

SYLLABUS

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|-------------------------|---|----------------------|------------------------------|
| <b>Subject:</b>         | <b>Biology 2</b>                            |                      |                              |
| <b>Study Programme:</b> | <i>General Medicine</i>                     | <b>Study Period:</b> | <i>2. semester</i>           |
| <b>Evaluation:</b>      | exam  | <b>Subject Type:</b> | <i>mandatory(compulsory)</i> |
| <b>Content:</b>         | <i>2 lecture and 3 exercise hours /week</i> |                      | <i>Total 70 hours</i>        |

Department: Department of Medical Biology

| <i>Week</i> | <i>Lectures</i>   | <i>Practical Lessons</i>   |
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| 1.          | <b>Mutations I</b> - classification of mutations, mechanisms of mutagenesis, gene (point) mutations   | <b>Gene expression</b> – gene structure and function, transcription, translation, genetic code   |
| 2.          | <b>Mutations II</b> - structural and numerical chromosome mutations   | <b>Mutations I</b> – gene mutations and chromosome aberrations, consequences of mutations  |
| 3.          | <b>Mendelian inheritance</b> - historical overview, general characteristics, Mendel's laws of inheritance                                     | <b>Mutations II</b> – nomenclature and karyotype explanation   |
| 4.          | <b>Gene linkage</b><br><b>Heredity and sex</b><br><b>Quantitative genetics</b> - polygenic inheritance, heritability, multifactorial diseases | <b>Mendel's laws of inheritance</b> – genotype and phenotype, gene, allele, locus, laws of segregation and independent assortment, Mendelian inheritance in humans |
| 5.          | <b>Inheritance of blood group systems I.</b> – ABO, H, Rh, MNS  | <b>Gene linkage</b> – linkage group, crossing over and power of linkage  |
| 6.          | <b>Inheritance of blood group systems II.</b> – Lewis, Secretor, Kell, Duffy. MHC (HLA)   | <b>Heredity and sex</b> - chromosomal determination of sex, sex-linked inheritance, sex-limited and sex-influenced traits  |
| 7.          | <b>1<sup>st</sup> written test</b>  | <b>Inheritance of blood group systems I</b> – ABO system, Rh system, MNS, Lewis, haemolytic disease of the newborns  |
| 8.          | <b>Population genetics</b> – Hardy-Weinberg law, panmixis, population equilibrium, inbreeding, genetic drift, eugenics, euphenics             | <b>Inheritance of blood group systems II</b> – HLA antigens, gene interactions, epistasis and hypostasis   |

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| 9.  | <b>Genealogy and genetic counselling</b>  | <b>Population genetics</b> – Hardy-Weinberg equilibrium, influence of mutations, migration, selection and genetic drift                                   |
| 10. | <b>Genetics of cancer</b>   | <b>Genealogy</b> – pedigree analysis, construction of pedigree, autosomal and sex-linked inherited traits in pedigree, dominant and recessive inheritance |
| 11. | <b>Cell signaling</b>   | <b>Genetic counselling I</b> – purpose, aim and general characteristics of genetic counselling, prenatal diagnosis of genetic diseases                    |
| 12. | <b>Molecular biology methods in human genetics</b> – basic principles and techniques        | <b>Genetic counselling II</b> – solving model problems  |
| 13. | <b>Molecular biology methods in clinical practice</b><br><b>2<sup>nd</sup> written test</b> | <b>Molecular biology methods</b> – PCR, electrophoresis, restriction endonucleases, DNA sequencing, hybridization of nucleic acids                        |
| 14. | <b>Ethical issues in human genetics</b>   | <b>Evaluation of prerequisites and compensations</b>  |