M.Sc. STATISTICS
PROSPECTUS
2021

THE MAHARAJA SAYAJIRAO UNIVERSITY OF BARODA

सत्यं शिवं सुन्दरम्

Estd. 1949

NAAC Accredited 'A' Grade

DST-FIST
Sponsored
Department of Statistics
Faculty of Science

DEPARTMENT OF STATISTICS

FACULTY OF SCIENCE

THE MAHARAJA SAYAJIRAO UNIVERSITY OF BARODA

H. H. MAHARAJA SAYAJIRAO GAEKWAD-III

MISSION STATEMENT

Vision and mission as perceived by

H. H. Maharaja Sayajirao Gaekwad-III

"The progress of a nation requires that its people should be educated. Knowledge is a necessity of man.

It instills in him a desire to question and to investigate, which leads him on the path of progress. Education, in the broadest sense, must be spread everywhere.

Progress can only be achieved by the spread of education. Cooperation is necessary to achieve any worthy end and this readiness to cooperate will not be found in people if they are not educated.

DEPARTMENT OF STATISTICS: PROFILE

Department of Statistics was established in the year 1949. Currently there are 13 faculty members, including 3 Professors, 4 Associate Professors, 1 Assistant Professor and 5 Temporary faculty members. Department is actively involved in research in the areas of Probability, Machine Learning, Statistical Inference, Operations Research and Design of Experiments. Department has produced 19 Ph.D's in various areas and 3 students are currently perusing Ph.D. The Department has to its credit more than 70 research papers in national as well as international repute journals in last five years. The department also has a Statistical Service Unit, which provides statistical consultation to the researchers.

Population Research Centre (PRC) of the Department has the status of fully developed PRC by MoFHW, India. At present, the major functions of the centre are Research and Consultation Services. The research findings of the center have helped the Gujarat State as well as the Central Government in formulating policies as well as revising the on-going health and family planning programs.

ACADEMIC PROGRAMMES OFFERED

- Bachelor of Science 3 years
- Master of Science (Statistics) 2 years
- Doctor of Philosophy

HIGHLIGHTS OF THE DEPARTMENT

- Highly qualified teachers
- Excellent infrastructure and computing facilities
- Industry sponsored programs and courses
- Audio-visual class rooms
- Fully furnished library having approximately 700 books and journals
- On and off campus placements for students
- Two rack mountable server HP DL380 Gen server P/N 719064-B21 with necessary software form virtualization VMware Horizon for 70 concurrent users
- Nationally and internationally acclaimed Alumni

Prof. V.A. Kalamkar

MESSAGE FROM HEAD

You are invited to initiate building of your career with us at Department of Statistics, The Maharaja Sayajirao University of Baroda. We offer one of the most contemporary curricula for our B.Sc. and M.Sc. program that help you to build strong foundations for a promising career in Statistics and Data Science.

The Department offers B.Sc., M.Sc., and Ph.D. programs in Statistics. With very experienced, award winning and helpful faculty, facilities like well-equipped Computer Laboratory, round the clock Internet access, Department library, vibrant alumni, and lively academic atmosphere, you are assured of the most enriching learning experience at Department of Statistics.

Our curricula equip you with sound knowledge of Statistical concepts, tools, and technologies, most sought after analytics skills in using modern statistical software and programming languages, practical exposure with real world projects, and good communication skills through Seminars and presentations. Extracurricular activities help our students to achieve all round development including soft skills.

We also work closely with industry for arranging campus placements, internships, and for also receiving valuable inputs to ensure that our curricula are always up to date. As a result of this, our students have been receiving highest number of placements with very attractive packages for last several years.

I, on behalf of all my colleagues, welcome you to start your journey towards a bright career in Statistics, analytics, and data science.

STRUCTURE OF M.SC. STATISTICS PROGRAM

M.Sc. Sem I	M.Sc. Sem II	M.Sc. Sem III	M.Sc. Sem IV
Core Courses	**Core Courses**	**Core Courses**	**Core Courses**
• Measure Theory • Linear Models • Multivariate Analysis-I • Decision Theory • Seminar • Introduction to R Programming • R Programming Lab • Multivariate and Inference Lab	• Probability Theory • Sampling Theory • Multivariate Analysis-II • Theory of Estimation • Non Parametric Inference • Programming in Python • Sampling and Inference Lab • Multivariate Analysis Lab • Programming in Python Lab	• Stochastic Processes-I • Design of Experiments • Design of Experiments Lab • Seminar	• Stochastic Processes-II • Theory of Hypothesis Testing • Hypothesis Testing Lab • Viva-Voce • Project • Stochastic Processes Lab
	Elective Courses	**Elective Courses**	**Elective Courses**
	• Project OR • Dissertation	• Six Sigma for Quality Improvement • Advanced R Programming • Bioassay • Survival analysis • Mathematical Programming • Advanced Multivariate Analysis -I • Operations Research • Database theory and Data ware housing • Numerical Methods • Data Analysis using python **All the elective courses are supported by laboratory training.**	• Data Mining • Clinical Trials • Econometrics • Statistical Pattern Recognition • Advanced Multivariate Analysis-II • Machine Learning • Scientific Computing in C++ **All the elective courses are supported by laboratory training.**

ADMISSION PROCEDURE

Apply online by visiting the URL https://admission.msubaroda.ac.in. Those applicants who fulfil eligibility criterion stated below will have to appear in the entrance examination to be conducted online.

The admissions are based purely on the performance of a candidate in the entrance examination.

NUMBER OF SEATS : 35

ELIGIBILITY

Candidates who have successfully completed B.Sc. degree in 10+2+3 pattern with Statistics as principal subject obtaining 50% marks or equivalent CGPA in the final year of B.Sc. will be eligible for admission in the M.Sc. in Statistics programme.

ENTRANCE TEST SYLLABUS

Introduction to Data, types of data. Various techniques of univariate and bivariate data exploration, correlation and regression. Meaning of probability and definitions, Algebra of sets, Results related to probability of events. Random variables (r.v.s) on finite, Countable and infinite sample pace, Probability distributions of r.v.s, Distribution function, Expectations and moments, random vectors, joint, marginal and conditional distributions. Covariance, correlation, independence of r.v.s, transformations of r.v.s. Chebychev's inequality. Discrete and continuous r.v.s(binomial, Poisson, Uniform, Normal etc. all), their properties, interrelations. PGF, MGF, Characteristic functions and relate results, WLLN, CLT.

Matrices, Quadratic forms, Eigen roots and vectors, Generalized inverse, Data matrix, SS and SP matrices. Field and sigma field. Sequences of real numbers, types and properties. Convergence of series and related results. Riemann and Riemann stiltjes integral and related results. Continuity of functions. Sampling distributions and related results, Order statistics and their distributions. Sampling and complete enumeration, various methods of sampling. Estimation of population characteristics and properties of estimators.

Statistical Inference : Point estimation: Properties of estimators, methods of estimation. Gauss-Markoff setup and related results. Confidence intervals. Testing of Hypothesis: Basic concepts, N-P lemma .Likelihood ratio tests. Non-parametric tests. Regression Analysis: single and multiple regressors and related results.

Indian official Statistics. Census and registration method of data collection, Mortality and fertility rates. Life tables. Population estimates and projection. Control charts: concept, charts for variables and attributes. Sampling plans. Design of Experiments: concept, CRD, RBD, LSD, Factorial designs. Index numbers .Time series analysis , models for time series. Statistical analysis of categorical data and related results.

SAMPLE QUESTIONS FOR PG ENTRANCE EXAMINATION

1. Which of the following quadratic form is positive definite?

(A) $x^2 + y^2$ (B) $x^2 - y^2$ (C) $-x^2 - y^2$ (D) $x^2 - 2xy + y^2$

2. Let (X, Y) be a two-dimensional RV of continuous type with joint pdf f(x, y). Let $f_1(x)$ and $f_2(y)$ denote marginal distributions of X and Y respectively. Then the conditional distribution of X given Y= y is given by

(A) $\frac{f(x,y)}{f_1(x)}$ (B) $\frac{f(x,y)}{f_2(y)}$ (C) $f_1(x) \cdot f_2(y)$ (D) $\frac{f_1(x)}{f_2(y)}$.

3. A reduced Latin square (or a Latin square in standard form) is one in which

(A) Treatments in the first row are arranged in alphabetic order
(B) Treatments in the first column are arranged in alphabetic order
(C) Treatments in the first row and first column are arranged in alphabetic order
(D) None of the above

4. For a single sampling inspection plan, it is given that $N = 100, n = 20$ and p=0.02. If $P_a = 0.64$, then what is the value of ATI?

(A) 30 (B) 38
(C) 45 (D) 49

5. Which of the following will give a more "accurate" representation of the population from which a sample has been taken?

(A) A large sample based on the convenience sampling technique
(B) A small sample based on simple random sampling
(C) A large sample based on simple random sampling
(D) A small cluster sample

6. Which of the following is not a statistic?

(A) $\bar{X}$ (B)$\sum X_i^2$ (C) $\frac{\bar{X}}{\sigma}$ (D) None of these.

7. Let $X_1, X_2, \ldots, X_n$ be a random sample from N(μ, σ^2), σ^2 unknown. Then

100x(1-α)% shortest length confidence interval for μ is given by

(A) $(\overline{X} \pm \frac{s}{\sqrt{n}} t_{n-1,\alpha/2})$ (B) $(\overline{X} \pm \frac{s}{\sqrt{n}} t_{n,\alpha/2})$

OUR PLACEMENT PARTNERS

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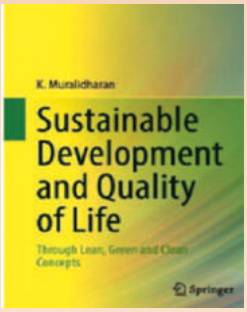

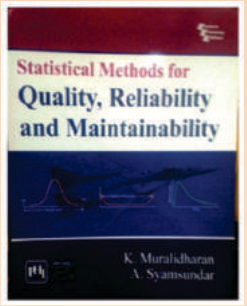

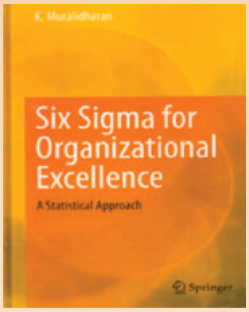

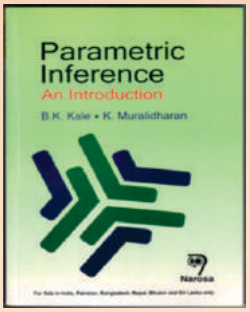

SOME IMPORTANT DATES AND SITE INFORMATION'S

- Application Dates: 11.06.2021 to 11.07.2021
- Application fee dates: 11.06.2021 to 11.07.2021
- Apply at: https://admission.msubaroda.ac.in

SOME IMPORTANT CONTACTS

- Prof. (Dr.) K. Muralidharan : 9879596190
- Dr. (Mrs.) Mangala Shah : 9427054075
- Dr. (Mrs.) Deepa Kandpal : 9427844734

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सत्यं शिवं सुन्दरम्

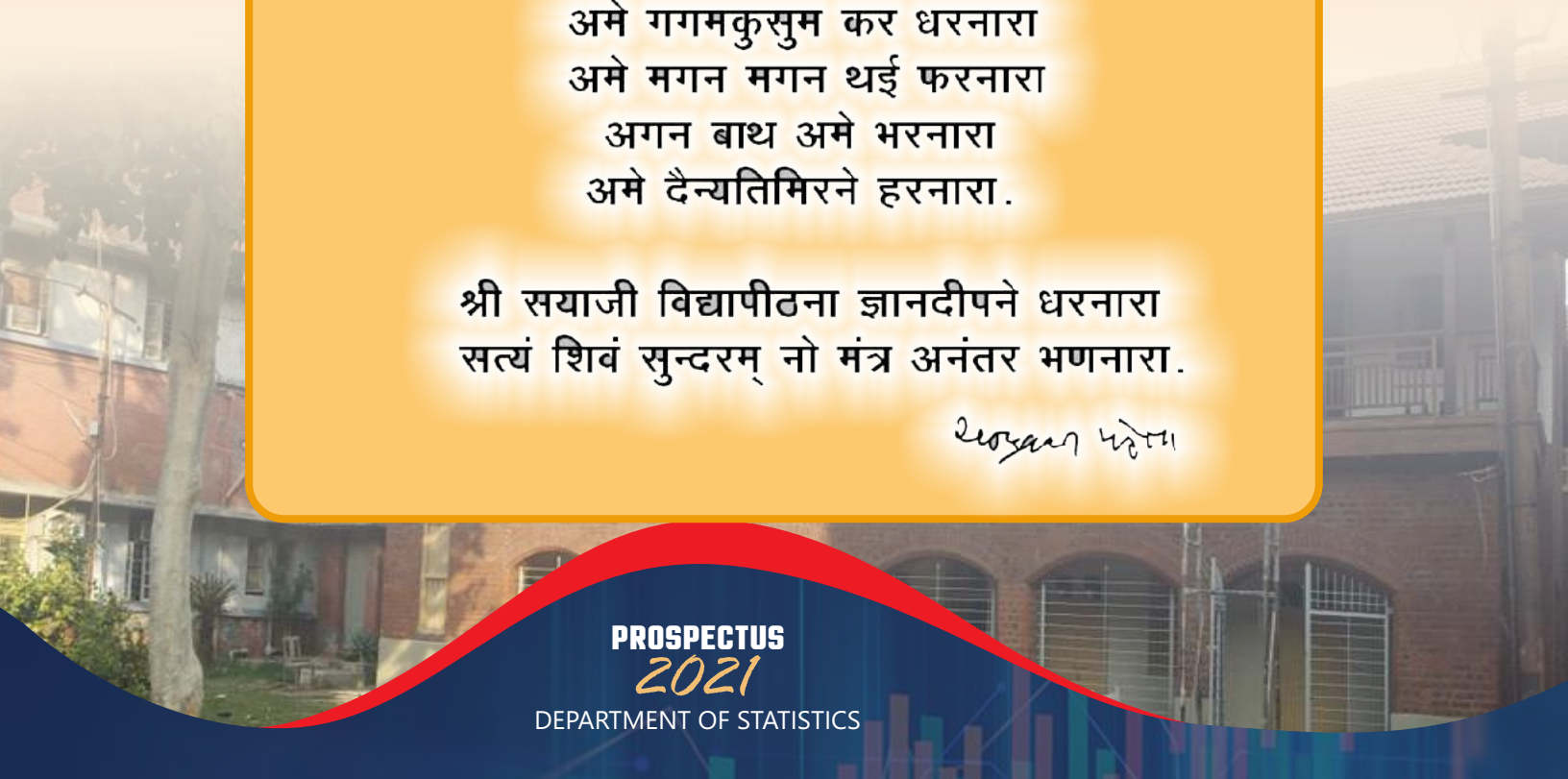
"The full-blown lotus growing out of the lake symbolises the emergence of the mind and its triumph over matter. The flame rising from the center of the lotus is the flame of the human knowledge, spreading light and learning for the coming generations. The motto inscribed below the lotus defines the purpose and existence of life which is love of beauty, goodness and intellectual curiosity."

महाराजा सयाजीराव विश्वविद्यालय गीत

अमे वडोदराना विद्यापीठना सपना सारवनारा
अमे ज्योत जलावी सृष्टी नवली सहसा सर्जनहारा.

अमे गगमकुसुम कर धरनारा
अमे मगन मगन थई फरनारा
अगन बाथ अमे भरनारा
अमे दैन्यतिमिरने हरनारा.

श्री सयाजी विद्यापीठना ज्ञानदीपने धरनारा
सत्यं शिवं सुन्दरम् नो मंत्र अनंतर भणनारा.



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