

## Theory Paper

### Part A Introduction

<b>Program: Honours/Research</b>		<b>Class : B.Sc.</b>	<b>Year : IV</b>	<b>Session :2024-25</b>
<b>Subject : ENVIRONMENTAL SCIENCE</b>				
1	<b>Course Code</b>	S4-ENSC1T		
2	<b>Course Title</b>	Biostatistics and Computer application (Paper I)		
3	<b>Course Type (Core Course/ Discipline Specific Elective)</b>	Core Course-I		
4	<b>Pre-requisite</b>	To study this course, a student must have had passed Degree in Environmental Science.		
5	<b>Course Learning outcomes (CLO)</b>	<p><b>On successful completion of this course, the student will be able to:</b></p> <ol style="list-style-type: none"> <li>1. Students will get the knowledge about the use of Statistics in Ancient Indian Period.</li> <li>2. Students will get the detailed account of data collection,</li> <li>3. Students will learn about various census techniques used in population study</li> <li>4. Students will learn about various important sampling techniques used in population study.</li> <li>5. Students will get an idea of conducting the surveys.</li> <li>6. Students will understand the collection and classification of statistical data.</li> <li>7. Students will understand the frequency distribution and tabulation of statistical data.</li> <li>8. Students will become familiar with the diagrammatic presentation of data;</li> <li>9. Students will able to draw suitable bar, rectangle and square diagrams for given data;</li> <li>10. Students will able to draw two dimensional pie, pictograms and cartograms;</li> <li>11. Students will be able to select an appropriate diagram to represent data.</li> <li>12. Students will get the knowledge of basics of MS office.</li> <li>13. Students will understand the uses of the Internet as well as the web Browsers, search engines.</li> </ol>		
6	<b>Credit Value</b>	4		
7	<b>Total Marks</b>	Max. Marks : 30+70	Min. Passing Marks: 35	

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**Part B – Content of the Course**

**Total No. of Lectures –Tutorials - Practical (in hours per week): L-T-P: 2-0-0**  
**Total No. of Lectures = 60**

Unit	Topics	No. of Lectures
I	<p><b>General Introduction of Biostatistics</b></p> <ul style="list-style-type: none"> <li>▪ Statistics in Ancient Indian Period.</li> <li>▪ Introduction, origin and growth of statistics, scope of statistics.</li> <li>▪ <b>Census and Sampling,</b></li> <li>▪ <b>Census</b> <ul style="list-style-type: none"> <li>➤ History, Modern Census Procedure</li> <li>➤ Essential features and utility of census.</li> <li>➤ Merits and limitation of Census,</li> </ul> </li> <li>▪ <b>Sampling</b> <ul style="list-style-type: none"> <li>➤ Sampling- introduction,</li> <li>➤ Methods of sampling- random sampling method, non-random sampling method.</li> <li>➤ Merits and limitations of sampling.</li> </ul> </li> <li>▪ <b>Survey</b> <ul style="list-style-type: none"> <li>➤ Organizing a statistical survey.</li> <li>➤ Planning and execution of survey.</li> <li>➤ Merits and limitations of survey.</li> </ul> </li> </ul> <p><b>Keywords\Tags:</b> Statistics in Ancient India, origin and growth of statistics, scope of statistics, Sampling, Statistical survey.</p>	10
II	<p><b>Classification and Presentation of Data</b></p> <ul style="list-style-type: none"> <li>▪ Collection of data, primary and secondary data.</li> <li>▪ Types of data           <ul style="list-style-type: none"> <li>➤ primary</li> <li>➤ secondary data,</li> </ul> </li> <li>▪ Collection of data: Methods of collection of primary data, Sources of secondary data.</li> </ul> <p><b>Classification and Tabulation of data.</b></p> <ul style="list-style-type: none"> <li>▪ Objects of classification, Types of classification.</li> <li>▪ Formation of discrete and continuous frequency distribution.</li> </ul> <p><b>Graphical representation of data</b>            Types of diagrams-one dimensional and two dimensional.            ➤ Graphs of frequency distribution, Histogram, frequency polygon, smooth frequency curve. Cumulative frequency curve (OGIVE).</p> <p><b>Keywords\Tags:</b> Types of data, Collection of data, Classification of data, Tabulation of data, Graphical representation of data</p>	12

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III	<p><b>Measures of Central Tendency</b></p> <ul style="list-style-type: none"> <li>▪ Requisites of good average,</li> <li>▪ Computation of Mean,</li> <li>▪ Types of Mean</li> <li>▪ Methods of Calculation of Mean in <ul style="list-style-type: none"> <li>➢ Individual series</li> <li>➢ Discrete series</li> <li>➢ Grouped series</li> </ul> </li> <li>▪ Computation of Median <ul style="list-style-type: none"> <li>➢ Individual series</li> <li>➢ Discrete series</li> <li>➢ Grouped series</li> </ul> </li> <li>▪ Computation of Mode. <ul style="list-style-type: none"> <li>➢ Individual series</li> <li>➢ Discrete series</li> <li>➢ Grouped series</li> </ul> </li> <li>▪ Measures of dispersion, Introduction, Objects of measuring variation, Methods of studying variation.</li> <li>▪ Computation of range and standard deviation,</li> </ul> <p><b>Keywords\Tags:</b> Measures of central tendency, Mean, Median, Mode, Measures of dispersion, Range ,Standard Deviation</p>	14
IV	<p><b>Fundamental of Computer and Peripherals.</b></p> <ul style="list-style-type: none"> <li>▪ Introduction of Computers.</li> <li>▪ Components of Computer Systems. <ul style="list-style-type: none"> <li>➢ Central Processing Unit, Input and Output Devices, Memory.</li> </ul> </li> <li>▪ Concept of Hardware and Software. Concept of Operating systems.</li> <li>▪ Basic features of MS office <ul style="list-style-type: none"> <li>➢ MS word basic features and Applications.</li> <li>➢ MS Excel basic features and Applications.</li> <li>➢ MS PowerPoint basic features and Applications.</li> </ul> </li> </ul> <p><b>Keywords\Tags:</b> Components of Computer System, Concept of Hardware and Software, Concept of Operating systems, Basic features of MS office</p>	12
V	<p><b>Introduction of Internet and basics of Networking</b></p> <ul style="list-style-type: none"> <li>▪ <b>Basic of Computer Networks</b> <ul style="list-style-type: none"> <li>➢ Local Area Network (LAN), Wide Area Network (WAN),</li> <li>➢ Internet: Concept of Internet, Applications of Internet, Connecting to the Internet,</li> <li>➢ World Wide Web (WWW), Web Browsing software, (Popular Web Browsing Software), Search Engines</li> </ul> </li> </ul> <p><b>Communications and Collaboration</b></p> <ul style="list-style-type: none"> <li>▪ Introduction, Objectives, Basics of E-mail.</li> </ul>	12

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- What is an Electronic Mail, Email Addressing,
- Using e-mails, Opening email account,
- Mailbox: Inbox and Outbox, Creating and sending a new e-mail,
- Replying to an e-mail message, forwarding an e-mail message.
- Sorting and Searching e mails.

**Keywords/Tags:** Basic of Computer Networks , Internet ,Basics of e-mail, Mailbox, e-mail message, Sorting and Searching e mails

### Part C : Learning Resources

#### Text Books, Reference Books, Other resources

#### Suggested readings:

1. Chakravorti S.R. and Giri N.(1997): Basis Statistics South Asian Publishers New Delhi 12/46
2. Clarke G.M. and Cooke D.(1994): A Basic Course in Statistics Arnold London.
3. Goon A.M. Gupta M.K. and Dasgupta B. (1985): Fundamental of Statistics Vol. I The World Press Private Ltd. Calcutta.
4. Goon A.M. Gupta M.K. and Dasgupta B. (1985): Fundamental of Statistics Vol. I The World Press Private Ltd. Calcutta.
5. Gupta S.C. and Kapoor V.K. (1986): Fundamental of Mathematical Statistics Sultan Chand and Sons Publishers
6. Gupta, S.C. (1999). Fundamentals of Statistics. Himalayan Pub. House Delhi.
7. Hadley G (1987). Linear Algebra; Narosa Publishing House.
8. Hoshmand, A.R.(1988).Statistical methods for Env.& Agr. Science. CRS Press, New York
9. Kartikeyan, S., Chaturvedi, R. M. Bhosale , R. M. "Comprehensive Textbook of Biostatistics and Research Methodology" Edition: 1st, Bhalani Publishing House, Parel, Mumbai 400 012, Maharashtra, India. 2016
10. Khan,I.A. & Khanum,A. (1994). Biostatistics. Ukaaz Publications, Hyderabad.
11. Leon SJ (1980). Linear Algebra with applications; Macmillan
12. Rao B.L.S.Prakasa "About Statistics as a discipline in INDIA" electronic journal of history of probability and statistics . vol 2, 2006.
13. Rao,P.S.S. & Richard, J.(1996). An Introduction to Biostatistics. Prentice Hall, New Delhi.
14. Graybill FA . Matrices with applications in statistics. John Wiley & Sons.1983
15. Sukhatma, P.Iii. and Amble,Iii.N. (1976). Statistical methods for Agricultural workers : ICAR, New Delhi.

#### Suggested digital platforms/Web links:

- [Science and Mathematics in India](#)
- [An overview of Indian mathematics, MacTutor History of Mathematics Archive, St Andrews University, 2000.](#)
- [Indian Mathematicians](#)

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## Practical Paper

### Part A Introduction

**Program : Honours/Research**

**Class :B.Sc.**

**Year : IV**

**Session : 2024-25**

**Subject : Environmental Science**

<b>1</b>	<b>Course Code</b>	<b>S4-ENSC1P</b>	
<b>2</b>	<b>Course Title</b>	Central Tendency, Graphical Representation of Data, Computers and Internet (Practical Paper 1)	
<b>3</b>	<b>Course Type (Core Course/ Discipline Specific Elective/Elective/Generic Elective/Vocational/.....)</b>	Core Course 1	
<b>4</b>	<b>Pre-requisite</b>	To study this course, a student must have had passed Degree in Environmental Science.	
<b>5</b>	<b>Course Learning outcomes (CLO)</b>	<p><b>On successful completion of this course, the student will be able to:</b></p> <ol style="list-style-type: none"> <li>1. Students will learn about various important sampling techniques used in population study.</li> <li>2. Students will understand the frequency distribution and tabulation of statistical data.</li> <li>3. Students will become familiar with the diagrammatic presentation of data;</li> <li>4. Students will able to draw suitable bar, rectangle and square diagrams for given data;</li> <li>5. Students will able to draw two dimensional pie, pictograms and cartograms;</li> <li>6. Students will able to select an appropriate diagram to represent data.</li> <li>7. Students will get the knowledge of basics of MS office.</li> <li>8. Students will understand the uses of Internet as well as the web Browsers, search engines.</li> </ol>	
<b>6</b>	<b>Credit Value</b>	<b>2</b>	
<b>7</b>	<b>Total Marks</b>	<b>Max. Marks: 30+70</b>	<b>Min. Passing Marks: 35</b>

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## Part B – Content of the Course

**Total No. of Lectures- Tutorials- Practical (in hours per week): L-T P: 0-0-2 hours per week**

**Total Number of Practical hours: 60 hours**

Unit	Topics	No. of Lectures (2 Hours Each)
1-5	<ol style="list-style-type: none"> <li>1. Preparation of frequency distribution of leaf length,/width data.</li> <li>2. Calculation of mean value of leaf length/width data.</li> <li>3. Calculation of median value of leaf length/width data.</li> <li>4. Calculation of mode value of leaf length/width data.</li> <li>5. To construct the Frequency polygon of different types of data:</li> <li>6. To construct the Histogram of different types of data:</li> <li>7. To construct the Smooth frequency curve of different types of data:</li> <li>8. To construct the frequency curve Ogive of different types of data</li> <li>9. Calculation of standard deviation.</li> <li>10. Study of various sampling techniques of data collection.</li> <li>11. Construct two dimensional diagram of statistical data                             <ul style="list-style-type: none"> <li>&gt; pie</li> <li>&gt; rectangle</li> <li>&gt; square</li> </ul> </li> <li>12. Prepare an assignment on MS word.</li> <li>13. Prepare an assignment on MS Excel.</li> <li>14. Prepare an assignment on MS Power Point.</li> <li>15. Prepare an assignment on computer networking.</li> <li>16. Prepare an assignment on electronic Mail.</li> </ol> <p><b>Keywords/Tags:</b> frequency distribution, Mean, Median, Mode, Frequency polygon, Histogram ,Smooth frequency curve, Standard deviation sampling techniques,, two dimensional diagram, MS word, MS Power Point., MS PowerPoint Computer networking, electronic mail</p>	30

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