

# **THIRUVALLUVAR UNIVERSITY**

**MASTER OF PHILOSOPHY**

## **BOTANY**

**(FT/PT)**

**(with effect from 2018-2019)**

### **PART I**

#### **CORE COURSE I**

#### **RESEARCH METHODOLOGY**

##### **UNIT-I: RESEARCH METHODOLOGY**

Meaning of research - Objectives of research - motivation of research - Types, approaches and significance - Methods versus methodology - Research in scientific methods - Research process - Criteria for good research - Problem encountered by research in India - Funding agencies.

##### **UNIT-II: RESEARCH DESIGN**

Research Problem: Selecting the problem - Necessity of defining the problem - Techniques involved in defining the problem - Research design - Needs and features of good design - Different research design - Basic principles of experimental designs.

##### **UNIT-III: DATA COLLECTION AND DOCUMENTATION**

Data collection methods - Data types - Processing and presentation of data - Techniques of ordering data - Meaning of primary and secondary data - The uses of computers in research - The library and internet - Uses of search engines - virtual libraries - common software for documentation and presentation.

##### **UNIT-IV: DATA AND ERROR ANALYSIS**

Statistical analysis of data - Standard deviation - Correlation - Comparison of sets of data - Chi squared analysis for data - Characteristics of probability distribution - Binomial, Poisson and normal distribution - Principle of least square fittings - Curve fitting - Measurement of errors - Types and sources of errors - Determination and control of errors.

## **UNIT-V: RESEARCH COMMUNICATION**

Meaning of research report - Logical format for writing thesis and paper - Essential of scientific report: abstract, introduction, review of literature, materials and methods and discussion - Write up steps in drafting report - Effective illustrations: tables and figures - Reference styles: Harvard and Vancouver systems.

### **REFERENCE BOOKS:**

1. Research Methodology, Methods and Techniques - C.R. Kothari - Wishwa Prakasam Publications, II Edition.
2. Research: An introduction - Robert Ross - Harper and Row Publications.
3. Research methodology - P. Saravanavel - Kitlab Mahal, Sixth Edition.
4. A Hand book of Methodology of Research - Rajammal P.A. Devadass - Vidyalaya Press
5. Introduction to Computers - N. Subramanian
6. Statistical methods - G.W. Snedecor and W. Cochran - Oxford and IBH, New Delhi.
7. Research Methodology Methods and Statistical Techniques - Santosh Gupta.
8. Statistical Methods - S.P. Gupta
9. Scientific social surveys and research - P. Young - Asia Publishers, Bombay.
10. How to write and publish a scientific paper - R.A. Day - Cambridge University Press.
11. Thesis and Assignment writing - Anderson - Wiley Eastern Ltd.

**PART I**  
**CORE COURSE II**  
**PLANT BIOTECHNOLOGY**

**UNIT-I: Recombinant DNA technique**

Principles - Preparation of DNA insert - restriction endonucleases (types), palindrome, end modification of DNA insert, cloning/expression vectors, insertion into vector, transformation, selection methods for transformed host cells.

**UNIT-II: Gene transfer techniques in plants**

Direct gene transfer methods - electroporation, microinjection, biolistics, PEG mediated, liposome mediated and plastid transformation. Indirect transfer method - *Agrobacterium* mediated gene transfer.

**UNIT-III: Plant tissue culture**

Types of culture - callus, organ, anther, embryo, cell and protoplast; micropropagation, germplasm storage and conservation in vitro, cryopreservation, somaclonal variation, haploid production with reference to rice, wheat, sugarcane and cotton. Synthetic seed.

**UNIT-IV: Crop improvement**

Production of transgenic plants for resistance to abiotic stress (low and high temperature, drought, salt, herbicide) and biotic stress (pests and disease), production of disease free plants. Quality improvement - modification of protein, starch and oil quality, improvement in shelf life. Terminator gene technology. Plant derived vaccines. Golden rice.

**UNIT-V: Intellectual property rights**

Definition; protection of IPR (trade secret, patent, copyright, trade mark, plant breeders right), TRIPs & GATT; Protection of biotechnological inventions - patenting of higher plants, patenting of transgenic organisms & patenting of genes and DNA sequences.

## **REFERENCE BOOKS:**

1. Biotechnology - Expanding horizons - BD. Singh
2. Molecular Biotechnology - SB. Primrose
3. Transgenic plant research - Lindsey K.
4. Principles and procedures of plant breeding - Chahal, G and Gosal, SS.
5. Introduction to plant biotechnology - Chawla, HS.

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