**Human Genetics Semester 6th (CBCS)**

**Course Title: Human Cytogenetics**

**Code: DSE-HG-16-603**

**UNIT I: Cell communication and signaling**

1.1. Overview of extracellular and intracellular signaling.

1.2. Basics of cell signaling – paracrine, endocrine, autocrine. .

1.3. Secondary messengers and their role in cell communication and signaling

1.4. G-protein coupled receptors and Tyrosine Kinase receptors.

**Unit II: Cell cycle**

2.1. An overview of cell cycle and Components of cell cycle control system

2.2. Necrosis, senescence, programmed cell death (apoptosis).

2.3.. Mechanism of necrosis, senescence and programmed cell death (intrinsic and extrinsic factors).

2. 4. Apoptosis in relation with Cancer

**UNIT III: Chromosome Banding Techniques**

3.1. Chromosome nomenclature

3.2 Chromosome banding techniques.

3.2. Molecular correlates of chromosome bands and fragile sites.

3.3. Use of Human cyto-genetics in medical science

**UNIT IV: Gene Mapping**

4.1Genetic mapping of Mendelian characters:

4.2 Recombinants, Non-recombinants, Genetic markers,

4.3. Two point mapping, Multipoint mapping,

4.4 Fine mapping using extended pedigrees and ancestral haplotypes

**Practicals**

1**.** Basic sterilization required for cytological techniques.

2**.** Numericals on structural and numerical aberrations

3. Peparation Pedigree charts

4. Preparation of Karyotype from Images of chromosomes

5. Demostration of cell culture techniques