

## **DEPARTMENT OF ANTHROPOLOGY**

### **BSc. (Hons.) Anthropology**

#### **Semester-4**

#### **DISCIPLINE SPECIFIC CORE COURSE -10 (DSC-10)**

##### **Human Genetics**

#### **CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE**

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical / Practice		
Human Genetics	04	03	Nil	01	Class XII pass	NIL

(Teaching hours required: Theory, 45 hours; Practical, 30 hours)

#### **Course Objectives**

1. To introduce the students the basic principles of human genetics.
2. To familiarize the students with the methods/technologies used in genetic research.
3. Aims to provide knowledge about the pattern of inheritance of genetic disorders, genetic abnormalities and the importance of genetic testing and counseling.

#### **Learning Outcomes**

Student will be able to:

1. describe the structure and function of DNA; concept of gene, transcription and translation.
2. grasps the inheritance pattern of human traits/diseases and types of chromosomal abnormalities and their implications.
3. handle the methods and techniques used in human genetics.
4. comprehend the importance of genetic counselling.

#### **Unit 1: Human Genome, Chromosomes and Abnormalities (09 Hours)**

History of Human genetics; Concept of gene; Chromosomal structure and abnormalities, Cytogenetics, and Human Genome Project

#### **Unit 2: DNA Structure and Function (09 Hours)**

DNA Structure and Function, DNA Replication, repair and recombination, gene expression, coding and non-coding regions. Expression of genetic information: from Transcription to Translation - the relationship between genes and protein.

#### **Unit 3: Patterns of Inheritance (09 Hours)**

Mendelian inheritance (Autosomal and X linked); Co-dominance; Sex-linked inheritance; Multiple allelism; Dosage compensation, Single factor and multifactorial inheritance and Non-Mendelian inheritance

#### **Unit 4: Methods in Human Genetics (09 Hours)**

Pedigree analysis, methods of assessing chromosomal abnormalities (Banding techniques; Karyotyping; FISH); Sib-pair and Twin studies; Genotyping and Sequencing methods

#### **Unit 5: Genetic Diagnosis and Counselling (09 Hours)**

Prenatal diagnosis; Newborn screening; Genetic counseling

#### **Practical (30 hours)**

Project report based on data collection related to one mendelian disorder on the basis of brief field visits, in nearby areas.

#### **References**

1. Brown TA. (2007). *Genomes*. Garland Science.
2. Cummings MR (2011). *Human Heredity: Principles and Issues*. Brooks/Cole, Cengage Learning
3. Klug WS (2012). *Concepts of Genetics*. Pearson.
4. Lewis R. (2009). *Human Genetics: Concepts and Application*. The McGraw–Hill Companies, Inc.
5. Vogel F. and Motulsky A.G. (1996). *Human Genetics: Problems and Approaches*. Springer, 3rd revised edition.

#### **Teaching Learning Process**

The process of learning will involve acquisition of domain knowledge and understanding of skills required for conducting human genetic research. Process will involve lectures and presentations and report submission.

#### **Assessment Methods**

Examination schemes and mode shall be as prescribed by the Examination Branch, University of Delhi from time to time.

#### **Keywords**

Human genetics, DNA, chromosomal abnormalities, anthropology, sequencing