

Nizam College Department of Genetics
Programme outcome

The Department offers Genetics as an optional for B.Sc. Degree course.

The course started in 1979 with an intake of 30 students and the combinations were Genetics, botany & Chemistry. Presently the combination offered is Microbiology, Genetics & Chemistry. The programme has a six semester pattern. In the first two semesters, the fundamentals are taught; in the next two semesters, molecular biology is dealt and in the last two semesters, the application part of the program is taught. The course is designed in such a way so that it can help the student in understanding the subject there by increasing their interest in learning the practical applicability of the course. The syllabus is designed keeping in view the common core syllabus. The course offered is in the CBCS pattern where 80% is the common core syllabus and 20% is the updated under the autonomy. The practical learning is beneficial to the students not only for aspiring the higher studies but also making them eligible entrepreneurship and skill development. The programme also provides employability in large number firms related to research and development in the field of applied biological science.

Nizam College Department of Genetics
Course outcome
Semester I paper 1 :Transmission genetics

Content:

Unit I: Mendelian Inheritance.

Unit II: Cell division and Chromosome segregation.

Unit III: Extension to Mendelian Segregation pattern

Unit IV: Linkage, Recombination and mapping of genes in eukaryotes.

Scope: This course is designed to provide the fundamentals of genetics. It also recalls the previous knowledge of the student regarding the subject and helps them to understand the concept of the course. It develops the mathematical ability by making them solve the problems based on inheritance mechanism.

Nizam College Department of Genetics
Course outcome
Semester II paper 2 :Genetic analysis

Content:

Unit I: PolyGenes and Multifactorial Inheritance

Unit II: Chromosome structure, chromatin organization and variation.

Unit III: Genetics of sex determination and sex linked inheritance

Unit IV: Recombination and mapping of genes in Bacteria and Viruses, Non-Mendelian Inheritance .

Scope: The course is oriented to offer fundamentals of genetics with various examples in plants animals and human beings. It makes students understand the concept of variability and positioning the genes on chromosomes. Thus, enabling them to show interest in various human traits and their inheritance mechanism.

Nizam College Department of Genetics
Course outcome
Semester III paper 3 : GENE AND GENOME STRUCTURE, ORGANIZATION AND
EXPRESSION

Content:

Unit I: Nucleic acids .

Unit II: Genome Organisation

Unit III: Gene Families, Organellar Genome and Fine Structure Analysis.

Unit IV: Gene expression in Prokaryotes and Eukaryotes.

Scope: This course provides the molecular basis of inheritance. The molecular biology aspect of this course helps the students have a thorough understanding of the molecular biology of gene. It helps them to understand the application aspects. Thus, inculcating scientific attitude.

Nizam College Department of Genetics
Course outcome

Semester IV paper 4: Molecular genetics

Contents:

Unit I: Regulation of gene Expression .

Unit II: Gene Regulation in Higher Eukaryotes , Rna Technology .

Unit III: Gene Mutations .

Unit IV: DNA damage and repair mechanisms; Transposable Elements.

Scope: This course of molecular genetics deals with the advance concepts to make the student develop scientific attitude and better understanding of the subject. This content helps in knowing the reason behind the cause of mutations which leads to altered phenotypes in the population which leads to variations

Nizam College Department of Genetics
Course outcome

Semester V CORE paper 5 : Biostatistics and population genetics

Contents:

Unit I: statistical analysis in genetics

Unit II: Structure of population and Genetic Equilibrium.

Unit III: Mutations and selections

Scope: This course is formulated on the basis of significance of biostatistical concepts in genetics. Fundamentals of statistics helps the students in studying the genes in population. The study of probability in genetics dates back to its origin. Population genetics helps in finding out the frequency of lethal genes in the population and evolution of the species.

Nizam College Department of Genetics
Course outcome
Semester V (elective A) paper 6 : Human genetics

Contents:

- Unit I: Inherited human disorders
- Unit II: Management of inherited human disorders
- Unit III: Gene therapy and genome projects

Scope: This course is framed based on the necessity of knowing the human genetic disorders as the genetic disorders are not curable, thus, prevention is the only option to make a perfect human race. The management of the disorders, the risk and preventive measures with sophisticated gene therapy techniques are dealt in this course. It leads to the application of the previous knowledge in advance studies.

Nizam College Department of Genetics
Course outcome
Semester V (elective B) paper 6 : Breeding and genome evolution

Contents:

- Unit I: Inbreeding and its effect
- Unit II: Selection and breeding methods in plants& Animals
- Unit III: Genome evolution and population variation.

Scope: This course provides the basic principles of breeding to improve the livestock and crop varieties. It helps in developing good varieties of crop plants and livestock based on the fundamental principles of genetics and to learn the evolutionary process of organisms.

Nizam College Department of Genetics
Course outcome
Semester VI (CORE) paper 7 : Genome analysis and genetic engineering

Contents:

- Unit I: advanced techniques in genome analysis
- Unit II: gene transfer techniques
- Unit III: genetic engineering of plants and animals

Scope: This course involves the advanced techniques in molecular biology. Thus, making the students to learn different techniques utilised in genome analysis and recombinant DNA technology. It fulfils the requirement of production of transgenic plants and animals for better productivity the market requirements.

Nizam College Department of Genetics
Course outcome
Semester VI (elective A) paper 8: Medical genetics

Contents:

Unit I: cancer genetics
Unit II: immuno genetics
Unit III: haemoglobinopathies and pharmacogenomics

Scope: The course contains information related to the genetic aspects of diseases like cancer and blood disorders. The molecular aspects of genetics behind these disorders makes the students develop various strategies to combat with these disorders. Thus, inculcating research strategies and helping them in curing and preventing such types of disorders.

Nizam College Department of Genetics
Course outcome
Semester VI (elective B) paper 8: Plant genetics and biotechnology

Contents:

Unit I: Plant Genetics
Unit II: Introduction to plant tissue culture.
Unit III : Methods in Plant Tissue Culture.

Scope: This course provides the application part of genetics dealing with biotechnological aspects such as plant tissue culture. These aspects ensures the production of economically important crop plants on vegetative mode in a less time duration compared to the conventional method to meet the requirements of the society.

Nizam College Department of Genetics
Course outcome
Semester IV (inter disciplinary paper) :Clinical genetics

Contents:

Unit I: Introduction
Unit II: Environmental effects on heredity
Unit III: Screening of disorders
Unit IV: Genetics and population improvement

Scope: The ID paper is designed keeping in view the students belonging to biological sciences, arts and commers. This course provides them basic knowledge of heredity and the ill effects of environmental pollutants on heredity which leads to abnormalities in the population. This course also provides the knowledge of such lethal effects of the disorders which are encountered commonly in the population. Thus, the students can acquire the knowledge of hereditary and non-hereditary disorders and their impact on the structure of population. The consanguineous marriages (cousin marriages) which is frequently practiced in our society can be one of the reasons of genetic disorders. This knowledge can help the individual in knowing the ill effects of inbreeding and making them move towards a good and h