



**Janardan Bhagat Shikshan Prasarak Sanstha's**  
**CHANGU KANA THAKUR**  
**ARTS, COMMERCE & SCIENCE COLLEGE,**  
**NEW PANVEL (AUTONOMOUS)**

**Re-accredited 'A+' Grade by NAAC**  
**'College with Potential for Excellence' Status Awarded by UGC**  
**'Best College Award' by University of Mumbai**

**Program: B.Sc.**

**Syllabus of Certificate Course: Learning Mathematics and**  
**Statistics using Software's**  
**Choice Based Credit System**  
**w.e.f. Academic Year 2023-24**

**Preamble:**

Mathematical thinking is important for all members of a modern society as a habit of mind for its use in the workplace and for personal decision making. Mathematics is fundamental to national prosperity in providing tools for understanding Science, Engineering, Technology and Economics. It is essential in public decision making and for participation in the knowledge economy. Mathematics is a creative discipline.

**Objectives:**

1. To introduce the basic commands of Excel and GeoGebra.
  2. To explain the Mathematical and Statistical concepts to the learner by using software's.
  3. To prepare learners to use software's to solve the problems of Mathematics and Statistics.
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**Learning Outcomes:**

1. This course will help students to learn about the basic commands of Excel and GeoGebra related to Mathematics and Statistics, Calculus, Measures of central tendencies, Probability distribution, etc. It will further help to use the software's to solve the problems of Mathematics and Statistics.

## Syllabus

# UCC4LMS: Certificate Course on Learning Mathematics and Statistics using Software's

## Course Outcomes

After completing the course, Student will be able to:	
CO1	<b>Make use of</b> the basic commands of Excel and GeoGebra.
CO2	<b>Solve</b> the problems of Correlation and Regression, Time series and Probability Distribution by using Excel.
CO3	<b>Determine</b> maxima and minima of the function by using GeoGebra
CO4	<b>Solve</b> the problems of Probability Distribution by using GeoGebra.

## Syllabus

Unit-I	Introduction to Excel and Basic Commands, Pivot Tables, Graphs
Unit -II	Correlation and Regression using Excel, Time series analysis, Probability Distribution
Unit- III	Introduction to GeoGebra, Basic commands, Graphs of some basic mathematical functions,
Unit -IV	Finding Maxima and Minima, Probability distribution using GeoGebra

## Reference Books

### Learning Mathematics and Statistics using Software's

- [1] Guide to Microsoft Excel for calculations, statistics, and plotting data by Stephen L. Morgan and Stanley N. Deming, 2006 <https://socialwork.wayne.edu/research/pdf/excel-guide-morgan.pdf>
- [2] STATISTICS FOR MANAGERS USING Microsoft Excel by David M. Levine David F. Stephan Timothy C. Krehbiel Mark L. Berenson, 2008  
<http://ramanujaninstitute.com/R%20Software/Statistics%20For%20Managers%20using%20MSExcel.pdf>
- [3] Software Tools and Mathematics Education: The Case of Statistics by Rolf Biehler, 1993  
DOI: [10.1007/978-3-642-78542-9\\_4](https://doi.org/10.1007/978-3-642-78542-9_4)
- [4] A guide to Probability and Statistics in Microsoft Excel™
- [5] <https://www.pluralsight.com/guides/using-math-and-statistical-functions-in-microsoft-excel>
- [6] <https://www.learner.org/series/learning-math-data-analysis-statistics-and-probability/>
- [7] Teaching Statistics with GeoGebra and Applets by Kate Quane, 2014  
[https://www.researchgate.net/publication/337336497\\_Teaching\\_Statistics\\_with\\_GeoGebra\\_and\\_Applets](https://www.researchgate.net/publication/337336497_Teaching_Statistics_with_GeoGebra_and_Applets)
- [8] APPLICATION OF GEOGEBRA FOR TEACHING MATHEMATICS by Dariusz Majerek, 2014  
DOI: [10.12913/22998624/567](https://doi.org/10.12913/22998624/567)



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**Revised syllabus of**  
**Program: Bridge Course in Mathematics and**  
**Statistics for Biotechnology**

**(w.e.f. the Academic Year 2019-2020)**

# Bridge Course in Mathematics and Statistics for Biotechnology

**Eligibility:** prerequisite course for Students without Mathematics at XI & XII standard

**Duration:** 15Hrs. (One Academic Year)

**Fee:**

**Seats:** As per demand of the students

## Infrastructure Requirements:

- Well Equipped Lecture room
- Well Equipped Laboratory
- Library with relevant books
- LCD Projector

## Staff Requirement:

- A coordinator who will be responsible for the smooth conduct of the course.
- Coordinator of the course may be paid an Honorarium of Rs.1000/- per year
- A lecture and practical can be conducted by the core faculty or visiting having expertise in concerned field. Guest Faculty/internal Faculty may be remunerated @ Rs.200/- per lecture of 1 hr. Duration.
- Faculty must possess at least a Bachelor Degree with a expertise respective filed.
- Faculty from industry and research institutes.

## Theory Question Paper Pattern:

Question 1	Objectives Questions with options	20 marks
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## Course content:

Course Name	Theory Hours
Bridge Course in Mathematics and Statistics	15Hrs

## Bridge Course in Mathematics and Statistics for Biotechnology

Unit	Unit name	Topics	Lectures /Hrs
1	Review of algebra	<ol style="list-style-type: none"> <li>1. Arithmetic and geometric progressions.</li> <li>2. Logarithm</li> <li>3. Polynominal Equations, Rational roots</li> <li>4. Functions: The Exponential Function, <math>ax</math> and <math>\log x</math></li> <li>5. Exponential growth and Decay.</li> <li>6. Graphs of Functions</li> <li>7. Linear equations</li> <li>8. Quadratic Functions and equations</li> <li>9. Sequences</li> </ol>	6
2	Calculus	Differential calculus (limits, derivatives), integral calculus (integrals, sequences and series <i>etc.</i> ).	5
2	Preliminary :Descriptive statistics	<ol style="list-style-type: none"> <li>1. Introduction</li> <li>2. Frequency Tables, Histograms</li> <li>3. Measures of Central tendency : Mean and Median</li> <li>4. Measures of Dispersion: Variance and Standard deviation.</li> </ol>	2
3	Basic Probability	<ol style="list-style-type: none"> <li>1. Introduction: Sample Space and Events</li> <li>2. Axioms of Probability and simple examples</li> </ol>	2

## REFERENCE:

1. SCHAUM'S outline of Theory and Problems of College Mathematics 3rd edition, by Philip. A Schmidt and Frank Ayres, Tata McGraw Hill publication/Chapters 2, 3, 4, 5, 12, 39, 41, 45, 46, 48.
2. SCHAUM'S outline of theory and Problems of Introduction to Probability and Statistics by Seymour Lipschutz and John J. Schiller. Tata McGraw Hill publishing Ltd. Chapters 1.1, 1.2, 1.3, 1.4, 3.1, 3.2, 3.3, 3.4.
3. THOMAS CALCULUS 11th edition , by George B Thomas Maurice D. Weir, Joel Hass, Frank R. Giordano, Pearson Addison Wesley 1.3, 2.1, 2.2, 3.1, 3.2, 3.3, 5.3, 7.3, 7.4, 7.5, 8.1, 11.1.
4. Calculus & Analytical Geometry Thomas & Finney.

## Evaluation System:

Sr. No	Exam No.	Name of the Students	Theory	Percentage %	Remarks	Grade
		Maximum Marks	50			
		Minimum Marks	17			
		Obtained Marks				

**Slander of Passing: 40%**

## Grading System:

<b>A Grade</b>	<b>Above 75%</b>
<b>B Grade</b>	<b>60-74%</b>
<b>C Grade</b>	<b>40-59%</b>

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**J.B.S.P.SANSTHA'S  
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**Remedial Course in Mathematics for Science**

**First Semester**

**Syllabus**

Unit-I	Set Theory, operation of sets, relation, functions, types of functions, composite functions, complex numbers, Limits and continuity
Unit -II	Binomial Theorem, Divisibility in integers, Fundamental theorem of Arithmetic, Euler's theorem, finite induction

**Scheme of Evaluation:**

The Scheme of Evaluation shall be conduct of 10 sessions of slow learners from F.Y. B.Sc. Class.

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**Second Semester**

**Syllabus**

Unit-I	Sequence and series, Arithmetic progression and Geometric progression, Differentiability, Cartesian Co-ordinates and polar Co-ordinates
Unit -II	Counting and Equivalence Relation: Counting of set of pairs, Cartesian product, Sterling numbers, Bell number, Multinomial theorem

**Scheme of Evaluation:**

The Scheme of Evaluation shall be conduct of 10 sessions of slow learners from F.Y. B.Sc. Class.