

ASC Course: 04



Vidya Prasarak Mandal's
**Advanced Study
Center**



Syllabus for

Programme : P. G. Programme

Course : Applications of Statistics

[Initiated in 2010 – 2011: - 1st update in 2016 – 2017,
2nd update with effect from Academic year 2019 - 2020]

**3rd update with effect from
Academic Year 2020-2021**

Course is fully online

POST GRADUATE PROGRAMME IN APPLICATION OF STATISTICS

Preamble

Statistical Techniques deal with collection, representation, analysis and interpretation of data. Now statistics holds a main position in almost every field, including industry, commerce, trade, physics, chemistry, economics, mathematics, biology, botany, psychology, astronomy, etc., so the application of statistics is very wide. Because of this the demand for statistics professionals is increasing by the day.

The PG Programme in Applications of Statistics has been developed to cater to the needs of working professionals and graduates aspiring for employment in industries (e.g., Software, Pharmaceutical industries, Insurance sector, Financial Institutes, Marketing Research Institutes, National Laboratories, R & D Organizations and Academic Institutions.)

The programme aims to provide the knowledge and hands-on training in selected areas of statistics and to acquaint the learners with the use of statistical tools in the analysis of industrial, social and business data. It would also help fresh Graduates, who wish to continue their education and are interested in getting into the field of Applied Statistics.

- To provide necessary statistical background for analyzing data and drawing inferences from that analysis.
- To increase the student's mastery of the deductive nature of reasoning.
- To understand the nature of critical thinking.
- To increase the student's ability in problem solving.
- To increase the student's ability to work with others towards a common goal.

The training will also include use of related software and statistical packages.

The curriculum covers:

- **Basic Statistics**
- **Financial Mathematics, Quality Control**
- **Time Series Analysis & Forecasting**
- **Actuarial Science / Clinical Trials / Statistical Validation / Financial Analysis / Marketing**

Job opportunities: in Pharma; Chemical Industries, Stock Exchange, Financial Institutes, Marketing Research Institutes etc.

Syllabus and Question Paper Pattern of

Course: Applications of Statistics

Course Code	Course Title	No. of lectures	Credits
ASCAST1	Descriptive Statistics	45	4
ASCAST2	Elementary Probability Theory, and Inference	45	4
ASCAST3	Financial Mathematics and Quality Control	45	4
ASCASP1	Practical Training I	45	4
ASCASP2	Practical Training II	45	4
ASCASP3	Internal Assignments	40	4
<i>Total Credits</i>		<i>265 Hours</i>	<i>24</i>

Course Code: ASCAST1	Course Title Descriptive Statistics	Credits 4	No. of lectures
Unit I : Data Types and Data Condensation <ul style="list-style-type: none"> • Concept of population and sample • Types of data • Tabulation & Diagrammatic representation • Univariate frequency distribution of discrete and continuous variables 			15
Unit II : Measurements of Characteristics of data Concept of central tendency of data Concept of dispersion			15
Unit III : Correlation, Association and Time series <ul style="list-style-type: none"> • Correlation Analysis • Regression Analysis 			15

Course Code: ASCAST2	Course Title Elementary Probability Theory and Inference	Credits 4	No. of lectures
Unit I : Probability and probability distributions Random Experiment			15
Unit II : Some specified distributions and concept of Estimation& testing <ul style="list-style-type: none"> • Properties and problems • Central Limit theorem for • Problem of testing of hypothesis 			15
Unit III : Testing of Hypothesis, and Design of Experiments Concept of Design of Experiments:			15

Course Code: ASCAST3	Course Title Financial Mathematics and Quality Control	Credits 4	No. of lectures
Unit I : Basics of Actuarial science			15
Unit II : Investment- Securities Market & Mutual Funds <ul style="list-style-type: none"> • Securities Market • Mutual Funds (M.F) 			15
Unit III : Statistical Quality Control <ul style="list-style-type: none"> • Statistical Quality Control • Control charts 			15

Course Code:	Course Title	Credits
ASCASP1	Practical Training - I	4

Following practicals are to be performed using Microsoft Excel / Spreadsheet of Open Office / any other suitable software

1. Diagrammatic representation- Bar-charts, Pie chart.
2. Descriptive statistics
 - i. mean, median, quartiles,
 - ii. variance, s.d. minimum, maximum range coefficient of range, coefficient of variation.
 - iii. Measurement of skewness and kurtosis.
3. Bivariate data
 - Scatter Diagram
 - Calculation of correlation coefficient and regression coefficients.
 - Equation of regression line and significance of r^2
4. Time series analysis.- calculation of trend values by using moving averages and method of least square
5. Probability problems
6. Problems based on distributions
7. Calculation of Present value in terms of commutation functions of Life annuities and Temporary life annuities (immediate and due) with and without deferment period
8. Calculation of beta value in case of share market
9. Calculation of NAV in case of mutual funds
10. Control charts

Course Code:	Course Title	Credits
ASCASP2	Practical Training - II	4

Following practicals are to be performed using 'R'

1. Fundamentals of R, Diagrammatic representation- Bar-charts, Pie chart
2. Descriptive statistics- R functions -Calculation of mean, median, quartiles, variance, s.d. minimum, maximum range coefficient of range, coefficient of variation. Measurement of skewness and kurtosis.
3. Probability problems
4. Problems based on distributions.
5. Correlation and regression analysis.
6. Testing of hypothesis- Z, t, F
7. Applications of chi square test
8. ANOVA

Reference books:

Course Code : **ASCAST1** **Descriptive Statistics**

1. Elementary Business Statistics- A.V. Deshpande, M.L. Vaidya, D.M. Doke
2. Topics in Statistical Methodology (1992), First edition, Wiley Eastern Ltd- Biswas S
3. Quantitative Techniques For Managerial Decisions: , (2001), MacMillan India Ltd.: J K Sharma
4. Mathematical Statistics, Fifteenth edition, S. Chand and Company: J. N. Kapur, H. C. Saxena
5. Business Statistics For Contemporary Decision Making- Ken Black
6. Descriptive statistics- M.N. Welling, P.P. Khandeparkar, R.J. Pawar, S.S. Naralkar
7. Statistical Techniques- M.N. Welling, P.M. Saraph, S.M. Diwali
8. Descriptive Statistics- R.J. Shah
9. New Mathematical Statistics, Satya Prakashan, New Market, New Delhi,5(1989): Sanjay Arora and Bansi Lal

Course Code : **ASCAST2** **Elementary Probability Theory, And Inference**

1. The Design and Analysis of Clinical Experiments, Second edition,: Fleiss J. L. (1989), Wiley and Sons
2. Options futures, and other derivatives: –7th edition. Prentice Hall: Hull John C
3. Business Statistics For Contemporary Decision Making- Ken Black
4. Statistical Methods- R.J. Shah
5. Fundamentals of Applied Statistics, Fourth edition, Sultan Chand & Sons, S. C. Gupta&. V. K. Kapoor
6. Fundamentals Of Mathematical Statistics- S.C. Gupta, V.K. Kapoor

Course Code : **ASCAST3** **Financial Mathematics And Quality Control**

1. Elementary Business Mathematics-, A.V Deshpande, M.L. Vaidya, A.P. Kumtha
2. Mathematical Basis of Life Assurance, First edition Insurance Institute of India: C.S Modi, R.V. Joshi, S.P. Dixit,.
3. Biostatistics- Daniel W. D.
4. Fundamentals of Clinical Trials, First edition, Springer Verlag.: Demets D. L. Friedman L. M., Furburg C., (1998)
5. Fundamentals of futures of Options and Marke Operation Research: 6th edition- Hull John C.
6. Business Mathematics- Dr. Neena Joshi
7. Life Contingencies, First edition, Heineman educational books London: Neill A.
8. Fundamental Of Applied Statistics- S.C. Gupta, V.K. Kapoor
9. Indian mutual funds handbook - A guide for industry professionals and intelligent investors by Shankaran Sunder
10. Biostatistical Analysis, Fourth edition, Pearson's education: Zar Jerrold H.

Book for Practical:

Statistical Methods Using R Software; Nirali Publications - V.R.Pawagi & Saroj A. Ranade

Evaluation Scheme

Theory Examination : Suggested Format of Question paper

Duration : 3 Hours

Total Marks : 100

- All questions are compulsory

Q. 1	Based on Unit I	25
	OR	
Q. 1	Based on Unit I	25
Q. 2	Based on Unit II	25
	OR	
Q. 2	Based on Unit II	25
Q. 3	Based on Unit III	25
	OR	
Q. 3	Based on Unit III	25
Q. 4	Based on Unit I, II, III	25
	OR	
Q. 4	Based on Unit I, II, III	25

Each question may have following subquestions

Full length question,	15 Marks
Short answer question	10 Marks
Short note questions	5 Marks
Objectives	2 Marks

The internal examination will consist of various assignments which will include presentation of given topic, seminar on given topic, writing the given assignment, attending and reporting seminars and conferences, field experience. And many such types.

There will be one assignment on each unit of each course and need to be submitted in the given time limit. Each assignment will be of 10 marks and total marks of assignments will be converted to 40% marks.

Total marks of Theory Examination

Course Code	External	Internal	Maximum marks
ASCAST1	60	40	100
ASCAST2	60	40	100
ASCAST3	60	40	100
TOTAL			300

Practical Examination

Course Code	Details	Marks	Viva	Journal	Total
ASCASP1	Practical I	80	10	10	100
ASCASP2	Practical II	80	10	10	100
Total				200	

Total of Internal Assignments	100 Marks
Total of Theory Examination	300 Marks
Total of Practical Examination	200 Marks
Grand Total	600 Marks

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