Topics – Biology
AY 2025-26

1. Expression of genes in prokaryotic and eukaryotic cell
2. Transcription of genetic information
3. Processing of mRNA in eukaryotes
4. Translation of genetic information – proteosynthesis
5. Genetic code
6. Regulation of gene expression
7. Mutations – classification
8. Gene (point) mutations, molecular consequences of point mutations
9. Single gene disorders in humans
10. Unbalanced structural chromosome mutations
11. Balanced structural chromosome mutations
12. Robertsonian translocations
13. Numerical chromosome mutations – classification and underlying mechanism
14. Aneuploidies of autosomes and sex chromosomes in humans
15. Basic molecular biology methods – nucleic acid extraction, PCR, FISH
16. Basic molecular biology methods – electrophoretic analysis, restriction endonucleases and RFLP, DNA sequencing
17. Sex chromosomes and sex determination
18. The X chromosome and dosage compensation
19. Genes involved in the process of carcinogenesis
20. Environmental and lifestyle risk factors for cancer
21. Monohybrid and dihybrid cross – Mendel's principles and laws
22. The extension of Mendelian genetics – multiple alleles, modifications of dominance relationship
23. The extension of Mendelian genetics – gene interactions, penetrance, expressivity
24. Non-Mendelian inheritance
25. Gene linkage
26. Population genetics
27. Quantitative genetics
28. Construction of pedigree – genealogic method
29. Characteristics of the basic types of inheritance in family trees
30. Genetic counselling
31. Genetic disorders with autosomal dominant inheritance in humans
32. Genetic disorders with autosomal recessive inheritance in humans
33. The ABO and H systems – inheritance, Bombay phenotype
34. The Rh, MNSs, Lewis and Kell blood group systems – inheritance
35. Inheritance of the major histocompatibility complex