

Syllabus of Genetic Engineering Course (Theoretical) (2023/2024)

**PhD Microbiology
Coordinator- Prof. Dr. Inam Jasim Lafta**

Theoretical Subjects

week	Subjects
1	Introduction, Recombinant DNA technology, Applications
2	Sub-cloning, DNA sources, Enzymes used in DNA cloning
3	Examples of some restriction endonucleases type II, Creation of recombinant DNA molecules, Vectors and hosts
4	Examples of plasmid cloning vectors, Non-plasmid vectors
5	Artificial chromosomes, Shuttle & PCR vectors, Cloning in mammals
6	Mid Examination
7	Expression vectors, Transcribable vectors, Gateway cloning technology
8	Hosts used in cloning, Introduction of DNA into living cells, Obtaining a clone of a specific gene
9	Identification of a clone, Molecular analysis of cloned DNA
10	Applications of gene cloning and DNA analysis in research, biotechnology, medicine, forensic science and archaeology
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12	

Practical Subjects

week	Title of Lecture
1	Gene cloning, Types of vectors, Preparation of total cell DNA
2	Purification of DNA from a cell extract, Preparation of plasmid DNA, Preparation of bacteriophage DNA
3	Manipulation of purified DNA, Performing a restriction digest in the laboratory
4	Analyzing the result of restriction endonuclease cleavage, Joining DNA molecules together
5	Introduction of DNA into living cells, Preparation of competent <i>E. coli</i> cells, Selection for transformed cells
6	Mid Examination
7	Identification of recombinants
8	PCR assay, PCR variations,
9	RNA studies: RT-qPCR
10	Protein studies: IHC assay, SDS PAGE and Immunoblotting
11	Bioinformatics
12	Revision