(For AC-Batch only)

ST.JOSEPH'S COLLEGE FOR WOMEN (AUTONOMOUS), VISAKHAPATNAM

V SEMESTER **BOTANY** TIME: 3 Hrs/Week

B……. (3) **CELL BIOLOGY, GENETICS & PLANT BREEDING** Max. Marks: 100

W.e.f 2017-2018 (AC batch) **SYLLABUS**

OBJECTIVES: To enable the students to

- Understand the ultra structure of envelopes of plant cell, nucleus, chromosomes and cell division.
- Understand and comprehend the basic principles of heredity
- Acquire an insight of molecular biology.
- Comprehend the types of mutations and polyploidy
- Concepts, methods and recent trends of Plant Breeding

COURSE ;

A. CELL BIOLOGY

UNIT I : Plant Cell & Cell division :

1. Plant cell envelopes: a. Cell Wall – Ultra structure, chemical constituents.
   b. Plasma membrane: Molecular Organization – Fluid Mosaic model.
   c. Nucleus: Ultra structure
2. Chromosomes: Morphology; Euchromatin, Heterochromatin, Karyotype, compaction of DNA – Nucleosome & Solenoid model; Special chromosomes.
3. Chromosomal variations in
   a. Structure: Deletions. Duplications, translocations, inversions.
   b. Number: Aneuploidy & Euploidy
4. Cell Division: Cell cycle and its regulation, Mitosis, Meiosis & their significance.

B. MOLECULAR BIOLOGY & GENETICS

UNIT II : Molecular Biology

1. Nucleic Acids : a. DNA – Structure
   b. RNA – Types, Structures & Functions
2. Replication of DNA.
3. Modern gene concept : Cistron, Recon & Muton
4. Gene expression: Transcription & Translation.
5. Regulation of gene expression in prokaryotes: Operon concept. Lac operon & Trp operon .

UNIT III : Genetics

1. Mendelism; Laws of Inheritance
2. Linkage & Crossing over – Discovery of linkage, Types of linkage, Crossing over – mechanism& significance.
3. Genetic maps: Construction of genetic maps – 2 point and 3 point test cross.
4. Transposable genetic elements; extra nuclear genome

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C. PLANT BREEDING

UNIT IV: Introduction & Methods

1. Introduction to plant breeding
2. Emasculation, Male sterility and Pollination Techniques
3. Methods in plant breeding
   i) Introduction and acclimatization
   ii) Selection
   iii) Hybridization
4. Hybrid Vigour,/Heterosis, inbreeding depression

UNIT V: Recent Trends in Plant Breeding

1. Genetically Modified (GM) Crops- Golden rice, BT Cotton
2. Plant production through Tissue culture –Technique, anther culture, embryo culture
3. Mutation Breeding: spontaneous & Induced
4. Polyploidy.
5. Green Revolution; International & National Research Institutes –IARI, ICAR, ICRISAT, NBPGR

TEXT BOOKS:

VST Sai and K.Ramakrishna – (2006)
A Text Book of Common Core Botany - Vol. IV – Sri Vikas Publications, Guntur.

REFERENCES:

1. Gupta, P.K.- (1999) – A Text Book of Cell and Molecular Biology, Rastogi Publications, Meerut.
2. Singh, B.D. – (1995) – Fundamentals of Genetics – Kalyani Publishers, New Delhi.
3. Sinnott, Dunn & Dobzhansky – (1999) Principles of Genetics. McGraw Hill Book & Co., New Delhi.
4. Snustad D.P. & Simmons M.J. – (2004) – Principles of Genetics ; John Wiley & Sons, Inc. New York.
5. Strickberger, M.W. – (1999) – Genetics – McMillan Publishing Corpn, New York.
6. Agarwal .V.K. (2006) Genetics. S.Chand & Co. New Delhi.
7. Principles of Plant Breeding Hardcover – by Robert W. Allard
8. Plant breeding, Gupta, P.K., Rastogi Publications, 2008
9. Plant Breeding principles & Methods by B.D. Singh, 2015
10. Plant Breeding by Chowdary

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ST.JOSEPH'S COLLEGE FOR WOMEN (AUTONOMOUS), VISAKHAPATNAM
V SEMESTER **BOTANY** TIME: 3 Hrs/Week
B ……(1) **CELL BIOLOGY , GENETICS & PLANT BREEDING** Max. Marks: 50
w.e.f 2007-2010 (U batch) **PRACTICAL-III A**

OBJECTIVES : To enable the students to –

- Know the cytochemical methods of fixation and nuclear staining.
- Make suitable cytological preparations for study of mitosis, meiosis and karyotype.
- Solve problems in genetics.
- Understand principles and techniques of Plant Breeding

COURSE

CELL BIOLOGY

I. Demonstration of Cytochemical methods: Fixation of plant material and nuclear staining.
II. Study of different stages of Mitosis by squash preparations of Onion roots.
III. Study of different stages of Meiosis by squash preparations of anthers of Onion/Maize flower buds.
IV. Preparation of karyotype slides from dividing root tip cells of Onion.

GENETICS

V. Solving problems in

1. Monohybrid Ratio
2. Dihybrid Ratio
3. Incomplete Dominance

PLANT BREEDING

1. Tools used in Plant Breeding
2. Emasculation
3. Hybridization
4. Bagging & tagging

5. Hybrid characterization

REFERENCE BOOKS :

1. Santra. S.C., Chatterjee, T.P and as A.P. (1989) College Botany Practical – Vol. I. New Central Book Agency, Calcutta.
2. Sharma, O.P. (2001) Experiments and techniques in Plant Sciences – Vol. II. Pragati Prakasan, Meerut
3. Practical Handbook of Plant Breeding by Vikas Pal, 2016

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