

Senior Certificate Course
on
Agricultural Statistics and Computing
(Offline Mode)
(September 22, 2026 – March 03, 2027)

Introduction

ICAR-IASRI, New Delhi is a premier Institute, established in 1959, mainly responsible for conducting research and imparting education/ training in the field of Agricultural Statistics, Computer Applications and Bioinformatics. There are six divisions in the Institute and the Institute is equipped with the modern facilities that include the *Computing facilities* with latest hardware and software packages along with modern teaching aids, the *e-library* with rich collection of books and journals on Statistics, Computer Science, Bioinformatics and other related disciplines including on-line journals and bibliographic databases.

This course aims to enhance analytical and computational skills of agricultural researchers, with emphasis on data-driven decision-making, reproducible research, and modern statistical computing tools. The course is practical-oriented, with strong emphasis on interpretation, visualization, and real-world applications.

Mode

The course will be conducted in the offline mode.

Number of Participants: Maximum limit is 20.

Eligibility: Employed professionals / Individuals holding B.Sc./B.Tech./M.Sc./M.Tech. in Agriculture and allied subjects (including Animal Husbandry, Veterinary Science, livestock, Dairy, Engineering, Fisheries, Forestry etc.)/Maths/ Statistics/ Computer Science/ or equivalent degree from any University or Institution recognized by ICAR/UGC. Only those candidates with sufficient knowledge of statistical methods and computer use may be directly admitted to Module II.

Nomination

Interested personnel fulfilling the eligibility conditions may apply through proper channel and mail the application to Incharge, Training Administration Cell by the due date.

Course Contents

This course would comprise of two independent modules of three months duration each. The course has been structured in a series of lectures and practical session. The course deals with statistical tools and techniques and the use of statistical software packages. The main focus of the course will be on the statistical issues in agricultural research.

Module I: September 22, 2026 – December 19, 2026

Paper-I: Statistical Methods and Official Agricultural Statistics

Statistical Methods

Descriptive statistics and visualization (including interactive dashboards using R/Shiny): Compilation of data, Frequency distributions, Scatter diagram, Graphs, Charts, 3-D charts, Use of Computer-Graphic display of data, Measures of Central tendencies and dispersions.

Probability and Mathematical Expectation: Postulates of probability, Elementary theorems on probability, Conditional probability, Random variables, Probability function. Concept of random variable and mathematical expectation. Concepts and applications of Binomial, Poisson, Normal distribution, Central Limit Theorem. Concepts of regression and correlation, Method of least squares, Multiple regression and Multiple correlation, Partial regression and Partial correlation.

Estimation and Hypothesis testing: Concepts of point estimation and confidence intervals, Hypothesis testing, Simple hypothesis, Composite hypothesis, Tests based on Chi-square, t and F, ANOVA. Introduction to Bayesian statistics and resampling methods.

Agricultural Statistics

Agricultural systems' statistics in India and globally: Scope and conduct of agricultural statistics-Basic and current agricultural statistics-Systems of collection in India and other countries-Methodological aspects of crop estimation and forecasting-improvements affected in Indian Agricultural Statistics in recent years. Agricultural census and livestock statistics.

Use of remote sensing, GIS, and digital agriculture data sources. Integration of big data in agricultural statistics.

Paper-II: Use of Computers in Agricultural Research

Computer fundamentals: Number systems, functional units of a computer, I/O devices, primary and secondary memory, system and application software, Windows, MS Office, networking fundamentals, and Internet basics.

Programming fundamentals in python, Algorithm development, problem-solving techniques, flowcharting, stepwise refinement, Introduction to Python: Python Variables, Python Basic Operators, Python Data Types: int, float, characters, Lists, Tuples, Dictionaries, Sets & their comparison, Python Flow Control statements: conditional (if), alternative (if-else), chained conditional (if-elif-else); Iteration: while, for, break, continue, Functions & Modules, Strings & String Operations, Arrays, Python packages: Simple programs using the built-in functions of packages matplotlib, Numpy, pandas etc.

Database management: Introduction to DBMS, basic database concepts, and organizing, storing, and retrieving data efficiently.

Data science basics: Introduction to data science concepts, data types, data handling, exploratory data analysis, and simple interpretation of data using summaries and visualizations.

Tools and applications: Basic use of R, RStudio, Python, SPSS and other inhouse software for data processing and analysis, along with introductory exposure to machine learning, cloud computing platforms, and APIs for agricultural data.

Module II: December 22, 2026 – March 03, 2027

Paper-III: Sampling Techniques

Sampling versus complete enumeration, Simple random sampling, Sampling for qualitative and quantitative characters. Standard error, Determination of sample size, Stratification and choice of strata-Different methods of allocation, Efficiency of stratification, Cluster sampling (equal and unequal size). Ratio and regression methods of estimation. Two stage sampling (equal and unequal units at both stages). Systematic sampling, Double sampling. Sampling on successive occasions, Non-sampling errors, Planning and organisation of sample surveys. Problems in organizing and conduct of pilot and large-scale sample surveys. Details of surveys conducted by the Institute. Recent Advances in Sampling Techniques

Paper-V: Design of Experiments

Need for designing of experiments – characteristics of a good design. Basic principles – replication, randomisation and local control. Uniformity trials. Shape and size of plots and blocks. Completely randomised design, randomised complete block design. Latin square design. Graeco latin squares. Youden square design. Balanced incomplete block designs. Simple lattice. Analysis of covariance. Missing plot techniques. Cross-over designs. Factorial experiments – symmetrical factorials, Confounding in symmetrical factorial. Concept of asymmetrical factorials. Split and strip plot designs. Response curves and surfaces, standardisation of fertilizer responses. Combination of results of group of experiments. Transformations. Sampling in field experiments. Optimal designs and computer-aided design generation, High-throughput phenotyping and field trial analytics, Mixed model approaches for experimental data.

Paper-VI: Statistical Genetics

Mendel's laws, Linkage, sex-linked and sex-limited inheritance, Multiple alleles, Detection and estimation of linkage. Inheritance of characters showing continuous variation, Multiple factor hypothesis, components of variation, estimation of heritability, response to selection, indirect selection, Progeny row trials and compact family block designs. Use of Discriminant function for selection. Progeny testing and sire evaluation. Elements of population genetics, Hardy-Weinberg law, inbreeding and its effects. Introduction to Bioinformatics and Genomics: Genomic resources/ tools; Overview of sequence analysis. Application of AI/ML in Bioinformatics.

Paper-IV: Econometrics and Forecasting Techniques

Econometrics

Introduction and Scope of econometrics. Econometrics models and other specification. Simple and multiple linear regression models, BLUE properties of least square estimation. Ordinary least squares method of estimation. Properties of least squares estimates, test of significance and confidence interval. Maximum likelihood estimation. Concepts of multicollinearity, heteroscedasticity and autocorrelation, Durbin – Watson test, lagged variables, Dummy variables and index numbers.

Forecasting Techniques

Forecast models using weather variables – regression approach; Forecast models using plant characters – between year models, regression approach, within year models, probability models; Agro meteorological models using stress index, water requirement satisfaction index; Time series models; Linear stationary and non-stationary models, Autoregressive integrated moving average processes, Forecasting agricultural production/ commodity prices/ fish production/ forecasting climatic variables, Multivariate time series, modelling the mean, stationary VAR models, spurious regression, co-integration analysis. Volatility: modelling the variance, The class of ARCH models, properties, analysis of forecasting, Extensions: IGARCH, HRCH-t, GARCH, GJR-GARCH; Forewarning of pests and diseases, Forecasting production; application of remote sensing techniques in forecasting. AI/ML in Agricultural Forecasting.

Examination

The candidates will be required to appear in the examination at the end of each module. Those who successfully qualify will be awarded certificates for each module. Those candidates who complete both the modules will be awarded the course certificate

Course Fee

For participants from India, the fee is Rs. 20,000 per module for 3 months, or Rs. 30,000 for both modules for 6 months. For participants from SAARC countries, the fee is US \$1000 per module for 3 months, or US \$1500 for both modules for 6 months. For participants from other countries, the fee is US \$2000 per module for 3 months, or US \$2500 for both modules for 6 months. ICAR employees do not need to pay any fee. The fee does not include logistics and meals. The fee must be paid online at the start of each module. Once paid, the fee will not be refunded.

Bank Details for Payment NEFT

Name of Account Holder : ICAR-Unit-IASRI, New Delhi

Name of Bank : Canara Bank

Address of Bank : IASRI, PUSA, New Delhi-12

Account No : 91421010000017

IFC Code : CNRB0019029

Nature of Account : Current Account

MICR Code : 110015498

All correspondence may be addressed to:

**Dr. Sarika, Course Coordinator & Incharge Training Administration Cell, ICAR-
IASRI**

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Application Form for Course on

“Senior Certificate Course (Agricultural Statistics & Computing)”

(September 22, 2026 – March 03, 2027)

1. Module of the Course for which nominated:
2. Full Name (in block letter):
3. Date of Birth:
4. Basic Pay and Scale of Pay:
5. Official Address:_____
6. Telephone No._____
7. Residential Address:_____

Telephone No. (off.): _____ (Res.): _____ (Mob): _____

Fax No.: _____

E-mail: _____

8. Educational Qualification:

Degree: University: Subjects: Year:

9. Total Experience:

Post Held Organisation: Office From To

10. Have you attended any Course by this Institute previously. If yes give details:

11. Number of Bank Draft and Bank Name

Signature of the Applicant with Date

Recommendations of the forwarding Institute

Signature of the sponsoring Authority with Seal and Date

CERTIFICATE

Certified that the candidate is employed by our Deptt./ organization and on return from the training he will be suitably employed so that his training is best utilized. The candidate would abide by all rules regulations of the Institute.

**Signature of the sponsoring Authority
with Seal and Date**