

B. Sc (CBCS) Industrial Microbiology – I Year
Semester-II – Paper-II
BS204-DSC-1B: BIostatistics AND ANALYTICAL Microbiology

Theory syllabus

Credits – 4

UNIT – I

1. Introduction - Types of biological data, population and samples.
2. Descriptions of samples and populations - Frequency distributions, descriptive statistics (measures of Central tendency and measures of dispersion, Boxplot)
3. Probability - Introductory concepts, Binomial distribution, Random sampling. Distribution Theory - Normal distribution and sampling distributions.

UNIT - II

1. Statistical Inference - Statistical estimation, standard error of the mean, confidence interval and hypothesis testing of the population mean – t test. Brief discussions on the comparison of two independent population means.
2. The Chi square test and its applications.
3. Analysis of Variance - Multi sample Hypotheses, Linear Regression and Correlation.

UNIT – III

1. Colorimetry and Spectrophotometry - Lambert – Beer's Law. Ultraviolet, Visible, Infra red and Fluorescence spectroscopy.
2. Chromatography- Principle. Types of chromatography- Paper, Thin layer, Column, Ion exchange and Gas chromatography. Sedimentation and filtration.
3. Principle, working and applications of centrifuge.

UNIT – IV

1. Quality Control tests- Sterility testing, Microbial Limit Test (MLT).
2. Pyrogen testing (LAL test), Minimum Inhibitory Concentration(MIC).
3. FDA and Good Manufacturing Practices. Quantitative and qualitative analysis of food, milk, water and sewage.



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Practical syllabus

Credits – 1

1. Mean, Median, Mode from grouped and ungrouped Data set
2. Standard Deviation and Coefficient of Variation
3. Correlation and Regression
4. Testing of Hypothesis- Normal Distribution, t-test and Chi-Square-test
5. Separation of carbohydrates by Paper Chromatography
6. Separation of amino acids by Paper Chromatography
7. Separation of lipids by Thin Layer Chromatography
8. Determination of MIC of antibiotics
9. Determination of microbiological quality of milk

References:

1. S. Palanisamy and M. Manoharan, 2002. Statistical methods for Biologists. Palani Paramount Publication, Anna Nagar, Palani, T. N.
2. S.C. Gupta and K. Kapoor, 2002. Fundamentals of Applied Statistics. 3rd Edition. Sultan Sons Educational Publisher, N.D.
3. N. Gurumani, 2002. An introduction to Biostatistics. MJP Publishers, Chennai.
4. P.R. Vittal, and V. Malini, 2002. Statistical and Numerical Methods. Margham Publications, Chennai.
5. Keeler, J. 2002 Understanding NMR spectroscopy. John Wiley and Sons England.
6. Cavangh John et al 1995 Proton NMR, Spectroscopy principles and practice, Academic Press.
7. Holme. D.J. and H. Peck. Analytical Biochemistry.
8. A.Upadhyay, K.Upadhyay and N. Nath 2006 Biophysical Chemistry, Principles and Techniques Himalaya Pub. House.
9. Slater, R.J. 1991 Radioisotopes in Biology. A practical Approach, IRL Press, Oxford.
10. Holler, F.J., D.A. Skoog and S.R. Crouch, 2007 Principles of Instrumental Analysis IV ED. Thomson, Brooks/Cole Pub. US