

UNIVERSITY OF MUMBAI

No.UG / 207 of 2007

CIRCULAR :-

A reference is invited to the Ordinances, Regulations and syllabi relating to the Master of Arts (M.A.) degree examination and the Master of Science (M.Sc.) degree examination vide Pamphlet No.157 and 175 respectively and to this office Circular No.UG/99 of 2002 dated 22nd February,2002 and the Head, University Department of Statistics, the Principals of the affiliated colleges in Arts and Science, the Heads of the recognized Institutions concerned and Professor-cum-Director, Institute of Distance Education are hereby informed that the recommendation made by the Board of Studies in Statistics at its meeting held on 14th March,2007 has been accepted by the Academic Council at its meeting held on 13th April,2007 vide Item No.4.4 and that in accordance therewith the syllabus in the subject of Statistics at the M.A./M.Sc. (Part-I) examination is revised as per Appendix and that the same will be brought into force with effect from the academic year 2007-2008.

MUMBAI-400 032

18th May, 2007

for I/c. REGISTRAR

To,

The Head, University Department of Statistics , Principals of affiliated colleges in Arts and Science, the Heads of the recognized Institutions concerned and Professor-cum-Director, Institute of Distance Education

A.C./4.4/13.04.2007

No.UG/ 207- A of 2007, MUMBAI-400 032

18th May,2007

Copy forwarded with compliments for information to :-

- 1) The Deans, Faculty of Arts and Science
- 2) The Chairman, Board of Studies in Statistics

for I/c. REGISTRAR

Copy to :-

The Director, Board of College and University Development , the Deputy Registrar (Eligibility and Migration Section), the Director of Students Welfare, the Executive Secretary to the Vice-Chancellor, the P.A. to the Pro-Vice-Chancellor, and the Registrar and the Assistant Registrar, Administrative sub-center, Ratnagiri for information

The Officer on Special Duty and Controller of Examinations (10 copies), the Finance and Accounts Officer (2 copies), Record Section (5 copies), Publications Section (5 copies), the Deputy Registrar, Enrolment, Eligibility and Migration Section (3 copies), the Deputy Registrar, Statistical Unit (2 copies), the Deputy Registrar (Accounts Section), Vidyanagari (2 copies), the Deputy Registrar, Affiliation Section (2 copies), the Director, Institute of Distance Education, (10 copies) the Director University Computer Center (IDE Building), Vidvanagari, (2 copies) the Deputy Registrar (Special Cell), the Deputy Registrar, (PRO) , the Assistant Registrar, Academic Authorities Unit (2 copies) and the Assistant Registrar, Executive Authorities Unit (2 copies) . They are requested to treat this as action taken report on the concerned resolution adopted by the Academic Council referred to in the above Circular and that no separate Action Taken Report will be sent in this connection. the Assistant Registrar Constituent Colleges Unit (2 copies), BUCT(1 copy), the Deputy Account, Unit V(1 copy), the In-charge Director, Centralize Computing Facility (1 copy), the Receptionist (1 copy), the



UNIVERSITY OF MUMBAI



REVISED SYLLABUS FOR M.A/M.Sc. (PART-I) IN STATISTICS

(with effect from the academic year 2007-2008)

**SCHEME AND SYLLABUS FOR M.A./M.Sc PART-I
(STATISTICS) COMMENCING FROM
ACADEMIC YEAR 2007-2008.**

The following will be the scheme of M.A./ M.Sc. Part – I examination for the branch of Statistics :

M.A./ M.Sc. PART –I EXAMINATION

Scheme of Examination : -

Paper I - Probability Theory and Sampling

For M.Sc. (Part-I) (One Paper – 3 hours – 100 marks)

For M.A. (Part-I) (One Paper – 3 hours – 75 marks)

Paper II - Linear Models

For M.Sc. (Part-I) (One Paper – 3 hours – 100 marks)

For M.A. (Part-I) (One Paper – 3 hours – 75 marks)

Paper III - Distribution Theory and Estimation

For M.Sc. (Part-I) (One Paper – 3 hours – 100 marks)

For M.A. (Part-I) (One Paper – 3 hours – 75 marks)

Paper IV - Planning and Analysis of Experiments

For M.Sc. (Part-I) (One Paper – 3 hours – 100 marks)

For M.A. (Part-I) (One Paper – 3 hours – 75 marks)

Distribution of marks : -

- All Questions in the theory Paper are compulsory and Appropriate weightage should be given to each topic in the syllabus.

Paper V - Practical based on Paper I to IV

For M.Sc. (Part-I) (3 hours – 100 marks)

For M.A. (Part-I) (3 hours – 100 marks)

Distribution of marks for paper V :-

- 80 marks for practical examination consisting of two sessions each of 3 hours duration.
- 20 marks for journal and viva-voce.

Teaching Hours :

- The syllabus of each Theory paper should be covered in 120 hours in one academic year i.e. 60 hours per term, consisting of 4 hours per week for each paper.
- There will be one Seminar of One - hour duration per paper per week.
- Eight hours of practical consisting of Two practical session of 4 hours per week per batch.
- Each batch for practical consist of Ten students.
- Two hours of practical session of teaching of Statistical Software per week per batch.

Paper – I

Module – I - Probability Theory

Prerequisites : 1. Real Analysis
2. Set Theory

Unit -1 (15 Lecture)s

- i) Sample Space : and relevance of Probability theory
- ii) Various definitions, Properties of Probability, Basic formulas
- iii) Combination of events, the realization of m among n events
- iv) Conditional Probability, Independent events (Stochastic independence) Bayes theorem.
- v) Occupancy Problems on runs and recurrent events

Book & Page Numbers

Feller: Pp: 1-6
Rohatagi: Pp :1-25
Feller : Pp:98-100
106-111
Feller: Pp:114-28

Unit -2 (15 Lecture)

- i) Generating functions, convolutions, compound distributions
- ii) Branching Process.
- iii) Characteristic Function.

Book & Page Numbers

Feller : Pp :265-278
Medhi: Pp :362-377
Bhat: Pp : 132-146

Unit -3 (15 Lecture)

- i) Probability inequalities, Basic inequality Markov , Chebychevs, Cauchy Schawartz, Jensen, Holder, Minkowski.
- ii) Modes of convergence,
Weak Law of Large Number
Strong Law of Large Number
Central Limit theorem

Book & Page Numbers

Rohatagi: Pp :158-60
Rohatagi: Pp:256-305

Unit -4 (15 Lecture)

- i) Markov chains

Book & Page Numbers

Ross : Pp:163-200
Medhi: Pp:54-90

References Books

1. Shat B.R. (1985) - Modern Probability Theory
2. Feller W. (1972) - Introduction to Probability Theory and its Applications, Vol -I (3rd Edition)
3. Medhi J (1994)- Sochastic Processes (2rd Edition)
4. Ross S.M (1993) - Introduction to Probability Models
5. Rohatgi V.K. & Saleh A.K. Md. Ehasanes (2001) - An Introduction to Probability and Statistics.

Recommended books for further reading

1. T. Cacoullos L: Exercises in Probability
2. Kathleen Subrahmaniam : A primer in Probability

Module -II - Sampling

Prerequisites : 1. Simple random sampling
2. Introduction of Stratified random sampling

Unit -1 (15 Lecture)		Book & Page Numbers
i)	Stratified random sampling. Optimum, proportional, Neyman Allocation.	Chocran: Pp: 89-111
ii)	Comparison of variance (opt), Var(prop), Var(rand). collapsed strata, Number of strata, strata boundaries	Chocran: Pp: 115-121
iii)	Post stratification, estimation of population proportion. Allocation with more than one item	Chocran: Pp: 127-138
iv)	Systematic sampling-procedure. Advantage over simple random sample. Properties of the estimate. variance in terms of ρ_w , Comparison of systematic sampling with Simple random sample without replacement.	Chocran: Pp: :205-208
v)	Systematic sampling and stratified sampling and their comparison	Chocran: Pp: 209-214
vi)	Systematic sampling in population with linear trend,	Chocran: Pp: 214-217
vii)	Use of centrally located sample; method of end correction; balanced systematic sample; estimation of pop. Mean when $N=nk+c$.	
viii)	Circular systematic sampling; Variance of sample mean; method inter penetrating sample.	

Unit -2 (15 Lecture)		Book & Page Numbers
i)	Ratio estimation - properties of estimate of R; Confidence intervals; Comparison of ratio estimate with mean per unit.	Chocran: Pp: 150-157
ii)	Bias in ratio estimate. Hartley Ross exact result for bias. Ratio estimate in stratified sampling. Separate, combined.	Chocran: Pp: 158-178
iii)	Regression estimate with preassigned b; Regression estimate when b is computed from sample, Comparison of regression Estimate with Ratio estimate and mean per unit. Regression estimate in stratified sampling : Separate, combined	Chocran: Pp: 189-200

Unit -3 (15 Lecture)

	Book & Page Numbers
i) Cluster sampling	Chocran: Pp: 233-240
ii) Jessen's result. Relation between optimum size of cluster and cost. cluster sampling for proportion	Chocran: Pp: 240-247
iii) Cluster sampling when clusters are of unequal size.	Chocran: Pp: 249-250
iv) Multi stage – Two stage sampling.(srswr-srswor) estimation of population mean and variance of the estimate and its estimate cost function; optimum value of m=size of second stage sample.	Chocran: Pp: 274-278 Chocran: Pp: 283-285

Unit -4 (15 Lecture)

	Book & Page Numbers
i) Two stage sampling for proportion.	Chocran: Pp: 279-280
ii) PPS sampling.-wr; methods of obtaining a sample .(a)cumu. Total method b) Lahiris method Properties of the estimator	Mukhopadhyay : Pp: 182-187
iii) PPSWOR Hansen Hurtwitz estimator ; variance of it; Yates and Grundy estimator;	Mukhopadhyay : Pp: 196-200
iv) Hortvitz Thompson estimator for pop total. Its variance	Mukhopadhyay : Pp: 201-202
v) Double sampling (two phase) for stratification.	
vi) Non-sampling errors; non-response.	Chocran: Pp: 327-333

References Books

1. Chocran W.G.: Sampling techniques
2. Parimal Mukhopadhyay : Theory and Methods of Survey Sampling
3. Murthy M.N.: Sampling theory and Methods
4. Sukhatme,P.V.and Sukhatme B.V. : Sampling theory of Surveys and applications

Recommended books for further reading

1. Leslie Kish : Survey sampling : John Wiley & Sons
2. Williams : Sampler on Sampling

Data Site & Case Studies are listed under paper V Software : SAS, SPSS, MINITAB, etc.

Seminar : Case Studies listed in the paper to be discussed and brief summary should be prepared.

PAPER – II
LINEAR MODELS

Prerequisites :

1. Basic operations, determinants, inverse and rank of a matrix, canonical forms.
2. Solving linear equations, generalized inverse.
3. Partitioned matrices, its determinant and inverse.
4. Eigenvalues and Eigenvectors of a matrix.
5. Vector spaces.

Module -I

Unit -1(15 Lecture)

Book & Page Numbers

Linear parametric function and its estimability, Gauss markoff theorem, Interval estimates and test of hypothesis, fundamental theorems on conditional error ss, Test of $\Lambda\beta=d$, generalized least squares.

Kshirsagar: pp: 1-118
and 333-342

Unit -2 (15 Lecture)

Book & Page Numbers

Analysis of variance, fixed effect models :

Kshirsagar: pp: 151-309

- i. One – way classification model
- ii. Two – way classification model with and without interaction effect, one observation per cell and r observations per cell. Tukey's test for non additivity.
- iii. Two – way classification model with and without interaction effect with unequal number of observations per cell.
- iv. Multiway classification model.
- v. Nested classification models.

Unit -3 (15 Lecture)

Book & Page Numbers

Liner regression models, subset selection, Stepwise regression: Forward selection, backward elimination and stepwise.
Orthogonal polynomials

Kshirsagar: pp: 119-142
Draper & Smith: pp: 327-34

Unit -4(15 Lecture)

Simultaneous Confidence Intervals: Scheffe's , Bonferroni and Tukey's interval.

Kshirsagar: pp: 195-207

References Books : Matrix theory

1. Healy M.J.R. : Matrices for Statistics
2. Hohn Franz E : Elementary Matrix Algebra
3. Searle S.R. : Matrix Algebra useful for Statistics,
4. Shantinayakan : Textbook of Matrices

References Books : Linear Models

1. Kshirsagar A.M. : A course in Linear Models
2. Draper N.R & Smith H : Applied Regression Analysis.
3. Song GUI Wang and S.C Chow: Advanced Linear Models.
4. David W Hosmer and Stanley Lemeshow: Applied Logistic regression.
5. Agresthi: Categorical data analysis.
6. Chattterjee and Haddi: Sensitivity Analysis
7. Hosmer L and Lemeshow . :- Applied logistic regression.

Recommended books for further reading

1. Bishop: discrete data analysis.
2. Cox, D. R. : Analysis of binary data.
3. Chatterjee and Price: Regression Analysis with examples
4. Finney D, J :- Statistical methods in biological assays.
5. Graybill F.A :- An introduction to linear statistical models Vol. I.
6. Montgomery D.C. & Peck B.A. :- Introduction to linear regression analysis.
7. Rao C.R :- Linear statistical inference and its applications.
8. Searie S.R :- Linear models.
9. Seber G.A.F :- Linear regression analysis.
10. Sen A & Srivastava M. :- Regression analysis. Springer.
11. Scheffe H :- Analysis of variance.

Data Site & Case Studies are listed under paper V

Software : SAS, SPSS, MINITAB, etc.

Seminar : Case Studies listed in the paper to be discussed and brief summary should be prepared.

Module -II

Unit -1 (15 Lecture)

- i) Analysis of variance with random and mixed effect models: Estimation and testing of variance components in one-way, two-way and multiway classification models. ANOVA method.
- ii) Assumptions and box-cox transformations in the Analysis of Variance: q-q plot, use of skewness and kurtosis, Bartlett's test for equality of variances, Levene's test.
Regression diagnostics: Analysis of residuals, definition of ordinary and Studentized residuals, their properties and use in regression diagnostics. Influence Analysis, Cook's distance.

Book & Page Numbers

Kshirsagar: pp: 377-395

Wang and Chow: pp: 335-357

Unit -2 (15 Lecture)

Analysis of Covariance: Model, BLUE, ANOCOVA table, testing of hypothesis, use of ANOCOVA for missing observation.

Book & Page Numbers

Kshirsagar: pp: 311-332

Unit -3 (15 Lecture)

Analysis of Categorical data : Loglinear models, Contingency tables.

Agresti: pp:36-69 & 314-356

Logistic regression: Example, model, MLE of parameters, Iterative procedure to solve likelihood equations, multiple regressors.

Hosmer & Lemeshow: pp:1-34

Unit -4 (15 Lecture)

Sensitivity Analysis.

Book & Page Numbers

Chatterjee & Hadi: pp: 1-59

Ridge regression: Ill conditioned matrix, need of ridge regression, biased estimator, Mean square error. Bias and MSE of ridge estimator, ridge trace method.

Wang and Chow: pp: 285-295

PAPER-III

DISTRIBUTION THEORY AND ESTIMATION

Module -I : DISTRIBUTION THEORY.

Prerequisites : 1. Fitting of distributions
2. S- Curve
3. Order Statistics from continuous distribution.

Unit -1 (15 Lecture)

Distribution functions

) Decomposition of D.F, Jordan Decomposition theorem

Book & Page Numbers

Rohatgi : pp:40-57

Bhat : pp:72-80

Unit -2 (15 Lecture)

Functions of Random variable

Moment & generating function

Book & Page Numbers

Rohatgi : pp:57-68)

Rohatgi : pp:69-85)

Unit -3 (15 Lecture)

Standard distributions : discrete and continuous

Characterization of some distribution

Book & Page Numbers

(Bhat : pp:132-137)

(Rohatgi : pp:180-255)

Unit -4 (15 Lecture)

Distribution of order statistics

Extreme value theory

Generation of random sample from different distribution

Book & Page Numbers

David : pp:13-25 & 33-49-

Ross: pp:

Module -II -ESTIMATION

Unit -1 (15 Lecture)

- i) Problem of point Estimation, Unbiased, Consistency, sufficiency ,Completeness and Ancillarity, UMVUE
- ii) Method of moments and maximum Likelihood Invariance, Minimavity and Admissibility.

Book & Page Numbers

Rohatgi : pp:354-391
Lehmann : Pp:83-146

Shao: pp:261-299

Unit -2 (15 Lecture)

- i) Confidence Sets
- ii) Equivariance

Book & Page Numbers

Shao: pp:471-527

Lehmann: pp: 147-223

Unit -3 (15 Lecture)

- i) Non-parametric Estimation, Generalized Estimating Equations, Jackknife and Bootstraps Estimator
- ii) Loss function, risk functions, Bayes and minimax method

Shao : pp:319-383

Shao: pp:231-245

Unit -4 (15 Lecture)

- i) Lower bounds for the variance of an Estimator
- ii) Large sample properties of estimators

Book & Page Numbers

Rohatgi: pp:391-424

Lehmann :pp: 429-443

References Books

1. Bhat , B.R.(1988) : Modern Probability Theory.
2. David H.A (1981): Order Statistics
3. Jun Shao (2005): Mathematical Statistics.
4. Lehmann, E.L.and George Casella(1998) :- Theory of point estimation
5. Rohatgi V.K.and Ehsanes Saleh A.K.(2001) : An introduction to probability theory and Statistics.
6. Ross S.M :- Introduction to Probability Models

Recommended books for further reading

1. Ferguson T.S.(1967) : Mathematical statistics
2. Johnson N.L. & Kotz S. : Distribution in statistics
 - a) Discrete distribution
 - b) Continuous univariate distribution-I
 - c) Continuous univariate distribution-II
3. Lee, A.J. : U- statistics – Theory and practices
4. Lehmann, E.L. : Notes on the theory of estimation
5. Rao, C.R : Linear statistical inference and its applications
6. Rohatgi V.K.(2001) : Statistical inference.
7. Sturat A and Ord J.R.(1987) :- Kendall's advanced theory of statistics
Vol-I
8. Zacks, S.(1971) : The theory of statistics inference.

Data Site & Case Studies are listed under paper V

Software : SAS, SPSS, MINITAB, etc.

Seminar : Case Studies listed in the paper to be discussed and brief summary should be prepared.

PAPER -IV
PLANNING AND DESIGN OF EXPERIMENTS

Prerequisites : 1.Matrix Theory
2.Liner Models

Module -I Analysis of Experiments

Unit -1 (15 Lecture)

Brief history of statistical design.
Strategy of experimentation.
Some typical application of experimental design.
Basic principles of design.
Guidelines for designing experiments
Completely randomized design.-an example.
Statistical analysis of CRD
Model adequacy Checking.
Practical interpretation of results.
Sample computer output.
Determining sample size.
Discovering Dispersion effects
The regression approach to the ANOVA.
Nonparametric methods in the ANOVA.
The randomized block design-an example.
Statistical analysis of RBD
Model adequacy Checking.
Practical interpretation of results.
Sample computer output.

Book & Page Numbers

Montgomery: pp: 1-20

Montgomery: pp: 60-125

Montgomery: pp:126-144

Unit -2 (15 Lecture)

Generalized block design-an example
Statistical analysis of GBD
C-Matrix and its properties.
Properties of design-Connectedness, Balance and Orthogonal. Optimality of block design : A,D,E-optimality
Balanced incomplete block design,
Group divisible design
Partially Balanced incomplete block design,
Lattice design.Statistical analysis of above design

Book & Page Numbers

Chakrabarti: pp:17-21

Raghavarao: pp:48-55

Chakrabarti: pp:43-55

Raghavarao: pp:63-76

Unit -3 (15 Lecture)

Row-column design-an example
Statistical analysis of Row-column design.
Latin square design
Youden square design
Cross over design
Graeco latin square design.
Statistical analysis of above design

Book & Page Numbers

Chakrabarti: pp:21-24

Chakrabarti: pp:39-43,47

Unit -4 (15 Lecture)

Factorial design-an example
Basic definitions and principles.
The advantage of factorials.
The two factor factorial design.
The general factorial design.
Fitting response curves and surfaces.
Blocking in a factorial design

Book & Page Numbers

Montgomery: pp:170-217
Chakrabarti: pp:60-61

Module -II Design of Experiments

Unit -1 (15 Lecture)

The 2^k factorial design
A single replicate of the 2^k design.
The addition of center points to the design
Blocking a replicated 2^k factorial design
Confounding in the 2^k factorial design.
Partial confounding.

Book & Page Numbers

Montgomery: pp:218-286

Montgomery: pp:287-302
Raghavarao: pp: 245-247

Unit -2 (15 Lecture)

Two level Fractional factorial designs.
The one-half fraction of the 2^k design
The one-Quarter fraction of the 2^k design
Resolution-III designs.
Resolution-IV and V designs.
The 3^k factorial design.
Confounding in the 3^k factorial design.
Fractional replication of the 3^k factorial design.
Factorials with mixed levels

Book & Page Numbers

Montgomery: pp:303-362
Raghavarao: pp:273-275

Montgomery: pp:363-391
Raghavarao: pp:274-276

Unit -3 (15 Lecture)

Response Surface methodology
The method of steepest ascent
Analysis of a second order response surface.
Experimental designs for fitting response surfaces
Mixture experiments
Evolutionary operation
Robust design.

Book & Page Numbers

Montgomery: pp:427-472

Montgomery: pp:472-510

Unit -4 (15 Lecture)

The Split -plot design-An example
Statistical analysis of above design.
Chemical balance weighing designs.
Hadamard Matrix and its relation to the above design.
A,D,E optimality of above design

Book & Page Numbers

Montgomery: pp:573-578

Raghavarao: pp:305-319

Reference Books :-

1. Montgomery D.C., Design and Analysis of Experiment 4th Edition.
2. Chakrabarti M.C. Mathematics of Design and Analysis of Experiment.
3. Raghavarao D. Construction and Combinatorial Problem in Design of Experiments.

Recommended Books for Further Reading

1. Das. M.M. and Giri N.C. : - Design and Analysis of Experiments.
2. Fisher R.A. : Design of Experiments.
3. John A.C. :- Experiments with Mixtures Design and Analysis of Mixture Data
4. Meyers R.H. :- Response surface methodology
5. Shah K.R and Sinha B.K. : - Theory of Optimal Designs.

Data Site & Case Studies are listed under paper V

Software : SAS, SPSS, MINITAB, etc.

Seminar : Case Studies listed in the paper to be discussed and brief summary should be prepared.

PAPER --V

Practical - Section -I

Based on Paper I and Paper II

Contents of this Section to be covered as given in the Data site and case studies with help of Statistical Software like SAS, SPSS, MINITAB etc.

Practical - Section -II

Based on Paper III and Paper IV

Contents of this Section to be covered as given in the Data site and case studies with help of Statistical Software like SAS, SPSS, MINITAB etc.

Reference Books : Statistical Software

1. Carver R.H. & others Data analysis with SPSS.
2. Cody E.P. & Smith J.H. Applied Statistics and the SAS programming language.
3. Darren George and Paul Mallery SPSS for windows.
4. Spencer N.H.(2004) SAS Programming, the one day course.
5. Practical Statistical for experimental biologists.
6. Random A and Everitt R.S. : A handbook of statistical analysis using SAS.
7. Nom o' Rowke, Larry Hatcher, Edward J. Stepanik : A Step by step approach using SAS for univariate and multivariate Statistics (2nd Edition)
8. A step by Approach using SAS for univariate and multivariate Statistics-2nd Edition by Nom O'Rourke, Larry Hatcher Edward J. Stepanik. SAS Institution. Inc. Wily.
9. Data. Statistics and Decision Models with Excel Donald L. Harmell, James F.Horrell.

Data Site :

<http://www.cmie.com/> - time series data (paid site)
www.mospi.nic.in / websitensso.htm (national sample survey site)
www.mospi.nic.in / cso_test.htm (central statistical organization)
www.cenrusindia.net (cenrus of India)
www.indiastat.com (paid site on India statistics)
www.maharashtra.gov.in / index.php (Maharashtra govt.site)
www.mospi.gov.in (government of India)

Case studies :

1. A.C Rosander : Case Studies in Sample Design
2. Business research methods – Zikund
([http://website, swlearning.com](http://website.swlearning.com))
3. C. Ralph Buncher 21 and Jia-Yeong Tsay : Statistical in the Pharmaceutical Industry
4. Contemporary Marketing research – carl McDaniel, Roges Gates.
(McDaniel, swcollegc.com)
5. Edward J Wegmes g. Smith : Statistical Methods for Cancer Studies
6. Eugene K. Harris and Adelin Albert : Survivorship Analysis for Clinical Studies
7. Marketing research – Zikmund
(<http://website.swlearning.com>)
8. Marketing research – Naresh Malhotra
([http://www.prenhall.com /malhotra](http://www.prenhall.com/malhotra))
9. <http://des.maharashtra.gov.in> (government of maharashtra data)
10. Richard G. Cornell :Statistical Methods for Cancer Studies
11. Stanley H. Shapiro and Thomas H.Louis Clinical Trials
12. William J. Kennedy, Jr. and James E. Gentle. Statistical Completing
13. Case Studies in Bayesion Statistics vol. VI
Lecture notes in Bayesion Statistics number 167 (2002)
Constantine, Gatsonis Alicia, Carriquary Andrew, Gelman
14. Wardlow A.C (2005) Practical Statistical for Experimental bilogists
(2nd Edition)

Given below are some sources for public domain software in statistics:

1. Open Source Software – The Silent Revolution. Editorial By N.V. Joshi. Current Science Volume 89 Number 10, 25, 2005 (This gives good and useful background material that will help readers develop a perspective on this issue).
2. <http://users.aol.com/johnp71/javasta2.html> - gives locations of many free packages.
3. www.statistics.com – another channel to addresses of downloadable packages
4. <http://freestatistics.altervista.org/stat.php>
5. ADE: Statistical Software for Multivariate Analysis and Graphical Display.
URL: <http://phil.univ-lyon.fr/ADE-4/>

6. DATAPLOT : Software for Scientific, Statistical Analysis, and Non-Linear Modeling.
URL: <http://www.itl.nist.gov/div898/software/dataplot/homepage.html>
Size: 22.6 MB
7. INSTAT: General Statistical Package particular aimed at Analysis of Climatic Data.
URL: <http://www.rdg.ac.uk/ssc/software/instatt/instat.html>
Size: 36.5 MB
8. KYPLOT: An Integrated Environment for Data Analysis and Visualization.
URL: <http://www.qualest.co.jp/japanses/link/link.html>,
Size: 4.8 MB
9. OPENSTAT: Software particularity aimed at Students in Social Sciences.
URL: <http://www.statpages.org/miller/openstat>
Size: 1.3 MB
10. TANAGRA: Data Mining Software for Research and Education
URL : <http://eric.univ-lyon.fr/~ricco/tanagra/index.html>
Size: 2.55 MB
11. VISTA : Statistical Visualization highly Dynamic and very Interactive
URL: <http://forrest.psych.unc.edu/research/index.html>
Size: 4.1 MB
12. WINIDAMS : Software Package for the Validation, Manipulation and Statistical Analysis of Data.
URL: <http://www.unesco.org/idams>
Size: 7.1 MB
13. Am: Software for Analyzing Data from Complex Samples. Especially Large-Scale Assessments.
URL: <http://www.am.air.org>
Size: 21.1 MB
14. ARC : Statistical Analysis Tool for Regression Problems.
URL: <http://www.stat.umn.edu/arc>
Size: 2.6 MB
15. EASYREGINT : Software for Various Economics Estimation and Testing Tasks.
URL: <http://econ.la.psu/~hbierens/easyreg.html>
Size : 21.1 MB
16. EPIINFO : Software for Epidemiological Statistics.
URL: <http://www.cdc.gov.epiinfo>
Size: 39.5 MB
17. G7: Software for Regression Analysis.
URL:
<http://www.inform.umd.edu/EdRes/Topic/Economics/EconData/pdg.html>
Size: 4.9 MB
18. GRETL : Econometrics Package, including a Shared Library, a Command-line Client Program and a Graphical User Interface.
URL: <http://gretl.sourceforge.net>
Size: 7.0 MB

- 19.HLM: Software for Hierarchical Linear Modeling
URL: <http://www.ssicentralcom/html/index.html>
Size: 16.1 MB
- 20.IRRSTAT: Software for Basic Statistical Analysis of Experimental Data aimed primarily at the Analysis of Data from Agriculture Field Trials.
URL: <http://www.irri.org/science/software/irristat.asp>
Size: 6.7 MB
- 21.OPENEPI: Epidemiological Statistical for Public Health
URL: <http://www.openepi.com>
Size: 3.75 MB
22. STATEASY : Software for Multivariate Statistics
URL: <http://www.space.tn.it/scuola/odiciacc>
Size: 8.4 MB
- 23.VISICUBE : Data Exploration and Visual Data Analysis
URL: <http://www.scuola/odiciacc>
Size: 8.4 MB
- 24.XPREMES : Interactive software for general statistics and risk analysis
URL: <http://www.xtremes.de/xtremes/index-xtremes.html>
Size: 13.2 MB
- 25.PCP: A machine-learning program for supervised classification of patterns.
URL: <http://pcp.sourceforge.net>
Size: 4.35 MB
- 26.Tetrad : A program for creating, simulating data from, estimating, testing , predicting with and searching for causal/statistical models of categorical(or ordinal) data and to linear models ("structural equation model's) with a Normal probability distribution, and to a very limited class of time series models.
URL: <http://www.phil.cmu.edu/projects/tetrad>
Size: 7.8 MB
27. WINSAAAM :Windows implementation of SAAM, i.e system Analysis and Modeling Software.
URL: <http://www.winsaam.com/#winsaam>
Size: 17.9 MB
- 28.WINPEPI : Windows versions of the renowned PEPI suite of programs.
URL: <http://www.brixtonhealth.com/pepi4windows.html>
Size: 5.14 MB
- 29.DEMETRA : User-friendly interface to TRAMO/SEATS and X-12-ARIMA.
URL:
<http://forum.europa.eu.int/Public/dsis/eurosam/info/data/demetra.html>
Size: 4.4 MB
