physiology, ecology, and conservation of plants and all other forms of life

.• Students can recall details of the unique ecological and evolutionary features of the local and Indian flora.

Communication skills

• Students can communicate effectively using oral and written communication skills

Problem solving and research skills

• Students can generate and test hypotheses, make observations, collect data, analyze and interpret results, derive conclusions, and evaluate their significance within a broad scientific context

Course Outcomes:

After completion of the course, learners would be able to:

To identify, describe and study in detail the life cycles of three Bryophytes.

• To and study in detail classification and general characters of three classes of Pteridophytes and identify as well as describe the life cycles of one example from each class.

• To study evolutionary aspects and economic utilization of Bryophytes and Pteridophytes.

• To identify, describe and study in detail the life cycles of three Gymnosperms.

PROGRAMME SPECIFIC OUTCOMES (PSO'S)

On completion of the B.Sc Botany programe, the learners should be enriched with knowledge and be able to-

To recognize and identify major groups of non-vascular and vascular plants and their phylogenetic relationships.

• To understand the phylogeny of plants and study various systems of classification.

• To explore the morphological, anatomical, embryological details as well as economic importance of algae, fungi, bryophytes, pteridophytes, gymnosperms and angiosperms.

• To understand physiological processes and adaptations of plants.

• To provide knowledge about environmental factors and natural resources and their importance in sustainable development.

• To be able to carry out phytochemical analysis of plant extracts and application of the isolated compounds for treatment of diseases.

• To be able to deal with all microbes and the technologies for their effective uses in industry and mitigation of environmental concerns.

• To explain how current medicinal practices are often based on indigenous plant knowledge and to get introduced to different perspectives on treating ailments according to ethnomedicinal principles.

• To understand patterns of heredity and variation among individuals, species and populations and apply principles for improvement of quality and yield.

• To be able to apply statistical tools to gain insights into significantly different data from different sources. • To acquire recently published knowledge in molecular biology, such as rDNA technology; PTC and bioinformatics and their applications.

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Semester	VI		
Name of the subject teacher			
Course code	**USACBT602**		
Course category	T.Y.B.Sc.		
Course title	**PLANT DIVERSITY – IV**		
Teaching scheme and credits weekly workload in hours	**Lectures**	**Practical's**	**Credits**
	4	4	2.5

PROGRAM OUTCOMES

Specific core discipline knowledge

• Students can recall details and information about the evolution, anatomy, morphology, systematics, genetics, physiology, ecology, and conservation of plants and all other forms of life

.• Students can recall details of the unique ecological and evolutionary features of the local and Indian flora.

Communication skills

• Students can communicate effectively using oral and written communication skills

Problem solving and research skills

• Students can generate and test hypotheses, make observations, collect data, analyze and interpret results, derive conclusions, and evaluate their significance within a broad scientific context

Course Outcomes:

After completion of the course, learners would be able to:

To study contribution of Botanical gardens, BSI to Angiosperm study and provide plant description, describe the morphological and reproductive structures of seven families.

• To gain exposure to a phylognetic system of classification.

• To gain insight into the anatomical adaptations of different ecological plant groups.

• To understand development plant of male and female gametophytes, embryonic structure and development.

• To understand the different aspects and importance of Biodiversity and utilize them for conservation of species so as to prevent further loss or extinction of Biodiversity and preserve the existing for future generations.

PROGRAMME SPECIFIC OUTCOMES (PSO'S)

On completion of the B.Sc Botany programe, the learners should be enriched with knowledge and be able to-

To recognize and identify major groups of non-vascular and vascular plants and their phylogenetic relationships.

• To understand the phylogeny of plants and study various systems of classification.

• To explore the morphological, anatomical, embryological details as well as economic importance of algae, fungi, bryophytes, pteridophytes, gymnosperms and angiosperms.

• To understand physiological processes and adaptations of plants.

• To provide knowledge about environmental factors and natural resources and their importance in sustainable development.

• To be able to carry out phytochemical analysis of plant extracts and application of the isolated compounds for treatment of diseases.

• To be able to deal with all microbes and the technologies for their effective uses in industry and mitigation of environmental concerns.

• To explain how current medicinal practices are often based on indigenous plant knowledge and to get introduced to different perspectives on treating ailments according to ethnomedicinal principles.

• To understand patterns of heredity and variation among individuals, species and populations and apply principles for improvement of quality and yield.

• To be able to apply statistical tools to gain insights into significantly different data from different sources. • To acquire recently published knowledge in molecular biology, such as rDNA technology; PTC and bioinformatics and their applications.

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Semester	VI		
Name of the subject teacher			
Course code	**USACBT603**		
Course category	T.Y.B.Sc.		
Course title	**FORMS AND FUNCTION – III**		
Teaching scheme and credits weekly workload in hours	**Lectures**	**Practical's**	**Credits**
	4	4	2.5

PROGRAM OUTCOMES

Specific core discipline knowledge

• Students can recall details and information about the evolution, anatomy, morphology, systematics, genetics, physiology, ecology, and conservation of plants and all other forms of life

.• Students can recall details of the unique ecological and evolutionary features of the local and Indian flora.

Communication skills

• Students can communicate effectively using oral and written communication skills

Problem solving and research skills

• Students can generate and test hypotheses, make observations, collect data, analyze and interpret results, derive conclusions, and evaluate their significance within a broad scientific context

Course Outcomes:

After completion of the course, learners would be able to:

To study various plants biomolecular structures and appreciate the structures, role, functions and applications of enzymes. •

To gain insight into the Nitrogen and plant hormone metabolism with applications of the same in agriculture and horticulture.

• To understand principles of genetic mapping, mutations and solve problems based on them, gain knowledge of various metabolic disorders and their implications.

• To generate and test hypotheses, make observations, collect data, analyze and interpret results, derive conclusions, and evaluate their significance within a broad scientific context, using suitable statistical techniques.

PROGRAMME SPECIFIC OUTCOMES (PSO'S)

On completion of the B.Sc Botany programe, the learners should be enriched with knowledge and be able to-

To recognize and identify major groups of non-vascular and vascular plants and their phylogenetic relationships.

• To understand the phylogeny of plants and study various systems of classification.

• To explore the morphological, anatomical, embryological details as well as economic importance of algae, fungi, bryophytes, pteridophytes, gymnosperms and angiosperms.

• To understand physiological processes and adaptations of plants.

• To provide knowledge about environmental factors and natural resources and their importance in sustainable development.

• To be able to carry out phytochemical analysis of plant extracts and application of the isolated compounds for treatment of diseases.

• To be able to deal with all microbes and the technologies for their effective uses in industry and mitigation of environmental concerns.

• To explain how current medicinal practices are often based on indigenous plant knowledge and to get introduced to different perspectives on treating ailments according to ethnomedicinal principles.

• To understand patterns of heredity and variation among individuals, species and populations and apply principles for improvement of quality and yield.

• To be able to apply statistical tools to gain insights into significantly different data from different sources. • To acquire recently published knowledge in molecular biology, such as rDNA technology; PTC and bioinformatics and their applications.

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Semester	VI		
Name of the subject teacher			
Course code	**USACBT604**		
Course category	T.Y.B.Sc.		
Course title	**Current Trends in Plant Science – II**		
Teaching scheme and credits weekly workload in hours	**Lectures**	**Practical's**	**Credits**
	4	4	2.5

PROGRAM OUTCOMES

Specific core discipline knowledge

• Students can recall details and information about the evolution, anatomy, morphology, systematics, genetics, physiology, ecology, and conservation of plants and all other forms of life

.• Students can recall details of the unique ecological and evolutionary features of the local and Indian flora.

Communication skills

• Students can communicate effectively using oral and written communication skills

Problem solving and research skills

• Students can generate and test hypotheses, make observations, collect data, analyze and interpret results, derive conclusions, and evaluate their significance within a broad scientific context

Course Outcomes:

After completion of the course, learners would be able to:

To gain insight into recent molecular biology techniques for DNA analysis and amplification and Barcoding techniques and applications therein.

• To understand and apply tools of Bioinformatics for data retrieval and phylogenetic analysis.

• To learn about the sources of economically important plants in the field of fats and oils and apply it for extraction, dealing with entrepreneurship in the field.

• To gain knowledge and proficiency in preservation of post-harvest produces and explore the possibility of entrepreneurship in the field. .

PROGRAMME SPECIFIC OUTCOMES (PSO'S)

On completion of the B.Sc Botany programe, the learners should be enriched with knowledge and be able to-

To recognize and identify major groups of non-vascular and vascular plants and their phylogenetic relationships.

• To understand the phylogeny of plants and study various systems of classification.

• To explore the morphological, anatomical, embryological details as well as economic importance of algae, fungi, bryophytes, pteridophytes, gymnosperms and angiosperms.

• To understand physiological processes and adaptations of plants.

• To provide knowledge about environmental factors and natural resources and their importance in sustainable development.

• To be able to carry out phytochemical analysis of plant extracts and application of the isolated compounds for treatment of diseases.

• To be able to deal with all microbes and the technologies for their effective uses in industry and mitigation of environmental concerns.

• To explain how current medicinal practices are often based on indigenous plant knowledge and to get introduced to different perspectives on treating ailments according to ethnomedicinal principles.

• To understand patterns of heredity and variation among individuals, species and populations and apply principles for improvement of quality and yield.

• To be able to apply statistical tools to gain insights into significantly different data from different sources. • To acquire recently published knowledge in molecular biology, such as rDNA technology; PTC and bioinformatics and their applications.

PRABHAKAR PATIL EDUCATION SOCIETY'S

Arts, Commerce & Science College

Department of Chemistry

Programme Specific Outcomes

At the completion of B.Sc. in Chemistry the students are able to:

The purpose of the undergraduate chemistry program is to provide the knowledge base and laboratory resources to prepare students for careers as professionals in the field of chemistry

1. Develop skills to solve and understand the principles in quantitative and qualitative analysis in chemistry

2. Students become cautions about handling of drugs, hazardous chemicals and able to perform industrial work with responsibility, honesty and safety

3. Develop skill in problem solving, critical thinking and analytical reasoning

4. Students will be able to carry out scientific experiments as well as accurately record and analyze the results of such experiments

5. Students will be able to explore new areas of research in both chemistry and allied fields of science and technology

6. Learners acquire recent knowledge in the respective and will apply it for the betterment of society especially in the field of Pharmaceutical, Chemical, Agriculture and Biochemistry.

7. Competent in emerging trends for entrepreneurship and successful career in Chemistry related fields

PRABHAKAR PATIL EDUCATION SOCIETY'S

Arts, Commerce & Science College

Department of Chemistry

Programme Outcomes

1. To develop skills in handling scientific instruments, planning and performing laboratory experiments.
2. Provide a basis which focus on scientific reasoning and analytical problem solving
3. Develop the ability to communicate scientific information & experimental results in written and oral format.
4. Develop research based mentality for higher studies
5. Able to use modern library referencing and retrieval method to obtain relevant information
6. Learn professional ethics including ability to work as a team or on individual basis
7. An ability to apply knowledge of science and skills.

PRABHAKAR PATIL EDUCATION SOCIETY'S

Arts, Commerce & Science College

Department of Chemistry

Course Outcomes

Upon successful completion of this course, the student will be able to :

F.Y.B.Sc

1. Able to write electronic configuration of given atomic number

2. To understand the shapes of different orbital.

3. Be able to draw the structure of organic compounds accurately from molecular and empirical formula

4. Use IUPAC nomenclature rules for naming of organic compounds

5.The students will be able to classify matter by its state and bonding behaviour using periodic table as a reference.

6. Students will able to state the principle of alkali metals, alkaline earth metals, halogens & noble gases

7. will be able to differentiate between metals, non-metals & metalloids

8. Student will able to state the basic principle of electrochemistry

9.Student will able to derive integrated rate expressions for Zero order, first order, and second order & third order reactions

10. To understand preparation methods for alkenes, alkynes & alkyl halides.

PRABHAKAR PATIL EDUCATION SOCIETY'S

Arts, Commerce & Science College

Department of Chemistry

Course Outcomes

Upon successful completion of this course, the student will be able to :

S.Y.B.Sc.

1. To understand the core concept of organic chemistry i.e. resonance, hyper conjugation, inductive effect & their applications

2. To understand the mechanism of attack of electrophiles & Neucleophiles

3. The students will able to understand the chemistry of many heterocyclic products, carbohydrates, amino acids, peptides, proteins & lipids used as drug and food

4. To understand the reactivity of different carbonyl compounds towards Neucleophilic reactions.

5. Able to know basic concept of thermodynamics.

6. Able to understand the different type of titrations, determination of equivalence points & their applications in various fields

7. Able to understand different methods of separation and purification techniques used in analytical chemistry

8. Student will able to describe different quantitative & qualitative methods of analysis of organic and inorganic substances

9.Student will able to understand general properties and applications of s-block, p-block & d-block elements

10. Student will able to recognize structure of acid halides, esters, amides, and acid anhydrides.

PRABHAKAR PATIL EDUCATION SOCIETY'S

Arts, Commerce & Science College

Department of Chemistry

Course Outcomes

Upon successful completion of this course, the student will be able to :

T.Y.B.Sc.

1. Student will able to understand different activities of drug molecules & its uses
2. Must be familiar about chemical and physical properties of inner transition elements
3. Students will able to explain large scale preparation and properties of industrial products such as cement, POP, sodium hydroxide, sodium carbonates and bicarbonates
4. Student will able to demonstrate methods of drugs analysis and pharmaceutical calculations
5. Able to write the order of reactivity of different carbonyl compounds and carboxylic acid derivates
6. Student will able to separate mixture of components in organic chemistry which having wild scope in research and forensic science
7. Understand to write nomenclature, classification, properties & preparation of coordination compounds
8. To understand basic feature of spectroscopy & ability to explain common terms in NMR spectroscopy such as chemical shift, coupling constant & anisotropy and describe how they are affected by molecular structure
9. Students are able to classify molecules in relevant point group
10. Student will able to understand different chromatographic techniques used in pharmaceutical and chemical industries

PROGRAMME OUTCOMES

The College is affiliated to the University of Mumbai. Thus, the college follows the guidelines and syllabus prescribed by the Affiliated University.

PROGRAMME: COMMERCE

Programme Outcomes

PO1 - Enables learners to get theoretical and practical exposure in the commerce sector which includes Accounts, Commerce, Marketing, Management, Economics, Environment etc.

PO2 - Develops communication skills and build confidence to face the challenges of the corporate world.

PO3 - Enhances the capability of decision making at personal and professional levels.

PO4 – Makes students industry ready and develop various managerial and accounting skills for better professional opportunities.

PO5 - Develops entrepreneurial skills amongst learners.

PO6 - Strengthens their capacities in varied areas of commerce and industry aiming towards holistic development of learners.

PO7 - Thus, after completing their graduation learners develop a thorough understanding of the fundamentals in Commerce and Finance.

Program Specific Outcomes

I. ***B.Com***

PSO1 - Learners venture into Managerial positions, Accounting areas, Banking Sectors, Auditing, Company Secretaryship, Teaching, Professor, Stock Agents, Government Employment etc.

PSO2 - Enables learners to prove themselves in different Professional examinations like CA, CS, CAT, GRE, CMA, MPSC, UPSC etc.

PSO3 -Learners further move towards research in the field of Commerce.

PSO4- Enables students to demonstrate Progressive learning of various tax issues and tax forms related to individuals and businessmen and setting up their own business start up.

PSO5 – The vast syllabi covers various fields of commerce and accountancy which helps students grasp practical and theoretical knowledge.

II. **B.Com (Accounting and Finance)**

PSO1 - The course helps aspirants to acquire knowledge in the field of accounting, taxation, auditing, risk management, financial accounting, managerial economics, business law and business communications.

PSO2 - Learners can pursue careers as financial experts and also develop a better understanding of the markets as this course gives an in-depth understanding of the essential qualities and areas of expertise required for such jobs.

PSO3 - Students get opportunities to explore many career paths like investment and portfolio management, stock market, security analysis, mutual fund and capital market analysis, accounting field, financial field etc.

PSO4 - The programme aims to develop professional skills among students and build a strong foundation in accounts, Finance and Ethics which will benefit themselves as well as the socie

Semester wise Course Outcomes

I. B. Com

- **Semester I**

Sr. No.	Name of the Course	Outcomes
1.	Commerce	• Transmits understanding of basic concepts of business along with setting business unit and logical provisions for initiating business. • Gives clue to learners on entrepreneurship and exposes them to problems and prospects of women entrepreneurs. • Conveys to the learners the current trends in business.
2.	Accountancy	• Inculcates knowledge of various accounting concepts and policies. • Introduces the students to working knowledge of Accounting Standards issued by the ICAI.
3.	Economics	• Familiarizes the students with the basic concepts of micro economics and its applications to business situations.

		• Guides the students towards understanding the real world market situations & business applications.
4.	Foundation Course	• Creates understanding of multi-lingual, multi-religious, multi-cultural nature & political nature of Indian society. • Creates understanding of the Indian Constitution & the disparity in Indian society
5.	Business Communication	• Corporate communication helps future managers and employees in performing managerial functions smoothly. • Creates awareness, imparts knowledge, shapes attitudes and overall improves overall interaction between people.
6.	Environmental Studies	• Makes students learn the role of environment and ecosystem. • Creates awareness about the relationship between population & environment.
7.	Mathematics and Statistics	• Introduces mathematics & statistics to undergraduate students of commerce so that they can use them in the field of commerce & industries to solve the real life problems. • Facilitates decision making with the help of decision making techniques

- **Semester II**

Sr. No.	**Name of the Course**	**Outcomes**
1.	Commerce	• Makes learners understand the fundamentals of services, and plans regarding various strategies to increase service and trends in services. • Imparts knowledge related to retail changes in India with global perspective and converses on problems and prospects in retailing. • Furnishes details regarding BPO, KPO and various e-commerce activities focusing on logistics
2.	Accountancy	• Understands the techniques of consignment, Branch and Accounting methods. • Acquaints learners with knowledge regarding accounting procedures related fire Ins. claims and the process of claims.

3.	Economics	• Enables understanding of the relationship between different market structures and how they compare and contrast with one another. • Enables understanding of how a firm sets price for its products by using different methods..
4.	Foundation Course	• Makes learners understand different evolution of Human Rights. • Creates the basic understanding about the issues related to economic changes and its impact on different fields.
5.	Business Communication	• Equips the students to learn the principles of effective communication so that they can communicate with confidence in the corporate world. • Imparts the techniques of group discussion, the guidelines of preparing for the interview along with the knowledge of drafting different formats of letters like inquiry, sales, marketing, claim, adjustments, appointment and termination.
6.	Environmental Studies	• Makes students aware about waste management. • Exposes learners to the impact of Industrial development on Agriculture.
7.	Mathematics and Statistics	• Prepares students to develop skills to solve financial problems. • Creates awareness of applications of Derivatives to concepts in Economics.

- **Semester III**

Sr. No.	Name of the Course	Outcomes
01	Accountancy and Financial Management	• Updates students with working knowledge of accounting standards issued by ICAI. • Imparts conceptual knowledge of various accounting concepts, conventions and policies..
02	Introduction to Management Accounting	• Enables them to know the concept of capital budgeting with reference to time value of money. • Enables understanding of the functions, advantages, limitations of management accounting.
03	Commerce	• Creates understanding of the concept of management along with evolution of management. • Let's students become aware about universal application of functions of Management..

04	Business Economics	• Creates awareness among students about various economic conditions of macro - economics such as inflation, unemployment etc. • Examines the economy as a whole and inspires a consistent way of thinking about key macroeconomic phenomena.
05	Company Secretary Practice	• Updates students about careers in Company Secretary Practice. • Have a thorough understanding of the role of the company secretary and the differing responsibilities of shareholders, the company secretary, the board of directors or governing body, the executives, management and stakeholders.
06	Foundation course	• Gives basic understanding on issues related to human rights violations, ecology and urban-rural disparities in access to health and education. • Creates the importance of developing scientific temper towards technology and its use in everyday life.
07	Business Law	• Provides a brief idea about the frame work of Indian business law. • Familiarizes the students with case law studies related to business law.

- **Semester IV**

Sr. No.	**Name of the Course**	**Outcomes**
01	Introduction to Auditing	• Imparts knowledge of audit planning, procedures and documentation and assurance standards. • Instills elementary understanding of internal control and internal audit.
02	Accountancy and Financial Management	• Imparts conceptual knowledge of various accounting concepts, conventions and policies. • Inculcates knowledge about accounting methods, practices and techniques particularly pertaining to joint stock companies.
03	Commerce	• Provides basic knowledge of production management, inventory management, and quality management. • Updates learners with recent trends in finance.
04	Business Economics	• Enables students to understand the primary functions of government like revenue, expenditure, debt and helps to analyze budget. • Provides students with the tools to understand the underlying concepts and practical trade offs entailed in public finance policy alternatives.

05	Company Secretary Practice	To provide the learners an insight about Company Secretarial Practices. • To make the learners understand the role of Company Secretary towards Company's statutory provisions, rules and regulations. • To make the learners understand the various aspects of Company Management, meetings and reports.

06	Foundation course	• Develops a basic understanding about rights of citizen, ecology, role of modern technology. • Provides an overview of significant skills required to address competition in career choices.
07	Business Law	• Acquaints students with laws related to Indian Companies' Act 2013, IPR, Partnership Act 2008, and Consumer Protection Act. • Provides a brief idea about the frame work of Indian business laws.

- **Semester V**

Sr. No.	Name of the Course	Outcomes
01	Financial Accounting and Auditing Paper	• Creates awareness about company accounts with provision of various companies act. • Provides knowledge about the buyback of shares, investment account with their accounting treatment.
02	Cost Accounting and Auditing Paper	• Impacts the knowledge of various costs on the basis of element behavior and functions. • Helps in ascertaining the cost of material and labour.
03	Commerce (Marketing)	• Intercepts and familiarizes students with different and basic concepts of marketing mix, MIS and Marketing Research. • Updates students about marketing challenges faced by marketing managers in 21st century. • Makes students aware about competitive strategies for market leader, and various aspects of market.
04	Business Economics	• Assess the performance of commercial banks in agricultural credit. • Identifies and explains economic concepts and theories related to the behavior of economic agents, markets, industry legal institutions, social norms and government policies.
05	Export Marketing (Elective)	• Furnishes learners with basic concepts and global framework for export marketing. • Instructs learners about basic financial incentives and updates them with current trends in export marketing.
06	Purchasing and Store Keeping	• Give learners insights about how the businessman make their purchase decision using scientific method. • Also learners get idea behind the various store design and how store design can help to improve sales.

- **Semester VI**

Sr. No.	Name of the Course	Outcomes
01	Financial Accounting and Auditing Paper	• Imparts knowledge about accounting treatment of amalgamation of companies, Foreign currency transactions. • Helps students in gaining practical knowledge of accountancy.
02	Cost Accounting and Auditing Paper	• Creates understanding on the various techniques of costing like Contract, Process, Standard and Marginal. • Imparts knowledge on various emerging concept of cost accounting like cycling costing, Bench Marking etc.
03	Commerce (HRM)	• Refurbishes students with fundamental aspects of HRM, the role, functions and process of HRM. • Explains students the applications of HRIS and different theories of leadership and motivation. • Updates learners with recent trends in HRM and make students aware about challenges faced by HR managers.
04	Business Economics	• Creates an understanding of the nature of International Trade and the nature of International organization such as the United Nations, the International Bank for Reconstruction and Development (World Bank), International Monetary Fund, World Trade Organization and their effects on business. • Creates understanding of the rate of exchange and how the rate of exchange is determined.
05	Export Marketing (Elective)	• Provides information regarding product planning and pricing decisions for export marketing.

		• Instructs students regarding various sources of export finance and provides knowledge regarding export Procedure and documentation.
06	Purchasing and Store Keeping	• .Provides information regarding how uninterrupted supply of materials without delay to various production departments of the organization is made. • Also provides information regaring

Course Outcomes (COs)

F.Y.B.Sc [CS] SEM-I

1. **Digital Systems & Architecture**
   - To have an understanding of Digital systems and operation of a digital computer.
   - To learn different architectures & organizations of memory systems, processor organization and control unit.
   - To understand the working principles of multiprocessor and parallel organization's as advanced computer architectures
2. **Introduction to Programming with Python**
   - To learn how to design and program Python applications.
   - To explore the innards of Python Programming and understand components of Python Program .
   - To define the structure and components of a Python program.
   - To learn how to write loops and decision statements in Python
   - To learn about inbuilt input/output operations and compound data types in Python
3. **LINUX Operating System**
   - To learn basic concepts of Linux in terms of operating system .
   - To learn use of various shell commands with regular expressions .
   - To set Linux Environment variables and learn setting file permissions to maintain Linux security implementation .
   - To learn various editors available in Linux OS.
   - To learn shell scripting.
   - To learn installation of compilers and programming using C and Python languages on Linux platform
4. **Open Source Technologies**
   - Understand the difference between open-source software and commercial software.
   - Understand the policies, licensing procedures and ethics of FOSS.
   - Understand open-source philosophy, methodology and ecosystem.
   - Awareness with Open-Source Technologies.
5. **Discrete Mathematics**

- The purpose of the course is to familiarize the prospective learners with mathematical structures that are fundamentally discrete.
- This course will enhance prospective learners to reason and ability to articulate mathematical problems.
- This course will introduce functions, forming and solving recurrence relations and different counting principles. These concepts will be useful to study or describe objects or problems in computer algorithms and programming languages and these concepts can be used effectively in other courses.

6. **Descriptive Statistics**
   - To develop the learners ability to deal with different types of data.
   - To enable the use of different measures of central tendency and dispersion wherever relevant.
   - To make learner aware about the techniques to check the Skewness and Kurtosis of data.
   - To make learner enable to find the correlation between different variables and further apply the regression analysis to find the exact relation between them.
   - To develop ability to analyze statistical data through R software.
7. **Soft Skills**
   - Understand the significance and essence of a wide range of soft skills.
   - Learn how to apply soft skills in a wide range of routine social and professional settings
   - Learn how to employ soft skills to improve interpersonal relationships
   - Learn how to employ soft skills to enhance employability and ensure workplace and career success

F.Y.B.Sc [CS] SEM-II

1. **Design & Analysis of Algorithms**
   - To make students understand the basic principles of algorithm design
   - To give idea to students about the theoretical background of the basic data structures
   - To familiarize the students with fundamental problem-solving strategies like searching, sorting, selection, recursion and help them to evaluate efficiencies of various algorithms.

- To teach students the important algorithm design paradigms and how they can be used to solve various real world problems.

2. **Advanced Python Programming**
   - To learn how to design object-oriented programs with Python classes.
   - To learn about reading, writing and implementing other operation on files in Python.
   - To implement threading concept and multithreading on Python
   - To design GUI Programs and implement database interaction using Python.
   - To know about use of regular expression and handling exceptions for writing robust python programs.
3. **Introduction to OOPs using C++**
   - Students should be able to write, compile and debug programs in C language.
   - Students should be able to use different data types in a computer program.
   - Students should be able to design programs involving decision structures, loops and functions.
   - Students should be able to explain the difference between call by value and call by reference
   - Students should be able to understand the dynamics of memory by the use of pointers.
   - Students should be able to use different data structures and create/update basic data files.
4. **Database Systems**
   - To make students aware fundamentals of database system.
   - To give idea how ERD components helpful in database design and implementation.
   - To experience the students working with database using MySQL.
   - To familiarize the student with normalization, database protection and different DCL Statements.
   - To make students aware about importance of protecting data from unauthorized users.
   - To make students aware of granting and revoking rights of data manipulation.
5. **Calculus**
   - Understanding of Mathematical concepts like limit, continuity, derivative, integration of functions.

- Ability to appreciate real world applications which uses these concepts.
- Skill to formulate a problem through Mathematical modeling and simulation

6. **Statistical Methods and Testing of Hypothesis**
   - Enable learners to know descriptive statistical concepts
   - Enable study of probability concept required for Computer learners
7. **E-Commerce & Digital Marketing**
   - To understand increasing significance of E-Commerce and its applications in Business and Various Sectors
   - To provide an insight on Digital Marketing activities on various Social Media platforms and its emerging significance in Business
   - To understand Latest Trends and Practices in E-Commerce and Digital Marketing, along with its Challenges and Opportunities for an Organization

S.Y.B.Sc [CS] SEM-III

1. **Principles of Operating Systems**
   - To learn basic concepts and structure of operating systems
   - To learn about process and synchronization in operating system level
   - To learn CPU scheduling algorithms
   - To learn Memory and File system management
2. **Linear Algebra**
   - Appreciate the relevance of linear algebra in the field of computer science.
   - Understand the concepts through program implementation
   - Instill a computational thinking while learning linear algebra.
3. **Data Structures**
   - To introduce data abstraction and data representation in memory
   - To describe, design and use of elementary data structures such as stack, queue, linked list, tree and graph
   - How and why different data structures are used for different types of problems.
4. **Advanced Database Concepts**
   - To develop understanding of concepts and techniques for data management and learn about widely used systems for implementation and usage.

- To develop understanding of Transaction management and crash recovery.
- To develop concepts of programming concepts of database.

5. **Java based Application Development**
   - To provide insight into java based applications using OOP concepts.
   - To provide understanding of developing GUI based desktop applications in java.
   - To provide knowledge of web based applications through servlet and jsp
   - To provide understanding and implementation of basic JSON
6. **Web Technologies**
   - To understand the concepts of Hyper Text Markup Language and Cascading Style Sheets.
   - To learn JavaScript for creating dynamic websites.
   - To learn various operations performed on data among web applications using XML
   - To learn Server-Side Programming using PHP
7. **Green Technologies**
   - Know about Green IT Fundamentals: Business, IT, and the Environment
   - Green IT Strategies and Significance of Green IT Strategies
   - Green Enterprise Architecture and Green Information Systems
   - Sociocultural Aspects of Green IT and Green Compliance

S.Y.B.Sc [CS] SEM-IV

1. **Theory of Computation**
   - Understand Grammar and Languages
   - Learn about Automata theory and its application in Language Design
   - Learn about Turing Machines and Pushdown Automata
   - Understand Linear Bound Automata and its applications
2. **Computer Networks**
   - Learner will be able to understand the concepts of networking, which are important for them to be known as a '*networking professionals*'.
   - Useful to proceed with industrial requirements and International vendor certifications.
3. **Software Engineering**
   - Basic knowledge and understanding of the analysis and design of complex system.
   - Ability to develop ,maintain and evaluate large-scale software systems.

- To produce efficient, reliable robust and cost-effective software solutions.
- Abilty to understand and meet ethical standards and legal responsiblites.

4. **Physical Computing and IoT Programming**
   - Enable learners to understand System On Chip Architectures.
   - Introduction and preparing Raspberry Pi with hardware and installation.
   - Learn physical interfaces and electronics of Raspberry Pi and program them using practical's
   - Learn how to make consumer grade IoT safe and secure with proper use of protocols.
5. **Android Application Development**
   - Kotlin Programming Language for application development
   - Creating robust mobile applications on simulators and physical devices
   - Creating intuitive, reliable mobile apps using the android services and components
   - Handling data local and remote data storage
   - Create a seamless user interface that works with different mobile screens
6. **Advanced Application Development**
   - To understand all the necessary and important technologies such as MongoDB, Express.js, AngularJS, and Node.js.
   - To understand modern app development using Flutter
7. **Research Methodology**
   - The research methodology course is proposed to assist students in planning and carrying out research projects.
   - The students are exposed to the principles, procedures and techniques of implementing research project.
   - The course starts with an introduction to research and carries through the various methodologies involved.
   - It continues with finding out the literature using technology, basic statistics required for research and finally report writing.

T.Y.B.Sc [CS] SEM-V

1. Artificial Intelligence

After completion of this course, learner should get a clear understanding of AI and different search
algorithms used for solving problems. The learner should also get acquainted with different
learning algorithms and models used in machine learning.

2. **Software Testing and Quality Assurance**

Understand various software testing methods and strategies. Understand a variety of software
metrics, and identify defects and managing those defects for improvement in quality for given
software. Design SQA activities, SQA strategy, formal technical review report for software
quality control and assurance.

3. **Information and Network Security**

Understand the principles and practices of cryptographic techniques. Understand a variety of
generic security threats and vulnerabilities, and identify & analyze particular security problems
for a given application. Understand various protocols for network security to protect against the
threats in a network

4. **Web Services**

Emphasis on SOAP based web services and associated standards such as WSDL. Design SOAP
based / RESTful / WCF services Deal with Security and QoS issues of Web Services.

5. **Game Programming**

Learner should study Graphics and gamming concepts with present working style of developers where everything remains on internet and they need to review it, understand it, be a part of community and learn.

T.Y.B.Sc [CS] SEM-VI

1. Cloud Computing

After successfully completion of this course, learner should be able to articulate the main concepts, key technologies, strengths, and limitations of cloud computing and the possible applications for state-of-the-art cloud computing using open source technology.
Learner should be able to identify the architecture and infrastructure of cloud computing, including SaaS, PaaS, IaaS, public cloud, private cloud, hybrid cloud, etc.
They should explain the core issues of cloud computing such as security, privacy, and interoperability.

2. **Cyber Forensics**
The student will be able to plan and prepare for all stages of an investigation - detection, initial
response and management interaction, investigate various media to collect evidence, report them in a way that would be acceptable in the court of law.

3. **Information Retrieval**
After completion of this course, learner should get an understanding of the field of information
retrieval and its relationship to search engines. It will give the learner an understanding to apply
information retrieval models.

4. **Data Science**

After completion of this course, the students should be able to understand & comprehend the
problem; and should be able to define suitable statistical method to be adopted.

5. **Ethical Hacking**

Learner will know to identify security vulnerabilities and weaknesses in the target applications.
They will also know to test and exploit systems using various tools and understand the impact of
hacking in real time machines.

Program Outcomes (POs)

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.

Program Specific Outcomes (PSOs)

1. Apply fundamental principles and methods of Computer Science to a wide range of application.

2. Design correctly implement and document solutions to significant computational problem.

3. Impart an understanding of the basic of our discipline.

4. Prepare for continued professional development.

5. Develop proficiency in the practice of computing.

DEPARTMENT OF HINDI OUTCOMES

Programme Outcomes

कार्यक्रम विशिष्ट परिणाम बी.ए. (हिन्दी)

बीए (हिंदी) के पूरा होने पर, छात्र निम्न में सक्षम हैं:

1. हिंदी की मूल अवधारणा और विषय और इसकी उत्पत्ति को समझने के लिए।
2. विषय हिंदी और उसकी शाखाओं का महत्व बनाना ।
3. हिंदी साहित्य के विभिन्न पहलुओं को समझने की विधि और देने की प्रक्रिया के साथ समझना नई विधा और दिशा।
4. अलग–अलग क्षेत्र और सिद्धांत जैसे शब्दावली और इसके विपरीत में प्रयास करने के लिए।
5. हिंदी साहित्य के बारे में जानने के लिए इसकी जड़ें दृष्टिकोण और पद्धतियों का कारण बनती हैं।
6. हिंदी साहित्य की दार्शनिक पद्धतियों को विस्तार देना और समझना।
7. अतीत से वर्तमान तक हिंदी की अवधारणा का मूल्यांकन करना और समाज को और अधिक घनिष्ठ बनाना

COURSE OUTCOMES:

TYBA

1. विद्यार्थी को हिन्दी साहित्य के इतिहास की व्यापक जानकारी प्राप्त होगी, साहित्य की अविरल धारा का परिचय प्राप्त होगा। हिन्दी साहित्य की विभिन्न विधाओं का व्यापक और क्रमबद्ध ज्ञान प्राप्त होगा।

2. विद्यार्थियों में साहित्य के माध्यम से कलात्मक गुणों की अभिवृद्धि होगी, कला की साहित्यिक विधाओं के प्रति अभिरुचि जागृत होगी तथा रचनात्मक कौशल को बढ़ावा मिलेगा, साहित्य के समकालीन परिवेश से जुड़ सकेंगे, सामाजिक समस्याओं, पक्षों से अवगत होते हुए समाधान की ओर बढ़ सकेंगे।

3. विद्यार्थी जनसंचार, सूचना प्रौद्योगिकी, सोशल मीडिया के अधुनातन माध्यमों में प्रयुक्त हिन्दी- देवनागरी लिपि के अध्ययन, प्रयोग से मीडिया, कोश निर्माण आदि क्षेत्रों में रोज़गार के अवसर प्राप्त कर सकेंगे।

4. विद्यार्थी भारतीय काव्यशास्त्र की व्यापक जानकारी प्राप्त होने के साथ काव्यशास्त्रीय मानदंडों का ज्ञान प्राप्त होगा जिसके माध्यम से विद्यार्थी स्वयं साहित्य-रचना की प्रवृत्ति की ओर प्रेरित हो सकेगा।

5. विद्यार्थी भाषा के विविध रूप तथा भाषा परिवर्तन के कारणों का ज्ञान प्राप्त कर सकेंगे। भाषा विज्ञान के विभिन्न अंगों से परिचित होते हुए उसकी उपयोगिता का ज्ञान प्राप्त कर सकेंगे। विद्यार्थी हिन्दी ध्वनियों के उच्चारण संबंधी तथा देवनागरी लिपि का वैज्ञानिक ज्ञान को प्राप्त कर सकेंगे।

6. विद्यार्थियों में मानवीय संवेदनाओं के विकास के साथ नवीन सामाजिक, सांस्कृतिक बोध और जीवन मूल्यों का विकास होगा, जिससे विद्यार्थी अधिक उदार, चेतना सम्पन्न तथा ज़िम्मेदार नागरिक बनेंगे।

7. विद्यार्थियों में नये वैश्विक मूल्यों के प्रति सजगता को बढ़ावा मिलेगा एवं पर्यावरणीय चेतना के प्रति दायित्व बोध उत्पन्न होगा।

SYBA

परिणाम Outcomes:

1. विद्यार्थियों में मानवीय संवेदनाओं के विकास के साथ नवीन सामाजिक, सांस्कृतिक बोध और जीवन मूल्यों का विकास होगा।

2. विद्यार्थियों में साहित्य के माध्यम से कलात्मक गुणों की अभिवृद्धि होगी, कला की साहित्यिक विधाओं के प्रति अभिरुचि जागृत होगी तथा रचनात्मक कौशल को बढ़ावा मिलेगा।

3. विद्यार्थियों में नये वैश्विक मूल्यों के प्रति सजगता को बढ़ावा मिलेगा एवं पर्यावरणीय चेतना के प्रति दायित्व बोध उत्पन्न होगा।

परिणाम- Outcomes:

1. विद्यार्थियों में मानवीय संवेदनाओं के विकास के साथ नवीन सामाजिक, संस्कृतिक और राजनीतिक मूल्यों का गुणात्मक विकास होगा।

2. विद्यार्थियों में राष्ट्र-निर्माण हेतु नये सामाजिक, राजनीतिक, संस्कृतिक विचारों का प्रसार होगा और दायित्व बोध.निर्वहन का विकास होगा।

3. विद्यार्थियों में नये वैश्विक मूल्यों के प्रति सजगता को बढ़ावा मिलेगा एवं मूल्यवादी दृष्टि के प्रति दायित्व बोध उत्पन्न होगा।

4. विद्यार्थियों में साहित्य - रसास्वादन के साथ कलात्मक अभिरुचि का निर्माण होगा, रचनात्मक कौशल को बढ़ावा मिलेगा।

FYBA
कथा संचयन - छात्रों को हिंदी कहानी के आरंभ से लेकर अद्यतन कहानी वाचन की प्रवृत्तियों एवं कहानी के विकास से अवगत कराना हिंदी कहानीकारों द्वारा लिखित कहानियों से परिचित कराना।

छात्रों का हिंदी कहानी विधा के स्वरूप विवेचन तथा विशेषताओं से परिचय कराना।

छात्रों को आत्मकथा, रेखाचित्र, व्यंग्य, एकाकी विधाओं से
परिचित कराना।

छात्रों को संस्मरण, यात्रावृत्त, निबंध,लोककथा विधाओं से
परिचित कराना।

मराठी विभाग

Course Outcomes (COs)

1) प्राचीन मराठी वाङ्मयाच्या इतिहासाची माहिती होईल
2) भारतीय साहित्य विचाराचा परिचय होईल
3) पाश्चात्य साहित्य विचारांचा परिचय होईल
4) साहित्य आणि समाज यांच्या अनोन्य संबंधाचा परिचय होईल
5) भाषेच्या विविध अंगाचा परिचय होईल
6) मराठी व्याकरण व्यवस्थेचा सूक्ष्म परिचय होईल
7) वां्डमयीन प्रवृत्ती समजतील
8) भाषांतर प्रक्रियेची ओळख होईल.

Program Outcomes

1) विद्यार्थ्यांमध्ये लेखन व वाचनाची आवड निर्माण होईल.
2) प्रथम वर्ष विद्यार्थ्यांना व्यवहारिक मराठीचे सखोल ज्ञान प्राप्त होईल
3) द्वितीय वर्ष विद्यार्थ्यांना वांग्मय प्रकारांची व विविध प्रवाहांची ओळख होईल
4) तृतीय वर्ष विद्यार्थ्यांना मध्ययुगीन व आधुनिक कालखंडाची ओळख होईल
5) तृतीय वर्ष विद्यार्थ्यांमध्ये साहित्यशास्त्रातील निर्मिती प्रक्रियेविषयी ज्ञान प्राप्ती होईल
6) मराठी विषयाच्या विद्यार्थ्यांमध्ये मराठी वर्णमाला व अद्ययावत लिपीचिन्ह तसेच भाषांतराविषयी जागृती निर्माण होईल....

Department of Mathematics

Mathematics Program Outcomes

On completion of the Program Students will be able to,

- Formulate and analyze mathematical and statistical problems, precisely define the key terms, and draw clear and reasonable conclusions.
- Read, understand and construct correct mathematical and statistical proofs and use the library and electronic databases to locate information on mathematical problems.
- Explain the importance of mathematics and its techniques to solve real life problems and provide the limitations of such techniques and the validity of the results
- Enabling students to develop positive attitude towards mathematics as an interesting and valuable subject
- Enhancing students overall development and to equip them with mathematical modeling, abilities, problem solving skills, creative talent and power of communication.
- Acquire good knowledge and understanding in advanced areas of mathematics and statistics.
- Enabling students to develop positive attitude towards mathematics as an interesting and valuable subject
- Enhancing students overall development and to equip them with mathematical modeling, abilities, problem solving skills, creative talent and power of communication.
- Acquire good knowledge and understanding in advanced areas of mathematics and physics.

Program Specific Outcomes

On completion of the Program Students will be able to,

- Demonstrate basic manipulative skills in algebra, geometry, trigonometry, and beginning calculus.
- Apply the underlying unifying structures of mathematics (i.e. sets, relations and functions, logical structure) and the relationships among them
- Demonstrate proficiency in writing proofs.
- Communicate mathematical ideas both orally and in writing.
- Understand the concept of a function.
- Apply Algebraic Techniques.
- Recalling the concepts of mathematics and applying them to the various courses like algebra, analysis, Differential equations, statistics, etc to form mathematical models.

- Apply Mathematics to interdisciplinary ways like statistician, mathematical finance, industry expertise and interpret quantitative ideas.

Course Outcomes

On completion of the Course Students will be able to,

F.Y.BSc

Calculus-I and II:

- State the properties of real numbers.
- Apply properties of real numbers to prove some inequalities.
- Define a sequence and classify different types of sequence.
- State and apply properties of convergence and divergence to sequences
- Define limit, continuity and differentiability of real valued function
- State and prove algebra of limits, continuous functions and differentiability.
- Construct discontinuous function to continuous function
- Apply continuous function State and prove algebra of limits, continuous functions and differentiability.
- Apply differentiation to graph of function functions, L-Hospital Rule, higher derivative and Taylors Expansion.

Algebra-I and Discrete Mathematics

- Define logic statements.
- Identify and apply various properties relating to the integers.
- Apply different methods of proof to verify mathematical assertions.
- Apply Fundamental theorem of algebra for finding roots of given polynomial.
- Solve counting problems involving the multiplication rule, permutations, and combinations (with and without replacement).
- Apply the Addition Rule and the Principle of Inclusion and Exclusion.
- Apply the Binomial and Multinomial Theorem.
- Apply the Pigeonhole Principle.
- Solve problems using counting techniques and combinatorics.

S.Y.BSc

On completion of the Course Students will be able to,

- Calculus (Sem III) & Multivariable Calculus I(Sem IV): This course gives introduction to basic concepts of Analysis with rigor and prepares students to study further courses in Analysis. Formal proofs are given lot of emphasis in this course which also enhances understanding of the subject of Mathematics as a whole.
- Linear Algebra I (Sem III) & Linear Algebra II (Sem IV): This course gives expositions to system of linear equations and matrices, Vector spaces, Basis and dimension, Linear Transformation, Inner product space, Eigen values and eigenvectors.
- Ordinary Differential Equations (Sem III) prepares learner to get solutions of so many kinds of problems in all subjects of Science and also prepares learner for further studies of differential equations and related fields.
- Numerical Methods and Statistical Methods: Lerner will learn different types of Numerical methods and statistical methods to apply in different fields of Mathematics.

T.Y.BSc

On completion of the Course Students will be able to,

- Multivariable Calculus II (Sem V): In this course students will learn the basic ideas, tools and techniques of integral calculus and use them to solve problems from real-life applications including science and engineering problems involving areas, volumes, centroid, Moments of mass and center of mass Moments of inertia. Examine vector fields and define and evaluate line integrals using the Fundamental Theorem of Line Integrals and Green's Theorem; compute arc length.
- Complex Analysis (Sem VI): Students Analyze sequences and series of analytic functions and types of convergence, Students will also be able to evaluate complex contour integrals directly and by the fundamental theorem, apply the Cauchy integral theorem in its various versions, and the Cauchy integral formula, they will also be able to represent functions as Taylor, power and Laurent series, classify singularities and poles, find residues and evaluate complex integrals using the residue theorem.
- Group Theory, Ring Theory (Sem V, Sem VI) Students will have a working knowledge of important mathematical concepts in abstract algebra such as definition of a group, order of a finite group and order of an element, rings, Euclidean domain, Principal ideal domain and Unique factorization domain. Students will also understand the connection and transition between previously studied mathematics and more advanced mathematics. The students will actively participate in the transition of important concepts such homomorphisms & isomorphisms from discrete mathematics to advanced abstract mathematics.

- Topology of metric spaces (Sem V), Topology of metric spaces and real analysis (Sem VI): This course introduces students to the idea of metric spaces. It extends the ideas of open sets, closed sets and continuity to the more general setting of metric spaces along with concepts such as compactness and connectedness. Convergence concepts of sequences and series of functions, power series are also dealt with. Formal proofs are given a lot of emphasis in this course. This course serves as a foundation to advanced courses in analysis. Apart from understanding the concepts introduced, the treatment of this course will enable the learner to explain their reasoning about analysis with clarity and rigour.
- Partial Differential equations (Sem V: Paper IV: Elective A): a. Students will able to understand the various analytical methods for solving first order partial differential equations. b. Students will able to understand the classification of first order partial differential equations. c. Students will able to grasp the linear and non linear partial differential equations.
- Integral Transforms (Sem VI: Paper IV- Elective A): a. Students will able to understand the concept of integral transforms and their corresponding inversion techniques. b. Students will able to understand the various applications of integral transforms.

Department of Microbiology

Programme Specific Outcome

PSO1 The program is aimed at equipping the students with basic knowledge in various branches of Microbiology such as Microbial Genetics, Molecular Biology, Virology, Medical Microbiology, Immunology, Microbial Biochemistry and Industrial Microbiology. Additionally, it also makes students aware of interdisciplinary sciences such as Bioinformatics and Bioinstrumentation

PSO2 At the end, student will have employability in food industry, pharmaceutical industry, Agricultural industry and fishery. Students will work as microbiologist in QA and production departments

PSO3 Students will develop basic understanding of the subject and will have developed life skills to solve environmental and hygiene related problem

Course Outcomes

Class: F.Y.B. Sc. Microbiology

Semester I

Course (Paper) Name and No.: Fundamentals of Microbiology-I

CO1 Learners will know the history and scope of Microbiology in industries

CO2 Learners will understand the microbial diversity

CO3 Learners will understand the prokaryotic and eukaryotic cytoskeleton and cellular structure in detail at microscopic level

CO4 Learners will understand the biochemistry of macromolecules present in cell

Course (Paper) Name and No.: Basic Techniques in Microbiology

CO1 Learners will understand the staining techniques routinely used in microbiology

CO2 Learners will learn how to handle microbial cultures while performing microbiology experiments

CO3 Learners will learn about nutritional requirements of micro organisms

CO4 Learners will understand the staining techniques routinely used in microbiology

Semester II

Course (Paper) Name and No.: Basics of Microbiology II

CO1 Learners will know about the diversity of micro-organisms.

CO2 Learners will know significance of microbes in industry and medical sciences

CO3 Learners understand the growth requirements of microbes

CO4 Learners will learn to study microbial growth using different analytical techniques

Course (Paper) Name and No.: Exploring Microbiology

CO1 Learners will know about various microbial associations found around the world

CO2 Learners can understand the various disease caused by pathogenic microbes

CO3 Learners can understand the defense system found in human against the pathogens

CO4 Learners can understand the working principle and methods of handling of microscopic instruments

Class: S.Y.B. Sc. Microbiology

Semester III

Course (Paper) Name and No.: I : Estimation of Biomolecules and nucleic acid structure and microbial taxonomy

CO1 Learners will understand the estimation of biomolecules

CO2 Learners will understand the concepts of nucleic acids structures

CO3 Learners will understand the basics of microbial taxonomy

Course (Paper) Name and No.: II: Introduction to Environmental Microbiology

CO1 Learners will learn about air microbiology

CO2 Learners will learn about fresh water and sewage treatment

CO3 Learners will learn importance of soil and geo microbiology

Course (Paper) Name and No.: III: Introduction to Clinical microbiology

CO1 Learners will learn about common infectious diseases

CO2 Learners will learn about public health awareness

CO3 Learners will learn about control of microorganisms

CO4 Learners will learn about safety in microbiology laboratory

Semester IV

Course (Paper) Name and No.: I : Introduction to Metabolism and Basic analytical techniques

CO1 Learners will learn about different types of metabolic pathways

CO2 Learners will learn about enzyme kinetics

CO3 Learners will learn about basic analytical techniques

Course (Paper) Name and No.: II : Introduction to Applied Microbiology

CO1 Learners will learn about Common infectious diseases

CO2 Learners will learn about Epidemiology and Public Health Awareness

CO3 Learners will learn about food and dairy microbiology

Course (Paper) Name and No.: III: Fermented foods, food sanitation and microbial ecology

CO1 Learners will be introduced about fermented foods

CO2 Learners will learn about food sanitation

CO3 Learners will learn about microbial ecology

Class: T.Y.B. Sc. Microbiology

Semester V

Course (Paper) Name and No.: I : Microbial Genetics I

CO1 Learners will know about the DNA replication process at the molecular level

CO2 Learners will know about the gene expression mechanism in bacteria

CO3 Learners will have a better understanding in mutations

CO4 Learners will understand about exchange of genetic material among the bacteria

Course (Paper) Name and No.: II: Medical Microbiology & Immunology

CO1 Learners understand the basic mechanisms acquired by pathogens of respiratory and Urinary tract to cause infection.

CO2 Learners gain information regarding the prognosis and course of infection of skin and gastrointestinal tract.

CO3 Learners acquire knowledge of various mechanism adapted by organisms to cause infection

CO4 Learners understand the functioning of immune system

CO5 Learners acquire knowledge of diagnostic skills involved in detection of pathogens

Course (Paper) Name and No.: III: Microbial Biochemistry I

CO1 Learners will understand the mechanisms to study solute uptake by bacteria

CO2 Learners will learn Electron transport chain and ATP synthesis process

CO3 Learners will learn carbohydrate metabolism pathways

CO4 Learners will learn various fermentation pathways

Course (Paper) Name and No.:IV: Bioprocess Technology Part-I

CO1 Learners will learn about applications of microbes and its strain improvement in Industrial Microbiology.

CO2 Learners will learn to determine growth and productivity parameters of batch continuous, fed batch and solid substrate fermentations.

CO3 Learners will learn to describe the design of bioreactors for different applications and its process parameters.

CO4 Learners will learn to design media, growth conditions and techniques for producing and recovering different types of products of commercial value.

CO5 Learners will understand the importance of the containment and levels of Containment

Semester VI

Course (Paper) Name and No.: Microbial Genetics I

CO1 Learners will understand the basics of genetic engineering and molecular biology

CO2 Learners will understand the use of different tools of genetic engineering in molecular

biology experiments

CO3 Learners will understand how to transform natural cell into transformed cell which can be used at commercial production of proteins

CO4 Learners will understand the regulatory mechanism found in viruses to control gene Expression

Course (Paper) Name and No.: II: Medical Microbiology & Immunology

CO1 Learners acquire knowledge of mechanism of infection of central nervous system and sexually transmitted diseases.

CO2 Learners acquire the ability to understand the application and use of antibiotics in treatment of various infections.

CO3 Learners will understand the mechanism of immune system and formation of immune response.

Course (Paper) Name and No.: III: Microbial Biochemistry II

CO1 The course will enhance learners understanding about lipid metabolism and will enhance their employability

CO2 The course will enhance learners understanding about proteins and nucleic acid metabolism and will enhance their employability

CO3 The course will enhance learners understanding about regulation of metabolism and will develop research aptitude

CO4 The course will enhance learners understanding about metabolism of inorganic compounds and will enhance their employability

Course (Paper) Name and No.:IV: Bioprocess Technology Part II

CO1 Understand the actual process involved in fermentations of important products

CO2 Apply the knowledge of applications of animal and plant tissue culture techniques

CO3 Learn the applications of immobilized enzymes in various fields

CO4 Understand the working of important instruments used in biochemical analysis and bioassay.

CO5 Learn the salient features of quality management, regulatory procedures and IPR

CO6 Techniques involved in running a bioassay, immobilization of cells & sterility testing

CO7 Preliminary techniques in animal & plant tissue culture