SRI VENKATESWARA UNIVERSITY - TIRUPATI

B.S.c., (Honours) in **BOTANY (MAJOR)**

III - SEMESTER

(W.E.F. 2024-25)

COURSE5:VASCULAR PLANTS (PTERIDOPHYTES, GYMNOSPERMS AND TAXONOMY OF ANGIOSPERMS)

Credits-3

I. Learning Objectives: By the end of this course the learner has:

1. To recognize the morphology, anatomy and reproduction in two groups of archegoniate.
2. To acquire knowledge of the taxonomic aid sand classification systems.
3. Toreadthevegetativeandfloralcharacteristicsofsomeformsofangiospermicfamilies along with their economic value.
4. To study the significance of other branches of botany in relation to plant taxonomy.

II. Learning Outcomes :On completion of this course students will be able to:

1. Infer the evolution of vasculature, heterospory and seed habit in Pteridophytes.
2. Illustrate the general characteristics of Gymnosperms along with their uses
3. Discuss about some Taxonomic aid sand their applications in plant systematic.
4. Compare and contrast the vegetative and floral characteristics of some angiospermic families
5. Evaluate the economic value of plant species from the families under the study.
6. Defend the utility of evidences from different branches of botany in solving the taxonomic lineages of some species.

III. Syllabus of Theory:

UNIT-1: PTERIDOPHYTES 10Hrs.

1. General characteristics of Pteridophyta; Smith(1955) classification.
2. Occurrence,morphology,anatomy,reproduction(developmentaldetailsar enotneeded) and life history of: (a) Lycopsida: *Lycopodium* and (b) Filicopsida: *Marsilea*
3. Stelarevolution in Pteridophytes; Hetero spory and seed habit.
4. Ecological and economic importance of Pteridophytes.

UNIT-2: GYMNOSPERMS 10Hrs.

1. General characteristics of Gymnosperms; Sporne(1965)classification.
2. Occurrence,morphology,anatomy,reproduction(developmentaldetailsare notneeded) and life history of:(a) Cycadopsida: *Cycas* and (b) Gnetopsida: *Gnetum*
3. Ecological and economic importance of Gymnosperms.

UNIT-3:PRINCIPLESOFPLANT TAXONOMY 10Hrs.

1. Aimandscopeoftaxonomy,speciesconcept,taxonomichierarchy-majorandminor categories.
2. Plant nomenclature : Binomial system ,ICBN-rules for nomenclature.
3. Herbariumanditstechniques,BSIherbariumandKewherbarium;concep tofdigital herbaria.
4. Bentham and Hooker system of classification.
5. Phylogenetic systematics: primitive and advanced, homology and analogy, parallelism andconvergence, monophyly, paraphyly, polyphyly, clades. synapomorphy, symplesiomorphy,apomorphy.APG-IV classification.

UNIT-4:DESCRIPTIVEPLANT TAXONOMY 8Hrs.

Systematic description and economic importance of the following families:

1. Polypetalae:(a) Annonaceae(b)Curcurbitaceae
2. Gamopetalae:(a)Asteraceae(b)Asclepiadaceae
3. Monochlamydae:(a)Amaranthaceae(b)Euphorbiaceae
4. Monocotyledonae:(a)Arecaceae(b)Poaceae

UNIT-5:EVIDENCES FORPLANT SYSTEMATICS 7Hrs.

1. Anatomyandembryology inrelation toplant systematics.
2. Cytologyandcytogeneticsinrelationtoplant systematics.
3. Phy to chemistry in relation to plant systematics.
4. Numerical taxonomy
5. Origin and evolution of angiosperms.

IV. TEXT BOOKS:

1. Acharya,B.C.,(2019)Archchegoniates,KalyaniPublishers,NewDelhi
2. Bhattacharya,K.,G.Hait&Ghosh,A.K., (2011)ATextBookofBotany,VolumeII,New Central Book Agency Pvt. Ltd., Kolkata
3. Hait,G.,K.Bhattacharya&A.K.Ghosh(2011)ATextBookofBotany,Vol ume-I, New Central Book Agency Pvt. Ltd., Kolkata
4. Pandey,B.P.(2013)CollegeBotany,Volumes-I&II,S.ChandPublishing,NewDelhi

V. REFERENCEBOOKS:

1. Smith,G.M.(1971)CryptogamicBotanyVol.II.,TataMcGrawHill,NewDelhi
2. Sharma,O.P.(2012)Pteridophyta.TataMcGraw-Hill,NewDelhi
3. Sporne,K.R. (1971)The MorphologyofGymnosperms.HutchinsonsCo. Ltd.,London
4. Coulter,J.M.&C.J.Chamberlain(1910)MorphologyofGymnosperms,TheUniver sityof Chicago Press, Chicago, Illinois
5. Bhatnagar,S.P.&AlokMoitra(1996)Gymnosperms.NewAge International,NewDelhi
6. Sambamurty,A.V.S.S. (2005)TaxonomyofAngiospermsI.K.InternationalPvt. Ltd., New Delhi
7. Singh,G.(2012).PlantSystematics:TheoryandPractice.Oxford& IBHPvt.Ltd.,NewDelhi.
8. Simpson,M.G. (2006).PlantSystematics.ElsevierAcademicPress,SanDiego, CA,U.S.A.

VI. SUGGESTED ACTIVITIES AND EVALUATION METHODS:

Unit-1:Activity: Making temporary slides/models/drawings of Pteridophytes in the syllabus.

Evaluation method: Assessment of the temporary slides/model/drawing.

Unit2:Activity: Studyofwoodelementsinlocallyavailable Gymnospermsandmaking temporary slides.

Evaluation method: Validation of prepared slides submitted by the learner.

Unit-3:Activity: Botanicalfieldtripandcollectingplantspecimensforherbarium.

Evaluation method: Attendance in field trip and submission of field note book and herbarium sheets with filled in labels.

Unit4:Activity

:Makinggoodmodelsordrawingsorcollectionofphotographsofsomeimportant plant species from the families included in the syllabus.

Evaluation method: Authorize the quality of the work and conferring reward.

Unit5:Activity

:Collectionofscientificliteratureonsolvingtaxonomicproblemsbytaking evidences from other branches of Botany.

Evaluation method : Validation of the collection submitted along with summary.

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III - SEMESTER

(W.E.F. 2024-25)

COURSE5: VASCULAR PLANTS (PTERIDOPHYTES , GYMNOSPERMS AND ANGIOSPERM TAXONOMY)

Practical 02hours /Week Credits-1

I. Course Out comes : On successful completion of this practical course, student shall be able to:

1. DistinguishthePteridophytesandGymnospermsbasedontheirmorphological, anatomical and reproductive structures.
2. Makesystematicclassificationofplantspeciesusingvegetativeandfloralcharacters.
3. Identify angiosperm plants pecies and make her barium specimens.

II LABORATORY/FIELDEXERCISES:

I. Study/microscopicobservationofvegetative,sectional/ anatomicalandreproductive structures of the following using temporary or permanent slides/specimens/ mounts:

1. Pteridophyta: *Lycopodium*and*Marselia*
2. Gymnosperms:*Cycas*and*Gnetum*

II.

Technicaldescriptionoflocallyavailableplantspeciesfromthefollowingangi osperm families:

1. Annonacae 2. Cucurbitaceae 3. Asteraceae 4. Asclepiadaceae
5. Amaranthaceae 6. Euphorbiaceae 7. Arecaceae 8. Poaceae

III. Demonstrationofherbariumtechniques.

IV.

Fieldtriptoalocalfloristicarea/forest(Submissionof30numberofHerbariums heetsof wild plants with the standard system are mandatory).

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III - SEMESTER

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COURSE 6: PLANT PATHOLOGY AND PLANT DISEASES

Credits-3

I. Learning Objectives: By the end of this course the learner has:

1. To study various plant pathogens ,their survival and dispersal mechanisms.
2. Tounderstandtheprocessesinvolvedininfectionandpathogenesisinplants.
3. Tostudythecommondiseasesofsomeimportantfieldandhorticulturalcrops.

II. Learning Outcomes:

1. Identify major groups of plant pathogen sand classify plant diseases.
2. Explain various stages in infection, plant pathogens is and responsible factors.
3. Elaborate the preventive and control measures for plant diseases.
4. Discuss about some diseases of field crops and their management.
5. Discuss about some diseases of horticultural crops and their management.

III. Syllabus of Theory:

Unit-1:Plantpathogens, survival and dispersal 8Hrs.

1. Plantpathology:definition,importanceofplantdiseases,importantfaminesinworld;scope and objectives of plant pathology.
2. Importantplantpathogenicorganismswithexamplesofdiseasescausedbythem.
3. Classification of plant diseases based on important criteria.
4. Abriefaccounton survivalof plant pathogens.
5. Dispersal of plant pathogens–active and passive processes.

Unit-2:Infectionandpathogenesisinplants 8Hrs.

1. Infection process–pre-penetration, penetration and post-penetration.
2. Role of enzymes in plant pathogenesis.
3. Role of toxins in plant pathogenesis.
4. Role of growth regulators in plant pathogenesis.
5. Defensemechanismsinplantsagainstpathogens.

Unit-3: Plant diseasemanagement 8Hrs.

1. Plantdiseaseepidemiology;plantdiseaseforecasting;remotesensinginplant pathology.
2. General principles of plant diseases management.
3. Regulatory methods, cultural methods; biological control and PGPR.
4. Physical methods, chemical methods; host plant resistance.
5. Integrated plant disease management(IDM) – Concept, advantages and importance.

Unit-4:Diseases of field crops 12Hrs.

Symptoms, etiology, disease cycle and management of major diseases of following crops:

a) Rice: Blasto frice, bacterial blight and Tungro

b) Bajra: Downymildew and Ergot

c) Pigeon-pea:Phytophthorablight, wiltand sterility mosaic

d) Groundnut:Tikkaleaf spot, rustandroot rot

Unit-5: Diseases of horticultural crops 9Hrs.

Symptoms,etiology,diseasecycleandmanagementofmajordiseasesof following crops:

a) Brinjal:Phomopsisblight andLittleleaf

b) Okra:PowderymildewandYellowveinmosaic

c) Pomegranate:AlternariafruitspotandAnthracnose

d) Coconut:BudrotandBasalstem rot

IV. Text Books:

1. P.D. Sharma (2011) Fundamentals of Plant Pathology, Tata McGraw-Hill Education, NewDelhi
2. R.S.SinghandU.S.Singh(2017)PlantPathology: AnIntroduction,CRCPress,BocaRaton, Florida, USA
3. R.S.Mehrotra(2008)PlantPathology,TataMcGraw-HillEducation,New Delhi
4. M. S. Reddy and Gopal Singh (2016) Plant Pathology: Concepts and Laboratory Exercises, Scientific Publishers, Jodhpur, India

V. ReferenceBooks:

1. Agrios,G.N.(2005).PlantPathology(5thed.).AcademicPress,SanDiego, California.
2. Dehne,H.W.(Ed.). (2012).PlantPathology:FromMolecularBiologytoBiologicalControl. Springer, Dordrecht, Netherlands.
3. Dicklow,M.B.,&Beaudry,R.M.(Eds.). (2013).PlantPathologyConceptsandLaboratory Exercises (2nd ed.). CRC Press, Boca Raton, Florida.
4. Lucas,J.A. (1998).PlantPathologyandPlantPathogens.BlackwellScience,Oxford,UK.
5. Lucas,J.A.(1998).Plantpathology andplantpathogens.BlackwellScience,Oxford, UK.
6. Schumann,G.L.,&D'Arcy,C.J. (2010).EssentialPlantPathology(2nded.).APSPress,St. Paul, Minnesota.
7. Schumann,G.L., andC.D'Arcy (2010).Essentialplant pathology.APS Press, St.Paul, MN.
8. Singh,R.P.,andU.S.Singh(2020).Plantdiseases:Identification,managementan d challenges. Springer, Singapore.

VI. Suggested activities and evaluation methods:

Unit1:Activity

:FieldSurveyandmakingareportonvariousplantpathogens,theirsurvival and dispersal mechanisms.

Evaluation method: Field reports, presentations and visual documentation based on a rubric.

Unit2:Activity: Casestudiesonplantinfectionsandfactorscontributingtodisease development.

Evaluation method: Diagnostic evaluation of case study report for problem-solving and critical thinking skills.

Unit-3: Activity: A survey report on various preventive and control measures for plant diseases practiced by the farmers in their locality.

Evaluation method: Peer review by student son the quality of report.

Unit-4:Activity: Fieldsurveyanddatacollectionondiseasesoflocalfieldcrops.

Evaluation method: Assessment of the quality of report bases on arubric.

Unit-5: Activity: Microscopic observations and making drawings of diseased samples.

Evaluationmethod

:Formativeassessmentofpresentationoffindingsthroughvisuals**/**drawings.

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COURSE6: PLANT PATHOLOGY AND PLANT DISEASES

Credits-1

PRACTICAL

I. Course Out comes: On successful completion of this practical course, student shall be able to:

1. Handle equipment and instruments in plant pathology laboratory.
2. Isolate plant pathogenic microbes.
2. Identify the plant diseases based of his to pathological observations.

II. Laboratory/field exercises:

1. Familiaritywithgeneralplantpathologicallaboratoryandfieldequipment.
2. Isolation and Identification of plant pathogenic fungi.
3. Isolation and Identification of plant pathogenic bacteria.
4. Identification of phanerogamic plant parasites.
5. Isolation and Identification of plant pathogenic nematodes.
6. Demonstration of Koch's postulates
7. Identificationandhistopathologicalstudiesofselecteddiseasesoffieldcrops.
8. Identificationandhistopathologicalstudiesofselecteddiseasesofhorticultura lcrops.

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III - SEMESTER

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COURSE7: PLANT BREEDING

Credits-3

I. LEARNING OBJECTIVES: By the end of this course the learner has:

1. Tolearntheobjectivesandscopeofplantbreedingalongwithreproductiveme thodsin plants.
2. To understand the breeding methods in plant for production of new varieties.
3. To have a comprehensive knowledge on tools and techniques in plant breeding.

II. LEARNING OUTCOMES:

1. Compare and contrast the methods of reproduction and also pollination mechanisms.
2. Design appropriate pollination method for a given crop plant.
3. Recommend the best possible breeding method for a crop species.
4. Propose the steps for production of hybrid varieties of crop plants.
5. Apply molecular techniques to develop a tailored plant variety.

III. SYLLABUS OF THEORY:

Unit-1:Basicconcepts of plant breeding 8Hrs.

1. Definition, aim, objectives and scope of plant breeding; concepts in plant breeding: genetic variation, heritability, and selection.
2. Advantagesanddisadvantagesofasexualandsexualreproduction;apomixis :definition, types and significance.
3. A brief account of self and cross pollination, their genetic consequences and significance; classification of crop plants based on mode of pollination and mode of reproduction.

Unit-2: Contrivances forcross pollination 7Hrs.

1. Self-incompatibilityinplants–
   Definition,heteromorphicandhomomorphicsystems; exploitation of self-incompatibility in hybrid production.
2. Malesterility-Genetic, cytoplasmic and cytoplasmic-genetic, utilization in plant breeding.
3. Domestication of plants, centres of origin of crop plants.

Unit-3:Breeding methods in plants 9Hrs.

1. Plantintroduction–
   types,objectives,plantintroductionagenciesinIndia,procedure,merits and demerits; germ plasm collections, genetic erosion, gene sanctuaries.
2. Selection–natural and artificial selection –basic principles of selection.
3. Self-pollinatedcrops:purelineselectionmethod–
   procedure,advantagesanddisadvantages, achievements.
4. Vegetativelypropagatedcrops:Clonalselection-
   procedure,advantagesanddisadvantages, achievements.

Unit-4:Breeding methods in cross- pollinated plants 12Hrs.

1. Hybridization–
   objectives,types,procedure,advantagesanddisadvantages,achievements.
2. Cross-pollinatedcrops:backcrossmethod-
   procedure,advantagesanddisadvantages, achievements.
3. Heterosis:definition,geneticbasesofheterosis–
   dominance,overdominanceandepistasis hypotheses; physiological bases of heterosis – commercial utilization.
4. Syntheticsandcomposites –productionprocedures –
   merits,demeritsandachievements.

Unit-5:Modernmethodsinplantbreeding 9Hrs.

1. Mutationbreeding:spontaneousandinducedmutations– characteristicfeaturesofmutations –procedureofmutation breeding – applications –advantages,limitationsandachievements.
2. Polyploidy breeding: auto-polyploids and allopolyploids – applications in crop improvementand limitations.
3. DNAmarkersandtheir applicationsin plantbreeding:RFLP,SSR,and SNP
4. MarkerAssistedSelection(MAS)anditsapplicationsinplantbreeding.

IV. TEXT BOOKS:

1. Singh, B. D. (2001) Plant breeding: Principles and methods. Kalyani Publishers, New Delhi, India.
2. Poehlman, J. M. and Sleper, D. A. (1995) Breeding field crops, 4th ed. Iowa State University Press, Ames, Iowa, USA.
3. Patil,J.V.,S.S.Patil,andR.A.Balikai(2019)PrinciplesandMethodsinPlantBreeding, Scientific Publishers (India), Jodhpur
4. Purohit,S.S. (2014)PlantBreeding:PrinciplesandMethods,Agrobios(India),Jodhpur

V. REFERENCE BOOKS:

1. Acquaah,G.2012.Principlesofplantgeneticsandbreeding,2nded.Wiley-Blackwell, Ames, Iowa, USA.
2. Allard,R.W.1999.Principles of plant breeding. John Wiley &Sons, New York, USA.
3. Stuber,C.W.,Edwards,M.D.andWendel,J.F.1987.Molecularmarkersinplantbreeding: Applications and potential. Science 238: 1659-1664.
4. Hayes,H.K.,R.E.Kirk,andR.H.Jones(1951). MethodsfortheStatisticalAnalysisof Plant Breeding Experiments. Iowa State College Press, Ames, IA.
5. Simmonds,N.W.(1979).PrinciplesofCrop Improvement(2nded.).Longman,Harlow,UK.

VI. SUGGESTED ACTIVITIES AND EVALUATION METHODS:

Unit-1: Activity: Written assessment on reproduction and pollination mechanisms in plants.

Evaluation method: Awarding grade based on writing appropriate points in a descriptive way.

Unit2:Activity: Collection of scientific literature on contrivances in plants to promote cross fertilization.

Evaluationmethod

:Qualityandorganizationofthereportinasystematicwaywithdata collected and analysis made.

Unit-3:Activity: Handsonactivityofselectionprocedureforagivencrop plant.

Evaluationmethod

:Assessmentofunderstandingandapplyingappropriateselectionprocedure.

Unit-4: Activity: Field trip to an agriculture or a horticulture research station to learn hybridization techniques.

Evaluation method: Active participation and learning skills on production of hybrid plants.

Unit5:Activity: Casestudiesofmodernapplicationsofmoleculartechniquesincrop improvement.

Evaluationmethod

:Basedonarubricwithspecifiedcriteriaandperformancelevelsofthe learner.

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COURSE7:PLANT BREEDING

Credits-1

PRACTICAL SYLLABUS

I. COURSE OUTCOMES : On successful completion of this practical course, students hall be able to:

1. Distinguish self and cross-pollinated plant species based on floral biology.
2. Perform skills related to self and cross pollination in plants.
3. Make hybridization to produce new varieties.

II. LABORATORY/FIELD EXERCISES:

1. Floral biology in a self and across pollinated plant species.
2. Identification and classification of plants based on pollination mechanism.
3. Pollen viability test.
4. Observation on pollen germination.
5. Practicing emasculation technique.
6. Practicing selfing and crossing techniques.
7. Assessment of genetic variability.
8. Estimation of heterosis and in breeding depression.
9. Studying mutant and polyploids in crop plants.

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COURSE8: PLANT BIOTECHNOLOGY

Credits-3

I. LEARNING OBJECTIVES: By the end of this course the learner has:

1. To acquire knowledge of sterilization techniques used in plant tissue culture.
2. To learn about various types of plant tissue culture practices.
3. To know the applications of plant biotechnology in production of novel plants.

II. LEARNING OUT COMES: Students at the successful completion of the course will be able to:

1. Explain the scientific techniques and tools used in plant tissue culture laboratories.
2. Appraise the applications of plant tissue culture in agriculture and horticulture sectors.
3. Acquire skills related to various aspects in plant tissue culture.
4. Evaluate the role of transgenic plants in solving certain plant related beneficiary issues.
5. Justify the role of plant biotechnology in bio energy and phyto remediation.
6. Judge the bio safety and bioethics related to plant biotechnology.

III. SYLLABUS OF THEORY:

UNIT-1:Basic techniques in plant tissue culture 10Hrs.

1. Plant tissue culture: Definition, scope and significance; infrastructure and equipment required to establish a tissue culture laboratory.
2. Sterilization techniques; formulation of media for plant tissue culture.
3. Concept of totipotency , initiation and maintenance of callus cultures; induction of morphogenesis in vitro.
4. Somatic embryogenesis and organogenesis; factors affecting somatic embryogenesis and organogenesis synthetic seeds and their applications.

UNIT-2:Organ and haploid culture techniques 8Hrs.

1. Importanceandapplicationsofmeristemculture,zygoticembryoculture,endosperm culture.
2. Micro propagation and its uses, commercial exploitation of micro propagation.
3. Production of haploids using anther, pollen and unfertilized ovule cultures-Characterization and applications.

UNIT-3:Cellandprotoplastcultures 12Hrs.

1. Cell suspensions continuous and batch cultures; mass cultivation of plant cells using bioreactors.
2. Productionofsecondarymetabolitesfromcellcultures,strategiesusedfor enhancedproduction of secondary metabolites. Biotransformation using plant cell cultures.
3. Isolation, purification and culture of proto plasts; methods used for protoplast fusion.
4. Somatichybridization/cybridization– selectionsystemsforsomatichybrids/cybrids,their characterization and applications.

UNIT-4:Transgenic plants 8Hrs.

1. Transgenicplants– definition,biosafetyandethicalissuesassociatedwithtransgenic plants.
2. Herbicideresistance(glyphosphate),insectresistance(alphaamylaseinhibitor).
3. Virusresistance(coatproteinmediated,nucleocapsidgene),diseaseresistance (antifungal proteins, PR proteins).
4. Qualityimprovement(Goldenrice),Shelf-lifeenhancement(Flavrsavrtomato).

UNIT-5:Advancesin plantbiotechnology 7Hrs.

1. Plantsyntheticbiologyanditsapplications;plant-basedvaccinesand therapeutics.
2. Biofortificationandgeneticallymodified foods.
3. Biodegradableplastics, polyhydroxybutyrate.
4. Applicationsofplantbiotechnologyinbioenergyproductionanden vironmental remediation.

IV. TEXT BOOKS:

1. Ignacimuthu,S., (2003)PlantBiotechnology.Oxford&IBHPublishingCo.Pvt.Ltd.New Delhi.
2. KalyanKumarDe.,(1997)PlantTissueCulture– NewCentralBookAgency(P)Ltd., Calcutta.
3. MascarenhasA.F., (1991)HandbookofPlantTissueCulture.IndianCouncilofAgricultural Research. New Delhi.
4. Narayanaswamy,S(1994)PlantCellandTissueCulture,Tata– McGrawHillPublishing Co., Ltd., New Delhi.

V. REFERENCE BOOKS:

1. C.NealStewartJr. (2018)PlantBiotechnologyandGenetics:Principles,Techniques,and Applications John Wiley & Sons, Inc. in Hoboken, New Jersey, USA.
2. AdrianSlater,NigelW.Scott,andMarkR.Fowler(2008)PlantBiotechnology:TheGenetic Manipulation of Plants Oxford University Press in Oxford, UK.
3. S.MohanJainandPramodK.Gupta(2010)PlantBiotechnology:MethodsandApplications CRC Press, Taylor & Francis Group in Boca Raton, Florida, USA.
4. RamLakhanSingh(2017)PlantBiotechnology:RecentAdvancesandFuture Prospects Springer International Publishing AG in Cham, Switzerland.
5. AltmanandP.M.Hasegawa(2013)PlantBiotechnologyandAgriculture:Prospectsforthe 21st Century Elsevier Inc. in Amsterdam, Netherlands.

VI. SUGGESTED ACTIVITIES AND EVALUATION METHODS:

Unit-1:Activity: Preparationofmediafortissueculture.

Evaluation method: Assessment of skill in preparation of media in an effective manner.

Unit-2:Activity: Groupdiscussiononvarioustissueculturepractices.

Evaluationmethod

:Activeparticipation,criticalthinking,contentpresentaion,collaboration skills etc., based on a rubric.

Unit-3: Activity: Designing a bioreactor system for mass cultivation of plant cells.

Evaluationmethod

:Awardinggradebasedon**s**killsperformedindesigningaprototype bioreactor.

Unit4:Activity

:Collectionofscientificliteratureonvarioustransgenicplantsdeveloped. **Evaluation method:** Assess credibility and relevance of literature collected, analysis and conclusions made.

Unit-5:Activity: Casestudiesonapplicationsof plant biotechnology.

Assessmentmethod

:BasedondataandInformationcollected,analysisandinterpretationmade, presentation and organization of the report.

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COURSE8: PLANT BIOTECHNOLOGY

Credits-1

I. COURSE OUTCOMES: On successful completion of this practical course, student shall be able to:

1. Operate all the equipment and instruments in a plant tissue culture laboratory.
2. Establish callus and organ culture.
3. Obtain quality plants using micro-propagation techniques.

II. LABORATORY/FIELD EXERCISES:

1. Equipment used in plant tissue culture.
2. Sterilization techniques in plant tissue culture laboratory.
3. Preparation of culture media
4. Callus induction and sub culturing.
5. Organogenesis using PGRs'
6. Demonstration of cell and protoplast culture.
7. Demonstration of organ cultures.
8. Demonstration of anther and pollen cultures.