



HUMAN MOLECULAR GENETICS

PROF. S GANESH

Department of Bioengineering
IIT Kanpur

TYPE OF COURSE : Rerun | Elective | UG / PG

COURSE DURATION : 4 weeks (24 Jan' 22 - 18 Feb' 22)

EXAM DATE : 27 Mar 2022

PRE-REQUISITES : Participants are expected to have at least class 12 level understanding in genetics.

INTENDED AUDIENCE : Students interested in pursuing research in human molecular genetics. Medical students and practicing clinicians interested in understanding the principles and complexities of human genetics. Students interested in careers in genetic counselling and DNA diagnostics. Scientists working in public health service, counselling centres, and diagnostic laboratories.

INDUSTRIES APPLICABLE TO : Medical and pharma companies, paramedic clinical centers, educational institutes, and hospitals.

COURSE OUTLINE :

This is an introductory course designed primarily for students in the undergraduate or masters programs interested in biomedical research, genetic counseling, medicine, and clinical genetics. This course is expected to introduce rapid advancements in our understanding of the role of human genome in health and disease. We would introduce key concepts of inheritance of human traits, pedigree analysis, and chromosome organization. Molecular biology tools used for understanding the genome, gene structure and gene mutations, gene mapping and gene cloning strategies will also be covered. Objectives and outcome of human genome project and the HapMap project will also be discussed at the end.

ABOUT INSTRUCTOR :

Prof. S. Ganesh teaches biology, genetics and genomics at IIT Kanpur. His research interests include human molecular genetics and neuroscience. He works on genetic forms of neurodegenerative disorders in humans to understand their genetics and disease mechanisms, and to develop therapeutics. He has been serving on the editorial boards of journals, and offers courses on professional and scientific communication at IIT Kanpur.

COURSE PLAN :

- Week 1:** Fundamentals of central dogma (DNA, RNA and proteins; mutations), Chromosome structure and function (organization; structure-function relationship; chromosome abnormalities).
- Week 2:** Genes in pedigree (Mendelian pedigree patterns, complications to pedigree patterns), DNA cloning and hybridization techniques (vector based cloning; nucleic acid hybridizations; PCR-based DNA analyses)
- Week 3:** Mutation and instability of human DNA (mutation and polymorphism; pathogenic mutations, repeat expansions), Molecular pathology (types of mutations; animal models for human disease)
- Week 4:** Identifying human disease genes (functional cloning versus positional cloning; mutation screening), Complex diseases; The Human Genome and HapMap projects

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To: NALLAMUTHU GOUNDER MAHALINGAM COLLEGE POLLACHI	
	
No. of credits recommended by NPTEL:1	
Score	Type of Certificate
>=90	Elite+Gold
75-89	Elite+Silver
>=80	Elite
40-59	Successfully completed the course
<40	No Certificate

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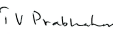
This certificate is awarded to
J. ALAHUPRETI
for successfully completing the course

Human Molecular Genetics

with a consolidated score of **49** %

Online Assignments	15.83/25	Proctored Exam	33/75
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Total number of candidates certified in this course: 939


Prof. T. V. Prabhakar
Chairman
Centre for Continuing Education, IITK


Prof. Satyaki Roy
NPTEL Coordinator
IIT Kanpur

Jan-Feb 2019
(4 week course)

 Indian Institute of Technology Kanpur



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