

**Al-Qasim Green University**

**College of Biotechnology/ Department of Genetic Engineering**

**YEAR:** Third

**SUBJECT:** Basic molecular technique

**THEORITICAL HOURS:** 2

**PRACTICAL HOURS:** 2

**UNITS:** 3

**Basic molecular technique ..... (Theoretical Syllabus)**

**Course module description:**

This is an introductory course of basic molecular technique . It is intended for students in the genetic engineering field. This course help students on understanding using the recent methods of molecular technique . the lectures of this course include DNA and RNA extraction, DNA cloning , polymerase chain reaction, Gel electrophoresis , molecular hybridization, reading and writing DNA, mutation in DNA and DNA array

**Course module academic calendar**

<b>week</b>	<b>Basic material to be covered</b>	<b>Hours</b>
1	Introduction, DNA extraction and purification	2
2	DNA extraction and purification	2
3	Gel electrophoresis	2
4	Gel electrophoresis	2
5	Polymerase chain reaction ,PCR dynamics ,PCR types	2
6	Polymerase chain reaction ,PCR dynamics ,PCR types	2
7	DNA cloning ,cut and paste DNA, bacterial transformation, tranfection	2
8	chromosome integration, cellular screening , cellular culture	2
9	Reading and writing DNA , DNA sequencing	2
10	Reading and writing DNA , DNA sequencing	2
11	Molecular hybridization ,Southren,Northren,Western blot	2
12	Molecular hybridization ,Southren,Northren,Western blot	2
13	DNA mutation	2
14	DNA arrays	2
15	DNA arrays	2

**Basic molecular technique ..... (Practical)**

**Course module academic calendar**

<b>week</b>	<b>Basic material to be covered</b>	<b>Hours</b>
1	Introduction , lab.biosafety	2
2	Buffers and instruments of molecular techniques	2
3	DNA extraction from animals	2
4	DNA extraction from animals	2
5	DNA extraction from plant	2
6	DNA extraction from microorngnisms	2
7	RNA extraction from animals	2
8	RNA extraction from plant	2
9	Gel Electrophoresis	2
10	Gel Electrophoresis	2
11	Gel Electrophoresis	2
12	Measurment of DNA concetration	2
13	DNA isolation , electrochromatochraphy,ion exchange	2
14	DNA isolation, SDS pag, PGE pag	2
15	Cloning technique	2

**Text Books :**

**References :**

**College of Biotechnology/ Department of Genetic Engineering**

**YEAR:** Third

**SUBJECT:** Cloning Vector

**THEORITICAL HOURS:** 2

**PRACTICAL HOURS:** 2

**UNITS:** 3

**Course module description:**

This course is a required course designed for the third level students at the department of Genetic Engineering. The course will provide the students with the basic biological and technical principles with regard to the field of gene cloning and its application in the various fields of biotechnology.

**(Theoretical Syllabus)**

<b>week</b>	<b>Basic material to be covered</b>	<b>Hours</b>
1	Basic and support material to be covered	2
2	Introduction, The basic principles of gene cloning	2
3	Importance of gene cloning	2
4	Plasmids and Bacteriophages	2
5	Plasmids and Bacteriophages	2
6	Purification of DNA from living cells	2
7	Purification of DNA from living cells	2
8	Manipulation of purified DNA	2
9	Introduction of DNA into living cells	2
10	How to study a cloned gene, How to obtain a clone of a specific gene.	2
11	Cloning vectors for E. coli	2
12	Cloning vectors for organisms other than E. coli	2
13	Applications of gene cloning in biological research	2
14	Past and potential uses of gene cloning in research	2

15	Production of proteins from cloned genes , Applications of gene cloning in biotechnology	2
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**Cloning Vector ..... (Practical Syllabus)**

week	Basic material to be covered	Hours
1	Subject will be covered	2
2	Orientation & Introduction	2
3	principles of gene cloning	2
4	Plasmids and Bacteriophages	2
5	Plasmids and Bacteriophages	2
6	Purification of DNA from different living cells	2
7	Purification of DNA from different living cells	2
8	Introduction of DNA into living cells	2
9	Introduction of DNA into living cells	2
10	How to obtain a clone of a specific gene	2
11	How to study a cloned gene	2
12	Applications of gene cloning in microorganisms cells	2
13	Applications of gene cloning in animals cells	2
14	Applications of gene cloning in plant cells	2
15	Applications of gene cloning in biotechnology	2

**Text Books :**

**References :**

## Al-Qasim Green University

### College of Biotechnology/ Department of Genetic Engineering

**YEAR:** Third

**SUBJECT:** Enzymology

**THEORITICAL HOURS:** 2

**PRACTICAL HOURS:** 2

**UNITS:** 3

#### Course module description:

This course will introduction the enzymology . Syllabus of this course will emphasize on the development specificity methods for extraction, isolation and purification of enzymes . This course will emphasize on mechanisms of enzyme action, enzyme inhibitions and multi-substrate reactions - mechanisms as well as allosteric regulation of enzymes . this course also emphasize on Immobilized enzymes and Commercial production of enzymes such as amylases, proteases, cellulose, artificial enzymes, industrial applications.

#### (Theoretical Syllabus)

week	Basic material to be covered	Hours
1	Introduction, enzyme classification & nomenclature of enzymes (IUB(	2
2	Enzyme extraction, isolation	2
3	Enzyme extraction, isolation	2
4	purification of enzyme by various methods	2
5	purification of enzyme by various methods	2
6	Mechanism of enzyme action - concept of active site	2
7	Energetic of enzyme substrate complex formation, specificity of enzyme action	2
8	kinetics of single substrate reactions - turnover number - estimation of Michaelis - Menten's parameters	2
9	multi-substrate reactions - mechanisms & kinetics; allosteric regulation of enzymes	2
10	Enzyme inhibitions - kinetics of competitive, non-competitive & uncompetitive inhibitions, nucleophilic & electrophilic attack; role of metal ions in enzyme catalysis	2
11	Immobilized enzymes - principles & techniques of immobilization	2
12	Commercial production of enzymes; amylases, proteases, cellulose, artificial enzymes, industrial applications, fermentation, enzymes modification, site directed mutagenesis; immobilized enzyme in industrial processes	2
13	Commercial production of enzymes; amylases, proteases, cellulose, artificial enzymes, industrial applications, fermentation, enzymes modification, site directed mutagenesis; immobilized enzyme in industrial processes	2
14	Structure and function of coenzyme - reactions involving TPP, pyrodoxal phosphate, nicotinamide, flavin nucleotide, coenzyme A and biotin	2
15	Industrial utilization of enzymes, food, detergents, energy, waste treatment, pharmaceuticals and medicine	2

**Enzymology ..... (Practical Syllabus)**

<b>week</b>	<b>Basic material to be covered</b>	<b>Hours</b>
1	Introduction . equipments of course	2
2	Enzymes extraction	2
3	Enzymes extraction	2
4	Enzyme extraction	2
5	Enzyme purification	2
6	Enzyme purification	2
7	Enzyme purification	2
8	Mechanism of enzyme action and reaction	2
9	Mechanism of enzyme action and reaction	2
10	estimation of Michaelis - Menten's parameters	2
11	multi-substrate reactions - mechanisms	2
12	Immobilized enzymes & techniques of immobilization	2
13	Commercial production of enzymes; amylases, proteases, cellulose, artificial enzymes, industrial applications, fermentation	2
14	Industrial utilization of enzymes, food, detergents, energy, waste treatment, pharmaceuticals and medicine	2
15	Industrial utilization of enzymes, food, detergents, energy, waste treatment, pharmaceuticals and medicine	2

**Text Books :**

**References :**

**Al-Qasim Green University**

**College of Biotechnology/ Department of Genetic Engineering**

**Year:** third

**Subject:** food microbiology

**Theoretical hours :**2

**Practical hours:** 2

**Units :** 3

**course description :** this course include accurately measure growth, survival, and death of microbes in food and water, understanding of the metabolic basis for food preservation and fermentation., recognizing the symptoms, epidemiology, and pathogenesis of food borne infections and critical evaluation of methods for detection, enumeration, and control of food borne pathogens.

### **Theoretical syllabus**

<b>week</b>	<b>Basic material to be covered</b>	<b>Hours</b>
1	Physiology, Growth , Introduction	2
2	Spores	2
3	Indicator Organisms, Disinfection	2
4	Meat, Poultry, Seafood , Disinfection	2
5	Milk /Dairy Products	2
6	Mid exam	2
7	Produce , Media preparation	2
8	Produce , Media preparation	2
9	Fermented Dairy	2
10	Fermented Dairy	2
11	Fermented Foods , Enumeration-Plate count	2
12	Fermented Foods , Enumeration-Plate count	2
13	Beer/Wine , Enumeration- Plate count	2
14	Beer/Wine , Enumeration- Plate count	2
15	Beer/Wine , Enumeration- Plate count	2

**(Practical Syllabus)**

<b>week</b>	<b>Basic material to be covered</b>	<b>Hours</b>
1	Preservation of food : physical	2
2	Preservation of food : chemical	2
3	Preservation of food : biological	2
4	Pathogenesis of food , protozoa	2
5	Pathogenesis of food , Mycotoxins and Helminths	2
6	Pathogenesis of food , Mycotoxins and Helminths	2
7	Mid exam	2
8	<i>Bacteria in food ,Staphylococcus aureus</i>	2
9	<i>Listeria monocytogenes</i>	2
10	<i>Bacillus spp</i>	2
11	<i>Clostridia spp</i>	2
12	<i>Salmonella enterica</i>	2
13	<i>Escherichia coli spp</i>	2
14	<i>Campylobacter spp, Shigella</i>	2
15	<i>Vibrios spp</i>	2

**Text Books :**

**References :**

Anita C. Wright ( 2007) Food Microbiology: Fundamentals and Frontiers. 4th edition.  
ASM



**Al-Qasim Green University**

**College of Biotechnology/ Department of Genetic Engineering**

**YEAR:** Third

**SUBJECT:** Immunology

**THEORITICAL HOURS:** 2

**PRACTICAL HOURS:** 2

**UNITS:** 3

**Course module description:**

Basic Immunology: An introduction to the immune system, with emphasis on mammalian models. Lecture includes discussions on generation of humoral and cell-mediated immune responses, antigen and antibody structure and function, transplantation and tolerance, and immunopathologies.

**(Theoretical Syllabus)**

<b>week</b>	<b>Basic material to be covered</b>	<b>Hours</b>
1	Introduction to immunology, History and Overview of innate and adaptive	2
2	Cells of the immune system, Organs of the immune system, Innate immunity, Adaptive immunity	2
3	Antigens, Antibodies – structure, Antibodies – classes	2
4	Major Histocompatibility complex	2
5	Antigen processing and presentation	2
6	(T cell receptor, T cell maturation,	2
7	B cell generation/mat,uration , T-Cell & b-Cell Activation,	2
8	Immune effectors mechanisms: complement,	2
9	Immune effectors mechanisms: cellular immunity, Hypersensitivity reactions – Type I & type II,	2
10	Transplantation immunology , Cancer and the immune system	2
11	Generation of B cells–their Selection and Heterogeneity	2
12	Immune Response to Bacteria & viruses	2
13	Hypersensitivity and immunologic Injury mucosal Immunology, Humoral Immune Response	2
14	Mechanisms of Tolerance and Autoimmunity	2
15	Diagnostic Immunology	2

## Immunology ..... (Practical)

### Course module academic calendar

week	Basic material to be covered	Hours
1	Introduction of Immune Lab, Laboratory Safety/ Student Surveys/Use of Micropipettes	2
2	Immunological Lab Equipments: Haemocytometer, ELISA reader, Gamma Coounter, Electrophoresis unit,	2
3	Making Buffers, Experimental Design, Immunohistology and Cell Counting	2
4	Immuno-precipitation	2
5	Ouchterlony's immuno diffusion technique	2
6	Counter current immuno-electrophoresis	2
7	Agglutination: Haemagglutination & Blood typing / grouping	2
8	Enzyme linked immunosorbant assay(ELISA), Western Blots,	2
9	Immunoglobulins purification -1	2
10	Immunoglobulins purification-2	2
11	Differential (Identification of cell types) & Total leukocyte counts of blood	2
12	Isolation & Viability determination of Lymphocytes from peripheral blood.	2
13	Lymphocyte proliferation with mitogen and migration with capillary tubes	2
14	Identification of cell types by receptors – Rose test, Immunofluorescence.	2
15	Raising of antibodies in animals – Polyclonal antibodies.	2

### Text Books

### References



University of Qasim  
College of Biotechnology  
Department of Genetic Engineering  
Molecular Genetics Course ,third year Student/2016-2017

Professor Ibrahim M S Shnawa, Ph.D.

#### Syllabus

1-Objectives of Molecular Genetics.

2-DNA structure ,Replication .

3-RNA transcription, translation.

4-MicroRNAs.

5-Regulation of Gene expression; Splicing ,Ulternative Splicing ,Silencing, enhancing.

5-Gene structure, gene regulatory circutes, regulons.

6-Chromosome.

7-Genome

8-Genomics

9-Transcriptomics

10 Proteomics

11-Extranuclear nuclear Genetic materials.

12-Mobilome

13-Molecular genetic disease.

#### References

- 1-Miglani G,2015,Essentials of Molecular Genetics ,Alpha Science international, Oxford Press, Oxford U.K.
- 2-Pasterrank JJ,2005,An introduction to Human Molecular Genetics, Mechanisms of Inherited diseases,2<sup>nd</sup> ed. Wiley.

University of Qasim  
College of Biotechnology

Department of Genetic Engineering

Practical Molecular Genetic Course, Third year students,2016-2017

Professor Dr. Ibrahim M S Shnawa

Syllabus

I-Molecular Genetics of Proteins

Lab.1;Separation of Protein

Lab.2;Dialysis of the separated proteins

Lab.3;Determination of Protein Concentration

Lab4;Film or Microsoft materials about protein electrophoresis and or AA acid sequencing.

II-Molecular Genetics of Nucleic Acids

Lab5; Total DNA separation ,precipitation

Lab.6;DNA determination of Concentration

Lab 7;DNA electrophoresis

Lab 8 Film or Microsoft material about PCR or Microarray technique

References

1-Chowdhury MR, Shastri SS, Kabara M,2014,Laboratory Manual for Molecular Genetic Tests,Jaypee,The Health Science Publishers.

University of Qasim  
College of Biotechnology  
Department of Genetic Engineering  
Molecular Genetics Course ,third year Student/2016-2017

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5-Gene structure, gene regulatory circutes, regulons.

6-Chromosome.

7-Genome

8-Genomics

9-Transcriptomics

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11-Extranuclear nuclear Genetic materials.

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#### References

- 1-Miglani G,2015,Essentials of Molecular Genetics ,Alpha Science international, Oxford Press, Oxford U.K.
- 2-Pasterrank JJ,2005,An introduction to Human Molecular Genetics, Mechanisms of Inherited diseases,2<sup>nd</sup> ed. Wiley.

University of Qasim  
College of Biotechnology

Department of Genetic Engineering

Practical Molecular Genetic Course, Third year students,2016-2017

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Syllabus

I-Molecular Genetics of Proteins

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II-Molecular Genetics of Nucleic Acids

Lab5; Total DNA separation ,precipitation

Lab.6;DNA determination of Concentration

Lab 7;DNA electrophoresis

Lab 8 Film or Microsoft material about PCR or Microarray technique

References

1-Chowdhury MR, Shastri SS, Kabara M,2014,Laboratory Manual for Molecular Genetic Tests,Jaypee,The Health Science Publishers.

**Al-Qasim Green University**

**College Of Biotechnology - Department Of Genetic Engineering**

**Course title : Virology**

**Course level : undergraduate**

**Number of units : 3**

**Course Description:**

**This course will introduction the virology , morphology , structures ,epidemiology and pathogenesis of viruses . we will emphasize on the development life cycle or replication of viruses . we will emphasize on effects of viruses on host especially herpes virus ,poxvirus ,hepitis virus,influenza and Human immunodeficiency virus. Syllabus will cover some aspects of genetics composition of viruses and study the viruses that cause cancerand how using the viruses as vaccine .**

**Theoretical syllabus**

week	Subject	Hrs
1	Introduction	2
2	Morphology ,symmetry and strucures of viruses	2
3	Scientific nomenclature and classification,physical and chemical properties	2
4	Pathogenesis and replication methods of viruses	2
5	Effects of viral infection on host and transmission	2
6	Bacteriophage , morphology andreplication methods	2
7	Viruses groups and humaninfection , poxviruses family	2
8	Herpes viruses family	2
9	Orthomyxoviridae or Influenza viruses family	2
10	Parainfluenza viruses family , mumps and measles	2
11	Hepitis viruses	2
12	Viruses and cancer	2
13	Viruses of nervous system, rabies virus	2
14	HIV ,Genetic of viruses	2
15	Viruses and vaccines	2

## Practical syllabus

week	Subject	Hrs
1	Defintion , structure ,size and chemical composition f viruses	2
2	Virology labs . Equipping	2
3	Reaction of viruses to physical and chemical agents	2
4	Cultivation of viruses on cell culture techneque	2
5	Cultivation of viruses in chicken embryos	2
6	Quantification of virus by Haemaaglutination	2
7	Detection of viruses in clinical specimens	2
8	Serological diagnosis & Immunological detection of viruses infection	2
9	Serological diagnosis & Immunological detection of viruses infection	2
10	Detection by Neutralization	2
11	Detection by Electron microscope	2
12	Detection by Hamaaglutination inhibition (Hi)	2
13	Detection by Hamaaglutination inhibition (Hi)	2
14	Detection by enzyme linked immunosorbent assay(ELISA)	2
15	Detection by Immunoflouresence and Immunodiffution assay	2

### Methods of instruction

- 1- using the lecture method with participation the pupils in discussion.
- 2- using of recent methods in presentation the lectures by power point .
- 3- coordination of concepts of practical expermenits withtheoreticalconcepts .

### Course degrees distribution :

### Refrencess :

- 1- Rechar,d,A.; Cynthia,N. and Bruce ,D.(2013). *Micobiology . Lippincott Willilams & Wilkins. Third edition .*
- 2- Jawetz, Melnick, & Adelberg's (2010).*Medical Microbiology, Twenty-Fifth Editionby The McGraw-Hill Companies.*



**3- Deseberger,U.(1995). Medical virology . practical approach .IRL.press .U.K.**

**Al-Qasim Green University**

**College of Biotechnology/ Department of Genetic Engineering**

**YEAR:** FIRST

**SUBJECT:** General Biology (Plant)

**THEORITICAL HOURS:** 3

**PRACTICAL HOURS:** 3

**UNITS:** 4.5

**General Biology ..... Theoretical Syllabus..... First Semester**

**Course module description:**

This course is equivalent introduction of Biology and the aims of this course are to give a principle an understanding of biological processes and to give a number of fundamental biological terms. To help, students review the scientific method, microscope use, and basic cell biology.

**Course/module academic calendar**

<b>Week</b>	<b>Basic material to be covered</b>	<b>Hours</b>
1	<b>Plant kingdom ( Overview)</b>	3
2	The important of plant , Energy Producer	3
3	<b>Main Characteristics of Life-1:</b> ,Reproduction evolution	3
4	<b>Main Characteristics of Life -1:</b> Heredity	3
5	<b>Plant Morphology</b>	3
6	<b>Plant Taxonomy -1:</b> Binomial Nomenclature	3
7	<b>Plant Taxonomy -2:</b> Binomial Nomenclature	3
8	<b>Plant Tissues:</b> Leaf , Stem	3
9	<b>Plant Tissues:</b> root ,dicot	3
10	<b>Plant movement:</b> geotropism ,Phototropism	3
11	<b>Plant Physiology:</b> Hormones	3
12	<b>Plant Physiology:</b> Photosynthesis	3
13	<b>plant ecology:</b> Mesophyte , Xerophyte	3
14	<b>Plant Pathology:</b> Disease & host Risk	3

15	<b>Plant Pathology:</b> Disease & host Risk	3
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**General Biology (Plant) ..... Practical Syllabus..... First Semester**

**Course/module academic calendar**

<b>Week</b>	<b>Basic material to be covered</b>	<b>Hours</b>
1	Microscope	3
2	Plant Cell ( Live & non- live components )	3
3	Plant Cell structure	3
4	Mitosis	3
5	Primary Meristem	3
6	Epidermis	3
7	Dicotyledons & Monocotyledones	3
8	Parenchymal Tissue	3
9	Collenchymas Tissue	3
10	Sclerenchyma tissue	3
11	Xylem	3
12	Phloem	3
13	Root,	3
14	Stem	3
15	Leaf & Flower	3

**References :**

- 1-Dickison, W. C. 2000. *Integrative Plant Anatomy*. Academic Press.
- 2-Meicenheimer, R. D. (2005). *Electronic Plant Anatomy Laboratory Exercises*.
- 3-Meicenheimer, R. D. 2005. *CD-ROM Plant Cell Expert System*.

**Al-Qasim Green University**

**College of Biotechnology/ Department of Genetic Engineering**

**YEAR:** FIRST

**SUBJECT:** Physics (1)

**THEORITICAL HOURS:** 2

**PRACTICAL HOURS:** 2

**UNITS:** 3

**Physics (1)..... Theoretical Syllabus... First Semester**

**Course module description:**

This course will explore topics in bio-electricity based on the classical theory of electricity and magnetism and will introduce nuclear physics in biology and medicine. Topics in electricity and magnetism will include: neuro-biophysics (nerve signals, action potentials, synapses, brain); electrical stimulation of the heart; molecular nature of vision and hearing; diffusion; membrane potential; fluorescence in bio-molecules; lasers in biology and medicine.

**Course/module academic calendar**

<b>Week</b>	<b>Basic material to be covered</b>	<b>Hours</b>
1	Terminology (Biophysics, Medical Physics, Physical Medicine, Physical Therapy.	2
2-3	Introduction to Biophysics: Historical overview, Connections with physics, Biology and Medicine.	4
4-5	Principle of Measurement. Physical units of measurement, their systems., ways to express it.	4
6-7	Fundamental notions of Dynamics: Mass, Acceleration, Force, Stress, Pressure.	4
5-6	The SI system. Measurement Uncertainty	4
8	The Newton's laws	2
9	Rotational Motion	2
10-11	Newton's Second Law	4
12-13	Kinetic energy of rotation	4
14-15	Heat ,	4

**Physics (1)..... Practical Syllabus... First Semester**  
**Course/module academic calendar**

<b>Week</b>	<b>Basic material to be covered</b>	<b>Hours</b>
1	Viscosity of liquids	2
2-3	Focal length of Convex Lens (Graphical Methods)	4
3-4	Ohm's Law	4
5-6	Boyle's Law	4
7-8	Semiconductors (Junction diode)	4
9-10	Resonance Frequency	4
11-12-13	The Focal length of Converging Lens (displacement Method)	6
14-15	Wheatston Bridge	4

**Text books:**

Nico A.M. Schellart (2008) Physics in biology & medicine, academic press, 3rd edition, 2008, Compendium of Medical Physics, Medical Technology and Biophysics, 2<sup>nd</sup> edition,

**Al-Qasim Green University**

**College of Biotechnology/ Department of Genetic Engineering**

**year : First**

**Subject : Statistics**

**Theoretical : 2**

**Units: 2**

**Statistics..... Theoretical Syllabus**

**Course/module academic calendar**

<b>Week</b>	<b>Basic material to be covered</b>	<b>Hours</b>
1	Biostatistics - definition - statistical methods - basic principles.	2
2-3	Variables - measurements, functions, limitations and uses of statistics.	4
4	Collection of data primary and secondary	2
5	types and methods of data collection procedures - merits and demerits.	2
6	Classification - tabulation and presentation of data - sampling methods.	4
7	Measures of central tendency - mean, median, mode, geometric mean - merits & demerits	
8	Discrete Probability Distribution Measures of central tendency - mean, median, mode, geometric mean - merits & demerits.	2
9	Measures of dispersion - range, standard deviation, mean deviation, quartile deviation - merits and demerits; Co-efficient of variations.	
10	Correlation - types and methods of correlation,	4
11	regression, simple regression equation, fitting prediction, similarities and dissimilarities of correlation and regression.	2
12	Tests of Hypothesis , Z- distribution	2
13	T- Distribution	2

**References:**

Bickel, Peter J., and Kjell A. Doksum(2015). *Mathematical Statistics: Basic Ideas and Selected Topics, Volume 1*. 2nd edition. Chapman and Hall / CRC,

**Al-Qasim Green University**

**College of Biotechnology/ Department of Genetic Engineering**

**Year:** first

**Subject:**Principles of Genetic Engineering

**Theoretical hours:** 2

**Practical hours:** 2

**Units:**3

**Course description:**The purpose of this course is to introduce students to basic molecular biological concepts and techniques used in the fields of genetic engineering. Current experimentations and practical progress in this field as well as ethical considerations of this research will be discussed.

**(Syllabus)**

<b>week</b>	<b>Basic material to be covered</b>	<b>Hours</b>
1	Introduction and Molecular definitions	2
2	The structural organization of eukaryotic chromosome	2
3	Molecular Structure of DNA and RNA	2
4	DNA replication	2
5	Mid exam	2
6	Gene structure	2
7	Central dogma: Transcription, Translation	2
8	Regulation	2
9	Recombinant DNA Technology : Restriction enzymes	2
10	Gene cloning using vectors	2
11	Transformation	2
12	Hosts	2
13	DNA amplification	2
14	Gel electrophoresis technique	2
15	Applications of genetic engineering	2

**(Practical Syllabus)**

<b>week</b>	<b>Basic material to be covered</b>	<b>Hours</b>
1	Equipments	2
2	Liquids and buffers	2
3	Handlings and safety	2
4	Agarose gel	2
5	Dyeing	2
6	Mid exam	2
7	DNA isolation Kits	2
8	DNA isolation technique	2
9	DNA purification technique	2
10	Gel electrophoresis technique	2
11	PCR technique	2
12	DNA storing and caring	2
13	DNA sequencing	2
14	RFLP	2
15	RAPD	2

**References:**

1. Anderson M. 2012. A closer look at genes and genetic engineering. Britannica Educational Publishing.
2. Brooker, Robert J. 2012. GENETICS: ANALYSIS & PRINCIPLES, 4<sup>th</sup> ed. McGraw-Hill Companies, Inc., 1221 Avenue of the Americas, New York, NY 10020.
3. Glick, B.R., Pasternak, J.J. and Patten, C.L. 2010. Molecular Biotechnology, 4th ed. ASM Press, 1752 N St. NW, Washington, DC 20036-2904, USA.
4. Larramendy M.L. and Soloneski S. 2016. Nucleic Acids from Basic Aspects to Laboratory Tools. 1<sup>st</sup> ed. ExLi4EvA Publishing.
5. Misra, A.K. 2011. Fundamentals of Cell and Molecular Genetics. Panima Publishing Corporation, New Delhi.



6. Hartwell,L.H.,Hood,L.,Goldberg,M.L.,Reynolds,A.E.,Silver,L.M.  
2011.Genetics from genes to genomes,4<sup>th</sup>ed.McGraw-Hill  
Companies, Inc., 1221 Avenue of theAmericas, New York, NY  
10020.

Al-Qasim Green University

College of Biotechnology/ Department of Genetic Engineering

المرحلة : الاولى  
المادة : حقوق انسان  
عدد الساعات : 2  
عدد الوحدات : 2

الفصل الاول

عدد الاسابيع	
15	حقوق انسان - النظري
	التطور التاريخي لحقوق الانسان
	تعريف حقوق الانسان
	انواع حقوق الانسان
	ضمانات احترام وحماية حقوق الانسان
	حماية حقوق الطفولة في الشريعة الاسلامية والقانون الوضعي
	حقوق الانسان بين الشريعة الاسلامية والفكر القانوني
15	المجموع الكلي للساعات

