

Genetic Research in Anthropology

GENERIC ELECTIVE -6 (GE-6)

Genetic Research in Anthropology

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical / Practice		
Genetic Research in Anthropology – GE-6	04	03	Nil	01	Passed 12 th with Science	NIL

Course Objectives

To introduce human genetics through anthropological perspectives where impetus will be laid on building an understanding of biochemical and molecular markers and their relevance in anthropology.

The course focuses on application of anthropological genetics in mendelian populations and molecular basis of complex diseases.

The course also focuses on aspects of field work, data collection, ethical, legal and social issues in genetic research in anthropology.

Course Learning Outcomes

The students will be trained to use biochemical markers with respect to disease profile.

The students can be better equipped to understand the importance of mendelian populations in genetic research that can be applied to disease genetics.

The students will be skilled with basic laboratory techniques for molecular markers.

The students will be better equipped to comprehend fieldwork and data collection along with an understanding of ethical and legal aspects of genetic research.

Unit 1 (08 Hours)

Basic concepts

History and relevance of genetic research in anthropology, evolution of genetic markers as a tool in human research, concept of Hardy-Weinberg Equilibrium principle.

Unit 2 (12 Hours)

Methods of genetic research in anthropology

Twin studies, genetic linkage studies, pedigree analysis, candidate gene studies, cohort studies, cross-sectional studies, hypothesis and technology driven research

Unit 3 (08 Hours)

Data collection in human genetic studies

Field work and data collection strategies, quantitative and qualitative data collection in field

Unit 4 (08 Hours)

Techniques in human genetics

Agglutination, electrophoresis, PCR, sequencing techniques

Unit 5 (09 Hours)

Ethical, legal and social issues in genetic research

Ethical guidelines and practices in genetic research, legal and social issues in genetic research, Indian national guidelines for collaborative research in genetics.

Practical (30 Hours)

1. Pedigree analysis
2. ABO blood group
3. DNA extraction
4. Identification of genetic mutation through specific technique

References

- Speicher, M. R., Motulsky, A. G., & Antonarakis, S. E. (Eds.). (2010). Vogel and Motulsky's human genetics. Berlin, Heidelberg: Springer Berlin Heidelberg.
- Crawford, M. H. (Ed.). (2007). Anthropological genetics: theory, methods and applications. Cambridge University Press.
- Mange, E. J., & Mange, A. P. (1999). Basic human genetics. Sinauer Associates Inc., U.S.
- Reich, D., Thangaraj, K., Patterson, N., Price, A. L., & Singh, L. (2009). Reconstructing Indian population history. *Nature*, 461(7263), 489-494.
- DePristo, M. A. (2010). The \$1,000 genome: The revolution in DNA sequencing and the new era of personalized medicine. *The American Journal of Human Genetics*, 87(6), 742.
- Jaworski, E., Routh, A., Head, S. R., Ordoukhanian, P., & Salomon, D. R. (2018). Next Generation Sequencing: Methods and Protocols. Springer New York.

Indian Council of Medical Research. (2017). National ethical guidelines for biomedical and health research involving human participants. National Ethics Guidelines for Biomedical and Health Research involving Human Participants.

Kumar, M., Sandhu, H., & Roshan, R. (2020). Indian Council of Medical Research's International Collaboration & Partnerships; Health Ministry's Screening Committee: Facts, figures & procedures. The Indian Journal of Medical Research, 151(6), 550.

Teaching Learning Process

Theoretical concepts will be covered through classroom/online lectures and presentations. Hands-on training on various laboratory techniques pertaining to biochemical and molecular techniques will be provided in the scheduled practical classes.

Keywords

Anthropological genetic research, pedigree analysis, fieldwork and data collection, PCR and sequencing techniques

Note: Examination scheme and mode shall be as prescribed by the Examination Branch, University of Delhi, from time to time.