SAINT CLARET COLLEGE, ZIRO

B. A. (ANTHROPOLOGY)

SYLLABUS AS PER RGU SEMESTRAL SCHEME

(Subjected to syllabus enrichment by SCCZ for Claretines)

Semester V

BANT 610: Human Genetics and Human Variation

Total Marks: 100 (80- End Semester and 20- Sessional)

Objectives: Having studied this paper, a student will be able to:

a. *Explain the meaning, scope, history and relevance of human genetics*
b. *Equipped with methods of human genetics study*
c. *Define a cell; describe cell structure, cell division, structure and function of DNA, concept of gene and chromosome*
d. *Explain the principles and patterns of inheritance, chromosomal aberration and its types*
e. *Understanding the definition and concept of population, mating patterns, and the forces responsible for changing of allele frequency*
f. *Familiarize with recent molecular approaches to studying human diversity especially in India.*

Unit 0: Baseline Analysis (2 hours): Introduction to basic concepts, objectives and goal setting.

Unit 1: **Human Genetics (6 hours):** Definition, scope, and historical development of Human Genetics; relevance of Human Genetic in Anthropology; methods of studying Human Genetics (twin study, family study and sib pair study).

Unit 2: **Human Cytology (6 hours):** Cell structure; cell division; structure and function of DNA; concept of gene and chromosome.

Unit 3: **Patterns of Inheritance (8 hours):** Mendel's principles of inheritance; pattern of inheritance: autosomal dominant, autosomal recessive, X-linked dominant, X-linked recessive.

Unit 4: **Chromosomal Aberration (10 hours):** Numerical abnormalities with special reference to the etiology and clinical features of Down's, Turner's and Klinefelter's Syndrome; structural abnormalities: brief introduction to translocation, deletion, insertion, inversion, duplication. ring-chromosome, iso-chromosome.

Unit 5: Population Genetics (10 hours): Definition and concept of population, definition and calculation of allele frequency (ABO and MN blood group), mating systems – random and assortative mating, evolutionary forces that bring changes in allele frequency, introductory ideas about recent approaches in studying Indian ethnic diversity using molecular data.

Unit 100: Advanced Skills (2 hours): Revision of concepts, journal/magazine review, assignments/projects.

Recommended Readings:

Crawford, M. H. (2007). *Anthropological Genetics: Theory, Methods, and Applications*. United Kingdom: Cambridge University Press.

Harlt, D., & Clark, A. G. (1997). *Principles of Population Genetics*. Massachusetts: Sinaver Associates Inc.

Hedrick, P. W. (2011). *Genetics of Populations* (4th ed). Massachusetts: Jones & Bartlett Publishers.

Jurmain, R., Kilgore, L., & Trevathan, W. (2010). *Essentials of Physical Anthropology* (8th ed). Belmont: Wadsworth Cengage Learning.

Mange, E. J., & Mange, A. P. (1999). *Basic Human Genetics* (2nd ed). Massachusetts: Sinauer Associates Inc.

Michael, C. (2009). *Human Genetics*. Belmont: Cengage Learning.

Relethford, J. H. (2012). *Human Population Genetics*. USA: John Wiley & Sons.

Stanford. C., Allen, S. J., & Antón, S C. (2013). *Biological Anthropology: The Natural History of Mankind* (3rd ed). New York: Pearson.

Stein, P., & Rowe, B. M. (2010). *Physical Anthropology* (10th ed). New York: McGraw Hill Book Co.

Chakraborty, S. (2010). Genetic Analysis on Frequency of Alleles for Rh and ABO Blood Group Systems in the Barak Valley Populations of Assam. *Notulae Scientia Biologicae. 2*(2)*,* 31-34.

Kumar, V., Reddy, A. N. S., Babu, J. P., Rao, T. N., Langstieh, B. T., Thangaraj, K., …Reddy, B. M. (2007). Y-Chromosome evidence suggests a common paternal heritage of Austro-Asiatic populations. *BMC Evolutionary Biology. 7*(47)*,* 1-14.