Program Final examination of Discipline “Methods of molecular biotechnology”

**6D05105 Biotechnology**

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| Describe methods of extraction of nucleic acids from different biological materials  |
| Present the main principle of methods and components used for cell lysis  |
| Characterize the main principles of RNA extraction |
| Give characterization of the types of electrophoresis |
| Present the methods to analyse PCR products |
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| Describe the main principles of DNA extraction |
| Show the main approaches and methods of molecular biotechnology  |
| Describe hybridization conditions and melting temperature of nucleic acids |
| Carry out analysis and characterization of nucleic acids  |
| Present Characterize Important Factors that affect Stringency and Hybridization |
| Relation between melting temperature and Oligonucleotide concentration |
| Modification of nuclear acids  |
| Describe Different types of endonucleases and their use in molecular biotechnology |
| Describe the main principles of electrophoresis for analysis of nucleic acids **and** Separation Techniques for different types of DNA  |
| Show methods of nucleic Acid Detection DNA  |
| Characterize the use of SDS-PAGE for analysis of nucleic acids |
| Present characterization of DNA cloning techniques  |
| Describe sequencing techniques of nucleic acids  |
| Analyze multiple cloning site (MCS)characterization and use in molecular biotechnology. Subclone characterization and use. |
| MicroRNA Cloning from Cells of the Immune System. Use of nucleases, exonuclease, restrictase in molecular biotechnology. |
| DNA Separation Techniques. Construction of Small RNA cDNA Libraries for Deep Sequencing |
| MicroRNA-Profiling in Formalin-Fixed Paraffin-Embedded Specimens Functional Analysis of miRNAs in the Immune System: Gain-of-Function Expression of miRNAs in Lymphocytes. |
| Characterize in vivo DNA cloning techniques |
| Show base‐Modified Nucleic Acids as a Powerful Tool for Synthetic Biology and Biotechnology.  |
| Present genome mapping, genetic mapping, physical mapping , mapping distance.  |
| Give characterization of sequencing techniques of DNA. |
| Present Gene expression analysis |
| Give characterization of principles and applications of different types of PCR in molecular biotechnology and  |
| Strategies for SNP detections strategies for arrays. |
| Protocols of Real-Time PCR |
| 1. Protocols *Allele-specific PCR*
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| 1. Protocols *Convective PCR*
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| 1. Present protocols of *Asymmetric PCR*
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| 1. Characterize the protocols of *Dial-out PCR*
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| Characterize developing single nucleotide polymorphism (SNP) markers for identification of germplasm |
| Describe the molecular markers in breeding  |
| Show the advantages of the molecular markers |
| Characterize the RAPD and molecular marker and its steps |
| Present AFLP molecular marker and its steps of applications  |
| Subclone characterization and use. Multiple cloning site (MCS)characterization and use in molecular biotechnology |
| Mismatches and single nucleotide polymorphisms (SNPs) |
| Mass analysis of proteolytic peptides is a popular method of protein characterization, as cheaper instrument designs used for characterization.  |
| Limitations of DNA microarrays.  |
| Preparation of DNA chip and the experiment **Collection and analysis of microarry** |
| Give characterization of Constructing a **DNA library and** genomic library |
| Present the methods of molecular cloning  |
| Describe of sequencing techniques of protein. |
| Show the methods of blotting for nucleic acids and proteins  |
| To Describe the methods to study transcriptomes and proteomes |