

MASTER OF SCIENCE
(ANTHROPOLOGY)
TWO YEAR FULL-TIME PROGRAMME

RULES, REGULATIONS AND COURSE CONTENTS

Department of Anthropology

FACULTY OF SCIENCE

UNIVERSITY OF DELHI

DELH110007

2009

MASTER OF SCIENCE (ANTHROPOLOGY)

TWO-YEAR FULL-TIME PROGRAMME

AFFILIATION

The proposed programme shall be governed by the Department of Anthropology, Faculty of Science, University of Delhi, Delhi – 110007.

PROGRAMME STRUCTURE

The M.Sc. Programme is divided into two Parts as under. Each Part will consist of two Semesters.

		Semester-Odd	Semester-Even
Part I	First Year	Semester – 1	Semester – 2
Part II	Second Year	Semester – 3	Semester – 4

Each semester would consist of four papers. Semesters I and II (Part-I) would have core Papers to be studied by all students of the M.Sc. –Anthropology programme. Semesters III and IV (Part II) would comprise Optional Papers from which each student to opt for three elective papers from either stream (A or B). He/She is also free to opt for only one elective paper from the list of common elective papers. In this case the other two elective papers have to be from one of the two streams (A or B) he /she has chosen. Selection of papers in Semester III and IV would be based on merit (performance in the Part I Examinations), Choice and other specific guidelines as outlined below. It is mandatory for each student to complete a Dissertation, assigned at the end of 2nd Semester and goes on until 4th semester. It would be based on fieldwork (2-3 weeks).

The schedule of papers prescribed for various semesters shall be as follows:

PART-I Semester 1

Theory

AN 6101 Fundamentals of Physical Anthropology

AN 6102 Fundamentals of Social Anthropology

AN 6103 Archaeological Anthropology

AN 6104 Fundamentals of Population Studies

Practical/ Project

AN 6101 Somatometry, Somatoscopy

AN 6102 Reading of Ethnography

AN 6103 Prehistoric Archaeology

AN 6104 Fundamentals of Population Studies

PART-I Semester 2

Theory

- AN 6201 Human Variation and Adaptations
- AN 6202 Anthropology of India: Ethnic and cultural diversity (Physical and Social)
- AN 6203 Kinship, Marriage and Family
- AN 6204 Human Ecology: Biological & Cultural Dimensions

Practical/ Project

- AN 6201 Osteology, Osteometry and Craniometry
- AN 6202 Research Methods & Techniques I
- AN 6203 Research Methods & Techniques II
- AN 6204 Human Ecology

PART-II Semester 3

Physical Anthropology (Group-A)

Theory

- AN 6301 Paleoanthropology
- AN 6302 Human Growth, Development and Nutrition.
- AN 6303 Human Population Genetics
- AN 6304 Biostatistics and Computational Anthropology (interdisciplinary)

Practical/ Project

- AN 6301 Paleoanthropology
- AN 6302 Human Growth ,Size and Shape measurements
- AN 6303 Serology, PTC, Colour Blindness, Dermatoglyphics
- AN 6304 Computational Human Genetics and Biostatistics (interdisciplinary)

Social Anthropology (Group-B)

Theory

- AN 6305 Anthropological Theory-I
- AN 6306 Anthropological Theory -II
- AN 6307 Epistemological Foundations of Social and Behaviour Sciences (Interdisciplinary)
- AN 6308 Religion and Symbolism

Practical/ Project

- AN 6305 Based on Anthropological Theory I
- AN 6306 Based on Anthropological Theory II
- AN 6307 Research Methods
- AN 6308 Religion and Symbolism

- 6401 Dissertation between Sem III and IV on the basis of fieldwork of the duration 2-3 weeks
(To be examined in Semester IV)

PART-II Semester 4

Elective Papers

Physical Anthropology (Group-A)

Theory

- AN 7101 Physiological Anthropology
- AN 7102 Kinanthropometry and Ergonomics
- AN 7103 Biochemical Genetics
- AN 7104 Molecular Anthropology
- AN 7105 Dermatoglyphics
- AN 7106 Primate Behavior
- AN 7107 Primate Biology
- AN 7108 Statistical Methods in Biological Anthropology

Practical/ Project

- AN 7101 Physiological Anthropology
- AN 7102 Kinanthropometry and Ergonomics
- AN 7103 Biochemical Genetics
- AN 7104 Molecular Anthropology
- AN 7105 Dermatoglyphics
- AN 7106 Primate Behaviour
- AN 7107 Primate Biology
- AN 7108 Statistical Methods in Biological Anthropology

Social Anthropology (Group-B)

Elective Papers

Theory

- AN 7201 Psychological Anthropology
- AN 7202 Tribal India
- AN 7203 Ecological Anthropology
- AN 7204 Urban Anthropology
- AN 7205 Gender & Society

Practical/ Project

- AN 7201 Psychological Anthropology
- AN 7202 Tribal India
- AN 7203 Ecological Anthropology
- AN 7204 Urban Anthropology
- AN 7205 Gender & Society

Common Elective Papers

Theory

- AN 7301 Demographic Anthropology
- AN 7302 Prehistoric India
- AN 7303 Medical Anthropology
- AN 7304 Anthropology of Development

AN 7305 Anthropology of Disaster
AN 7306 Forensic Anthropology

Practical/ Project

AN 7301 Demographic Anthropology
AN 7302 Prehistoric India
AN 7303 Medical Anthropology
AN 7304 Anthropology of Development
AN 7305 Anthropology of Disaster
AN 7306 Forensic Anthropology

Note : A student is permitted to opt for three elective papers from either stream (A or B). He/She is also free to opt for only one elective paper from the list of common elective papers. In this case the other two elective papers have to be from one of the two streams (A or B) he /she has chosen. Dissertation would carry 4 credit (100 marks.)

SCHEME OF EXAMINATIONS

1. English shall be the medium of instruction and examination.
2. Examinations shall be conducted at the end of each Semester as per the Academic Calendar notified by the University of Delhi
3. Each course will carry 100 marks and will have two components:
 - (i) **Internal Assessment** 30 marks
 - (ii) **End Semester Examination**
 - (a) Theory Examination 70 marks
 - (b) Practical Examination 50 marks
4. The system of evaluation shall be as follows:
 - 4.1 Internal assessment will be broadly based on attendance in Theory and Practicals (5 marks), assignments, seminars and tests in the theory component (15 marks). The internal assessment for the Practical component would be based on continuous evaluation of performance in laboratory exercises and maintenance of regular record notebooks

(10 marks). These criteria are tentative and could be modified by the faculty members associated with teaching of a paper based on guidelines approved by the academic council.

4.2 As regards dissertations / Project Work (Paper -6401), the scheme of evaluation shall be as follows:

4.2.1 Project work would be assigned at the end of Semester II to enable students to initiate work on the same.

4.2.2 It would formally begin from Semester III and shall be based on group fieldwork of 2-3 weeks.

4.2.3 The dissertation based on group field work would be evaluated at the end of Semester IV by a board of examiners consisting of two internal and one external examiner (Dissertation =70 marks, Viva-voce= 30 marks).

5. Examinations for courses shall be conducted only in the respective odd and even Semesters as per the Scheme of Examinations. Regular as well as Ex-Students shall be permitted to appear/re-appear/improve in courses of Odd Semesters only at the end of Odd Semesters and courses of Even Semesters only at the end of Even Semesters.

PASS PERCENTAGE

Minimum marks for passing the examination in each semester shall be 40% in each paper and 45% in aggregate of a semester.

However, a candidate who has secured the minimum marks to pass in each paper but has not secured the minimum marks to pass in aggregate may reappear in any of the paper/s of his choice in the concerned semester in order to be able to secure the minimum marks prescribed to pass the semester in aggregate.

No student would be allowed to avail of more than 3 chances to pass any paper inclusive of the first attempt.

PROMOTION CRITERIA

SEMESTER TO SEMESTER : Students shall be required to fulfill the Part to Part Promotion Criteria. Within the same Part, students shall be allowed to be promoted from a Semester to the next Semester, provided she/he has passed at least half of the courses of the current semester.

PART I TO PART II: Admission to Part-II of the Programme shall be open to only those students who have successfully passed at least 75 % papers out of papers offered for the Part-I courses comprising of Semester-1 and Semester-2 taken together. However, he/she will have to clear the remaining papers while studying in Part-II of the Programme.

DIVISION CRITERIA

Successful candidates will be classified on the basis of the combined results of Part-I, Part-II and Part-III examinations as follows:

Candidates securing 60% and above	:	Ist Division
Candidates securing between 50% and above and less than 60%	:	IInd Division
All others	:	IIIrd Division

QUALIFYING PAPERS

No qualifying papers.

SPAN PERIOD

No student shall be admitted as a candidate for the examination for any of the Parts/Semesters after the lapse of four years from the date of admission to the Part-I/Semester-1 of the M.Sc. Anthropology Programme.

ATTENDANCE REQUIREMENT

As per University Rules.

No student shall be considered to have pursued a regular course of study unless he/she is certified by the Head of the Department of Anthropology, University of Delhi, to have attended 75 % of the total number of lectures, tutorials and seminars conducted in each semester, during his/her course of study. Provided that he/she fulfils other conditions the Head, Department of Anthropology may permit a student to the next Semester who falls short of the required percentage of attendance by not more than 10 per cent of the lectures, tutorials and seminars conducted during the semester.

COURSE CONTENT FOR EACH COURSE

Attached

LIST OF READINGS

Attached

M.Sc. (Anthropology)

Course No.		Page No.	Credits (T+Tu+P)
Semester 1			
Theory			
AN 6101	Fundamentals of Physical Anthropology	1	3+1+2
AN 6102	Fundamentals of Social Anthropology	3	3+1+2
AN 6103	Archaeological Anthropology	5	3+1+2
AN 6104	Fundamentals of Population Studies	8	3+1+2
Practical			
AN 6101	Somatometry, Somatoscopy	2	3+1+2
AN 6102	Reading of Ethnography	4	3+1+2
AN 6103	Prehistoric Archaeology	7	3+1+2
AN 6104	Fundamentals of Population Studies	9	3+1+2
Semester 2			
Theory			
AN 6201	Human Variation and Adaptations	10	3+1+2
AN 6202	Anthropology of India: Ethnic and cultural diversity (Physical and Social)	15	3+1+2
AN 6203	Kinship, Marriage and Family	18	3+1+2
AN 6204	Human Ecology: Biological & Cultural Dimensions	23	3+1+2
Practical			
AN 6201	Osteology, Osteometry and Craniometry	11	3+1+2
AN 6202	Research Methods & Techniques I	17	3+1+2
AN 6203	Research Methods & Techniques II	20	3+1+2
AN 6204	Human Ecology: Biological & Cultural Dimensions	21	3+1+2
Semester 3			
Group-A		Physical Anthropology	
Theory			
AN 6301	Paleoanthropology	24	3+1+2
AN 6302	Human Growth, Development and Nutrition	26	3+1+2
AN 6303	Human Population Genetics	29	3+1+2
AN 6304	Biostatistics and Computational Anthropology (interdisciplinary)	31	3+1+2
Practical			
AN 6301	Paleoanthropology	25	3+1+2
AN 6302	Human Growth, Size and Shape measurements	27	3+1+2
AN 6303	Serology, PTC, Colour Blindness, Dermatoglyphics	30	3+1+2
AN 6304	Biostatistics and Computational Anthropology (interdisciplinary)	32	3+1+2
Group-B		Social Anthropology	
Theory			
AN 6305	Anthropological Theory-I	33	3+1+2

AN 6306	Anthropological Theory –II	35	3+1+2
AN 6307	Epistemological Foundations of Social and Behaviour Sciences (Interdisciplinary)	37	3+1+2
AN 6308	Religion and Symbolism	39	3+1+2
Practical			
AN 6305	Based on Anthropological Theory I	34	3+1+2
AN 6306	Based on Anthropological Theory II	36	3+1+2
AN 6307	Research Methods	38	3+1+2
AN 6308	Religion and Symbolism	40	3+1+2
AN 6401	Dissertation between Sem III and IV on the basis of fieldwork of the duration 2-3 weeks (To be examined in Semester IV)=6 credits		
Semester 4			
Elective Papers			
Group-A	Physical Anthropology		
AN 7101	Physiological Anthropology	41	3+1+2
AN 7102	Kinanthropometry and Ergonomics	43	3+1+2
AN 7103	Biochemical Genetics	45	3+1+2
AN 7104	Molecular Anthropology	47	3+1+2
AN 7105	Dermatoglyphics	50	3+1+2
AN 7106	Primate Behavior	52	3+1+2
AN 7107	Primate Biology	54	3+1+2
AN 7108	Statistical Methods in Biological Anthropology	56	3+1+2
Practical			
AN 7101	Physiological Anthropology	42	3+1+2
AN 7102	Kinanthropometry and Ergonomics	44	3+1+2
AN 7103	Biochemical Genetics	46	3+1+2
AN 7104	Molecular Anthropology	49	3+1+2
AN 7105	Dermatoglyphics	51	3+1+2
AN 7106	Primate Behaviour	53	3+1+2
AN 7107	Primate Biology	55	3+1+2
AN 7108	Statistical Methods in Biological Anthropology	57	3+1+2
Group-B	Social Anthropology		
Elective Papers			
Theory			
AN 7201	Psychological Anthropology	58	3+1+2
AN 7202	Tribal India	61	3+1+2
AN 7203	Ecological Anthropology	64	3+1+2
AN 7204	Urban Anthropology	66	3+1+2
AN 7205	Gender & Society	68	3+1+2
Practical			
AN 7201	Psychological Anthropology	60	3+1+2
AN 7202	Tribal India	63	3+1+2
AN 7203	Ecological Anthropology	65	3+1+2
AN 7204	Urban Anthropology	67	3+1+2
AN 7205	Gender & Society	70	3+1+2
Common Elective Papers			
Theory			
AN 7301	Demographic Anthropology	71	3+1+2
AN 7302	Prehistoric India	74	3+1+2
AN 7303	Medical Anthropology	77	3+1+2

AN 7304	Anthropology of Development	79	3+1+2
AN 7305	Anthropology of Disaster	81	3+1+2
AN 7306	Forensic Anthropology	83	3+1+2
Practical			
AN 7301	Demographic Anthropology	73	3+1+2
AN 7302	Prehistoric India	76	3+1+2
AN 7303	Medical Anthropology	78	3+1+2
AN 7304	Anthropology of Development	80	3+1+2
AN 7305	Anthropology of Disaster	82	3+1+2
AN 7306	Forensic Anthropology	84	3+1+2

T-Theory, Tu- Tutorial, P-Practicals

3 hrs. of Teaching = 3 credits

1hr. of Tutorial = 1 credit

4 hrs. of Practical = 2 credits

Each course = 6 credits (3+1+2)

Total credits = 96 (4 semesters)

AN 6101: Fundamentals of Physical Anthropology

Theory

- a. History and development of physical/ biological Anthropology, aim, scope and its relationship with allied disciplines.
- b. Theories of evolution- Lamarckism, Neolamarckism, Darwinism, Neo-Darwinism, Synthetic theory, Neomutationism.
- c. Distribution, classification and characteristics of living primates. Comparative anatomy of man and non-human primates with special reference to skull, pelvis, dentition and long bones. Evolution of brain and senses.
- d. Bio-genetic basis of phylogeny and taxonomy of primates.
- e. Primate behaviour with special reference to rhesus monkeys, baboons, langurs and apes.
- f. Concept of Race, historical development, formation and criteria of racial classification. Racial classification of Hooton's, Deniker's, Coon, Garn and Birdsell's and Boyd's .UNESCO statement.
- g. Human evolution with respect to hominoid fossil.

Suggested Literature:

1. Understanding Physical Anthropology and Archaeology. N A Turnbaugh, R. Jurmain, L. K; Igore H. Neison. (2002). Wadsworth Group, Canada.
2. Physical Anthropology, G.W. Lasker. (1976) Holt, Rinehart & Winston Inc.
3. Anthropology (2003) Ember, Ember and Peregrine. Prentice Hall Inc.
4. Fundamentals of Biological Anthropology, (1996) (Third Ed). John. H. Relethford. Mc Graw-Hill.
5. Exploring Biological Anthropology: The Essentials. Standford, Allen, John. S, Anton, Susan C, Prentice Hall. Prentice Hall.

AN 6101: Somatometry, Somatoscopy

Practical/ Project

Somatometry

1. Maximum head length
2. Maximum head breadth
3. Minimum frontal breadth
4. Maximum bizygomatic breadth
5. Bigonial breadth
6. Nasal height
7. Nasal length
8. Nasal breadth
9. Physiognomic facial height
10. Morphological facial height
11. Physiognomic upper facial height
12. Morphological upper facial height
13. Head circumference
14. Stature
15. Sitting height
16. Body weight

Somatoscopy

1. Head form
2. Hair form
3. Facial form
4. Eye form
5. Nose form
6. Hair colour
7. Eye colour
8. Skin colour

AN 6102: Fundamentals of Social Anthropology

Theory

- a. Subject matter and scope of socio-cultural anthropology and its relations with other subjects, such as sociology, psychology, history and economics.
- b. Approaches to the study of society and culture:
 - i. Evolutionism
 - ii. Historical particularism
 - iii. Diffusion
 - iv. Functional (pattern and integration)
 - v. Interpretative
 - vi. Structuralism
- c. Concept of society and culture; status and role; groups, association, community, institution and organisation.
- d. Institutions- Economic, political and religious.
- e. Social stratification- analysis of caste, class and power.

Suggested Literature:

1. Davis, Kingsley. 1949. Human society. New York: Macmillan Co.
2. Metcalf, Peter. 2005. Anthropology: the basics. Abingdon [England]: Routledge.
3. Barnard, Alan. 2000. History and theory in anthropology. Cambridge, U.K.: Cambridge University Press.
4. Nadel, S. F. 1951. The foundations of social anthropology. Glencoe, Ill: Free Press.
5. Ingold, Tim. 1994. Companion encyclopedia of anthropology. Routledge reference. London: Routledge.

AN 6102: Reading of Ethnography

Practical/ Project

The student will be required to critically comment on the methodology and findings of an ethnographic account as directed by the teacher concerned.

1. The student should be able to critically examine the theoretical approach followed.
2. Make a critical evaluation of data used.
3. Suggest alternative analytical tools.
4. Evaluate the impact made by this ethnography an anthropological theory.

AN 6103: Archaeological Anthropology

Theory

a. The Framework of Archaeology

- i. Formation Processes
- ii. Basics of Archaeology
- iii. Dating Methods- Relative dating and Absolute dating
- iv. Introduction to Social Archaeology
- v. Environmental Archaeology
- vi. Cognitive Archaeology

b. European Prehistory

- i. Introduction to Prehistory of Europe: Chronology and Terminology.
- ii. Dating of Artifacts: Absolutes and Relatives.
- iii. Lower Palaeolithic Culture of Europe.
- iv. Middle Palaeolithic Culture of Europe.
- v. Upper Palaeolithic Culture of Europe.
- vi. Paleolithic Art of Europe.
- vii. European Prehistory in 21st Century: With Special Reference to Dmanisi of Georgia, Isernia la Pineta, Monte Poggiolo, Pirro Nord of Italy and Atapuerca of Spain.

c. Indian Prehistory

- i. Introduction of Indian Prehistory: Chronology and Terminology.
- ii. Lower Palaeolithic Culture of India.
- iii. Middle Palaeolithic Culture of India.
- iv. Upper Palaeolithic Culture of India.
- v. Paleolithic Art of India.
- vi. Mesolithic Culture of India.
- vii. Neolithic Culture of India.
- viii. Indus Valley Civilization.
- ix. Megalithic Cultures of India.
- x. Indian Prehistory in 21st Century: Problems and Challenges.

d. New Trends in World Prehistory: Origin and Dispersal of Earliest Homo from Africa

- i. The First Human Settlement of Europe during Lower Pleistocene Epoch.
- ii. The First Human Settlement of Asia during Lower Pleistocene Epoch.

Suggested Literature

1. An outline of Indian Prehistory. Delhi: Palaka Prakashan. Bhattacharya, D.K. (2006).
2. Palaeolithic Europe. Netherland: Humanities press. Bhattacharya, D.K. (1977).
3. Prehistory and Protohistory of India and Pakistan. Pune: Deccan College. Sankalia, H.D.(1974).
4. The Archaeology of Early Man. London: Faber and Faber. Coles, J.M. and E.S. Higgs. (1969).
5. The Old Stone Age: A study of Palaeolithic Times. London: Bowes and Bowes. Burkitt, M. (1963).
6. Archaeology: Theories methods and Practices, London: Thames and Hudson. Renfrew, C. and P. Bahn. (2001).
7. People of the Earth: An Introduction to World Prehistory. New Jersey: Pearson Education. Fagan B. M. (2004).
8. Frameworks for dating Fossil man.London: Weidenfeld and Nicolson. Oakley, K.P. (1966).
9. The Explanation of culture change: Models in prehistory. London. Duckworth. Renfrew, C. (ed.). (1973).
10. Man the Hunter. Chicago: Aldine Publishing Company. Lee, R.B and I. Devore (Eds.).(1977).
11. An Introduction to Prehistoric Archaeology. New York: Hold, Rinehart and Winston, INC. Hole, H. and R.F. Heizer. (1969).
12. Prehistory of India. Delhi: Munshiram Manoharlal Publishers Pvt. Ltd. Sankalia, H. D. (1977).
13. The Indus Civilization: Contemporary Perspectives. New Delhi: Vistaar publication. Possehl, G. L. (2002).
14. Mesolithic Europe. Cambridge: Cambridge University Press. Bailey, G. and P. Spikins (eds.). (2008).
15. The Rise of Civilization in India and Pakistan. Cambridge: Cambridge University Press. Allchin, B. and R. Allchin. (1982).

AN 6103: Prehistoric Archaeology

Practical/ Project

1. Quaternary geological formations
2. Detailed Study and Understanding of tool types-
 - i. Lower Palaeolithic Culture
 - ii. Middle Palaeolithic Culture
 - iii. Upper Palaeolithic Culture
 - iv. Mesolithic Culture
 - v. Neolithic Culture
 - vi. Art objects
 - vii. Bone Tools and artefacts

Suggested Literature

1. Old Stone Age Tools: A Manual of Laboratory Techniques of Analysis. Calcutta: K. P. Bagchi and Company. Bhattacharya, D.K. (1979).
2. Technology and terminology of Knapped Stone. Nanterre: CREP. Inizan, M.L.; M. R. Ballinger; H. Roche and J. Tixier. (1999).
3. Man the Tool Maker. London. Trustees of the British Museum Natural History. Oakley, K.P. (1972).
4. Stone Age Tools: Their techniques, Names and Probable Functions. Poona: Deccan College. Sankalia, H.D. (1982).

AN 6104: Fundamentals of Population Studies

Theory

- a. Evolution of population studies as a separate discipline. Difference between demography and population studies. Its relevance in Anthropology and scope.
- b. Role of other social disciplines; Economics, political Science, Sociology, psychology, Geography, Medical Science, Genetics, Women studies, social work and statistics in population Studies.
- c. Human Population: as part of Natural Ecosystem, population growth, impact of population growth of a species on Environment & Ecosystem.
- d. History of population growth; Causes of Climatic Change, Environmental changes in the historic period.
- e. Population ethics and their role to solve the problems of growing population Factors influencing the distribution of World population : Population Dynamics in an ecosystem,
- f. International migration - Demographic variables and its importance. Theories of International Migration. Causes, consequences Dimensions and Dynamics of International Migration, Cultural, Psychological and Ethnic impact of International Migration on the society.
- g. Definition of Occupational Health, Health of a worker and interactions in a working environment, Occupational Hazards, Occupational diseases Health problems due to Industrialization, Measures for Health protection of workers
- h. Recent trends of population growth in India - Population and Religion: Value of Religion in regulation and maintenance of population growth in India. Demographic profile of different religions in India.

Suggested Literature

1. Henriette Engelhardt, Hans-Peter Kohler, and Alexia Fürnkranz-Prskawetz (2009) Causal Analysis in Population Studies: Concepts, Methods, Applications (The Springer Series on Demographic Methods and Population Analysis) .Springer Publication
2. Bhat, P.N.M., (1995); "Maternal Mortality in India; Estimate from Regression Model' Studies in Family Planning, Vol. 16(4)
3. IIPS (International Institute for Population Sciences). 1995. National Family Health Survey (MCH and Family Planning), India 1992-93. Bombay.
4. Vlasoff, Michael. 1979. Labour demand and economic utility of children: A case study of rural India. Population Studies 33:415-28.
5. World Health Organisation (1999); 'The World Health Report 1999: Making a Difference", WHO, Geneva, Switzerland, WHO.
6. Park. K "Preventive and Social Medicine" Banarsidas Bhanot Publishers, Jabalpur.2000
7. Grigg,D.B. 1982,Modern population growth in historical perspective, Geography 67, pp.97-108.
8. Husain M. 2003, Human Geography, Rawat publications,Nice printing press, New Delhi.

AN 6104: Fundamentals of Population Studies

Practical/ Project

1. Survey of census record.
2. Introduction to sample survey reports and various other governmental and non governmental records.
3. A short report based on the available secondary data.

AN 6201: Human Variation and Adaptations

Theory

- a. History and development of human genetics, concept, scope and fields of human genetics. Human genetics in relation to other sciences and medicine.
- b. Chromosomes in Man: Identification and Techniques of studying; Cell mechanics and chromosomes : Chromosomal aberrations – Numerical and Structural.
- c. Mendelian Genetics in Man: autosomal and sex-linked inheritance, dominant and recessive inheritance, penetrance and expressivity, extra nuclear inheritance, linkage, genetic interaction.
- d. Methods of Genetic analysis in localisation of Genes on Chromosome.
- e. Methods of studying heredity: Twin method, diagnosis of zygosity, Heritability estimates. Application of Twin method to complex disorders. Pedigree, sib pair, foster child method and co-twin methods.
- f. Bio-cultural adaptation in human populations.
- g. Human population ecology: Adaptation to different ecozones.

Suggested Literature

1. The Great Human Diasporas: The History of Diversity and Evolution. Helix book (2007)
2. Human Biological Variation (2004). J. H. Mielke, L. N. Konigsherg, JH Relethford. Oxford University Press.
3. Human Biodiversity: Genes, Race and History (Foundations of Human Behaviour) (1995) Jonathan Marks. Aldine.
4. Human adaptation (1998). G.A. Harrison and Howard Morphy. Berg Publisher, Oxford.
5. Human Adaptability: An Introduction to Ecological Anthropology (2000) Emilio F. Morgen. Westview Press.
6. Human adaptation & population growth by Kleinman, David S. (1980) New Jersey: Osman & Co.
7. The Human Species: An Introduction to Biological Anthropology. (2007) John Relethford. MC Graw Hill.
8. Anthropology: Understanding Human Adaptation. (1992) Michael C. Howard and Janet Dunaif-Hattis. Harper Collins Publishers, New York.

AN 6201: Osteology, Osteometry and Craniometry Osteology

Practical/ Project

Description and identification of the disarticulated skeleton of man:

1. Skull
2. Mandible
3. Clavicle
4. Scapula
5. Vertebral column
6. Humerus
7. Radius
8. Ulna
9. Carpels
10. Metacarples and Phallanges
11. Os-innominatum
12. Femur
13. Patella
14. Tibia
15. Fibula
16. Tarsal bones
17. Metatarsals and phalanges
 - i. Assessment of sex of skull, Mandible and long bones
 - ii. Assessment of age of skull and Mandible

Osteometry

Measurements on following human bones (To be specified)

1. Femur
2. Tibia
3. Fibula

4. Pelvis
5. Scapula
6. Humerus
7. Radius
8. Ulna
9. Sacrum

Craniometry

Direct (d) and Indirect (i) Measurements to be taken on skull and Lower Jaw:

Skull

i Linear Curvi-Linear Measurements:

1. Maximum Cranial Length (d+i)
2. Maximum Cranial Breadth (d)
3. Maximum Frontal Breadth (d)
4. Maximum Occipital Breadth (d)
5. Least Frontal Breadth (d)
6. Palatal Breadth (d)
7. Palatal Length (d)
8. Maxillo-Alveolar Breadth (d)
9. Facial depth/Prosthion-Basion line (d)
10. Outer Biorbital Breadth/Upper Facial Breadth (d)
11. Inner Biorbital Breadth (d)
12. Bizygomatic Breadth (d)
13. Bimaxillary Breadth (d)
14. Morphological Facial Height (d)
15. Morphological Superior Facial Height (d)
16. Anterior Inter orbital Breadth (d) ,
17. Nasal Height (d)
18. Nasal Breadth (d)

19. Biauricular Breadth (d)
20. Basion-Bregma Length (d + i)
21. Nasion-Inion Line (d+i)
22. Nasion -Lambda Line (d + i)
23. Frontal Chord (d +i)
24. Parietal Chord (d+i)
25. Occipital Chord (d+i)
26. Frontal Perpendicular (i)
27. Parietal Perpendicular (i)
28. Occipital Perpendicular (i)
29. Calvarial Height (i)
30. Lambda Calvarial Height (i),
31. Cranial Valuton Keith's plane.

ii Angles

32. Metopic Angle (d+i)
33. Facial Profile Angle/Total Profile Angle (d + i)
34. Nasal Profile Angle
35. Alveolar Profile Angle (d+i)
36. Profile Angle of Nasal Roof (d+i)
37. Lambda Opisthion Angle/Profile of Occiput (d)
38. Calvarial Base Angle (d + i)
39. Inclination Angle of Occipital Foramen (d+i)
40. Frontal Curvature Angle (i)
41. Parietal Curvature Angle (i)
42. Occipital Curvature Angle (i)
43. Superior Facial Length Angle (i)
44. Bregma Angle of Schwalbe (i)
45. Lambda Angle of Schwalbe (i)
46. Relation of Angles of Superior Facial Triangle (i)

Any other additional measurements may be specified.

II Lower Jaw (Linear measurements and angles)

1. Bicondylar Breadth (d)
2. Bigonial Breadth (d)
3. Height of Ramus (d)
4. Symphyseal Height (d)
5. Minimum Breadth of Ramus (d)
6. Mandibular Angle (d)

**AN 6202: Anthropology of India:
Ethnic and cultural diversity (Physical and Social)**

Theory

Section A

- a. A critical appraisal of contribution of Risley, Guha, Rickstett and Sarkar towards understanding ethnic elements in the Indian populations.
- b. Pre and Proto historic racial elements in India.
- c. Linguistic classification of Indian population.
- d. Recent trends in Indian Population Genetic Studies.
- e. Nutritional problems with reference to women and children in India.

Section B

- a. Introduction to Indian Civilization: Foundations of social life - The origin and evolution of social structures and their underlying philosophies.
- b. Composition of Indian society:, Understanding the diversity in Indian social structure, Culture zones in India.. Social reality – Caste, class, tribe, communal and gender hierarchies – their economic and cultural impact.
- c. Tribes of India : Definitional Issues, Place in Indian Civilization, Classification and distribution; Diversity of social organization . Linkages with other communities, modernizations and ethnicity issues:.
- d. Caste system and its structure. Ritual, economic and social aspects of caste. Relevance of caste in Indian social structure, Changes in the caste system.
- e. Rural and Urban India : Rural Social Structure , Structure and function in the traditional system, urbanization and urban social structure, Changes in Rural and Urban India .

Suggested Literature

1. Bose, N.K. 1961. The Structure of Hindu Society. Delhi Orient Longman .
2. Cohn S. Bernard: 2000. India: The Social Anthropology of Civilization. Delhi: Oxford University Press.
3. Dirks Nicholas. 2001. Castes of Mind: Colonialism and the Making of Modern India. Princeton University Press.
4. Donald S. Lopez, (ed.). 1995. Religions of India in Practice. Princeton University Press
5. Gupta, Dipankar (ed): Social Stratification. Delhi: Oxford University Press.
6. Karve, Irawati 1961. Hindu Society : An Interpretation . Poona : Deccan College
7. Mandelbaum, D.G., 1970. Society in India : Changes and Continuities. Bombay : Popular Prakashan.
8. Srinivas M.N. 2002. Collected Essays : M.N Srinivas. Delhi :Oxford University Press.
9. Srivastava V. K. 1997, Religious Renunciation of a Pastoral people. Delhi : :Oxford University Press

AN 6202: Research methods and techniques-I

Practical/ Project

1. Nature of anthropological research
2. Genealogical method: Construction of Genealogy.
3. Observation: Direct, Indirect, Participant, Non-participant, Controlled
4. Questionnaire and Schedule, Interview- Unstructured, Structured, Key informant interview, Focussed Group Discussion, and Free listing, pile sorting
5. Case study and life history
6. Participatory Methods
7. Project Report: The student shall undertake a project under which they will investigate and interpret a social problem by collecting primary data from the field.

AN 6203: Kinship, Marriage and Family

Theory

- a. Kinship in evolutionary perspective
 - i. Non-human primate social organisation
 - ii. Evolution of human society: band, tribe, chiefdom and state
- b. Kinship, descent and filiation
 - i. Kinship as a cultural principle and social mechanism
 - ii. The principle and structure of descent: unilineal, cognatic and bilateral principle
- c. Kinship nomenclature
 - i. Types of terminology
 - ii. Rules of marriage and kin terms
- d. Meaning, form and regulation of marriage, alliance systems
- e. The family
 - i. Definition and foundation of the family
 - ii. Descent groups and domestic groups
 - iii. Variation in family forms
 - iv. Approaches to the study of family
- f. Kinship, marriage and family in India
 - i. North Indian and South Indian kinship systems
 - ii. Variations from tribal society: Ethnographic accounts.

Suggested Literature

1. Harris, C. C. 1990. Kinship. Concepts in social thought. Minneapolis: University of Minnesota Press.
2. Carsten, Janet. 2004. After kinship. New departures in anthropology. Cambridge, UK: Cambridge University Press.
3. Lévi-Strauss, Claude. 1969. The elementary structures of kinship. Boston: Beacon Press.
4. Goody, Jack, and Meyer Fortes. 1973. The Character of kinship. Cambridge [Eng.]: University Press.
5. Trautmann, Thomas R. 1981. Dravidian kinship. Cambridge studies in social anthropology. Cambridge [Eng.]: Cambridge University Press.
6. Radcliffe-Brown, A. R., and Cyril Daryll Forde. 1950. African systems of kinship and marriage. London: Published for the International African Institute by the Oxford University Press.

7. Farber, Bernard. 1966. Kinship and family organization. New York: Wiley.
8. Barnes, J. A. 1971. Three styles in the study of kinship. Berkeley: University of California Press.
9. Karve, Irawati. 1968. Kinship organization in India. London: Asia Publ. House.

AN 6203: Research methods and techniques-II

Practical/ Project

1. An Introduction to bio-statistic.
2. Presentation and summarization of data, types of variables and data presentation (tabulation, illustration).
3. Descriptive statistics.
 - i. Measurers of Central Tendency
 - ii. Measure of Variation, Skewness and Kurtosis.
 - iii. Variance and standard deviation.
 - iv. Normal and binomial distribution.
4. Correlation
5. Regression Analysis
6. Tests of Inference
 - i. Variance ratio test
 - ii. Student's 't' tests
 - iii. Chi-square test and measures of association
 - iv. Estimation of confidence interval
 - v. Study design issues: Sample size and Power
7. Analysis of variance
8. Importance and implication of Pedigree Analysis.

Note: A student will be required to construct 5 pedigrees for understanding inheritability or variability of some specific, characteristics of a population problems.

AN 6204: Human Ecology: Biological & Cultural Dimensions

Theory

Biological Dimensions

- a. Concepts in Ecology: Definition, ecosensitivity adaptation, acclimation, acclimatization, biotic and abiotic component.
- b. Methods of studying human ecology.
- c. Adaptation to various ecological stressors.
- d. Ecological rules and their applicability to human populations.
- e. Impact of urbanization and industrialization on Man.

Suggested Literature

1. Human ecology: biocultural adaptation in human communities. (2006) Schutkowski, H. Berlin:Springer Verlag.
2. Human ecology and cognitive style: comparative studies in cultural and physical adaptation. (1976). Berry, J.B. New York: John Wiley.
3. Human ecology. (1964) Stapledon. Faber & Faber.
4. Studies in Human Ecology. (1961) Theodorson, G.A. Row, Peterson & Company Elmsford, New York.
5. Human ecology: (1973) Problems and Solutions. Paul R. Ehrlich, Anne H. Ehrlich and John P. Holdress. W.H. Freeman & Company, San Francisco.

Cultural Dimensions

- (a) Culture as a tool of adaptation
- (b) Various modes of human adaptation in pre-state societies-
 - i. hunting and food gathering
 - ii. pastoralism
 - iii. shifting cultivation
- (c) Ecological themes of state formation
 - i. Neolithic revolution
 - ii. Hydraulic civilization
- (d) Agriculture and peasantry
- (e) Industrial civilization and growth of urban societies

Suggested Literature

1. Cohen, Yehudi A. 1968. *Man in adaptation; the cultural present*. Chicago: Aldine Pub. Co.
2. Redfield, Robert. 1965. *Peasant society and culture an anthropological approach to civilization*. Chicago [u.a.]: Univ. of Chicago Press.
3. Wittfogel, Karl August. 1957. *Oriental despotism; a comparative study of total power*. New Haven: Yale University Press.
4. Symposium on Man the Hunter, Richard B. Lee, and Irven DeVore. 1969. *Man the hunter*. Chicago: Aldine Pub. Co.

AN 6204: Human Ecology: Biological & Cultural Dimensions

Practical/ Project

Biological Dimensions

Size and Shape Measurements

1. Stature
2. Sitting Height
3. Body Weight
4. Total Upper Extremity Length
5. Total Lower Extremity Length
6. Nasal Breadth
7. Nasal Height

Size and Shape Indices

1. Body Mass Index
2. Ponderal Index
3. Relative Sitting Height
4. Relative Upper Extremity Length
5. Relative Total Lower Extremity Length
6. Nasal Index

Cultural Dimensions

1. Make a research design pertaining to any environmental problem and do a project based on it.

AN 6301: Paleoanthropology

Theory

- a. Terminological taxonomic and chronological problems of fossils. Dating methods. Geological Time Scale. Taphonomy and fossilization.
- b. Principles and processes of evolution. Formation of new population and species. Methods of studying human evolution.
- c. Early primate evolution, Adaptive primate radiation, differential rate of somatic evolution.
- d. Ramapithecus: Phylogenetic & Taxonomic status.
- e. The evolution of early hominids: Distribution, Characteristics, life ways and phylogenetic status.
 - i. Australopithecines
 - ii. Homo habilis
 - iii. Homo erectus
- f. Early Homo sapiens (Fontchevade, Shiring dorf, Karapina, Saccopastore)
Homo sapiens neanderthalensis
Homo sapiens sapiens (Upper Palaeolithic men - Grimaldi, Cromagnon and Chancelade).
- g. Hominization Process: Evolution of hominid-human bipedalism.
- h. Palaeodemography- skeletal analysis and determination of demographic variables in prehistoric populations and post-neolithic population growth.
- i. Palaeopathology- The dispersion of modern humans - molecular and morphological patterns of relationship.
- j. On going evolution in man : are we still evolving?

Suggested Literature

1. Human Evolution: Trails from the past: (2007) Camilo J. Cela-conde and Francisco J. Ayala Oxford University Press.
2. Human Origin: The fossil Record (1998) Clark Spencer Larsen, R.M. Matter, Daniel.L. Gebo. Waveland Press.
3. Bone, Stones and Molecules: "Out of Africa" and Human Origins. (2004) David W. Cameron and Colin P. Groves- Elsevier Inc.

AN 6301: Paleoanthropology

Practical/ Project

1. Comparative primate Osteology
2. Description and identification of the disarticulated skeleton of non-human primates (to be specified)
3. Identification and description of fossil casts; Excursion to a site for seven days for collection of fossil material and its record (not exceeding 5 pages)

AN 6302: Human Growth, Development and Nutrition.

Theory

- a. Definition and concepts of growth, differentiation, maturation and development. Evolution of Human Growth: Human Lifespan development process, Human Life Cycle.
- b. Major stages of human growth and development - Prenatal growth, Postnatal growth and their characteristics
- c. Factors affecting growth : Genetic and Environmental: secular trends , adaptation of growth rates to environmental stresses. Methods of studying Human Growth.
- d. Measurement and Assessment of Human growth: Changing Human Growth Patterns, Human Growth Curves of different body parts and tissues, Catch-Up Growth, maturation, growth references and standards. Abnormal Growth.
- e. Segmental growth and development; analysis of Human physique and body composition – Sheldon, Parnell, Heath -Carter methods of somatotyping.
- f. Significance of age in growth studies: Methods of assessing age-chronological age, dental age, skeletal age, secondary sex character age, morphological age, age-grouping. Decimal age calander
- g. Body Composition: Methods of study, changes during growth, variation and covariates.
- h. Nutritional status: assessment and methods of evaluation. Concept of balanced diet.
- i. Nutritional epidemiology, impact of malnutrition under-nutrition and over-nutrition.

Suggested Literature

1. Growth, maturation & physical activity (2004) Malina, Robert M; Bouchard, Claude, Bar-Or, Oded. Human Kinetics.
2. Human growth and development by Cameron Noel (2002). St. Louis, Academic Press.
3. Patterns of human growth by Bogin, Barry (1999). Cambridge University Press.
4. Human biology: An introduction to human evolution, variation, growth & adaptability by Harrison, GA; Tanner, JM; Pilbeam, DR; Baker PT (1988). Oxford, England, Oxford University Press.
5. Proceeding on Human Physical Growth and Maturation by eds. Johnson, FE, Roche, AF, Susanne, C, (1980). Plenum Publishing Corporation.
6. Applied body Compositon Assessment (2009) Heyward, VH; Wagner DR. Human Kinetic.

AN 6302: Human Growth

Practical/ Project

I Size and Shape measurements

1. Standing Height Vertex
2. Sitting Height Vertex
3. Body weight
4. Total Right Upper Extremity Length (Direct & Indirect)
5. Total Right Lower Extremity Length (K-quotient method)
6. Right Upper Arm Length (Direct & Indirect).
7. Right Fore Arm Length (Direct & Indirect)
8. Right Hand Breadth
9. Right Hand Length
10. Right Foot Length
11. Right Foot Breadth
12. Biacromial Breadth
13. Bicristal Breadth
14. Chest Breadth (Transverse)
15. Chest Depth (Sagittal)
16. Chest Girth (Inspiration, Expiration, Normal)
17. Minimum Waist Girth
18. Head Circumference
19. Mid. Upper Arm Girth
20. Maximum Calf Girth
21. Skinfold at Triceps
22. Skinfold at Biceps

II Shape Growth Ratios

23. Relative Sitting Height vertex
24. Relative Right Total Upper Extremity Length
25. Relative Right Total Lower Extremity Length

26. Relative Right Fore Arm Length
27. Relative Right Hand Length
28. Relative Biacromial Breadth
29. Relative Bicristal Breadth
30. Relative Head and Face Segment
31. Relative Head and Neck Segment
32. Relative Height Gnathion
33. Relative Height Cervicale
34. Relative Right Upper arm length
35. Cephalic Index
36. Nasal Index

AN 6303: Human Population Genetics

Theory

- a. Mendelian populations, concept of Hardy-Weinberg equilibrium, Testing equilibrium and measuring departure from it. Application of H-W law in human population genetics.
- b. Measurers of Genetic diversity and tool used for Phylogenetic analysis.
- c. Genetic polymorphism- basic concept of transient and balanced polymorphism. Natural selection, Darwinian fitness, selection relaxation, selection leading to change in gene frequency, and selection leading to change in genetic equilibrium.
- d. Models explaining the maintenance of genetic polymorphism (Relationship between sickle cell and malaria, other polymorphism and adaptation to malaria, X-linked polymorphism, selection due to infectious diseases and its association with blood groups and other polymorphism).
- e. Haemoglobin polymorphism, thalassaemia and abnormalities of polypeptide chains.
- f. Genetic isolates- Formation and disintegration. Mutation rate, Dynamics of genetic drift, mutation, selection and gene flow/ migration
- g. Consanguinity and inbreeding – (definitions and concept) Genetic consequences of inbreeding in human population, inbreeding coefficient and genetic load. Magnitude of consanguineous marriages in India and World over.

Suggested Literature

1. Principles of Population Genetics Daniel Hartl & A.G. Clark (1997) Sinauer Associates, Inc.
2. Principles of Genetics Peter Snustad and M. J. Simmons (2006). John Wiley and Sons, Hoboken, NJ.
3. Genetics : A Conceptual Approach Benjamin Pierce (2003). W. H. Freeman & Company.
4. A Primer of Population Genetics Daniel Hartl (1999) Sinauer Associates, Inc.
5. The genetics of Human Population Cavalli – S. Ferza and Bodmer (1976) Freeman, San Francisco.

AN 6303: Serology, PTC, Colour Blindness, Dermatoglyphics

Practical/ Project

1. Blood Group
 - i Blood Typing-Detection of complete and incomplete antibodies with reference to Rh (including subgroups), MNSs, Kell, and Lewis blood group systems.
 - ii Detection of secretion of antigens in saliva-ABH and Lewis antigen secretion.
2. ABO (Subgroups), MN and Rh Blood group Systems
3. PTC
4. Colour Blindness
5. Dermatoglyphics
 - i. Finger Print
 - ii. Palmer Print
 - iii. Planter Print

AN 6304: Biostatistics and Computational Anthropology (Interdisciplinary)

Theory

- a. Introduction to Basic Components of Computers
- b. Concepts of Hardware
- c. Concept and Application of Software – Introduction to MS-Office (MS-Word, MS-Excel, MS-Powepoint)
- d. Basic knowledge of softwares applied in anthropological data like demography and genetic data. (Eg.- SPSS, POPGENE, PHYLIP, DISPAN, HAPLOPOP, LD)
- e. Concepts of Primary and Secondary data
- f. Various types of representation of population data (tabular, graphical)
- g. Basic concepts like Hypothesis, Probability, Variance, Test of significance (one-way & two-way), Confidence intervals, Odds ratio.
- h. Introduction to various sites on internet like NCBI, EMBO; sequence alignment-BLAST, FASTA, Primer designing, Polymerase Chain Reaction (PCR)
- i. Data Mining

Suggested Literature

1. Biostatistical Analysis 4th Edition (1999) Jerrold Pearson Education.
2. Anthropological Genetics: Theory, Methods and Applications (2006) Crawford; Cambridge University Press.
3. Bioinformatics for Geneticists: A Bioinformatics Primer for the analysis of Genetic Data (2007) Michael R. Barnes; Wiley.
4. Statistical Genetics: Gene Mapping Through Linkage and Association (2008) Benjamin M. Neale Eds. Manual AR. Ferreira, Sarah T. Medland, Danielle Posthuma; Taylor & Francis.
5. Principles of Biostatistics, Pagano M., Gauvreau, K, (2000), Duxbury Press, USA.
6. Bioinformatics for Dummies, Claverie J. M., Notredame C., (2nd Ed., 2007), Wiley Publishing, Inc., New York, USA.

AN 6304: Biostatistics and Computational Anthropology (Interdisciplinary)

Practical/ Project

1. MS-Office
2. Statistical Package for Social Sciences (SPSS)
3. Application of softwares for analyzing anthropological data (POPGENE, PHYLIP, DISPAN, HAPLOPOP, LD)

AN 6305: Anthropological Theory-I

Theory

- a. Emergence of anthropological theory- The philosophical foundations.
- b. Colonialism and its impact on anthropological theory : concept of primitive, evolution, function and diffusion, culture contact and development.
- c. Post-colonial critiques.
- d. Marxism and Neo-Marxian Trends.
- e. Phenomenology:

Suggested Literature

1. Voget, Fred W. 1975. *A history of ethnology*. New York: Holt, Rinehart and Winston.
2. Leaf, Murray J. 1979. *Man, mind, and science: a history of anthropology*. New York: Columbia University Press.
3. Leaf, Murray J., and Bernard Grant Campbell. 1974. *Frontiers of anthropology; an introduction to anthropological thinking*. New York: Van Nostrand.
4. Applebaum, Herbert A. 1987. *Perspectives in cultural anthropology*. Albany: State University of New York Press.
5. Bloch, Maurice. 1983. *Marxism and anthropology: the history of a relationship*. Marxist introductions. Oxford [Oxfordshire]: Clarendon Press.
6. Evans-Pritchard, E. E., and André Singer. 1981. *A history of anthropological thought*. New York: Basic Books.

AN 6305: Practical based on Anthropological theory Part1

Practical/ Project

1. Preparing research tools adequate for doing the following kind of research
 1. Functional studies
 2. Village and community studies
 3. Historical studies
2. Making a research proposal and doing an independent project on any of the above areas
3. Preparing bibliography and list of references for the project

AN 6306: Anthropological Theory- II

Theory

- a. Structuralism: Structural analysis of symbols, myth and totemism (Claude Levi- Strauss and E.R.Leach)
- b. New Ethnography and Semantic analysis
- c. Interpretive and hermeneutical approach (Clifford Geertz)
- d. Post-structuralism and post-modernism: Theories and trends (M. Foucault, P. Bourdieu)
- e. Globalization and its impact
- f. Contemporary social anthropology: its foci and concerns

Suggested Literature

1. Lévi-Strauss, Claude. 1963. Structural anthropology. New York: Basic Books.
2. Leach, Edmund, Stephen Hugh-Jones, and James Laidlaw. 2000. The essential Edmund Leach. Vol. 1, Anthropology and society. New Haven [Conn.]: Yale University Press.
3. Leach, Edmund, Stephen Hugh-Jones, and James Laidlaw. 2000. The essential Edmund Leach. Vol. 2, Culture and human nature. New Haven [Conn.]: Yale University Press.
4. Leach, Edmund. 1985. Culture & [and] communication: the logic by which symbols are connected ; an introduction to the use of structuralist analysis in social anthropology. Themes in the social sciences. Cambridge: Cambridge Univ. Press.
5. Geertz, Clifford. 2001. The interpretation of cultures: selected essays. New York, N.Y.: BasicBooks.
6. Foucault, Michel. 1992. The order of things: an archeology of the human sciences. London: Routledge.
7. Bourdieu, Pierre. 1977. Outline of a theory of practice. Cambridge studies in social anthropology, 16. Cambridge [England]: Cambridge University Press.
8. Ina, Jonathan Xavier, and Renato Rosaldo. 2002. The anthropology of globalization: a reader. Blackwell readers in anthropology, 1. Malden, Mass: Blackwell Publishers.
9. Ahmed, Akbar S., and Cris Shore. 1995. The future of anthropology: its relevance to the contemporary world. London: Athlone.

AN 6306: Practical based on Anthropological Theory Part 2

Practical/ Project

1. Preparing research tools adequate for the following types of research
 1. Structural studies such as of myths and rituals
 2. Multi-sited research
 3. Studying complex and multicultural situations
2. Preparing a research proposal and doing an independent study on any of the above areas.
3. Preparing a bibliography and list of references for the project.

AN 6307: Epistemological Foundations of Social and Behaviour Sciences (Interdisciplinary)

Theory

- a. Introduction to social research: The process, conceptualization and measurement
- b. Theoretical and epistemological foundation of research
- c. Preparation of research projects
- d. Survey research: Data analysis and presentation of research
- e. Qualitative research: Analysis of textual data and presentation
- f. Writing up qualitative research
- g. Evaluative research
- h. Critics, politics and ethics of social research

Suggested Literature

1. Research methods in cultural anthropology H. R. Bernard (1988).Sage.
2. Research Methods in Anthropology Qualitative and Quantative approaches: H. R. Bernard, (2006).Rowman and Lillerfield Publication.
3. Participant Observation J. P. Sproldley & K. Baker Holt Rinehart and Winston New York. (1980).
4. Cross-Cultural Research Methods. R. W. Brislin, W. J. Conner, R. M. Thorndike. John Willey and Sons.
5. Research Practices in the Study of Kinship. A. Barnard & A. Good. (1984). Academic Press.
6. Methodology and Fieldwork. V. K. Srivastava Oxford University Press (1994).
7. Research Methods in Anthropology. H. Russel and H. Russel. Alta Mira Press.
8. Case Study Research Design and Methods R. K. Yin Sage, (2008).
9. Reliability and Validity in Qualitative Research. J. Krik and M. L. Miller. Sage (1986).
10. Quantitative Inquiry and Research Design : Choosing among five traditions. J. W. Creswell. Sage. (1998).
11. Quantitative Research and Evaluation Methods Patton. Sage (2002).
12. Handbook of Research Design & Social Measurement. D.C. Miller & N. J. Salkind. (2002) Sage.

AN 6307: Research Methods

Practical/ Project

Student will be required to design two research proposal based on qualitative and quantities methods respectively. They will then collect appropriate data, analysis the data and write the report based on their findings.

1. Making a research design on any problem related to the social or behavioural fields.
2. Construct statistical tools to study any social problem.
3. Make a bibliography of the research project and write a research report based on research design.
4. Indicate ethical and critical problems you are likely to face in conducting this research.

AN 6308: Religion and Symbolism

Theory

- a. Concept of Sacred: Evolution of anthropological theories to explain the sacred and its relevance in human societies: Edward Tylor, James Frazer Herbert Spencer, Rudolph Otto, Emile Durkheim, B. Malinowski , A.R. Radcliffe-Brown , M.N. Srinivas , Melford Spiro
- b. Sacred Symbols: E.E. Evans Pritchard, Sherry Ortner, Clifford Geertz, Mary Douglas , Victor turner
- c. Rituals: Functions: Durkheim and Radcliffe Brown , Max Gluckmann, Roy Rappaport
- d. Ritual s: Symbolism and Meaning, Van Gennep, Edmund Leach, Marshall Sahlins, and Clifford Geertz.
- e. Religious Specialists : Shamans, Priests, Yogis, Mystics.
- f. Witchcraft and Magic: Traditional and Modern.

Suggested Literature

1. A Reader in Comparative Religion by Lessa and Vogt (4th ed) New York, Harper And Row (1979)
2. A Reader in the Anthropology of Religion (ed) Michael Lambeck, Malden, Blackwell (2002)
3. Dimensions of the Sacred: An Anatomy of World's Beliefs by Ninian Smart, C.A. University of California Press (1998)
4. Elementary Forms of religious Life by Emile Durkheim, Tr. Karen E Fields, New York, Free Press (1995) reprint.
5. The Ritual Process: Structure and Anti-Structure by Victor Turner, Aldine , Chicago(1969)
6. Natural Symbols: Explorations in Cosmology by Mary Douglas,1996(reprint) By Routledge
7. Rites of Passage by Arnold Van Gennep (1960 Tr. Reprint) University of Chicago Press
8. Negara: The Theatre State by Clifford Geertz, 1980, Princeton University Press

AN 6308: Religion and Symbolism

Practical

1. Make a research design to do a study on any aspect of religion
2. Do a critical book review of any book on religion
3. Prepare an annotated bibliography on any topic in religion and symbolism

AN 6401: Dissertation based on fieldwork at 2-3 weeks duration.

AN 7101: Physiological Anthropology

Theory

- a. Fundamentals of Work Physiology: Cardio-vascular and respiratory endurance, haemodynamics and exercise (blood pressure, pulse rate, heart rate and oxygen-transporting system, blood flow, Hb, haematocrit etc)
- b. Physical working capacity and physical fitness methodology: evaluation of response and adaptation of the body to stress of exercise.
- c. Variations in respiratory functions with age, sex and environment; Interrelationship of body measurements with respiratory functions.
- d. Impact of smoking, alcohol, air pollution and occupation on cardio-respiratory functions.
- e. Physical performance and environmental stress: heat stress, cold stress and high altitude, chronic diseases, malnutrition.
- f. Regulation of body weight: energy expenditure and physical activity. Body composition: methods of assessment, environmental and genetic contribution to obesity, treatment and prevention and management. Obesity and ethnicity.
- g. Global prevalence and secular trends in obesity: regulation of body weight- energy expenditure and physical activity.
- h. Ageing and health related aspects of exercise. Health and fitness

Suggested Literature

1. Human Physiology: From Cells to Systems by Sherwood, Lauralee (2008). Brooks Cole.
2. Variations in Human Physiology by Case, RM, Ed (1985). Manchester University Press.
3. Principles of Human Physiology by Eds. Davson, Hugh, Eggleton, M Grace. Lea & Febiger 1968.
4. Human Physiology: The Mechanisms of Body Functions by Vander, Arthur J; Sherman, James H; Luciano, Dorothy (1978) Mc Graw-Hill Education.
5. Practical workbook of Human Physiology by Nageswari, K Sri; Sharma Rajeev (2006). Jaypee Brothers Medical Publisher.
6. Exercise Physiology by Tudor Hale (2003). John Wiley & Sons Inc, England.

AN 7101: Physiological Anthropology

Practical/ Project

1. Blood pressure
2. Heart rate/pulse rate
3. Minute ventilation
4. Respiratory rate
5. Tidal volume
6. Vital capacity/forced vital capacity
7. Timed Expiratory volumes
8. Maximal voluntary ventilation
9. Haemoglobin estimation

AN 7102: Kinanthropometry and Ergonomics

Theory

- a. Man-Machine relationship and operational designing : and its relationship with human factors.
- b. Applied ergonomics: Designing and safety, Ergonomics, work and health
- c. Anthropology of sports: Physical conditioning, Training-Techniques and Physiological effects, Body composition and Athletes, Nutrition, doping and performance.
- d. Environmental effects on physical performance: Effect of heat stress, cold stress and high altitude on physiological response and performance.
- e. Physical performance tests
- f. Disability ageing and inclusive design.
- g. Physical Activity and Health.

Suggested Literature

1. Applied Bio-mechanics concepts & connections (2008) John Mclester; Peter St. Pierre. Wadsworth Publishing Co.
2. Ergonomics man in his working environment by Murrell, KFH (1965) London; Chapman & Hall.
3. Ergonomics Glossary: Terms Commonly used in Ergonomics by North, K; Stepheton, C; Vogt, Chantal (1982). Published for the Bureau of information and co-ordination of community ergonomics action of the European Coal and Steel Community by Bohn, Scheltema & Holkema (Utrecht).

AN 7102: Kinanthropometry and Ergonomics

Practical/ Project

1. Rapid Fitness Index
2. VO_2 submax
3. Treadmill test/Bicycle ergometer
4. Physical performance test
 - i Pull ups
 - ii Sit ups
 - iii Shuttle run
5. Operation Designing Measurements

AN 7103: Biochemical Genetics

Theory

- a. Genetical variation and polymorphism of human red cell enzymes with special reference to G-6PD, PGM, ADA, APOE, Aldehyde dehydrogenase, MTHFR.
- b. Serum proteins: Genetic variability, synthesis and physiological role of Haptoglobins, Transferrins, and Immunoglobulins. Immunology & Reproduction.
- c. Haemoglobins: Normal and abnormal Structural variation and Inheritance of with special reference to HbA, HbF, HbS, HbA2, HbC, HbD and HbE, Thalassaemia.
- d. Inborn errors of metabolism: Biochemical pathways and inheritance of PKU, Alkaptonuria, Galactosaemia, Albinism and Lysch-Nyhan Syndrome, hyperchomocysteis.
- e. Tools for biochemical analysis: Types of electrophoresis. Isoelectric focusing, ELISA, HPLC.

Suggested Literature

1. L.L. Cavalli-sforza, P Menozzi, A Piazza (1994). History and Geography of Human Genes. Princeton University.
2. Blau, N., Duran, M. and Gibson, M.K. (Eds) Laboratory Guide to the Methods in Biochemical Genetics. 2008, Springer, Berlin.
3. Shapira, E., Miller, JB and Blitzer, MG. Biochemical Genetics. 1989, Oxford University Press, USA
4. Hommes, FA (Ed) Techniques in Diagnostic Human Biochemical Genetics: A Laboratory Manual 1991. Wiley-Liss, New York.
5. Harris, H. Principles of Human Biochemical Genetics. 1976, North- Holland Publication Company, Amsterdam.
6. Brock, DJH and Mayo, O. (Eds) The Biochemical Genetics Of Man. 1972. Academic Press, London.
7. Giblett, ER. Genetic Markers in Human Blood. 1969, Blackwell Scietific, Oxford.
8. Prokop, O and Uhlenbruck, HB. Human Blood and Serum Groups. 1969. Wiley Interscience, New York.
9. Hames, BD and Rickwood, D (Eds) Gel Electrophoresis of Proteins. 2002. IRL Press, Oxford.

AN 7103: Biochemical Genetics

Practical/ Project

1. G6PD-deficiency states.
2. Hb -Qualitative and Quantitative analysis
3. Plasma Proteins- Hp, Tf, C'3 and albumin by Electroresis.
4. PGM typing.

AN 7104: Molecular Anthropology

Theory

- a. Nature and scope of Molecular anthropology.
- b. Molecular Marker technology.
- c. The nature and structure of the human genome and its diversity. Genomic complexity as illustrated by the genetic basis for immune response. Molecular evolution, human genetic diversity and the genetic basis of human evolution. Molecular Genetic basis of common complex diseases. Cancer, diabetes and cardiovascular diseases.
- d. Gene environment interaction. Molecular genetics of complex disorder like CVD, diabetes, cancer, and the role of Anthropology.
- e. Molecular Phylogenetics: The history of molecular phylogenetics. Applications to anthropology, Phylogeny: Phylogeography: Population Structure and Gene Flow
- f. Use of common software in Molecular Anthropology.
- g. Some importance software for Molecular Anthropology, Data Analysis like DISPAN, POPGENE, ARLIQUENE, Sequence editing tool.
- h. Forensic Applications: Identity and Non-Identity, Paternity, Gender Determination.
- i. Speciation and Hybridization: Mitochondrial Eve versus the Multiregional Hypothesis
- j. MacroEvolution and Speciation
- k. mtDNA , Y chromosome and the Peöpling. Migrations of Modern Humans
- l. Ancient DNA and Molecular Archaeology.
- m. Various methods of mutation detection, contribution in linkage and association.
- n. Human Genome Diversity initiation in global perspective with special reference to India.

Suggested Literature

- 1 Jobling, MA Hurler, M and Tyler-Smith, C. Human Evolutionary Genetics, Origins, Peoples and Disease. 2004, Garland Science, New York.
- 2 Kresina, TF. (Ed) An Introduction to Molecular Medicine and Gene Therapy. 2001, Wiley-Riss, New York.
- 3 Reece, RJ. Analysis of Genes and Genomes. 2004, John Wiley and Sons Ltd, England.
- 4 Strachan, T and Read, AP. Human Molecular Genetics. 2003. Garland Publishing Inc, New York
- 5 Li, WH. Molecular Evolution. 1997, Sinauer Associates Inc, Sunderland, MA.

- 6 Page, DM and Holmes, EC. *Molecular Evolution: A Phylogenetic Approach*. 1998, Blackwell, Oxford.
- 7 Nei, M. *Molecular Evolutionary Genetics*. 1987, Columbia University Press, New York.
- 8 Chakraborty, R *Gene Admixture in Human Populations; Models and Predictions*. 1986, *Yearbook of Physical Anthropology*, 29: 1-43.
- 9 Malcolm, S. and Goodship, J (Eds) *Genotype to Phenotype*. 2001, BIOS Scientific Publications Ltd., Oxford.
- 10 Nesse, RM and Williams, GC. *Why We Get Sick: The New Science Of Darwinian Medicine*. 1994, Wintage, New York.
- 11 Reed, A and Donnai, D. *New Clinical Genetic*, 2007. Scion Publishing Ltd., Oxfordshire, UK.
- 12 Griffiths, AJF., Gelbart, WH , Lewontin, RC. And Miller, JH. *Modern Genetic Analysis*. 1999, WH Freeman, Newyork.
- 13 Ott, J. *Analysis of Human Genetic Linkage*. 1999. Johns Hopkins University Press, Baltimore.
- 14 Templeton, AR. *Population Genetics and Microevolutionary Theory*. 2006, Wiley Liss, New York.
- 15 Palsson, G. *Anthropology and the New Genetics*. 2007, Cambridge University Press, Cambridge.
- 16 Xuhua, X. *Data Analysis in Molecular Biology and Evolution*. 2002, Kluwer Academic Publishers, New York.
- 17 Rob, E. and Roger, M. (Eds) *Molecular Diagnosis of Genetic Diseases*. 1996. Humana Press, USA

AN 7104: Molecular Anthropology

Practical/ Project

Collection of Biological samples (blood). Extraction of DNA from blood

1. PCR amplification
2. Restriction enzyme digestion
3. Allele specific PCR.
4. Documentation of Result in Gel documentation system.
5. Molecular data analysis using DISPAN.
6. Phylogentic analysis (Dendogram).

AN 7105: Dermatoglyphics

Theory

- a. Early history & development of Dermatoglyphics; Development of ridges
- b. Identification of various finger prints, Technique of taking prints.
- c. Topography of finger prints
- d. Study of mid phalangeal patterns
- e. Mode of Inheritance of Finger prints
- f. Study of Palm prints. Main Line formula, Palmer formula, Main Line Index and Transversality, Mode of Inheritance of Main Lines D, C, B & A and the Patterns on the configurational areas of Palm.
- g. Identification of the Toe Prints, Mode of Inheritance, Typology.
- h. Study of Sole Prints, Main Line Formula, Pattern Formula, Main Line Index and Transversality; Mode of Inheritance of patterns on the configurational areas of plantar surface.
- i. Practical applicability of Dermatoglyphics in relation to congenital malformation.
- j. Dermatoglyphics in relation to Chromosomal aberrations
- k. Finger Print classification-Primary, Secondary, Major, Sub-secondary, Second sub-secondary, Final and Key.
- l. Uses of Dermatoglyphics in Paternity Disputes -Recent trends in Dermatoglyphics
- m. Discriminant analysis of finger patterns
- n. Flexion creases
- o. Comparative dermatoglyphics & Population Variations.

Suggested Literature

1. Fingerprints, Palms and Soles- An Introduction to Dermatoglyphics. Harold Cummins and Charles Midlo. (1961) Dover Publications
2. Fingerprints. Francis Galton. MacMillan and Co., London. (1895), Paper Back June 2008.

AN 7105: Dermatoglyphics

Practical/ Project

Collection and analysis of 50 individuals' dermal prints.

1. Identification of pattern types: Arch, Loop, Whorl and Composites.
2. Ridge counting : procedure and applicability.
3. Calculation of various indices.
4. Taking of palmer prints, identification of palmar main lines, calculation of main line formula, main line index.
5. Identification of patterns in different palmer configurational areas.
6. Position of axial triradii.
7. Importance of atd angle.
8. Use of statistical techniques in the analysis of finger and palmer print data.

AN 7106. Primate Behaviour Theory

- a. Evolution of Behaviour
- b. Behaviour taxonomy: hierarchical, associative and sexual
- c. Patterns of social behaviour
- d. Field and laboratory studies
- e. Leadership: inter and intra group encounters
- f. Dominance
- g. Aggression
- h. Primate Societies

Suggested Literature

1. Primate Behavioral Ecology (3rd edition). Karen B. Strier. (2006) Allyn and Bacon
2. Kinship and Behaviour in Primates. (2004) Bernard Chapais and Carol M. Berman. Oxford University Press.
3. Primate Paradigms: Sex Roles and Social Bonds, (1992) Linda Marie Fedigan. University of Chicago Press.
4. The Primate Anthology: Essays on Primate Behaviour, Ecology and conservation from National History. (1997) Russell L. Ciohon and Richard A. Nisbett. Prentice Hall.

AN 7106: Primate Behaviour

Practical/ Practical

1. Field studies on mother-infant relationship, social structure, population dynamics of the non-human primates.
2. 7 Day's visit to a non-human primate population living in the natural habitat.

AN 7107: Primate Biology

Theory

- a. Aim and scope of evolutionary biology with special reference to nonhuman primates.
- b. Trends in early primate radiation-dentition, postural modifications with special reference to shoulder girdle, pelvic girdle, limbs, hand and foot.
- c. Population genetics of nonhuman primates.
- d. Cladistic: relationships and molecular evolution of primates: Serological aspects
Amino acid sequences
Immunochemical studies
Proteins
Chromosomal aspects
DNA
- e. Socioecology and population dynamics of nonhuman primates.
- f. Communication: patterns, signals, display and vocalization
- g. Use of nonhuman primates in biomedical research
- h. Breeding and husbandary of non-human primates: Conservation of nonhuman primates.

Suggested Literature

9. The functional and Evolutionary Biology of Primates (2007) Russell Tuttle. Aldine Transaction.
10. Major topics in Primate and Human Evolution (2009) B.A. Wood Eds. L.B.Martin, Peter Andrews. Cambridge University Press
11. Primate Anatomy: An Introduction (2007) Friderun Ankel-Simons, Academic Press.
12. Primate Adaptation & Evolution (1998) John G. Fleagle, Academic Press
13. Primate and Human Evolution (Cambridge Studies in Biological Anthropology)(2006) Cambridge University Press

AN 7107: Primate Biology

Practical/ Project

1. Electrophoretic assays of serum proteins and red cell enzymes in nonhuman primates
2. Immunodiffusion
3. Preparation and identification of nonhuman primate chromosomes
4. Osteology, craniometry and osteometry of primate bones Blood groups and dermatoglyphics of nonhuman primates.

AN 7108: Statistical Methods in Biological Anthropology

Theory

- a. Development and importance of statistical methods in Biological Anthropology.
- b. Formation of a research design on a specific problem.
- c. Definition and identification of universe, units and methods of sampling, variables, frequency, percentages and ratios. Graphical representation of frequency curves.
- d. Measures of Central tendency and dispersion.
- e. Concept of probability-properties and uses. Types of distribution.
- f. Tests of significance: t-test, χ^2 test, F-test, etc.
- g. Analysis of variance; one-way, two-way, multiple.
- h. Correlation: linear and non-linear tests of significance Z-test, multiple and partial correlation and regression. Statistical inference and anthropological interpretation.
- i. Knowledge of computer: various computer programmes: to be specified.
- j. Role model studies in Biological Anthropology - Robert's Schalls & Haris' Kirks, Dangers, Gaddis, etc.

Suggested Literature

1. Statistical Research Methods in Life Sciences. (1997) P. V. Rao. Duxbury Press.
2. Statistics for Anthropology (1998). Lorena Madrigal. Cambridge University Press.

AN 7108: Statistical Methods in Biological Anthropology

Practical/ Project

Measures of Central tendency and dispersion, test of significance, Analysis of variance and correlation based on hypothetical data.

1. Odds ratios and confidence intervals.
2. The use of various statistical software like SPSS, Stata, Statistica etc for data entry and analysis of biological epidemiological and clinical data.

AN 7201: Psychological Anthropology

Theory

- a. The basis of human behaviour- Cultural, psychological and biological
- b. The relationships of anthropology, psychology, psycho-analysis and psychological anthropology
- c. Culture and child-rearing practices- infancy, childhood and puberty (comparative and cross cultural)
- d. Socialization and personality formation
- e. Culture and personality
 - i. Modal personality
 - ii. Psychopathology
 - iii. Adult personality: Assessment, inferential and direct
- f. National character studies
- g. Perception and cognition
 - i. Perception- culture and biology
 - ii. Colour vocabularies and colour vision
 - iii. Perception and personality
 - iv. Sensotypes
 - v. Case studies of cognition
- h. Culturally stimulated altered state of consciousness
 - i. Ritual
 - ii. Possession
 - iii. Trance
 - iv. Mythology
- i. Recent trends in psychological anthropology

Suggested Literature

1. Psychological anthropology Benedict, Ruth.(1946) *The Chrysanthemum and the Sword: Patterns of Japanese Culture*. New York: New American Library.
2. Erika Bourguignon (1979) *Psychological Anthropology : An Introduction to Human Nature and Cultural Differences*. New York : Holt, Rinehart and Winston.

3. Imgham J. M. (1996) *Psychological Anthropology Reconsidered*. Cambridge: Cambridge University Press
4. Schwartz, Theodore, Geoffrey M. White and Catherine A. Lutz, eds. (1992) *New Directions in Psychological Anthropology*. Cambridge: Cambridge University Press.
5. Shweder, Richard A. and Robert A. LeVine, eds. (1984) *Culture Theory: Essays on Mind, Self and Emotion*. Cambridge: Cambridge University
6. Spiro, Melford E. (1987) *Culture and Human Nature: Theoretical Papers of Melford E. Spiro*. Benjamin Kilborne and L.L. Langness, eds. Chicago: University of Chicago Press.
7. Strauss, Claudia and Naomi Quinn (1997) *A Cognitive Theory of Cultural Meaning*. Cambridge: Cambridge University Press.
8. Sudhir kakar 2001 *The Essential Writings of Sudhir Kakar* Delhi: Oxford University Press
9. *Rethinking Psychological Anthropology*. P. K. Bock. (1974) Wave Land Press
10. *Human Motives & Cultural Models*. R. G. Andrade & C. Stress, (1992). Cambridge University Press.
11. *The Making of Psychological Anthropological Anthropology*. G.D. Spindler, J. W. M. Whiting & B.B. Whiting. 1978, University of California Press.
12. *Handbook of Psychological Anthropology*. P. K. Bock. (1994) Greenwood Publishing group.
13. *Psychology and Anthropology*. G. Jahoda. 1982. Academic Press.
14. *Thinking through Cultures*. R. A. Shweder 1990/ Academic Press.

AN 7201: Psychological Anthropology

Practical/ Project

Introduction to Psychological tests : Inferential and Direct Tests on 20 individuals belonging to a cultural cohort using quasi- participant techniques. Use of Computers in Psychological Qualitative Data Analysis.

The students are required to do the following tests:

1. IPAT Humor Test
2. Culture Fair Test
3. Eysenck's Modular Personality Inventory
4. General Mental Ability Test
5. Personality Traits Tests

Project Work : The students are supposed to prepare a report based on minimum 15 days of fieldwork in a community, on a topic related to psychological anthropology .

AN 7202: Tribal India

Theory

- a. Concept of tribe in Indian context
- b. Tribal societies in changing perspective
 - i. Pre-colonial period
 - ii. Colonial period
 - iii. Post Independence
- c. Geographic and linguistic distribution of tribes in India
- d. Institutional structure
 - i. Kinship, Family and Marriage
 - ii. Economy
 - iii. Religion
- e. Social Change in Tribal Societies: A Historical perspective
 - i. Tribe-caste Interaction
 - ii. Religious conversions
 - iii. Economic and political factors of change
 - iv. Tribal uprisings
- f. Social change in contemporary period
 - i. Political democracy
 - ii. Constitutional safeguards in modern India
 - iii. Industrialization and urbanisation
- g. Tribal society in contemporary India
 - i. Identity and ethnicity
 - ii. Conflict and dissension
 - iii. Integration
- h. Tribal development: plans and policies

Suggested Literature

1. Hardiman, David. 2008. *Missionaries and their medicine: a Christian modernity for tribal India*. Manchester: Manchester University Press.
2. Füller-Haimendorf, Christoph von. 1985. *Tribal populations and cultures of the Indian subcontinent*. Handbuch der Orientalistik, 7. Bd. Leiden: E.J. Brill.
3. Bhandari, J. S., and Subhadra Channa. 1997. *Tribes and government policies*. New Delhi: Cosmo Publications.
4. Channa, Subhadra. 1992. *Nagaland, a contemporary ethnography*. New Delhi, India: Cosmo Publication.
5. Xaxa, Virginius. 2008. *State, society, and tribes: issues in post-colonial India*. New Delhi: Dorling Kindersley (India), licencees of Pearson Education in South Asia.
6. Miri, Mrinal. 2003. *Identity and the moral life*. New Delhi: Oxford University Press.
7. Miri, Mrinal. 1993. *Continuity and change in tribal society*. Shimla: Indian Institute of Advanced Study.

AN 7202: Tribal India

Practical/ Project

1. Map out the various tribal communities on a Map of India
2. Make a research proposal on any contemporary tribal issue and prepare a relevant bibliography.
3. Write a book review of any tribal ethnography.

AN 7203: Ecological Anthropology

Theory

- a. Cultural/ Social Ecology: concept, definition and relevance
- b. Cultural ecology: Concept, its development and different theories
- c. Nature and Culture: Cognitive, Phenomenological and contemporary approaches
- d. Indigenous Knowledge and alternative models
- e. Contemporary environmental issues and debates
- f. The Himalayas- an environmental case study

Suggested Literature

1. Descola, Philippe, and Gísli Pálsson. 1996. *Nature and society: anthropological perspectives*. London: Routledge.
2. Cohen, Yehudi A. 1968. *Man in adaptation; the cultural present*. Chicago: Aldine Pub. Co.
3. Guha, Ramachandra. 1990. *The unquiet woods: ecological change and peasant resistance in the Himalaya*. Berkeley: University of California Press.
4. Guha, Ramachandra. 2003. *Social ecology. Oxford in India readings in sociology and social anthropology*. Delhi [u.a.]: Oxford University Press.
5. Shiva, Vandana. 2009. *Staying alive*. [S.I.]: Zed Books Ltd.

AN 7203: Ecological Anthropology

Practical/ Project

14. Critically review and ethnographic work on ecological anthropology
15. Make a project proposal and an annotated bibliography.
16. Make a report on any contemporary environmental issue.

AN 7204: Urban Anthropology

Theory

- a. Rise of city and civilization in India
 - i. Pre-industrial
 - ii. Orthogenetic and Heterogenetic
- b. Folk-urban continuum of India
- c. Processes of Urbanisation, urbanism, urban structures and urban ecology
- d. Basic features of Urban Social Structure
 - i. Heterogeneity
 - ii. Neighbourhood
 - iii. Slums
 - iv. Ethnic, Cultural, Linguistic affiliation of an Indian city
- e. Continuity and change in Indian Urban Society
 - i. Kinship and family
 - ii. Caste
 - iii. Religion
- f. Secular values and Urban setting
 - i. Secularism
 - ii. Multi-ethnicity
 - iii. Cultural integration

Suggested Literature

1. Exploring the city inquires towards an urban anthropology. U.Hannertz (1983). Columbia University Press.
2. Urban Anthropology: Cities and their Cultural Setting. R. G. Fox. (1977) Prentice Hall
3. Urban anthropology: Cross-Cultural Studies of Urban Citites. A.W. Southall. (1973). Oxford University Press.
4. Peasant in City. W. Mangin. (1970) Houghon Mifflin
5. Urban anthropology: A Southhall & A.W. Southall (1973). Oxford University Press.
6. Anthropology of the city. E. Eames & J. G. Good. (1977).Prentice Hall.
7. Urban Life. G. GMelch & W.P. Zanner. (1996). Waveland Press
8. Urban Anthropology. J.D. Uzzell & R. Provencher. (1976). W.C. Brown Co. Dubuque.

AN 7204. Urban Anthropology

Practical/ Project

The students will be required to undertake two minor research projects, one comprising study of a city based on secondary sources and another on some specific dimension of city, based on primary field research.

1. Identify a problem in an urban area, consult secondary sources to make an annotated bibliography.
2. Write a report on the problem selected using secondary sources.
3. Do fieldwork in any urban area and do any of the following type of primary research.
 - a. Observing an urban situation.
 - b. Understanding neighbourhood relations.
 - c. Analyzing urban Kinship.
 - d. Any other urban problems.

AN 7205: Gender and Society

Theory

- a. The basic concepts of gender and the construction of gender.

This unit will examine the emergence of the theoretical concept of gender, relationship between gender and sex, the historical and social conditions that favoured a gendered approach, the cross cultural implications of the concept of gender. Basic notions of femininity and masculinities.

- b. Nature, Culture and Gender:

This unit will critically examine how historically men and women have been conceptualized with respect to nature and culture bringing out some of the key issues that situate human beings with respect to nature and to their bodies. It will also include some of the issues raised with respect to medical and western science's contribution to understanding of the human body and also compare it to non-western modes of thinking.

- c. Gender and Kinship:

This unit will focus on how personhoods are constructed in society and how relationships are observed and evaluated. This will examine men's and women's position within the kinship network and critically examine rules and norms pertaining to rights and duties, inheritance and rules of marriage etc. Laws pertaining to women; Special emphasis will be paid here to the South Asian ethnographic material.

- d. Intersections of gender with other social categories like caste, race and ethnicity

This section will examine the internal divisions in gender categories and what it means to be men and women in unequal social situations and historical contexts.

- e. Gender and globalization

How concepts of gender are being critiqued and reconstructed in the contemporary world. Rethinking of categories of gender and gender roles, influence of mass media, communication and new reproductive technologies, new perspectives on sexuality

Suggested Literature

1. Rosaldo, Michelle Zimbalist, Louise Lamphere, and Joan Bamberger. 1974. *Woman, culture, and society*. Stanford, Calif: Stanford University Press.
2. Reiter, Rayna. 1977. *Toward an anthropology of women*. New York: Monthly Review.
3. Valle, Teresa del. 1996. *Gendered anthropology*. European Association of Social Anthropologists. London [u.a.]: Routledge.
4. Misra, K. K., and Janet Huber Lowry. 2007. *Recent studies on Indian women: empirical work of social scientists*. Jaipur: Rawat Publications.
5. MacCormack, Carol P., and Marilyn Strathern. 1980. *Nature, culture, and gender*. Cambridge [Eng.]: Cambridge University Press.
6. Dube, Leela. 1997. *Women and kinship: comparative perspectives on gender in South and South-East Asia*. Tokyo: United Nations University Press.
7. Harrison, Faye Venetia. 2005. *Resisting racism and xenophobia: global perspectives on race, gender, and human rights*. Walnut Creek [Calif.]: AltaMira Press.
8. Kapadia, Karin. 1995. *Siva and her sisters: gender, caste, and class in rural South India*. Studies in the ethnographic imagination. Boulder, Colo: Westview Press.
9. Unnithan-Kumar, Maya. 1997. *Identity, gender, and poverty: new perspectives on caste and tribe in Rajasthan*. Providence: Berghahn Books.
10. Gunewardena, Nandini, and Ann E. Kingsolver. 2007. *The gender of globalization: women navigating cultural and economic marginalities*. Santa Fe, N.M.: School for Advanced Research Press.
11. Naples, Nancy A., and Manisha Desai. 2002. *Women's activism and globalization: linking local struggles and transnational politics*. New York: Routledge.

AN 7205: Gender and Society

Practical/ Project

1. Make a fully annotated bibliography on any topic on the theory of gender.
2. Make a research design to study a relevant gender based social issue.
3. Make research tools for studying the problem and submit a report.

AN 7301: Demographic Anthropology

Theory

- a. Basic concepts and definition of demography relationship between demography and anthropology. Importance of population studies and their implications. Population dilemma and fluctuations in population thought.
- b. Various types of sampling design and their relevance in demographic studies.
- c. Sources of demographic data- Census, Civil Registration system (CRS), Sample Registration system (SRS), National samples survey organizations (NSSO), Model Registration System (MRS) – merits and demerits.
- d. Population theories – Grant, Godwin, Malthus, Sadler, Marx, Gray, Mercantilism, biological theory of population, theories of demographic transition.
- e. Population structure- Age and sex composition, Ethnic and racial composition, geographical distribution and urbanization, distribution according to various social characteristics. Literacy trend in world population, population projection.
- f. Population of India: Pre-independence and post-independence scenario, population dynamics of Indian tribes and castes.
- g. Population planning activities in India (Pre-independence and Post-independence activities) National Population Policy. Evaluation and management of family welfare programmes.
- h. The basic components of population change – fertility, mortality, marriage, migration and biological, social, ecological and economical factors influencing these components
- i. Morbidity and its relationship with fertility and mortality.
- j. National increase and population growth. Methods used in describing population growth, effect of socio-economic development on population growth.
- k. Reproductive health care in Indian Populations with special reference to MCH, STDs, AIDS, Abortion etc.
- l. Estimation of demographic characteristics – general estimates and specific estimates and their merits and demerits.

Suggested Literature

1. Driver, E.D. 1963 Fertility differentials in Central India. Princeton University Press Princeton.
2. NFHS I II III, 1992, 1998, 2006 India : IIPS Bombay
3. Zubrow EBW 1976. Demographic Anthropology Quantitative Approaches University of New Mexico Press, Albuquerque.
4. World Bank 2000 World Development Report 2000, World Bank Publication.

5. Journal Demography India
6. UNDP 2004 Human Development Report Oxford University Press.
7. Cox, P. 1976 Demography Vikas Publishing House.
8. Bogue 1969 Principles of Demography.
9. Shryock, H.S. and Siegel, JS (1971) The Methods & Materials in Demography.
10. Srivastava O.S. (1994) Demography and Population Studies Vikas Publishing House.

AN 7301: Demographic Anthropology

Practical/ Project

Collection and analysis of some demographic characteristics of a specified population.

1. Preparation of schedules for collection of demographic data.
2. Preparation of flow chart and graphic presentation
3. Compilation and presentation of data on population studies :
 - a. age composition
 - b. sex composition
 - c. age ratio
 - d. fertility measures
 - e. modality measures
4. Pictorial comparison of health indicators.

AN 7302 :Prehistoric India

Theory

Geological Features of India

- a. Geological formations
- b. Introductory overview of the stratigraphy of the Indian sub-continent.
- c. Pleistocene chronology, climate and environmental features of Indian subcontinent

Contemporary Theories and models in Archaeology

- a. Middle Range Theory
- b. New Archaeology/ Processual Archaeology
- c. Post-processual Archaeology
- d. Post-Modernism
- e. Models for understanding Hunter-gatherers' and early Agriculturalists' Appropriation of Nature
 - i. Site Catchment Analysis (SCA)
 - ii. Site Exploitation Territory (SET)
 - iii. XTENT Modeling
 - iv. Multi-Dimensional Scaling (MDSCAL)
 - v. Optimal Foraging Models

Palaeolithic in India

- a. Northern Region
- b. Western Region
- c. Central Region
- d. Eastern Region
- e. Southern Region

Mesolithic Cultures in India

- a. Northern Region
- b. Western Region
- c. Central Region
- d. Eastern Region
- e. Southern Region

Advent and Evolution of settlement in India

- a. Advent of agriculture in India with respect to all five regions.
- b. The beginning of agriculture in India in pan-Asian perspective

Rise of Complex Society in India

- a. Emergence of the Indian Civilization.
- b. Emergence of State Civilization: Harrapan civilization
- c. Neolithic/ Chalcolithic cultures- Western region, Central region, Eastern region and Southern region

Legacy of the Harrapan Civilization

- a. Advent of Iron.
- b. Late/ Post Harrapan Civilization: Ochre Coloured Pottery and Copper Hoards in Ganga Valley, Gujarat and Sindh.
- c. Megaliths and use of iron in South India

Suggested Literature

1. An outline of Indian Prehistory. Delhi: Palaka Prakashan. Bhattacharya, D.K. (2006).
2. Prehistory and Protohistory of India and Pakistan. Pune: Deccan College. Sankalia, H.D.(1974).
3. The Old Stone Age: A study of Palaeolithic Times. London: Bowes and Bowes. Burkitt, M. (1963).
4. Archaeology: Theories methods and Practices, London: Thames and Hudson. Renfrew, C. and P. Bahn.(2001).
5. People of the Earth: An Introduction to World Prehistory. New Jersey: Pearson Education. Fagan B. M. (2004).
6. Frameworks for dating Fossil man. London: Weidenfeld and Nicolson. Oakley, K.P. (1966).
7. The Explanation of culture change: Models in prehistory. London. Duckworth. Renfrew, C. (ed:). (1973).
8. Man the Hunter. Chicago: Aldine Publishing Company. Lee, R.B and I. Devore (Eds.). (1977).
9. An Introduction to Prehistoric Archaeology. New York: Hold, Rinehart and Winston, INC. Hole, H. and R.F. Heizer. (1969).
10. Prehistory of India. Delhi: Munshiram Manoharlal Publishers Pvt. Ltd. Sankalia, H. D. (1977).
11. The Harrapan Civilization: A Contemporary Perspective. New Delhi: Vistaar publication. Possehl, G. L. (2002).
12. The Rise of Civilization in India and Pakistan. Cambridge: Cambridge University Press. Allchin, B. and R. Allchin. (1982).

AN 7302: Prehistoric India

Practical/ Project

1. Identification of stone tools-type, technology and function
2. Identification of ceramic traditions- type, technology and function
3. Computer applications for archaeology
4. Geographical Information System (GIS) for archaeology

Suggested Literature

1. Old Stone Age Tools: A Manual of Laboratory Techniques of Analysis. Calcutta: K. P. Bagchi and Company. Bhattacharya, D.K. (1979).
2. Technology and terminology of Knapped Stone. Nanterre: CREP. Inizan, M.L.; M. R. Ballinger; H. Roche and J. Tixier. (1999).
3. Man the Tool Maker. London. Trustees of the British Museum Natural History. Oakley, K.P. (1972).
4. Stone Age Tools: Their techniques, Names and Probable Functions. Poona: Deccan College. Sankalia, H.D. (1982).

AN 7303: Medical Anthropology

Theory

- a. Medical anthropology: Historical development and subject matter
- b. Development of theory in medical anthropology
- c. Traditional systems: classical systems, alternative systems, medical pluralism
- d. Medical anthropology and mental health
- e. Issues and trends in international health: AIDS, Diarrhoea, ARI, Reproductive health and Vector borne diseases
- f. Health care in India: National Health Policy; health care programmes

Suggested Literature

- 1. Culture, Health and Illness by C. Helman. Butterworth Heinman. 2003.
- 2. Medical Anthropology by G.M. Foster and BG Anderson. McMillan, 1976.
- 3. Medical Anthropology in ecological perspective. Mc Elroy and PK Townsend. Westview Press. 2003.
- 4. Adaptation in Cultural Evolution: An approach to Medical Anthropology. A. Alland. Columbia University Press. 1970.
- 5. Culture, Disease and Healing: studies in Medical Anthropology. D. Landy. Mcmillan University Press. 1976.
- 6. Handbook of Medical Anthropology. S. Morsy. Greenwood Press. 1996.
- 7. Understanding and Applying Medical Anthropology. PJ Brown, RJ Barrett, MB Padilla. Mayfield Publishing Company. 1998.
- 8. Culture-bound Syndrome. RC Simons and CC Hughes. Kluwer. 1985.
- 9. Shamans, Mystics and Doctors. S. Kakar. Oxford University Press. 1982.
- 10. Tribal Health and Medicines. AK Kalla and PC Joshi. Concept Publishing Company. 2003.
- 11. Studies in Medical Anthropology. PC Joshi and A. Mahajan. Reliance Publishers. 1991.

AN 7303: Medical Anthropology

Practical/ Project

The students shall be required to undertake two projects: one based on secondary sources and the other based on primary data collected through fieldwork in a community.

1. Make a project proposal on any relevant issue in Medical Anthropology.
2. Collect secondary data using a multisource approach like books, formulas, newspapers, media etc.
3. Submit a project report based on the above material.
4. Do a short field-work to investigate any of the following.
 - a. Cultural approach to health and healing.
 - b. Traditional health practitioners.
 - c. Collection of medical biographies.
 - d. Indigenous knowledge of medicine.
 - e. Any other as suggested by concerned teacher.

AN 7304: Anthropology of Development

Theory

- a. Development: Meaning and evolution of concept
- b. Development: Theories and models
- c. Development in India-
 - i. Identification of needs
 - ii. Socio-cultural aspects
 - iii. Poverty and development
 - iv. Constitutional provision for development
 - v. Agencies for development
- d. Sustainable development
- e. Role of anthropology in development
- f. Case studies in development

Suggested Literature

1. Encountering Development: (1995) Arturo Escobar, The Making and Unmaking of the Third World, Princeton, N. J. Princeton University Press.
2. Anthropology in Practice: Case Studies in Development Anthropology, (1986) Edward Green, Boulder, Colorado, West View Press.
3. Local Science vs. Global Science: Approaches to Indigenous Knowledge in International Development, New York, Berghehn Book, 2007.

AN 7304: Anthropology of Development

Practical/ Project

Do a critical evaluative case study of any development Project in India using a multimedia approach (Books, magazines, newspaper articles, television and radio reporting etc).

1. Identify any development project in India and construct a brief ethnography of the project.
2. Collect all available material debating the project.
3. Make a project report with your own critical evaluation of the debate.
4. Provide a comprehensive bibliography.

AN 7305: Anthropology of Disaster

Theory

- a. Disaster: Definition, typology, vulnerability, risk, coping
- b. Anthropological approaches to study disasters - archaeological/historical, political ecology, socio-cultural behavioural, gendered perspective.
- c. Disaster trends--EM-DAT and National Institute of Disaster Management.
- d. Management of Disaster- Historical perspective, International and national agreements and protocols.
- e. Methods for studying disasters.
- f. Health, social and economic impacts of disaster.
- g. Plans and National policies concerning disasters, disaster risk mitigation, disasters management.

Suggested Literature

1. The Angry Earth: Disasters in Anthropological perspectives. A. Oliver-Smith and SM Hoffman. Routledge. 1999.
2. Community in Disaster. WH Form and S. Nosow. Harper. 1958.
3. Environmental Disaster and the Archaeology of Human Response. G. Bawden and RM Reycraft. University of New Mexico Press. 2000.
4. The Northridge Earthquake: Vulnerability and Disasters. RC Bolin. Stanford. 2000.
5. Disasters, Relief and the Media. J Benthall. IB Tauris and Company Ltd. 1993.
6. Mapping Vulnerability. J Bankoff and G Frerks. Earthscan. 2004.
7. Natural Disasters. A. Alexander. Routledge Taylor and Francesbrip. 1993.
8. Confronting Catastrophe: New perspective on Natural Disasters. DE Alexander. Terra Publishing. 2000.
9. Terrorism and Disasters: New threats, new ideas. LB Clarke. JAI Press. 2003.
10. Methods for Disaster Mental Health Research. FH Norris, S galea, MT Friedman, PJ Watson, Guilford Press. 2006.
11. Phenomenology of Disasters: Towards a Rhetoric of Tragedy. Pennsylvania State University Press. 2006.

AN 7305: Anthropology of Disaster

Practical/ Project

The students are required to do two projects.

1. The first project will be on disaster trends in a country or disaster incidence based on EMDAT or NIDM data base.
2. A project based on primary data collected from a disaster affected population.
 - a. Identify the problem.
 - b. A project based on primary data collected from a disaster affected population.
 - i. Identify the problem.
 - ii. Make a comprehensive research design
 - iii. Construct appropriate tools.
 - iv. Identify sample and sample size.
 - v. Conduct fieldwork.
 - vi. Prepare report and suitable bibliography.

AN 7306: Forensic Anthropology

Theory

- a. Definition, scope and schools of forensic anthropology.
- b. Study of skeletal material: Human and animal remains. The study of bone fragments. Attribution of sex, estimation of age and reconstruction of stature from the skeletal remains, and their medico-legal implications.
- c. Forensic Odontology: tooth structure and growth, estimation of age in young and adults. Population differences in size and morphology. Bite marks. Individualization of tooth pulp.
- d. Establishment of partial and complete identity of skeletal material and dead bodies –morphometric techniques.
- e. Personal identification of living persons- Identification through somatometric and somatoscopic observations, nails, occupation marks, scars, tattoo marks and deformities; handwriting and mannerisms.
- f. Finger prints: Identification of living and dead through partial and complete prints. Classification of fingerprints for criminal record purposes. Chance Prints. Various methods of latent print development.
- g. Forensic Haemogenetics: Pattern of blood splashes, Identification of bloodstains and determination of species of origin. Individualization of blood stains: Determination of blood group, sex, age and racial origin from dried bloodstains. Typing of some common polymorphic enzymes. HLA haplotypes and serum proteins from dried blood stain. Menstrual and lochial blood identification. Identification and individualization of body fluids like semen, saliva, urine etc.
- h. DNA profiling and individualization:- concept of sequence variations, STR, VNTRs, STR markers used in DNA finger printing.
- i. Disputed parentage: role of Anthropologic traits in solving such cases: Forensic Anthropologist's as an expert witness under section 45 of the Indian Evidence Act.

Suggested Literature

1. Fundamentals of Forensic Anthropology, Linda L. Klepinger (2006). Wiley-Liss.
2. Introduction to Forensic Anthropology (3rd Edition) 2007 Steven N. Byers.

AN 7306: Forensic Anthropology

Practical/ Project

1. Study of human long bones and relevant measurements for estimation of stature.
Estimation of age from skull, and determination of sex from skull and Pelvic measurements.
2. Measurement and observations on living persons.
3. Recording and classification of fingerprints, development of chance prints by various methods.
Comparison of questioned and suspected fingerprints.
4. Hair examination from various body sites and comparative analysis.
5. Identification of blood stains, Determination of blood group from dried stains, Determination of origin (i.e. the species).
6. Identification of seminal, urine and saliva stains.

UNIVERSITY OF DELHI

MASTER OF SCIENCE

(FORENSIC SCIENCE)

M.SC IN FORENSIC SCIENCE

(Two year full time Programme)

[Rules, Regulations and Course contents]

(Four-Semester Course)



**DEPARTMENT OF ANTHROPOLOGY
FACULTY OF SCIENCE
UNIVERSITY OF DELHI
DELHI-110007**

MASTER OF SCIENCE

(FORENSIC SCIENCE)

TWO YEAR FULL-TIME PROGRAMME

AFFILIATION

The proposed programme shall be governed by the Department of Anthropology, Faculty of Science, University of Delhi-110007.

ELIGIBILITY

Any student who has completed B.Sc Chemistry, Physics, Botany, Zoology, Anthropology, Bio-Chemistry, Bio-Physics, Mathematical Sciences, Bio-Tech, Genetics, Microbiology or B.Pharma, B.Tech, MBBS, BDS or life sciences with minimum 55% marks from a UGC recognized University.

PROGRAMME STRUCTURE

The M.Sc. Programme is divided into two Parts as under. Each Part will consist of two Semesters.

		Semester-Odd	Semester-Even
Part I	First Year	Semester – 1	Semester – 2
Part II	Second Year	Semester – 3	Semester – 4

The schedule of papers prescribed for various semesters shall be as follows:

Part I – Semester 1

Theory

Paper 1: Forensic Science, Photography, Crime Scene Management

Paper 2: Criminology, Criminal Law and Police Administration

Paper 3: Forensic Physics

Paper 4 : Forensic Dermatoglyphics and other impressions

Practical

Paper I Crime scene management and criminology

Paper II Forensic physics and forensic impressions

Part I – Semester 2

Theory

Paper 5: Forensic Chemistry and Toxicology

Paper 6: Forensic Ballistics

Paper 7: Instrumental Techniques

Paper 8: Questioned Documents

Practical

Paper III Forensic Chemistry and Instrumentation

Paper IV Ballistics and Questioned Documents

Part II- Semester III

Theory

Paper 9: Forensic Anthropology

Paper 10: Forensic Biology and DNA profiling

Paper 11: Forensic medicine and psychology

Paper 12: Digital Forensics and Cyber crime

Practical

Paper V Anthropology, Biology and DNA

Paper VI Digital Forensics

Part II – Semester IV

1. Dissertation
2. Project Work
3. Field visits
4. Out-house training

SCHEME OF EXAMINATION

1. English shall be the medium of instructions and examination.
2. Examination shall be conducted at the end of each Semester as per the Academic Calendar notified by the University of Delhi.
3. Each course will carry 100 marks and will have two components:
 - (i) Internal Assessment 30 marks
 - (ii) End Semester Examination
 - (a) Theory Examination 70 marks
 - (b) Practical Examination 100 marks
 - (iii) Dissertation 150 marks
 - (iv) Project work 150 marks
 - (v) Field Visit Evaluation 150 marks
 - (vi) Out-house Training/ Attachment with any FSL, CFSL and crime branch etc. 150 marks

PASS PERCENTAGE

Minimum marks for passing the examination in each semester shall be 40% in each paper and 45% in aggregate of a semester.

COURSE CONTENT FOR EACH COURSE

Attached.

M.Sc (FORENSIC SCIENCE)

SEMESTER –I

Paper 1: Forensic Science, Photography, Crime Scene Management

Unit 1

Forensic Science Unit

Introduction, Need, Scope, Concepts and Significance of Forensic Science, History and Development of Forensic Science, Laws and Basic principles of Forensic Science, Branches of forensic science, Organizational set-up of a Forensic Science Laboratory. Investigative strategies. Expert testimony and eye-witness report.

Unit 2

Tools and techniques in Forensic Science

Basic principles of microscopy, spectroscopy, chromatography. Electrophoresis, Enzyme-Linked Immunosorbent Assay (ELISA), Radio Immuno Assay (RIA). Measuring and optical instruments. Research methodologies. Formation of research design on a specific problem. Central tendency and Dispersion. Test of significance. Analysis of variance. Correlation and Regression.

Unit 3

Forensic Photography

Basic principles of Photography, Techniques of black & white and color photography, cameras, lenses, shutters, depth of field, film; exposing, development and printing techniques; Different kinds of developers and fixers; UV, IR, fluorescence illumination guided photography; Modern development in photography- digital photography, working and basic principles of digital photography; Surveillance photography. Videography and Crime Scene & laboratory photography.

Unit 4

Crime Scene Management

Crime scene investigations, protecting and isolating the crime scene; Documentation, sketching, field notes and photography. Searching, handling and collection, preservation and transportation of physical evidences. Chain of custody and Reconstruction of scene of crime. Report writing.

Suggested Readings

1. Houck, M.M & Siegel, J.A; Fundamentals of Forensic Science, Academic Press, London, 2006.
2. Sharma, B.R; Forensic Science in Criminal Investigation & Trials, Universal Publishing Co., New Delhi, 2003
3. Nanda B.B and Tewari, R.K; Forensic Science in India- A vision for the Twenty First Century, Select Publisher, New Delhi, 2001.
4. James, S.H and Nordby, J.J; Forensic Science- An Introduction to Scientific and Investigative Techniques, CRC Press, USA, 2003.
5. Saferstein; Criminalistics- An Introduction of Forensic Science, Prentice Hall Inc, USA,2007.
6. Barry, A.J. Fisher; Techniques of Crime Scene Investigation, 7th Ed, CRC Press, NewYork, 2003.
7. Mordby, J. & Reckoning, D; The Art of Forensic Detection, CRC Press NewYork, 2003.
8. G.R. Chatwal; Analytical Spectroscopy 2nd Edn, Himalaya Publishing House New Delhi,2002.
9. Aitken and Stoney; The Use of Statistics in Forensic Science, Ellis Horwood, New York, 1991.
10. Robertson and Vignaux; Interpreting Evidence, John Wiley, New York, 1995.
11. H.L. Blitzer and J.Jacobia; Forensic Digital Imaging and Photography, Academic Press, London, 2002
12. David R.Redsicker; The Practical Methodology of Forensic Photography- 2nd Ed. CRC Press, New York, 2001.
13. R.E.Jacobson, S.F.Ray, G.G.Attridge; The Manual of Photography- Photographic and Digital Imaging , N.R. Oxford

Paper 2: Criminology, Criminal Law and Police Administration

Unit 1

Crime

Definition, concept and scope of crime. Types of crime. Causes, effects, control and prevention of crime. Recent developments.

Unit 2

Criminology and criminal anthropology

Aim and scope of criminology; Criminal behavior and theories of criminal behavior: classic, positivist, sociological. Organized crimes, white collar crime. Juvenile delinquency. Role of correctional institutions. Criminal profiling and modus operandi, portrait parley, voice stress analysis. Victimology.

Unit 3

Criminal Law

Indian Penal Code: sections-23, 24, 25,39,44,52,76-79,84-86.

Criminal Procedure Code: sections-2, 6-35, 41-60, 61-90,154-176, 293, 294. Charges: bailable/non-bailable offences, cognizable/ non-cognizable, summon case and warrant cases.

Indian Evidence Act: sections- 3, 24-30, 45, 135-138, 141. Expert testimony.

NDPS Act, Food and Adulteration Act, Drugs and Cosmetic Act, Arms Act, Explosives Act.

Unit 4

Police Administration

History and development of police administration; Police duties, responsibilities and powers. Organization and structure of police station; maintenance of crime records and accountability of police to law. People and society. Custodial deaths, Police and Human Rights.

Suggested Readings

1. Swanson, C.R, Terrbles, L & Taylor,R.W; Police Administration, Prentice Hall, USA, 1998.
2. Gross.H; Criminal Investigation- A Practical Textbook for Magistrates, Police Officers, and Lawyers; Universal Law Publishing Co., New Delhi, 2000.
3. Lyman, M.D; Criminal Investigation – The Art & the Science, Prentice Hall, New Jersey, 2002.
4. O’Hara CE & Osterburg, JW; An Introduction to Criminalistics., Indiana University. Press, London, 1972.
5. Swansson,C.R, Chamelin, N.C, & Territ, L; Criminal Investigator, McGrawhill, New York, 2000.
6. The Indian Evidence Act,(1872), Amendment Act (2002); Universal Law Publishing Co., 2003.
7. The Code of Criminal Procedure (1973) Amendment Act, (2001); Universal Law Publishing Co., 2002.
8. Rattan Lal & Dhiraj Lal; The Indian Penal Code, 28th Ed. Wadhwa & Co. Nagpur, 2002.

Paper 3: Forensic Physics

Unit 1

Soil, Cement and Concrete

Types and composition of soil, sample preparation, removal of contaminants, colour, molecular particle size distribution, turbidity test, pH measurements, microscopic examination, density gradient analysis, ignition-loss test, elemental analysis, interpretation of soil evidence. Cement-bromoform test, fineness test, ignition-loss test. Identification of adulterated cement. Mortar and concrete analysis.

Unit 2

Paint and Fibre

Types of paint and their composition, macroscopic and microscopic analysis of paint pigments, pigment distribution, micro-chemical analysis- solubility test, pyrolysis gas chromatography, TLC, colorimetric analysis, IR spectroscopy and X-ray diffraction, elemental analysis, mass spectrometer, interpretation of paint evidence.

Types of fibres, forensic aspects of fibre examination- fluorescence, optical properties, refractive index, birefringence, dye analysis. Physical fit and chemical testing. TLC, IR-micro spectroscopy, Py-MS. Difference between natural and man-made fibres.

Unit 3

Glass

Types of glass and their composition-soda-lime, boro-silicate, safety glass, laminated, light-sensitive, tampered/ toughened, wire glass, coloured glass. Matching and comparison. Forensic examinations of glass fractures- rib marks, hackle marks, cone fracture, wavy, backward fragmentation, concentric and radial fractures. Colour, fluorescence, physical measurements, refractive index, density gradient, becke-line, specific gravity examination and elemental analysis of glass evidence.

Unit 4

Toolmarks

Types of toolmarks- compression marks, striated marks, combination of compression and striated marks, repeated marks, class characteristics and individual characteristics, tracing and lifting of marks, Photographic examination of tool marks and cut marks on clothes and walls etc. Restoration of erased / obliterated marks- Method of making-cast, punch, engrave; methods of obliteration, method of restoration- etching (etchings for different metals), magnetic, electrolytic etc., recording of restored marks – restoration of marks on wood, leather, polymer etc.

Suggested Readings

1. Caddy, B; Forensic Examination of Glass and Paint Analysis and Interpretation, CRC Press, New York, 2001.
2. Shaw, D; Physics in the Prevention and Detection of Crime, Contem Phys. Vol.17, 1976.
3. Saferstein, R; Forensic Science Handbook. Vol. I,II, (Ed.), Prentice Hall, New Jersey, 1988.
4. Working Procedure Manual; Physics BPR&D Publication, 2000.
5. Sharma, B.R; Forensic Science in Criminal Investigation and Trials (3rd Ed.), Universal Law Publishing Co., New Delhi, 2001.
6. Working Procedure Manual- Physics, BPR&D Publication. 2000
7. Hess, K.P; Textile Fibers and their Use, 6th Edn, Oxford and IBH Publishing Co., 1974.

Paper 4: Forensic Dermatoglyphics and other impressions

Unit 1

Fingerprints and Palm prints

History and development of Dermatoglyphics , formation of ridges, pattern types, pattern area. Classification of fingerprints- Henry's system of classification, single-digit classification, Extension of Henry's classification, filing, searching and fingerprint bureau. Composition of sweat, development of chance, latent, visible and plastic prints. Conventional methods of development of latent prints- fluorescent methods, magnetic powder method, fuming method, chemical method etc. Application of laser and other radiations to develop latent fingerprints, metal deposition method and development of latent prints on skin. Taking of fingerprints from living and dead person, preserving and lifting of fingerprints, photography of fingerprints. Ridge counting and ridge tracing, class and individual characteristics, various types of ridge characteristics. Comparison of palm prints on the basis of individual ridge characteristics. Automated Fingerprint Identification System (AFIS). Modern methodologies in fingerprinting.

Unit 2

Biometrics

Biometric evidences such as finger impressions, retina, iris pattern, voice, gait pattern, face recognition, 3D face recognition, automatic forensic dental identification, hand vascular pattern technology, Multibiometric systems, Recent developments, biometric databases.

Unit 3

Foot/ Footwear/Tyre impressions

Importance, Gait pattern, Casting of footprints in different medium, electrostatic lifting of latent footprints. Taking of control samples. Collection, tracing, lifting, casting of impressions, enhancement of footwear impressions, analysis and comparison of foot impressions, moulds, identification characteristics.

Unit 4

Lip prints, Ear prints and their significance

Nature, location, collection and evaluation of lip prints. Forensic Significance, photography, location, collection and evaluation, taking of control samples of footprints, lip prints and Ear prints for comparison. Modern techniques and developments.

Suggested Readings

1. Bridges, B.C; Criminal Investigation, Practical Fingerprinting, Thumb Impression, Handwriting expert Testimony, Opinion Evidence., Univ. Book Agency, Allhabad,2000
2. Mehta, M.K; Indentification of Thumb impression & cross examination of Fingerprints, N.M. Tripathi Pub. Bombay, 1980.
3. Chatterjee, S.K; Speculation in Fingerprint Identification, Jantralekha printing Works, Kolkata, 1981.
4. Cowger James F; Friction Ridge Skin- Comparison & Identification of Fingerprints, CRC Press, NY, 1993
5. Cossidy, M.J; Footwear Identification, Royal Canadian, Mounted Police, 1980.
6. Iannavelli, A.V; Ear Identification, Forensic Identification Series, Paramount,1989.
7. Henry, C.L. & Ganesslen, R.E; Advances in Fingerprint Technology, CRC Press, London,1991.
8. Jain, A.K., Flynn, P.& Ross A.A., Handbook of Biometrics, Springer, New York 2008

Practical- I

Paper 1 : Crime scene management and criminology

1. Descriptive study of organizational structure of a forensic science laboratory.
2. To carry out photography of indoor and outdoor crime scenes
3. Crime scene photographic processing and development in different light sources and using different filters.
4. To carry out digital photography of various forensic evidences
5. Mock crime scene investigation and writing a report on evaluation of crime scene.
6. Interpretation of crime scene notes, photos, sketches and reconstruction of crime scene
7. Microscopy of various physical evidences
8. Study the theories of crime
9. Criminal profiling
10. Portrait parley
11. Expert testimony in a mock court case scenario.

Paper II: Forensic physics and impression

1. Preliminary examination of glass, soil, fibre, paint and cloth evidences.
2. Examination of physical properties of glass, soil, fibre and paint evidences.
3. Develop latent fingerprints using different powder and chemical methods.
4. Comparison of fingerprints and palm prints by individual and class characteristics.
5. Restoration techniques of tool mark impressions and casting footprints.
6. Comparison and identification of individuals from lip print evidence.
7. Gait pattern recognition

Semester - II

Paper 5: Forensic Chemistry and Toxicology

Unit 1

Forensic Chemistry

Introduction to Forensic chemistry, sampling of chemical evidences, presumptive, screening (colour/ spot test), inorganic analysis. Detective dyes- cases and importance in trap cases. Arson Chemistry of fire, searching of fire scene, collection, preservation and examination of arson evidences. Adulteration in Petroleum products. Examination procedures involving standard methods and instrumental techniques, analysis of beverages- alcoholic and non-alcoholic, country made liquor and medicinal preparations containing alcohol as constituents. Significance of alcohol in breath and breath screening devices. Forensic analysis of Fertilizers/ insecticides/ pesticides/ biocides.

Unit 2

Explosives

Classification of explosives, synthesis and characteristics of Tri-nitro toluene (TNT), Pentaerythritol tetranitrate (PETN) and Research and Development Explosives (RDX). Explosion process, blast waves, searching of scene of explosion. Post blast residue collection and analysis, blast injuries and detection of hidden explosives. Improvised explosive devices.

Unit 3

Forensic Toxicology and Pharmacology

Definition, classification of poisons- organic, inorganic, metallic, non-metallic etc. Acute and chronic poisoning, Accidental, homicidal and suicidal poisoning, Extraction and identification of commonly used poisons. Dosage, Frequency, Route of administration, Absorption, distribution and metabolism and factors affecting metabolism and excretion. Toxicological techniques.

Unit 4

Drugs of Abuse

Natural and synthetic drugs of abuse. Drug dependence, classification of drugs- Narcotics, Hallucinogens, Depressants, Stimulants, Anabolic steroids. Psychotropic and Psychedelic drugs of abuse. Field and laboratory tests of drugs of abuse. Instrumental methods of analysis, collection, preservation and transportation of drug evidences.

Suggested Readings

1. Niesink, RJM; Toxicology- Principles and Applications, CRC Press,1996
2. Modi, JP, Textbook of Medical Jurisprudence & Toxicology, N.M. Tripathi Pub,2001
3. Chadha, PV; Handbook of Forensic Medicine & Toxicology, Jaypee Brothers, New Delhi,2004
4. Parikh, C.K; Text Book of Medical Jurisprudence, Forensic Medicine & Toxicology, CBS Pub. New Delhi,1999
5. Morrison R.T and Boyd R. N;Organic Chemistry 6th Ed Prentice Hall, 2003
6. Laboratory Procedure Manual : Petroleum Products ,Directorate of Forensic Science, MHA, Govt. of India, 2005
7. Working Procedure Manual on Chemistry ; Directorate of Forensic Science MHA Govt. of India
8. Bureau of Indian Standard Specifications related to Alcohols and Petroleum Products.
9. Welcher F; Standard Methods of Chemical Analysis, 6th Ed.Van Nostrand Reinhold, New York, 1969
10. Watson C. A; Official and Standardised Methods of Analysis, Royal Society of Chemistry, UK,1994.
11. Central Excise Act ; Universal Law Publication.
12. Essential Commodity Act, 1955
13. Feigl, F; Spot Test in Inorganic Analysis , Elsevier Publ. New Delhi, 2005.
14. Curry A.S ; Analytical Methods in Human Toxicology : Part II ,CRC Press Ohio, 1986.
15. Curry, A.S : Poison Detection in Human Organs, C Thomas Spring field, CRC Press, Costa Rica, 1976
16. Clark E.G.C; Isolation and Identification of drugs, Academic Press, London, 1986
17. Sunshine I : Handbook of Analytical Toxicpology, CRC Press, Costa Rica,1969.

Paper 6: Forensic Ballistics

Unit 1

Forensic Ballistics-I

History and background of Firearms, their classification and characteristics, various components of small arms, smooth bore and rifled firearm, different systems and their functions, rifling – various class characteristics, types of rifling and methods to produce rifling. Trigger and firing mechanism, cartridge-firing mechanism. Projectile velocity determination, Theory of recoil, methods for measurement of recoil. Techniques of dismantling/assembling of firearm. Types of ammunitions, classification and constructional features of different types of cartridges, types of primers and priming composition, propellants and their compositions, velocity and pressure characteristics under different conditions, various types of bullets and compositional aspects, latest trends in their manufacturing and design, smooth bore firearm projectile, identification of origin, improvised ammunition and safety. Identification of origin, improvised/ country-made/ imitative firearms and their constructional features.

Unit 2

Internal and External Ballistics

Definition, ignition of propellants, shape and size of propellants, manner of burning, various factors affecting the internal ballistics: lock time, ignition time, barrel time, erosion, corrosion and gas cutting, equation of motion of projectile, principal problems of exterior ballistics, vacuum trajectory, effect of air resistance on trajectory, base drag, yaw, shape of projectile and stability, trajectory computation, ballistics coefficient and limiting velocity, Ballistics tables, measurements of trajectory parameters, introduction to automated system of trajectory computation and automated management of ballistics data.

Unit 3

Terminal Ballistics

Effect of projectile on hitting the target: function of bullet shape, striking velocity, striking angle and nature of target, Tumbling of bullets, effect of instability of bullet, effect of intermediate targets, influence of range, Cavitation – temporary and permanent cavities, Ricochet and its effects, stopping power, Wound Ballistics; Threshold velocity for penetration of skin/flesh/bones, preparation of gel block, penetration of projectiles in gel block and other targets, nature of wounds of entry, exit, initial track with various ranges and velocities with various types of projectiles, explosive wounds, evaluation of injuries caused due to shot-gun, rifle, handguns and country made firearms, methods of measurements of wound ballistics parameters, post-mortem and anti-mortem firearm injuries.

Unit 4

Examination and identification

Firearms, ammunition and their components identification and examination, different types of marks produced during firing process on cartridge-firing pin marks, breech face marks, chamber marks, extractor and ejector marks and on bullet number/direction of lands and grooves, striation marks on lands and grooves, identification of various parts of

firearms, techniques for obtaining test material from various types of weapons and their linkage with fired ammunition, class and individual characteristics, determination of range of fire- burning, scorching, blackening, tattooing and metal fouling, shots dispersion and GSR distribution, time of firing – different method employed, and their limitations, stereo & comparison microscopy, automatic bullet and cartridge comparison system.

GSR analysis :Mechanism of formation of GSR, source and collection, spot test, chemical test, identification of shooter and instrumental methods of GSR Analysis, Management and reconstruction of crime scene; suicide, murder and accidental and self defence cases.

Suggested Readings

1. Sharma, B.R.; Firearms in Criminal Investigation & Trials, 4th Ed, Universal Law Publishing Co Pvt Ltd, New Delhi, 2011.
2. Mathews, J.H; Firearms Identification, Vol I, II and III, Charles C. Thomas, USA, 1977.
3. Hatcher, Jury and Weller; Firearms Investigation, Identification and Evidence, Stackpole Books, Harrisburg, Pennsylvania,1997.
4. Heard, B.J; Handbook of Firearms and Ballistics, John Wiley, England, 1997.
5. Warlow, T.A.; Firearms, The Law and Forensic Ballistics, Taylor and Francis, London,1996.
6. Schooeble, A.J. and Exline, L.D; Current methods in Forensic Gunshot Residue Analysis, CRC Press, New York, 2000.
7. Wilber; Ballistic Science for the Law Enforcement Officer, Charles C. Thomas, USA, 1977
8. Carlucci, D.E & Jacobson, S.S; Ballistics, CRC Press, London, 2008.
9. Sellier, K.G; Wound Ballistics and the Scientific Background, Elsevier Pub. Co., London, 1994.
10. Jauhari M; Identification of Firearms, Ammunition, & Firearms Injuries, BPR&D, New Delhi.
11. Ordog, G.J; Management of Gunshot wounds, Elsevier Pub. Co., New York, 1983.
12. Schooeble, A.J. and Exline, L.D; Current methods in Forensic Gunshot Residue Analysis, CRC Press, NewYork, 2000.
13. Beyer, J.C; Wound Ballistics, US. Printing Office, Washington, 1962.
14. Wilber; Ballistic Science for the Law Enforcement Officer, Charles C. Thomas, USA, 1977.
15. Di Maio, JM; Gunshot Wounds, CRC Press, New York, 1999.

Paper 7: Instrumental Techniques (Physical, Chemical, Biological)

Unit 1

Atomic & Molecular Spectroscopy

Spectroscopy, electromagnetic spectrum, sources of radiation, their utility and limitations. Conventional sources for UV, visible and infrared rays, sources for shorter wavelength radiations (X-ray tubes), radioactivity, Laser (He, Ne Argon, ion, dye lasers, semi conductor lasers) a source of radiation, interaction of radiation with matter:- reflection, absorption, transmission, fluorescence, phosphorescence and their forensic applications, radiation filters. Detection of radiations; photographic detectors, thermal detectors, photoelectric detectors etc. Atomic spectra, energy levels, quantum numbers and designation of states, selection rules, qualitative discussions of atomic spectra. Elements of X-ray spectrometry, fluorescence, energy dispersive X-ray analysis (EDX), wavelength dispersive X-ray analysis (WDX), X-ray diffraction, Auger effect.

Unit 2

Physical instrumentation techniques

IR spectroscopy- correlation of infrared spectra with molecular structure, fourier transform, infrared (FTIR) and Raman spectroscopy, fluorescence and phosphorescence spectrophotometry, Ultra violet and visible spectrophotometry: Types of sources, filters-cells and sampling devices, detectors, resolution, qualitative and quantitative methods for detection. Fluorescence and phosphorescence spectrometry: Types of sources, structural factors, instrumentation, comparison of luminescence and UV-visible absorption methods. Atomic absorption spectrometry: Instrumentation and techniques, interference in AAS, background correction methods, quantitative analysis. Atomic emission spectrometry: Instrumentation and techniques, arc/spark emission, ICP-AES, comparison ICP vs AAS methods, quantitative analysis, applications.

Unit 3

Radiochemical and Nuclear techniques

Radiochemical techniques: Basic principles and theory, introduction about nuclear reactions and radiations, neutron sources, neutron activation analysis (NAA), Thermal analysis methods: Basic principles and theory, differential scanning calorimetry and differential analysis, thermogravimetry. Nuclear Magnetic Resonance spectroscopy: Basic principles, theory and instrum, Mass Spectrometry, GCMS, LCMS, Secondary Mass Spectrometry, Laser Mass spectrometry, Fast Atom bombardment and liquid secondary Ion Mass spectrometry, High performance liquid chromatography, Electrospray Ionization mass spectrometry

Unit 4

Biochemical techniques

Biological and biochemical techniques: General principles of Biological/ Bio-chemical Analysis, pH and buffers, Physiological solution, cell and tissue culture, Cell fractionation, Biological variations etc. Centrifugation Techniques, Immuno-chemical Technique, General principles, Production of antibodies, Precipitin reaction, Gel immune-diffusion, Immuno-electrophoresis, complement fixation, Radio Immuno Assay (RIA), Enzyme-linked Immuno Sorbent Assay (ELISA), Fluorescence immune assay. Chromatographic Techniques, Electrophoretic Technique: General principles, Factors affecting electrophoresis, Low voltage thin sheet electrophoresis, High voltage electrophoresis, Sodium dodecylsulphate (SDS) polyacrylamide gel electrophoresis, Isoelectric focusing (IEF), Isoelectrophoresis, Preparative electrophoresis, Horizontal and Vertical Electrophoresis.

Suggested Readings

1. Robinson, J.W; Atomic Spectroscopy, 2nd Ed. Revised & Expanded, Marcel Dekkar, Inc, New York, 1996.
2. Workman, J; Art Springsteen; Applied Spectroscopy- A compact reference for Practitioners, Academic Press, London, 1997.
3. Subrahmanyam, N. & Lal B; A text Book of Optics, S. Chand & Company, New Delhi, 2004.
4. Willard, H.H. Lynne L. Merrett, J. Dean, A. Frank, A. Settle. J; Instrumental Methods of Analysis, 7th Edn. CBS pub. & Distributors, New Delhi, 1986.
5. Khandpur, R.S; Handbook of Analytical Instruments, Tata McGraw Hill Pub. Co. New Delhi, 2004.
6. Thomson, K.C. & Renolds, R.J; Atomic Absorption Fluorescence & Flame Emission Spectroscopy, A Practical Approach, 2nd Edn. Charles Griffith & Company, New South Wales, 1978.
7. Dudley, H. Williams & Fleming, I; Spectroscopic Methods in Organic Chemistry, 4th Edn, Tata McGraw- Hill Publishing Company, New Delhi, 1994.

Paper 8: Questioned Documents

Unit 1

Introduction to Document Examination

Nature and problems of document examination, classification of forensic documents, Specimen/Admitted writings/type writings etc: handling, preservation and marking of documents, importance of natural variations and disguise in writing, various types of forensic documents- genuine and forged documents, holographic documents, principles of handwriting identification, basic tools needed for Forensic Document Examination & their use, analysis of paper and inks.

Unit 2

Handwriting and Signature examination

Various writing features and their estimation, general characteristics of handwriting, individual characteristics of handwriting, ethnic and gender variability of handwriting, various types of forgeries and their detection, examination of signatures – characteristics of genuine and forged signatures, identification of forger, identification of writer of anonymous letters and application of Forensic Stylistics/Linguistics in the identification of writer, examination of built-up documents and determination of sequence of strokes.

Unit 3

Typewritten and Printed Documents

Identification of typescripts-identification of typist, various types of printing processes, identification of printed matter including printing of security documents and currency notes, identification of electronic typewriters, dot matrix, inkjet and laser jet printers, examination of black and white and color photocopies, fax messages and carbon copies.

Unit 4

Forgery Detection

Determination of age of documents by examination of signatures, paper, ink etc., Examination of alterations, erasures, over writings, additions and obliterations, decipherment of secret writings, indentations & charred documents, physical matching of documents, examination of seal, rubber and other mechanical impressions, examination of counterfeit currency notes, Indian passport/visas, stamp papers, postal stamps etc., examination of fake credit cards, e-documents, digital signatures, an introduction of computer forensics, preliminary examination of documents, opinion writings and reasons for opinion.

Suggested reading:

1. Hilton, O; Scientific Examination of Questioned Documents. Revised Edition, Elsevier, New York, 1982.
2. Osborn, A.S; Questioned Documents, 2nd Ed., universal Law Publications, Delhi, 1998.
3. Osborn, A.S; The Problem of Proof, 2nd Ed., Universal Law Pub. Delhi, 1998.
4. Thomas, C.C; Identification System for Questioned Documents, Billy Prior Bates Springfield, Illinois, USA, 1971.
5. Harrison, W.R; Suspect Documents Their Scientific Examination, Universal Law Publication, Delhi, 2001.
6. Morris, R.N; Forensic Handwriting Identification, Academy Press, London, 2001.
7. Sheila, K; Graphotypes a new Plant on Handwriting Analysis, Crown Pub. Inc., USA, 1983.
8. Lerinson, J; Questioned Documents, Academy Press, London, 2001.
9. Katherine, M. K; CDE-Forensic Document Examination-Humana Press, New Jersey, 2007.

Practical

Paper III: Forensic Chemistry and Instrumentation

1. TLC and spot test of alkaloids of drugs of abuse and toxic substances.
2. Isolation and instrumental analysis of different toxic substances and drugs.
3. Thin layer chromatography of explosive substances
4. Examination of petroleum products as per BIS standards.
5. Detection and identification of doping drugs from- hair, blood, saliva, urine and other body fluid and estimation of alcohol from breath, urine and blood.
6. UV-Visible Spectroscopic analysis of Drugs
7. Fourier transform infrared spectroscopic (FTIR) analysis of physical evidences
8. Gas chromatography (GC) and High performance liquid chromatography (HPLC) analysis of poisons, explosives, amino acids and proteins

Paper IV: Ballistics and Questioned Documents

1. Forensic identification of class and individual characteristics of handwriting
2. Analysis of signature forgery
3. Examination of anonymous letters and disguised writing
4. To detect and decipher alterations in a document
5. To decipher secret writings, indentations and charred documents
6. To study the handwriting of ethnic and population groups
7. To examine forgery in currency notes, passports and credit cards under Visual Spectral Comparator
8. Linkage of suspected bullet and cartridge case with the firearm on the basis of class and individual characteristics.
9. Classification and designation of ammunition using physical measurements
10. GSR collection and analysis of various components of GSR.
11. Estimation of Range.
12. Determination of velocity and energy of projectiles.

Semester - III

Paper 9: Forensic Anthropology

Unit 1

Personal Identification

Genesis and development of forensic anthropology. Personal identification of living persons- Identification through somatometric and somatoscopic observation, nails, occupation marks, scars, tattoo marks and deformities; handwriting and mannerisms. Genetic traits of forensic significance: Colour blindness, ear lobe, brachydactyly, polydactyly, widow's peak, eye colour, hair colour, face form, frontal eminences, nasal profile, nasal tip, lips, chin form. Identification of the recently dead and decomposed bodies.

Unit 2

Human Growth and Development

Major stages of human growth and development- Prenatal growth, Postnatal growth and their characteristics, Factor affecting growth- Genetic and Environmental. Methods of studying Human Growth, Significance of age in growth studies Methods of assessing age-chronological age, dental age, skeletal age, secondary sex character age and morphological age .

Unit 3

Forensic Morphometry of Skeletal Remains

Techniques for recovering skeletonised human remains. Laboratory analysis of skeletal and decomposing remains; maceration, skeletal analysis. Human and Animal remains. Bone fragments, Attribution of sex, estimation of age and reconstruction of stature from skeletal remains. Trauma analysis and identifying skeletal pathology. Antimortem, perimortem, post-mortem and pseudo mortem trauma. Pathological changes in bone. Establishment of partial and complete identity of skeletal material and dead bodies-morphometric techniques.

Unit 4

Forensic Odontology

Tooth structure and growth. Estimation of age from odontological evidences. Population differences in size and morphology. Individualisation of tooth pulp. Bite marks and its forensic significance. Photography, lifting and preservation of bite marks. Comparison and evaluation of bite mark evidences.

Suggested Readings

1. Reddy, V.R; Dental Anthropology, Inter-India Publication, New Delhi, 1985.
2. Singh, I.P. & Bhasin M.K; A manual of biological Anthropology, Kamla Raj Enterprises, New Delhi, 2004.
3. Kroeber; Anthropology, Oxford & IBH Publishing Company, New Delhi, 1972.
4. Pickering, R. & Bachman D; The use of Forensic Anthropology, CRC Press, Costa Rica, 2009.
5. Bose, N K; Anthropology, Narayana Press, Denmark, 1972.
6. James, R; Forensic examination of hair, Taylor & Francis, 2ND Ed. London, 1999.
7. Shubhra, G; Introduction to forensic examination, Selective Scientific Books, New Delhi, 2008
8. Michael, W. Haney, H.A. & Freas, L.E; The Forensic Anthropology Laboratory, CRC Press, 2008.
9. Eveleth, P.B. & Tanner, J.M; Worldwide Variation in Human Growth, Cambridge University Press, London, 1976.

Paper 10: Forensic Biology and DNA Profiling

Unit 1

Serology and Immunology

Cell structure and functions. Structure and function of carbohydrates, fats and proteins, serum proteins, haemoglobin and its variants, haptoglobins, HLA, polymorphic enzymes, blood groups-history, biochemistry and genetics of ABO, Rh, Mn and other systems, Methods of ABO blood grouping from fresh blood and biological stains, body fluids, determination of secretor status, polymorphic enzyme typing, serogenetic markers, determination of origin of species, immunology, immune response, antigens, haptens and antibodies, function and rising of antisera, lectins.

Unit 2

Forensic Biology

General plant classification schemes. Sub specialisation of forensic botany- plant morphology, plant anatomy, plant systematic, palynology, plant ecology. Wood and timber analysis. Diatoms and their forensic importance. Study and identification of various diatoms. Paper and pulp identification. Introduction and importance of wild life. Protected and endangered species of animals and plants. Sanctuaries and their importance. Relevant provision of wild life and environmental act. Types of wildlife crimes, different methods of killing and poaching of wildlife animals. Collection and preservation of hair samples. Morphological and microscopic examination of human and animal hair. Hair growth and development, determination of origin, race, sex, site from hair. Comparison between human and non-human hair. Macroscopic and microscopic features of hair.

Unit 3

DNA Profiling

Double helical structure of DNA, alternate forms of DNA double helix, denaturation and renaturation of DNA, DNA binding proteins, factors affecting DNA stability, types and structure of RNA. Chemical nature of DNA and RNA. Nature and structure of human genome and its diversity. mt-DNA, Y-Chromosomes and the peopling, migration, of modern humans.

Unit 4

DNA Polymorphism

Concept of gene – Conventional and modern views.

Concept of sequence variation - VNTRs, STRs, Mini STRs , SNPs. Detection techniques - RFLP, PCR amplifications, Amp-FLP, sequence polymorphism, Y-STR, Mitochondrial DNA. Disputed paternity cases. Missing person identity, population genetics and legal admissibility of DNA evidence.

Suggested Readings

1. Brown, T; Gene cloning and DNA analysis: An Introduction , 5th ed. Blackwell publishing, London, 2006 .
2. Butler, J; Advanced Topics in Forensic DNA Typing: Methodology, 1st Ed., Academic Press, London, 2009.
3. Easteal, S. McLeod, N. & Reed, K; DNA Profiling: Principles, Pitfalls and Potential, Harwood Academic Publishers, New Jersey, 1991.
4. Primorac, D.& Schanfield, M; Forensic DNA Applications: An Interdisciplinary Perspective, CRC Press, New York, 2014.
5. Rudin, N. & Inman, K; An Introduction to Forensic DNA Analysis, Second Ed.,CRC press, New York, 2001.
6. Spencer, C; Genetic testimony: a guide to forensic DNA profiling, Pearson, New Delhi, 2004.

Paper 11: Forensic Medicine and Psychology

Unit 1

Medico legal aspects of death

Death: Signs of death and changes after death. Somatic death, molecular death ,early changes after death - Algor mortis, rigor mortis, cadaveric spasm, heat stiffening, cold stiffening, changes in blood, chemical changes in cerebrospinal fluid, changes in vitreous humour, post mortem lividity, fluidity of blood,. Late changes – putrefaction- external and internal changes. Adipocere, mummification, gastric content and bladder content and time of death from growth of hair and nails .destruction of body and tissues by maggots and other insects, rodents, fish and crabs, moulds . Sudden death, post-mortem demonstration of myocardial infarction Medico legal aspects of death- Asphyxia, syncope, coma, death by starvation, drowning, hanging and strangulation. Causes and mechanism of traumatic death, manner of death. Classification of traumatic deaths.

Unit 2

Injuries and investigations

Mechanical Injuries: Abrasions, Bruises, Lacerations, Incised wounds, Stab wounds, Firearm injuries, Defence injuries, fabricated injuries. Traffic accident injuries: vehicular injuries, railway injuries and aircraft injuries. Thermal injuries: Burn and scalds, Lightning, Electricity, Explosions. Chemical trauma. Injuries- Accidental, self-inflicted, or inflicted by others. Ante -mortem and post-mortem, artificial injuries and aging of injuries. Fractures, Dislocations Secondary causes of death Regional injuries- wound of the scalp- incised, contusions, lacerations, firearm injuries. Fractures of the skull from direct & indirect impact.

Unit 3

Forensic Entomology

Forensic Entomology- History, significance, determination of time since death- Dipterean larval development & successional colonization of body, determining whether the body has been moved, body disturbance, presence and position wounds, linking suspect to the scene, identification of drugs and toxins from the insects and larvae feeding on the body, entomology as an evidentiary tool in child and senior abuse cases and animal abuse cases, collection of entomological evidence.

Unit 4

Forensic Psychology

Lie detection, brain fingerprinting, narco analysis, hypnosis, neuro-anthropological and psychological testing. Ethical issues in forensic psychology, mental disorders, eye witness testimony, memory recovery, psychological assessment, hypnosis, current research in detection of deception/truth finding mechanisms, legal and ethical aspects of human rights of individual.

Suggested Readings

1. Mclay, W.D.S; Clinical forensic medicine, Cambridge University Press, London, 1990.
2. Shepherd, R; Simpson's forensic medicine, Oxford University press, London, 2003.
3. Mant, A.K; Taylor's principles & practice of medical jurisprudence, Wingking Tong company ltd., Hong Kong, 2003
4. Maio, D.J. & Maio V.J; Forensic pathology, CRC press, Costa Rica, 1993.
5. Wecht, C.H; Legal medicine annual, Academic Press Publisher, Massachussets, 1970.
6. Polson C.H; Essentials of forensic medicine, Pergamon press, London, 1973.
7. Lahiri, S.K; Elements of medical jurisprudence , Prabasi press, Calcutta, 1973.
8. Flzinga, R.J; Fundamentals of Entomology, Prentice hall of India pvt ltd, New Delhi, 1978.
9. Smith, D.G.V; A manual of Forensic Entomology, Ithaca New York Camstock Univ. Press, New York, 1986.
10. Byrd, J.H. & Castner, J.L; Forensic Entomology, The utility of Anthropods in legal Investigation, CRC Press, New York, 2000.
11. <http://www.apa.org/practice/guidelines/forensic-psychology.pdf>
12. http://www.uk.sagepub.com/upm-data/39927_1.pdf
13. <http://www.blackwellpublishing.com/intropsych/pdf/chapter21.pdf>
14. W.O.Donohue & E.Levensky; Handbook of Forensic Psychology, Elseiver Academic Press, 2004.

Paper 12: Digital Forensic and Cyber Crime

Unit 1

E-data analysis

Principles of computer and data storage, Hardware, passwords and encryption techniques, seizure of computers, Preparations to be made before seizure, Actions at the scene, treatment of exhibits, bit stream of original media, Investigation on imaging methods, acquisition, collection and seizure of magnetic media, Legal and privacy issues, Preparing and verifying forensically sterile storage media

Unit 2

Types of cyber crimes

Definition and types of cyber crimes, Digital signal processing overview of several operating systems, html and other internet protocols, internet history, e-mail and header interpretation, virus and Trojan infections, different type of attacks, internet research and investigative tools

Unit 3

Audio-video examination

Forensic audio video analysis, voltage, decibels, audio line levels, frequency measurements, spectrum analysis, noise characteristics, digital filters and audio enhancement, authentication of recorded audio, speech spectrographic analysis, magnetic developing and optical methods Falsification in video recording, video frame sequence, method – waveform – vectroscope, videogrametry and photogrametry techniques, video image analysis, facial image recognition from video frame image

Unit 4

Speaker Identification

Basic factors of sound in speech, components of speech, analogue and digital speech signal, Fourier analysis, Fourier transforms, acoustic speech production, speech anatomy, mechanism of speech production, phonetic aspects of speech, principles of speaker recognition, methods of speaker recognition, various approaches in forensic speaker identification, concept of test and error in speaker identification, application in automatic speaker identification and verification system.

Suggested Readings

1. Blitzer, H.L. & Jacob J; Forensic Digital Imaging and Photography, Academic Press, London, 2002
2. Henry, H; Color photography – A Working Manual, Little Brown Co. Boston, 1995.
3. Vacca, J. R; Computer Forensic, Firewall Media Pub. New Delhi, 2002
4. Rose, P; Forensic Speaker Identification, Taylor & Francis, Forensic Science Series, London,2002.
5. Sharma, B.R., Forensic Science in Criminal Investigation & Trials, Universal Publishing Co., New Delhi, 2003.
6. James, S.H. & Nordby, J.J; Forensic Science- An Introduction to Scientific and investigative Techniques, CRC Press, New York, 2003.
7. Seigel, J.A, Sukoo, R.J, & Knupfer, G.L; Encyclopaedia of Forensic Science, Academic Press, London, 2000.
8. Swansson, C.R. Chamelin, N.C. & Territ, L; Criminal Investigator, McGrawhill, New York, 2000.
9. Becker, R; Criminal Investigation, ASPEN Publishing, Inc. Maryland, 2000.

Practical

Paper V: Anthropology, Biology and DNA

1. Morphological and microscopic examination examination of hair and fibres
2. Examination of blood stains : Physical and Chemical tests; spectroscopic examination
3. Examination of body fluids (Saliva, vomit, urine, semen, sweat)
4. Identification of diatoms and pollen grains
5. Determination of age and sex from skull, teeth, pelvic girdle and long bones.
6. Stature estimation from long bones
7. Determination of species of origin from blood.
8. Blood grouping from fresh and dried blood stains
9. Determination of secretor status
10. Electrophoresis of polymorphic markers
11. DNA isolation from biological samples, quantitation and profiling

Paper VI : Digital Forensics

1. Recovery of data, copying and imaging
2. Tracking of IP address
3. Encrypting and decrypting files
4. Audio, video and image authentication
5. Speaker identification using voice spectrograph.

Semester IV

1. Dissertation based on field work or laboratory work (for 2-3 weeks) in a specialized field chosen by the student. Two hard copies of the dissertation to be submitted by the student for its evaluation by the end of month of April.
2. Project Work.
A student will submit a project report on the basis of forensic anthropology/ forensic physics/ forensic chemistry/ document examination pertaining to one case starting from police station to court room and final forensic analysis to be done by the student.
3. Field visits to crime scenes, police stations, FSLs, court rooms etc. and submit a specific report on the same for the evaluation.
4. Out house trainings at FSLs/ CFSLs/University and Research laboratories/ GEQD's for 2-3 weeks and submit a brief report on the work done.