TELANGANA GOVT.TRIBAL WELFARE RESIDENTIAL DEGREE COLLEGE FOR WOMEN DEVARAKONDA	
Name of the Faculty: S.SWATHI	Department: Botany (Life Sciences)
Course/Group: BSc BZC	Semester: 1
Subject: Botany	Topic: Microbial Diversity and Lower Plants
Learning objectives:	• To gain knowledge about microbial biodiversity • Understand the diversity and life cycle patterns of algae, fungi, bryophytes and pteridophytes. • To know about the various plant diseases and their control measures. • To explore economic importance of algae and fungi. • To know the evolution of sporophytes of bryophyte and stelar evolution in pteridophytes.
Previous knowledge required:	Difference between Prokaryotic and Eukaryotic cells and their characteristics, Classification of Living organisms.
Synopsis:	Study of microorganisms , or microbes , a diverse group of generally minute simple life - forms that include bacteria , archaea , algae , fungi , protozoa , and viruses . The field is concerned with the structure , function , and classification of such organisms and with ways of both exploiting and controlling their activities . The 17th - century discovery of living forms existing invisible to the nake eye was a significant milestone in the history of science . for from the 13th century onward it had postulated that " invisible " entities were responsible for decay and disease . The word microbe was coine in the last quarter of the 19th century to

	describe these organisms , all of which thought to be relate . As microbiology eventually develd into a specialize science , it found that microbes are a very large group of extremely diverse organisms . Unlike traditional plants , algae do not have true roots . stems and leaves . Hence , they need to be near à moist or watery environment to survive . In other words , they do not possess vascular tissue necessary for conduction of water and minerals . Also called Rhodophyta , it is a distinctive species found in marine as well as freshwater ecosystems . The pigments phycocyanin and phycoerythrin are responsible for the characteristic red colouration of the algae . Other pigments that provide green colouration (such as chlorophyll a) are present . Fungi are eukaryotic organisms that include microorganisms such as yeasts , moulds and mushrooms . These organisms are classified under kingdom fungi . The organisms found in Kingdom fungi contain a cell wall and are omnipresent . They are class as heterotrophs among the living organisms . Kingdom Fungi To name a few - the appearance of black spots on bread left outside for some days , the mushrooms and the yeast cells , which are commonly used for the production of beer and bread are also fungi . They are also found in most of the skin infections and other fungal diseases . If we observe carefully , all the examples that we cited involve moist conditions . Thus , we can say that fungi usually grow in places which are moist and warm enough to support them . The structure, Classification and characters of Fungi are discussed in this unit. Bryophyta is a group of the simplest land plants which are considered to have evolved ... 1 Marchantia sp . 2. Pellia epiphylla . 3. Riccia sp . The term Bryophyta originates from the word " Bryon ' meaning mosses

	and phyton ' meaning plants . Bryophyta includes embryophytes like mosses , hornworts , and liverworts . These are small plants that grow in shady and damp areas . They lack vascular tissues . They don't produce flowers and seeds , instead , reproduce through spores . The study of bryophytes is called bryology. This unit includes Characteristics of Bryophytes Classification Of Bryophytes Examples (Type Studies) Pteridophytes (Gr , pteron- feather , phyton = plant) constitute the most primitive seedless vascular plants that reproduce by means of spores . Hence , they are known as vascular cryptogams . Haeckel (1866) called these groups of plants as Pteridophytes " because of their pinnate or feather like fronds (leaves) . Pteridophyta Before the flowering plants , the landscape was dominated with plants that looked like ferns for hundreds of millions of years , Pteridophytes show many characteristics of their ancestors . Unlike most other members of the Plant Kingdom , pteridophytes dont reproduce through seeds , they reproduce through spores instead. Pteridophyta is one of the older groups of plants present in the Plant kingdom . They have evolved much earlier than the angiosperms . They are one of the very first " true " plants to adapt to life on land . Primary characteristics of Pteridophytes are as follows : They are seedless , vascular plants that show true alternation of generations . Furthermore , the sporophyte has true roots , stems and leaves . They reproduce by spores , which are develop in sporangia . They may be homosporous or heterosporous . Pteridophytes are vascular plants that reproduce using spores . They do not produce flowers and seeds and hence are also known as cryptogams
Illustrations/ Demonstration shown:	Life cycles , Cell structures with labels.

Teaching aids used:	Black Board and Chalk
References:	Telugu Akademi Text Book
Student activity planned/ homework given:	Slip tests

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TELANGANA GOVT. TRIBAL WELFARE RESIDENTIAL DEGREE COLLEGE FOR WOMEN DEVARAKONDA	
Name of the Faculty: S.SWATHI	Department: Botany (Life Sciences)
Course/Group: BSc BZC	Semester: 2

Subject: Botany	Topic: Gymnosperms, Taxonomy of Angiosperms and Ecology
Learning objectives:	• To gain the knowledge about the life cycles and the economic importance of gymnosperms. • To understand about the diversity of the plants, their description, identification, nomenclature and their classification including recent advances in the field of plant taxonomy. • To compare the ecological adaptations of hydrophytes, mesophytes and xerophytes.
Previous knowledge required:	Flowering and Non Flowering Plants and their characteristics, Nomenclature, Morphological Characteristics of Flowering plants.
Synopsis:	Gymnosperms are non - flowering plants belonging to the sub - kingdom Embophyta . The seeds are not enclosed in an ovary or fruit . They are exposed on the surface of the leaf - like structures of the gymnosperms . They can be classified as Coniferophyta . Cycadophyta . Ginkgophyta and Gnetophyta . Gymnosperms Did you know that plants also underwent evolution just like all other living organisms ? The group of plants that we call gymnosperms is major evidence for this . These plants were the first to develop seeds . Seeds are an efficient system of dispersal . Moreover , this mechanism ensures that new plants can grow almost anywhere . And not necessarily next to the parent plant . Let us learn more about these gymnosperms . Life Cycle of Gymnosperm The life cycle of a gymnosperm involves alternation of generations with a dominant orophyte in which

	reduced male and female gametophytes reside . All gymnosperms are heterosporous . The male and female reproductive organs can form in cones or strobili . Paleobotany is the study of fossil plants . A fossil plant is the remains or traces of a once living plant (Allaby . 2006) . Fossil plants are generally found buried below ground . Paleobotanical information is used to unravel the evolutionary history of plant taxa , in both time and space.Paleobotany allows us to know about the types of plants that lived long ago . It helps us to know more about what life on Earth was like in the distant past . Diversity of Plants the students begin by taking Botany as a with the diversity of plant life , an outline of the classification of plants . Diversity classification of plants on The Basis of Habitat : Plants grow in a variety of habitats . On the basis of habitat , plants may be classified into following groups : 1. Hydrophytes: The plants growing mear water or submerged under water are hydrophytes . Such plants have poor root system , soft stem and poor vascular tissue . The bulk of the tissue is spongy provided with air spaces. Mesophytes : The majorities of angiosperms grows in places of moderate water supply and are as mesophytes . They are usually large and fast growing . They have well developed roots and leaves . There stem may be herbaceous or woody . There are certain mesophytes , such as deciduous trees (viz .. shedding leaves at a certain season) , which are mesophytic during the summer and xerophytic during the winters . Xerophytes : The plants which grow in xeric or dry conditions or where water availability is negligible , are as xerophytes , e.g. Euphorbia , Acacia . Argemone , Amaranthus . calotropis , Nerium , Ziziphus etc. some xerophytes store water in their stem (opunitia) , leaves (Aloe Agava , Bryophyllum) or in roots (Asparagus)

	and are called as Succulents .
Illustrations/ Demonstration shown:	Diagrams with Labels , Floral diagrams , Technical Description of plants.
Teaching aids used:	Black Board and Chalk , Bio Visual Charts
References:	Telugu Akademi Text Book
Student activity planned/ homework given:	Section Cutting, Collection of the plant specimens and preparation of Herbarium.

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TELANGANA GOVT.TRIBAL WELFARE RESIDENTIAL DEGREE COLLEGE FOR WOMEN DEVARAKONDA	
Name of the Faculty: S.SWATHI	Department: Botany (Life Sciences)
Course/Group: BSc BZC	Semester: 3
Subject: Botany	Topic: Plant Anatomy and Embryology
Learning objectives:	To gain knowledge of plant cells, tissues and tissue systems and their functions. To understand and gain knowledge about the economic importance of wood. To identify and compare the differences in the anomalous secondary growth of dicots and monocots. To understand the structure of anther, ovule and pollen grains. To gain knowledge about the micro and mega sporogenensis.
Previous knowledge required:	Concepts of Cell Theory, Types of Cells , Essential Parts of the flower. Fertilization, Pollination
Synopsis:	Anatomy Study of internal structure of plant by section cutting process is caused plant Anatomy Plant tissues . Plant organs are made of tissues . A tissue is a group of cells which are performing a particular function , these are categorised into two groups . 1) Meristematic tissues & permanent tissue. Meristematic tissues : - It is a group of immature cells which have power of cell division Permanent tissues :A group of differentiated cells which has seazed to divide to form permanent tissues . They are further classified into three types . (1) Simple (2)Complex & (3) Secretary tissues. Simple tissues are homogenous in structure and function where as complex tissues are

	heterogenous in structure and function . STEM AND ROOT ANATOMY Commonly , the cambium maintains a close relationship with the vascular bundles or vascular tissues . Hence it is called as the vascular cambium , Usually the secondary growth takes place in certain plants through the activity of the vascular cambium . In addition , in certain other plants abnormal secondary growth also takes place due to the activity of the cambium . Normal secondary growth In plants , the primary structure is produced through the divisions of the apical meristems . In monocotyledons and certain herbaceous dicotyledons , only the primary body develops . But in several Gymnosperms and Angiosperms , the axis not only grows in height , but also increases in width . The stem increases its width through the divisions of the lateral meristems like the vascular cambium and cork cambium . This mode of growth is known as the secondary growth . The secondary xylem and secondary phloem are formed by the activity of the vascular cambium , whereas the periderm develops from the division of the cork cambium . Secondary growth is not usually seen in the monocotyledons . But in certain arborescent monocots , special type of secondary growth takes place . The abnormal secondary growth shown by certain dicotyledonous , herbaceous plants is of no functional significance to those plants . Here the secondary growth takes place as per the environmental requirements . Such type of secondary growth is called as the non - adaptive type : eg : Amaranthus. Unlike this , the anomalous secondary growth that takes place in certain plants is functionally useful to them . Such type of anomalous secondary growth , which is adaptive and useful to the plant , is known as the adaptive type . This type of secondary growth takes place to fulfill the mechanical requirements of the plants and as per their morphological structure ; eg :

	Aristolochia Achyranthus Boerhaavia Bignonia Dracaena WOOD STRUCTURE. The wood is a product of secondary growth . It is essentially composed of secondary xylem elements namely Trachcary elements (vessel elements and trache) , Wood fibres (fibre tracheids , libriform fibres and gelatinous fibres) and Wood parenchyma (axial parenchyma). The ray parenchyma is associated with the wood . The wood elements (secondary xylem elements) vary in size , shape , type and arrangement . The wood elements are disposed in two ways . 1. Horizontal system - consisting of xylem rays 2. Vertical system - consisting of the rest , The vessel elements show ring porous or diffuse porous arrangement . ✓They may be solitary or in clusters . They show variation in their length , diameter , type of pitting , perforation plate etc.. The wood parenchyma stores starch and fats , tannins , crystals and other substances . The axial (wood) parenchyma is similar to other elements of wood in being a part of vertical system . It may be Apotracheal (independent of vessel member) or Paratracheal (associated with vessel member) . In the former case it may be diffuse or banded and in the latter case it may be vasicentric (around vessels) , aliform (wing like) etc. The ray parenchyma , the sole component of horizontal system extends along with the i wood . It originates from ray initials . The ray parenchyma may have only a primary wall or it may have secondary wall too . The number of wood rays increases the width of wood . It may be uni , bi or multiseriate . unit 3 EMBRYOLOGY. Plant embryology deals with the sexual cycle of the plant . It includes / micro and megasporogenesis , development and organisation of gametophytes , fertilization and development of endosperm , embryo and seed . THE ANTHER. The stamen is the male reproductive organ of the flower . Typically , it consists of two distinct parts - a lower sterile part , the filament and an

	upper fertile part , the anther . The sterile median part of the anther is known as connective . The anther shows a great variety in form , size and colour . Typically it is two lobed and the lobes are called anther - lobes . Such anthers are described as dithecous . MICROSPOROGENESIS Microspores (pollen grains) develop from the sporogenous tissue . The primary sporogenous cells may directly function as microspore mother cells or they undergo several mitotic divisions to form microspore mother cells . Each microspore mother cell undergoes meiosis and forms four haploid microspores . The process of formation of microspores from sporogenous tissue is known as microsporogenesis . MEGASPORANGIUM (THE OVULE) The gynoceium or pistil is the female reproductive organ of the flower . It is made up of one or more carpels . Carpels are also called megasporophylls Typically , the carpel consists of 3parts : (1) the basal swollen portion is called the ovary (2) the median elongated part is called the style and (3) the apical pollen receiving part known as the stigma . The ovules , which are enclosed in the ovary develop into seeds after fertilization . MEGASPOROGENESIS A single hypodermal cell at the apex of the nucellus differentiates as archesporial cell . It is distinguishable from the other cells by its conspicuous large size , dense cytoplasm and prominent nucleus . In tenuinucellate ovules , the archesporial cell directly functions as megaspore mother cell . The megaspore mother cell is the last cell of the sporophytic division . It undergoes a reduction division (meiosis) to form four haploid megaspores . This process is known as megasporogenesis . The first division of megaspore mother cell is always transverse resulting in the formation of two cells (dyads) . Second division is also transverse , resulting in a linear tetrad of megaspores . FEMALE GAMETOPHYTE. The haploid megaspore is the first cell of the female gametophytic generation . It germinates within the nucellus of the ovule and

	develop into the female gametophyte known as the embryo sac . The embryo sac is dependent on the surrounding sporophytic tissues for its nourishment . The organized embryo sac typically consists of an egg cell , two synergids , three antipodal cells and two polar nuclei . The egg apparatus is situated towards the micropylar end and the antipodals lie on the chalazal side . Cells of the egg apparatus and the antipodal cells are uni nucleate and haploid , whereas the central cell is binucleate or diploid . POLLEN MORPHOLOGY : Pollen grains (male gametophyte) carry the male gametes / sperms for fertilization . Each pollen grain has 2 wall layers characteristically - outer tough Exine and inner smooth Intine . All morphological identification characters are based on the Exine structure . Exine has small openings ranging from 1- called the Germ pores or apertures through which the intine comes out in the form of pollen tube . The size , shape , symmetry , polarity , apertures and exine ornamentation of pollen are characteristic for particular species , genus and family . The process of pollination is described as ' transfer of pollen grains from anther on to the stigma of a flower ' . The pollen grains carry the male gamete and pollination is vital as the pollen grains germinate only on the stigma to produce a pollen tube which carry them to the female gamete lodged inside the embryosac of the ovule and brings about fertilization . In course of evolution , the angiosperms have devised many methods for pollination . Basically pollination is of two types in angiosperms- self pollination and cross pollination . POLLEN - PISTIL INTERACTION . Prior to fertilization , the male gamete need to go through a long journey before they reach the female gamete located deep inside the ovule by first germination of pollen grain , followed by production of the pollen tube which carry the two male gametes , the pollen tube has to travel through the long style and reach the embryosac in the

	ovule . The pistil (gynoecium) which is made of the ovary carrying ovules , the long style and receptive stigma has certain devices to recognize the right kind of pollen and allow it to germinate and discard the unwanted pollen . Hence the fertile pollen which brings about fertilization is called compatible pollen and the phenomenon is called Sexual compatibility a in case if the pistil is not able to set seed or fertilize even after pollination with viable and ferti pollen then it is considered to be incompatible and the phenomenon as Sexual incompatibility DOUBLE FERTILIZATION : During sexual reproduction the fusion between male gamete with the female gamete brings about fertilization . In angiosperms , the fertilization is described as " Double Fertilization as both the male gametes / sperms participate in sexual reproduction . The male gametes are produced in the pollen grains and female gamete is located in the embryosac of the ovule . At the time of pollination , pollen grains reach the stigma and germinate to produce a pollen tube which carries the two male gametes via style into the ovule through micropyle and discharges the male gametes into the embryosac . One male gamete fuses with the egg cell leading to fertilization to form diploid zygote and other male gamete fuses with the binucleate central cell to form Primary endosperm nucleus (PEN) leading to Triple fusion . ENDOSPERM : Endosperm is the nutritive tissue and in angiosperms , it's a post fertilized product formed due to fusion of second male gamete with the secondary polar nucleus of the central cell . It is called PEN (primary endosperm nucleus) which later forms the Endosperm . It is absent in Orchidaceae and Podostemonaceae families . The mature seed in angiosperms is of two types : endospermic and non - endospermic On basis of their development the following three types of endosperm is observed : 1. Nuclear endosperm , 2. Cellular endosperm and 3. Helobial

	endosperm . EMBRYOGENESIS : After fertilization , the development of a mature embryo from the zygote following predetermined divisions is called as Embryogenesis . In angiosperms , the dicotyledonous embryo has two cotyledons attached to embryonal axis . The terminal part of axis , above the level of cotyledons is called as Epicotyl and it forms the Plumule and the lower part of the embryo below the cotyledons is called as Hypocotyl and it forms the Radicle . The monocotyledonous embryo has only one cotyledon and is lateral in position . The zygote : After fertilization (syngamy) the fertilized egg- the zygote undergoes a period of rest varying from few hours to four months . POLYEMBRYONY : After fertilization , ovules mature into seeds and the zygote develops into an embryo . Normally , a single embryo is present in each seed . But sometimes , more than one embryo is present in each seed . This condition is known as polyembryony . However , in nature , the additional embryos do not mature and degenerate during the course of seed development . Thus , the mature seed contains only one mature embryo . Except for a few taxa (Citrus , Mangifera) polyembryony occurs as an abnormal feature . Polyembryony was first time reported by Anton van Leeuwenhock (1719) in the seeds of orange . Classification of Polyembryony Polyembryony is of two types : 1. Spontaneous : Includes instances of naturally occurring polyembryony . 2. Induced : Includes instances of experimentally induced polyembryony . Apomixis : Apomixis may be defined as the substitution of the usual sexual reproduction by a form of asexual reproduction which does not involve meiosis and syngamy " . In plants with independent gametophytes (e.g. ferns) apomixis refers to the formation of sporophytes by parthenogenisis of gametophytic cells . Apomixis in higher plants is known as agamospermy , where seeds and embryos are produced by non - sexual processes . Apomixis is known to occur in more

	than 300 species belonging to 35 families . It is most common in the families Asteraceae , Poaceae , and Rutaceae . As a rule , apomixis is more common in polyploids than in diploids . Apomictic species are invariably perennials and they often reproduce vegetatively by stolons or rhizomes . Types of Apomixis Apomixis involves two main categories : (1) Vegetative reproduction and (2) Agamospermy The seed in a plant is the part that develops from the ovules after fertilization . They are enclosed in the fruit which develops from the fertilized ovary . The seeds are formed as a result of sexual reproduction and contain the young embryo which can develop into a new plant . Structure of a Seed Seeds of different plants may vary in many ways , but the basic anatomy remains the same . Seed has basic three parts - Seedcoat , Endosperm and Embryo ... So , apart from these three parts some seeds have extra appendages attached to the seed coat which plays an important role in successful germination and dispersal of seeds 1.Hilum (in pulses seeds) a scar like structure . 2. Wings (in moringa) a papery structure around the seed .3. Hairs (in cotton) Thread like appendages on the outer surface of the seed . 4. Caruncle (in castor) It is a spongy outgrowth of the outer integument . Dispersion of Seeds Dispersion is defined as the scattering or transport of seeds from one place to another by means of a dispersing agent . It can occur by four modes : • Wind • Water • Animals Explosion Dispersion by Wind The seeds that are dispersed by wind are generally light and small such that they can be easily carried away by the wind . Example : cotton seeds .

Illustrations/ Demonstration shown:	Internal Structure of Plant parts with Labells, Structure of various types of simple ,complex , special Tissues. Illustrations of the Seeds, Embryo sacs Development.
Teaching aids used:	Black Board and Chalk , Biovisual Charts, PPT
References:	Telugu Akademi Text Book
Student activity planned/ homework given:	Section cuttings of the stem, root. Slip Tests, Assignments.

Sign of the faculty

Principal's sign

TELANGANA GOVT.TRIBAL WELFARE RESIDENTIAL DEGREE COLLEGE FOR WOMEN DEVARAKONDA	
Name of the Faculty: S.SWATHI	Department: Botany (Life Sciences)
Course/Group: BSc BZC	Semester: 4
Subject: Botany	Topic: Cell Biology, Genetics and Plant Physiology

Learning objectives:	To understand and describe the organization, structure and functions of a cell and cell organelles. To know about the significance of meiosis. To have knowledge of the nature and functions of genes and the processes of inheritance. To understand the various physiological processes in plants. To explain the role of nutrients and the phytohormones in the growth and development of plant.
Previous knowledge required:	Structure of Cell , Cell Organelles, Genes , Nucleus , Anabolic and Catabolic process.
Synopsis:	All organisms are made of cells or aggregates of cells. Cells vary in their shape, size and activities/functions. Based on the presence or absence of a membrane bound nucleus and other organelles, cells and hence organisms can be named as eukaryotic or prokaryotic. A Plant cells have a cell wall outside the cell membrane. The plasma membrane is selectively permeable and facilitates transport of several molecules. The endomembrane system includes ER, golgi complex, lysosomes and vacuoles. All the cell organelles perform different but specific functions. Centrosome and centriole for the basal body of cilia and flagella that facilitate locomotion. In animal cells. Centrioles also form spindle apparatus during cell division. Nucleus contains nucleol and chromatin network. It not only controls the activities of organelles but also plays a major role in heredity. Endoplasmic reticulum contains tubules or cisternae. They are of two types: rough and smooth. ER helps in the transport of substances, synthesis of proteins,

	lipoproteins and glycogen. The golgi body is a membranous organelle composed of flattened sacs. The secretions of cells are packed in them and transported from the cell. Lysosomes are single membrane structures containing enzymes for digestion of all types of macromolecules. Ribosomes are involved in protein synthesis. These occur freely in the cytoplasm or are associated with ER. Mitochondria help in oxidative phosphorylation and generation of adenosine triphosphate. They are bound by double membrane; the outer membrane is smooth and inner one folds into several cristae. Plastids are pigment containing or nutrient storing organelles found in plant cells only. In plant cells, chloroplasts are responsible for trapping light energy essential for photosynthesis. The grana, in the plastid, is the site of light reactions and the stroma for biosynthetic phase of photosynthesis. The green coloured plastids are chloroplasts, which contain 'chlorophyll, whereas the other coloured plastids are chromoplasts, which may contain other pigments like carotene, and xanthophyll. The nucleus is enclosed by nuclear envelope, a double membrane structure with nuclear pores. The inner membrane encloses the nucleoplasm and the chromatin material. Nucleosomes, the basic structural units, are packed into chromatin fibers that are in turn coiled and condensed to form chromosome. Thus, cell is the structural and functional unit of life. Genetics is a branch of biology which deals with the principles of inheritance Gnd its practices. Progeny resembling the parents in morphological and Physiologycal features has attracted the attention of many biologists. Mendel was the first to study this phenomenon systematically. While studying the pattern of Inheritance in pea plants with contrasting characters, Mende proposed the principles of inheritance, which the freddy referred to as Mendel's Laws of Inheritance'. He proposed that the 'factors' (later named as genes) regulating the characters are

	found in pairs known as alleles. He observed that the expression of the characters in the offspring follow a definite pattern in different generations-first generations (F1), second (F2) and so on. Some characters are dominant over others. The dominant characters are expressed when factors are either in homozygous or in heterozygous condition (Law of Dominance). The recessive characters are only expressed in homozygous conditions. The characters never blend in heterozygous condition. A recessive character that was not expressed in heterozygous conditon may be expressed again when it becomes homozygous. Hence, characters segregate during formation of gametes (Law of Segregation). Not all characters show true dominance. Some characters show incomplete dominance and some show co-dominance. When Mendel studied the inheritance of two characters together, it was found that the factors independently assort and combine in all permutations and combinations (Law of Independent Assortment). Different combinations of gametes are theoretically represented in a square tabular form known as 'Punnett Square'. The factors (now known as genes) on chromosomes regulating the characters are called the genotype and the physical expression of the chraracters is called phenotype. After knowing that the genes are located on the chromosomes, a good correlation was drawn between Mendal's laws and segregation and assortment of chromosomes during meiosis. Mendel's laws were extended in the form of 'Chromosomal Theory of Inheritance'. Later, it was found that Mendel's law of independent assortment did not hold true for the genes that were located on the same chromosomes. These genes are called 'linked genes'. Closely located genes assorted together, and distantly located genes, due to recombination, assorted independently. Mutations involve changes in chromosomes and / or genes. They help to increase variability which might be useful in crop improvement. Plants, unlike animals, have no special systems for

	breathing or gaseous Planange. Stomata and lenticels allow gaseous exchange by diffusion. Almost all living cells in a plant have their surfaces exposed to air, The breaking of C-C bonds of complex organic molecules by oxidation In cells leading to the release of a lot of energy is called cellular respiration. Glucose is the favoured substrate for respiration. Fats and proteins can also be broken down to yield energy. The initial stage of cellular respiration takes place in the cytoplasm. Each glucose molecule is broken, through a series of enzyme catalysed reactions, into two molecules of pyruvic acid. This process is called glycolysis. The fate of pyruvate depends on the availability of oxygen and the type of organism. Under anaerobic conditions either lactic acid fermentation or alcohol fermentation occurs. Fermentation takes place under anaerobic conditions in many prokaryotes, unicellular eukaryotes and in germinating seeds. In eukaryotic organisms aerobic respiration occurs in the presence of oxygen. Pyruvic acid is transported into the mitochondria where it is converted into acetyl CoA with the release of CO_2. Acetyl CoA then enters the tricarboxylic acid pathway or Krebs' cycle operating in the matrix of the mitochondria. NADH + H+ and FADH2 are generated in Krebs' cycle. The energy in these molecules as well as that in the NADH + H+ synthesised during glycolysis are used to synthesise ATP. This is accomplished through a system of electron carriers called electron transport system (ETS) located on the inner membrane of the mitochondria. The electrons, as they move through the system, release enough energy that is trapped, to synthesise ATP. This is called oxidative phosphorylation. In this process, O_2 is the ultimate acceptor of electrons and it gets reduced to water. The respiratory pathway is an amphibolic pathway as it involves both anabolism and catabolism. The respiratory quotient depends upon the type of respiratory substance used during respiration.

Illustrations/ Demonstration shown:	Structure of the Cell Organelles, Biochemical pathways and Reactions
Teaching aids used:	Black Board and Chalk , PPT
References:	Telugu Academy Text Book
Student activity planned/ homework given:	Assignments, Seminars, Revision Tests, Model makin of Cell Organells , Cell Division.

Sign of the faculty Principal's sign

TELANGANA GOVT.TRIBAL WELFARE RESIDENTIAL DEGREE COLLEGE FOR WOMEN DEVARAKONDA	
Name of the Faculty: S.SWATHI	Department: Botany (Life Sciences)
Course/Group: BSc BZC	Semester: 5
Subject: Botany	Topic: Economic botany
Learning objectives:	To understand the role of plants in human welfare To understand the origin of cultivated plants. To know about major cerales,vegetables ,fruits,millets To understand about the importence of legumes,south Indian fruits,sugarcane To know about the bevarages,oil yielding plants,para rubber To learn about the drug ,fiber yielding plants

Previous knowledge required:	Concept of plants types,fruits,vegetables,.
Synopsis:	Economic botany is the study of the relationship between people (individuals and cultures) and plants. Economic botany intersects many fields including established disciplines such as anthropology as his link between botany and anthropology explores the ways humans use plants for food, medicines, and commerce Economic botany derived from ethano botany powers used the term aboriginal botany that deals with the study of plants that the aborginals them for medicine, food, textiles, fabrics, ornaments. Ethanobotany coined by Hershberger. It is discuss the role, and importance and contribution of ethano medicine, ethano pharmacology, ethanoecology,ethanogynecology,ethanomycologyetc.,in our modern civilisation. Plants that yield our food fall into the following groups ,cerales,pulses,fruits,vegetablesand sugar yielding plants . Major cerales; which produces crops have big seeds eg;rice,wheat,oats ,rye Paddy:oryza sativa, it is the most important food crop.china started cultivation of rice since2800B.C Rice grown as annual herb. It has adventious roots system. Discuss about Morphology,uses of rice,wheat,maize, Minor cereals they produces small seeds Eg.jowar,bajra,foxtail millet,finger millet Minor cerales another name millets.and discuss about jowar,bajra,milltes morphology,uses,. Jowar is called as great millet.foxtail millet called as Italian millet. Vegetables are obtained from plants for three types. Vegetables from roots and stem tubers: potato,colacasia,carrot,beetroot,radish Leafy vegetables: palak,amaranthus,Malabar spinach,roselle Fruits as vegetables: tomato,brinjal, lady's finger,bitterguard,cucumber. Importance of legumes to man and ecosystem: Leguminosae is one of the largest families.they produces their seeds with in their dry fruits known as legumes.

	Legumes contribute to reduce the emission of green house gases. Reduces the use of fertilisers.intercroping results in incresein soil fertility. Commercial and nutritional value of south Indian fruits: mango,banana,grapes,oranges,pomegranate,papaya morohology and uses . Commercial and nuts nutritional value of nuts:cashew nut,almond,walnut morphology uses. Sugarcane, potato morphology uses Spices:cloves,black peppar,fennel,saffron Bevarages:tea,coffee , morphology,cultivation,uses Edible oils : obtained from plants. ground nut, sun flower,coconut,flax seeds Essential oil with extraction methods comprasion with fatty oils and their uses. Rubber extraction : morphology,latex collection,rubber production,uses. Drug yielding plants: cinchona, digitalis purpuriya, papaver somniferum,cannabis sativa complte morphology and uses discussed. Tobacco processing,using health hazards Timber yielding plants:teak pine plants use, Fiber yielding plants: jute, cotton morphology cultivation uses.
Illustrations/ Demonstration shown:	List of different plant species under cultivated plants
Teaching aids used:	Black Board and Chalk
References:	Telugu Akademi Text Book
Student activity planned/ homework given:	Group activity -Herbarium Preparation, Slip tests

Sign of the faculty Principal's sign

TELANGANA Govt.TRIBAL WELFARE RESIDENTIAL DEGREE COLLEGE FOR WOMEN DEVARAKONDA	
Name of the Faculty: s.swathi	Department: Botany (Life Sciences)
Course/Group: BSc BZC	Semester: 6
Subject: Botany	Topic: Tissue Culture and Biotechnology
Learning objectives:	The students will learn about the concepts, tools and the techniques related to the in vitro propagation of the plants. The students will have the scientific understanding of the subject and also have the good knowledge of application of recombinant DNA technology. To know about the gene cloning and the cloning vectors. To explain the construction of c DNA library and their applications. To compare the pros and cons of the transgenic plants on the environment. Able to publish their research findings in Journals.
Previous knowledge required:	Knowledge on tissues , propagation, laboratory equipment, Hybridisation .
Synopsis:	Plant breeding may be used to create varieties which are resistant to pathogens and insect pests. This increases the yield of the food. This method has also been used to increase the protein content of plant foods and thereby enhance the quality of food. In India, several varieties of different crop plants have been produced. All these measures enhance the

	production of food. Techniques of tissue culture and somatic hybridisation offer vast potential for manipulation of plants to produce new varieties. Nucleic acids are long polymers of nucleotides. While DNA stores genetic Information, RNA mostly helps in transfer and expression of information. Though DNA and RNA both function as genetic material, DNA is chemically and structurally more stable and is a better genetic material. However, RNA was the first to evolve and DNA was derived from RNA. The hallmark of the double stranded helical structure of DNA is the hydrogen bonding between the bases from opposite strands. The rule is that Adenine pairs with Thymine through two H-bonds, and Guanine with Cytosine through three H-bonds. This makes one strand complementary to the other. The DNA replicates semiconservatively, the process is guided by the complementary H-bonding. A segment of DNA that codes for RNA may, In simplistic term be referred to as gene. During transcription also, one of the strands of DNA acts as a template to direct the synthesis of complementary RNA. In bacteria, the transcribed mRNA is functional, hence can directly be translated. In eukaryotes, the gene is split. The coding sequences, exons, are interrupted by non-coding sequences, introns. Introns are removed and exons are joined to produce functional RNA by a process called splicing. The messenger RNA contains the base sequences that are read in a combination of three (to make triplet genetic code) to code for an amino acid. The genetic code is read again on the principle of complementarity by tRNA that acts as an adapter molecule. There are specific tRNAs for every amino acid. The tRNA binds to specific amino acid at one end and pairs through H-bonding with codes on mRNA through its anticodons. The site of translation (protein synthesis) is ribosomes, which bind to mRNA and provide a platform for Joining of amino acids. One of the rRNA acts as a catalyst for peptide bond formation, which is an example of RNA as an enzyme (ribozyme). Translation

	is a process that has evolved around RNA, Indicating that life began around RNA. Since, transcription and translation are energetically very expensive processes, these have to be tightly regulated. Regulation of transcription is the primary step for regulation of gene expression. In bacteria, more than one gene is arranged together and regulated in units called operons. Lac operon is the prototype operon in bacteria, which codes for genes responsible for metabolism of lactose. The operon Is regulated by the amount of lactose in the medium where the bacteria are grown. Therefore, this regulation can also be viewed as regulation of enzyme synthesis by its substrate. Biotechnology has given humans several useful products by using microbes, plant, animals and their metabolic machinery. Recombinant DNA technology has made it possible to engineer microbes, plants and animals such that they have novel capabilities. Genetically Modified Organisms have been created by transferring one or more genes from one organism to another using techniques such as recombinant DNA technology. Such genetically modified plants have been useful in increasing crop yields, reduce post-harvest losses and make crops more tolerant to stresses. There are crop plants with improved nutritional value of foods and those which reduced the reliance on chemical pesticides. Recombinant DNA technological processes have made immense Impact in the area of healthcare by enabling mass production of safe and more effective therapeutics. Gene therapy is the insertion of genes into an individual's cells and tissues to treat hereditary diseases. It does so by replacing a defective mutant allele with a functional one.

	The current interest in the manipulation of microbes, plants, and animals has ralsed serious ethical questions about usage and protection of biodiversity.
Illustrations/ Demonstration shown:	Flow Charts of the Procedures used for culturing. Demonstration of the Lab equipment.
Teaching aids used:	Black Board and Chalk , PPT
References:	Telugu Akademi Text Book
Student activity planned/ homework given:	Assignments

Sign of the faculty

Principal's sign