



وكالة الجامعة للشؤون التعليمية
البرامج الدراسية والتطوير

(5)

مختصر توصيف المقرر

(Course Syllabus)

Genetic Engineering

هندسة وراثية	:
BIOL-453	:
BIOL-351	:
-	:
	:
3	:
Module Title:	Genetic Engineering
Module ID:	BIOL-453
Prerequisite (Co-requisite) :	Genetics, BIOL-351
Co-requisite :	-
Course Level:	7 TH
Credit Hours:	3

:(Course Information) *

Module Description

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This course gives an introduction to genetic engineering

The major objective of the paper is to provide information on genetic engineering of prokaryotic and eukaryotic organisms to the students. Additionally to improve the knowledge on genomic structure of microbes and applications of genetic engineering

This paper describes the latest techniques used in genetic engineering research, which is powerful tool in modern genetic engineering.

Module Aims

أهداف المقرر :

1	To provide a knowledge of principles and application of genetic engineering	1
2	To describe structure of DNA and plasmid vectors	2
3	To explain DNA application, cloning methods	3
4	To explain various types of cloning vectors and enzymes used in genetic engineering	4
5	To describe the applications of genetic engineering in medicine and agriculture	5

Learning Outcomes:

مخرجات التعليم:

1	Understanding the definition and history of genetic engineering	1
2	Knowledge of basic molecular biology techniques used to handling of living and clone cells Knowledge of different enzymes and vectors used in the genetic engineering field.	2

3	Understanding the use of the genetically modified organisms in medicine, industrial and agricultural field.	U
4	Practical knowledge of the operation of certain equipments (Thermal cyler, Gel documentation system) and instruments to amplify the DNA templates, and examine PCR products.	4
5	Practical skills and ability to work with different biological samples and the ability to obtain records, observe and analyze information in the laboratory.	5

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Course Contents:

ساعات التدريس (Hours)	الأسابيع (Weeks)	(Subjects)
2	1	Introduction and scope of genetic engineering
2	1	History of genetic engineering
4	2	Plasmid DNA, Genomic DNA – Structures and Watson Crick Model, DNA replication
4	2	Vectors (Plasmids, Phages, Cosmids, Shuttle vectors, PBR 322)
4	2	Enzymes in genetic engineering: exonuclease & endonuclease, concept of restriction and modification, Restriction endonucleases, DNA modifying enzymes, Ligases
6	3	Genetic engineering techniques <ul style="list-style-type: none"> • Transformation, • Recombinant DNA technology (molecular cloning), • Polymerase chain reactions
4	2	Steps involved in gene cloning and blotting techniques <ul style="list-style-type: none"> • Southern blotting • Northern blotting • Western blotting and PCR techniques
4	2	Applications of genetic engineering in medicine, agriculture and industry, Genetically modified crops, Role of Agrobacterium
30	15	Total
30	15	Practical's : Laboratory safety, DNA model, Isolation of DNA, Quantification of DNA, Transformation, Polymerase chain reaction, Agarose gel electrophoresis, Gel documentation, SDS Page, Western blotting

Textbook and References:

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ISBN	Publishing Year	Publisher	اسم المؤلف (رئيسي) Author's Name	Textbook title
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ISBN : 978-1-4051-3544-3	2006	Blackwell Science	Sandy B. Primrose, Richard Twyman	Principles of Gene Manipulation and Genomics,
ISBN 9781482260892	2015	CRC Press	Isil Aksan Kurnaz	Techniques in Genetic Engineering
ISBN 9780415300070	2002	CRC Press	W E Hill	Genetic Engineering: A Primer
ISBN-13: 978-0521615211	2008	Cambridge university press	Dr Desmond S. T. Nicholl	An Introduction to Genetic Engineering
ISBN 81-219-3190-8	2009	S Chand & Company, India	Verma PS, Agarwal PK	Genetic Engineering

