BOARD OF STUDIES IN M.Sc BOTANY
2023-2024

DEPARTMENT OF BOTANY

SYLLABUS FOR M.Sc BOTANY

PITHAPUR RAJAH'S GOVERNMENT COLLEGE
Autonomous and Accredited with 'A' Grade by NAAC (3.17 CGPA
KAKINADA – 533 001, E G Dist., ANDHRA PRADESH

SUGGESTED LABORATORY EXERCISES

1. Isolation of plasmid DNA
2. Bacterial transformation and identification of transformation
3. Restriction enzyme digestion and gel electrophoresis
4. Genetic engineering assignments

SUGGESTED READINGS & TEXT BOOKS

1. Glick BR, Pasternak JJ and Patten CL. 2010. Molecular Biotechnology Principles and Applications of rDNA. ASM Press, USA.
2. Attwood TK, Smith DJP and Phukan S. 2009. Introduction to Bioinformatics. Pearson Education Ltd., UK.
3. Watson JD. 2007. Recombinant DNA: Genes and Genomes: A short course. W. H. Freeman, USA.
4. Lewin B. 2004. Genes VIIII. Pearson Prentice Hall, New Jersey.
5. Balasubramanian, D. 2005. Concepts of Biotechnology New edition.
6. 06. Old and S.B. Primrose. 2002. Principles of Gene Manipulation by Blackwell, Oxford.
7. Brown, T.A. 2002. Gene cloning – DNA Analysis – Blackwell, London.
8. Davies, J.A. and WS Reznikoff. 1992. Milestones in Biotechnology.
9. Glick and Pasternock 2002. Molecular Biotechnology, Panima
10. Mickloss, D.A. and GA Freyer 1990. DNA Science. A first Course in Recombinant Technology, Cold Spring Harbor Laboratory Press, New York.
11. Primrose, S.B. 1994. Molecular Biotechnology (2nd Edn), Blackwell Scietific Pub. Oxford.
12. Sambrook, J., E. Frisch and T. Maniatis 2000. Molecular Cloning: Laboratory manual, Cold Spring Harbor Laboratory Press New York.
13. Satyanarayana U. 2005 Biotechnology.
14. Glick BR, Pasternak JJ and Patten CL. 2010. Molecular Biotechnology Principles and Applications of rDNA. ASM Press, USA
15. Benjamin Lewin, Genes X 2004 Pearson Prentice Hall International Edition
16. Channarayappa, Molecular Biotechnology Principles and practices 2006 University
17. Chawla, H S. 2002. Introduction to Plant Biotechnology Oxford and I B H Publlishers
18. Primrose, S B and RM Twyman 2006. Principles of Genome Analysis and genomics Blackwell publishers
19. Sateesh, M K. 2008.Bioethics and Biosafety I K International

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
M.Sc – BOTANY, SEMESTER – IV
PAPER CODE: 402: EVOLUTION AND PLANT BREEDING

Theory

UNIT – I
Origin of life and Unicellular evolution – Origin of basic biological molecules – abiotic synthesis of monomers and polymers – Concept of Oparin and Haldane, Evolution of prokaryotes and eukaryotes.
Theories of organic evolution – Darwinism, Synthetic theory, Phyletic gradualism, Punctuated equilibrium; Molecular evolution – Concepts of neutral evolution, molecular divergence and molecular clocks – protein and nucleotide sequence analysis; gene duplication and divergence

UNIT – II
Natural Selection; Reproductive isolation – types and species concept; Hardy Weinberg equilibrium and applications
Polygenic inheritance, heritability and its measurements

UNIT – III
Origin of cultivated plants; evolution of wheat and maize; Plant introduction, Germplasm banks. Methods of breeding self and cross pollinated plants; breeding of vegetatively propagated crops; Heterosis and Hybrid Vigor – genetic basis and significance

UNIT – IV
Bio statistical Methods: Basic concept of Parametric and non-parametric methods; - Graphical representation, measures of central tendency and dispersion; Probability distributions (Binomial, Poisson and Normal distributions); types of error, levels of significance, t-test, X2 – test, ANOVA.

SUGGESTED LABORATORY EXERCISES

1. Assignment containing problems on topics mentioned in the theory syllabus
2. Floral biology
3. Pollination mechanisms
4. Breeding techniques of Rice, Maize, Sorghum, Bajra, Brassica, Chilli and Solanum

SUGGESTED READINGS & TEXT BOOKS

1. Allard, R.W. 1961: Principles of Plant Breeding
2. Briggs and Knowles, Introduction to Plant Breeding
3. Jones & Wilkins – Variation and adaptation in plant species. Heinemann Educational Books Ltd., London
4. James L Brew Baker, Agricultural Genetics, Foundation of Modern Genetics Series
5. Kenneth J Frey, Breeding, Univ. Press, Ames, Iora
6. Poehiman and Borthakur, 1981. Breeding Asian field crops
7. Stebbins, J.L. – Chromosomal evolution in Higher Plants. Edward Arnold Publishers Ltd., London
8. Singh, B.D.: Plant Breeding
9. Stickberger, M.W., Genetics, Macmillan Company, New York

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
M.Sc – BOTANY, SEMESTER – IV
PAPER CODE: 403: ECOLOGY AND ENVIRONMENTAL BIOLOGY

Theory

UNIT – I

Ecosystem organization: Structure and functions of Ecosystem, Management, Stability, Complexity, Dynamics, Homeostasis (Forest, Grassland, Freshwater, Ecosystems) Ecological efficiencies, Energy Dynamics, Trophic organization, Energy flow pathways
Litter falls and decomposition (mechanism, substrate quality and climate factors). Global biogeochemical cycles of C, N, P, S and H2O.

UNIT – II

The role of biodiversity in Ecosystem functions and stability, speciation and extinction, IUCN categories of threat, distribution and global patterns of terrestrial bio-diversity
Air, Water and Soil pollution; kinds, sources, quality parameters, effects on plants and ecosystems.

UNIT – III

Ecosystem stability: Concept (resistance and resilience) ecological perturbations (Material and anthropogenic) and their impact on plants and ecosystems
Environmental impact assessments. Ecosystem restoration. Primary production and estimation.

UNIT – IV

Climate change: Greenhouse gases (CO2, CH4, NO2, CFCS sources trends and role) Ozone layer, Ozone hole and consequences of climate change (CO2, fertilization, global warming, sea level rise, UV radiation)
Composition of soil. Factors affecting soil formation and soil profile (Laterization podsolization, gleization, mineralization and soil classification, soil water, soil solution). Soil organic matter or humus and soil organisms

SUGGESTED LABORATORY EXERCISES

1. Estimation of Carbon footprint in the campus
2. Estimation of biomass of crop plants
3. Estimation of Chlorophyll
4. Determination of leaf area index
5. To determine the water holding capacity of soil moisture content

SUGGESTED READINGS & TEXT BOOKS

1. Cunningham, W.P. & M.A.Cunningham 2007. Principles of Environmental Science Inquiry and applications. Tata Mc GrawHill Pub.New Delhi
2. Dash, M.C.2009. Fundementals of Ecology. Tata Mc GrawHill Pub.New Delhi
3. Horpes and Row, N.Y; Batra, N.K. & Sharma, K.K. 1990. A Treatise on Plant Ecology. Pradeep Publications
4. Molles, M.C. 2005. Ecology-concepts and applications. Mc GrawHill. Boston
5. Odum.E.P. & Gary W.Barrett. 2005. Ecology.Tomson Brooks/Cole, Singapore
6. Misra, K. C. D.N. Rao, R.S; Ambasht and Mukherjee. Ecology study of ecosystems
7. Odum, E.P. 1971. Fundamentals of Ecology (3rd Edition), Saunders & Co., Philadelphia
8. Sharma, P.D. 2001. Ecology and Environment
9. Sharma, P.D. 2nd Edition, Environmental Ecology