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| Annexure No. | 20 E |
| SCAA Dated | 29.02.2008 |

BHARATHIAR UNIVERSITY, COIMBATORE

(For the students admitted from 2008 – 2009 onwards)

For B. Sc., MICROBIOLOGY

PART – III – GROUP B – ALLIED A – PAPER I

Subject Title: BIO-STATISTICS AND COMPUTER APPLICATIONS – I

Semester I:

Number of hours:

Subject description: This course introduces the basic Statistical tools that are applied in Microbiology

Goal : To enable the students to learn the Statistical measures and fundamentals of computers

Objective : On successful completion of this course the students shall enrich to draw various diagrams and solving various problems in microbiology using computers

Unit I

Nature and Scope of Statistical methods and their limitations – Data collection – Classification and Tabulation – Primary and Secondary data and their applications in life sciences – Diagrams– Line diagram, Bar diagram and Pie diagram – Graphical presentation – Histogram and Ogives

Unit II

Measures of Location and Dispersion – Stem and Leaf plots – Box and Whisker Plots – Co-efficient of variation – Skewness and its measures.

Unit III

Probability – Concept and Definition – Addition and Multiplication theorems of Probability (statement only) – simple problems – Binomial, Poisson and Normal distributions (without proof) – simple problems.

Unit IV

Introduction to Computers – Classification – Generations – Low, Medium and High level languages – Software and Hardware – Operating Systems – Compilers and Interpreters – Personal, Mini, Main frame and Super computers – their characteristics and application, BIT, BYTE, WORD computer memory and types; data representation and storage, binary codes, binary system

UNIT V

Microsoft Excel – Data entry – Graphs – Aggregate functions- formulae and functions (students are expected to be familiar with all operations)- different number systems and conversions, input and output devices, secondary storage media- Numerical problems based on Units I to IV may be worked using Microsoft Excel.

Books for reference:

1. Daniel W.W. (1995) *BIOSTATISTICS: A foundation for Analysis in health sciences*, 6th Edition, John Wiley
2. Campbell R.C.(1989): *Statistics for Biologists*, Cambridge University Press
3. Snedecor G.W. and Cochran W.G. (1967): *Statistical Methods*, Oxford Press
4. R.K. Taxali: *PC Hardware and Software*, Galgotia Publication

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B. Sc., MICROBIOLOGY

PART – III – GROUP B – ALLIED A – PAPER II

Subject Title: BIO-STATISTICS AND COMPUTER APPLICATIONS – II

Semester II :

Number of hours :

Subject Descriptin: This course introduces the basic Statistical tools that are applied in Microbiology

Goal : To enable the students to learn the Statistical measures and their applications in Microbiology

Objective : On successful completion of this course the students shall enrich to solve various problems in microbiology which helps the students to do research problems

Unit I

Correlation – Scatter diagram – Karl Pearson’s co-efficient of Correlation – Co-efficient of determination – Spearman’s Rank Correlation – Linear Regression.

Unit II

Curve fitting- Fitting of Linear, Parabolic and Exponential curves.
Need for Sampling – Methods of Sampling – Simple random, Stratified random, Systematic random and Cluster sampling – Sampling and Non-sampling errors

Unit III

Concept of Sampling Distribution – Standard error – Tests of significance based on Normal, ‘t’, ‘F’ and Chi square distributions.

Unit IV

Non-parametric tests – Advantages and Disadvantages – Uses – Sign test, Mann-Whitney ‘U’ test, Kruskal-Wallis test, Run test and Median test.

UNIT V

Analysis of Variance – One way and Two way Classifications – Principles of Experimentation – Completely Randomized Design and Randomized Block Design.

Books for reference:

1. Daniel W.W. (1995) *BIostatistics: A foundation for Analysis in health sciences*, 6th Edition, John Wiley
2. Campbell R.C.(1989): *Statistics for Biologists*, Cambridge University Press
3. Snedecor G.W. and Cochran W.G. (1967): *Statistical Methods*, Oxford Press
4. Gupta S.P. *Statistical Methods*
5. Arora P.N, Sumeet Arora and Arora .S: *Comprehensive Statistical Methods*

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B. Sc., MICROBIOLOGY
PART – III – GROUP B – ALLIED PRACTICAL
BIO-STATISTICS AND COMPUTER APPLICATIONS I & II

The listed topics to be covered under practicals in MS-Excel provided the students have prior exposure in the package.

1. **Graphical Representation**
 - a. Histogram
 - b. Ogives
 - c. Scatter diagram
2. **Diagrams**
 - a. Line diagram
 - b. Bar diagram
 - c. Pie diagram
3. **Measures of Location**
 - a. Mean (Arithmetic, Geometric and Harmonic)
 - b. Median
 - c. Mode
 - d. Quartile
4. **Measures of Dispersion**
 - a. Range (max – min)
 - b. Standard Deviation
 - c. Variance
 - d. Coefficient of variation
 - e. Skewness
5. **Correlation**
 - a. Karl Pearson's coefficient
 - b. Spearman's Rank
 - c. Coefficient of determination
6. **Curve Fitting**
 - a. Linear Regression
 - b. Parabolic
 - c. Exponential curves
7. **Parametric tests**
 - a. Normal (z)
 - b. t (Equal Variance)
 - c. F
 - d. Chi square
8. **Analysis of Variance (ANOVA)**
 - a. One way classification.
 - b. Two way classification.

(For the candidates admitted from 2008 – 2009 onwards)

B.Sc. DEGREE EXAMINATION

First Semester

Part III - Microbiology

Allied - BIO STATISTICS AND COMPUTER APPLICATIONS - I

Time : Three hours

Maximum : 75 marks

SECTION A – (10 X 1 = 10 marks)

Answer **ALL** the questions

1. Data originally collected for an investigation is known as
(a) secondary data (b) primary data (c) grouped data (d) sources of data
2. The heading of row in a statistical table is known as
(a) Stub (b) Caption (c) Title (d) all the above
3. Which of the following is not a Measure of central tendency
(a) Mean (b) Median (c) Mode (d) Range
4. Standard deviation is a measure of
(a) Averages (b) Dispersion (c) Both 'a' and 'b' (d) none
5. Mean and variance are equal in
(a) Binomial distribution (b) Poisson distribution (c) Normal distribution (d) None
6. The probability that x and y will be alive ten years hence is 0.5 and 0.8 respectively.
The probability that both of them will be alive ten years hence is
(a) 0.3 (b) 0.4 (c) 0.5 (d) 0.8
7. The ALU stands for -----
8. Example of Input device
(a) Mouse (b) Printer (c) Monitor (d) Speaker
9. Graphs and Charts can be created using
(a) Excel (b) Power point (c) Adobe page maker (d) Word 2000
10. The computer program used in Bio statistics is -----

SECTION B - (5 X 5 =25 marks)

Answer **ALL** the questions

11. (a) Write short notes on Classification (or)
(b) Explain how will you construct a Histogram
12. (a) Explain the term Measure of location. What are various Measures of location? (or)
(b) Write short notes on Co-efficient of variation
13. (a) Write short notes on Probability (or)
(b) What are the properties of Normal Distribution
14. (a) Write short notes on CPU (or)
(b) Explain the term Keyboard and Mouse
15. (a) Comment on input and output devices (or)
(b) Comment on Spread sheets

SECTION C - (5 X 8 = 40 marks)Answer **ALL** the questions

16. (a) What is Primary data ? Explain various methods of collecting primary data.

(or)

(b) Draw a Pie diagram to the following data

| | | | | | | | |
|-------------|---|----|----|----|----|----|----|
| Items | : | A | B | C | D | E | F |
| Expenditure | : | 87 | 24 | 11 | 13 | 25 | 20 |

17. (a) Calculate mean, median and mode from the following data

| | | | | | | |
|-----------------|---|--------|---------|---------|---------|---------|
| Marks | : | 0 – 10 | 10 – 20 | 20 – 30 | 30 – 40 | 40 - 50 |
| No.of students: | | 5 | 10 | 20 | 8 | 2 |

(or)

(b) Compute Standard deviation from the following data

| | | | | | | | |
|-----|---|---|---|----|----|----|----|
| X : | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| F : | 3 | 6 | 9 | 13 | 8 | 5 | 4 |

18. (a) Explain the features of Binomial Distribution

(or)

(b) Explain the features of Poisson Distribution

19. (a) Write notes on (i) DOS commands (ii) Number system

(or)

(b) Explain the various components of computer

20. (a) Explain the applications of MS Excel

(or)

(b) Explain the following:

(i) Byte and Bit (ii) Computer memory

(For the candidates admitted from 2008 – 2009 onwards)

B.Sc. DEGREE EXAMINATION**Second Semester****Part III - Microbiology****Allied - BIO STATISTICS AND COMPUTER APPLICATIONS - II**

Time : Three hours

Maximum : 75 marks

SECTION A – (10 X 1 = 10 marks)Answer **ALL** the questions

1. Co-efficient of Determination is

(a) r (b) $1/r$ (c) r^2 (d) $1 - r^2$

2. Who discovered Rank correlation co-efficient?

(a) Fisher (b) Gosset (c) Spearman (d) Karl Pearson

3. A random sample can be obtained by

(a) Census (b) Judgement (c) Number tables (d) Purposive selection

4. The number of samples of size 'n' that can be selected from a population of size 'N' by Simple random sampling is
 (a) N/n (b) $1/n$ (c) NCn (d) n/N
5. A sample is called large sample if its size is
 (a) ≥ 10 (b) ≥ 20 (c) ≥ 30 (d) ≥ 40
6. Accepting null hypothesis when it is not true is
 (a) Type I error (b) Type II error (c) Probable error (d) None of these
7. Non-parametric tests include
 (a) Run test (b) 't' test (c) F – test (d) 'Z' test
8. To test the equality of two population distributions, we use
 (a) Sign test (b) Run test (c) Median test (d) Mann-Whitney U test
9. Randomization is followed in
 (a) Non-parametric tests (b) Field experiments (c) 't' test (d) Chi-square test
10. RBD is
 (a) One direction variation (b) Two direction variation (c) Three direction variation
 (d) None of these

SECTION B - (5 X 5 = 25 marks)

Answer **ALL** the questions

11. (a) Explain Scatter diagram (or)
 (b) What are the regression lines? Why we have two regression lines?
12. (a) Explain the need of sampling (or)
 (b) Explain the random number method of selecting samples
13. (a) Define Standard error with suitable example (or)
 (b) Explain the test procedure for testing the significant difference between sample mean and population mean using 't' test
14. (a) Explain run test (or)
 (b) What are non-parametric tests? How do they differ from other tests?
15. (a) What short notes on CRD (or)
 (b) Give the ANOVA table for one way classification

SECTION C - (5 X 8 = 40 marks)

Answer **ALL** the questions

16. (a) Calculate Karl Pearson's Co-efficient of correlation of the following data

| | | | | | |
|------------------------|----|----|----|----|----|
| Amount of Fertilizer : | 30 | 40 | 50 | 60 | 70 |
| Yield : | 9 | 12 | 11 | 15 | 16 |

(or)

- (b) From the following data, construct the two regression equations. Also find the value of y when x is 12

| | | |
|------|----------|----------|
| | X | Y |
| Mean | 7.6 | 14.8 |
| S.D | 3.6 | 2.5 |

$$r = + 0.99$$

17. (a) What is Curve fitting? Explain how will you fit an exponential curve.

(or)

(b) What is Stratified sampling? Explain with an example. Give its merits and Demerits.

18. (a) In a hospital 620 female and 600 male babies are born. Do these figures confirm the hypothesis that males and females are born in equal numbers?

(or)

(b) Explain the Test of Goodness of fit using suitable example

19. (a) Explain Run test

(or)

(b) Explain Median test

20. (a) Write an account on one way classification in analysis of variance

(or)

(b) Write in detail Randomized Block Design