THIRUVALLUVAR UNIVERSITY

MASTER OF PHILOSOPHY

BOTANY

(FT/PT)

(with effect from 2009-2010)

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. Cocharan - 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 - lectrophoration, 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, another, 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. Tansgenic 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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