

THE STANDARD FIREWORKS RAJARATNAM COLLEGE FOR WOMEN (AUTONOMOUS), SIVAKASI – 626 123.

(Affiliated to Madurai Kamaraj University, Re-accredited with A Grade by NAAC, College with Potential for Excellence by UGC and Mentor Institution under UGC PARAMARSH) DEPARTMENT OF BOTANY

UG DEGREE PROGRAMME INBOTANY WITH SPECIALIZATION IN PLANT BIOTECHNOLOGY

PROGRAMME EDUCATIONAL OBJECTIVES

The Graduates will

| PEO1. | be a productive employee in herbal industries, botanical gardens, educational |
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| | institutions or pursue higher studies. |
| PEO2. | create novel ideas to solve economic, social and environmental issues related to |
| | Botany. |
| PEO3. | be competent to handle a demanding situation and involve in the collection and |
| 12001 | preparation of specimens to aspire as a successful entrepreneur. |
| PEO4. | adhereto the principles of ethics in the production and usage of organic food materials both |
| | in professional and personal life. |

PROGRAMME SPECIFIC OUTCOMES

By the Completion of B.Sc. Botany with specialization in Plant Biotechnology programme, the learners will be able to

| PSO1. | apply their botanical knowledge to identify and compare the fundamental features and processes of different groups of plants |
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| PSO2. | critically think and apply the understanding of the subject of plant sciences in identifying the problems which can be solved through the use of plants |
| PSO3. | evaluate and apply the skills in Botany with the understanding of general laboratory practices. |
| PSO4. | articulate effectively with the use of digital resources to explain the concepts related to life sciences. |
| PSO5. | exhibit their caliber to work efficiently as a member /leader in teams, preferably in a multi-disciplinary setting. |
| PSO6. | reflect the environmental values and uses of plants and be aware of environmental implications. |
| PSO7. | engage in sustainable utilization of plants, land, water, forest and energy resources. |

| | Major | Course |
|--------------|---|---|
| Course Code | : GLBP11 | Course Title:PLANT DIVERSITY I |
| On successfu | l completion of the course, the learn | ners should be able to |
| CO1 | summarize the characters, classification | on and economic importance of lower plants. |
| CO2 | illustrate the thallus structure and repr | oduction of algae. |
| CO3 | analyze the structure and reproduction | n of fungi. |
| CO4 | examine the thallus structure and repr | oduction of lichens. |
| CO5 | explain the structure and reproduction | n of bryophytes. |

COURSE OUTCOME

| | Major | Course |
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| Course Code | : GLBP12 | Course Title: CELL BIOLOGY AND PLANT ANATOMY |
| On successfu | l completion of the course, the learn | ners should be able to |
| CO1 | summarize the structure and functions | s of different components of cell. |
| CO2 | analyze the process of cell divisions a | nd its significances. |
| CO3 | identify the types of tissue and its fun | ctions. |
| CO4 | compare the tissue composition of dif | ferent parts of a plant. |
| CO5 | explain the normal and anomalous sec | condary growth in plants. |

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COURSE OUTCOME

| | Allied C | ourse |
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| Course Code: (| GLBP1A | Course Title: ANIMAL BIOTECHNOLOGY I |
| On successful | completion of the course, the learne | ers should be able to |
| CO1 | demonstrate the techniques pertaining | g to animal cell culture. |
| CO2 | design and evaluate the techniques fo | r development and maintenance of cell lines. |
| CO3 | develop animal cell culture products. | |
| CO4 | examine the methods of transgenesis. | |
| CO5 | unravel the information pertaining to ethical issues. | transgenesis and to relate transgenic animals with |

COURSE OUTCOME

| | Major C | lourse |
|---------------|---|---|
| Course Code: | GLBP21 | Course Title:PLANT DIVERSITY II |
| On successful | completion of the course, the learne | rs should be able to |
| CO1 | recall the general characters and class | ification of Pteridophytes and Gymnosperms. |
| CO2 | discuss the structure and reproduction | n of Pteridophytes. |
| CO3 | analyse the morphology, anatomy, report of Gymnosperms. | production and economic importance |
| CO4 | explain the formation and types of for | ssil and their existence in various eras. |
| CO5 | examine the structure and reproduction | on of fossil. |

| | Major | Course |
|-------------|--|---|
| Course Co | de:GLBP2L | Course Title:- PRACTICALI |
| On successf | ful completion of the course, the learn | ners should be able to |
| CO1 | identify the specimens and slides. | |
| CO2 | illustrate the preparation of whole mou | nt. |
| CO3 | analyze the structure and functions of c | ell organelles. |
| CO4 | examine the process of cell division in | plants. |
| CO5 | formulate suitable technique for the stu | dy of internal structure of a plant part. |

| | Major | r Course |
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| CO2 | illustrate the preparation of whole mo | unt. |
| CO3 | analyze the structure and functions of | cell organelles. |
| CO4 | examine the process of cell division in | n plants |
| | | r Pranto. |
| | COUTCOME | audy of internal structure of a plant part. |
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| | Allied C | ourse |
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| Course Co | de:GLBP2AL | Course Title: ALLIED PRACTICAL |
| On successf | ful completion of the course, the learne | rs should be able to |
| CO1 | design the animal cell culture laboratory | and adopt biosafety practices. |
| CO2 | demonstrateanimal cell culture trials. | |
| CO3 | prepare animal cell culture products. | |
| CO4 | estimate the microbial load and their sense | sitivity to antibiotics. |
| CO5 | handle equipments. | |

COURSE OUTCOME

| | Major C | Course |
|-------------|--|---|
| Course Co | de:GLBP31 | Course Title: EMBRYOLOGY AND PLANT TISSUE CULTURE |
| On successf | ful completion of the course, the learne | ers should be able to |
| CO1 | explain the stages of microsporogenesis | and megasporogenesis. |
| CO2 | analyze the process of fertilization and for | ormation of endosperm. |
| CO3 | discuss about the embryo, polyembryony | and apomixis in angiosperms. |
| CO4 | summarize the concepts and fundamenta | l requirements for plant tissue culture. |
| CO5 | examine the regeneration of plantlets var | rious through tissue culture techniques. |

| | Major C | ourse |
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| Course Code | e:GLBP32 | Course Title:GENETICS |
| On successfu | l completion of the course, the learne | rs should be able to |
| CO1 | demonstrate the process of inheritance | and interaction of genes in plants. |
| CO2 | analyze about linkage and crossing ove | r and its significances. |
| CO3 | assess the structure, replication and role | e of nucleic acids. |
| CO4 | classify and detect the basis of mutation | ns and its effects. |
| CO5 | apply statistical tools in life sciences. | |

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|--|---|---|
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| CO3 | assess the structure, replication and ro | le of nucleic acids. |
| CO4 | classify and detect the basis of mutation | ons and its effects. |
| CO5 | apply statistical tools in life sciences. | |
| | OUTCOME Major de:GLBP41 | Course Course Title:BIOCHEMISTRY |
| Course Co | Major ode:GLBP41 | Course Title:BIOCHEMISTRY |
| Course Co | Major of the course, the learn | Course Title:BIOCHEMISTRY ers should be able to |
| Course Co On success | Major ode:GLBP41 oful completion of the course, the learn outline the structure of atoms, nature of atoms, natoms, natoms, nature of atoms, nature of atoms, natom | Course Title:BIOCHEMISTRY eers should be able to of bondings and buffers. |
| Course Co On success CO1 | Major ode:GLBP41 oful completion of the course, the learn outline the structure of atoms, nature of analyze the structure and properties of | Course Title:BIOCHEMISTRY ers should be able to of bondings and buffers. f biomolecules. |
| Course Co On success CO1 CO2 | Major ode:GLBP41 ful completion of the course, the learn outline the structure of atoms, nature of analyze the structure and properties of illustrate the classification of biomole | Course Title:BIOCHEMISTRY eers should be able to of bondings and buffers. f biomolecules. cules. |
| Course Co On success CO1 CO2 CO3 | Major ode:GLBP41 oful completion of the course, the learn outline the structure of atoms, nature of analyze the structure and properties of | Course Title:BIOCHEMISTRY eers should be able to of bondings and buffers. f biomolecules. cules. aanism and role of enzymes. |

| | Major | Course |
|-------------|--|--|
| Course Co | de:GLBP4L | Course Title:PRACTICAL II |
| On successf | ful completion of the course, the learn | ers should be able to |
| CO1 | demonstrate the preparation of cultu | re medium and sterilization. |
| CO2 | examine the germination of pollen g | grains and dissect out embryo. |
| CO3 | analyze solution for a genetic proble | em with its cross. |
| CO4 | interpret the role of several genes in method. | the inheritance of character using statistical |
| CO5 | make use of the biochemical technic | ques to detect and estimate the samples. |

COURSE OUTCOME

| | Allied | Course |
|-------------|---|--|
| Course Co | de:GLBP3A | Course Title:FUNDAMENTALS OF BIOCHEMISTRY |
| On successf | ful completion of the course, the learn | ers should be able to |
| CO1 | explain the structure of atoms and n | ature of bondings and buffer. |
| CO2 | analyze the structure and functions | of biomolecules. |
| CO3 | discuss about enzymology. | |
| CO4 | assess the biochemical nature of nuc | leic acids, their role in living systems. |
| CO5 | make use of different techniques rel | ated to biochemistry. |

| | Allied C | ourse |
|-------------|--|--|
| Course Co | de:GLBP4A | Course Title: MICROBIOLOGY AND BIOTECHNOLOGY |
| On successf | ful completion of the course, the learne | rs should be able to |
| CO1 | examine the contribution of microbio their multiplication. | logists, general characteristics of microbes and |
| CO2 | analyze the involvement of microbes | in agriculture. |
| CO3 | evaluate the role of microorganisms i | n industry. |
| CO4 | discuss about genetic engineering and | I their applications. |
| CO5 | explain the concepts and applications | of plant tissue culture. |

COURSE OUTCOME

| | Allied Co | urse |
|-------------|--|---------------------------------|
| Course Co | de:GLBP4AL | Course Title:- ALLIED PRACTICAL |
| On successf | ful completion of the course, the learners | s should be able to |
| CO1 | demonstrate bacterial inoculation techr | iques. |
| CO2 | summarize the characterization of bact | eria and their multiplication. |
| CO3 | detect and evaluate the biomolecules u | sing analytical techniques. |
| CO4 | discover the ways to regenerate plantle | ts through tissue culture. |
| CO5 | make use of various equipments to ach | ieve sterilization techniques. |

| | Non Major Elective | e I (Open Option) |
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| Course Code | e:GLBP3N | Course Title:FRESHWATER AQUACULTURE |
| On successfu | l completion of the course, the learne | ers should be able to |
| CO1 | categorize the various types of fresh and culture practices. | water aquaculture, cultivable species of carps |
| CO2 | construct and prepare fish culture po | onds. |
| CO3 | outline nutrient management and to diseases which occur in fish culture | o summarize predators, weeds and common e practices. |
| CO4 | manage soil and water quality parar | neters. |
| CO5 | adapt fishing crafts to harvest and e realizing the scope and need for aqu | volve methodology to preserve the fishes by uaculture practices. |

| Course Code:GLBP3N Course Title:FRESHWATER AQUACT On successful completion of the course, the learners should be able to CO1 CO1 categorize the various types of freshwater aquaculture, cultivable species or and culture practices. CO2 construct and prepare fish culture ponds. CO3 outline nutrient management and to summarize predators, weeds and corr diseases which occur in fish culture practices. CO4 manage soil and water quality parameters. CO5 adapt fishing crafts to harvest and evolve methodology to preserve the fish realizing the scope and need for aquaculture practices. COURSE OUTCOME Non Major Elective II (Open Option) Course Code:GLBP4N Course Title:SERICULTURE On successful completion of the course, the learners should be able to CO1 CO1 outline the races and biology of silkworm and to list the causes and symptiseases in silkworm. CO2 illustrate the basic design of the rearing house and to disinfect the rearing hous | COURSE OUTCOME Non Major Elective I (Open Option) Course Code:GLBP3N Course Title:FRESHWATER AQUACED On successful completion of the course, the learners should be able to CO1 categorize the various types of freshwater aquaculture, cultivable species of a and culture practices. CO2 construct and prepare fish culture practices. CO3 outline nutrient management and to summarize predators, weeds and comm diseases which occur in fish culture practices. CO4 manage soil and water quality parameters. CO5 adapt fishing crafts to harvest and evolve methodology to preserve the fishes realizing the scope and need for aquaculture practices. COURSE OUTCOME Non Major Elective II (Open Option) Course Code:GLBP4N Course Title:SERICULTURE On successful completion of the course, the learners should be able to Course Code:GLBP4N CO1 outline the races and biology of silkworm and to list the causes and symptom diseases in silkworm. CO2 illustrate the basic design of the rearing house and to disinfect the rearing and appliances. CO3 demonstrate the feeding frequency of silkworm and to evaluate the oper environmental conditions for rearing and spinning. CO4 elaborate the strategies pertaining to harvest, sor | | Non Major Elec | tive I (Open Option) |
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| CO2 construct and prepare fish culture ponds. CO3 outline nutrient management and to summarize predators, weeds and cor diseases which occur in fish culture practices. CO4 manage soil and water quality parameters. CO5 adapt fishing crafts to harvest and evolve methodology to preserve the fishe realizing the scope and need for aquaculture practices. COURSE OUTCOME COURSE OUTCOME Course Code:GLBP4N Course Title:SERICULTURE On successful completion of the course, the learners should be able to outline the races and biology of silkworm and to list the causes and sympt diseases in silkworm. CO2 illustrate the basic design of the rearing house and to disinfect the rearing house here here here here here here here he | CO2 construct and prepare fish culture ponds. CO3 outline nutrient management and to summarize predators, weeds and comma diseases which occur in fish culture practices. CO4 manage soil and water quality parameters. CO5 adapt fishing crafts to harvest and evolve methodology to preserve the fishes realizing the scope and need for aquaculture practices. COURSE OUTCOME Course Code:GLBP4N Consuccessful completion of the course, the learners should be able to CO1 outline the races and biology of silkworm and to list the causes and symptor diseases in silkworm. CO2 illustrate the basic design of the rearing house and to disinfect the rearing and appliances. CO3 demonstrate the feeding frequency of silkworm and to evaluate the op environmental conditions for rearing and spinning. CO4 elaborate the strategies pertaining to harvest, sort, store, preserve, remarket the cocoons and to relate world silk production and Central Silk Boar cost | CO1 | categorize the various types of fr and culture practices. | eshwater aquaculture, cultivable species of ca |
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| CO4 manage soil and water quality parameters. CO5 adapt fishing crafts to harvest and evolve methodology to preserve the fisher realizing the scope and need for aquaculture practices. COURSE OUTCOME COURSE OUTCOME Course Code:GLBP4N Course Title:SERICULTURE On successful completion of the course, the learners should be able to CO1 outline the races and biology of silkworm and to list the causes and symptotic diseases in silkworm. CO2 illustrate the basic design of the rearing house and to disinfect the rearing house h | CO4 manage soil and water quality parameters. CO5 adapt fishing crafts to harvest and evolve methodology to preserve the fishes realizing the scope and need for aquaculture practices. COURSE OUTCOME Non Major Elective II (Open Option) Course Code:GLBP4N Course Title:SERICULTURE On successful completion of the course, the learners should be able to Course Title:SERICULTURE On successful completion of the course, the learners should be able to Col CO1 outline the races and biology of silkworm and to list the causes and symptom diseases in silkworm. CO2 illustrate the basic design of the rearing house and to disinfect the rearing and appliances. CO3 demonstrate the feeding frequency of silkworm and to evaluate the op environmental conditions for rearing and spinning. CO4 elaborate the strategies pertaining to harvest, sort, store, preserve, remarket the cocoons and to relate world silk production and Central Silk Boar market the cocoons and to relate world silk production and Simptoms of diserties and to the strate of the strate world silk production and Central Silk Boar market the cocoons and to relate world silk production and Simptoms of diserties and board to relate causes and symptoms of diserties and to rel | CO3 | outline nutrient management an diseases which occur in fish cul | d to summarize predators, weeds and comm ture practices. |
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| Teamzing the scope and need for aquaculture practices. COURSE OUTCOME Non Major Elective II (Open Option) Course Code:GLBP4N Course Title:SERICULTURE On successful completion of the course, the learners should be able to Course Title causes and symptotic diseases in silkworm. CO2 illustrate the basic design of the rearing house and to disinfect the rearing house and h | Teaming the scope and need for aquaculture practices. COURSE OUTCOME Non Major Elective II (Open Option) Course Code:GLBP4N Course Title:SERICULTURE On successful completion of the course, the learners should be able to Co1 outline the races and biology of silkworm and to list the causes and symptom diseases in silkworm. C02 illustrate the basic design of the rearing house and to disinfect the rearing and appliances. C03 demonstrate the feeding frequency of silkworm and to evaluate the op environmental conditions for rearing and spinning. C04 elaborate the strategies pertaining to harvest, sort, store, preserve, reamarket the cocoons and to relate world silk production and Central Silk Boar CO5 | CO5 | adapt fishing crafts to harvest an | d evolve methodology to preserve the fishes b |
| On successful completion of the course, the learners should be able to CO1 outline the races and biology of silkworm and to list the causes and symptotic diseases in silkworm. CO2 illustrate the basic design of the rearing house and to disinfect the rearing house and to d | On successful completion of the course, the learners should be able toCO1outline the races and biology of silkworm and to list the causes and symptod diseases in silkworm.CO2illustrate the basic design of the rearing house and to disinfect the rearing and appliances.CO3demonstrate the feeding frequency of silkworm and to evaluate the op environmental conditions for rearing and spinning.CO4elaborate the strategies pertaining to harvest, sort, store, preserve, rearing arket the cocoons and to relate world silk production and Central Silk BoarCO5demonstrate mulberry cultivation and to relate causes and symptoms of disest mulberry plante | COURSE Course Co | OUTCOME Non Major Elect ode:GLBP4N | ive II (Open Option) Course Title:SERICULTURE |
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| CO3 demonstrate the feeding frequency of silkworm and to evaluate the centre environmental conditions for rearing and spinning. | CO4elaborate the strategies pertaining to harvest, sort, store, preserve, remarket the cocoons and to relate world silk production and Central Silk BoarCO5demonstrate mulberry cultivation and to relate causes and symptoms of disesmulberry plante | COURSE Course Co On success CO1 CO2 | OUTCOME Non Major Elect Dede:GLBP4N Sful completion of the course, the lea outline the races and biology of diseases in silkworm. illustrate the basic design of the and appliances. | ive II (Open Option) Course Title:SERICULTURE rners should be able to silkworm and to list the causes and sympton rearing house and to disinfect the rearing |
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| demonstrate mulberry cultivation and to relate causes and symptoms of dis | mulderry plants. | COURSE Course Co On success CO1 CO2 CO3 CO4 | OUTCOME Non Major Elect ode:GLBP4N sful completion of the course, the lea outline the races and biology of diseases in silkworm. illustrate the basic design of the and appliances. demonstrate the feeding frequere environmental conditions for reader and to relater the cocoons and to relater | ive II (Open Option) Course Title:SERICULTURE rners should be able to silkworm and to list the causes and sympton rearing house and to disinfect the rearing ncy of silkworm and to evaluate the opti ring and spinning. ining to harvest, sort, store, preserve, ree world silk production and Central Silk Board |

| | Discipline Sp | ecific Course |
|-------------|--|--|
| Course Co | de:GLBP4DS | Course Title:FOOD PROCESSING TECHNOLOGY |
| On successf | ful completion of the course, the learn | ers should be able to |
| CO1 | explain the processing of cereals and | d pulses. |
| CO2 | list out the advantages and disadvan | tages of food processing techniques. |
| CO3 | analyse the steps involved in vegeta | ble and fruit processing. |
| CO4 | discuss the stages of meat, fish and | poultry processing. |
| CO5 | list out the significance of defeather processing. | ing and deheading in poultry and fish |

| | Discipline S | pecific Course |
|-----------|--|---|
| Course Co | ode:GLBP4DS | Course Title:FOOD PROCESSING TECHNOLOGY ners should be able to nd pulses. ntages of food processing techniques. able and fruit processing. poultry processing. ring and deheading in poultry and fish rCourse Course Title:TAXONOMY OF |
| On succes | sful completion of the course, the lear | ners should be able to |
| CO1 | explain the processing of cereals an | nd pulses. |
| CO2 | list out the advantages and disadva | ntages of food processing techniques. |
| CO3 | analyse the steps involved in veget | able and fruit processing. |
| CO4 | discuss the stages of meat, fish and | poultry processing. |
| CO5 | list out the significance of defeathe | ring and deheading in poultry and fish |
| On succes | sful completion of the course, the lear | ners should be able to |
| CO1 | explain the morphology of a plant | in technical terms. |
| CO2 | analyse the importance of herbarius recommendations of ICBN. | rCourse Course Title: TAXONOMY OF ANGIOSPERMS rners should be able to in technical terms. m, binomial nomenclature and rules and ssification with its merits and demerits. nic importance of different angiospermic characters of angiospermic families. |
| CO3 | identify the basis of systems of clas | ssification with its merits and demerits. |
| CO4 | conclude the characters and econor families. | nic importance of different angiospermic |
| CO5 | compare the vegetative and floral c | haracters of angiospermic families. |
| | | |
| | | |
| | | |

| | Major Co | urse |
|------------|--|-------------------------------|
| Course Co | de:GLBP5L | Course Title: PRACTICAL III |
| On success | ful completion of the course, the learners | s should be able to |
| CO1 | conclude the morphological features of | f a plant in technical terms. |
| CO2 | identify the plants and prepare herbarit | ım. |
| CO3 | demonstrate the various plant propagat | ion techniques. |
| CO4 | create bouquet and arrange flowers in a | different patterns. |
| CO5 | examine the beauty of nature. | |

| | | Major Co | ourse |
|--|--|---|---|
| Course | Code:GLBP5L | | Course Title: PRACTICAL III |
| On succ | essful completion of the co | urse, the learner | s should be able to |
| CO1 | conclude the morpholo | ogical features o | f a plant in technical terms. |
| CO2 | identify the plants and | prepare herbari | um. |
| CO3 | demonstrate the variou | ıs plant propaga | tion techniques. |
| CO4 | create bouquet and arr | ange flowers in | different patterns. |
| | | | |
| CO5 | examine the beauty of SE OUTCOME | nature. Major Co | Durse |
| CO5 COURS Course | E OUTCOME | nature. Major Co | Ourse Course Title: PRACTICAL III rs should be able to f a plant in technical terms. um. tion techniques. different patterns. |
| CO5 COURS COURS On succ | examine the beauty of SE OUTCOME Code:GLBP61 ressful completion of the co | nature. Major Co urse, the learner | ourse Course Title:PLANT PHYSIOLOGY rs should be able to |
| CO5 COURS Course On succ CO1 | EXAMINE the beauty of SE OUTCOME Code:GLBP61 ressful completion of the co Summarize the water process. | nature. Major Co urse, the learner relation in plar | ourse Course Title:PLANT PHYSIOLOGY is should be able to ats with respect to various physiological |
| CO5 COURS COURS CO1 CO2 | E Code:GLBP61 Code:GLBP61 Code:GLBP61 Completion of the co Summarize the water process. explain the various p | nature. Major Co urse, the learner r relation in plar hysiological pro | ourse Course Title:PLANT PHYSIOLOGY s should be able to ats with respect to various physiological ocesses in plants. |
| CO5 COURS COURS CO1 CO1 CO2 CO3 | examine the beauty of SE OUTCOME Code:GLBP61 eesssful completion of the co Summarize the water process. explain the various p determine the physic | nature. Major Co urse, the learner r relation in plar hysiological pro al and biologica | ourse Course Title:PLANT PHYSIOLOGY is should be able to its with respect to various physiological ocesses in plants. l nitrogen fixation in plants. |
| CO5 COURS COURS CO1 CO1 CO2 CO3 CO4 | E examine the beauty of SE OUTCOME Code:GLBP61 ressful completion of the co Summarize the water process. explain the various p determine the physic analyze the growth or regulators. | nature. Major Co urse, the learner r relation in plar hysiological pro al and biologica f plants, role of | Durse Course Title:PLANT PHYSIOLOGY s should be able to tts with respect to various physiological ocesses in plants. I nitrogen fixation in plants. mineral elements and effects of plant gr lization and phytochromes in flowering |

| | Major C | course |
|--------------|--|---|
| Course Code | e:GLBP62 | Course Title:BIOTECHNOLOGY |
| On successfu | l completion of the course, the learne | rs should be able to |
| CO1 | analyze the role of enzymes and vec | ctors in gene manipulation techniques. |
| CO2 | illustrate the aspects of DNA clonin | g strategies and its applications. |
| CO3 | discuss the role of microbes in biom toxoids. | ining and in the production of vaccines and |
| CO4 | examine the fermentation tools and commercially valuable products. | techniques involved in the production of |
| CO5 | explain the mass production and app and microbial pesticide. | plications of single cell protein, biofertilizers |

| | Μ | ajor Course |
|---|--|---|
| Course C | ode:GLBP62 | Course Title:BIOTECHNOLOGY |
| On succes | ssful completion of the course, the | learners should be able to |
| CO1 | analyze the role of enzymes a | and vectors in gene manipulation techniques. |
| CO2 | illustrate the aspects of DNA | cloning strategies and its applications. |
| CO3 | discuss the role of microbes i toxoids. | n biomining and in the production of vaccines and |
| CO4 | examine the fermentation too commercially valuable produ | ols and techniques involved in the production of acts. |
| | | |
| CO5 COURSE Course C | explain the mass production and microbial pesticide. | and applications of single cell protein, biofertilizer |
| CO5 COURSE Course C | COUTCOME M | Tajor Course Course Title:BIOTECHNOLOGY e learners should be able to and vectors in gene manipulation techniques. cloning strategies and its applications. n biomining and in the production of vaccines and oble and techniques involved in the production of accines and applications of single cell protein, biofertilizer |
| CO5 COURSE Course C On succes | E OUTCOME M Code:GLBP6L2 Seful completion of the course, the | and applications of single cell protein, biofertilizer fajor Course Course Title:- PRACTICAL V e learners should be able to |
| COURSE COURSE Course C On succes CO1 | E OUTCOME Code:GLBP6L2 Seful completion of the course, the analyse the nature of vegetatio | and applications of single cell protein, biofertilizer fajor Course Course Title:- PRACTICAL V e learners should be able to n by quadrat method. |
| COURSE COURSE Course C On succes CO1 CO2 | explain the mass production and microbial pesticide. courcome code:GLBP6L2 ssful completion of the course, the analyse the nature of vegetatio explain the anatomy of various | and applications of single cell protein, biofertilizer fajor Course Course Title:- PRACTICAL V e learners should be able to n by quadrat method. s groups of plants. |
| COURSE COURSE Course C On succes CO1 CO2 CO3 | explain the mass production and microbial pesticide. | and applications of single cell protein, biofertilizer fajor Course Course Title:- PRACTICAL V e learners should be able to n by quadrat method. s groups of plants. terilization and culturing of microbes. |
| COURSE COURSE Course C On succes CO1 CO2 CO3 CO4 | explain the mass production and microbial pesticide. COUTCOME Code:GLBP6L2 Seful completion of the course, the analyse the nature of vegetatio explain the anatomy of various demonstrate the preparation, st classify the group of microorga | and applications of single cell protein, biofertilizer Course Course Title:- PRACTICAL V e learners should be able to n by quadrat method. s groups of plants. errilization and culturing of microbes. anisms based on staining. onomy. |

| Major Elective Course | | |
|--|---|--|
| Course Code:GLBP5E1 Course Title:MICROBIOLOGY AND PLANT PATHOLOGY | | |
| On successful completion of the course, the learners should be able to | | |
| CO1 | recall the contribution of microbiologists. | |
| CO2 | examine the characteristics and multiplication of microbes. | |
| CO3 | acquire the knowledge of bacterial inoculation techniques. | |
| CO4 | identify plant diseases and their remediation. | |
| CO5 | analyze the microbiology of waste water and its implications. | |

| | Major | Elective Course | |
|--|--|---|--|
| Course Code:GLBP5E1 Course Title:MICROBIOLOGY AND PLANT PATHOLOGY | | | |
| On succe | essful completion of the course, the | learners should be able to | |
| CO1 | recall the contribution of microb | piologists. | |
| CO2 | examine the characteristics and | multiplication of microbes. | |
| CO3 | acquire the knowledge of bacter | ial inoculation techniques. | |
| CO4 | identify plant diseases and their | remediation. | |
| CO5 | analyze the microbiology of was | analyze the microbiology of waste water and its implications | |
| COURS Course | E OUTCOME Major Code:GLBP5E2 | Elective Course Course Title:HORTICULTURE | |
| COURS Course | E OUTCOME Major Code:GLBP5E2 | Elective Course Course Title:MICROBIOLOGY AND PLAN PATHOLOGY learners should be able to biologists. multiplication of microbes. ial inoculation techniques. remediation. ste water and its implications. Elective Course Course Title:HORTICULTURE | |
| COURS Course | E OUTCOME Major Code:GLBP5E2 essful completion of the course, the | Elective Course Course Title:HORTICULTURE learners should be able to | |
| COURS Course On succe CO1 | E OUTCOME Major Code:GLBP5E2 essful completion of the course, the analyse the importance of hort | Elective Course Course Title:HORTICULTURE learners should be able to iculture, its tools and divisions. | |
| COURS Course On succe CO1 CO2 | E OUTCOME Major Code:GLBP5E2 essful completion of the course, the analyse the importance of hort explain various methods of pro | Elective Course Course Title:HORTICULTURE learners should be able to iculture, its tools and divisions. pagation and techniques practiced in horticulture | |
| COURS Course On succe CO1 CO2 CO3 | E OUTCOME Major Code:GLBP5E2 essful completion of the course, the analyse the importance of hort explain various methods of pro- plan various types of garden. | Elective Course Course Title:HORTICULTURE learners should be able to iculture, its tools and divisions. pagation and techniques practiced in horticulture | |
| COURS Course On succe CO1 CO2 CO3 CO4 | E OUTCOME Major Code:GLBP5E2 essful completion of the course, the analyse the importance of hort explain various methods of pro plan various types of garden. summarize the role of fruit and | Elective Course Course Title:HORTICULTURE learners should be able to iculture, its tools and divisions. pagation and techniques practiced in horticulture l flowers in economy. ation and manure. | |

| MajorElective Course | | |
|--|---|--|
| Course Code:GLBP5E3 Course Title:NATURAL RESOURCES | | |
| On successful completion of the course, the learners should be able to | | |
| CO1 | summarize the social forestry and forest protection. | |
| CO2 | analyze about the conventional and non conventional energy resources. | |
| CO3 | CO3 explain the biomass and bioconversion technology. | |
| CO4 | elaborate the usage and over utilization of water resources. | |
| CO5 | the uses, exploitation and conservation of mineral resources. | |

COURSE OUTCOME

| MajorElective Course | | |
|--|---|--|
| Course Code:GLBP5E4 Course Title:HERBAL MEDICINE | | |
| On successful completion of the course, the learners should be able to | | |
| CO1 | list out the medicinal plants and their cultivation process, active principles and mode of usage. | |
| CO2 | evaluate the uses of drugs obtained from roots. | |
| CO3 | CO3 examine the usage of drugs obtained from the stem and bark. | |
| CO4 | discuss about the drugs obtained from leaves. | |
| CO5 | summarize the drugs obtained from the flowers, fruits and seed. | |

| Major Elective Course | | |
|--|---|--|
| Course Code:GLBP6E1 Course Title: ECOLOGY AND BIODIVERSIT | | |
| On successful completion of the course, the learners should be able to | | |
| CO1 | explain the basics of ecology and ecosystem. | |
| CO2 | analyse different groups of plants and their adaptations. | |
| CO3 | discuss about major environmental pollutions. | |
| CO4 | inspect the cycling of minerals and water. | |
| CO5 | summarize biodiversity and its conservation. | |

COURSE OUTCOME

| Major Elective Course | | |
|--|--|--|
| Course Code:GLBP6E2 Course Title:ECONOMIC BOTANY | | |
| On successful completion of the course, the learners should be able to | | |
| C01 | list out the economic produces with special reference to botanical name, family, morphology of the useful part and uses. | |
| CO2 | discuss the commercial uses of pulses and cereals. | |
| CO3 | CO3 analyse the core concepts of economic botany. | |
| CO4 | identify the binomials and uses of fruits and nuts. | |
| CO5 | distinguish the morphology of the useful part in the production resin, gum and tannin. | |

| Self Employment Course | | |
|--|--|--|
| Course Code:GLSE68 Course Title:HERBAL COSMETICS | | |
| On successful completion of the course, the learners should be able to | | |
| CO1 | summarize the knowledge on herbal cosmetics. | |
| CO2 | relate the importance of skin and hair maintenance. | |
| CO3 | CO3 apply the techniques of preservation and marketing of herbal products. | |
| CO4 | analyse the effects of natural and synthetic cosmetics. | |
| CO5 | make use of herbs for common ailments. | |

COURSE OUTCOME

| Self Employment Course | | |
|--|--|-----------------------------------|
| Course Code:GLSE68L Course Title:HERBAL COSMETICS LAB | | Course Title:HERBAL COSMETICS LAB |
| On successful completion of the course, the learners should be able to | | |
| CO1 | recall the basic knowledge on natural products. | |
| CO2 | recognize the basic medicinal herbs with scientific knowledge. | |
| CO3 discuss the effects of synthetic cosmetics. | | |
| CO4 | modify and preserve herbal cosmetics on their own. | |
| CO5 | inspect the ways to market their own herbal products. | |

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THE STANDARD FIREWORKS RAJARATNAM COLLEGE FOR WOMEN (AUTONOMOUS), SIVAKASI – 626 123.

(Affiliated to Madurai Kamaraj University, Re-accredited with A Grade by NAAC, College with Potential for Excellence by UGC and Mentor Institution under UGC PARAMARSH)

DEPARTMENT OF BOTANY

PG DEGREE PROGRAMME IN BOTANY WITH SPECIALIZATION IN PLANT

BIOTECHNOLOGY

PROGRAMME EDUCATIONAL OBJECTIVES

The Graduates will

| PEO1. | exhibit a mastery of skills and knowledge with ethics at a level required for plant based industry or to be an eminent research scholar. |
|-------|--|
| PEO2. | pursue research of significance in Botany or an interdisciplinary or creative project to solve the problems in thrust areas. |
| PEO3. | enhance the productivity of several economically important products/botanicals and thereby become a successful entrepreneur |
| PEO4. | imbibe moral, ethical and professional values to preserve nature for a better and respectable life in the society. |

PROGRAMME SPECIFIC OUTCOMES

By the Completion of M.Sc. Botany with specialization in Plant Biotechnology programme, the learners will be able to

| icamers will | |
|--------------|---|
| PSO1. | demonstrate a systematic, extensive and coherent knowledge of plant sciences and its application with the use of established theories, principles and concepts of Botany. |
| PSO2. | apply their botanical knowledge and transferable skills to identify and analyze issues related to new/unfamiliar contexts and to solve it with well-defined solutions. |
| PSO3. | be competent on data collection and process of scientific documentation in areas related to specializations and current updates in the field of Botany. |
| PSO4. | make use of appropriate techniques, skills and modern ICT tools necessary to decipher knowledge related to life sciences. |
| PSO5. | demonstrate leadership and team workmanship in order to serve efficiently in institution, industry and society. |
| PSO6. | defend the environmental and professional issues with moral ethics. |
| PSO7. | involve in life-long learning and to adapt to the technological advancements in the emerging areas of Botany. |

| Core Course | | |
|--|--|-------------------------------|
| Course Code: HLBP11 Course Title: PLANT DIVERSITY | | Course Title: PLANT DIVERSITY |
| On successful completion of the course, the learners should be able to | | |
| CO1 | recall the occurrence and structure of cryptogams and Gymnosperms. | |
| CO2 | analyse the classification and lifecycle patternof different groups of plants. | |
| CO3 | explain the economic importance of different groups of plants. | |
| CO4 | relate the evolution of sporophyte in Pteridophytes. | |
| CO5 | identify the existence of life on earth in various eras. | |

COURSE OUTCOME

| Core Course | | |
|--|---|-----------------------------------|
| Course Code | : HLBP12 | Course Title: INHERITANCE BIOLOGY |
| On successful completion of the course, the learners should be able to | | |
| CO1 | relate the knowledge on laws of inheritance, genetic basis of loci and alleles. | |
| CO2 | compute the various steps in protein synthesis and protein modification. | |
| CO3 | analyze the chromosome structure and genome organization. | |
| CO4 | discussthe effect of linkage and crossing over. | |
| CO5 | interpreton non-allelic genic interactions and population genetics. | |

| Core Course | | |
|--|--|---|
| Course Code: HLBP13 | | Course Title: TAXONOMY OF ANGIOSPERMS |
| On successful completion of the course, the learners should be able to | | |
| CO1 | analyze different systems of classification and its historical account with its merits and demerits. | |
| CO2 | summarize the rules and recommenda | tions of ICN, role of BSI and herbarium. |
| CO3 | CO3 explain the use of digital resources in plant taxonomy. | |
| CO4 demonstrate the key characters and economic importance of angiospermic families. | | |
| CO5 | compare the vegetative and flor families. | al characters within and between angiospermic |

COURSE OUTCOME

| Core Course | |
|--------------------|---------------------------|
| Course Code:HLBP1L | Course Title: PRACTICAL I |

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

| CO1 | illustrate the preparation of whole mount and sectioning of plant materials. |
|-----|--|
| CO2 | analyzegenetic problems. |
| CO3 | determine the role of several genes in inheritance. |
| CO4 | identify the family of an angiospermic plant with its taxonomical description. |
| CO5 | construct taxonomic keysand make use of herbarium. |

| | Electi | ve Course |
|---|--|---|
| Course C | Code:HLBP1E1 | Course Title: BIOINSTRUMENTATION |
| On succes | ssful completion of the course, the lea | rners should be able to |
| CO1 | recall the principles and applications of microscopy. | |
| CO2 | demonstrate the preparation of gel and detection of nucleic acid by electrophoresis. | |
| CO3 | classifythe various types of chrom | atographic techniques and its applications. |
| CO4 | analyse the working principle and applications of colorimetry, spectrophotometer, flame photometer and NMR. | |
| | explain the stages involved in the preparation of permanent slides. | |
| CO5 | EOUTCOME | paration of permanent slides. ve Course |
| COURSI | EOUTCOME | |
| COURSI Course (| E OUTCOME Electi | ve Course Course Title:HERBAL MEDICINE |
| COURSI Course (| E OUTCOME Electi Code:HLBP1E2 | ve Course Course Title:HERBAL MEDICINE arners should be able to |
| COURSI Course C On succes | E OUTCOME Electi Code:HLBP1E2 ssful completion of the course, the lea | ve Course Course Title:HERBAL MEDICINE arners should be able to cory of medicinal practices. |
| COURSI Course C On succes CO1 | E OUTCOME Electi Code:HLBP1E2 ssful completion of the course, the lea illustrate the basic principles and hist | ve Course Course Title:HERBAL MEDICINE urners should be able to cory of medicinal practices. different methods. |
| COURSI Course C On succes CO1 CO2 | E OUTCOME Electi Code:HLBP1E2 ssful completion of the course, the lea illustrate the basic principles and hist discuss theways to cultivateherbs by | ve Course Course Title:HERBAL MEDICINE Course Title:HERBAL MEDICINE ory of medicinal practices. different methods. nd storageof herbal drugs. |

| Elective Course | | | |
|---------------------|--|---|--|
| Course Code:HLBP1E2 | | Course Title:HERBAL MEDICINE | |
| On successf | On successful completion of the course, the learners should be able to | | |
| CO1 | illustrate the basic principles and history of medicinal practices. | | |
| CO2 | discuss theways to cultivateherbs by di | fferent methods. | |
| CO3 | CO3 conclude the collection, processing and storageof herbal drugs. | | |
| CO4 | justify the importance of major herbs in day today life. | | |
| CO5 | identify the adulteration of drug and its | evaluation through various testing methods. | |

| Core Course | | |
|---|---|--|
| Course | Code:HLBP21 Course Title:PLANT ANATOMY AND EMBRYOLOGY | |
| On succe | essful completion of the course, the learners should be able to | |
| C01 | summarize about meristematic, epidermal and ground tissue systems. | |
| CO2 | explain the origin, types, structure and functions of vascular tissue system. | |
| CO3 | elaboratesporogenesis on the basis of their structure and development. | |
| CO4 | analyze the process of fertilization and sexual incompatibility. | |
| CO5 | discuss endosperm, polyembryony, embryo development, apomixis and parthenocarpy in | |
| COURS | E OUTCOME Core Course Code:HLBP21 Course Title:PLANT ANATOMY AND EMBRYOLOGY essful completion of the course, the learners should be able to summarize about meristematic, epidermal and ground tissue systems. explain the origin, types, structure and functions of vascular tissue system. elaboratesporogenesis on the basis of their structure and development. analyze the process of fertilization and sexual incompatibility. discuss endosperm, polyembryony, embryo development, apomixis and parthenocar plants. | |
| COURS Course | Plants. SE OUTCOME Core Course Code:HLBP22 Course Title:BIOCHEMISTRY | |
| COURS Course (On succe | E OUTCOME Core Course Code:HLBP22 Code:HLBP22 essful completion of the course, the learners should be able to | |
| COURS Course On succe CO1 | plants. E OUTCOME Core Course Code:HLBP22 Course Title:BIOCHEMISTRY essful completion of the course, the learners should be able to discuss the classification, properties and metabolism of carbohydrates. | |
| COURS Course On succe CO1 CO2 | Plants. PE OUTCOME Core Course Code:HLBP22 Code:HLBP22 Course Title:BIOCHEMISTRY essful completion of the course, the learners should be able to discuss the classification, properties and metabolism of carbohydrates. elaborate the classification, structure, biosynthesis and properties of amino acids and 1 | |
| COURS Course On succe CO1 CO2 CO3 | plants. BE OUTCOME Core Course Code:HLBP22 Course Title:BIOCHEMISTRY essful completion of the course, the learners should be able to discuss the classification, properties and metabolism of carbohydrates. elaborate the classification, structure, biosynthesis and properties of amino acids and 1 explain the classification, structure and properties of proteins and vitamins. | |
| COURS Course On succe CO1 CO2 CO3 CO4 | plants. COUTCOME Core Course Course Title:BIOCHEMISTRY essful completion of the course, the lear ress should be able to discuss the classification, properties and metabolism of carbohydrates. elaborate the classification, structure, biosynthesis and properties of amino acids and 1 explain the classification, structure and properties of proteins and vitamins. illustrate the classification, principle and mechanism of enzyme action. analyze the structure, types, composition and biosynthesis of nucleic acids. | |

| Core Course | | | |
|--------------------|--|--|--|
| Course Code:HLBP22 | | Course Title:BIOCHEMISTRY | |
| On succes | On successful completion of the course, the learners should be able to | | |
| CO1 | CO1 discuss the classification, properties and metabolism of carbohydrates. | | |
| CO2 | elaborate the classification, structure, bio | osynthesis and properties of amino acids and lipids. | |
| CO3 | CO3 explain the classification, structure and properties of proteins and vitamins. | | |
| CO4 | ^{D4} illustrate the classification, principle and mechanism of enzyme action. | | |
| CO5 | analyze the structure, types, composition | and biosynthesis of nucleic acids. | |

| Core Course | | |
|--|---|---|
| Course Code:HLBP23 | | Course Title:MICROBIOLOGY |
| On successful completion of the course, the learners should be able to | | |
| CO1 | identify the characters and methods of classification of microbes. | |
| CO2 | explain the structure and multiplication of bacteria and viruses. | |
| CO3 | CO3 analyze the impact of microflora in soil, air and water. | |
| CO4 | elaborate the symptoms, transmission, diagnosis and control of microbial diseases caused to human beings. | |
| CO5 | assess the cellular and molecular basis | of immune responsiveness and the ways to detect it. |

| Core Course | | |
|--|---|--|
| Course (| Code:HLBP23 | Course Title:MICROBIOLOGY |
| On succe | ssful completion of the course, t | he learners should be able to |
| CO1 | identify thecharactersandmethods of classification of microbes. | |
| CO2 | explain the structure and multi | plication of bacteria and viruses. |
| CO3 | analyze the impact of microflo | ra in soil, air and water. |
| CO4 | elaborate the symptoms, transm human beings. | nission, diagnosis and control of microbial diseases caus |
| 00 <i>5</i> | human beings. | |
| COURS | assess the cellular and molecul | ar basis of immune responsiveness and the ways to deter Core Course |
| COURS COURS | assess the cellular and molecul E OUTCOME Code:HLBP2L | Course Course Title:MICROBIOLOGY he learners should be able to ods of classification of microbes. olication of bacteria and viruses. ra in soil, air and water. hission, diagnosis and control of microbial diseases cause ar basis of immune responsiveness and the ways to detect Course Course Course Title: PRACTICAL II |
| COURS COURS Course (On succe | E OUTCOME Code:HLBP2L ssful completion of the course, t | ar basis of immune responsiveness and the ways to detect Core Course Course Title: PRACTICAL II he learners should be able to |
| COURS COURS Course (On succe CO1 | E OUTCOME Code:HLBP2L ssful completion of the course, t make use of maceration technic | ar basis of immune responsiveness and the ways to detect Core Course Course Title: PRACTICAL II he learners should be able to que to isolate and identify cells. |
| COURS COURS Course (On succe CO1 CO2 | assess the cellular and molecul E OUTCOME Code:HLBP2L ssful completion of the course, t make use of maceration technic identify the anomalous seconds | Core Course Course Title: PRACTICAL II he learners should be able to que to isolate and identify cells. ary growth and bark anatomy of plants. |
| COURS COURS Course (On succe CO1 CO2 CO3 | E OUTCOME Code:HLBP2L ssful completion of the course, t make use of maceration technic identify the anomalous seconds examine pollen germination, en | ar basis of immune responsiveness and the ways to detect Core Course Course Title: PRACTICAL II he learners should be able to que to isolate and identify cells. ary growth and bark anatomy of plants. nbryo development and endosperm . |
| COURS COURS Course (On succe CO1 CO2 CO3 CO4 | E OUTCOME Code:HLBP2L ssful completion of the course, t make use of maceration technic identify the anomalous seconds examine pollen germination, en estimate the biomolecules qual | ar basis of immune responsiveness and the ways to detect Course Course Title: PRACTICAL II he learners should be able to que to isolate and identify cells. ary growth and bark anatomy of plants. nbryo development and endosperm . itatively and quantitatively. nedia, staining, Isolation and identification of |

| Elective Course | | |
|--|--|------------------------------------|
| Course Code:HLBP2E | | Course Title: FOOD PRESERVATION |
| On successful completion of the course, the learners should be able to | | |
| CO1 | outline the basic methods and techniques of food preservation. | |
| CO2 | illustrate the protocol for fruit juices and beverages. | |
| CO3 | CO3 make use of various preparation and preservation techniques. | |
| CO4 | assess the use of food additives and sweeteners. | |
| CO5 | analyze food adulteration and various | forms of food packaging materials. |

COURSE OUTCOME

| Core Course | | |
|-------------|---|--|
| Course Co | de:HLBP31 | Course Title:CELL AND MOLECULAR BIOLOGY |
| On successf | On successful completion of the course, the learners should be able to | |
| CO1 | recall the structure and functions of cell and cell cycle. | |
| CO2 | explain about the structure and functions of cell organelles. | |
| CO3 | CO3 examine the different types of genome organization and gene expression. | |
| CO4 | elaborate the steps involved in DNA cloning and DNA sequencing. | |
| CO5 | discuss the process, types and applications of PCR and its allied techniques. | |

| Core Course | | |
|--|---|---|
| Course Code:HLBP32 | | Course Title: ENVIRONMENTAL MICROBIOLOGY |
| On successful completion of the course, the learners should be able to | | |
| CO1 | relate the microbial interaction and plant- microbe interactions. | |
| CO2 | illustratethe microbiology of air, soil and role of microbes in nutrient cycling. | |
| CO3 | CO3 analyze microbial adaptations and associations in extreme environment. | |
| CO4 | explain the various bioremediation technology. | |
| CO5 | discuss the ways to solve the problem | s posed by solid and liquid waste. |

COURSE OUTCOME

| Core Course | | |
|--|---|-------------------------------|
| Course C | ode:HLBP33 | Course Title:PLANT PHYSIOLOGY |
| On successful completion of the course, the learners should be able to | | |
| CO1 | demonstrate the absorption of water in land plants. | |
| CO2 | explain the physiological process such as photosynthesis, respiration, photorespiration and circadian rhythm. | |
| CO3 | ³ explain the metabolism of lipid and nitrogen. | |
| CO4 | analyze about plant growth regulators and seed dormancy. | |
| CO5 | discuss about the various physiological mechanisms that protect the plants from environmental stress. | |

| Core Course | | |
|--|--|-----------------------------|
| Course Co | ode:HLBP3L | Course Title: PRACTICAL III |
| On successful completion of the course, the learners should be able to | | |
| CO1 | demonstrate skill in squash and smear techniques. | |
| CO2 | make use of a protocol for the isolation of DNA and RNA. | |
| CO3 | analyse the quantification of primary and secondary metabolites. | |
| CO4 | evaluate the potability of water under different environmental conditions. | |
| CO5 | estimate various nutrients in soil. | |

COURSE OUTCOME

| Elective Course | | |
|--|--|---|
| | | Course Title: CSIR UGC-NET PREPARATORY COURSE - LIFE SCIENCES |
| On successful completion of the course, the learners should be able to | | |
| CO1 | explain the basic principle of biochemistry and molecular biology. | |
| CO2 | analyse insights of cell functions and embryo development. | |
| CO3 | assess the importance of plant and animal physiology. | |
| CO4 | compose the genetic variations and outline the hierarchy of diversity forms. | |
| CO5 | apply and utilize the advanced techniques in the biomedical field. | |

| Elective Course | | |
|--|--|--|
| Course Code:HLBP3E2 Course Title: ENERGY RESOURCES | | |
| On successful completion of the course, the learners should be able to | | |
| CO1 | list out the energy requirement in relation to population and industrial growth. | |
| CO2 | summarize the source and applications of non conventional energy resources. | |
| CO3 make use of solar energy and solar gadgets for thermal conversion. | | |
| CO4 | CO4 classify the basic components of wind energy generating system and management of wind forms. | |
| CO5 | analyze the production and use of bioenergy. | |

COURSE OUTCOME

| Core Course | | |
|--|---|----------------------------|
| Course Code:HLBP41 Course Title:PLANT ECOLOGY | | Course Title:PLANT ECOLOGY |
| On successful completion of the course, the learners should be able to | | |
| CO1 | outline the basics of ecology, concept of ecosystem and ecological succession. | |
| CO2 | analyze the biodiversity and methods of studying plant community. | |
| CO3 | discuss about environmental pollution and disaster management. | |
| CO4 | summarize about phytogeography. | |
| CO5 | explain environmental impact assessment and role of GOs and NGOs in its management. | |

| Core Course | | |
|--|---|-------------------------------------|
| Course Code:HLBP42 Cou | | Course Title: APPLIED BIOTECHNOLOGY |
| On successful completion of the course, the learners should be able to | | |
| CO1 | recall the core concepts and fundamentals of plant Biotechnology, biological nitrogen fixation and genetic engineering. | |
| CO2 | develop their ability to raise plantlets on different types of plant tissue culture. | |
| CO3 | list the different types of biofertilizers based on their mass cultivation and its importance. | |
| CO4 | compare the various types of fermentation and produce the various industrial products. | |
| CO5 | compile fundamental knowledge on bioinformatics and problems and its solution in | |

| COURSE | COUTCOME | |
|--|---|--|
| | Co | ore Course |
| Course C | ode:HLBP42 | Course Title: APPLIED BIOTECHNOLOGY |
| On succes | sful completion of the course, the | learners should be able to |
| CO1 | recall the core concepts and fundation fixation and genetic engineering. | mentals of plant Biotechnology, biological nitrogen |
| CO2 | develop their ability to raise plantl | ets on different types of plant tissue culture. |
| CO3 | list the different types of biofertiliz | zers based on their mass cultivation and its importance. |
| | compare the various types of fermentation and produce the various industrial products. | |
| CO4 | compare the various types of ferme | entation and produce the various industrial product |
| CO5 | compile fundamental knowledge o | entation and produce the various industrial product on bioinformatics and problems and its solution in ore Course |
| CO5 | compile fundamental knowledge o | on bioinformatics and problems and its solution in ore Course |
| COURSE COURSE | compile fundamental knowledge of COUTCOME Code:HLBP4L | on bioinformatics and problems and its solution in ore Course Course Title: PRACTICAL IV |
| COURSE COURSE | Compile fundamental knowledge of COUTCOME Code:HLBP4L | on bioinformatics and problems and its solution in Ore Course Course Course Title: PRACTICAL IV learners should be able to |
| COURSE COURSE Course C On succes CO1 | compile fundamental knowledge of COUTCOME Code:HLBP4L ssful completion of the course, the analyze the nature of vegetation | on bioinformatics and problems and its solution in ore Course Course Title: PRACTICAL IV learners should be able to 1. |
| COURSE COURSE Course C On succes CO1 CO2 | compile fundamental knowledge of COUTCOME Code:HLBP4L Substrate of the course, the course, the course is the cours | on bioinformatics and problems and its solution in ore Course Course Title: PRACTICAL IV learners should be able to h. ty. |
| COURSE COURSE Course C On succes CO1 CO2 CO3 | compile fundamental knowledge of COUTCOME Code:HLBP4L ssful completion of the course, the analyze the nature of vegetation examine the primary productivi evaluate the role of biofertilizer | on bioinformatics and problems and its solution in ore Course Course Title: PRACTICAL IV learners should be able to ty. rs on plant growth. |
| COURSE COURSE Course C On succes CO1 CO2 | compile fundamental knowledge of COUTCOME Code:HLBP4L Soful completion of the course, the analyze the nature of vegetation examine the primary productivi evaluate the role of biofertilizer demonstrate various tissue cultu | on bioinformatics and problems and its solution in ore Course Course Title: PRACTICAL IV learners should be able to ty. rs on plant growth. |

| Elective Course | | |
|--|--|--|
| Course Code:HLBP4E1 | | Course Title: BIOPHYSICS AND BIOSTATISTICS |
| On successful completion of the course, the learners should be able to | | |
| CO1 | Summarize bioenergetics, photobiology and concepts of biostatistics. | |
| CO2 | determine the measures of central tendency and measures of dispersion. | |
| CO3 | analyze about correlation and regression. | |
| CO4 | relate the knowledge onprobability and theoretical distribution. | |
| CO5 | formulate hypothesis and test the significance with interpretation. | |

COURSE OUTCOME

| Elective Course | | |
|--|---|--|
| Course Code:HLBP4E2 Course Title: MICROBIAL GENETICS | | |
| On successful completion of the course, the learners should be able to | | |
| CO1 | recall the effect of mutation on gene function. | |
| CO2 | analyse about genetic recombination in T4 phage. | |
| CO3 | distinguish DNA and RNA virus genomes and its role in molecular genetics. | |
| CO4 | explain the chromosomal and extra chromosomal inheritance in yeast. | |
| CO5 | demonstrate the genetics of bacteria and bacteria phages. | |

| Core Course | | |
|--|--|------------------------------------|
| Course Code:HLBP4P Course | | Course Title:PROJECT AND VIVA VOCE |
| On successful completion of the course, the learners should be able to | | |
| CO1 | develop laboratory skills and master in advanced techniques. | |
| CO2 | make use of advanced tools in analyzing data. | |
| CO3 | summarize the concept of research with ethics. | |
| CO4 | CO4 defend their research professionally. | |
| CO5 | justify valuable solutions to the betterment of society. | |

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