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| 1. | Course title | **Introduction to Genetics Engineering** | | |
| 2. | Course code | InIS-I-03 | | |
| 3. | Study program | Intelligent Systems Engineering | | |
| 4. | Unit offering the course | **FCSE** | | |
| 5. | Undergraduate/master/PhD | **Master** | | |
| 6. | Year/semester<br>1(2)/spring/compulsory | 7. ECTS: **6** | | |
| 8. | Teacher(s) | Nevena Ackovska, Ana Madevska Bogdanova | | |
| 9. | Course prerequisites | None | | |
| 10. | Goals (competences):<br>The subjects enables the students to understand the basics of genetics engineering. Although the methods used in genetics engineering are traditionally considered as related to biomedical sciences, in the last decade more scientists from other, classical engineering disciplines, are interested in obtaining specific characteristics using bio-principles.<br>Upon completion of this course the students should be able to:<br>• understand the methods for gene separation, both in laboratory conditions and in nature.<br>• learn the basics of enzyme functioning in order to obtain wanted genetics information<br>• get introduced to the ethical issues of this modern engineering discipline. | | | |
| 11. | Course content:<br>• Gene organization<br>• Gene expression<br>• Genes and genomes<br>• DNA isolation<br>• Electrophoresis<br>• DNA sequencing<br>• Enzymes<br>• Host cells and vectors<br>• Genetic engineering<br>• Ethics and genetic engineering | | | |
| 12. | Teaching methods:<br>Lectures supported by slide presentations, interactive lectures, trainings (using lab equipment and software packages), team work, case studies, invited guests and lectures, individual practical assignments presentations, seminar paper, e-learning (forums, consultations). | | | |
| 13. | Total available time | 6 ECTS x 30 hours = 180 hours | | |
| 14. | Distribution of the available time | 30+30+40+40+40 = 180 hours | | |
| 15. | Teaching activities | 15.1. | Lectures | 30 hours |

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| | | 15.2. | Training (labs, problem solving), seminar and team work | 30 hours |
| 16. | Other activities | 16.1. | Project work | 40 hours |
| | | 16.2. | Self study | 40 hours |
| | | 16.3. | Home work | 40 hours |

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| 17. | Grading | | |
| | 17.1. | Tests | 20 points |
| | 17.2. | Seminar work/project (written or oral presentation) | 70 points |
| | 17.3. | Active participation | 10 points |

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| 18. | Grading criteria | to 59 points | 5 (five) (F) |
| | | from 60 to 68 points | 6 (six) (E) |
| | | from 69 to 76 points | 7 (seven) (D) |
| | | from 77 to 84 points | 8 (eight) (C) |
| | | from 85 to 92 points | 9 (nine) (B) |
| | | from 93 to 100 points | 10 (ten) (A) |
| 19. | Final exam prerequisites | Successfully completed activities 15.1 and 15.2 | |
| 20. | Course language | Macedonian and English | |
| 21. | Quality assurance methods | Internal evaluation and student questionnaires | |

22. Literature

22.1. Compulsory

| No. | Authors | Title | Publisher | Year |
|---|---|---|---|---|
| 1 | M Desmond S. T. Nicholl | An Introduction to Genetic Engineering, | Cambridge University Press | 2008 |
| 2. | Gustav Joseph Victor Nossal, Ross L. Coppe | Reshaping Life: Key Issues in Genetic Engineering, 3rd Edition | Cambridge University press | 2002 |
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22.2. Additional

| No. | Authors | Title | Publisher | Year |
|---|---|---|---|---|
| 1. | | | | |
| 2. | | | | |
| 3. | | | | |