MOTHERHOOD UNIVERSITY, Roorkee

ENLIGHTENING WORLD

Doctor of Philosophy (Ph.D.)
COURSE WORK SYLLABUS

FACULTY OF SCIENCES
(BOTANY)

Implemented from June, 2017 onwards

Roorkee-Dehradun Road, Village Karoundi
Post Bhagwanpur, Tehsil Roorkee
District Haridwar, Uttarakhand

Compulsory Course - I

PAPER I- Research Methodology and Computer Applications

Section I: Research Methodology **Max. Marks: 100**
((60 hrs) 6 Credits) (70 External+30 Internal)

Objective:

- To enable to student to understand and work methods and concepts related Research.
- To enable the student to develop research proposal and to work with research problem.
- To develop broad comprehension of research area.

UNIT –I : Concept of Research **10 hrs (20 Marks)**

Meaning, Concept, nature steps types and characteristics of research., Types and approaches , Ethics in Research and Plagiarism, Scientific Inquiry, Philosophical and Sociological foundations of research, Interdisciplinary approach and its implications in various research area.

Unit II: Types and Methods of Research **10 hrs (20 Marks)**

Qualitative and quantitative methods of research like Descriptive, Historical, Case study, Ethnography, Ex-post facto, documentary and content analysis, survey field and laboratory experimental studies. Characteristics of methods and their implications in research area.

Unit III: Development of research proposals **10 hrs (20 Marks)**

Research proposal and its elements, Formulation of research problem-criteria of sources and definition, Development of objectives and characteristics of objectives, Development of hypothesis and applications.

Writing a Research Paper, Choosing a Topic, Preparing a Working Bibliography, Outlining and need to write a Research Paper

Unit IV: Methods of data collection & data analysis **10 hrs (20 Marks)**

Concept of sampling and other concepts related to sampling. Probability and non-probability samples, their characteristics and implications. Tools of data collections, their types, attributes and uses. Redesigning, research tools-like questionnaire, observation, interviews, scales and tests etc.

Analysis of qualitative data based on various tools. Analysis of quantitative data and it presentation with tables, graphs etc. Statistical tools and techniques of data analysis-measures of central tendency, dispersion. Decision making with hypothesis testing through parametric and non-parametric tests.

Validity and delimitations of research findings.

Section II: Computer Applications

Unit V: **20 hrs (20 Marks)**

Basic Knowledge of Computer, Use of Internet for Research Purpose: E-mail, WWW, Web browsing, acquiring technical skills, drawing inferences from data, Use of technology and other equipment in Research, Research publishing tool-MS Word, Adobe acrobat, Graphics tool-MS Excel, Presentation tool-MS Power, Data Analysis Software and Analysis Techniques point. Application of Internet in research : INFLIBNET, Use of Internet, sights (DOAJ), Use of E Journals, Use of E library, use of EBSCO HOST online database of Academic Libraries.

References:

- Best, J.W. (1995) & Kahan, J.V. – Research Education, Prentice Hall of India Pvt. Ltd., New Delhi.
- Edwards, A.L. (1960) – Experimental Design in Psychological Research, New York, Holts (revised Ed.).
- Ferguson, G.A. and Takane Yoshio (1989) – Statistical Analysis in Psychology and Education.
- Garrett, H.E. (1986) – Statistics in Psychology and Education, Vikils Feffers and Simmons Pvt. Ltd.
- Kaul Lokesh (1984) – Methodology of Educational Research, Vikas Publishing House Pvt. Ltd., New Delhi.
- Sukhiya, S. P. : Melhotra P.V., Elements of Educational Research, New Delhi, Allied Publishers.
- Tuckman, B.W. (1972) – Conducting Educational Research, Harcourt Brace, Javanovich.
- Verma, An Introduction to Educational and Psychological Research, Bombay, Asia Publishing House.
- Lindquist, E.F. (1960) – Elementary Statistical Methods in Psychology and Education, Oxford Book Company, New Delhi.
- Sharma, A.R. (1984) Fundamentals of Educational Research, Loyal Book Depot, Meerut.
- Sanders, D.H., Computer Today, NY: McGraw Hill, 1981
- Sinha, P.K., Computer Fundamentals, New Delhi: BPB Publications, 1992
- Cox, J. And Urban, P. “Quick Course in Microsoft Office. Galgotia Publications, New Delhi,
  1990.
- Jain, Satish: “Introduction to Computer Science and basic Programming.” BPB Publications,
  New Delhi, 1990.
- Rajaraman, V., “Fundamental of Computers”, Prentice Hall of India, New Delhi, 1996.
- Saxena, S., “A First Coursein Computers”, Vikas Publishing House Pvt. Ltd., New Delhi,
  1998.

COURSE WORK SYLLABUS
CORE PAPER –II
BOTANY

Total Hours 60((6 Credits) **Max. Marks 100**

UNIT I

Biodiversity: Introduction, estimation, distribution, significance, causes of depletion and conservation strategies; Biodiversity hot spots; Impact of climate change on biodiversity; Biodiversity and biotechnology relationship; Biopiracy and intellectual property rights; Organizations involved in biodiversity conservation; Indian Biodiversity Act (2002)

UNIT II

Molecular Biology: Role of engineering in stress tolerance, Kinds of molecular markers- Proteins markers , Isozyme markers and DNA markers, advantages, disadvantages & applications of molecular markers in the field of molecular biology, Relationship among different molecular markers. Cry genes- classification and properties, Bacillus thuringenesis endotoxin and their mode of action, Advantages of molecular markers in transgenic crops.

UNIT III

Stress Physiology: Physiological Effects and Mechanism of action of Auxins, Gibberellins ,Cytokinins, Abscisic acid,Polyamines and Salicylic acid Water deficit and its physiological consequences, drought tolerance mechanisms, salinity stress and plant responses, heat stress and heat shock proteins, metal toxicity, pollution stress. biotic stress , HR and SAR mechanisms. biotechnological approaches for stress tolerance in plants.

UNIT IV

Enzyme Technology: Introduction to enzymes, specificity of enzyme action, kinetic and chemical mechanisms of enzyme – catalyzed reactions, enzyme inhibition, active site structure, enzyme assay, application of enzymatic analysis in agriculture, environment, medicine and forensic science and industry. Stability, denaturation and renaturation of enzymes, immobilized enzymes and their uses, Biosensors. Recent advances in enzyme technology, future prospects for enzyme technology.

References:

- Enzyme Technology by Martin Chaplin and Christopher Bucke (1990) Cambridge
- University Press.
- Biocatalysts and Enzyme Technology by Klaus Buchholz , Volker Kasche, Uwe Theo
- Bornscheuer (2005), 1 edition, Wiley-VCH.
- Enzyme Technology, edited by Ashok Pandey, Colin Webb and Carlos icardo Soccol (2006),
- Springer US.
- Introduction to plant physiology by W.G.Hopkins and NPA Huner, Wiley Int.3rd Ed. 2
- Old and Primrose (1984).Principles of gene manipulation. Blackwell
- Patterson, 1996. Genome mapping in plants, Academic Press.330p