

Biotechnology and Genetic Engineering Program
Correlation Matrix between Taught Obligatory Courses and Program Learning Outcomes

| No. | Program Learning Outcomes | Course Name | Assessment Method in Detail | Target Performance Level |
|------------------|--|---|--|---|
| K _p 1 | Understand and recognize the biochemical, molecular and cellular structure of organisms and biological systems. | Human Cell Technology (0240370) | A ten-point essay assessment that is included in the final exam mark. An individual task distributed in more than one form (assignment, report, short exam, presentation, writing a summary) and is evaluated on a regular basis. | 100% get a score of 7 or more 100% of students score 68% or higher on the performance assessment scale. |
| | | Molecular Biology (0240386) | Objective assessment, multiple choice, 10 marks, in the final exam | 100% get a score of 6 or more |
| | | General Biology (1)- (0216151) | Essay and objective assessment of exams, (quizzes, mid-term, homework and final exam) | 90% of students score 50% or higher on the performance assessment scale. |
| | | Biochemistry (1) - (0240343) | Essay and objective assessment of exams, (quizzes, mid-term, homework and final exam) | 90% of students score 50% or higher on the performance assessment scale. |
| | | Microbiology Lab (0240217) | Objective questions in short, midterm and final exams | 100% of students achieve the purpose of the learning outcome |
| | | Genetics Lab (0240232) | Objective questions in short, midterm and final exams | 100% of students achieve the purpose of the learning outcome |
| | | Cell Biology (0240233) | Quiz, midterm and final exam (objective and short answer questions) Assignment/ homeworks per student | |
| | | Plant Biotechnology (0240326) | Quiz, midterm and final exam (objective and short answer questions) | |
| K _p 2 | Understand concepts, applications and regulations of the existing and emerging methods of biotechnology and the role of bio-entrepreneurs in the successful commercial innovations. | Human Cell Technology (0240370) | Objective assessment, multiple choice, 10 marks, in the final exam | 100% get a score of 6 or more |
| | | Applied Molecular Biology (0240482) | Objective assessment, multiple choice, 10 marks, in the final exam An individual task distributed in more than one form (assignment, report, short exam, presentation, writing a summary) and is evaluated on a regular basis. | 100% get a score of 6 or more 100% of students score 68% or higher on the performance assessment scale. |
| | | Introduction to Biotechnology (0240282) | Essay and objective assessment of exams, (quizzes, mid-term, homework and final exam) | 90% of students score 50% or higher on the performance assessment scale. |
| | | Proteins Biotechnology (0240447) | An individual task distributed in more than one form (assignment, report, short exam, presentation, writing a summary) and is evaluated on a regular basis. | 100% of students score 68% or higher on the performance assessment scale. |
| | | Microbiology Lab (0240217) | Objective questions in short, midterm and final exams | 100% of students achieve the purpose of the learning outcome |
| | | Genetics Lab (0240232) | Objective questions in short, midterm and final exams | 100% of students achieve the purpose of the learning outcome |
| | | Cell Biology (0240233) | Quiz, midterm and final exam (objective and short answer questions) Assignment/ homeworks per student | |
| | | Plant Biotechnology (0240326) | Quiz, midterm and final exam (objective and short answer questions) Assignment/ homeworks per student | |
| K _p 3 | Understand the molecular techniques including: immunological techniques, gene cloning, polymerase chain reaction, DNA sequencing, gene editing, blotting and nucleic acids hybridizations along with the basic skills of laboratory organization and management. | Cell Biology (0240233) | Objective assessment, multiple choice, 10 marks, in the final exam A ten-point essay assessment that is included in the final exam mark. An individual task distributed in more than one form (assignment, report, short exam, presentation, writing a summary) and is evaluated on a regular basis. | 100% get a score of 6 or more 100% get a score of 7 or more 100% of students score 68% or higher on the performance assessment scale. |
| | | Applied Molecular Biology (0240482) | Objective assessment, multiple choice, 10 marks, in the final exam A ten-point essay assessment that is included in the final exam mark. | 100% get a score of 6 or more 100% get a score of 7 or more |
| | | General Biology (1)- (0216151) | Objective assessment of short exams during the semester | 90% of students score 60% or higher on the performance assessment scale. |
| | | Introduction to Biotechnology (0240282) | objective assessment of exams, quizzes, mid-term homework and final exam | 90% of students score 60% or higher on the performance assessment scale. |
| | | Genetics Lab (0240232) | Objective questions in short, midterm and final exams | 100% of students achieve the purpose of the learning outcome |
| | | Cell Biology (0240233) | Quiz, midterm and final exam (objective and short answer questions) | |
| | | Plant Biotechnology (0240326) | Quiz, midterm and final exam (objective and short answer questions) | |

| No. | Program Learning Outcomes | Course Name | Assessment Method in Detail | Target Performance Level |
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| Kp4 | Understand the basic principles of heredity in particular the inheritance patterns of human traits and its implication on human health and possible gene therapy. | Genetics (0240231) | Essay exams include a midterm exam, 3 quizzes and a final exam. | Good |
| | | Genetics Lab (0240232) | Objective questions in short, midterm and final exams | 100% of students achieve the purpose of the learning outcome |
| Kp5 | Define basic concepts in microbial biotechnology and ecology for biodegradation and bioremediation of pollutants, fermentation kinetics, metabolite excretion and production of biological ingredients for industries. | Applied Molecular Biology (0240482) | A ten-point essay assessment that is included in the final exam mark. | 100% get a score of 7 or more |
| | | | A ten-point essay assessment that is included in the final exam mark. | 100% get a score of 7 or more |
| | | Genetics Lab (0240232) | Objective questions in short, midterm and final exams | 90% of students submit the topic on time and collect information from reliable scientific sources |
| Kp6 | Conceptualize the fundamentals of computer programs and databases and their applications in research, medicine and biotechnology. | Animal Tissue Culture (0240472) | An individual task distributed in more than one form (assignment, report, short exam, presentation, writing a summary) and is evaluated on a regular basis. | 100% of students score 68% or higher on the performance assessment scale. |
| | | | Practical Task | 100% of students score 68% or higher on the performance assessment scale. |
| | | Molecular Genetics and Human Genome (0240333) | Essay exams include a midterm exam, 3 quizzes and a final exam. | Good |
| | | Bioinformatics (0240464) | Written and oral exams including a midterm exam, 3 quizzes and a final exam. | Good |
| | | Proteins Biotechnology (0240447) | Individual assignment to write a report during the semester on the principle of predicting the three-dimensional shape of proteins and its application. | 90% of students submit the topic on time and collect information from reliable scientific sources |
| | | Plant Biotechnology (0240326) | HomeWorks and assignments Quiz, midterm and final exam (objective and short answer questions) | |
| | | Seminar and Scientific Writing (0240394) | Present seminar per student Practice writing a report per student and write a proposal Quiz, midterm (objective and short answer questions on skills of writing) | |
| Sp1 | Demonstrate ability and responsibility in using, preserving and maintaining laboratory equipment's necessary in the applications of biotechnology and related fields. | Microbiology Lab (0240217) | Write a report after each experiment. | 95% of students achieve the purpose of the learning outcome |
| | | Genetics Lab (0240232) | Write a report after each experiment. | 95% of students achieve the purpose of the learning outcome |
| | | Plant Tissue Culture (0240323) | Quiz, midterm and final exam (objective and short answer questions) Writing reports per each student | |
| | | General Biology (1) Lab - (0240106) | Quiz, midterm and final exam (objective and short answer questions) Writing reports per each student | |
| | | Lab Management and Entrepreneurship in Biotechnology (0240390) | Quiz, midterm and final exam (objective and short answer questions) Writing a proposal for establishing a lab in one of the fields of biotechnology Writing a proposal of an entrepreneur idea and its marketability | |
| Sp2 | Investigate and analyze the role of heredity and molecular genetics in a wide range of application. | Cytogenetics (0240335) | A ten-point essay assessment that is included in the final exam mark. Objective assessment, multiple choice, 10 marks, in the final exam | 100% get a score of 6 or more 100% get a score of 7 or more |
| | | Genetics (0240231) | Written exams include a midterm exam, 3 quizzes and a final exam. | Good |
| | | Molecular Genetics and Human Genome | Written exams include a midterm exam, 3 quizzes and a final exam. | Good |
| | | Bioinformatics (0240464) | Written and oral exams including a midterm exam, 3 quizzes and a final exam. | Good |
| Sp3 | Demonstrate proficiency; establish, maintain and preserve cell cultures using aseptic techniques and standard procedures. | Animal Tissue Culture (0240472) | Practical task A ten-point essay assessment that is included in the final exam mark. Objective assessment, multiple choice, 10 marks, in the final exam | 100% of students score 68% or higher on the performance assessment scale. 100% get a score of 7 or more 100% get a score of 6 or more |
| | | Plant Tissue Culture (0240323) | Writing reports per each student. Quiz, midterm and final exam (objective and short answer questions). | 95% of the students should be able to initiate their plant cultures and take care of them. |

| No. | Program Learning Outcomes | Course Name | Assessment Method in Detail | Target Performance Level |
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| S _p 4 | Use the appropriate computational tools and databases to make sense of the molecular data (DNA, RNA and Protein). | Cytogenetics (0240335) | Study and analysis of a medical case for a scientific publication with a presentation and submission of a medical report on the most important genetic tests covered in the scientific paper. | 100% of students score 68% or higher on the performance assessment scale. |
| | | | Presenting a research topic in front of class. | 100% of students score 68% or higher on the performance assessment scale. |
| | | | An individual task distributed in more than one form (assignment, report, short exam, presentation, writing a summary) and is evaluated on a regular basis. | 100% of students score 68% or higher on the performance assessment scale. |
| | | Human Cell Technology (0240370) | Presenting a research topic in front of class. | 100% of students score 68% or higher on the performance assessment scale. |
| | | Applied Molecular Biology (0240482) | Presenting a research topic in front of class. | 100% of students score 68% or higher on the performance assessment scale. |
| | | | Written and oral exams including a midterm exam, 3 quizzes and a final exam. | Good |
| | | Proteins Biotechnology (0240447) | Presenting a research topic in front of class. | 90% of students score 60% or higher on the performance assessment scale. |
| | | Genetics Lab (0240232) | HomeWorks | 85% of students achieve the purpose of the learning outcome |
| | | Microbiology Lab (0240217) | HomeWorks | 85% of students achieve the purpose of the learning outcome |
| Plant Tissue Culture (0240323) | HomeWorks and assignments per each student | | | |
| Plant Biotechnology (0240326) | HomeWorks and assignments per each student | | | |
| S _p 5 | Practicing time management, balancing workload, implementing and following biosafety regulations, designing, managing and running biological laboratories and biotech firms. | Genetics Lab (0240232) | Perform the experiment as groups and evaluate each student's performance in the laboratory. | 100% of students achieve the purpose of the learning outcome |
| | | Microbiology Lab (0240217) | Perform the experiment as groups and evaluate each student's performance in the laboratory. | 100% of students achieve the purpose of the learning outcome |
| | | Plant Tissue Culture (0240323) | Perform the experiment as groups and evaluate each student's performance in the laboratory. | |
| | | General Biology (1) Lab - (0240106) | Instructor evaluation at the end of the semester | |
| C _p 1 | Recognize the use of biotechnology to study, monitor and treat diseases and alter food and environment. | Field Training (0240494) | Practical Task | 100% of students score 68% or higher on the performance assessment scale. |
| | | | Extracting scientific papers and critiquing them as individual assignments | 75% of students score 68% or higher on the performance assessment scale. |
| | | | Proficiency exam | 100% of students achieve the purpose of the learning outcome |
| | | Genetics (0240231) | Written exams include a midterm exam, 3 quizzes and a final exam. | Good |
| | | Molecular Genetics and Human Genome (0240333) | Written exams include a midterm exam, 3 quizzes and a final exam. | Good |
| | | Bioinformatics (0240464) | Written and oral exams including a midterm exam, 3 quizzes and a final exam. | Good |
| | | General Biology (1)- (0216151) | Applied assignment and writing assignment on some important topics | 90% of students score 75% or higher on the performance assessment scale. |
| | | Microbiology Lab (0240217) | Homework | 100% of students achieve the purpose of the learning outcome |
| | | Genetics Lab (0240232) | Homework | 100% of students achieve the purpose of the learning outcome |
| | | Cell Biology (0240233) | Short Quiz, midterm and final exam (objective and essay questions) Writing reports and doing assignments | 60% of students should be able to find a solution and/or related scientific background to solve a problem/question |
| | | Lab Management and Entrepreneurship in Biotechnology (0240390) | Short Quiz, midterm and final exam (objective and essay questions) Writing reports and doing assignments | 60% of students should be able to find a solution and/or related scientific background to solve a problem/question |
| | | Plant Biotechnology (0240326) | Short Quiz, midterm and final exam (objective and essay questions) Writing reports and doing assignments | 60% of students should be able to find a solution and/or related scientific background to solve a problem/question |
| | | General Biology (1) Lab - (0240106) | Short Quiz, midterm and final exam (objective and essay questions) Writing reports and doing assignments | 60% of students should be able to find a solution and/or related scientific background to solve a problem/question |
| | | Plant Tissue Culture (0240323) | Short Quiz, midterm and final exam (objective and essay questions) Writing reports and doing assignments | 60% of students should be able to find a solution and/or related scientific background to solve a problem/question |
| Seminar and Scientific Writing (0240394) | Short Quiz, midterm and final exam (objective and essay questions) Writing reports and doing assignments | 60% of students should be able to find a solution and/or related scientific background to solve a problem/question | | |

| No. | Program Learning Outcomes | Course Name | Assessment Method in Detail | Target Performance Level |
|-------------------------------------|---|---|--|--|
| C _P 2 | Demonstrate critical thinking skills utilize a wide range of information sources and communicate through oral presentations and written reports | Research Project (0240499) | Applied Assignment | 100% of students score 68% or higher on the performance assessment scale. |
| | | | Writing a review paper and submitting it in printed form individually or in groups | 100% of students score 68% or higher on the performance assessment scale. |
| | | Cytogenetics Lab (0240336) | Applied assignment | 100% of students score 68% or higher on the performance assessment scale. |
| | | | An individual task distributed in more than one form (assignment, report, short exam, presentation, writing a summary) and is evaluated on a regular basis. | 100% of students score 68% or higher on the performance assessment scale. |
| | | | A ten-point essay assessment that is included in the final exam mark. | 100% get a score of 7 or more |
| | | Microbiology Lab (0240217) | Writing a report | 100% of students achieve the purpose of the learning outcome |
| | | Genetics Lab (0240232) | Writing a report | 100% of students achieve the purpose of the learning outcome |
| | | Plant Tissue Culture (0240323) | Writing reports or doing assignments after practical work. Short Quiz, midterm, final exam (objective and essay questions) Instructor evaluation of student's lab skills | |
| General Biology (1) Lab - (0240106) | Writing reports or doing assignments after practical work. Short Quiz, midterm, final exam (objective and essay questions) Instructor evaluation of student's lab skills | | | |
| C _P 3 | Recognize the need for, and have the preparation and ability to engage in life-long learning independently, with a high level of enthusiasm and commitment to improve knowledge and competence continuously | Research Project (0240499) | Presenting a research topic in front of class. | 100% of students score 68% or higher on the performance assessment scale. |
| | | | A research project on a specific issue in biotechnology. The student investigates and researches its ethical implications in religious, legal and customary aspects and its impact on society. | Good |
| | | Biochemistry (1) - (0240343) | Write anscientific topic and submit it at the end of the semester. | 90% of students submit the topic on time and collect information from reliable scientific sources. |
| | | Proteins Biotechnology (0240447) | Presenting a research topic in front of class. | 90% of students collect information from reliable scientific sources and present it in an acceptable manner. |
| | | Genetics Lab (0240232) | Discussion of experimental results | 70% of students achieve the purpose of the learning outcome |
| Microbiology Lab (0240217) | Discussion of experimental results | 70% of students achieve the purpose of the learning outcome | | |
| C _P 4 | Demonstrate professional and ethical conduct in compliance with biorisk and biosafety regulations | Ethics in Biotechnology (0240491) | A research project on a specific issue in biotechnology. The student investigates and researches its ethical implications in religious, legal and customary aspects and its impact on society. | Good |