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|----|--|---|---|-------------------|--------------|
| 1  | Subject  | <b>BIOLOGY</b>  |   |                   |              |
| 2  | Code   | DBL103  |   |                   |              |
| 3  | Study Program  | Study Program of Integrated studies in dental medicine            |   |                   |              |
| 4  | Organizing Institution (Unit, Institute, Chair, Department)  | Faculty of Natural Sciences and Mathematics, Institute of Biology |   |                   |              |
| 5  | Educational degree (first or second cycle)   | Integrated study  |   |                   |              |
| 6  | Study year/semester  | 1/1   | 7 | Number of credits | 5            |
| 8  | Teacher  | Dr. Icko Gjorgoski, full professor                                |   |                   |              |
| 9  | Preconditions  | /   |   |                   |              |
| 10 | <p>Teaching goals: To enable students in the first year of studies to become familiar with the basis of life, the diversity of living organisms, the basic organization of the cell, its structure, its communication with other cells and the environment as well with cell cycle control. On the other hand, students will be able to get acquainted with the basics of molecular biology and gene techniques and methods that are used in modern biotechnological processes. During the course, the student will be able to master the basic techniques of microscopy, the isolation of gene material, and his laboratory processing. Knowing the organization and functioning of cells at the molecular level of students will facilitate the understanding of the processes that arise as a cause of disease, as well as the possibility of using modern technologies for treatment of the conditions that students will meet in other subjects in course of studies.</p> |   |   |                   |              |
| 11 | <b>Brief content</b>   |   |   |                   |              |
|    | <b>Theoretical course</b>  |   |   |                   | <b>Class</b> |
|    | 1. Biology as a Natural Science, Biology Today, Origin of Life   |   |   |                   | 2            |
|    | 2. The nature of the molecules and the building blocks of living organisms   |   |   |                   | 2            |
|    | 3. Diversity of living organisms   |   |   |                   | 2            |
|    | 4. Introduction to the cell - prokaryotic and eukaryotic organization  |   |   |                   | 2            |
|    | 5. Construction of the cellular membrane-construction and function of the molecules in the membranes   |   |   |                   | 2            |
|    | 6. How cells provide energy and how to use it  |   |   |                   | 2            |
|    | 7. Membrane transport and cellular communication   |   |   |                   | 2            |
|    | 8. Cell division,  |   |   |                   | 2            |
|    | 9. Cellular control system and cell death  |   |   |                   | 2            |
|    | 10. Pathways of inheritance  |   |   |                   | 2            |
|    | 11. Structure and function of DNA, Chromosomes and genes   |   |   |                   | 2            |
|    | 12. Gene expression, from DNA to proteins  |   |   |                   | 2            |
|    | 13. Changes in gene material and their impact and protection   |   |   |                   | 2            |
|    | 14. DNA and Biotechnology  |   |   |                   | 2            |
|    | 15. Biology in the future of dentistry   |   |   |                   | 2            |
|    | <b>Total</b>   |   |   |                   | <b>30</b>    |
|    | <b>Practical lessons:</b>  |   |   |                   | <b>Class</b> |
|    | Microscopy   |   |   |                   | 6            |
|    | Microscopy of native preparations  |   |   |                   | 3            |
|    | Microscopy of permanent transcription and recognition of cellular structures   |   |   |                   | 3            |

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|----|--|--|---|----------------------|---------------|------|
|    | Cell division stages   |  |   |                      | 6             |      |
|    | Isolation of DNA, Digestion with restriction endonucleases,  |  |   |                      | 6             |      |
|    | Separation of DNA fragments  |  |   |                      | 6             |      |
|    | Total  |  |   |                      | 30            |      |
| 12 | Methods of studying: class room oriented lectures, interactive lectures, group work, practical training, seminar paper |  |   |                      |               |      |
| 13 | Total available time   | 150 classes  |   |                      |               |      |
| 14 | Organization of the course   | 30 classes - theoretical course, 30- practical course, 90 classes - home individual learning and other activities  |   |                      |               |      |
| 15 | Forms of teaching activities   | 15.1.  | Theoretical course  | 30 classes           |               |      |
|    |  | 15.2.  | Practical course, seminars  | 30 classes           |               |      |
| 16 | Other forms of activities  | 16.1.  | Project tasks   |                      |               |      |
|    |  | 16.2.  | Individual tasks  | 15 classes           |               |      |
|    |  | 16.3.  | Individual (home) learning  | 75 classes           |               |      |
| 17 | Method of assessment   | 17.1.  | Tests   | 30 points            |               |      |
|    |  | 17.2.  | Active participation, seminar paper/project (oral/written presentation) | 10 points            |               |      |
|    |  | 17.3.  | Final (oral) exam   | 60 points            |               |      |
| 18 | Grading criteria (points / grade)  | Up to 59 points  |   |                      | 5 (five) (F)  |      |
|    |  | from 60 to 67 points   |   |                      | 6 (six) (E)   |      |
|    |  | from 68 to 75 points   |   |                      | 7 (seven) (D) |      |
|    |  | from 76 to 84 points   |   |                      | 8 (eight) (C) |      |
|    |  | from 85 to 93 points   |   |                      | 9 (nine) (B)  |      |
|    |  | from 94 to 100 points  |   |                      | 10 (ten) (A)  |      |
| 19 | Requirement for signature and taking the final exam  | <p>The student is required to actively follow all of the planned activities.</p> <p>Conditional criteria for assessment of knowledge:</p> <p>In order to get a signature, the student should obtain minimum points in both theoretical and practical courses, and to present seminar paper;</p> <p>In order to take the final exam, the student should obtain the minimum points from activity and test;</p> <p>If the student has not obtained the minimum points in the continual assessments, he/she in next exam session will have paper part of the exam (70 points) and final exam (30 points)</p> |   |                      |               |      |
| 20 | Language of the course   | English  |   |                      |               |      |
| 21 | Method for evaluation of the quality of education  | Anonymous student's evaluation of the subject, teachers and collaborators involved in the educational activities   |   |                      |               |      |
| 22 | <b>Literature</b>  |  |   |                      |               |      |
|    | 22.1.  | <b>Mandatory textbooks</b>   |   |                      |               |      |
|    |  | No.  | Author  | Title                | Publisher     | Year |
|    |  | 1  | Gjorgoski, I., and ass  | Biology for dentists | FNSM- Skopje  | 2018 |

|  |       |                              |                     |                        |                              |      |
|--|-------|------------------------------|---------------------|------------------------|------------------------------|------|
|  |       | 2                            | Albert et al.       | Essential Biology      | Garland Pub. New York&london | 2004 |
|  | 22.2. | <b>Additional literature</b> |                     |                        |                              |      |
|  |       | No.                          | Author              | Title                  | Publisher                    | Year |
|  |       | 1                            | Snustad and Simmons | Principles of Genetics | John Wiley&Sons Singapore    | 2017 |