

**A91003: RESEARCH METHODOLOGY AND STATISTICAL ANALYSIS
TEACHING PLAN**

UNIT	TOPIC	NUMBER OF CLASSES
UNIT-I	NATURE AND IMPORTANCE OF RESEARCH	2
	THE ROLE OF BUSINESS RESEARCH	1
	AIMS AND TYPES OF SOCIAL RESEARCH.RESEARCH DESIGN:MEANING OF RESEARCH DESIGN	2
	FUNCTIONS AND GOALS OF RESEARCH DESIGN	1
	PILOT STUDY AND DEVELOPING A CASE STUDY	2
	MECHANICS OF REPORT WRITING,PRELIMINARY PAGES,MAIN BODY AND APPENDICES INCLUDING BIBLIOGRAPHY	1
	PRIMARY DATA AND SECONDARY DATA COLLECTION TECHNIQUES	2
	SAMPLING DESIGN AND SAMPLING PROCEDURES	1
	TABULATION OF DATA AND GENERAL RULES OF TABULATION	1
	MEASUREMENT CONCEPTS:MEASUREMENTS AND SCALING CONCEPTS,ATTITUDE MEASUREMENT	2
	QUESTIONNAIRE DESIGN	1
	LEVELS OF MEASUREMENT AND TYPES OF SCALES	1
	CRITERIA FOR GOOD MEASUREMENT	1
UNIT- II	MEASURES OF CENTRAL TENDENCY	2
	MEASURES OF DISPERSION	2
	MEASURES OF SKEWNESS AND INTERPRETATION	1
	DIAGRAMMATIC AND GRAPHICAL PRESENTATION OF DATA	2
	CORRELATION AND REGRESSION ANALYSIS	2
	METHOD OF LEAST SQUARES	2
	TYPES OF CORRELATION ANDTHEIR SPECIFIC APPLICATIONS	1
UNIT- III	INTRODUCTION TO TESTING OF HYPOTHESIS	1
	NULL HYPOTHESIS VS.ALTERNATIVE HYPOYHESIS	1
	PROCEDURE FOR TESTING OF HYPOTHESIS	1
	TESTS OF SIGNIFICANCE FOR SMALL SAMPLES,APPLICATIONS,t-TEST	3
	ANOVA-ONE WAY ABD TWO WAY CLASSIFICATIONS	3
	CHI-SQUARE TEST,ASSOCIATION OF ATTIBUTES AND INFERENCE	1
UNIT- IV	PARAMETRIC VS. NON-PARAMETRIC	1
	SIGN TEST	1
	SIGN RANK TEST	1
	RUN TEST	1
	MEDIAN TEST	1
	McNEMAR'S TEST	1
UNIT- V	TIME SERIES,UTILITY OF TIME SERIES,COMPONENTS	3
	MEASUREMENT OF TREND THROUGH METHOD OF LEAST SQUARES,MOVING AVERAGES,AND GRAPHICAL METHODS	4
	INDEX NUMBERS:LASPEYERS'S INDEX, PAASCHE'S INDEX,FISHER'S IDEAL INDEX	3
	TIME REVERSAL AND FACTOR REVERSAL TESTS	1
	TOTAL	60

ANURAG GROUP OF INSTITUTIONS**(Autonomous)****School of Business Management****I-M.B.A-I-Semester End Examinations, February - 2016****Subject: Research Methodology and Statistical Analysis****Time: 3 Hours****Max.Marks:60****Section – A (Short Answer Type Questions)****(5 × 4 = 20 marks)**

- **Answer all questions**

1. What are the various Characteristics of good Business Research?
2. Find the mean of following frequency distribution

Class Interval	10-20	20-30	30-40	40-50	50-60	60-70
Frequency	2	4	6	3	2	1

3. What is Chi-square test of goodness of fit?
4. Explain Median Test.
5. What are the components of time series?

Section – B (Essay Type Questions)**(5 × 8 = 40 Marks)**

- **Answer all questions, each carry equal marks**

6. a) Explain the various methods all collecting statistical data?
OR
b) Explain the steps involved in designing a Questionnaire.

7. a) Calculate Regression line x on y and y on x for the following data

X	45	70	65	30	90	40	50	75	85	60
Y	35	90	70	40	95	40	60	80	80	50

OR

- b) Calculate the pearsons coefficient of skewness baesd on Mean and Mode from the following data

Wages	0-10	10-20	20-30	30-40	40-50
No.of Workers	15	20	30	25	10

8. a) A certain drug was administrated to 456 males out of a total 720 in certain locality to test its efficiency against typhoid. The incidence of typhoid is shown below. Find the effectiveness of the drug against the disease.(The table value of chi square at 5% L.O.S is 3.84)

	Infection	No infection
Administering the drug	144	312
Without Administering the drug	192	72

P.T.O

OR

b) In the given data, daily production levels of 16 persons are available as follows

Training method	Daily outputs in number of units				
A	15	18	11	19	22
B	17	22	21	18	27
C	15	16	24	22	19

Check if the training method has been effective.

9. a) Explain Signed-Rank Test procedure clearly?

OR

b) In a class there are 30 boys and 20 girls. These students are selected for getting into bus for the picnic according to their pattern of arrival as given below

G,B,G,G,G,B,B,B,G,B,G,B,B,G,G,G,B,G,G,B,B,G,B,B,B,G,B,B,G,G,B,B,B,
B,G,G,B,B,B,B,G,B,B,B,B,B.

From this sequence of arrival can we conclude, if the arrival pattern is random?

10. a) Fit a trend line from the following data by using semi average method.

Year	1973	1974	1975	1976	1977	1978
Profits	100	120	140	150	130	20

OR

b) Define index number and explain their characteristic and uses?

Calculate Fisher's ideal index number and check whether it satisfies both factor reversal and time reversal test from the following data.

Commodities	Base year		Current year	
	Price	Quantity	Price	Quality
A	10	5	15	4
B	12	6	16	3
C	8	9	10	5
D	6	3	9	3

ANURAG GROUP OF INSTITUTIONS**(Autonomous)****School of Business Management****I-M.B.A-I-Semester End Examinations, February - 2016****Subject: Research Methodology and Statistical Analysis****Time: 3 Hours****Max.Marks:60****Section – A (Short Answer Type Questions)****(5 × 4 = 20 marks)**

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2. Find the mean of following frequency distribution

Class Interval	10-20	20-30	30-40	40-50	50-60	60-70
Frequency	2	4	6	3	2	1

3. What is Chi-square test of goodness of fit?
4. Explain Median Test.
5. What are the components of time series?

Section – B (Essay Type Questions)**(5 × 8 = 40 Marks)**

- **Answer all questions, each carry equal marks**

6. a) Explain the various methods all collecting statistical data?
OR
b) Explain the steps involved in designing a Questionnaire.

7. a) Calculate Regression line x on y and y on x for the following data

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OR

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B,G,G,B,B,B,B,G,B,B,B,B,B.

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ANURAG GROUP OF INSTITUTIONS**(Autonomous)****School of Business Management****I-M.B.A-I-Semester Supplementary Examinations, February - 2016****Subject: Research Methodology and Statistical Analysis****Time: 3 Hours****Max.Marks:60****Section – A (Short Answer Type Questions)****(10×2 = 20 marks)**

- **Answer all questions**

1. What are the objectives of classification?
2. Define Measurement and Give the Criteria for good measurement.
3. Define kurtosis and give the measures of kurtosis
4. Calculate variance for the following data

Class Interval	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55
Frequency	7	3	8	15	13	9	5	3

5. Explain type- I error.
6. Define Null Hypothesis and Alternative Hypothesis.
7. Explain Run test
8. Give test procedure for Kruskal-Walis test
9. Write components of time series.
10. Measure the trend by graphical method for the following data

Year	1990	1991	1992	1993	1994	1995
Sales (Million Rs)	24	25	29	26	22	24

Section – B (Essay Type Questions)

- **Answer all the questions.**

5x8=40 marks

11. a) Explain the steps involved in designing a Questionnaire.

OR

- b) Explain nature and importance of Research and explain in detail various types of Research

12. a) Calculate Regression line x on y and y on x for the following data

X	36	23	27	28	29	30	31	38	35
Y	28	18	20	22	21	29	27	29	28

OR

- b) (i) Give the Guidelines for the use of graphs and diagrams in presetting data.
(ii) Draw the Pi-diagram for the following data

Item of Expenditure	Food	Clothing	Rent	Education	Recreation	Miscellaneous
Family Expenditure in Rupees	1000	500	800	400	200	100

13. a) The following table gives the retail prices of commodity in three cities: A,B,C. Four shops were chosen at random in each city and prices observed in rupees were as follows.

A	16	8	12	14
B	14	10	10	6
C	4	10	8	8

Do the data indicate that the price in the three cities is significantly different? Test at 5%L.O.S.

OR

- b) A random sample of 10 students had the following IQ's
70, 120, 110, 101, 88, 83, 95, 98, 107, 100

Do these data support the assumption of a population mean of IQ of 100?(test at 5% L.O.S)

14. a) Three training methods were compared to see if they led to greater productivity after training. The productivity measures for individuals trained by different methods are as below:

Method-I	36	26	31	20	34	25
Method-II	40	29	38	32	39	34
Method-III	32	18	23	21	33	27

At the 0.05 level of significance, do the three training methods lead to different levels of productivity by using Kruskal-Wallis test.

OR

- b) (i) Compare the Parametric and Non-parametric
(ii) The following data relate to the costs of building comparable lots in the two Resorts A and B (in million rupees):

Resort A	7	8	5	9	10	6	5	9	6
Resort B	5	6	7	6	9	7	6	5	7

The company owning the resort area A claimed that the median price of building lots was less in area A as compared to resort area B. You are asked to test this claim, using a non parametric test with a 1% level of significance.

15. a) From the following data fit a straight line trend equation of the form $y=a+bx$

Year	2000	2001	2002	2003	2004	2005	2006
Production	75	86	102	125	110	120	132

Also estimate most likely production in 2010.

OR

b) Define index number and explain their characteristic and uses?

Calculate Fisher's ideal index number and check whether it satisfies both factor reversal and time reversal test from the following data.

Commodities	Base year		Current year	
	Price	Quantity	Price	Quality
A	10	5	15	4
B	12	6	16	3
C	8	9	10	5
D	6	3	9	3

Subject Code: R14E11MB05

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(Autonomous)

School of Business Management

I-M.B.A-I-Semester Supplementary Examinations, August 2015

Subject: RESEARCH METHODOLOGY AND STATISTICAL ANALYSIS

Time: 3 Hours

Max.Marks:60

Section – A (Short answer type questions)

(10 × 2 = 20 marks)

• **Answer all the questions**

1. Explain the importance of research.
2. What are the functions and goals of research design?
3. What are the measures of central tendency?
4. Calculate standard deviation from the following data:

Class	0-4	4-8	8-12	12-16	16-20
Frequency	2	3	4	2	1

5. Define hypothesis.
6. Explain regression analysis.
7. What do you know about run test?
8. Explain parametric versus non parametric tests.
9. Explain time reversal test.
10. Explain the applications of time series.

SECTION-B (Essay Questions)

• **Answer all questions**

(5×8=40 Marks)

11. a) What do you mean by measurement and scaling concepts?

OR

- b) Define sampling design. Explain various sampling procedures.

12. a) Calculate co efficient of skewness to the following data.

Class interval	10-20	20-30	30-40	40-50	50-60
Frequency	5	10	21	9	5

OR

- b) Five students obtained the marks in accountancy and marketing management as shown below:

Accountancy	60	71	82	45	56
Marketing	64	68	79	56	44
Management					

Calculate rank correlation coefficient for the above.

13. a) Explain in detail t – test for single mean and difference of means.

OR

P.T.O

b) The scores of 10 athletes have the following scores before and after a special training given by an international coach.

Before: 86 50 38 39 56 72 85 98 90 65
 After : 92 60 58 51 64 81 88 95 84 75

Is the special training effective? Test at 5% level of significance .

14. a) i) What is a sign rank test?

ii) Pre and post scores after particular training program are known to be non-normal in the distribution. A sample of the scores with the calculated changes is given below.

Pre-test : 62 66 78 64 63 31 47 67 51 59 71 78 64 63 31

Post-test : 57 61 83 66 71 37 62 71 54 58 75 83 68 71 37

conduct a sign test for determining whether any significant change has taken place.

OR

b) i) Define Kruskal-Wallis test .

ii) Determine whether there is significant difference in the following populations at 5% level of significance

Population-1	15	25	35	45	50		
Population-2	20	26	32	43	52	56	
Population-3	26	28	30	32	34	36	38

15. a) A company that manufactures Bolts observed that production Bolts (in metric tons) represented by the time-series:

Year: 2007 2008 2009 2010 2011 2012 2013 2014

Production: 80 70 75 65 80 55 95 68

Find the linear equation that described the trend in the production of steel by the company and Estimate the production of Bolt in 2015

OR

b) Explain the criteria of good index number. For the following data, show that

Fisher's index number satisfies time reversal test and Factor reversal test.

Year	Article I		Article II		Article III		Article IV	
	Price	Quantity	Price	Quantity	Price	Quantity	Price	Quantity
2012	5	5	7.75	6	9.63	4	12.5	9
2013	6.3	4	8.8	10	7.75	6	12.75	9

Section – A (Short Answer type questions) (10*2=20marks)

• **Answer all questions**

1. Discuss Aim and Scope of Social Research.
2. Define Measurement and Scaling
3. Discuss the Mechanics of Report writing.
4. Define regression with an example.
5. Explain the importance of research.
6. What are the functions and goals of research design?
7. What are the measures of central tendency?
8. Define regression with an example.
9. Calculate mean for the following data.
15, 20, 25, 19, 12, 11, 13, 17, 18,
10. Find the mean of following frequency distribution
Class Interval 10-20 20-30 30-40 40-50 50-60 60-70
Frequency 2 4 6 3 2 1
11. Define Null Hypothesis and Alternative Hypothesis. Give one example for each.
12. Define Type-I and Type-II errors.
13. Define hypothesis.
14. Explain regression analysis.
15. What is Chi-square test of goodness of fit?
16. Explain Median Test.
17. What do you know about run test?
18. Explain parametric versus non parametric tests.
19. Write any two advantages and disadvantages of Non-parametric methods.
20. Define run with an example
21. What is time -series? Write the components of time –series.
22. Define Laspeyre's and Paasche's Price and Quantity index number
23. Explain time reversal test.
24. Explain the applications of time series.
25. What are the components of time series?

Section – B (Essay Type Questions) (5*8 =40 Marks)

• **Answer all questions, each carry equal marks**

1. Explain the various methods all collecting statistical data?
2. Explain the steps involved in designing a Questionnaire.
3. Explain the concept of research design.
4. Explain primary data and secondary data collection techniques.

11. What do you mean by measurement and scaling concepts?

6. Define sampling design. Explain various sampling procedures.

7. Calculate co efficient of skewness to the following data.

Class interval	10-20	20-30	30-40	40-50	50-60
Frequency	5	10	21	9	5

8. Five students obtained the marks in accountancy and marketing management as shown below:

Accountancy	60	71	82	45	56
Marketing Management	64	68	79	56	44

Calculate rank correlation coefficient for the above.

9. Calculate Regression line x on y and y on x for the following data

X	45	70	65	30	90	40	50	75	85	60
Y	35	90	70	40	95	40	60	80	80	50

10. Calculate the pearsons coefficient of skewness baesd on Mean and Mode from the following data

Wages	0-10	10-20	20-30	30-40	40-50
No of workers	15	20	30	25	10

11. Four different drugs have been developed for a certain disease. These drugs are used in three different hospitals and the result given below show the number of cases of recovery from the disease per 1000 people who have taken the drugs.

	A1	A2	A3	A4
B1	119	108	203	80
B2	110	109	102	160
B3	111	103	103	100

What conclusions can you draw?

12. a) An IQ test was administered to 5 persons before and after they were trained. The results are given below

Candidates	I	II	III	IV	V
IQ before training	110	120	123	132	125
IQ after training	120	118	125	136	121

Test whether there is any change in IQ after the training program

13. A test was given to five students take at random from the fifth class of three schools of a town. The individual scores are:

STUDENTS

School	A	B	C	D	E
I	9	7	6	5	8
II	7	4	5	4	5
III	6	5	6	7	6

Carry out the analysis of variance and state your conclusions.

14. The following data refer to annual production of a certain business. Fit a straight line trend by the method of least squares for measuring trend values. Estimate the Production for 2012.

Year	2005	2006	2007	2008	2009	2010	2011
Production	77	88	94	85	91	98	90

15. From the following data prove that Fisher's ideal index satisfies both the time reversal and the factor reversal test.

Commodity	Base year		Current year	
	Price	Quantity	Price	Quantity
A	6	50	10	60
B	2	100	2	120
C	4	60	3	60

17. Fit a trend line from the following data by using semi average method.

Year	1973	1974	1975	1976	1977	1978
Profits	100	120	140	150	130	20

18. Test whether the following data satisfies time reversal and factor reversal test

Commodity	P ₀	Q ₀	P ₁	Q ₁
A	8	4	10	5
B	12	5	15	7
C	6	15	12	10
D	9	5	18	8
E	16	7	12	15

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PROGRAM OUTCOMES					
a	b	c	d	e	f
	x		x		

MBA I YEAR I SEMESTER

**T P C
4 1 3**

A91006 RESEARCH METHODOLOGY AND STATISTICAL ANALYSIS

Course Aim: To understand basic statistical tools for analysis and interpretation of quantitative and qualitative data.

Unit – I:

Introduction: Nature and Importance of Research, The Role of Business Research, Aims and Types of Social Research. Research Design: Meaning of Research Design. Functions and Goals of Research Design, Pilot Study and Developing a Case Study. Mechanics of Report Writing, Preliminary Pages, Main Body and Appendices Including Bibliography. Primary Data and Secondary data collection techniques, Sampling Design and Sampling Procedures. Tabulation of data and General Rules of Tabulation. Measurement Concepts: Measurement and Scaling Concepts, Attitude Measurement, Questionnaire Design, Levels of Measurement and Types of Scales. Criteria for Good Measurement.

Unit – II:

Central Tendency, Correlation and Regression: Measures of Central Tendency, Measures of Dispersion, Measures of Skewness and Interpretation. Diagrammatic and Graphical Presentation of Data. Correlation and Regression Analysis, Method of Least Squares. Types of Correlation and their Specific Applications.

Unit – III:

Statistical Inference: Introduction to Null Hypothesis vs. Alternative Hypothesis, Tests of Hypothesis, Procedure for Testing of Hypothesis, Tests of Significance for Small Samples, Application, t-test, ANOVA – One Way and Two-Way Classifications and Chi-Square Test, Association of Attributes and Inferences.

Unit – IV:

Parametric vs Non-parametric: Definition, Importance, Sign Test, Sign Rank Test, Run Test, Median Test, McNemar's Test, Kruskal-Wallis Test.

Unit – V:

Time Series and Index Numbers: Time Series, utility of Time Series, Components, Measurement of Trend through Method of Least Squares, Moving Averages, and Graphical

Methods. Index Numbers: Laspeyres's Index, Paasche's Index, Fischer's Ideal index, Time Reversal and Factor Reversal tests.

Text Book

1. J.K.Sharma "Business Statistics -Problems and Solutions" Pearson,2010.

References:

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2. Gaur: Statistical Methods for Practice and Research, Sage Publication,2009
3. Bhandarkar & Wilkinson: Methodology and Techniques of Social Research, Himalaya, 2009
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