K.V.R.Govt. COLLEGE FOR WOMEN (A), KURNOOL

(Under the Jurisdiction of Rayalaseema University)

Accredited with "A" Grade by NAAC

BOARD OF STUDIES MEETING

2020-21

Subject: M.Sc BOTANY

25-8-2020

K.V.R. Govt. COLLEGE FOR WOMEN (AUTONOMOU), KURNOOL

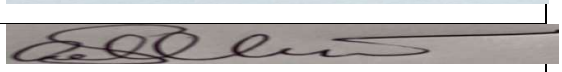
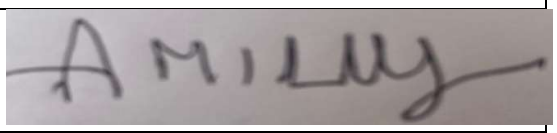
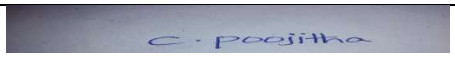
ACCREDITATED BY NAAC WITH 'A' GRADE

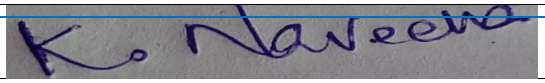
M.Sc DEPARTMENT OF BOTANY

2020-2021

MINUTES OF THE BOARD OF STUDIES MEETING

Board of Studies meeting was conducted in the department of Botany
On **13-07-2020** at 10.00 am with the following members.

S.N0	Name	Designation and Address	Signature
MEMBERS FROM THE DEPARTMENT			
1	**Dr. R. VINOLYA KUMARI**	**CHAIRMAN**	
2	**Dr. D. SWAPNASREE**	Member	
3	**Dr. S. SUNITHA**	Member	
4	**Dr. J. VASUNDHARAMMA**	Member	
UNIVERSITY NOMINEE			
6	**PROF. C.SUDHAKAR**	**Prof. of Botany S.K University ANANTHPUR**	
SUBJECT EXPERTS			
7	**Dr. A. M. Reddy**	Assistant Professor in Botany Yogivemana university, kadapa	
8	**Dr. G.S.Ranganayakulu**	Assistant Professor in Botany, Rayalaseema University Kurnool	
ALUMNAE			
9	**Dr. M. Suseelamma**	Professor of Botany, SML GovtDegree college, yemmiganure Kurnool	
STUDENT REPRESENTATIVES			
11		M.Sc	

12	**K. Naveena**	M.Sc	

K.V.R. Govt. COLLEGE FOR WOMEN (AUTONOMOU), KURNOOL

ACCREDITED BY NAAC WITH 'A' GRADE,

Established in 1958 under G.O.Ms.No.197 Edn. Dt.27-01-1958

DEPARTMENT OF BOTANY

CURRICULUM(CBCS)- M.Sc (Botany)

(syllabusW.e.fAcademis Year 2020-21)

SEMESTER -1

S.NO	PAPER CODE	TITLE OF THE PAPER	NO OF CREDITS	SEMESTER END EXAM DURATION	TOTAL MARKS IAE	SEE
THEORY						
1	3111	Plant Ecology and Environment	4	3	20	80
2	3121	Plant Molecular Biology & Bioinformatics	4	3	20	80
3	3131	Plant Development andReproduction	4	3	20	80
4	3141	BIOSYSTEMATICS	4	3	20	80
PRACTICALS						
1	3111& 3121	Plant Ecology and Environment & Plant Molecular Biology & Bioinformatics	4	3		100
2	3131& 3141	Plant Development andReproduction &BIOSYSTEMATICS	4	3		100

SEMESTER -IV

S.NO	PAPER CODE	TITLE OF THE PAPER	NO OF CREDITS	SEMESTER END EXAM DURATION	TOTAL MARKS IAE SEE
THEORY					

1	4111	Plant Biotechnology	4	3	20	80
2	4121	EthnoBotany&Phytomedicine	4	3	20	80
3	4131	Biodiversity, Conservation & Management	4	3	20	80
4	4141	Horticulture and Agriculture Biology	4	3	20	80
PRACTICALS						
1	4111& 4121	Plant Biotechnology&Ethnobotany&Phytomedicine	4	3		100
2	4131	Biodiversity, Conservation & Management& Horticulture and Agriculture Biology	4	3		100
3	Dissertation of Project work in last semester along with Viva and Seminar		4			100

RESOLUTIONS

The members of BOS in Botany met on 25-08-2020 in the Department of Botany, KVR Govt. Degree College for Women(A), Kurnool under the chairmanship of **Dr.R. VinolyaKumari**Incharge of M.Sc. Botany Course, discussed the proposals on the curriculum for the II year PG Botanty course and passed the following resolutions applicable to the academic year 2020-21.

- Resolved to follow the Rayalaseema university revised syllabus in Botany for I M.Sc., Semester-I and Semester-II as decided by the expert members and members of the Board of Studies (PG) Botany.
- It is unanimously resolved that there is 20% change in theory syllabus for First year M.Sc., The question paper pattern for theory shall have two sections . Section - A for 20 marks and Section - B for 40 marks. IAE: Internal assessment marks -20Marks(Internal examination 15, Seminar5) and extracurricular activity : NSS,YOUTHRED CROSS,NCC.
- The BOS chairman is authorized to give the panel of Internal and external examiners to the controller of Examination

- Resolved to approve the new syllabus in Botany for I M.Sc., Semester-III and Semester-IV

- The new syllabus will come into effect from the academic year 2020-21 for II M.Sc. Semester-III and Semester-IV.

- Resolved to conduct the practical examinations at the end of Semester-IV for I M.Sc. students.

1. In each Semester there will be four papers i.e. four Core papers for Semester-III, for Semester-IV There are fourpaper These Semester End Examinations will be for 80 Marks .

2. Internal Assessment Examination will be for 20 Marks.
   There will be two Internal Assessment Examinations in each semester.
   (Average of two to be taken).

   Seminar/Assignment/Project is given the weight age of 5 Marks.

   Total Internal Assessment Marks =15 + 5 = 20 Marks

3. Model Question Paper for Semester End Examination :

   i) The Semester End Examination Question Paper consists of
   Part A with four questions to be answered out of eight questions of five marks each (64x 5 = 20) and

Part B with four questions of internal choice carrying 15 marks each (4 x 15 = 60)

ii) Duration is 3 Hours

iii) Maximum marks are 80 and Minimum Passing marks are 30.

4. Model question paper for IAE.

i) Internal Assessment Examination will be for 20 marks.
ii) One big question and one short answers
iii) Duration of Internal Assessment Examination is 45 minutes.
iv) The above pattern stands for Semester-I and Semester-II.

5. Practical Examination:-

i) There will be **one** Practical Examination at the end of Semester-II.

ii) Maximum marks for Practical Examination is 100.

iii) Minimum passing marks for Practicals are 20.

iv) Duration of Practical Examination is 3 hours.

v) There will be no Internal Assessment Examination in Practical Examination.

Scheme of valuation for each suject paper Practical Examination:
Practical-I

i)	Major Experiment	20 Marks
ii)	Minor Experiment	10 Marks
iii)	Spotters	10 Marks
iv)	Record	05 Marks
v)	Viva	05 Marks
	Total =	50 Marks

6. Resolved to approve the syllabus (Theory Semesters III, IV) as prescribed below

7. Resolved to approve the Model Papers for II-M.Sc. Semester-IIIand Semester-IVas per

8. Resolved to follow the CBCS Semester pattern with a total of 100 Credits for 2400 marks. In each semester :
   - Four instructional hours per week has been given four Credits for Theory and
   - Three instructional hours per week considered as two credits for Practicals.
   - Each open Elective has been given four credits
   - Dissertation of Project work in last semester along with Viva and Seminar has been given four credits.

3111. Plant Ecology and Environment

Unit- I: Ecology and Environment
Definition, Scope and History of Ecology; Ecosystem-structure and function; Physical environment-light, temperature and soil factors; Energy flow in ecosystems-Concept of productivity, types of food chains, food web; Biogeochemical cycling- global carbon cycle, Sulphur and water cycle; Ecosystems of the world- terrestrial (tropical forests- seasonal and rainforests; grasslands) and aquatic ecosystems.

Unit- II: Populations and Individuals
Characteristics of plant populations-density, dispersion, natality, mortality and survival, age structure and biotic potential; population growth patterns; population regulation; concept of metapopulation; Population dynamics- Species interactions: plant-plant (inter-specific competition) and plant-animal (pollination ecology and plant defense against herbivores); Concept of ecological niche.

Unit- III: Plant Communities and Classification
Characteristics of plant communities; analytic-qualitative (life forms, phenology), and quantitative (abundance, density, frequency, basal area); synthetic-species dominance and species diversity. Methods of study of plant communities- quadrats and transects; Importance Value Index, dominance index, similarity index, species diversity indices; Succession-process and modeling; concept of climax. Ecological adaptations.

Unit- IV: Environmental Challenges
Natural resources, Classification of natural resources. Energy resources: Non-Conventional energy resources- solar energy, bio energy. Non-renewable energy resources- fossil fuels; coal, natural gas, petroleum. Environmental pollution: sources, effects and control measures of air pollution, water pollution. Global warming-greenhouse gases, impacts on global environment and biodiversity; Ozone layer depletion; El Nino Southern Oscillation, La Nino; Earth Summit – 1992 (RIO DE JANERIO) and 2002 (JOHANNESBURG) and its outcome. Bioremediation.Environmental Impact Assessment (EIA).

Practicals:

1. Determination of texture of different soilsamples.
2. Determination of organic matter in soilsamples.
3. Determination of salinity in soil and watersamples.
4. Estimation of dissolved oxygen in watersamples.
5. Determination of minimum size ofquadrates.
6. Determination of minimum number ofquadrates.
7. Determination of quantitative characters of plantcommunity.

8. Determination of species-wise IVI in plant community.
9. Determination of species diversity indices of plant communities.

Suggested Readings:

1. Alan beebay& Anne-Maria Brennan. 2008. First Ecology. 3rd ed. Oxford UniversityPress.

2. Begon Michael, Colin Townsend & John L. Harper. 2005. Ecology, From Individuals to Ecosystems. 4th ed.Black well Publishing,Oxford.

3. Brower, J., Jerold Zar and Carl von Ende. 1989. Field and laboratory methods forGeneral Ecology. Wm. C. BrownPublishers.

4. Chapman, J.I. & M.J. Reiss. 1992. Ecology-Principles and applications.OUP.

5. Cunningham, W.P. &M.A.Cunningham 2007. Principles of Environmental ScienceInquiry and applications. Tata McGrawHillPub.NewDelhi.

6. Dash, M.C.2009. Fundementals of Ecology. Tata McGrawHillPub.NewDelhi.

7. Girard, James. 2005.Principles of Environmental Chemistry. Jones &Barlett. Sudbury.MA,USA.

.8. Harborne, H.B. 1998.Introduction to Ecological Biochemistry.Academic Press.

9. Kormondy, E.J.1996. Concepts of Ecology.PHI. New Delhi.

10. Mackenzie, A., A.S. Ball &S.R.Virdee. 2001. Instant Notes in Ecology. Viva Books.New Delhi.

11. Molles, M.C. 2005. Ecology-concepts and applications.McGrawHill. Boston

12. Moore, P.D. &S.H.Chapman. 1986. Methods in Plant Ecology. Blackwell, Oxford

13. Odum.E.P. 1971. Fundamentals of Ecology. W.B.Saunders, Phiadelphia.

14. Odum.E.P. & Gary W.Barrett. 2005. Ecology.Tomson Brooks/Cole, Singapore.

MODEL QUESTION PAPER
KVR GOVT. COLLEGE FOR WOMEN (A), KURNOOL
SEMESTER-II END EXAMINATIONS
M.SC- BOTANY

PAPER BOT 3111. Plant Ecology and Environment

Time: 3Hrs. **Max. Marks: 80M**

(Instruction to Q.P.Setters: Set **atleast TWO** question from each unit)

SECTION-I

Answer any FOUR the questions **4x5M= 20M**

1. Energy flow in Ecosystem
2. Temperature as an ecological factor
3. Concept of metapopulation
4. Concept of Ecological niche
5. Importance Value Index(IVI)
6. Concept of Climax
7. Ozone layer depletion
8. El Nino Southern Oscillation

SECTION-II **4x15M=60 M**

Answer the following Questions

9. Write a brief account on biogeochemical cycles of Carbon, Water and Sulpur Cycles.

(OR)

10. Write an essay on terrestrial and aquatic ecosystems.
11. Write a brief account on the characteristics of plant populations.

(OR)

12. Write an essay on species interactions.
13. Write a detailed account on global warming and its impacts on environment and biodiversity?

(OR)

14. Write about Air pollution, types and its effects.

3121 Plant Molecular Biology & Bioinformatics

Unit – I: DNA Replication and Repair: Modes of Replication Experimental evidences for Semi Conservative mode of Replication –Messelson- Stahl and Cairns experiments; Replication fork; Continuous and Discontinuous DNA synthesis(Prokaryotes and Eukaryotes); Enzymes and Proteins in Replication - Single Strand DNA binding Proteins (SSB); Helicases; Topoisomerases,;DNA Ligases; Priming by RNA Polymerase and Primase; DNA Polymerases - E.coli DNA Polymerase I, II and III and Eukaryotic DNAPolymerases.

Unit – II: Transcription (RNA Biosynthesis) & Translation (Protein synthesis) - Polynucleotide phosphorylase; RNA polymerases Structure of E.coli; RNA polymerase and Nature of Eukaryotic RNA polymerases; Promoters and their Characterization; Enhancer Sequences; Initiation, Elongation and Termination of RNA Synthesis. Mechanism of Initiation, Elongation and Termination of Protein synthesis;Introns splicing by spliceosomes; Inhibitors of Protein synthesis - Antibiotic and other Inhibitors; Post- Translational Modifications; Protein sorting and Targeting.

Unit – III: Regulation of Gene Expression - House Keeping genes; Constitutive genes and Regulatory genes; Induction and Repression; Regulation of Gene expression in Prokaryotic Operons - Negative regulation and Positive regulation; Fine structure of lac operon - Repressor and the Catabolite activator proteins in gene regulation of lac operon; Dual functions of the Repressor in araoperon; Antisense RNA; Hormones and Environmental factors affecting Gene expression.

UNIT IV: Bioinformatics : Introduction - Origin of bioinformatics. Biological database - Introduction of database (DB), need, organization, search of DB. An over view of biologicaldatabases
- NCBI, EMBL, DDBJ, SWISS-PROT, PDB, KEGG. Introduction to Sequence alignment - Pairwise and multiple sequence alignment (MSA) using Clustal programs.Sequence analysis - concepts of sequence analysis and their importance. BLAST – blastn, blastp, blastx, tblastx. Disciplines of bioinformatics-Genomics, transcriptomics, proteomics, functional genomics, structural genomics, meta-bolomics, pharmacogenomics. Genome projects - General introduction to genome projects (Arabidopsis and rice genome project).

Practicals:

1. Estimation of DNA by Diphenylaminemethod.

2. Estimation of RNA by Orcinolmethod.

3. Determination of purity and quantity of DNA by UV absorptionmethod.

4. Determination of Melting Temperature (Tm) ofDNA.

5. Determination of log phase during Culturing of E.coli.

6. Demonstration of β-galactosidase induction in E. coli lac+strains.

7. Demonstration of Southern and western blottingtechniques.
8. Familiarization with Windows, UNIX and Internet, Database searching (Given name ofgene/protein search sequence with key words, downloads the sequence, locate related literaturereference}

9. BLAST analysis and FASTAanalysis.

Suggested Readings:

1. B. Alberts, D. Bray, J.Lewis, M.Raff, K. Roberts and J.D.Watson - Molecular Biology of the Cell, Garald Publishing, New York &London.

2. D.Freifelder - Molecular Biology – A Comprehensive Introduction to Prokaryotesand Eukaryotes, Jones and Bartlett,USA.

3. Maniatis, E.F.Fritsch and J.Sambrook - Molecular Cloning: Laboratory Manual, Cold Spring Harber Laboratory, NewYork.

4. Benjamin Lewin – Genes, Oxford UniversityPress.

5. Nelson and Cox - Principles of Biochemistry.

6. Alberts Johnson et al. –Molecular
7. Biology of the Cell, Garland Science, NewYork.

MODEL QUESTION PAPER
KVR GOVT. COLLEGE FOR WOMEN (A), KURNOOL
SEMESTER-II END EXAMINATIONS
M.SC- BOTANY

3121 Plant Molecular Biology & Bioinformatics

Time: 3Hrs. **Max. Marks: 80M**

(Instruction to Q.P.Setters: Set **atleast TWO** question from each unit)

SECTION-I

Answer any FOUR the questions **4x5M= 20M**

1. Topoisomerases,
2. DNA Polymerase I, II and III
3. RNA Polymerase
4. Antibiotic and other Inhibitors
5. Fine structure of lac operon
6. Antisense RNA
7. SWISS-PROT
8. meta-bolomics

SECTION-II

4x15M=60 M

Answer the following Questions

9. write about Eukaryotic replication

(OR)

10. write about experimental evidences of semiconservative model of replication.
11. Write about Eukaryotic RNA polymerases; Promoters and their Characterization;

(OR)

12. Write about translation process in eukaryotes.
13. Write about any four biological databases ?

(OR)

14. Write about Pairwise and multiple sequence alignment (MSA) using Clustal programs.

3131Plant Development, Reproduction and Tissue Culture

UNIT I: PLANT REPRODUCTION-MALE AND FEMALE GAMETOPHYTES

Microsporangium, microsporogenesis and male gametophyte.Anthers-structure and development of anther wall– anther tapetum- secretary and periplasmodial, role of tapetum.Male gametophyte development.Pollen wall structure and development.Types of ovules, megasporogenesis.Embryosac – ultra structure, development and types: monosporic, bisporic and tetrasporic; nutrition of the embryosac. Pollination and fertilization: pollen–pistil interactions, double fertilization.

UNIT II: ENDOSPERM, EMBRYO, POLYEMBRYONY AND APOMIXIS

Development of Endosperm-nuclear, cellular and helobial types; endosperm haustoria, composite and ruminate endosperm. Development of embryo in dicots- onagrad, asterad, chenopodiad, caryophyllad and solanad types; suspensor.Polyembryony – nucellar, integumentary, synergid, zygotic, suspensor and multiple types; twins and triplets; causes of polyembryony and applications. Apomixis- apospory, diplospory, psedogamy, semigamy, parthenogenesis.

UNIT III: Introduction to Plant Tissue culture; Organization of Plant Tissue culture Lab:

Sterilization of Explants; Media Preparation; Inoculation and Instrumentation; Concept of totipotency; Dedifferentiation and Redifferentiation; Cell suspension culture Organogenesis; Methods of sterilization; principals of micropropagation.

UNIT IV: Tissue culture Methods:

Embryo and endosperm culture;pollen culture; Somatic Embryogenesis; Synthetic seeds;Somatic hybridization- protoplast isolation, fusion and hybrid selection and regeneration; somaclonal variations; production of secondary metabolites/ natural products, eliucitorsCryopreservation and Germplasmconservation

Suggested readings:

1. Atwell, B.J. Kriedermann, P. E. and Jumbull, C.G.N. (Ed.) 1999. Plants in Action. Adaptationin Nature, performance in cultivation. MacMilan Education, Sydney, Australia.
2. Burgess, J. 1985. An introduction to Plant Cell development. Cambridge Univ. Press,Cambridge.
3. Fahn, A. 1982. Plant Anatomy (3rdEd.), Pergamon Press,Oxford.
4. Fosket, D.E. 1994. Plant growth and Development. A molecular approach, Academic Press,San Diego,USA.
5. Howell, S.H. 1998. Molecular Genetics of Plant Development, Cambridge Univ. Press,Cambridge.
6. Jane, F.W. 1970. The structure of wood. Black,London.
7. Lyndon, R.F. 1990. Plant Development. The Cellular Basis, Unnin Hyman,London.
8. Murphy, T.M. and Thompson, W.F. 1988. Molecular Plant Development, Prentice Hall, NewJersey.
9. Pullaih, T., Naidu, K. C., Lakshminarayana, K. &HanumanthaRao, B. 2007. PlantDevelopment. Regency Publications, New Delhi.
10. Raghavan, V. 1999. Developmental Biology of Flowering Plants, Springer-Verlag, New York. 11. Steeves, T.A. and Sussex, TM. 1989. Patterns in Plant Development (2ndEd.). Cambridge Univ Press,Cambridge.
11. Waisel, Y., Esnel, A, and Kafkaki U. (Eds.). 1996. Plant Roots. The Hiden Hall (2ndEd.), New York, USA.
12. Bhojwani, S. S. and Bhatnagar, S.P. 2000. The embryology of Angiosperms (4thRevised and Enlarged Ed.). Vikas Publishing House, NewDelhi.

13. The plant cell. Special issue on Reproductive Biology of Plants, Vol. 5. 1993. The AmericanSociety of plant physiologist, Rockville, Maryland,USA.

14. Howell, S. H. 1998. Molecular genetics of Plant Development. Cambridge Univ. Press,Cambridge.

15. Murphy, T .M. and Thompson, W. F. 1988. Molecular plant development, prentice Hall,New Jersey.

16. Pullaiah, T .Lakshiminarayana, K. &Hanumantharao, B. 2008.plant reproduction.Scientific publishers, Jodhpur.

17. Raghavan, V. 1997. Molecular embryology of Flowering plants, Cambridge Univ. Press,Cambridge.

MODEL QUESTION PAPER

KVR GOVT. COLLEGE FOR WOMEN (A), KURNOOL

SEMESTER-II END EXAMINATIONS

M.SC- BOTANY

PAPER BOT3131 - Plant Development, Reproduction and Tissue Culture

Time: 3Hrs. **Max. Marks: 80M**

(Instruction to Q.P.Setters: Set **atleast TWO** question from each unit)

SECTION-I

Answer any FOUR the questions **4x5M= 20M**

1. Tapetum
2. Ovule- Structure
3. Pistil Mechanism
4. Monocot embryo
5. Media Preparation
6. Dedifferentiation and Redifferentiation
7. Somatic Embryogenesis
8. Synthetic seeds

SECTION-II

4x15M=60 M

Answer the following Questions

9. Describe microsporogenesis

OR

10. Write about the Structure of Embryo sac

11. Write about Endosperm development

OR

12. Describe Polyembryony

13. Explain Sterilization techniques

OR

14. Describe the principals of micropropagation.

15. Describe Embryo culture

OR

16. Write about secondary metabolite

3141 BIOSYSTEMATICS

UNIT I: BIOSYSTEMATIC CATEGORIES

Biosystematics: Introduction, history, scope, importance and objectives; Ecotype: nature, origin and their significance, different types of ecotypes, ecospecies, coenospecies, comparium; phenotype, genotype, biotype; deme concept. Infra specific and Inter specific variations.Genecotypes and phenecotypes.Plasticity of phenotypes; factors affecting phenotype variations and their significance, role of biosystematics in evolution.

UNIT II: CONCEPT OF CHARACTER AND BREEDING SYSTEMS

Character- definition, different types of characters - analytic vs synthetic, qualitative vsquantitave, homology vs analogy, consistent vs variable, etc; Heterobathmy, Character weighting, Character state transitions, Correlation of characters, role of selection pressures on character. Methods of sampling and processing of data.Breeding systems and their role in sexual and asexual populations; Ideal species.

UNIT III: SOURCE OF CHARACTERS AND EVALUATION (OMEGA TAXONOMY)

External morphology, Comparative Anatomy, Embryology, Palynology-pollen aperturalmorphoforms, exine stratification and ornamentation. Cytology: Chromosome morphology and behaviour, banding patterns. Biochemical and molecular systematics: Secondary metabolites, chemical markers, Chemotypes, Semantides, Isozymes, Allozymes and Immunosystematics.

UNIT IV: TAXIMETRICS AND CONCEPT OF SPECIES

Adansonian principles.Phenitics and Phyletics.Apomorphies and Plesiomorphies, summerizing the data and analysis of relationship and distance among the taxa, Merits and demerits of numerical taxonomy. Cladistics: Phenograms, Cladograms and Dendrograms, construction of taxonomic groups. Concept of species; Classification of species (taxonomic, biological, semispecies, successional species, cryptic and semi-cryptic). Mechanism of speciation-allopatry ,sympatry and parapatry.

PRACTICALS

1. All the students taken admission into this course are to go on local field trips minimum 1-2 days each at least thrice in a semester covering local forests, plains and wastelands for collection of the selected group of plants for taxonomic assessment.
2. Description of a minimum of five species of any genus with the help of different characters.
3. Construction of keys (Bracketed and Indented) for the selected groups.
4. Study of different ecotypic variations in selected group of plants.
5. Study of not less than 75 characters using external morphology, leaf architecture, epidermal and trichome complex, Palynology, Phytochemistry, Cytology etc., in the selected taxa.
6. Construction of similarity matrix and cladistic analysis to indicate the taxonomic relationship among the members ofstudy.

SUGGESTED READINGS

Crawford, DJ. 1990. Plant molecular systematics:Macromolecularapproach,JohnWiley,New York
Davis, PH. & VM.Heywood.1963.Principles of Angiosperm Taxonomy Oliver & Boyd. Edinburgh.
Gibbs, RD. 1974. Chemotaxonomy of flowering plants. Montreal. &London.
Heywood, VH.(ed) 1968. Modern methods in Plant Taxonomy.Academic press. London.
Hollis, DM.1996. Molecular Systematics 2nd .edn. Freeman & Co.
Judd, W.S, Christopher S. Campbell, Elizabeth A. Kellogg, Peter F. Stevens, and Michael J. Donoghue. 2007. Plant Systematics: A Phylogenetic Approach, 3rd ed. Sinauer.
Lawrence, GHM.1951. Taxonomy of vascular plants. McMillan, New York.
Naik, VN. 1992. Taxnomy of Angiosperms. 2nd Edn. Tata Mc. Graw Hill
Radford.AE.et al., 1974.Vascular Plant systematics.Harper & Row. New York.
Radhakrishnaiah, M. 1996. Essentials of Plant Taxonomy. Hyderabad
Sivarajan, VV.1991. Introduction to principles of Plant Taxonomy.2nd edn.Oxford&IBH, New Delhi.
Sneath, PHA &RR.Sokal, 1973.Numerical Taxonomy. WH Freeman & Co.
Solbrig, O.T.1970. Priciples and Methods of Plant Biosystematics.Macmillan series, London.

Model Question Paper
M.Sc. Botany- SEMESTER-III

Paper No: 3141

PAPER TITLE: BIOSYSTEMATICS

Time: 3 Hrs **Max. Marks:80 M**

PART – A **4 x 5 = 20 Marks**

Answer any 4 of the following

1. Objectives of biosystematics
2. Plasticity of phenotypes
3. Ideal species
4. Role of selection pressure on character
5. Chemotypes
6. Secondary metabolites
7. Cladograms

PART – B **4 x 15 = 60 Marks**

Answer the following Questions

8. Write an account on different types of biosystematics categories.

(OR)

9. Explain the role of biosystematics in evolution
10. Define character. Explain different types of characters

(OR)

11. Write an essay on breeding systems and their role in sexual and asexual populations.
12. Explain role of palynology in relation to biosystematics

(OR)

13. Write an essay on chromosome morphology, behavior and banding pattern.
14. Write an essay on merits and demerits of numerical taxonomy.

(OR)

15. Define speciation? Explain the mechanism of speciation.

Semester-VI

4111- PLANT GENETIC ENGINEERING

UNIT I: INTRODUCTION AND OUTLINES OF GENE CLONING

DNA cutting and joining-Enzymatic cleavage of DNA.Restriction and modification enzymes-classification, nomenclature and importance of restriction endonucleases.Restriction mapping, DNA ligases, polynucleotide kinase, alkaline phosphotases, S1 nuclease, terminal transferase, Bal 31 nuclease.Polymerase chain reaction - principle, types (RT-PCR, nested and inverse PCR), primer design, and applications of PCR.Sequencing methods-Sanger's &Maxam-Gilbert's method.Automated sequencing.

UNIT II: CLONING VECTORS

Characteristics of a vector. Natural plasmids used as vectors- advantages and disadvantages. Artificial plasmids and their importance as cloning vectors. Vectors used for cloning in *E.coli.* (plasmids, bacteriophage derivatives, cosmids, BACs), yeast (YACs, shuttle vectors), higher plants (Ti plasmid derivatives, caulimovirus. Joining of DNA fragments to vector molecules, cohesive termini ligation and blunt end ligation – linkers, adaptors and homopolymer tails.

UNIT III: GENE (DNA) LIBRARIES

Genomic and cDNA libraries.Screening of recombinants for a positive clone- Genetic, biochemical and hybridization methods.Microarrays.Introduction of Recombinant DNA molecules into appropriate hosts-competent cells preparation, electroporation, microinjection and particle bombardment method, and selection of transformants.*Agrobacterium* - mediated transformation of plant cells-Identification of transformed cells and micropropagation of transformed cell into callus, and regeneration of transgenic plants. Transgenic plants.IPRs.

UNIT IV: EXPRESSION OF CLONED GENES AND PRODUCTION TECHNOLOGIES

Construction of expression vectors: Vectors having inducible *lac, taq*promoters. Expression of proteins with His tag and purification of recombinant proteins.Production technologies - synthesis of plantibodies.Molecular markers and their applications in agriculture. DNA Finger Printing - RAPD, RFLP and AFLP analysis.

PRACTICALS

1. Bacterial culture and antibiotic selection media. Preparation of competent cells.
2. Isolation of Plasmid DNA
3. Agarose gel electrophoresis and restriction mapping of DNA
4. Construction of restriction map of plasmid DNA
5. Cloning in plasmid/phagemid vectors –Selection of positive clones using blue/white colours.
6. PCR
7. Reporter gene assay (Gus/CAT/b-GAL)
8. Demonstration of RFLP and RAPD
9. Project work: Minor research project has to be taken up and submit a report.

SUGGESTED READINGS

Balasubramanian, D. 2005. *Concepts of Biotechnology* New edition..

Old and S.B. Primrose. 2002. *Principles of Gene Manipulation* by Blackwell, Oxford.

Brown, T.A. 2002.*Gene cloning – DNA Analysis* – Blackwell, London.

Davies, J.A. and WS Reznikoff. 1992. *Milestones in Biotechnology.*

Glick and Pasternock 2002.*Molecular Biotechnology*, Panima

Kaufman, P.B., W. Wu, D. Kim and L.J. Cseke. 2000. *Molecular and Cellular methods in Biology and Medicine.*CRC Press.

Lewin, Benjamin. 2008. *Genes VIII.*Pearson and Mc Milam.

Mickloss, D.A. and GA Freyer 1990.*DNA Science.A first Course in Recombinant Technology,* Cold Spring Harbor Laboratory Press, New York.

Primrose, S.B. 1994.*Molecular Biotechnology* (2nd Edn), Blackwell Scietific Pub. Oxford.

Sambrook, J., E. Frisch and T. Maniatis 2000.*Molecular Cloning: Laboratory manual ,* Cold Spring Harbor Laboratory Press New York.

Satyanarayana U. 2005 *Biotechnology*.

Winnacker, E.L.2003. *From genes to Clones*.Panima.

MODEL QUESTION PAPER

KVR GOVT. COLLEGE FOR WOMEN (A), KURNOOL
SEMESTER-II END EXAMINATIONS
M.SC- BOTANY

4111- PLANT GENETIC ENGINEERING

Time: 3Hrs. **Max. Marks: 80M**

(Instruction to Q.P.Setters: Set **atleast TWO** question from each unit)

SECTION-I

Answer any FOUR the questions **4x5M= 20M**

1. write about restriction endonuclease

2. write about Maxam-Gilbert's method
3. Ti plasmids
4. linkers, adaptors
5. Microarrays.
6. IPRs.
7. tagpromotores
8. RAPD

SECTION-II

4x15M=60 M

Answer the following Questions

9. write about PCR, types of PCR asnd applications.

OR

10. Write about DNA cutting and joining-Enzymatic cleavage of DNA.

11. Write about Bacterial vectores

OR

12. Write about yeast vectores

13. Write about Genomic and cDNA libraries

OR

14. Write about gene transfer methods

15. Write about Expression of proteins with His tag and purification of recombinant proteins

OR

16.write about Molecular markers and their applications in agriculture.

4121- ETHNOBOTANY AND PHARMACOGNOSY

Unit- I

Ethnobotany: Ethnobotany, its scope and various sub disciplines; Methods and literature in ethnobotany; Recent ethnobotanical works in India; Main world centres and workers of ethnobotany; Different aspects related to tribes of Andhra Pradesh. Wild medicinal plants and their therapeutic values with reference to tribes of Eastern Ghats.

Unit- II

Phytomedicine and Systems of Medicine: Complementary/Alternative medicine;Different systems of indigenous medicine; Ayurveda- Origin and understanding of Ayurveda; Siddha- Origin and understanding of Sidha; Unani- History and principles of practices and perspectives of Unani; Homeopathy - History and principles of practices and perspectives of Homeopathy Phytopharmaceuticals: inventory, taxonomic validation and evaluation of sources.

Unit- III

Analytical Pharmacognosy: Introduction, history, scope and applications of Pharmcognosy. Phytopharmacy: constitution, identification of different constituents; Classification of drugs; analytical methods-drug adulteration, drug evaluation; phytochemical analysis of crude drugs: preliminary screening.

Unit- IV

Pharmacological analysis and Utilization: Drugs of alkaloids, coumarins, tannins, terpinoides and glycosides; Natural pesticides, antibiotics, and poisonous plants. Antimicrobial assay: antibacterial and antifungal screening. Potential drug yielding plants and their marketing avenues.IPR and patenting of active principles.

Suggested Practicals:

1. Recording Medicinal Practices and Herbal Formulations of Tribal Medicine.
2. Study of important medicinal plants used in drugs.
3. Field trip to study and identify locally occurring Medicinal plants.
4. Qualitative analysis of crude drugs for different phytochemicals
5. Quantitative estimation of secondary metabolites: Phenolic compounds and alkaloids.
6. Antimicrobial studies to determine MIC and MBC of different solvent extracts

Suggested Readings:

1. Cotton, CM. 1996. *Ethnobotany: principles and applications*.
2. Dey, A.C.1988. *Indian Medicinal Plants and Ayurvedic preparations,* Bishen Singh, M. Singh.
3. Gibbs, R.D. 1974. *Chemotaxonomy of flowering plants*. Montreal & London.
4. Kokate, CK., AP. Purohit& SB. Gokhale. 2000. *Pharmacognosy*. NiraliPrakashan Publ.
5. Kokate,CK, Khandelwal, SB Gokhale 1996. *Practical Pharmacgnosy*. NiraliPrakashan, Pune.
6. Manitto, P. 1981. *The biosynthesis of natural products*. Ellis Horwood, Chichester.

7. Martin, G.J. 1996. *Ethnobotany. A methods manual*. Chapman&Hall. London
8. Ramachandran, S.P. 1991. *Recent Advances in Medicinal, aromatic and spice crops.*
9. Trease, GE and WC Evans. 2002. Pharmacognosy. Saunders. New York.
10. Tyler, V.E., Brandy, L.R. and Robbers, J.E. 1988. *Pharmacognosy*. 9th edition. Lea and Febiger.Philadelphia. USA.

MODEL QUESTION PAPER
KVR GOVT. COLLEGE FOR WOMEN (A), KURNOOL
SEMESTER-II END EXAMINATIONS
M.SC- BOTANY
PAPER BOT4121-Ethnobotany and Pharmacognosy

Time: 3Hrs. **Max. Marks: 80M**

(Instruction to Q.P.Setters: Set **atleast TWO** question from each unit)

SECTION-I

Answer any FOUR the questions **4x5M= 20M**

1. Main world Ethnobotanycentres

2. Different aspects related to tribes of Andhra Pradesh
3. Unani
4. Phytopharmaceuticals
5. drug adulteration
6. drug evaluation
7. alkaloids
8. Natural pesticides

SECTION-II

4x15M=60 M

Answer the following Questions

9. Describe Recentethnobotanical works in India
OR
10. Explain Wild medicinal plants and their therapeutic values

16. Write about Ayurveda Medicine
OR
17. Write about Siddha Medicine

18. Explain about applications of Pharmcognosy
OR
19. Write about Classification of drugs

20. Write about antibacterial and antifungal screening
OR
21. Describe Potential drug yielding plants and their marketing

4131- Biodiversity, Conservation & Management

UNIT I: Nature, Values and Magnitude of Biodiversity:
Nature of biodiversity-genetic, species and ecosystem diversity; Values of biodiversity – economic and environmental; plants for food, forage, fiber, medicine, gums and resins, oils and timber; Non-Timber Forest Produce(NTFP) – a general account; Magnitude and global distribution of biodiversity; Global biodiversity hotspots; hotspots in India; Mega diverse countries – India as a Mega diversity center; Floristic richness of India; Agro diversity-VavilovCentres of Crop plants.

UNIT II: Biodiversity Conservation:
Principles of conservation; process of extinction; threats to biodiversity – habitat destruction, invasive species and climate change; IUCN threat categories and criteria; Threatened plants of India; In situ conservation of biodiversity: natural protected areas-biosphere reserves, sanctuaries, national parks and sacred groves with reference to India; Ex- situ conservation-Plant propagation methods; botanical gardens and gene banks; Biodiversity assessment and monitoring – different methods.

UNIT III: Applications of Remote Sensing to Plant Resources Conservation:
Principles of remote sensing-acquiring, processing and interpreting the remote sensed data; a brief account on aerial photography-types of photographs; satellite remote sensing- types of satellites and sensors; sensors resolution –types; ; Applications of remote sensing technology-forest cover, forest fire monitoring, agriculture, global climate studies and biodiversity monitoring; Principles and applications of Geographical Information Systems (GIS); Global Positioning System (GPS).

UNIT IV: Conservation Organizations and Concepts:
Brief account on the conservation organizations and their activities – International (WWF, UNEP, FAO, IUCN) and national (NBPGR); International agreements on biodiversity conservation-CBD, CITES, IPCC; Intellectual Property Rights (IPR) and Patents; Biodiversity Bill of India; Role of NGO's in Biodiversity Conservation; Biodiversity Registers; Environmental Impact Assessment (EIA); Ecological Footprints – Carbon credits.

Practicals:

1. Study of local crops, each one from cereals/ pulses/ oil seeds.
2. Documentation of biodiversity of any protected area
3. Assessment of plant resources- biomass/species dominance and species diversity.
4. Mapping of endemic and threatened taxa of Andhra Pradesh.
5. Test for stereoscopic view - aerial photographs.
6. Measurement of scale of aerial photographs.
7. Study of satellite imageries-visual and digital.
8. Experiments with GPS.
9. Demonstration of GIS.

Suggested Readings:

1. Campbell, J.B. & R.H. Wynne. 2011. Introduction to Remote Sensing. 5thed.The Guilford Press.

2. Christian Leveque, Jean-Claude Mounolou and Vivien Reuter. 2004. Biodiversity. John Wiley

3. Jensen, John R. 2007. Remote Sensing of the Environment: An Earth Resource Perspective. 2nd ed., Upper Saddle River, NJ: Prentice Hall

4. Kevin J.Gaston& John I. Spicer, 2004. Biodiversity, an introduction. Blackwell. 5.Lillesand. T.M. &R.W. Kiefer. 2000. Remote Sensing and Image Interpretation. John Wiley

6.Meerabai, G. & T.Pullaiah,2015. Plant Biodiversity, Conservation & Management; Astral International Publishers.

7. Ravi Prasad Rao, B. 2005. Biodiversity.In Pullaiah, T (ed.) Taxonomy of Angiosperms.Regency publications, New Delhi. Pp. 287-317.

8. Sharma, P.D. 2015. Ecology and Environment.12th ed. Rastogi Publications, Meerut.

9.Groombridge B. (1992) Global Biodiversity-Status of the Earths living resources. Chapman and Hall, London

MODEL QUESTION PAPER

KVR GOVT. COLLEGE FOR WOMEN (A), KURNOOL
SEMESTER-II END EXAMINATIONS
M.SC- BOTANY

PAPER BOT 4131- Biodiversity, Conservation & Management

Time: 3Hrs. **Max. Marks: 80M**

(Instruction to Q.P.Setters: Set **atleast TWO** question from each unit)

SECTION-I

Answer any FOUR the questions **4x5M= 20M**

1. Non-Timber Forest Produce
2. India –a mega biodiversity centre
3. IUCN Threat categories
4. Sacred groves
5. Types of satellites & Sensors
6. GPS
7. IPR
8. Carbon credits

PART –B (Essay Type) **4 x 15M =60 Marks**

Answer the following Questions

9. What is biodiversity? Write about the types and values of biodiversity?

(OR)

10. What is hotspot? Write about the Indian hotspots?

11. Write a detailed account on ex-situ conservation of genetic resources?

(OR)

12. Write about the different methods of Biodiversity assessment and monitoring?

13. Write about the applications of remote sensing technology in forest cover, global climate studies and biodiversity monitoring.

(OR)

14. Write a detailed account on Principles & applications of Geographical Information System (GIS)?

15. Write about any three international organizations associated with conservation of biodiversity?

(OR)

16. Write an account on Environmental Impact Assessment?

4141 HORTICULTURE

UNIT- I FUNDAMENTALS OF HORTICULTURE

Introduction to Horticulture., Classification of horticultural crops based on soil and climatic requirements; Importance of vegetable and fruit cultivation in India and Andhra Pradesh;Nutritive value of vegetables and fruits and area and production of vegetables and fruits in India and Andhra Pradesh;Export and import potential of vegetables and fruits in India;An account on different methods of plant propagation.

UNIT -II GARDENING AND NURSERY MANAGEMENT

Gardening and its types; Vegetable crop gardens – (Nutrition and kitchen garden – tracer garden –market garden – roof garden.) and Floriculture gardens (flower gardens – soil and mixed gardens; land scape gardening);Plant nursery: Definition, importance; Basic facilities for a nursery; layout and components of a good nursery, Nursery beds – types, their merits and demerits; precautions to be taken during preparation;Orchard: Definition, different systems of planting orchards – square, rectangular Quincunx, hexagonal and contour;Harvesting and Labour Concerns, grading, packing, storage and marketing.

UNIT-III : SOIL MANAGEMENT

Soil: Definition, minerals and weathering to form soils; factors of soil formation;Soil organic matter – composition and decomposability, Humus – fractionation of organic matter;Soil biology: Soil ;microorganisms and fauna –beneficial and harmful roles.Biofertilizers and Biopesticides.

UNIT IV: PESTS AND DISEASES OF HORTICULTURAL CROPS

Vegetable crops- Bhendi (Spotted boll worms, Red cotton bug, Yellow vein mosaic) and Cucurbits (Fruit flies, Pumpkin beetles; Downy and powdery mildews); Fruit Crops- Banana (Banana weevil, Banana aphids; Panama wilt. Bunchy top) and Custard apple (Mealy bug, Fruit boring caterpillar; Anthracnose, Glomerella fruit rots).Commercial Flowers - Rose (Rose aphid, Dieback, and black spot) and Marigold (Aphids, leaf spot, and bud rot); Integrated Orchard Management/Principles of IPM.

Practical syllabus of Horticulture

1. Study of Plant propagation methods-layering, grafting, budding and Cutting
2. Study of tools and equipment used in Horticulture
3. Study of features of orchard planning and layout orchard.
4. Identification, collection and preparation of herbarium of various Horticulture crops.
5. Preparation of nursery beds to sow vegetable seeds.

6. Preparation of biofertilizer mixtures and field application
7. Identification and management of nutritional disorders in important fruit,
8. vegetable and flower crops as mentioned in the theory syllabus
9. Identification and collection of major diseases and insect pests of fruit, vegetable and flower crops as mentioned in the theory syllabus
10. Visit to Horticulture University/ Research Station to learn about various vegetable crops.
11. Visit to a vegetable nursery/ orchard/garden.

References:

Prasad and Kumar , 2014.: *Principles of Horticulture 2nd Edition Agribios India*

Kumar, N., 1990 *Introduction to Horticulture. Rajyalakshmi Publications, Nagarkoil, Tamilnadu*

Jithendra Singh, 2002. *Basic Horticulture.Kalyani Publishers, Hyderabad*

KausalkumarMisra and Rajesh Kumar, 2014 *Fundamentals of Horticulture, Biotech books*

Brady Nyle C and Ray R Well 2014 *Nature and Properties of Soil, Pearson Educational Inc , New Delhi*

Indian society of Soil Science IARI, *New Delhi*

Sadhu .M .K. 1996.*Plant propagation, New Age International Publishers, New Delhi*

Sarma. R. R. 2002 *Propagation of Horticultural crops : Principles and practices Kalyani Publishers, New Delhi*

Hartman, H.T. and D.E. Kester 1976 *Plant propagation. Principles and Practices, Prentice Hall of India Pvt. Limited, Mumbai*

Ratha Krishnan, P. 2014.*Plant Nursery Management: Principles and Practices. Central Arid Zone Research Institute (ICAR), Jodhpur*

Model Question Paper
M.Sc. Botany- SEMESTER-IV

Paper No: 4141

PAPER TITLE: HORTICULTURE

Time: 3 Hrs Max. Marks:80 M

PART – A 4 x 5 = 20 Marks

Answer any 4 of the following

1. Nutritional value of fruits
2. Kitchen garden
3. Nursery Beds
4. Humification
5. Biopesticides
6. Yellow vein mosaic of Bhendi
7. Bunchy top of Banana

PART – B 4 x 15 = 60 Marks

Answer the following Questions

8. Discuss briefly on classification of horticultural crops based on soil and climatic requirements

(OR)

9. Explain various methods of propagation involved in raising of horticulture crops

10. Write an account on gardens of floriculture

(OR)

11. Define a nursery. Give a note on layout and components of a good nursery.

12. Explain role of soil microbes in horticultural crop management

(OR)

13. Give an account on various biofertilizers used to improve horticultural crops.

14. Write an essay on any five diseases of horticultural crops you studied

(OR)

15.Give an account on Integrated Orchard management