

S. P. Mandali's
Ramnarain Ruia Autonomous College
(Affiliated to University of Mumbai)



Syllabus for
Program: S.Y.B.Sc
Program Code: (STATISTICS) RUASTA

(As per the guidelines of National Education Policy 2020-
Academic year 2024-25)

(Choice based Credit System)

Graduate Attributes

S. P. Mandali's Ramnarain Ruia Autonomous College has adopted the Outcome Based Education model to make its science graduates globally competent and capable of advancing in their careers. The Bachelors Program in Arts also encourages students to reflect on the broader purpose of their education.

GA	Graduate Attributes Description
	A student completing Bachelor's Degree in Arts program will be able to:
GA 1	Demonstrate understanding and skills of application of knowledge of historical and contemporary issues in the social and linguistic settings with a transdisciplinary perspective to make an informed judgement.
GA 2	Analyse and evaluate theories of individual and social behaviour in the familiar contexts and extrapolate to unfamiliar contexts in order to resolve contemporary issues.
GA 3	Effectively and ethically use concepts, vocabularies, methods and modern technologies in human sciences to make meaningful contribution in creation of information and its effective dissemination
GA 4	Explore critical issues, ideas, phenomena and debates to define problems or to formulate hypotheses; as well as analyse evidences to formulate an opinion, identify strategies, evaluate outcomes, draw conclusions and/or develop and implement solutions.
GA 5	Demonstrate oral and written proficiency to analyse and synthesise information and apply a set of cognitive, affective, and behavioral skills to work individually and with diverse groups to foster personal growth and better appreciate the diverse social world in which we live.
GA 6	Develop a clear understanding of social institutional structures, systems, procedures, and policies existing across cultures, and interpret, compare and contrast ideas in diverse social- cultural contexts, to engage reasonably with diverse groups.
GA 7	React thoughtfully with emotional and moral competence to forms of expressive direct action and apply social strategies toward eradicating threats to a democratic society and a healthy planet.



GA 8	Articulate and apply values, principles, and ideals to the current societal challenges by integrating management and leadership skills to enhance the quality of life in the civic community through actions that enrich individual lives and benefit the community.
GA 9	Recognize and appreciate the diversity of human experience and thought, and apply intellect and creativity to contemporary scenario, to promote individual growth by practicing lifelong learning.

PROGRAM OUTCOMES

PO	Description
	A student completing Bachelor's Degree in Arts program in the subject of Statistics will be able to:
PO 1	Understand, condense, visualize, analyze and interpret the data collected in daily walk of life.
PO 2	Understand the data generated in various scenarios of scientific, industrial, or social problems.
PO 3	Pursue their higher education programs leading to post-graduate or doctoral degrees.
PO 4	Enhance knowledge of Statistical tools.
PO 5	Enhance the theoretical rigor with technical skills which prepare them to become globally competitive to enter into a promising professional life after graduation.
PO 6	Make a pathway to a range of traditional avenues in Academia and Industry , Govt. Service, IAS, Indian Statistical/ Economic Services, Industries, Commerce, Investment Banking, Banks and Insurance Sectors, CSO and NSSO, Research Personnel/Investigator in Govt. organizations such as NCAER, IAMR, ICMR, Statistical and Economic Bureau & various PSUs., Market Research, Actuarial Sciences, Biostatistics, Demography etc.



PO 7	Seek employment in different sectors like Stock trading, Sports, Politics, Business, Financial services and Media Industry.
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PROGRAM OUTLINE

YEAR	SEMESTER	COURSE CODE	COURSE TITLE	CREDITS
S.Y.B.Sc	III	RUSVSCSTAPO201	Introduction to Excel and Power BI	2
S.Y.B.Sc	IV	RUSSECSTAPE211	Linear Programming Techniques	2

CREDIT STRUCTURE BSc

Semester	Subject 1		Subject 2	GE/ OE course (Across disciplines)	Vocational and Skill Enhancement Course (VSC) & SEC	Ability Enhancement Course/ VEC/IKS	OJT/FP/CEPCC, RP	Total Credits
	DSC	DSE						
1	4		4	4 (2*2)	VSC-2 + SEC -2	AEC- 2 (CSK) + VEC- 2 (Understanding India) + IKS-2		22
2	4		4	4 (2*2)	VSC-2 + SEC -2	AEC-2 (CSK)+ VEC-2 (Env Sc)	CC-2	22
Total	8		8	8	8	10	2	44
Exit option: award of UG certificate in Major with 44 credits and an additional 4 credit Core NSQF course/ Internship or Continue with Major and Minor								
3	Major 8		Minor 4	2	VSC-2	AEC-2 MIL	FP -2, CC-2	22



4	Major 8		Minor 4	2	SEC-2	AEC-2 MIL	CEP-2, CC-2	22
Total	16		8	4	4	4	8	44
Exit option: award of UG Diploma in Major with 88 credits and an additional 4 credit Core NSQF course/ Internship or Continue with Major and Minor								
5	DSC 12	DS E	Minor		VSC-2-Major		CEP/FP-2	22
6	DSC 12	DS E 4	Minor 2				OJT-4	22
Total	24	8	4		2		6	44
Exit option: award of UG Degree in Major with 132 credits or Continue with Major for Honours/ Research								

SEMESTER III

Course Code: RUSVSCSTAPO201

Course Title: Introduction to Excel and Power BI

Type of Course: Vocational Skill Enhancement Course (VSC)

Academic year 2024-25

COURSE OUTCOMES:

COURSE OUTCOME	DESCRIPTION
	A student completing this course will be able to:
CO 1	Analyse any given data set within Excel, summarize it quickly with Advanced Excel Analysis Techniques to highlight the key points and make it presentable for clients or management making a dash board.
CO 2	Create POWERFUL reports and dashboards with Microsoft Power BI with and with-out DAX function and make it presentable.
CO 3	Perform various functions of power query editor.

DETAILED SYLLABUS

Course Code	Unit	Course/ Unit Title	No. of Hours
RUSVSCSTAPO201	Unit I	Introduction to Excel 1. Functions in Excel: <ul style="list-style-type: none"> • Sort and Filter, Conditional Formatting • <u>Statistical Functions</u>: - MEDIAN, MODE, QUANTILE, SUMIFS, SUMPRODUCT, AVERAGEIF, COUNTA, COUNTIFS, MIN and MAX, LARGE and SMALL, STDEV, VARIANCE, AUTOSUM, Data Tools • <u>Date and Time Functions</u>: - TODAY, NOW DATEDIF, EDATE, EOMONTH, WORKDAY, TEXT • <u>Logical Functions</u>: - IF and Nested IF function 2. Data analysis in Excel: <ul style="list-style-type: none"> • Correlation, Simple linear regression • Discrete Probability Distributions 3. Creating Dashboard: - <ul style="list-style-type: none"> • Pivot table with slicers, Pivot Chart 	15



		<ul style="list-style-type: none"> • Visuals as Bar charts, Line charts, Pie charts, Tree Map, Box and Whisker chart 	
	Unit II	<p>1. Introduction to Power BI</p> <ul style="list-style-type: none"> • Installing power BI and understanding its components as Power BI Desktop, Power Query editor etc. • Import data from databases, Excel files, CSV files, web services, and more using Power Query Editor <p>2. <u>Power Query editor</u> (Power BI) <u>used for Data transformations with functions:</u> -</p> <ul style="list-style-type: none"> • Text functions: Merge, split columns etc • Date functions: To calculate Age, Extract date • Statistical Functions: SUM, MEDIAN, COUNT, STANDARD DEVIATION, MIN, MAX etc. • Conditional column functions: If Expressions. • Sort and Filter, Merge tables/queries, • Pivoting and Unpivoting of columns • Group by function: Grouping of columns • M Language of Power Query: M functions Date, Text, writing a small code in advanced query editor. <p>3. Power Pivot: Building relationships between tables.</p> <p>4.DAX (Data Analysis Expressions) :</p> <ul style="list-style-type: none"> • Creating calculated columns, calculated tables or measures using DAX functions as below <ul style="list-style-type: none"> • Logical Functions: IF with AND, OR • Date and Time Functions: DATESBETWEEN, EDATE, MAX, TODAY • Statistical Functions: AVERAGE, COUNT, SUM, MIN, MAX, etc. • FILTER function with AND, OR conditions and DISTINCTCOUNT function <p>5.Creating Dash Board:</p> <ul style="list-style-type: none"> • Creating visuals (charts, tables, maps, slicers, KPI, tree maps, bubble charts, and funnel diagrams etc.) in Power BI. • Formatting and customizing visuals using tooltips and interactions. • Hierarchies and drill-down capabilities. 	15

Practical

Course Code: RUSVSCSTAPO201	
Sr. No.	Practical on Introduction to Excel and Power BI
1	Statistical functions in Excel
2	Logical Functions and Date function , Format options
3	Data tools, Sort and Filter of the given data
4	Discrete Probability Distributions, Correlation Regression analysis
5	Pivot table and chart ,Creating Dash boards In Excel
6	Various transformations in power query editor
7	M language functions of power query editor
8	Group by and pivot, unpivot of column functions in Query
9	Sort and filter, IF functions In DAX
10	Making Various visuals in PB
11	DAX function and Query functions revision
12	Create Dash board using visuals(bar diagram, pie diagram,funnel diagram) on PB canvas

References:

1. MICROSOFT EXCEL 2019 – TRAINING BOOK WITH MANY EXERCISES by Peter Schiessl
2. EXCEL BASICS for beginners by Henry E. Mejia
3. Excel Workbook for Dummies by Greg Harvey
4. <https://www.youtube.com/watch?v=wbJcJcKbCmQ>
5. <https://www.youtube.com/watch?v=kSQmPK-tWnw>
6. <https://www.youtube.com/watch?v=VI0H-qTclOg>

Course Code: RUSSECSTAPE211

Course Title: LINEAR PROGRAMMING TECHNIQUES

Type of Course: Skill Enhancement Course (SEC)

Academic year 2024-25

COURSE OUTCOMES:

COURSE OUTCOME	DESCRIPTION
	A student completing this course will be able to:
CO 1	Formulate and solve LPP by various methods
CO 2	Crash activities to optimise the project cost and update networks from time to time.
CO 3	Solving problems using excel

Course Code	Unit	Course/ Unit Title	No. of Hours
RUSSECSTAPE211	Unit I	LPP 1 <ul style="list-style-type: none"> • Linear Programming Problem (L.P.P.): • Mathematical Formulation: Maximization & Minimization. Concepts of Solution, Feasible Solution, • Basic Feasible Solution, Optimal solution. Graphical Solution for problems with two variables	1/15
	Unit II	LPP 2 <ul style="list-style-type: none"> • Simplex method of solving problems with two or more variables. • Big M method. Concept of Duality. Its use in solving L.P.P. • Relationship between optimum solutions to Primal and Dual. 	1/15

Distribution of topics for Practical

Course Code: RUSSECSTAPE211	
Sr. No.	Practical based on course
1	Formulation of LPP
2	Graphical Method
3	Simplex Method Maximisation problems
4	Simplex Method Minimisation problems
5	Formulation of Dual problem

REFERENCES:

1. E.L. Grant. (2nd edition) McGraw Hill, 1988.: Statistical Quality Control
2. Duncan. (3rd edition) D. Taraporewala sons & company.: Quality Control and Industrial Statistics
3. Bertrand L. Hansen, (1973), Prentice Hall of India Pvt. Ltd.: Quality Control: Theory and Applications
4. Douglas Montgomery, Arizona State University. John Wiley & Sons, Inc. (6th Edition): Statistical Quality Control
5. Gupta S.C., Kapoor V.K., Fundamentals of Applied Statistics, Sultan Chand & Sons
6. Srinath. 2nd edition, East-west press Pvt. Ltd.: PERT and CPM, Principles and Applications
7. Kantiswaroop and Manmohan Gupta. 4th Edition; S Chand & Sons.: Operations Research
8. Richard Broson. 2nd edition Tata Mcgraw Hill Publishing Company Ltd.: Schaum Series book in O.R.
9. Maurice Sasieni, Arthur Yaspan and Lawrence Friedman, (1959), John Wiley & Sons.: Operations Research: Methods and Problems
10. J K Sharma, (1989), Tata McGraw Hill Publishing Company Ltd.: Mathematical Models in Operations Research
11. S.D.Sharma. 11th edition, Kedar Nath Ram Nath & Company.: Operations Research
12. H. A. Taha, 6th edition, Prentice Hall of India.: Operations Research
13. J.K.Sharma, (2001), MacMillan India Ltd.: Quantitative Techniques for Managerial Decisions



Modality of Assessment: Vocational Skill Enhancement Course (VSC) / Skill Enhancement Course (SEC)

Semester End Practical Examination:

Practical Examination Pattern (Per Semester)

Practical Examination	50 Marks
Journal and attendance	5 Marks
Paper	45 Marks

At the end of the semester, examination of **2 hours** duration.

Pattern of **Practical question** paper at the end of the semester for **the course**:

1. Paper will consist of **two questions**.
2. The distribution of marks will be as follows:

Question based on Unit	Marks
1	25
2	20
Total	45

PRACTICAL JOURNAL(5 marks)

The students are required to present a duly certified journal for appearing at the practical examination, failing which they will **not be allowed to appear for the examination. The journals will be certified if the student attends 75% practicals.**

In case of loss of Journal and/or Report, a Lost Certificate should be obtained from Head/ Co-ordinator / In charge of the department; failing which the student will not be allowed to appear for the practical examination.
