**HUMAN GENETICS Semester IV (CBCS)**

**Core Course Title: Advances in Cell Biology and Genetics Code: DSC- HG-16-401**

**UNIT I Functional Cell Biology**

* 1. Cell-Cell Interaction, Cell adhesion molecules, Cell Junctions
  2. Intracellular compartments and protein sorting- concept of clathrin coated vesicles,SNARE protein and Rab proteins.
  3. Transport from Endoplasmic reticulum through Golgi apparatus--- COP II coated Vesicles, Retrieval transport.
  4. Cell cycle and programmed cell death

**UNIT II Organization of viral and bacterial genomes**

2.1. Organization and forms of DNA in virus (General Concept)

2.2. Bacteriophage T4 and Lambda

2.3. RNA virus – retrovirus and their genome

2.4. Organization and forms of DNA in Bacteria (with reference to E.coli)

**UNIT III Mechanism of Genetic exchange and recombination in bacteria**

3.1. Transformation

3.2. Conjugation

3.3. Transduction

3.4. Plasmids and Episomes

**UNIT I Genetics of Mitochondria**

4.1. Origin and evolution of Mitochondria

4.2. Mitochondrial DNA

4.3. Replication and Expression of Mitochondrial DNA.

4.4. Interplay between Mitochondrial and nuclear gene products. Mitochondrial DNA and Human diseases

**LABORATORY WORK**

1. Methods of Cell separation (Demonstration)
2. Cell- Cell Interaction (through charts/ slides)
3. Tight junctions
4. Adhering junctions
5. Gap junction
6. Use of Centrifugation (Demonstration)
7. Basis of Centrifugation
8. Organelle separation
9. Slide study of
10. Bacterial genetic exchange
11. Conjugation
12. Transduction

**Books Recommended**

1. Nelson, D.L. and Cox, M.M. Lehninger's Principles of Biochemistry. W.H. Freeman and Co., New York, 5th ed.
2. Voet, D., Voet, J.G. and Pratt, C.W. Fundamentals of Biochemistry: Life at the Molecular Level. John Wiley and Sons, New York
3. Biochemistry, Stryer
4. Molecular Biology of Cell, Bruce Alberts
5. Lodish et al: Molecular Cell Biology
6. Principles of Genetics , D. Peter Sinustad & Michael J Simmon ,Wiley & Sons, Inc
7. Dobzhansky: Genetics and origin of species
8. Gardner, E.J. Human Genetics. Viva Books Pvt. Ltd., India.
9. Klug, W.S. and Cummings, M.R. Concepts of Genetics. Pearson Education, Inc., New Delhi.
10. Snustad, D.P. and Simmons, M.J. Principles of Genetics. John Wiley and Sons, Inc., New York.
11. Strickberger, M.W. Genetics. Prentice-Hall India Pvt. Ltd., New Delhi
12. . Medical Genetics; Jorde, B; Carey, C; Bamshad; Elsevier Publication
13. Genetics; Elrod, Stansfield; Tata Mc Graw Hill.
14. Human Genetics; Lewis 11th Edition, McGraw Hill
15. Genetics: L. Hartwell et al, McGraw Hill.