

बस्तर विश्वविद्यालय
जगदलपुर (धरमपुरा), जिला-बस्तर (छत्तीसगढ़)



पाठ्यक्रम

M.A./M.Sc. Previous
Mathematics, Anthropology

परीक्षा : 2011

कुलसचिव
बस्तर विश्वविद्यालय, जगदलपुर
छत्तीसगढ़ की ओर से



अधिकृत मुद्रक एवं प्रकाशक :

गीता पब्लिकेशन

महामाईपारा, रायपुर (छत्तीसगढ़)

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REVISED ORDINANCE NO. - 22 MASTER OF SCIENCE EXAMINATION

The examination for the degree of Master of Science shall consist of two parts-

- a) The Previous Examination; and
- b) The Final Examination.

1. A candidate who after obtaining the degree of Bachelor of Science of the University or an examination of any Statutory University in India which has been recognised by the University as equivalent to the B.Sc. degree of the University and has completed a regular course of study for one academic year in a teaching department of the University or in a college affiliated to the University, shall be admitted to the Previous Examination for the degree of Master of Science. A candidate after passing a graduate Examination under 11+3 Scheme or any other examination recognised by the University as equivalent thereto shall be eligible for admission to a post graduate course of studies where graduation is minimum qualification only after passing One Year Bridge Course prescribed for the purpose. This shall apply to student graduating in 1991 examination.

2. Provided, however, every candidate shall offer for the Previous examination one of the subjects offered by him/her for his/her B.Sc. degree. However, a candidate passing B.Sc. with any of the subject prescribed for the examination, will be eligible to offer Anthropology as one of the subjects at the Previous Examination.

3. Provided further (i) for admission in M.Sc. Previous (Physics) a candidate must have offered Maths as one of the subjects in B.Sc., (ii) for admission in M.Sc. Previous (Chemistry) preference will be given to those who have offered Maths as one of their subjects in B.Sc.

4. A candidate who, after passing the M.Sc. Previous Examination of the University, has completed a regular course of study for one academic year in a teaching department of the University or in a college affiliated to the University shall be admitted to the Final Examination for the degree of Master of Science in the subjects in which he/she has passed the Previous Examination.

5. A candidate who has passed the Previous Examination for the degree of Master of Science of another University, may also be admitted to the Final Examination for the degree of Master of Science obtaining previous permission of the Kulpati, provided he offered for his Previous Examination a course of study of an equivalent standard with almost identical syllabus as is required for the Previous Examination of this University and has attended a regular course of study for one academic year in a teaching department of the University or in a college affiliated to the University.

6. The Examination shall be partly by means of papers and partly practical including sessionals, except in the case of Mathematics where the Examination shall be by means of papers only.

7. Besides regular students and subject to their compliance with this Ordinance, ex-students and non-collegiate candidate shall be eligible for admission to the Examination as per provision of Ordinance No. 6 relating to Examination-(General).

A candidate securing 60% or more marks in the M.Sc. Previous Examination will be eligible to offer "dissertation" in lieu of one of optional papers for the Final. A regular candidate can offer dissertation with the permission of the Professor and Head of Department of his institution, while a private candidate will have to secure the prior permission in writing of any of the professors of the subject working in an institution within the jurisdiction of the University and will work under supervision of that professor after obtaining prior permission of the University to that effect.

Provided that non-collegiate candidates shall be permitted to offer only such subject/papers as are taught to the regular students at any of the University teaching department or college.

6. The subject of Examination shall be one of the following :

- (i) Mathematics
- (ii) Anthropology

Any candidate who has passed the M.Sc. Examination of this University in any subject shall be allowed to present himself in Examination in any one or more of the optional papers in the subject not taken by him at the said Examination and if successful, will be given a certificate to that effect.

Provided that no candidate shall be allowed to offer more than two additional papers in any one year and in subjects other than Mathematics, a candidate shall undergo a practical test in respect of the paper concerned.

7. For both the Previous and Final Examinations a candidate will be declared successful if he/she obtains atleast 36% of the aggregate marks in the subject. A candidate is required to pass in the Practical Examination separately by obtaining not less than 36% marks.

8. The division in which a candidate is placed shall be determined on the basis of aggregate marks obtained in the total of the M.Sc. Previous and M.Sc. Final Examinations. No division will be assigned on the Previous Examination.

9. Successful candidates who obtain 60% or more of the aggregate marks shall be placed in the First Division; those obtaining less than 60% but not less than 48% in the Second Division; and all other successful candidates obtaining less than 48% in the Third Division.

10. Candidates who have passed in the M.Sc. Examination of the University in any subject in Third or Second Division and desire to appear at the M.Sc. Examination in the same Subject for improving Division may without attending a regular course of study in a college affiliated to the University or in a Teaching Department of the University shall be allowed to appear at the aforesaid Examination as non-collegiate students on the following conditions :

- (i) There shall be only two Divisions for such candidates i. e. First Division and Second Division. The marks required for obtaining these divisions shall be the same as prescribed in the Ordinance i.e. examinees who are successful in Final of the Examination and have obtained 60% or more of the aggregate in total of the marks in the Previous and Final of the Examination taken together shall be placed in the

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First Division and examinees who are successful in Final of the Examination and have obtained less than 60% but not less than 48% marks in the Previous and Final of the Examination taken together shall be placed in the Second Division.

(ii) The results of the candidates obtaining less than 48% of the aggregate marks in the Previous and Final of the Examination taken together shall not be declared.

(iii) Candidates shall have the option to appear at both the Previous and Final Examination in one and the same year and for being successful at the Examination, the candidate shall obtain 48% of the aggregate marks.

Provided that such candidates who opt to appear in Previous and Final Examinations separately shall have to obtain minimum aggregate required for the Previous Examination but he will have to obtain atleast 48% in the aggregate of the Previous and Final Examination taken together or else his result will be cancelled.

(iv) The syllabus for the Examination shall be same as prescribed for the year in which examination is held.

(v) Not more than two attempts shall be allowed to such candidates, failure or non-appearance at the Examination after permission has been accorded by the University shall be counted as an attempt.

Provided, however, such candidates who opt to appear at the Previous and Final Examinations separately will be allowed only one attempt at the Previous Examination and two attempts at the Final Examination.

(vi) Candidates who wish to avail the opportunity given in the foregoing paras will have to apply for the permission as required in the Ordinance relating to admission of Non collegiate Students to the University Examination along with requisite Registration Fee.

(vii) In case a student improves his division under the provisions of this para, the fresh degree will be issued after cancelling his first degree.

USE OF CALCULATORS

The students of Degree/P.G. classes will be permitted to use of Calculator in the examination-hall from annual 1986 examination on the following conditions as per decision of the standing Committee of the Academic Council.

1. Student will bring their own Calculators.
2. Calculators with memory and following variables be permitted : +, -, x, ÷, square, reciprocal, exponential log, square root, trigonometric functions viz sine, cosine, tangent ect. factorial summation, xy, yx and in the light of objective approval of merits and demerits of the viva only will be allowed.

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DETAILS OF SYLLABUS
M.A./M.Sc. (Previous)
MATHEMATICS

There shall be five papers in M.A./ M.Sc. (Previous) Mathematics. All are compulsory. Each paper will have 100 Marks and divided into five units. However, there will be internal choice in each Unit.

Paper	Description	Theory	Practical	Remark
I	Advanced Abstract Algebra	100	-	-
II	Real Analysis	100	-	-
III	Topology	100	-	-
IV	Complex Analysis	100	-	-
V	Advanced Discrete Mathematics	100	-	-

PAPER - I

Advanced Abstract Algebra

UNIT-I Groups - Normal and Subnormal series. Composition series. Jordan-Holder theorem. Solvable groups. Nilpotent groups.

Field theory- Extension fields. Algebraic and transcendental extensions. Separable and inseparable extensions. Normal extensions. Perfect fields. Finite fields. Primitive elements. Algebraically closed fields.

UNIT-II Automorphisms of extensions. Galois extensions. Fundamental theorem of Galois theory. Solution of polynomial equations by radicals. Insolvability of the general equation of degree 5 by radicals.

UNIT-III Modules - Cyclic modules. Simple modules. Semi-simple modules. Schuler's Lemma. Free modules. Noetherian and artinian modules and rings-Hilbert basis theorem. Wedderburn Artin theorem. Uniform modules, primary modules, and Noether-Lasker theorem.

UNIT-IV Linear transformations- Algebra of linear transformations, characteristic roots, Matrices of linear transformations.

Canonical Forms - Similarity of linear transformations . Invariant subspaces. Reduction to triangular forms. Nilpotent transformations. Index of nilpotency. Invariants of a nilpotent transformation. The primary decomposition theorem. Jordan blocks and Jordan forms.

UNIT-V Smith normal form over a principal ideal domain and rank. Fundamental structure theorem for finitely generated modules over a Principal ideal domain and its applications to finitely generated abelian groups. Rational canonical form. Generalized Jordan form over any field.

Books Recommended:

1. P.B.Bhattacharya, S.K.Jain, S.R.Nagpaul : Basic Abstract Algebra, Cambridge University press
2. I.N.Herstein : Topics in Algebra, Wiley Eastern Ltd.

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3. Quazi Zameeruddin and Surjeet Singh : Modern Algebra

References

1. M.Artin, Algebra, Prentice -Hall of India, 1991.
2. P.M. Cohn, Algebra, Vols. I,II &III, John Wiley & Sons, 1982,1989,1991.
3. N.Jacobson, Basic Algebra, Vols. I , W.H. Freeman, 1980 (also published by Hindustan Publishing Company).
4. S.Lang, Algebra, 3rd edition, Addison-Wesley, 1993.
5. I.S. Lurher and I.B.S. Passi, Algebra, Vol. I-Groups, Vol.II-Rings, Narosa Publishing House (Vol.I-1996, Vol. II-1999)
6. D.S.Malik, J.N.Mordeson, and M.K.Sen, Fundamentals of Abstract Algebra, Mc Graw-Hill, International Edition, 1997.
7. Vivek Sahai and Vikas Bist, Algebra, Narosa Publishing House, 1999.
8. I. Stewart, Galois theory, 2nd edition, Chapman and Hall, 1989.
9. J.P. Escotier, Galois theory, GTM Vol.204, Springer, 2001..
10. Fraleigh , A first course in Algebra Algebra, Narosa, 1982.
11. K.B. Datta, Matrix and Linear Algebra, Prentice Hall of India Pvt. Ltd., New Delhi, 2000.
12. S.K.jain, A. Gunawardena and P.B Bhattacharya, Basic Linear Algebra with MATLAB, Key College Publishing (Springer-Verlag), 2001.
13. S.Kumaresan, Linear Algebra, A Geometric Approach, Prentice-Hall of India, 2000.
14. T.Y. Lam, lectures on Modules and Rings, GTM Vol. 189, Springer-Verlag, 1999.
15. D.S. Passman, A Course in Ring Theory, Wadsworth and Brooks/Cole Advanced Books and Softwares, Pacific groves. California, 1991.

PAPER - II

Real Analysis

UNIT-I

Definition and existence of Riemann-Stieltjes integral, Properties of the Integral, integration and differentiation, the fundamental theorem of Calculus, integration of vector-valued functions, Rectifiable curves.

UNIT-II

Rearrangement of terms of a series, Riemann's theorem. Sequences and series of functions, pointwise and uniform convergence, Cauchy criterion for uniform convergence, Weierstrass M-test, Abels' and Dirichlet's tests for uniform convergence, uniform convergence and continuity, uniform convergence and Riemann-Stieltjes integration, uniform convergence and differentiation, Weierstrass approximation theorem. Power series, uniqueness theorem for power series, Abels' and Tauber's theorems.

UNIT-III

Functions of several variables, linear transformations, Derivatives in an open subset of R^n , Chain rule, Partial derivatives, interchange of the order of differentiation, Derivatives of higher orders, Taylor's theorem, Inverse function theorem, Implicit function theorem. Jacobians, extremum problems with constraints, Lagrange's multiplier method, Differentiation of integrals. Partitions of unity. Differential forms, Stoke's theorem.

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UNIT-IV Lebesgue outer measure. Measurable sets. Regularity. Measurable functions. Borel and Lebesgue measurability. Non-measurable sets. Integration of Non-negative functions. The General integral. Integration of Series. Reimann and Lebesgue Integrals. The Four derivatives. Functions of bounded variations. Lebesgue Differentiation Theorem. Differentiation and Integration.

UNIT-V Measures and outer measures, Extension of a measure. Uniqueness of Extension. Completion of a measure. Measure spaces. Integration with respect to a measure. The L^p -spaces. Convex functions. Jensen's inequality. Holder and Minkowski inequalities. Completeness of L^p , Convergence in Measure, Almost uniform convergence.

Recommended Books:

1. Principle of Mathematical Analysis By W.Rudin
2. Real Analysis By H.L.Roydon

References

1. Walter Rudin, Principles of Mathematical Analysis (3rd edition) McGraw-Hill, Kogakusha, 1976, International student edition.
2. T.M. Apostol, Mathematical Analysis, Narosa Publishing House, New Delhi, 1985.
3. Gabriel Klambauer, Mathematical Analysis, Marcel Dekkar, Inc. New York, 1975.
4. A.J. White, Real Analysis; an introduction, Addison-Wesley Publishing Co., Inc., 1968.
5. G.de Barra, Measure Theory and Integration, Wiley Eastern Limited, 1981.
6. E. Hewitt and K. Stromberg. Real and Abstract Analysis, Berlin, Springer, 1969.
7. P.K. Jain and V.P. Gupta, Lebesgue Measure and Integration, New Age International (P) Limited Published, New Delhi, 1986 Reprint 2000).
8. I.P. Natanson, Theory of Functions of a Real Variable. Vol. I, Frederick Ungar Publishing Co., 1961.
9. H.L. Royden, Real Analysis, Macmillan Pub.Co.Inc.4th Edition, New York, 1962.
10. Richard L. Wheeden and Antoni Zygmund, Measure and Integral: An Introduction to Real Analysis, Marcel Dekker Inc. 1977.
11. J.H. Williamson, Lebesgue Integration, Holt Rinehart and Winston, Inc. New York, 1962.
12. A. Friedman, Foundations of Modern Analysis, Holt, Rinehart and Winston, Inc., New York, 1970.
13. P.R. Halmos, Measure Theory, Van Nostrand, Princeton, 1950.
14. T.G. Hawkins, Lebesgue's Theory, of Integration: Its Origins and Development, Chelsea, New York, 1979.
15. K.R. Parthasarathy, Introduction to Probability and Measure, Macmillan Company of India Ltd., Delhi, 1977.
16. R.G. Bartle, The Elements of Integration, John Wiley & Sons, Inc. New York, 1966.
17. Serge Lang, Analysis I & II, Addison-Wesley Publishing Company, Inc. 1969.
18. Inder K. Rana, An Introduction to Measure and Integration, Norosa Publishing House, Delhi, 1997.
19. Walter Rudin, Real & Complex Analysis Tata McGraw-Hill Publishing Co.Ltd. New Delhi, 1966.

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**PAPER - III
Topology**

UNIT-I Countable and uncountable sets. Infinite sets and the Axiom of Choice. Cardinal numbers and its arithmetic. Schroeder-Bernstein theorem. Cantor's theorem and the continuum hypothesis. Zorn's lemma, well-ordering theorem. Definition and examples of topological spaces. Closed sets. Closure. Dense subsets. Neighbourhoods. Interior, exterior and boundary. Accumulation points and derived sets. Bases and sub-bases. Subspaces and relative topology.

Alternate methods of defining a topology in terms of Kuratowski Closure Operator and Neighbourhood Systems.

UNIT-II Continuous functions and homeomorphism. First and Second Countable spaces. Lindelof's theorems. Separable spaces. Second countability and reparable. Separation axioms $T_0, T_1, T_2, T_3, T_3^1, T_4, T_4^1$; their Characterizations and basic properties. Urysohn's lemma, Tietze extension theorem.

UNIT-III Compactness. Continuous functions and compact sets. Basic properties of Compactness. Compactness and finite intersection property. Sequentially and countably compact sets. Local compactness and one point compactification. Stone-Čech compactification. Compactness in metric spaces. Equivalence of compactness, countable compactness and sequential compactness in metric space. Connected spaces. Connectedness on the real line. Components. Locally connected spaces.

UNIT-IV Tychonoff product topology in terms of standard sub-base and its characterizations. Projection maps. Separation axioms and product spaces. Connectedness and product spaces. Compactness and product spaces (Tychonoff's theorem). Countability and product spaces. Embedding and metrization. Embedding lemma and Tychonoff embedding. The Urysohn metrization theorem. Metrization theorems and Paracompactness-Local finiteness. The Nagata-Smirnov metrization theorem. Paracompactness. The Smirnov metrization theorem.

UNIT-V The fundamental group and covering spaces-Homotopy of paths. The fundamental group. Covering spaces. The fundamental group of the circle and the fundamental theorem of algebra. Nets and filter. Topology and convergence of nets. Hausdorffness and nets. Compactness and nets. Filters and their convergence. Canonical way of converting nets to filters and vice-versa. Ultra-filters and Compactness.

Recommended Books:

1. Topology By James R.Munkres
2. Topology By K.D.Joshi

References

1. James R.Munkres, Topology, A First Course, Prentice Hall of India Pvt. Ltd., New Delhi, 2000.
2. J. Dugundji, Topology, Allyn and Bacon, 1966 (reprinted in India by Prentice Hall of India Pvt. Ltd.).
3. George F.Simmons, Introduction to Topology and modern Analysis, McGraw-Hill Book Company, 1963.

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theorem. Order of an entire function. Exponent of Convergence. Borel's theorem. Hadamard's factorization theorem.

UNIT-V The range of an analytic function. Bloch's theorem. The Little Picard theorem. Schottky's theorem. Montel Caratheodory and the Great picard theorem. Univalent functions. Bieberbach's conjecture (Statement only) and the "1/4-theorem."

Recommended Books:

1. Complex Analysis By L.V.Ahlfors
2. J.B. Conway, Functions of one Complex variable, Springer-Verlag, International student-Edition, Narosa Publishing House, 1980.

References

1. H.A. Priestly, Introduction to Complex Analysis, Clarendon Press, Oxford 1990.
2. Complex Function Theory By D.Sarason
3. Liang-shin Hahn & Bernard Epstein, Classical Complex Analysis, Jones and Bartlett Publishers International, London, 1996.
4. L.V. Ahlfors, Complex Analysis, McGraw - Hill, 1979.
5. S. Lang, Complex Analysis, Addison Wesley, 1977.
6. D. Sarason, Complex Function Theory, Hindustan Book Agency, Delhi, 1994.
7. Mark J.Ablowitz and A.S.Fokas, Complex Variables: Introduction and Applications, Cambridge University press, South Asian Edition, 1998.
8. E. Hille, Analytic Function Theory (2 Vols.) Gonn & Co., 1959.
9. W.H.J. Fuchs, Topics in the Theory of Functions of one Complex Variable, D.Van Nostrand Co., 1967.
10. C.Caratheodory, Theory of Functions (2 Vols.) Chelsea Publishing Company, 1964.
11. M.Heins, Complex Function Theory, Academic Press, 1968.
12. Walter Rudin, Real and Complex Analysis, McGraw-Hill Book Co., 1966.
13. S.Saks and A.Zygmund, Analytic Functions, Monografic Matematyczne, 1952.
14. E.C Titchmarsh, The Theory of Functions, Oxford University Press, London.
15. W.A. Veech, A Second Course in Complex Analysis, W.A. Benjamin, 1967.
16. S.Ponnusamy, Foundations of Complex Analysis, Narosa Publishing House, 1997.

PAPER - V

Advanced Discrete Mathematics

UNIT-I Formal Logic-Statements. Symbolic Representation and Tautologies. Quantifiers, Predicates and Validity. Propositional Logic. Semigroups & Monoids-Definitions and Examples of Semigroups and monoids (including those pertaining to concatenation operation). Homomorphism of semigroups and monoids. Congruence relation and Quotient Semigroups. Subsemigroup and submonoids. Direct Products. Basic Homomorphism Theorem.

UNIT-II Lattices-Lattices as partially ordered sets. Their properties. Lattices as Algebraic Systems. Sublattices, Direct products, and Homomorphisms. Some Special Lattices

M.Sc. Previous

4. K.D.Joshi, Introduction to General Topology, Wiley Eastern Ltd., 1983.
5. J.Hocking and G Young, Topology, Addison-Wiley Reading, 1961.
6. J.L. Kelley, General Topology, Van Nostrand, Reinhold Co., New York, 1955.
7. L. Steen and J. Seebach, Counter examples in Topology, Holt, Rinehart and Winston, New York, 1970.
8. W.Thron, Topologically Structures, Holt, Rinehart and Winston, New York, 1966.
9. N. Bourbaki, General Topology Part I (Transl.), Addison Wesley, Reading, 1966.
10. R. Engelking, General Topology, Polish Scientific Publishers, Warszawa, 1977.
11. W. J. Pervin, Foundations of General Topology, Academic Press Inc. New York, 1964.
12. E.H.Spanier, Algebraic Topology, McGraw-Hill, New York, 1966.
13. S. Willard, General Topology, Addison-Wesley, Reading, 1970.
14. Crump W.Baker, Introduction to Topology, Wm C. Brown Publisher, 1991.
15. Sze-Tsen Hu, Elements of General Topology, Holden-Day, Inc. 1965.
16. D. Bushaw, Elements of General Topology, John Wiley & Sons, New York, 1963.
17. M.J. Mansfield, Introduction to Topology, D.Van Nostrand Co. Inc. Princeton, N.J., 1963.
18. B. Mendelson, Introduction to Topology, Allyn & Bacon, Inc., Boston, 1962.
19. C. Berge, Topological Spaces, Macmillan Company, New York, 1963.
20. S.S. Coirns, Introductory Topology, Ronald Press, New York, 1961.
21. Z.P. Mamuzic, Introduction to General Topology, P. Noordhoff Ltd., Groningen, 1963.
22. K.K.Jha, Advanced General Topology, Nav Bharat Prakashan, Delhi.

PAPER - IV

Complex Analysis

UNIT-I Complex integration, Cauchy-Goursat Theorem. Cauchy's integral formula. Higher order derivatives. Morera's Theorem. Cauchy's inequality and Liouville's theorem. The fundamental theorem of algebra. Taylor's theorem. Maximum modulus principle. Schwarz lemma. Laurent's series. Isolated singularities. Meromorphic functions. The argument principle. Rouché's theorem Inverse function theorem.

UNIT-II Residues. Cauchy's residue theorem. Evaluation of integrals. Branches of many valued functions with special reference to $\arg z$, $\log z$ and z^a . Bilinear transformations, their properties and classifications. Definitions and examples of Conformal mappings. Spaces of analytic functions. Hurwitz's theorem. Montel's theorem Riemann mapping theorem.

UNIT-III Weierstrass' factorisation theorem. Gamma function and its properties. Riemann Zeta function. Riemann's functional equation. Runge's theorem. Mittag-Leffler's theorem. Analytic Continuation. Uniqueness of direct analytic continuation. Uniqueness of analytic continuation along a curve. Power series method of analytic continuation Schwarz Reflection Principle. Monodromy theorem and its consequences. Harmonic functions on a disk. Harnack's inequality and theorem. Dirichlet Problem. Green's function.

UNIT-IV Canonical products. Jensen's formula. Poisson-Jensen formula. Hadamard's three circles

M.Sc. Previous

M.A./M.Sc. ANTHROPOLOGY

M.A./M.Sc. Examination in Anthropology shall be conducted in two parts - Previous and Final. The Previous Examination shall consist of 600 marks. All papers are compulsory and will consist of 100 marks each.

SCHEME OF EXAMINATION M.A./M.Sc. PREVIOUS ANTHROPOLOGY

NO.	PAPER	NAME OF PAPER'S	M.MARKS
1.	Paper-I	Social/Cultural Anthropology.	100
2.	Paper-II	Physical/Biological Anthropology.	100
3.	Paper-III	Archaeological Anthropology.	100
4.	Paper-IV	Research Methods.	100
5.	Paper-V	Field Work and Field Work Report.	100
6.	Paper-VI	Practical	100
	Total		600

Note:- Field Work is compulsory for at least two to three weeks in any Tribal area/Rural area decided by the department under the guidance of Teacher/Teachers. Those students who fail to join the fieldwork decided by the department will be marked absent in Paper-V. Typed copy of field work report shall be submitted by the student under the guidance of the teacher designated for this purpose by the Head and examined by the External examiner appointed by the University. Fifty percent will be internal & Fifty percent marks will be external. A brief report of the fieldwork done by the candidate has to be presented in front of examiners in the department. The data will be the property of the department and cannot be used without taking the permission of the Head of the department.

M.A./M.Sc. Final examination shall consist of three theory papers and two practicals, each carrying 100 marks for Physical Anthropology specialization (Group-A) and five theory papers each carrying 100 marks for Social Anthropology specialization (Group-B) in addition, there will be compulsory dissertation, carrying 100 marks for both groups (A and B).

The details of the papers are given below:

M.A./M.Sc. FINAL ANTHROPOLOGY

There will be two specializations in M.A./ M.Sc. Final.

Group A - Physical Anthropology.

Group B - Social Anthropology.

e.g., Complete, Complemented and Distributive Lattices. Boolean Algebras-Boolean Algebras as Lattices. Various Boolean Identities. The Switching Algebra example. Subalgebras, Direct Products and Homomorphisms. Join-Irreducible elements, Atoms and Minterms. Boolean Forms and Their Equivalence. Minterm Boolean Forms, Sum of Products Canonical Forms. Minimization of Boolean Functions. Applications of Boolean Algebra to Switching Theory (using AND, OR & NOT gates). The Karnaugh Map Method. Graph Theory-Definition of (Undirected) Graphs, Paths, Circuits, Cycles, & Subgraphs. Induced Subgraphs. Degree of a vertex. Connectivity, Planar Graphs and their properties. Trees. Euler's Formula for connected planar Graphs. Complete & Complete Bipartite Graphs. Kuratowski's Theorem (statement only) and its use. Spanning Trees, Cut-sets, Fundamental Cut-sets, and Cycle, Minimal Spanning Trees and Kruskal's Algorithm. Matrix Representations of Graphs. Euler's Theorem on the Existence of Eulerian Paths and Circuits. Directed Graphs. In degree and Out degree of a Vertex.

UNIT-III

Weighted undirected Graphs. Dijkstra's Algorithm.. strong Connectivity & Warshall's Algorithm. Directed Trees. Search Trees. Tree Traversals.

UNIT-IV

Introductory Computability Theory-Finite State Machines and their Transition Table Diagrams. Equivalence of finite State Machines. Reduced Machines. Homomorphism. Finite Automata. Acceptors. Non-deterministic Finite Automata and equivalence of its power to that of Deterministic Finite Automata. Moore and mealy Machines. Turing Machine and Partial Recursive Functions.

UNIT-V

Grammars and Languages-Phrase-Structure Grammars. Rewriting Rules. Derivations. Sentential Forms. Language generated by a Grammar. Regular, Context-Free, and Context Sensitive Grammars and Languages. Regular sets, Regular Expressions and the Pumping Lemma. Kleene's Theorem. Notions of Syntax Analysis, Polish Notations. Conversion of Infix Expressions to Polish Notations. The Reverse Polish Notation.

Recommended Books:

1. J.P. Tremblay & R. Manohar, Discrete Mathematical Structures with Applications to Computer Science, McGraw-Hill Book Co., 1997.

References

- J.L. Gersting, Mathematical Structures for Computer Science, (3rd edition), Computer Science Press, New York.
- Seymour Lipschutz, Finite Mathematics (International) edition 1983), McGraw-Hill Book Company, New York.
- S. Winitz, Discrete Mathematics-A Unified Approach, McGraw-Hill Book Co.
- J.E. Hopcroft and J.D Ullman, Introduction to Automata Theory, Languages & Computation, Narosa Publishing House.
- C.L Liu, Elements of Discrete Mathematics, McGraw-Hill Book Co.
- N. Deo, Graph Theory with Application to Engineering and Computer Sciences. Prentice Hall of India
- K.L.P. Mishra and N.Chandrashekar., Theory of Computer Science PHI(2002)

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M.Sc. Previous

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**GROUP - A
(PHYSICAL ANTHROPOLOGY)**

The Physical Anthropology specialization will consist of three theory papers, two practicals and one dissertation.

Typed copies of Dissertation shall be submitted by the student under the guidance of the teacher designated for this purpose by the Head and examined by the external examiner appointed by the University.

**M.A./M.Sc. FINAL
SCHEME OF EXAMINATION**

GROUP - A (PHYSICAL ANTHROPOLOGY)			
Compulsory Papers			
A - Theory Papers			
SL. NO.	PAPER	NAME OF PAPER	MAXI. MARKS
1	Paper I	Applied Anthropology (Group A & B)	100
2	Paper II	Human Genetics	100
3	Paper III	Human Growth and Nutrition	100
B - Dissertation			
4	Paper IV	Field based Dissertation (Independent Research)	100
C - Practicals			
5	Paper V	Laboratory based Practical	100
6	Paper VI	Practical in Applied Biological Anthropology	100
	Total		600
GROUP - B (SOCIAL ANTHROPOLOGY)			
Compulsory Papers			
A - Theory Papers			
1	Paper I-	Applied Anthropology (As in Group - A)	100
2	Paper II	Theory and methods in Social Cultural Anthropology	100
3	Paper III	Indian Anthropology	100
4	Paper IV	Development Anthropology	100
5	Paper V	Tribal Development.	100
B- Dissertation			
6	Paper VI	Community based Dissertation (Independent Research)	100
	Total		600

M.A. / M.Sc. Anthropology

Previous

PAPER - I

SOCIAL-CULTURAL ANTHROPOLOGY

MM-100

UNIT-I Meaning and scope of Social Anthropology and its main branches.

Anthropology and relations with other branches of Anthropology: Social Science, Life Sciences, Medical Science and Humanities.

Culture: Concept and definition.

Theory of culture, attributes of culture, culture trait, culture complex, culture area, integration of culture.

Caste and Class, Status and Role.

Family: typology, residence, functions.

Dowry and bride price.

Kinship: Kin: Consanguine, Affinal.

Kin group: tribe, class, moiety, phratry.

Principle and types of descent and residence.

Kinship terminology: classificatory and descriptive, Terms of reference and address.

Kinship behaviour: Joking and avoidance relationship.

Social Stratification.

UNIT-II Economic organisation: Property: individual and collective.

Concept of value in primitive economy.

Stages of economy: collection, hunting, fishing, pastoralism, cultivation, shifting and settled.

Subsistence, surplus and market economy.

System of trade exchange: reciprocity, redistribution, barter and markets.

Political organisation: Law and social control: concept of authority and leadership.

Types of political organisation: band, tribe, state.

Kinship and chiefdom.

Primitive Law and justice.

Types of punishment.

UNIT-IV Religion and magic: Anthropological approaches to the study of religion - evolutionary

Psychological and functional.

Primitive religion: animism, animatism, bongaim, totemism.

Magic: religious functionaries: Shaman, Priest, medicine man, Sorcerer, Witch.

Symbolism in religion and rituals.

Religion, magic and sciences.

UNIT-V Application and new areas in social-cultural anthropology.

Medical Anthropology, Ecological Anthropology, communication Anthropology, Urban

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Anthropology, Development Anthropology.

Recommended Readings:

1. Barnouw, V. 1979. Anthropology: A General Introduction, The Dorsey Press, Illinois.
2. Holmes, L. D. Anthropology: An Introduction, The Ronald Press Company, New York.
3. Sharma and Sharma. 1997. Anthropology, Atlantic Publishers and Distributors, New Delhi.
4. Hunter & Whitten. The Study of Cultural Anthropology, Harper & row Publishers, New York
5. Moore, A. 1978. Cultural Anthropology, Harper & row Publishers, New York.
6. Kaplan, D. & Manners, R. A. Culture Theory, Prentice Hall of India Private Ltd., New Delhi.
7. Herskovitz, M. J. Cultural Anthropology, Oxford & IBH Publishing Co., New Delhi.
8. Mair, L. 1965. An Introduction to Social Anthropology, Clarendon Press, Oxford.
9. Majumdar, D.N. & Madan, T. 1986. An Introduction to Social Anthropology, National Publishing House, New Delhi.
10. Mishra, U. S. Samajik Sanskritik Manavshastra, Palak Prakashan, Delhi.
11. Shrivastava, A. R. N. Samajik Manav Vigyan Vivechan (in Hindi), Madhya Pradesh Hindi Granth Academy, Bhopal.
12. Evans-Pritchard, E.E. Social Anthropology.
13. Honnigman, J. Handbook of Social and Cultural Anthropology.
14. Fox, Robin. Kinship and Marriage.
15. Sahilns & Service. Evolution and Culture. The University of Michigan Press, Ann Arbor.
16. Barth, F. Ethnic Group Boundaries.
17. Barnet, H.G. Innovation. The Basis of Culture Change.
18. Rogers E.M. & Shoe Maker, F.F. Communication of Innovation.
19. Rogers, E.M. Diffusion of Innovation.
20. Rad-cliffe Brown, A.R. Structure and Function in Primitive Society.
21. Harris, Marvin. Cultural Anthropology.
22. Malinowsky, B.K. Scientific Theory of Culture and Other Essay.
23. Foster, G.M. Tradition, Cultures and Impact of Technological Change.
24. Dalton, George. Tribal and Peasant Economics: Readings in Economic Anthropology.
25. Kluckhohn, C. Mirror for Man.
26. Herskovits, M.J. Man and His Works.

M.A. / M.Sc. Anthropology Previous

PAPER - II

PHYSICAL/BIOLOGICAL ANTHROPOLOGY

- UNIT-I** Meaning, Scope of Physical Anthropology and its relations with other branches of Anthropology and Social and Medical Sciences.

A brief outline on the origin of earth and life and geological time scale.

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Man's place in the Animal Kingdom.

Human origin and Evolution: Theories of origin of man.

Theories of Evolution: Lamarckism, Darwinism, Synthetic Theory.

Evolution in Skull, Jaw, Pelvis etc.

Comparative anatomy of Man and Apes.

Erect posture and bipedalism.

Primate evolution: From Eocene to Pleistocene.

Emergence of Man: Fossil evidences- Pongid and Hominid.

Dryopithecus, Ramapithecus,

Australopithecines.

Homo erectus.

Homo sapiens Neanderthalensis.

Homo sapiens sapiens (Cromagnon, Grimaldi, Chancelade).

UNIT-III Human Genetics: Structure & function of cell, Cell Division, Mendel's Laws & its application to man.

Methods for studying genetic principles in Man- Family studies, Twin studies, Pedigree analysis, Multiple alleles: Blood groups (ABO, Rh, MN), Polygenic inheritance.

UNIT-IV Race and population diversity: Concept of Race, Major Racial groups, Criteria (Morphological, Serological & Genetic), Formation, Classification of Racial groups in India (Guha, Risley, Sarkar).

Classification of Living human populations.

Recommended Readings:

1. Comas, J. 1960. Manual of Physical Anthropology, Springfield, Charles C. Thomas.
2. Sarkar, R. M. 1976. Fundamentals of Physical Anthropology. Blackie (India).
3. Das, B. M. 1985. Outlines of Physical Anthropology, Kitab Mahal, New Delhi.
4. Shrivastav, A. R. N. 1994. Shariirik Manav Vigyan (in Hindi), Gyandeeep Prakashan, Allahabad.
5. Barnouw, V. 1979. Anthropology: A General Introduction, The Dorsey Press, Illinois.
6. Hooton, E. A. Up from the Ape, The Macmillan Co., New York.
7. Lasker, G.B. and Tyzzer, R.N. Physical Anthropology, Holt Rinechart & Winston, New York.
8. Shukla, B.R.K. and Rastogi, S. Physical Anthropology and Human Genetics: An Introduction, Palak Prakashan, Delhi.
9. Buettner-Janusch, J. Origins of Man, Wiley Eastern Pvt. Ltd. New Delhi.
10. Montagu, M.F.A. The Concept of Race, The Free Press, New York.
11. Montagu, M.F.A. An Introduction to Physical Anthropology, Charles C Thomas, Springfield Illinois.
12. Dobzhansky. Evolution, Genetics and Race. John Wiley and Sons, New York.

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13. Harrison, G.A., Weiner, J.S., Tanner, J.M. and Barnicot, N.A. Human Biology: An Introduction to Human Evolution, Variation And Growth, Clarendon Press, Oxford.
14. Ashley, Montague. Concept of Race.
15. Backer, P.T. & Weiner (eds.). Biology of Human Adaptability.
16. Bodmer and Cavalli Stroza. Genetics, Evolution and Man.
17. Coxes, P. Demography.
18. M. Ember and Ember. Anthropology.
19. Emery, A.E.H. Elements of Medical Genetics.
20. Harrison, G.A. and Boyce, J. The Structure of Human Population.
21. Mange and Mange. Basic Human Genetics.
22. Marrell. Evolution and Genetics.
23. Sarkar S.S. Aboriginal races of India.
24. Sahlins and Service. Evolution and Culture.
25. Simpson, G.G. The Meaning of Evolution.
26. Vogel, F. and Motulsky, A.C. Human Genetics Problems and Approaches.
27. Weiner and Lourie. Human Biology – A Guide to Field Methods.
28. Weiss, K.M. & Ballonoff, P.A. Demographic Genetics.
29. Williams B.J. Evolution and Human Origine.
30. Wright, S. Evolution, Genetics and Population.

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PAPER - III

ARCHEAEOLOGICAL ANTHROPOLOGY

- UNIT-I**
1. Definition, aim, genesis, scope and objectives.
 2. Branches: Environmental Archaeology, Ethnoarchaeology Experimental Archaeology, etc.
 3. Relationship to other branches of Anthropology: Earth Sciences, Physical Sciences, Life Sciences & Social Sciences.
 4. Pleistocene epoch: Chronology, environmental episodes as seen in geomorphological features, markers fauna, flora and human interaction etc.
- UNIT-II**
1. Dating methods:
 - a) Relative dating methods: Stratigraphy, river terraces, raised sea beaches, dunes, flourine dating etc.
 - b) Absolute dating methods: C-14 dating technique, K-Ar dating technique, Uranium- Thorium technique, Dendrochronology, Thermoluminescence dating, Obsidian hydration etc.
 2. Tools and Technology: Raw material and sources, temporal dimension of tool

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making techniques and tool types and their function of tool types.

UNIT-III

Cultural chronology (European perspective); Palaeolithic (Lower, Middle and Upper) and Mesolithic cultures: salient features, environment, sites and areas, typo-technology, distribution, artifacts and their physical forms.

UNIT-IV

Cultural chronology (Indian Perspective): Palaeolithic (Lower, Middle and Upper) and Mesolithic cultures: salient features, environment, sites and area, typo-technology, distribution, artifacts and their physical forms.

UNIT-V

1. Neolithic culture (Indian perspective): Salient features, environment, sites and area, typotechnology, distribution, artifacts and their physical forms.
2. Neolithic revolution: Emergence of agriculture, domestication, village, communities, tooltypes, pottery, wheel and plough. Diffusion of agriculture in S-E Asia and West Asia.
3. Protohistoric cultures in India: Chalcolithic culture, Indus civilization and Megalithic cultures: features and distribution.

Recommended Readings:

1. Agrawal, D.P. The Archeology of India.
2. Allchin and Allchin, 1982. The Rise of Civilization in India and Pakistan, Select Book Service Syndicate, New Delhi.
3. Bhattacharya, D.K. 1987. Pre-historic Archaeology: A comparative study of human succession.
4. Bhattacharya, D.K. 1994. Outline of Indian Prehistory.
5. Pandey, J. N. 2000. Puratatva Vimarsh (in Hindi)
6. Misra, V. N. & M. S. Mate 1995. Indian Prehistory; 1964.
7. Choubey, R. Puratatvik Manavvigyan (in Hindi)
8. Sankalia, H. D. 1974. Pre and Protohistory of India and Pakistan.
9. Varma, R.K. & N. Varma, 2001. Puratatva Anushilan
10. Wheeler, R.E.M. 1959. Early India & Pakistan.

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PAPER - IV

RESEARCH METHODS

UNIT-I

Fieldwork tradition in Anthropology: covering all branches of Anthropology to gain holistic perspective.

Methods: ethnographic, comparative method, Scientific method, Historical method survey.

Research design: review of literature, aims, objective, hypothesis, questions, types of research design.

Techniques of data collection primary sources, Observation, Geneological method,

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FIELD WORK AND FIELD WORK REPORT

SYLLABUS:

1. Field Work tradition in anthropology.
2. Preparation for field work: physical, psychological and academic.
3. Rapport building - initial contact.
4. Review of data collection methods (as per Research method).

No societies are static. Increasingly they are exposed to force of change, through education, technology, market forces and political processes in which they participate. The economic and political decisions at macro level affect the micro situations affecting lives of the people. Hence the ethnographic data should not be misconstrued or limited to aspects as reflected in monographs of island communities or primitive communities. The data should also be collected about the current issues and problems regarding change processes initiated by planned programs of government and voluntary organisations. The following list is illustrative and additive to traditional ethnographic data collected in anthropological field work following "Notes and Queries in Anthropology or Outline of Cultural materials."

1.1 Social - Cultural:

- a. Census and demographic profile
- b. Diet survey
- c. Morbidity survey
- d. Health practitioners: allopathy, homeopathy, ayurved, unani
- e. Local healers and ethnomedicine.
- f. Anganwadis
- g. Prevalence of common/rare diseases.
- h. Environmental sanitation, drinking water sources.
- i. Health care delivery in the public and private sector.
- j. Indebtedness- extent and causes.
- k. Land alienation- extent and causes.
- l. Reproductive survey.
- m. Disability survey.
- n. Obstetric history of women.
- o. Educational dropouts.
- p. Political awareness and political organisation.
- q. Functioning of government institutions.
- r. Functioning of local panchayats.
- s. Impact of government programmes.

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casestudy interview, scaling techniques, audio-visualrecording; secondary sources: census, national sample survey, PRA Technique.

UNIT-III Scope and utility of Statistics in Biology.

Sampling; Data collection, Classification and Tabulation.

Graphic and Diagrammatic representation of data: Frequency distribution.

Measures of Central Tendency- Mean, Mode, Median.

Measures of dispersion : Range, Mean deviation, Variation, Variance and Standard deviation.

UNIT-V Test of Significance: Chi- Square Test and goodness of fit, 'T' test.

Moments, Skewness and Kurtosis.

Vital Statistics: Fertility rates, Mortality rates.

Recommended Readings:

1. Goode & Hatt. Methods in Social Research.
2. Young, P. V. Scientific Social Surveys and Research.
3. Danda, Ajit. Research Methodology in Anthropology. Inter- India, New Delhi.
4. Gupta, S. P. Statistics Methods.
5. Elhance, D. N. Practical Problems in Statistics, Kitab Mahal, Allahabad.
6. Levin, J. Elementary Statistics in Social Research.
7. Sarin, S.S. and Balchandani, M.K. Fundamentals of Statistics. Ratan Prakashan Mandir, Agra.
8. Fernandes & Tondon, Participatory Research.
9. Fisher, Michael. Application in Computing for Social Anthropologists. London, Routledge.
10. H. Russel. Bernard, Handbook of Methods in Cultural Anthropology, Altamira Press.
11. Kaplan, Abraham. The Conduct of Enquiry: Methodology for Behavioural Sciences.
12. Kassam & Mustafa. Participatory Research.
13. Madrigal, Lorena. Statistics for Anthropology.
14. Mukherjee, Neela. Participatory Rural Appraisal and Questionnaire Survey.
15. Pelto P.S. & Pelto G.H. Anthropological Research: the structure of inquiry. London, Cambridge University Press.
16. Renfrew, C. (ed.). The Explanation of Culture Change: Models in Prehistory. Duckworth.
17. Sankalia, H.D. Stone Age Tolls, Families and Techniques, Pune, Deccan College.
18. Triger, B.G. Beyond History the Methods of Prehistory. Holt, Rinehard and Winston.
19. Young, Pauline. Scientific Social Survey and Research.

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- t. Problems of rehabilitation.
- u. Gender issues.
- v. Women's participation in development programmes.
- w. Harijan and Adivasi problems.
- x. Mass communication.
- y. Infrastructure in the Village: road, electricity, water, transportation facilities, PHC, etc.
- z. Caste-tribe interaction.

1.2 Physical/Biological:

- a. Somatometry.
- b. Somatoscopy.
- c. ABO, MN, Rh Systems.
- d. Colourblindness, PTC tasting.
- e. Growth standards for children.
- f. Nutritional status: children, adults.
- g. Haemoglobin count.
- h. Genetic/congenital anomalies.
- i. Pregnancy wastage.
- j. Dermatoglyphic data.

1.3 Archaeological:

- a. River terraces and stratigraphy: sediments.
- b. Antiquity of the village: stories, temples.
- c. Raw material for stone tools: quartz/chert etc.
- d. Exploration and surface collection of tools if any.
- e. Excavation sites, artifacts:
 - a. Dialects: caste, tribe peculiarities.
 - b. Semantic changes in kinship structure, terms and kinship behavior.
 - c. Borrowed words.
 - d. Proverbs and key words.
 - e. Nicknames.

Social Anthropology

1. Analysis of material artifacts in Museum.
2. Preparation for observation and interview guides and collection of data in the city or nearby villages about Socio-Cultural, religious events, festivals or markets connected to rural areas, social issues and social problems.
3. Computer awareness: Data processing of the available / collected data, computer analysis of qualitative and quantitative data.
4. Genealogy preparation.

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Physical Anthropology

1. Human skeletal system: Its importance in biological anthropology, palaeoanthropology, Anthropology and Forensic Science, Study of Museum material.
2. Osteology and Osteometry importance of studying human skeletal system in anthropology.
3. Description of skull and mandible, long bones (description and side identification) vertebrae and girdle bones, age and sex differences, selected measurements viz. maximum cranial length, maximum cranial breadth, least frontal breadth bi-zygomatic breadth, bi-maxillary breadth, nasal height, nasal breadth indices viz. cranial index, nasal index.
4. Somatometry and Somatoscopy, importance of body measurements in anthropology applications, in growth, forensic clothing, sports etc. selected measurements on head viz. maximum head length, maximum head breadth least frontal breadth, bizygomatic breadth, bigonial breadth, nasal height, nasal breadth, nasal depth, length of nose, physiognomic facial length, morphological facial length, height vertex, height acromion, sitting height vertex,
 - biacromial diameter, girth of thorax, maximum hip width. Indices viz cephalic index, nasal index, physiognomic facial index, morphological facial index, upper facial index, relative sitting height index.
5. Somatoscopy: Colour of skin, colour of eye, hair, eye brows, nasal depression, nasal bridge, nasal septum, alveolar prognathism.

Archaeology:

1. Drawing and identification of stone tools of different cultural phases.
2. Study of fossils & tools in museum.
3. Treatment & preservation of bones & fossils.
4. Drawing, identification & labeling of human fragmentary bones, teeth etc.

BOOK RECOMMENDED:

1. Singh, S.P. Kinanthropometry.
2. Cornwell, I. W. Bones for the Archaeologists.
3. Oakley, K.P. Man the tool maker, British Museum.
4. Sankalia, H.D. Stone Age tools, their techniques, names and functions.
5. Ashley Montagu, M.F.A. hand book of Anthropometry, Charles C. Thomas. Illinois.
6. Singh, I.P. Bhasin, M.K. Anthropometry, Bharti Bhavan, New Delhi.
7. Weiner, J.S. & Lourie. J.A. Human Biology: A Guide to field Methods. I.B.P. Hand book No 9 Blackwell Scientific Publication, Oxford.
8. Binford L.R. An archaeological perspective, Seminar press.
9. Davidson, D.A. and Shackley M.L. Geoarchaeology Earth Sciencez and Past, Duckworth, London.
10. Evans, J.G. Environment Archaeology, Paul Elek.

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11. Maanen, Johnvan, Tales of the Field: On Writing Ethnography, The University of Chicago Press, Chicago.
12. Muroock: Outline of Cultural Materials.
13. Pelic P.S. & Pelto G.H. : Anthropological Research Cambridge University Press, London
14. Wheeler R.B.M.: Archeaology from the earth Ponguin Books.
15. Wiener, J.S. & J.A. Loorie: Human Biology: A Guide to field Methods.
16. Young, Pauline: Scientific Social Surveys and Research.
17. Royal Anthropological institute of Great Britain and Ireland Notes and queries on anthropology. Routledge and Kegan Paul Ltd. London.