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### თბილისის ჰუმანიტარული სასწავლო უნივერსიტეტი

**TBILISI HUMANITARIAN TEACHING UNIVERSITY**

**Syllabus**

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| **Name of the course/module** | **Medical Biology, Genetics** |
| **Code of the course** | **PhM0405DM** |
| **Status of the course**  **(elective/compulsory)** | **C**ompulsory course  for the one-cycle higher educational Programme-Dentistry |
| **ECTS** | **4credits.Total:100 hours**  Contact Hours–49hours (Class Meeting Time Period:15L/30Pr.) + 4 hours  (Midterms:2h and Final Examinations:2h)  Individual Work-51 hours |
| **Authors (lecturer)** | Elene Petriashvili-Ph.D. (Biology),THTUinvited lecturer  Tel -595252540.  e–mail –elene\_pet@yahoo.com  Consultation days: according to consultation schedule – Monday, Wednesday, 11.00-13.00, classroom N7 |
| **Aim of the course** | The course of Medical Biology studies the principles of human body organization at molecular and cellular levels and molecular mechanisms of reproduction and development. The priority of this course is the cell biology, which is a contemporary and important branch of science.  Developmental biology studies the stages of ontogenesis, starting from the formation of a zygote, including embryonic and postembryonic periods. The latter includes the study of regulatory mechanisms of homeostasis as well as molecular mechanisms of ageing and death. |
| **Program prerequisits** | N/A |
| **Assessment system and criteria** | **Assessment system of the Tbilisi Humanitarian Teaching University's**is divided into the following components:  The total marks of the mid term Out of the overall assessment (100 points ) is 60 points, which includes three kinds of grades:  **Student’s activity during a semester**  **One-midterm exam**  **final exam**  Theminimum competence requirement for mid termevaluation components is at least 18 points in total.  **The minimum competence requirement of the final evaluation is 50% of the total mark from final evaluation that means 20 points out of 40.**  Evaluation System includes:  I. Five Forms of Positive Assessment:  (A) Excellent – 91% and more from maximum evaluation  (B) Very good – 81-90% from maximum evaluation  (C) Good – 71-80% from maximum evaluation  (D) Satisfactory – 61-70% from maximum evaluation  (E) Sufficient – 51-60% from maximum evaluation  II. Two Forms of Negative Assessment:  (A)(FX) Fail (Not passed ) - 41-50 from maximum evaluation score, which means that the student will need to work more and to retake the test after additional independent work;  (B) (F) Fail – A student gets 40 points, or less from maximum evaluation, which means that the work done by him/her is not sufficient and s/he has to retake the course from the beginning.  1. One of the negative assessment: In case of not passing, the University fixes additional exam at least in 5 days, after the announcement of final examination results, which must be published in the examination table.  2. The grades, which student gets after additional test is a student's final grades, in which is not considered the negative points of the major examination.  If a student receives from 0 to 50 points after additional test, in the final exam sheet is formed (F) -0 for the student. |
| **Course description** | **appendix1** |
| **Assessment system/activities, methods**  **and criteria** | The sum of the course assessment (100 points) breaks down as follows:   * **Activities- 30points** * **Midterm exam - 30points** * **Final Exam - 40 points**   **Activities – 20 points**. Each student is evaluated 10 times a semester, each evaluation – 2 points: total – 20 points, Evaluation criteria:  2,0 points - s/he is active during classes, obtains perfect knowledge of the ongoing topic, answers all questions completely.  1,0 points - s/he is less active during classes, does not present perfect knowledge of the ongoing topic, answers questions partly.  0 - s/he is less active during classes/group works, does not present perfect knowledge of the ongoing topic, does not answer any questions.  **Quiz** – total**10 points**  Includes theoreticalmaterial, it holds 2 times in semester,each quizincludes 5 issues, each correct answer is evaluated with 1 point, each wrong answer is evaluated with 0 point.  **Midterm exam – 30 points.**(The format of midterm examination is written, Task includes 15 questions, each correct answer is evaluated with 2 points).  2.0 points - the answer is complete, student shows perfect knowledge of the given question/topic.  1.0 points- the answer is limited;student answers briefly.  **Final Exam -40 points**- is combined:  - Oral component-20 points,  - Written component - 20 points.  *Oral component*:t here are given four topics, each is evaluated by maximum of5 points.  5 points- student obtains perfect knowledge of the given topic, has full awareness of problem issues, s/he has used different sources to cover material answers all questions completely.  4 points –student obtains good knowledge of the given topic, has good understanding of problem issues, S/he has used several sourses, answers all questions well.  3 points –student obtains fair knowledge of the given topic, partly understands the problem issues, s/he has used a few sourses, answers all questions briefly.  2 points – student has fair knowledge of the giventopic, does not understand the problem issues, answers some questions briefly. S/he has used a few sourses.  1 point –student has fair knowledge of the presented topic, cannot answer all questions.  *Written component :* administered in writtenform (the test). |
| **Core literature:** | 1. "Molecular Basis of medical Cell Biology "M.Fuller, D.Shields; 2. Medical Cell Biology ", edit. Steven R. Goodman. 3. Molecular Biology of The Cell" –B.Alberts, A.Jonson,L.Raff,K.Roberts, R.Walter 4. Modern Biology-J.H.Postlethwait,J.L.Hopson.   5. M.Pavelka,J.Roth-Functional ultrastructure- atlas of tissue biology and pathology. |
| **Additional literature** | 1. "Developmental Biology" - Scott F. Gilbert, 2006. |
| **Learning outcomes, competences**  **(general and field specific)** | **Knowledge**   1. Student explains about the ongoing processes of molecular mechanisms occurring within the composition, architecture, diversity and structure of cells. 2. Student describes the structure and function of prokaryotic and eukaryotic cells. 3. Student explains the Life Cycle of Cells, It’s Stages and Periodization. 4. Student compares the protein and nucleic acid structure and functionand the relationship between them.   **Skills**   1. Student applies critical thinking and logical analysis in the assessment and evaluation of issues in cell biology and genetics; 2. Student evaluates recent advances in molecular biology and their impact on society. 3. Student correlates the basic mechanisms of vital processes with basic aspects of genetic diseases |
| **Learning/Teaching methods** | Lecture/ practical  Individual/Group work  Verbal teaching method  Demonstration of study materials  Presentation  Explanation methods  Discussion/debate |

**appendix1**

**Course description:**

**Topics of the lecture, practical classes/laboratory work/working group, literature**

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| **Week №** | **Type of**  **the class** | **Topics** | **Contact hours** | **literature** |
| **Iweek** | Lect. | Introduction: Medical Biology: its importance and relation to medicine. Basic characteristics of life and its diversity. Cell as the structural, functional and genetic unit of life; the universal features of cells. | **1** |  |
| Pract. | Shared characteristics of life. Life’s diversity.The levels of Life Organization. Major Life Forms. Metabolism, interdependency among organism. | **2** |  |
| **IIweek** | Lect. | Generalized picture of the cell, cell theory, basic aspects of cell structure and function. Type of the cells. prokaryotic and eukaryotic cells stricture. | **1** |  |
| Pract. | Generalized picture of the cell, cell theory, basic aspects of cell structure and function. Type of the cells. prokaryotic and eukaryotic cells stricture. | **2** |  |
| **IIIweek** | Lect. | Structural-functional organization of cells: biological membrane, its chemical structure and functions; membrane transport and its importance. | **1** |  |
| Pract. | Nucleus and its Structural Components. Nuclear envelope, nucleolus chromosomes. | **2** |  |
| **IVweek** | Lect. | Structure and function of intracellular organelles: nucleus, mitochondria, peroxisomes, the endoplasmic reticulum. Processes going on within these organelles and diseases resulting from their dysfunction. Vesicular transport, its molecular mechanisms; the Golgi complex | **1** |  |
| Pract. | Lysosomes, their structure and function. Endocytosis and its types, diseases caused by the impairment of endocytosis | **2** |  |
| **V week** | Lect. | Cell cycle and its regulation. Apoptosis, its molecular mechanisms | **1** |  |
| Pract. | Cell investigation methods | **2** |  |
| **VIweek** | Lect. | Principles of development: types of reproduction; meiosis, gametes, gametogenesis, the importance of sexual reproduction | **1** |  |
| Pract. | Molecular mechanisms of fertilization in humans, human reproduction peculiarities | **2** |  |
| **VII week** | Lect. | Principles of individual development: ontogenesis; its periodization. Stem cells and their importance | **1** |  |
| Pract. | Principles of homeostasis, cellular mechanisms of homeostasis; regeneration, transplantation | **2** |  |
| **VIII week** | **Midterm** | | 2 |  |
| **IX week** | Lect. | Ageing and death, their biological and molecular mechanisms | **1** |  |
| Pract. | Dividing cells. The bridge between the generations.Eukaryotic gene structure. Chromatin and its Structural Organization Chromosomes structure and number. | **2** |  |
| **X week** | Lect. | The Life Cycle of Cells, its Stages: its Periodization: Mitosis, Amitosis, Endomitosis. Comparative Aspects of Reproductive Biology: Reproduction in the Organic World.Cell MultiplicationThe Phases of Mitosis. Dynamics and Continuity of Chromosome Structures during the Life Cycle | **1** |  |
| Pract. | Mitosis and cell cycle, stages of mitosis. Sexual and asexual reproduction, Biological Role of Meiosis. Reproduction – its Biological Essence, Artificial Reproduction, Parthenogenesis | **2** |  |
| **XI week** | Lect. | Type of nucleotides. DNA discoveryand DNA function. | **1** |  |
| Pract. | DNA discoveryand DNA function | **2** |  |
| **XII week** | Lect. | DNA structure and function. Organization level of DNA double helix. RNA, type, and function | **1** |  |
| Pract. | Closer look of replication. Origin and direction of replication. Type and functions of DNA polymerases.. | **2** |  |
| **XIII week** | Lect. | DNA repair mechanisms. | **1** |  |
| Pract. | Central dogma of molecular biology. transcription of DNA into RNA. stages of transcription.. | **2** |  |
| **XIV week** | Lect. | Posttranscriptional modification of messenger RNA | **1** |  |
| Pract. | From DNA to protein. Protein synthesis protein folding. | **2** |  |
| **XV week** | Lect. | Stepwise synthesis of proteins on ribosomes. Translation, stages of translation. | **1** |  |
| Pract. | Codon-Anticodon interaction., recognition of AUG start codon | **2** |  |
| **XVI week** | Lect. | Role of molecular biology in modern medicine. | **1** |  |
| Pract. | Overview of previous material. | **2** |  |
| **XVII-XVIII week** | **Final Exam** | | **2** |  |
| **XIX-XXweek** | **Additionalexam** | |  |  |