DISCIPLINE SPECIFIC ELECTIVE COURSE –DSE-19

Course title& Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
Humans: Evolution, Variation and Population Dynamics (BS-DSE-19)	**4**	**2**		**2**	Class XII pass with Biology	**NA**

Learning Objectives:

Charles Darwin's *The Descent of Man* exerted a vast influence over scientific and religious thinking in the 19th century, disturbing widely-held views on the origin of the human species, the age of the earth, and humans' supposedly special role in the universe. This course intends to give the student a foundational understanding in evolution of mankind, human variation and their population dynamics. They will develop a deep understanding of the mechanisms that fuelled the evolution of humans from their ape-like ancestors. The course will help students to develop concepts pertaining to the relation of modern humans with living and non-living primates. It will give the student a foundational understanding in population structure, growth and its implications

2.1 Course Learning Outcomes

On successful completion of the course, a student will:

- learn about the origins and development of evolutionary thought regarding human evolution.
- learn about the compelling evidences in favor of evolution like fossils, comparative anatomy and molecular homologies.
- learn about basal hominins, Australopithecines and members of Genus *Homo*
- know about variations, natural selection and population dynamics of Humans

2.2 Course Contents

Theory

Credits: 2 **Total Hours: 30**

Unit 1: Introduction to Biological anthropology **No. of Hours: 04**

Debate around Darwin's "Descent of Man". Basic concepts of human evolution and variation, Scope and relationship of biological anthropology with other disciplines, brief Classification and characteristics of living primates.

Unit 2: Primate Radiation and Basal Hominins **No. of Hours: 07**

Geochronology of Pleistocene Epoch. Comparative anatomy (Skull, Dentition, Vertebral Column, Girdles, forelimbs and Hindlimbs) and behavior of humans and non-human primates. Primate origins and radiation: phylogenetic relationships of living primates with special reference to Miocene hominoids. *Orrorin, Sahelanthropus, Australopithecines*: distribution, features and their phylogenetic relationships.

Unit 3: Genus *Homo* **No. of Hours: 10**

Appearance of genus *Homo*: *Homo habilis*. *Homo erectus* from Asia, Europe and Africa: Distribution, features and their phylogenetic status. The origin of Homo sapiens: Fossil evidences of Neanderthals. Origin of modern humans (*Homo sapiens sapiens*): Archaic and Modern humans, Distribution and features. Multiregional and Out of Africa Model with evidences. Use of Y chromosome and mitochondrial DNA population structure in tracing human migrations. Technique of tool manufacture and estimation of their relative efficiency. Classification of tools.

Unit 4: Recent Human Evolution and Population Growth **No. of Hours: 09**

Evolutionary adaptation, sexual and natural selection, and genetic drift within *Homo sapiens* populations. Concept of Biological Variability; Concept of Race, Genetic basis of race; UNESCO Statement on RACE; Human Adaptation and mechanisms. Human Genome Diversity Project; Genetic adaptation: lactose intolerance, Sickle Cell Anemia, High altitude genetic adaptation in Tibetans.

Population theories of John Graunt, Thomas R. Malthus and Demographic transition model. Sources of demographic data. Population structure: Age and sex composition and its importance, Demographic structure of Indian population, Estimates of different demographic rates and ratios. National policies: National Population Policy, National Health Policy, Factors affecting population growth.

2.3 Practical

Credits: 2 **Total Hours: 60**

1. Typo-technological Analysis of Prehistoric Tools: Identification, Interpretation and Drawings of the tool Types
2. Identification of important fossils of family Hominidae from Images
3. To study Changes in skull shape and cranial capacity during Human evolution
4. Size and Shape Measurements: a). Stature b). Sitting Height c). Body Weight d). Total Upper Extremity Length Size and Shape Indices e). Body Mass Index f). Total Lower Extremity Length.
5. Construction of Cladogram based on morphological characters for Living Primates and Extinct Hominins
6. Exploration of key dimensions of human variation, including skin color, altitude, climate, ABO blood alleles, and lactose tolerance with focus on the adaptive significance of the variation and what these variations tell us about human population histories.
7. To study major skeletal adaptations for bipedalism, as well as the advantages afforded by each of these adaptations.
8. Preparation of Atlas of Human morphological Variations across the world /Educational visit: Anthropology museums, Delhi University or any other museum

2.4 Essential readings:

1. Futuyma Douglas and Mark Kirkpatrick (2017) 3rd Ed.*Evolutionary Biology*, Oxford University Press
2. Hall B. K. and Hallgrimson B., (2014) 5thEd.*Strickberger's Evolution.* Jones and Bartlett
3. H. Schutkowski. Human Ecology: Biocultural adaptations in Human communities, Springer, Germany, 2006
4. Jurmain R., Kilgore L., Trevathan W., Ciochon R.L. (2012). Introduction to Physical Anthropology. Wadsworth Publications, 2012
5. John Relethford (2010). The human species : an introduction to biological anthropology. McGraw Hill
6. Lundquist J. H., Anderton D L and Yaukey D (2015) Demography : the study of human population. Waveland Press, Inc.

Suggested readings:

- Darwin C., (2003)*The Origin of Species: 150th Anniversary Edition* , Penguin USA
- Darwin C., (1871), The Descent of Man, Neeland media llc
- Xaxa V. (2003). Tribes in India. In Veena Das (ed.), The Oxford Indian Companion to Sociology and social anthropology Vol. 1. Delhi : Oxford University Press.
- Trautmann, T.R. (2011). India: Brief history of Civilization. Oxford University Press: Delhi.

3. Teaching Learning Process and Assessment Methods
Facilitating the achievement of Course Learning Outcomes**

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
1	Students will be introduced to the concept of anthropology	Teaching using chalk and board; Power point presentations.	Oral questions will be asked in the class. Class tests will be conducted for internal assessment.
2	Students will learn about Comparative anatomy and behavior of humans and non-human primates; their origins and radiation.	Power point presentations Teaching using chalk and board; Documentaries relevant to the topic will be shown.	Class tests will be conducted for internal assessment. Students will be given assignments to test their understanding of the subject.
3	Understand about genus *Homo: Homo habilis, Homo erectus, Homo sapiens*; and Out of Africa Model with evidences. Students will also learn classification of tools.	Teaching using chalk and board; Power point presentations. Relevant documentaries will be shown.	Class tests will be conducted for internal assessment. Students will be given assignments to test their understanding of the unit

4	Students will learn about genetic variations within human populations and the concept of race Gain knowledge about adaptation with respect to certain conditions.	Teaching using chalk and board; Power point presentations; Oral discussion sessions in the class. Simulation exercises in associated practicals to help understand the concepts.	Class tests will be conducted for internal assessment. Students will be given assignments to test their understanding. Students will be tested for their problem solving ability in population genetics.
5	Understand population theories, and population structure with respect to India.	Teaching using chalk and board; Power point presentations; Visit to Anthropology museum	Students will be given Class test and assignments to test their understanding of the subject.

(**Assessment tasks enlisted here are indicative in nature)

5. Keywords

Human Evolution, Human Population, Anthropology, Race, Policies