C.S.J.M. UNIVERSITY, KANPUR

Syllabus for Pre-Ph.D. Course Work

HORTICULTURE

1. Each paper will carry 100 marks: 70 marks for theory paper and 30 for internal assessment. The internal assessment in Paper I will be based on Mid sem. Test, and Practical work/library work/written assignments/own paper presentation (published in any reputed journal bearing ISSN Number). The internal assessment in Paper II will be based on Mid sem. Test, and seminar presentation and report writing consisting of about 5000 words on any subject of the student’s choice dealing with the field of research in the subject of Research.

2. 5 Marks in internal assessment in both Paper I and Paper II will be assigned to attendance where 75% to 80% only 1 mark, 80% to 85% only 3 marks and above 85% 5 marks.

3. During the entire Course at least one paper published in any reputed journal bearing ISSN Number by the student is desirable and it will be the part of internal assessment.

4. The candidate will have to obtain at least 50% marks in theory as well as internal assessment in order to qualify the course.

5. 75% attendance will be compulsory in theory/practical classes.

6. The marks distribution of internal assessment (30 marks) will be: 5 marks for attendance, 15 marks for mid sem. Test and 5 marks for two written assignments (Research-1, Computer Application-1)
Detailed Syllabus

Paper I: Research Methodology (Objectives, Hypothesis, Report writing, and Thesis writing), Quantitative methods, Computer Applications, Research ethics and reviewing of published research in the relevant field and other techniques/methods, specific for the broad subject/area:

1. **Foundation of Research**
   Objectives of Research, Scientific Research, Research and Theory, Conceptual and Theoretical Models, Importance of Research methodology in scientific research.

2. **Types and Methods of Research**
   Classification of Research, Pure and applied Research, Exploring or Formulative Research, Descriptive Research, Diagnostic Research/Study, Evaluation of Research/Studies, Action Research, Experimental Research.

3. **Literature Survey and Problem Definition**
   Need for Reviewing Literature, what to review and for what purpose, Literature Search Procedure, Sources of Literature, Planning of Review work, Note Taking, Libraries and Documentation.

4. **Planning of Research**
   Selection of a Problem for Research, Formulation of the Selected Problems, Hypothesis formation, Measurements, Research Design/Plan.

5. **Sampling**
   Sampling Methods, Choice of sampling methods, Sample size, Sampling and Non-Sampling errors, Estimation of Population Proportion and Population Mean, Estimation of Standard Error and Confidence Interval.

6. **Methods of Data Collection**
   Meaning and Importance of Data, Design of Experiments, Experimentation, Sources of Data, Methods of Collecting Primary Data, Observation Methods, Experimentation, Design of Experiments, Simulation.

7. **Processing of Data**
   Editing, Classification and Coding, Transcription, Tabulation, and Graphical Representation, Measures of Relationship, Simple Regression Analysis, Multiple Correlation and Regression, Simple, Partial and Multiple Correlation Coefficients (For three variables only)

8. **Statistical Analysis of Data and Design of Experiments**

9. **Report Writing**

10. **Spreadsheet Tools**
    Introduction to spreadsheet application, Features and functions, Data storing, features for statistical mathematical data analysis, generating chart/graphs and other features, Tools used may be Microsoft Excel, Open Office or Similar tool, Mathematical Computing.

11. **Presentation Tool**
    Introduction to presentation tool, Features and function, creating presentation, Customizing presentation, showing presentation, Tools used may be Microsoft Power Point, Open Office or Similar tools.
12. Fundamentals of Computer

13. Word Processing
Introduction to word processing, MS-Word, creation of files, Folders, Save Documents as files, Print, Formatting, Insert Page Layout, Reference (citation and bibliography), Review (comments, tracking compare), Converting to PDF, Writing Scientific Documents with latex, Graphics and visualization, Gnu plot, Introduction to other useful software tools e.g. Mathematics.

14. Web Search
Introduction to internet, Use of internet and search engine like Google, Yahoo etc., Use of internet in Research activities, Submission of paper in Archive Electronic Mail System, Cyber law, working knowledge of Math SciNet, JSTOR, Sodhganga, EBSCOhost and other online journals.

Books/References:
Research Methodology: A step by step for beginners by Ramjet Kumar, Sage Publication.
Mathematics for Economics by Mehta & Madanami.
Quantitative application to Management by Levis and Kirkpatrick.

List of Experiments & Assignments:
To write a short note on evaluation of Windows Operating system.
To prepare a list of different system and application software with their uses.
To prepare a word document of the Ph.D. synopsis with proper formatting.
To prepare a word document of 20 references related to your Research work in a standard format.
To prepare a worksheet to calculate the salary of employees of your department using MS-Excel.
To prepare a chart of any organization to present the production with respect to time using MS-Excel (based on assumed data)
To prepare a Power Point presentation of Ph.D. synopsis having Animation, Graphics, Sound etc.
To write a short note on the importance of e-journals in research work using internet.
To prepare a list of 10 popular websites imparting education with their uses.
Paper II: Advance level theory and Research Methods

Objective: To update knowledge on the recent research trends in the field of horticulture with special emphasis on fruits, vegetable and ornamental crops and their post-harvest management.

Theory-

Unit-1
National and International Scenario in fruit production. Recent advances in Propagation - root stocks influence, planting system, High density planting, crop Modeling and Precision farming. Modern approaches in water and nutrient management.

Unit-2
Recent advance in improvement of fruit crops like Mango, Banana, Papaya, Citrus, Grape, Guava, Papaya, Aonla, Ber, Bael, Pine apple, Apple, Pear, Peach and Straw berry.

Unit-3

Unit-4
National and International Scenario of Ornamental crops and flowers. Recent advances in Production of Rose, Gladiolus, Marigold, Crysanthemum, Canna, Bougainvillea, Garbera, Carnetion, Tubrose and Jasmine. Protected cultivation of flowers.

Unit-5
Recent advances in Post-harvest Technology of fruit, vegetable and flowers. Pre-harvest treatments in relation to post-harvest quality of Horticulture produce. Bio-chemical changes in fruit and Vegetable with special reference to ripening, role of ethylene, respiration and transpiration. Various methods of fruit and vegetables preservation, heat processing, Dehydration, freezing and chemical preservation. Advance in food processing techniques: Microwave, heating vacuum impregnation. Recent methods of packaging, plastic film wrapping, pre-cooling, Packaging and marketing of fruits, vegetables and ornamental Plants. Flower products, essential oil and pigments extraction, purification and marketing.

Practical-