

M.Sc. Human Genetics
Semester Ist

1. Cell Biology (PSHGTC-101)

- **CO-1:** -The course has been designed to enable the students to understand the structure and function of cell membrane and related transport mechanisms,
- **CO-2:** Students will be able to understand and function of different cell organelles and bimolecular
- **CO-3:** Understanding about the processes of cell division.
- **CO-4:** Knowledge about the mechanism of cellular processes- cell cycle and regulation,
- **CO-5:** Cellular energetic, Signal transduction and Programmed cell death are some of the mechanism which will make a student to have better understanding of the cell.

2. Human Physiology (PSHGTC-102)

Course Outcomes:- Course is designed to apprise the student about the details of physiological aspects various organ systems of human body.

- **CO-1:** Understanding about the basic concepts of Human Skeletal system
- **CO-2:** Knowledge about the physiology of digestive system and respiratory system
- **CO-3:** Knowledge about the physiology of cardiovascular system and nervous system
- **CO-4:** Understanding the concepts of Human Endocrinology
- **CO-5:** Understanding the concepts of human fertilization and embryonic development

3. Human Molecular Biology (PSHGTC-108)

Course Outcomes: Human Molecular Genetics is a vast field that provides information of Genetic Material, general principles and applications of molecular hybridization. It provides comprehensive guide to the structure, function and changes in the human genome.

- **CO-1:** Introduction to the structure of Gene and Genome
- **CO-2:** Structure and functions of Nucleic Acids
- **CO-3:** Concept of transcription and translation
- **CO-4:** Introduction to Mutations and its types.
- **CO-5:** Understanding the genome evolution and various genome projects.

4. Principles of Genetics (PSHGTC-109)

Course Outcome: The course has been designed to provide an introduction to the basic concepts of Genetics. The course will help the students to understand the mechanism of determining sex of an individual. Structural details and the role of chromosomes in human congenital anomalies have been discussed so that a student pursuing P.G course in Human Genetics is able to understand the importance of human chromosomes.

- **CO-1:** Understanding about history of cytogenetics and extensions of Mendelism.
- **CO-2:** Introduction to the Structure of Human Chromosomes and related conditions.
- **CO-3:** Knowledge about chromosomal theory of inheritance.

5. Gene Diagnostics and Methodology (PSHGTC-110)

Course Outcomes: The course has been designed to provide an introduction to the basic concepts about the different types of diagnostic techniques. These techniques are the most relevant techniques used for the genetic testing purposes and would give a more comprehensive picture to make genetic testing relevant in day to day life.

- **CO-1:** Introduction to basic research methodologies- Centrifugation, Electrophoresis and microscopy.
- **CO-2:** Knowledge about various cytogenetic techniques.
- **CO-3:** Understanding various types of molecular diagnostic techniques.

Semester IInd

1. Biochemistry of Metabolic Disorders & Developmental Genetics (PSHGTC-201)

Course Outcomes

- **CO-1:** The syllabus has been designed to provide the students about the carbohydrate metabolism pathways in human body.
- **CO-2:** The students will get knowledge about Protein and Nucleic acid metabolism. Any change in biochemical pathways leads to the change in the product and the same gets reflected in the form of change in the phenotype.
- **CO-3:** Students will be able to understand the metabolism of Lipids and fatty acid and their related disorders.
- **CO-4:** The course will also help students to understand the process of development at genetic level.
- **CO-5:** The course offers understanding about differentiation of human reproductive systems and focuses on genetic basis of reproductive disorders.

2. Microbial Genetics and Clinical Biology (PSHGTC- 207)

Course Outcomes

- **CO-1:** Introduction to Microbiology.
- **CO-2:** Methods of gene transfer and role of vectors with their property.
- **CO-3:** This course is about various pathogens like bacteria, virus and fungi and about their testing

3. Immunogenetics (PSHGTC- 208)

Course Outcomes

- **CO-1:** - Objectives of this course is to understand basic principles of Immunology
- **CO-2:** The course will help the students to gather knowledge about Humoral and cell mediated Immunity
- **CO-3:** The course is about the Immunological disorders.
- **CO-4:** The objective of the course is apprise students about the basics of Immunodiagnostic techniques
- **CO-5:** Course has been designed to make the student of Human Genetics Familiar with Immuno-biotechnology which discusses its applications.

4. Human Molecular Genetics (PSHGTC-209)

Course Outcomes

- **CO-1:** The course has been designed with the objective to make the students of Human Genetics to learn various hybridized assays and cloning and its applications on human diseases.
- **CO-2:** Students will get knowledge about Molecular pathology of human diseases.
- **CO-3:** The course will provide knowledge about Identification of diseases and instability of genome.
- **CO-4:** Students will be able to learn various advanced techniques for detection of proteins and gene analysis
- **CO-5:** The students will learn various diagnostic and therapeutic approaches for human diseases.

5. Advanced Cytogenetics (PSHGTC-210)

Course outcomes

- **CO-1:** The course has been designed with the objective to make the students of Human Genetics to learn about Structural and numerical abnormality.
- **CO-2:** Students will get knowledge about various human congenital abnormalities
- **CO-3:** The course will provide knowledge about mutagens and teratogens

Semester IIIrd

1. Medical Genetics and Disorders (PSHGTC-307)

Course outcomes (CO)

- **CO-1:** The course has been designed to provide knowledge to the students of Human Genetics about the importance of Genetics in medicine, various human mitochondrial diseases, study of human genetic diseases using animal model.
- **CO-2:** Students will be taught inheritance patterns, of different genetic diseases.
- **CO-3:** This course will make the students to learn about the management of human genetic diseases
- **CO-4:** Course will help the students to have knowledge about cancer, various cancer biomarkers and their role in therapeutics.
- **CO-5:** Students will learn about genetic valuation and treatment of human infertility.

2. Medical Biotechnology with Nanotechnology (PSHGTC-308)

Course outcomes

- **CO-1:** The course will provide an opportunity to understand various diagnostics techniques like prenatal, biochemical, and Immunodiagnostic techniques.
- **CO-2:** Course has been designed to impart knowledge of stem cells and its applications to the students.
- **CO-3:** The course design will be focused on application of medical biotechnology in synthesis of different vaccines and peptide based drugs.
- **CO-4:** This course is about Introduction to Nanotechnology.
- **CO-5:** The students will learn the principles and applications of nanotechnology.

3. Evolution and Phylogenetics (PSHGTC- 309)

Course outcomes:

- **CO-1:** The course is designed with the objective to provide knowledge to the students about the concept and theories of evolution
- **CO-2:** The students will have an understanding of genetic constitution of a population.
- **CO-3:** The students will learn the concepts of population genetics; phenotype and genotype analysis

4. Bioinformatics and Biostatistics (PSHGTC- 310)

Course outcomes:

- **CO-1:** The course is designed with the objective to provide knowledge to the students about the scope of bioinformatics
- **CO-2:** The students will learn the use of various bioinformatics tools.
- **CO-3:** This course will make the students to learn the concept and methods of Biostatistics.

5. IPR AND BIOETHICS (PSHGTC-311)

Course Outcomes:

- **CO-1:** The course is designed with the objective to provide knowledge to the students about role of intellectual property rights in genetics.
- **CO-2:** Students will be briefed about the principles of ethics.
- **CO-3:** This course is designed with the objective to provide knowledge about entrepreneurship in genetics.

Semester IVth

1. Genetic Counselling (PSHGTC-406)

Course Outcomes

- **CO-1:** The course has been designed with the objective to make students learn about the importance of Genetic Counselling in the welfare of family as well as society.
- **CO-2:** It will also help in providing knowledge to students that how genetic counselling services can be used to detect a genetic condition.
- **CO-3:** Course will provide an insight into different testing issues viz. discrimination, privacy and confidentiality.
- **CO-4:** The course will further help in tackling the issues associated with human cloning, organ transplantation & Surrogacy. Students will also gather information regarding ethics involved in medicine in Indian system.
- **CO-5:** The course will provide a comprehensive picture about relation of Pre-conception and Pre-natal Diagnosis Act in Human Genetics.

2. Clinical Genetics (PSHGTC-407)

Course Outcomes:

CO-1: The course has been designed with the objectives to make the students to learn about the role of clinical genetics.

CO-2: The course will provide knowledge on reproductives.

CO-3: Students will be able to get information on treatment of genetic diseases.

CO-4: The course will give an elaborative insight on etiology and genetics of multifactorial diseases.

CO-5: The course will provide an understanding on rare genetic diseases.