

# FACULTY OF LIFE SCIENCES

## Syllabus

For

## Interdisciplinary Course in Human Genetics (UG)

Examinations: 2019–20



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**Guru Nanak Dev University**  
**Amritsar**

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**Interdisciplinary Course in Human Genetics (UG)**

**SCHEME OF COURSE**

**Interdisciplinary/Optional Courses in Human Genetics (UG) — For other departments**

Course No.	C/E/I	Course Title	Course	L	T	P	Total Credit	Total Marks		
								Max. Marks	Mid Sem	End Sem
<b>SEMESTER-ODD</b>										
<b>HGL-003</b>	<b>1</b>	<b>Introduction to Human Biology</b>	<b>UG</b>	<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>	<b>100</b>	<b>20</b>	<b>80</b>
<b>SEMESTER- EVEN</b>										
<b>HGL-004</b>	<b>1</b>	<b>Introduction to Human Genetics</b>	<b>UG</b>	<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>	<b>100</b>	<b>20</b>	<b>80</b>

**The Interdisciplinary Courses are offered for the students of other departments of Guru Nanak Dev University Campus, Amritsar.**

**Interdisciplinary Course in Human Genetics (UG)****HGL-003 INTRODUCTION TO HUMAN BIOLOGY****(Odd Semester)****Time: 3 Hours****Credits: 3-1-0****Max. Marks: 100****Mid Semester Marks : 20****End Semester Marks : 80****Mid Semester Examination: 20% weightage****End Semester Examination: 80% weightage****Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

**Section A**

The cell, Cell division, Chromosome structure, DNA structure, Sex determination, Mutations, Chromosomal disorders, Genetic basis of inheritance, Transcription, Translation.

**Section B**

Introduction to Human Body: Cells, tissues and organization of body, Skeletal system, Circulatory system (blood and cardiovascular system), Digestive system and

**Section C**

Introduction to Respiratory system, Nervous system and sense organs (eye, ear and olfactory) in humans.

**Section D**

Urinary system, Endocrine system, Reproductive system, in humans.

**Books Recommended**

1. Cummings, M.R. (2009). Human Genetics. Cengage Learning India Pvt. Ltd., New Delhi.
2. Chiras, D.D. (2012). Human Biology. Jones and Bartlett Publishers.
3. Harrison, G.A., Tanner, J.M., Pilbeam, D.R. and Bahor, P.T. (1976). Human Biology. Oxford University Press, London.

**Interdisciplinary Course in Human Genetics (UG)****HGL-004 INTRODUCTION TO HUMAN GENETICS  
(Even Semester)****Time: 3 Hours****Credits: 3-1-0****Max. Marks: 100****Mid Semester Marks : 20****End Semester Marks : 80****Mid Semester Examination: 20% weightage****End Semester Examination: 80% weightage****Instructions for the Paper Setters:**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

**Section A**

Introduction to Genetics, Mitosis and Meiosis, The Human Genome structure and organization, Mitochondrial genome, Human chromosomes — types and analysis, Chromosome mutations: Variation in number and arrangement

**Section B**

Gametogenesis, Sex ratio, Sex determination and Sex chromosomes, Gene mutation and single gene disorders, DNA repair, Genetic basis of cancer: Oncogenes and tumour suppressor genes.

**Section C**

Mendelian Genetics, Problems in Mendelian Genetics, Patterns of inheritance, Genetic variation, Multifactorial inheritance, Threshold model, Recurrence risk.

**Section D**

Overview of population genetics, Hardy-Weinberg principle, biochemical genetics, prenatal diagnosis, amniocentesis, Chorionic villus sampling (CVS), genetic counselling, gene therapy, stem cell therapy, genetic testing, genetic basis of human diversity, The human Genome Project, eugenics.

**Books Recommended:**

1. Cummings, M.R. (2009), Human Heredity: Principles and Issues. Pacific Grove, CA: Brooks/Cole.
2. Cummings, M.R. (2009), Human Genetics. Cengage Learning India Pvt. Ltd., New Delhi.
3. Gardner, A. and Davies, T. (2009). Human Genetics. Scion Publishing, 2<sup>nd</sup> ed.
4. Lewis, R. (2011). Human Genetics: The Basics. Routledge, Oxon.
5. Sanders, M.F. and Bowman, J.L. (2012), Genetics — An Integrated Approach. Pearson, Boston.