



**MANGALORE UNIVERSITY**  
**DEPARTMENT OF BIOSCIENCES**  
**MSc BIOTECHNOLOGY**

**BTE 512      MEDICAL BIOTECHNOLOGY      (OPEN ELECTIVE)      Hours: 40**

**Course outcome**

This Course will enable students to:

- Get an overview of the immune system with particular reference to malfunctioning in disease
- Understand the genetics behind genetic diseases and syndromes and understand cell division and assisted reproductive techniques
- Learn about cancer biology with particular reference to carcinogenic agents, basis of cancer, treatment strategies and approaches, stem cells and applications
- Get an understand of altered disease states and its physiological implications

**UNIT I (13 hrs)**

Immunology: Overview: concept of self and non self, antigens, antibodies; immune response, evolution of immune response, immunological tolerance, hypersensitivity, humoral and cell-mediated immunity, active and passive immunization, antigen processing and MHC. Immunobiology: blood groups and transplantation antigens, HLA. Immune deficiencies and disorders – AIDS. Allergy. Immunization and vaccines. Organ transplantation.

**UNIT II (13 hrs)**

Genetics: Structure, organization and types of eukaryotic chromosomes, Heterochromatin, euchromatin, telomeres, types of chromosomes. Cell division. Molecular and cellular biology of fertilization *in-vitro* fertilization, assisted reproductive techniques, cloning. Karyotyping - heritable diseases and syndromes. Prenatal diagnosis (amniocentesis and chorionic villus sampling). Diagnosis of genetic diseases and gene therapy.

**UNIT III (14hrs)**

Cancer biology: Carcinogenic agents and molecular biology of cancer, Abnormal cell growth: mechanism of transformation of cells. Genetic basis of Cancer, Physical and chemical carcinogenic agents; Viral and cellular oncogenes, tumor suppressor genes, Telomerases and their role in cancer. Cell cycle and its regulation. Apoptosis. Recent advances in therapeutic approaches to disease treatment: Stem cells - types and applications. Cancer therapy – immunotoxins.

**References**

1. The Cell. A Molecular Approach. Cooper, G.M. Sunderland: Sinauer Associates, Inc., 2000
2. Basic Genetics. Hartl D.L. & Jones E.W. Jones & Bartlett Pub., 1998
3. Kuby Immunology. Kindt T.J. et al., W.H. Freeman & Co. 2007