BCC 105-P BIOSTATISTICS [P]
Practical Course Credit : 1
Contact Hours : 30
1. Excel spreadsheet and data analysis
2. Linear equation analysis (regression analysis)
3. Normal distribution
4. Hypothesis testing
5. Application of other software (graphpad) for statistical analysis

Reference Books (Composite List for theory and practicals)
1. Kothari, C.R., Quantitative techniques, Vikas Publishing House
2. Arora, P.N. &Malhan, P.K., Biostatistics, Himalaya Publishing House
3. Danilina, et al., Computational Mathematics, Mir Publishers
4. Surya, R.K., Biostatistics, Himalaya Publishing House

BCC 105-T BIOSTATISTICS [T]
Theory Course Credit : 3
Contact Hours : 45

1		**(15)**
1.1	**Characteristics of biological data:** Variables and constants, discrete and continuous variables, relationship and prediction, variable in biology (measurement, ranked, attributes), derived variables (ratio, index, rates), types of measurements of biological data (interval scale, ratio scale, ordinal scale, nominal scale, discrete and continuous data);	**(6)**
1.2	**Elementary theory of errors:** exact and approximate numbers, source and classification of errors, decimal notation and rounding off numbers, absolute and relative errors, valid significant digits, relationship between number of valid digit and error, the error of sum, difference, product, quotient, power and root, rules of calculating digits	**(5)**
1.3	Introduction to Bioinformatics Concepts and applications	**(4)**
2		
2.1	**Measures of central tendency:** characteristics of ideal measure, Arithmetic mean – simple, weighted, combined, and corrected mean, limitations of arithmetic mean; Median – calculation for raw data, for grouped data, for continuous series, limitations of median; Mode – computation of mode for individual series, by grouping method, in a continuous frequency distribution, limitations of modes; Relationship between mean, median and mode; mid-range, geometric mean, harmonic mean, partition value, quartiles, deciles, percentiles	**(5)**
2.2	**Measure of dispersion:** variability, Range, mean deviation, coefficient of mean deviation, , standard deviation (individual observations, grouped data, continuous series), variance, coefficient of variance, limitation Skewness – definition, positive, negative, purpose, measure, relative measure, Karl pearson's Coefficient, Bowley's Coefficient, Kelly's Measure, Moments	**(5)**
2.3	**Correlation analysis** – Correlation, covariance, correlation coefficient for ungrouped data, Spearson's Rank Correlation coefficient, scatter and dot diagram (graphical method) **Regression analysis -** Linear and exponential function **-** DNSA conversion by reducing sugar, survival/growth of bacteria, regression coefficients, properties, standard error of estimates, prediction, regression analysis for linear equation	**(5)**

3

3.1	Probability: Probability, Combinatorial Techniques, Elementary Genetics, Conditional Probability, Bayes' Rule, Statistical Independence, Binomial, Poisson, Normal Distributions	**(5)**
3.2	Hypothesis Testing – parameter and statistics, sampling theory, sampling and non-sampling error, estimation theory, confidence limits testing of hypothesis, test of significance; Students' T-test, t-distribution, computation, paired t-test	**(5)**
3.3	Chi-square test, F-test and ANOVA	**(5)**

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