M. Sc. Biostatistics

Course Outcomes

M. Sc. Part – I

HCT 1.1: Probability Distributions

At the end of this course student will be able to

- Understand the statistical distributions
- Interpret the events and the distribution associated with it.
- Obtain probability of certain event using the statistical distributions.
- Apply statistical probability distribution at different situations.

HCT 1.2: Sample Survey Methods

At the end of this course student will be able to

- Identify the methods of sampling in different situations.
- Use proper sampling method in certain situation.
- Make questionnaire for data collection.

HCT 1.3: Basic Epidemiology

At the end of this course student will be able to

- Identify different types of disease.
- Understand different types of study design.
- Measure the effect and causes of exposure of the population.

SCT1.1: Statistical Ecology

At the end of this course student will be able to

- Understand about ecology, evolution.
- Identify and study different components of ecology
- Apply statistical tools such multivariate analysis, hypothesis testing
- Apply game theory in Ecology

SCT 1.2: Design of Experiments & Bioassay

At the end of this course student will be able to

- Understand the statistical design and experiment.
- Conduct analysis of out put from a designed experiment.
- Identify correct type of Bioassay to be conducted for given situation.

HCT 2.1: Stochastic Processes

At the end of this course student will be able to

- Identify and classify the type of stochastic processes
- Learn how to apply Markov chain in Life sciences
- Understand Brownian motion, Reflexion principle

HCT 2.2: Statistical Inference – I

At the end of this course student will be able to

- Understand the concept of estimation of parameter of a statistical distribution
- Find a good estimator of a parameter
- Apply different procedure of parameter estimation such as MLE, MME, etc.

SCT 2.1: Statistical Genetics

At the end of this course students will be able to

- Understand the basic biological concepts in genetics
- Know what is population genetics
- Apply statistical tools such as MLE in genetics.

SCT 2.2: Linear Algebra and Regression methods

At the end of this course students will be to

- Learn the basic algebraic concepts like, matrix, vector space, etc
- Do operations on matrices.
- Understand the important concept of regression
- Apply different regression models in medical data sets.

OET2.1: Statistical Methods

At the end of this course students will be able to

- Understand the basic descriptive statistics like average, dispersion, etc.
- Apply statistical tools such as correlation and quartiles in given data sets.
- Understand the basic concept in testing of hypothesis.

OET 2.2: Vital Statistics

At the end of this course students will be able to

- Understand the Demography and Statistical measures
- Calculate the demographic measurements like Mortality, Fertility, etc.
- Understand the concept of Population growth and their components.

M. Sc. Part-II

HCT 3.1: Statistical Inference –II

At the end of this course students will be able to

- Understand the use of Hypothesis testing
- Use appropriate statistical test procedure
- Understand the LRT, SPRT, tests
- Use non-parametric statistical tests

HCT 3.2: Microarray Data Analysis

At the end of this course students will be able to

- Understand the meaning of microarrays and normalization techniques
- Understand the meaning of RNA, mRNA.
- Apply statistical tools like testing of hypothesis, logistic regression, cluster analysis, etc.

SCT 3.1 Multivariate Statistical Methods

At the end of this course students will be able to

- Understand the Exploratory Data Analysis tools
- Understand Multivariate Normal distribution and its application
- Understand and apply different classification techniques.
- Apply principle component procedures.

SCT 3.2 Research ethics

At the end of this course students will be able to

- Understand the difference between ethic and professionalism
- Understand the principles of ethics.
- Know ethics in clinical trials
- Understand Data ethics and Stewardship

OET 3.1: Applied Statistics

At the end of this course students will be able to

- Understand the concept of time series and its application
- Understand and also apply different sampling techniques
- Calculate different index numbers like Fisher's, Pashce's, etc
- Understand different Statistical Process control procedures

OET 3.2: Modelling and Simulation

At the end of this course students will be able to

- Know applications of CPM and PERT techniques
- Use different simulation techniques
- Use Random number generation procedures

HCT 4.1: Demography and Health Statistics

At the end of this course students will be able to

- Understand the concept of Demography

- Identify and calculate components of Population growth
- Understand the method of census and Sample surveys
- Understand the different methods of population projections

HCT 4.2: Clinical Trials

At the end of this course students will be able to

- Understand different phases of Clinical Trials
- Understand different statistical designs used in a clinical trials
- Report and analyze the results of a clinical trials.

HCT 4.3: Reliability and Survival Analysis

At the end of this course students will be able to

- Understand the concept of Reliability and different systems
- Calculate the Reliability of a given system
- Understand the Survival function and its form.
- Calculate survival rate for a given lifetime of a system.

SCT 4.1: Time series Analysis

At the end of this course students will be able to

- Understand the Exploratory time series Analysis
- Understand the concept of Exponential smoothing
- Understand the Stationary time series
- Use ARIMA models.

SCT 4.2: Data Mining

At the end of this course students will be able to

- Understand the data cleaning tools, data transformation tools.
- Understand the supervised and unsupervised techniques
- Understand the Support vector machine and Artificial Neural Network concepts.